



CHANGES IN COGNITIVE REAPPRAISAL AND EXPRESSIVE SUPPRESSION AS PREDICTORS OF EMOTIONAL WELL-BEING FOLLOWING A SCHOOL-BASED SEL INTERVENTION

Shaily Rai¹, Ajay Sharma², Vivek Yadav³, Rajendra Bhati⁴

¹Clinical Psychologist, Department of Clinical Psychology,
MAN College of Special Education and Psychological Studies, Guna, Madhya Pradesh

²Assistant Professor, Department of Clinical Psychology,
MAN College of Special Education and Psychological Studies, Guna, Madhya Pradesh

³Psychiatrist, Department of Psychiatry, Charak Hospital, Bhopal, Madhya Pradesh

⁴Psychiatrist, Department of Clinical Psychology, MAN College of Special Education and Psychological Studies,
Guna, Madhya Pradesh

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ABSTRACT

School-based social and emotional learning (SEL) programs may contribute to children's emotional well-being by strengthening adaptive emotion-regulation strategies and decreasing excessive reliance on expressive suppression. However, empirical evidence concerning culturally adapted SEL interventions for Indian primary-school students remains comparatively scarce.

This study examined changes in cognitive reappraisal, expressive suppression, positive affect, and negative affect following participation in the five-week, 20-session SEED Curriculum. It also outlined an individual-level analytical framework for determining whether changes in emotion-regulation strategies predict emotional well-being after the intervention.

A single-group quasi-experimental pre-test/post-test design was used with 80 Grade 4 students aged 8–9 years who attended English-medium schools affiliated with the Central Board of Secondary Education in India. Positive and negative affect were measured using a short-form version of the Positive and Negative Affect Schedule, whereas cognitive reappraisal and expressive suppression were assessed using a child-adapted Emotion Regulation Questionnaire. Paired-samples *t* tests and standardized within-participant effect sizes were reconstructed from the aggregate statistics presented in the source dissertation.

Mean positive affect increased from 24.63 (SD = 3.87) at pre-test to 29.21 (SD = 4.14) at post-test, $t(79) = 8.12$, $p < .001$, $d_{\text{sub}z} = 0.91$. Mean negative affect declined from 18.38 (SD = 4.02) to 14.32 (SD = 3.47), $t(79) = -6.87$, $p < .001$, $d_{\text{sub}z} = -0.77$. Cognitive reappraisal increased from 20.46 (SD = 4.33) to 25.10 (SD = 3.98), $t(79) = 7.24$, $p < .001$, $d_{\text{sub}z} = 0.81$. In contrast, expressive suppression decreased from 22.31 (SD = 3.71) to 18.59 (SD = 3.92), $t(79) = -5.93$, $p < .001$, $d_{\text{sub}z} = -0.66$. These aggregate results demonstrate a consistent pattern of favorable change in affective outcomes and emotion-regulation strategy use. Nevertheless, predictive regression analyses could not be conducted because participant-level data were unavailable.

Participation in the intervention was associated with substantial favorable changes between pre-test and post-test. However, the findings require confirmation using verified participant-level data, a suitable comparison group, psychometrically validated child measures, and baseline-adjusted regression or mediation analyses before it can be concluded that changes in cognitive reappraisal and expressive suppression predict children's emotional well-being.

KEYWORDS: Social and Emotional Learning; Cognitive Reappraisal; Expressive Suppression; Positive Affect; Negative Affect; School Mental Health; Primary-School Children; India.

1. INTRODUCTION

Social and emotional learning (SEL) has emerged as an important developmental and preventive approach within education because it provides explicit instruction in recognizing emotions, regulating behavior, understanding the perspectives of others, forming constructive relationships, and making responsible decisions. The current framework proposed by the Collaborative for Academic, Social, and Emotional Learning identifies five interconnected areas of competence: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (Collaborative for

Academic, Social, and Emotional Learning [CASEL], 2020). Rather than positioning emotional development as separate from academic learning, SEL conceptualizes social, emotional, and cognitive processes as interdependent elements of effective learning and healthy child development.

A substantial international evidence base supports universal school-based SEL. In a landmark meta-analysis of 213 school-based interventions, Durlak et al. (2011) reported improvements in students' social-emotional competencies, attitudes, behavior, emotional distress, and academic performance. Subsequent follow-up research suggested that



some benefits may remain after formal program completion and that post-intervention social-emotional competence may be associated with later well-being (Taylor et al., 2017). More recently, a meta-analysis incorporating 424 studies from 53 countries and more than 575,000 students identified favorable effects on social-emotional skills, attitudes, behavior, peer relationships, school functioning, school climate, and academic outcomes. However, it also documented considerable variation in program content, implementation quality, and cultural context (Cipriano et al., 2023). These findings support a shift from asking whether SEL is generally effective toward examining the mechanisms through which it operates, the populations for whom it is most beneficial, and the emotional processes that may explain improvements in well-being.

Emotion regulation represents one potential mechanism through which participation in SEL may influence emotional well-being. Emotion regulation refers to the processes by which individuals shape the emotions they experience, the circumstances in which those emotions occur, and the manner in which they are expressed or experienced (Gross, 1998, 2015). The process model of emotion regulation distinguishes strategies according to the stage at which they intervene in the development of an emotional response. Cognitive reappraisal is an antecedent-focused strategy that involves changing the interpretation of an emotionally significant situation before the emotional response becomes fully established. Expressive suppression, by contrast, is a response-focused strategy that involves limiting the visible expression of an emotional reaction that has already been activated. Although these strategies are not direct opposites, they tend to demonstrate different average relationships with affective and interpersonal functioning.

