



Compassion Training in Elementary School Children

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Evaluating the Feasibility and Preliminary Impact of the Social, Emotional, and Ethical Learning (SEE Learning) Program: A Compassion-Based Social and Emotional Learning Program for Elementary School Children

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Abstract

Objectives: This study aimed to assess the feasibility and preliminary outcomes of the Social, Emotional, and Ethical Learning (SEE Learning®) program, a program designed to cultivate compassion-based skills in elementary school-aged children.

Methodology: A quasi-experimental design was employed, with 685 4th- and 5th-grade students across 33 classrooms (344 students received the 12-week SEE Learning program; 341 students were wait-list controls). Assessments of compassion, social and emotional competence, and classroom supportiveness were collected at pre-test and post-test.

Results: Teachers in the program demonstrated high lesson completion and fidelity rates with minimal preparation time and strong adherence to the lesson structure. The program's design demonstrated feasibility, with most activities fitting within less than a 50-minute timeframe, reflecting its suitability for elementary school time blocks. Students who received SEE Learning exhibited significant improvements in several intrapersonal constructs, including perspective-taking, empathic concern, intrinsic prosocial motivation, and self-compassion when compared to students in the wait-list control group. Students in the SEE Learning group also demonstrated enhanced academic goal setting compared to wait-list controls.

Significance: This study is among the first to demonstrate the feasibility and preliminary student impacts of the compassion-focused SEE Learning program for elementary students. It underscores the potential importance of incorporating compassion into SEL programs to foster empathy, compassion, and prosocial behavior. Future investigations should explore the implementation and impacts of the SEE Learning program using more rigorous experimental designs, and in diverse cultural and educational settings. The goal is to gain a more comprehensive understanding of the program's impact on students' social, emotional, and ethical

development, and the role compassion cultivation plays in student outcomes, including well-being.

Introduction

Social and emotional learning (SEL) plays a crucial role in education, encompassing knowledge, attitudes, and skills necessary for recognizing and managing emotions, developing empathy, establishing positive relationships, and making responsible decisions¹⁻⁵. School-based SEL programs have gained prominence globally, demonstrating positive effects on students' social and emotional competencies, mental health, and academic achievement⁵⁻⁸. Research findings have been consistent in demonstrating the positive benefits of SEL programs in increasing students' social and emotional competencies, health, and well-being and in decreasing anxiety, depressive symptoms, and stress^{9,10}. Moreover, SEL programs have demonstrated significant impacts on students' academic achievement. Longitudinal studies also demonstrate that SEL programs provide children with essential life skills that extend beyond their schooling and are sustained into adulthood^{11,12}. By nurturing the emotional and social development of young learners, SEL programs lay the foundation for more positive outcomes in students' academic and social and emotional development.

Contemplative approaches in education

More recently, educational programming and research have extended SEL work to include the direct training of attention and prosocial emotions such as compassion^{13,14,15,16}. Much of this work has focused on the impact meditation and mindfulness have on developing or enhancing skills that positively impact self-regulation, prosocial behavior, and positive mental habits that contribute to academic and social achievement¹⁷. The theory of change for this work is that there exist developmental windows of opportunity in the early decades of life when the plasticity of neural and mental systems is particularly high¹⁸. Mental training and enrichment that