Evidence from both adult and youth populations generally associates habitual cognitive reappraisal with higher positive affect, lower negative affect, and stronger indicators of psychological functioning. Habitual expressive suppression, in contrast, is frequently associated with reduced positive affect, greater emotional distress, and less favorable social outcomes (Gross & John, 2003; Hu et al., 2014). A meta-analysis examining emotion regulation and mental health found that reappraisal was positively related to favorable indicators of mental health and negatively related to adverse indicators, whereas suppression generally demonstrated the reverse pattern. However, the strength and even the direction of associations involving suppression varied across cultural settings (Hu et al., 2014). Meta-analytic findings have also linked suppression with poorer relationship quality and weaker social support (Chervonsky & Hunt, 2017), while a systematic review associated greater reliance on suppression with lower positive affect (Fernandes & Tone, 2021). These cultural qualifications are particularly important in collectivistic contexts, where moderated emotional expression may sometimes protect relationships or support social obligations. Suppression should therefore not automatically be classified as maladaptive in every situation.

Emotion-regulation capacities continue to develop throughout middle childhood. Between approximately 8 and 10 years of age, children become increasingly capable of recognizing mixed emotions, understanding that thoughts can influence feelings, anticipating the social consequences of behavior, and selecting strategies according to contextual

demands. These developmental advances make the primary-school years an appropriate period for explicit teaching in emotional vocabulary, perspective-taking, problem-solving, cognitive reframing, and constructive emotional expression.

Emotion-regulation skills are also directly relevant to classroom participation. They support sustained attention, persistence during difficult tasks, interaction with peers, coping with evaluation, and recovery from frustration. However, the usefulness of any particular strategy depends on its compatibility with the emotional and interpersonal context. Instruction should therefore emphasize flexible strategy selection rather than teaching children that one regulatory strategy is universally desirable and another is always inappropriate.

School-based interventions may influence emotion regulation through several complementary pathways. Storytelling, role play, facilitated discussion, emotion labeling, reflective drawing, and cooperative problem-solving may help children recognize emotional cues, identify their interpretations of events, generate alternative perspectives, and practise effective communication. The SAFE principles—sequenced, active, focused, and explicit instruction—are widely regarded as key characteristics of high-quality SEL delivery (CASEL, 2020).

Reviews of school-based emotion-regulation interventions generally identify small-to-moderate improvements. Nevertheless, they also highlight recurring methodological weaknesses, including inconsistent measurement, limited follow-up periods, variable implementation fidelity, and inadequate planning of sample size (Pedrini et al., 2022). A recent meta-analysis of psychosocial interventions involving children and young people likewise reported small-to-medium effects on emotion regulation and mental-health outcomes. These findings support emotion regulation as a meaningful intervention target while cautioning against assuming equivalent effects across programs, populations, and settings (Espenes et al., 2025).

Evidence directly connecting intervention-related changes in reappraisal and suppression with improvements in youth well-being is beginning to develop. In a randomized preventive intervention involving primary-school children, expressive suppression mediated the effect of the program on worry (Johnstone et al., 2020). Among treatment-seeking young people, reductions in suppression and increases in reappraisal occurred alongside decreases in anxiety following cognitive-behavioral therapy, although the temporal and causal relationships among these changes required further investigation. Research conducted in adolescents' daily lives has also suggested that reappraisal may predict subsequent positive affect, providing a plausible short-term pathway through which regulation strategies influence emotional experience.

Taken together, these findings support the possibility that changes in emotion regulation may represent more than secondary outcomes occurring alongside intervention effects. They may constitute one of the processes through which emotional well-being improves.

The Indian educational context requires focused examination. India's National Education Policy 2020 emphasizes holistic development, experiential learning, health, well-being, and the cultivation of social and emotional



capacities within formal education (Ministry of Education, Government of India, 2020). Despite this policy emphasis, systematic research on school-based SEL in India remains less extensive than the international evidence base, particularly with respect to primary-school children and culturally adapted interventions.

Recent Indian research has contributed to the measurement of positive and negative affect among young populations (Kumar et al., 2025), while school-based mental-health initiatives increasingly incorporate emotion regulation, mindfulness, relationship skills, and help-seeking. However, locally grounded evidence concerning young children, short-duration structured curricula, and the mechanisms underlying intervention-related change remains limited.

The SEED Curriculum was developed as a culturally sensitive, activity-based SEL intervention intended to strengthen self-awareness, relationship skills, and emotion regulation within Indian school contexts. In the source study, 80 Grade 4 students participated in 20 sessions delivered over five weeks. The reported outcomes included positive affect, negative affect, cognitive reappraisal, and expressive suppression, allowing coordinated change in emotional experience and regulation strategy use to be examined.

However, any claim that changes in cognitive reappraisal and expressive suppression predict emotional well-being requires participant-level covariance data. Group means, standard deviations, and paired-samples *t* statistics can demonstrate average change across the sample, but they cannot establish whether children showing greater increases in reappraisal or larger decreases in suppression also experienced stronger improvements in positive affect or reductions in negative affect.

Accordingly, the present manuscript has two related objectives. The first is to report the magnitude and statistical significance of pre-test/post-test changes in cognitive reappraisal, expressive suppression, positive affect, and negative affect using the aggregate findings available in the source dissertation. The second is to define a transparent, baseline-adjusted analytical framework that can be applied once an anonymized participant-level dataset becomes available.

The study hypotheses were as follows: positive affect would increase after the intervention (H1); negative affect would decrease (H2); cognitive reappraisal would increase (H3); expressive suppression would decrease (H4); and increases in reappraisal together with decreases in suppression would predict more favorable post-intervention affect after adjustment for baseline affect (H5). Hypotheses 1–4 can be examined using the available aggregate statistics. Hypothesis 5 cannot be tested validly without access to participant-level data.

2. METHOD

2.1 Study Design

The study adopted a single-group quasi-experimental pre-test/post-test design. All participants completed the outcome measures before receiving the intervention, participated in the SEED Curriculum, and completed the same assessments immediately after the final session.

This design may be appropriate for an initial pilot or feasibility evaluation when random assignment is unavailable. However, it is susceptible to several threats to internal validity, including maturation, historical events, repeated-testing effects, regression toward the mean, expectancy effects, and changes in the classroom environment. The observed differences are therefore described as changes associated with participation in the intervention rather than as definitive evidence of a causal effect.

The present manuscript represents a structured secondary analysis and journal-format reconstruction based on aggregate statistics reported in the source dissertation. No participant-level response dataset, item-level scoring file, reliability analysis, missing-data record, or school-cluster identifier was available. In addition, the results chapter of the source dissertation characterized the reported statistics as hypothetical.

The analyses presented in this manuscript should therefore be interpreted as a transparent reconstruction of the reported results rather than as an independent verification of the underlying data.

2.2 Participants and Setting

The sample consisted of 80 Grade 4 students between 8 and 9 years of age. Both boys and girls participated, although the precise distribution according to sex was not reported in the available documentation.

Participants were recruited through purposive sampling from English-medium schools affiliated with the Central Board of Secondary Education and located near the researcher's institution in India. Eligibility criteria included being 8–9 years of age, enrollment in Grade 4, regular school attendance, and receipt of parental or guardian consent. Children with diagnosed developmental disorders or special educational needs were excluded, as were participants who were absent from more than two of the 20 intervention sessions.

Although purposive recruitment facilitated practical implementation of the program, it restricts the external validity of the findings. The results may not be generalizable to children attending government schools, rural institutions, vernacular-medium schools, or schools in regions with different cultural and socioeconomic characteristics. They may also not apply to children with disabilities, students from other age groups, or populations receiving education under substantially different institutional conditions.

School-level clustering could not be incorporated into the analysis because the aggregate report did not provide the exact number of participating schools or the distribution of students across schools.



Table 1: Study design, participants, and intervention characteristics

Domain	Reported characteristic	Implication for interpretation
Design	Single-group pre-test/post-test quasi-experiment	Supports within-group change estimates; does not isolate causal effects.
Sample	N = 80 Grade 4 students; age 8-9 years	Adequate for paired comparisons; limited for complex prediction models.
Setting	English-medium CBSE-affiliated schools in India	Contextually relevant but geographically and institutionally restricted.
Sampling	Purposive sampling	Possible selection bias and limited population generalizability.
Intervention dose	20 sessions over five weeks; four sessions per week	Relatively intensive short-duration exposure.
Delivery	Small groups of approximately 10-15 students; researcher-facilitated	Potentially supports engagement; facilitator and expectancy effects are possible.
Activities	Storytelling, role play, reflective drawing, emotional charades, guided discussion	Consistent with active and explicit SEL pedagogy.
Follow-up	Immediate post-test only	Durability of effects is unknown.
Data available for this manuscript	Aggregate means, SDs, and paired t values	Prediction and mediation cannot be estimated or independently verified.

Note. CBSE = Central Board of Secondary Education; SEL = social and emotional learning.

2.3 Intervention

The SEED Curriculum Activity Manual constituted the intervention evaluated in the study. The program consisted of 20 sessions implemented over a five-week period, with four sessions delivered each week. Sessions were conducted by the principal researcher in groups of approximately 10–15 students. The researcher had received prior training in the delivery of social and emotional learning programs.

The intervention incorporated storytelling, role-play exercises, drawing-based reflective activities, emotion-focused charades, and facilitated group discussions. These methods were designed to promote self-awareness, emotional knowledge, effective communication, cooperation, perspective-taking, and emotion-regulation skills.

From an implementation-science perspective, the curriculum appears to incorporate several potentially beneficial features, including repeated exposure to program content, active skills practice, explicit instruction in emotional language, structured learning activities, and interaction among peers. However, the available documentation did not include a formal intervention-fidelity checklist, a detailed distribution of attendance, ratings of facilitator adherence, an assessment of contamination between groups, or a qualitative coding framework.

These implementation-related components should be documented systematically in future controlled evaluations because variation in the quality and consistency of program delivery may influence the magnitude of SEL outcomes (Cipriano et al., 2023).

2.4 Measures

Positive and negative affect. Positive and negative affect were measured using an abbreviated version of the Positive and Negative Affect Schedule. The original PANAS

was developed to generate distinct measures of positive and negative affective experience (Watson et al., 1988). Adaptations for children and adolescents have generally supported the interpretation of these dimensions as two related but distinguishable factors across different settings.

Positive affect refers to the extent to which a child reports emotional states characterized by energy, interest, enthusiasm, attentiveness, and engagement. Negative affect refers to distress-related emotional states, including feeling upset, irritable, nervous, or afraid.

The available dissertation identifies the instrument as a 10-item short form but does not report the precise items administered, response anchors, possible scoring range, language-adaptation process, or internal-consistency estimates obtained in the present sample. These details should be confirmed directly from the questionnaire used during data collection and reported before manuscript submission.

Cognitive reappraisal and expressive suppression. The use of emotion-regulation strategies was assessed with a child-adapted version of the Emotion Regulation Questionnaire. The Emotion Regulation Questionnaire for Children and Adolescents was developed to assess habitual cognitive reappraisal and expressive suppression using wording that is more accessible to younger respondents (Gullone & Taffe, 2012).

Cognitive reappraisal involves modifying the meaning or interpretation assigned to a situation in order to alter its emotional effect. Expressive suppression refers to restricting or inhibiting the outward expression of an emotional response.

The source dissertation does not specify the exact number of questionnaire items retained, the possible score range, the method used to adapt the measure, or the reliability coefficients obtained for the current participants. Because the



children were only 8–9 years old, procedures such as cognitive interviewing, age-appropriate language simplification, pilot comprehension testing, and carefully standardized assisted administration are particularly important for demonstrating that the items were understood as intended.

Emotional well-being. Emotional well-being was operationalized through two associated but conceptually distinct affective outcomes: greater positive affect and lower

negative affect. The two dimensions were not combined into a single difference score because positive and negative affect are not exact opposites and may vary independently.

Accordingly, the proposed predictive analyses treat post-intervention positive affect and post-intervention negative affect as separate dependent variables. This approach allows the relationships between emotion-regulation strategies and each dimension of emotional well-being to be evaluated independently.

Table 2: Outcome measures and analytic operationalization

Construct	Instrument	Time points	Higher score indicates	Role in analysis
Positive affect	PANAS short form	Pre, post	More frequent/intense positive emotional states	Well-being outcome
Negative affect	PANAS short form	Pre, post	More frequent/intense negative emotional states	Well-being outcome
Cognitive reappraisal	Child-adapted ERQ	Pre, post	Greater habitual reinterpretation of emotion-eliciting situations	Intervention outcome; proposed predictor
Expressive suppression	Child-adapted ERQ	Pre, post	Greater habitual inhibition of emotional expression	Intervention outcome; proposed predictor

Note: ERQ = Emotion Regulation Questionnaire; PANAS = Positive and Negative Affect Schedule. Exact administered versions and scoring rules require verification.

2.5 Procedure

Permission from the participating schools and written consent from parents or legal guardians were obtained before data collection began. The children also provided verbal assent. Baseline assessments were administered in classroom settings using simplified verbal instructions, with assistance from the researcher provided when necessary to support comprehension.

The SEED Curriculum was subsequently implemented over a five-week period. Immediately following completion of the twentieth session, the same measures of affect and emotion regulation were administered again. The study records were reported to have been anonymized and stored securely before analysis.

Although the source dissertation states that institutional ethical approval was obtained, it does not identify the approving committee, ethical approval number, approval date, or version of the consent documentation. These details should be incorporated into the manuscript before submission.

Research involving minors should also describe how confidentiality was protected during group-based activities, whether children were free to decline participation in particular exercises, and what procedures were available for responding to emotional discomfort or distress. The final report should further clarify whether referral pathways to school-based support services, counselors, or external mental-health professionals were established.

2.6 Statistical Analysis

Means and standard deviations were used to summarize each outcome at the pre-test and post-test assessments. Paired-samples t tests were conducted to evaluate within-participant changes in positive affect, negative affect, cognitive reappraisal, and expressive suppression. Statistical significance was defined using an alpha level of $p < .05$.

To complement significance testing, Cohen's d was reconstructed by dividing the paired-samples t statistic by the square root of the sample size. Approximate 95% confidence intervals for the mean differences were calculated from the reported mean change, t statistic, sample size, and the implied standard deviation of the paired difference scores. Under this coding convention, positive values indicate increases from pre-test to post-test, whereas negative values represent decreases.

Once participant-level data become available, the most appropriate predictive analysis would use baseline-adjusted regression models. Post-intervention positive affect should be modeled as a function of baseline positive affect, change in cognitive reappraisal, and change in expressive suppression. A corresponding model should examine post-intervention negative affect using baseline negative affect and the same emotion-regulation change scores as predictors.

Additional covariates, including age, sex, school, intervention attendance, and baseline symptom indicators, may be included when they have been measured validly and the available sample size is sufficient. The final analysis should report standardized regression coefficients, adjusted R^2 values,



confidence intervals, multicollinearity diagnostics, residual analyses, and checks for influential cases.

Because only aggregate statistics were available, the proposed regression models could be described but not estimated. It was also not possible to conduct an independent assessment of missing data, outliers, normality, scale reliability, or correction for multiple comparisons. The reported paired-samples *t* tests were therefore retained. However, any future reanalysis should examine the distribution of the change scores and apply robust or nonparametric sensitivity analyses when the assumptions of parametric testing are not adequately satisfied.

3. RESULTS

3.1 Descriptive Change and Paired Comparisons

All four outcomes changed in the direction predicted by the study hypotheses. Positive affect increased by 4.58 points, representing an 18.6% increase relative to the baseline mean. Negative affect declined by 4.06 points, corresponding to a 22.1% reduction.

Cognitive reappraisal increased by 4.64 points, equivalent to a 22.7% rise from the pre-test mean. Expressive suppression decreased by 3.72 points, representing a 16.7% reduction.

The paired-samples comparisons were statistically significant for all outcomes at $p < .001$. The largest standardized within-participant change was observed for positive affect, $d_{\text{z}} = 0.91$. This was followed by cognitive reappraisal, $d_{\text{z}} = 0.81$; negative affect, $d_{\text{z}} = -0.77$; and expressive suppression, $d_{\text{z}} = -0.66$.

According to conventional effect-size interpretations, the observed changes ranged from moderate-to-large to large. Nevertheless, because the study did not include a control or comparison group, these values should not be interpreted as controlled treatment effects. They represent the magnitude of pre-test/post-test change within the participating sample and may include influences unrelated to the intervention.

Table 3. Pre-post outcomes, reconstructed confidence intervals, and within-subject effect sizes

Outcome	Pre M (SD)	Post M (SD)	Mean change	95% CI for change	t(79)	p	Cohen dz
Positive affect	24.63 (3.87)	29.21 (4.14)	+4.58	[3.46, 5.70]	8.12	< .001	0.91
Negative affect	18.38 (4.02)	14.32 (3.47)	-4.06	[-5.24, -2.88]	-6.87	< .001	-0.77
Cognitive reappraisal	20.46 (4.33)	25.10 (3.98)	+4.64	[3.36, 5.92]	7.24	< .001	0.81
Expressive suppression	22.31 (3.71)	18.59 (3.92)	-3.72	[-4.97, -2.47]	-5.93	< .001	-0.66

Note: Mean change = post-test minus pre-test. Confidence intervals were reconstructed from reported aggregate values and paired *t* statistics. Cohen's $d_z = t/\sqrt{N}$. Values have not been verified against participant-level data.

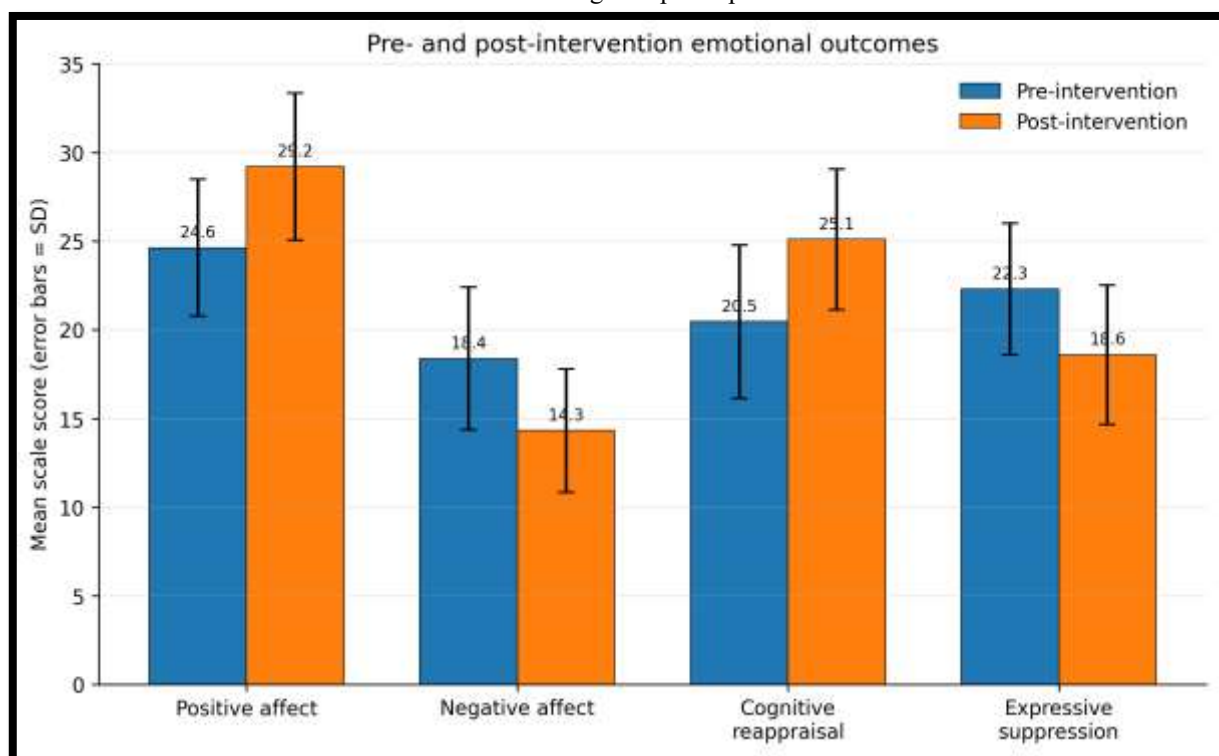


Figure 1. Mean pre- and post-intervention scores for positive affect, negative affect, cognitive reappraisal, and expressive suppression. Error bars represent standard deviations, not confidence intervals.

3.2 Hypothesis Evaluation

The aggregate findings provided support for Hypotheses 1–4. Specifically, positive affect increased, negative affect declined, cognitive reappraisal increased, and expressive suppression decreased following the intervention.

Hypothesis 5 proposed that individual-level changes in cognitive reappraisal and expressive suppression would predict emotional well-being after the intervention. This hypothesis could not be examined using the available aggregate statistics. A statistically significant increase in the group mean for

cognitive reappraisal does not establish that participants who demonstrated the greatest increases in reappraisal also experienced the largest improvements in positive affect.

Similarly, a significant reduction in the average level of expressive suppression does not demonstrate that individual decreases in suppression were associated with corresponding reductions in negative affect. Testing these relationships requires participant-level data that preserve the covariance between changes in emotion-regulation strategies and post-intervention affective outcomes.

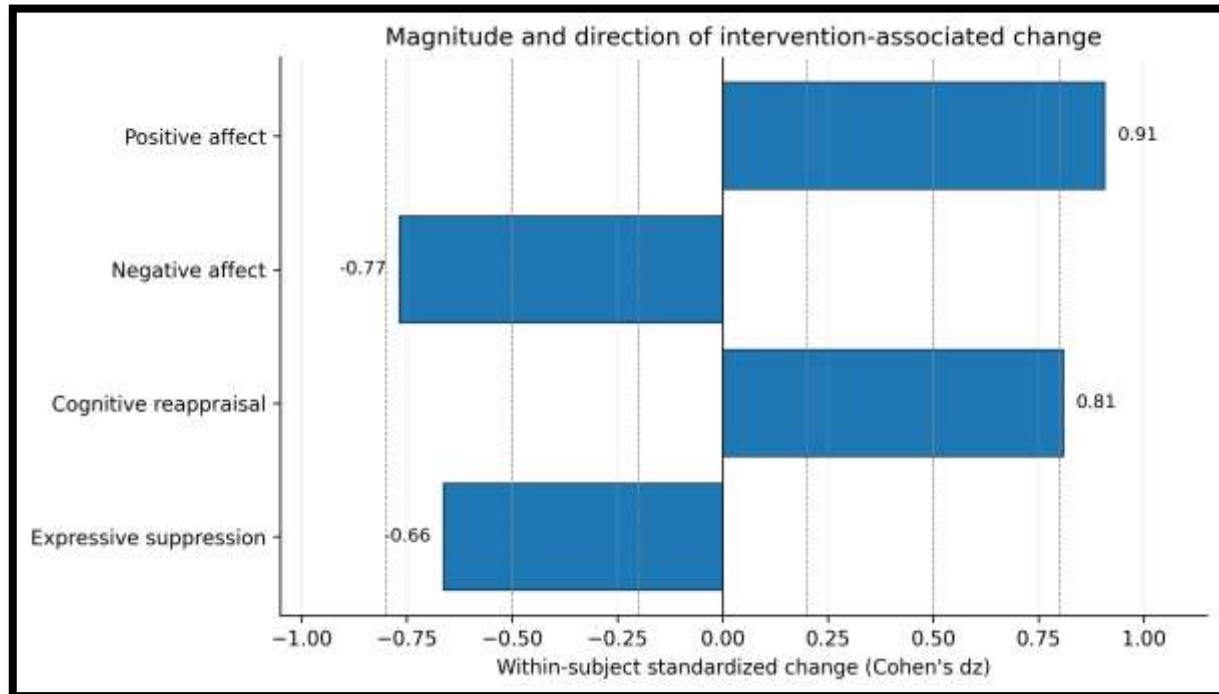


Figure 2. Within-subject standardized changes. Positive values indicate increases and negative values indicate decreases. Dashed reference lines mark conventional small, medium, and large magnitudes at absolute dz values of 0.20, 0.50, and 0.80.

Table 4. Hypothesis decisions and evidential status

Hypothesis	Statistical evidence	Decision	Interpretive limit
H1: Positive affect increases	$t(79) = 8.12, p < .001, dz = 0.91$	Supported	No control group; causality not established.
H2: Negative affect decreases	$t(79) = -6.87, p < .001, dz = -0.77$	Supported	Immediate post-test only.
H3: Reappraisal increases	$t(79) = 7.24, p < .001, dz = 0.81$	Supported	Measure version and reliability require verification.
H4: Suppression decreases	$t(79) = -5.93, p < .001, dz = -0.66$	Supported	Cultural and situational meaning of suppression requires nuance.
H5: Strategy changes predict well-being	Participant-level covariance unavailable	Not testable	Requires raw change scores and baseline-adjusted regression or mediation.

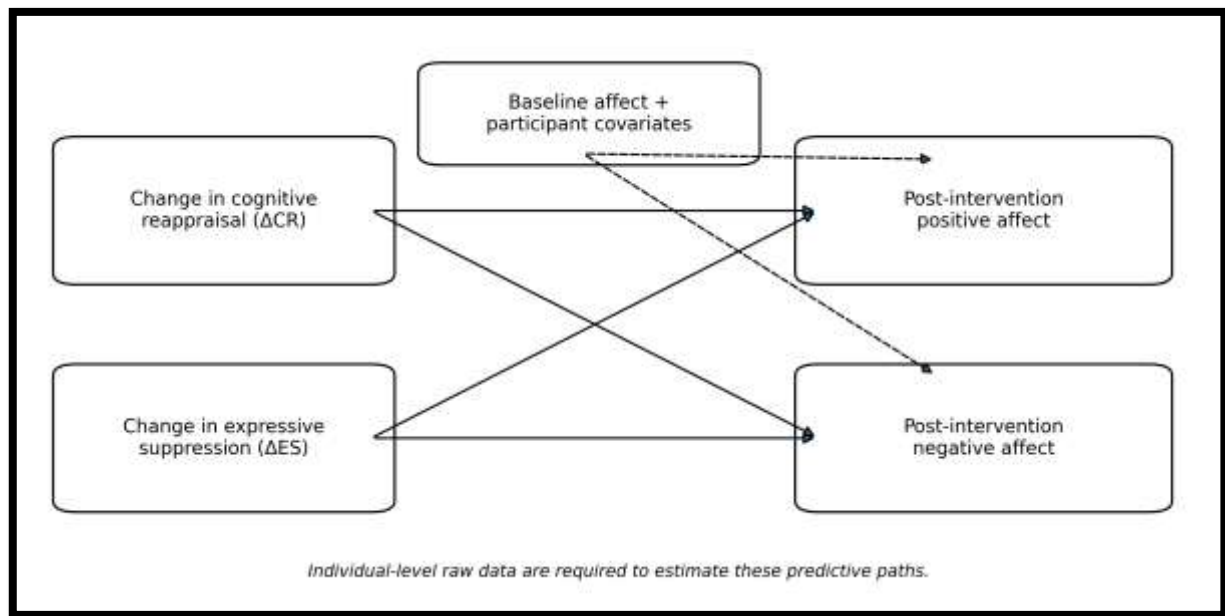


Figure 3. Pre-specified individual-level predictor framework. Solid paths represent the proposed effects of changes in cognitive reappraisal and expressive suppression on post-intervention affect. Dashed paths represent baseline adjustment and potential covariates. The model cannot be estimated from aggregate statistics.

Table 5. Pre-specified predictor models to be estimated after raw-data verification

Model	Dependent variable	Core predictors	Required adjustment	Current status
1	Post positive affect	Δ reappraisal; Δ suppression	Baseline positive affect; school/sex/age/attendance if available	Not estimable from aggregate data
2	Post negative affect	Δ reappraisal; Δ suppression	Baseline negative affect; school/sex/age/attendance if available	Not estimable from aggregate data
3	Emotional well-being composite	Δ reappraisal; Δ suppression	Baseline composite and covariates	Only after confirming a psychometrically defensible composite
4	Post affect or affect change	Intervention $\rightarrow$ Δ strategy $\rightarrow$ affect	Control condition, baseline variables, bootstrap indirect effects	Requires a controlled longitudinal dataset

Note. Δ = post-test minus pre-test. Model 4 is a design recommendation and cannot be performed in a one-group aggregate dataset.

4. DISCUSSION

4.1 Principal Findings

The reported results demonstrate a consistent pattern of favorable emotional change following participation in the SEED Curriculum. After completing 20 sessions, students reported higher positive affect, lower negative affect, greater use of cognitive reappraisal, and reduced reliance on expressive suppression. The standardized within-participant effects were comparatively large, particularly for positive affect and cognitive reappraisal. At a descriptive level, this pattern corresponds with the curriculum's intended focus on recognizing emotions, reflecting on challenging situations, communicating feelings, and practising more constructive responses.

The simultaneous improvement in affective outcomes and emotion-regulation strategies is theoretically significant. Cognitive reappraisal can modify the course of an emotional response by changing how a child understands a difficult experience. For example, a peer's refusal may be interpreted not as deliberate rejection, but as a temporary preference, situational constraint, or misunderstanding. Such reinterpretation may reduce distress and facilitate more effective problem-solving.

SEL activities based on storytelling, role play, and facilitated discussion may repeatedly expose children to alternative explanations and allow them to practise reappraisal within a socially supportive environment. The observed



increase in cognitive reappraisal is therefore plausible as a direct skill-related outcome of the curriculum.

The decline in expressive suppression may indicate that children developed a greater willingness or ability to communicate emotions rather than simply conceal them. Activities involving emotional charades, storytelling, reflective drawing, and group discussion may normalize emotional expression and provide children with developmentally appropriate language for describing feelings.

Reduced reliance on suppression may support help-seeking, mutual understanding among peers, and constructive conflict resolution, all of which are closely related to interpersonal competence. Meta-analytic evidence has generally linked habitual suppression with lower positive affect and poorer interpersonal functioning. However, these relationships differ across cultural settings and may depend on the emotional valence, purpose, and context of suppression (Chervonsky & Hunt, 2017; Fernandes & Tone, 2021; Hu et al., 2014).

The affective results are also broadly consistent with the international SEL literature. Meta-analyses have shown that universal school-based SEL programs can improve emotional competencies, attitudes, behavior, and indicators of well-being (Cipriano et al., 2023; Durlak et al., 2011; Taylor et al., 2017). The present pattern also resembles findings from school-based mindfulness and emotion-regulation interventions that reported improvements in positive outlook, resilience, life satisfaction, or emotional symptoms among children (Amundsen et al., 2020; Johnstone et al., 2020).

Nevertheless, the standardized effects reconstructed in the present study are larger than the average effects commonly reported in controlled meta-analyses. This difference should not be interpreted as evidence that the SEED Curriculum is more effective than other interventions. Single-group pre-test/post-test designs often produce larger estimates because they do not account for changes that may also arise from maturation, repeated testing, facilitator attention, classroom events, or participant expectations.

4.2 Can Reappraisal and Suppression Be Considered Predictors?

The proposed title emphasizes prediction, but it is essential to distinguish between average group-level change and individual-level prediction. Paired-samples *t* tests determine whether the average score of the group changed between two assessment occasions. A predictive analysis, by contrast, examines whether variation in one participant's change in emotion-regulation strategy explains variation in that participant's post-intervention emotional well-being after relevant baseline scores have been controlled.

These two analyses address fundamentally different statistical questions.

The aggregate findings are theoretically compatible with the proposed prediction hypothesis because the average changes occurred in the expected directions. However, they do not provide direct confirmation. Prediction requires participant-level paired observations so that covariance between strategy change and emotional outcomes can be estimated.

Without participant-level data, regression coefficients, partial correlations, confidence intervals, measures of model fit, and mediation estimates cannot be calculated legitimately. Any

such values would be speculative rather than empirically derived. Accordingly, the present manuscript treats cognitive reappraisal and expressive suppression as potential predictors and outlines the analytical framework necessary to evaluate this proposition.

Once the raw dataset becomes available, baseline-adjusted regression analysis would be preferable to simple correlations between change scores. This approach controls for initial affective levels and reduces interpretive problems associated with regression toward the mean.

A stronger future study would randomly allocate schools or classrooms to intervention and comparison conditions, assess emotion regulation and affect at baseline, post-intervention, and follow-up, and test longitudinal mediation. Such a design could evaluate whether assignment to the SEL intervention produces changes in reappraisal or suppression and whether these changes subsequently predict later affect after baseline levels are taken into account. Temporal separation between the proposed mediator and outcome would provide stronger evidence for a mechanism of change.

4.3 Cultural Interpretation

Cultural context is especially important when interpreting expressive suppression. Much of the foundational research on emotion regulation was conducted in Western settings, where individual authenticity and open emotional expression are often strongly valued.

In collectivistic or relationship-oriented contexts, regulating emotional expression may sometimes protect social harmony, demonstrate respect for authority, or prevent interpersonal conflict from escalating. Meta-analytic findings suggest that the relationship between suppression and mental health is often weaker or more variable in Eastern cultural settings (Hu et al., 2014).

The objective of SEL should therefore not be the complete elimination of suppression. Instead, children should learn flexible emotion regulation. This includes understanding when emotional expression is safe and constructive, how feelings can be communicated respectfully, when temporary restraint may be appropriate, and how emotions can be processed even when immediate expression is unsuitable.

The culturally adapted character of the SEED Curriculum may be important because children's emotional understanding is shaped by language, family expectations, classroom norms, peer relationships, and familiar social situations. Culturally responsive SEL should connect broadly applicable developmental competencies with practices that are meaningful within the local setting.

This may involve using recognizable stories and social dilemmas, accommodating multilingual forms of communication, including teachers and families in implementation, and recognizing that emotional competence involves both self-expression and socially appropriate restraint.

Future studies should provide detailed documentation of the cultural-adaptation process. The curriculum should not be described as culturally appropriate without evidence of stakeholder consultation, pilot testing, language adaptation, and child comprehension.



4.4 Educational and Clinical Implications

From an educational perspective, the findings support further investigation of structured, activity-based SEL programs in the primary grades. A five-week intervention delivered in small groups may be feasible for trained teachers, counselors, or school psychologists.

The use of storytelling, role play, drawing, and guided discussion is developmentally appropriate for younger children and may be integrated into life-skills periods, classroom meetings, language activities, or school well-being programs. However, broader implementation should be accompanied by facilitator preparation, structured manuals, intervention-fidelity monitoring, safeguarding procedures, and clear processes for responding when children disclose distress, abuse, or interpersonal harm.

For school-based mental-health professionals, emotion regulation may provide a useful connection between universal prevention and more targeted intervention. Children who find it difficult to reinterpret situations, express feelings appropriately, or recover from frustration may benefit from additional guidance or individualized coaching.

Universal classroom-based SEL can normalize emotional skills for all students, while school counselors and psychologists can provide more intensive support for children experiencing persistent anxiety, mood-related symptoms, behavioral difficulties, trauma exposure, or developmental concerns. Universal SEL should not replace clinical assessment, specialist referral, or individualized treatment.

At the policy level, the study is consistent with India's emphasis on holistic development and student well-being. However, implementation decisions should remain evidence-based. A curriculum developed within the local context should be evaluated according to the same standards of measurement validity, ethical reporting, implementation quality, and controlled outcome assessment expected of programs developed elsewhere.

The most appropriate next step is not immediate large-scale dissemination based on a single uncontrolled study. Instead, development should proceed through a staged validation process involving instrument verification, feasibility testing, cluster-randomized evaluation, implementation research, and longer-term follow-up.

4.5 Strengths

Several features support the value of the study as an initial evaluation. It examined an age group that remains comparatively underrepresented in Indian SEL research, used repeated measurement of both affective experience and emotion-regulation strategies, and evaluated a structured curriculum employing several active-learning techniques.

The selected outcomes were also theoretically related, allowing changes in emotional experience and regulatory strategy use to be considered together. The present reconstruction further improves interpretability by providing standardized effect sizes and confidence intervals, distinguishing average change from individual-level prediction, and explicitly identifying the data required for a valid predictive analysis.

4.6 Limitations

The absence of a control group is the most important limitation. Maturation, repeated questionnaire exposure, increased adult attention, concurrent school events, participant expectations, or regression toward the mean may explain part of the observed change. The use of an immediate post-test also prevents conclusions regarding the durability of the results. A waiting-list, active-comparison, or usual-curriculum group would substantially improve causal inference.

Second, participant-level data were unavailable, and the source chapter described the reported descriptive statistics as hypothetical. Consequently, the present manuscript cannot confirm that the means, standard deviations, *t* statistics, and sample size were derived from a single internally consistent dataset.

It was also impossible to evaluate missing data, extreme observations, scoring procedures, internal consistency, distributional assumptions, or clustering by school. Journal submission should not proceed until the original anonymized dataset has been audited and the results have been reproduced using a documented analysis procedure or statistical script.

Third, the description of the outcome measures is incomplete. The exact PANAS short form, the specific child-adapted ERQ version, response categories, scoring ranges, translation or simplification procedures, and reliability coefficients were not reported.

Measures validated in older children or adolescents cannot automatically be assumed to function equivalently among children aged 8–9 years. Future analysis should include cognitive interviewing, item-level descriptive statistics, assessment of factor structure, and internal-consistency estimates. Teacher and parent reports would also reduce exclusive dependence on young children's self-reported responses.

Fourth, purposive recruitment from a limited number of English-medium CBSE-affiliated schools restricts generalizability. Information concerning the exact number of schools, participant sex distribution, socioeconomic characteristics, language background, and intervention attendance was unavailable.

The primary researcher also delivered the intervention, creating the possibility of expectancy, allegiance, and demand effects. Independent outcome assessment and formal ratings of implementation fidelity are therefore recommended.

Fifth, the available evidence does not support the causal or predictive language implied by the proposed title. Emotion-regulation strategies and affect were measured concurrently at the same two assessment points. Even if participant-level data were available, a relationship between change scores would not demonstrate that changes in reappraisal or suppression caused improvements in affect.

Baseline-adjusted regression would represent the minimum analytical requirement for examining prediction. Claims concerning mediation would require stronger experimental evidence and clearer temporal ordering.

4.7 Future Research

A definitive evaluation should employ a cluster-randomized controlled design in which schools or classrooms are allocated to the SEED Curriculum or an active comparison condition. Assessments should be conducted at baseline,



immediately after the intervention, and at later follow-up points such as three and six months.

The study protocol should be registered prospectively, and the primary outcomes, hypotheses, and statistical analysis plan should be specified before the data are examined.

The measurement battery should include verified child-appropriate measures of positive affect, negative affect, and emotion regulation. These should be supplemented with teacher ratings of social-emotional competence, parent observations, and behavioral indicators such as classroom cooperation, emotional recovery, or conflict resolution.

Intervention fidelity, attendance, participant acceptability, facilitator adherence, and adverse events should be documented systematically. Multilevel statistical models should account for the nesting of students within classrooms and schools.

Mechanism-focused analyses should investigate whether changes in cognitive reappraisal and expressive suppression mediate the relationship between intervention participation and later emotional well-being. Because regulation is context dependent, future studies should also assess emotional flexibility, awareness, acceptance, problem-solving, and help-seeking rather than relying solely on the two ERQ strategies.

Qualitative interviews with children, teachers, and parents may help identify which activities are regarded as meaningful and how cultural expectations influence the interpretation and expression of emotions.

Finally, equity-focused analyses should determine whether intervention effects differ according to sex, socioeconomic background, school type, language, attendance, or baseline emotional difficulties. Any curriculum intended for broad or national use must be evaluated across India's considerable linguistic, cultural, institutional, and rural-urban diversity.

5. CONCLUSION

The reported aggregate findings indicate substantial favorable changes from pre-test to post-test in positive affect, negative affect, cognitive reappraisal, and expressive suppression following a 20-session school-based SEL intervention for Grade 4 children.

The coordinated direction of these changes is consistent with the proposition that SEL may strengthen adaptive emotional competencies and improve children's emotional experiences. However, a single-group design cannot establish that the intervention caused these outcomes. Similarly, aggregate means cannot determine whether changes in reappraisal or suppression predict individual differences in emotional well-being.

The manuscript therefore provides a structured journal-format foundation rather than definitive confirmation of the proposed predictive relationship. Before submission, the raw dataset should be verified, the exact measures and ethical approval details should be documented, reliability and statistical-assumption checks should be completed, and baseline-adjusted predictive models should be estimated.

Following these steps, and preferably after controlled longitudinal replication, the study may make a useful

contribution to research on culturally responsive social and emotional learning in Indian primary-school settings.

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