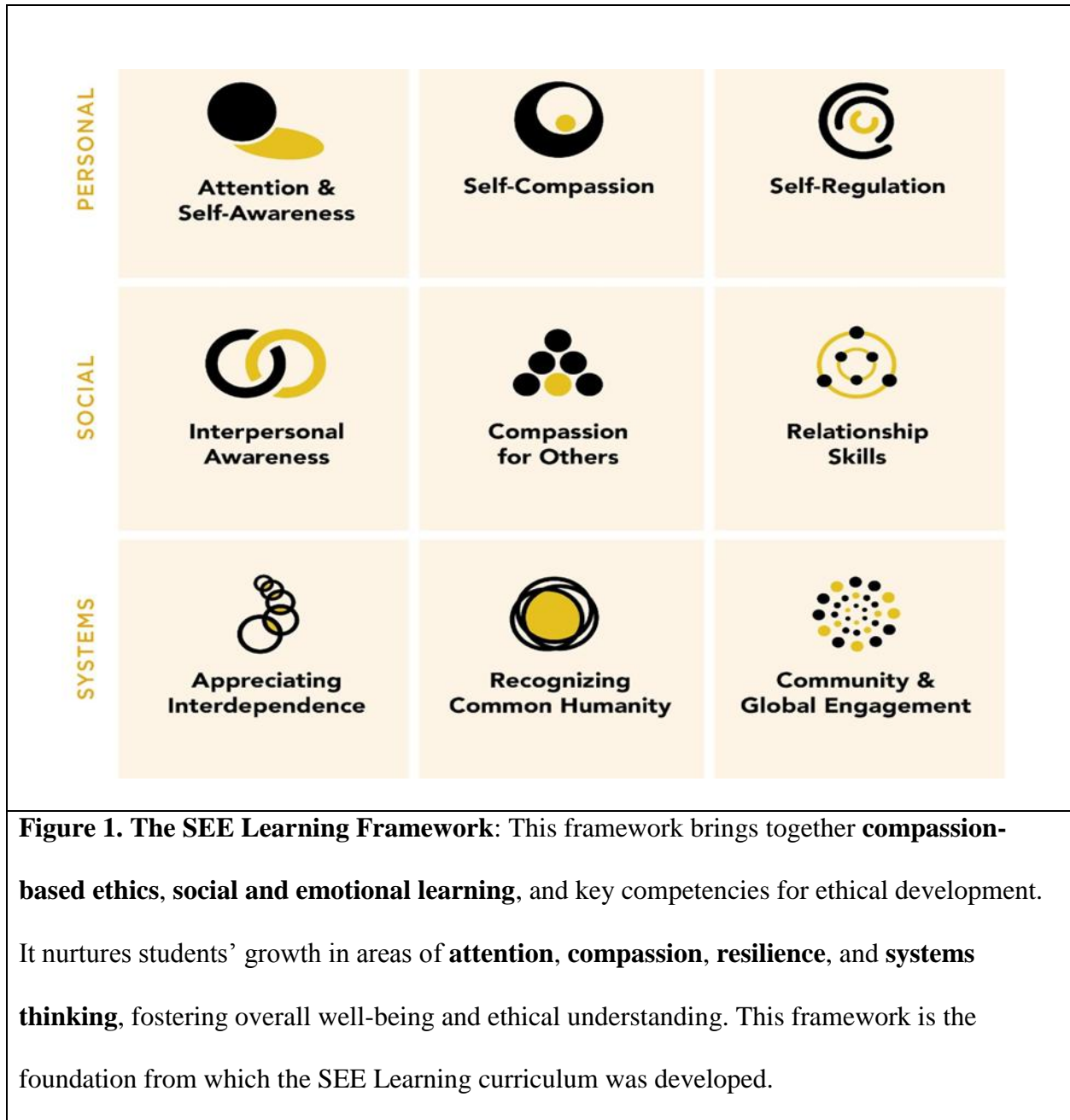
targets attentional, social, and emotional skills through practices like reflection, meditation, and service are thus hypothesized to be particularly impactful during the early childhood and adolescent years for cultivating such skills^{19,13}.

The elementary school period, particularly late elementary, is a crucial developmental stage during which children develop their capacities for self-control, for perspective taking and empathy, and for prosocial behavior^{20,21}. Early research by Windle et al. (2008) suggests that this juncture, around ages 10 to 15, presents an optimal opportunity for the implementation of compassion-based programs in schools^{22,23,24}. By introducing such programs during late elementary and early adolescence, educators and researchers can tap into this critical period of neurodevelopment to foster greater social and emotional skills in young individuals, potentially yielding lasting positive effects on their overall well-being and social interactions²²⁻²⁸. The work in contemplative education fills a needed gap in the SEL work by focusing on the direct cultivation of attention, awareness, and compassion.

SEE Learning framework

This study examined the feasibility and preliminary impacts of a program that blends SEL and contemplative skills such as compassion. The program, called Social, Emotional, and Ethical Learning or SEE Learning, is a new SEL program comprised of an educational framework developed by Emory University's Center for Contemplative Science and Compassion-Based Ethics. The program was designed to foster the holistic development of students by cultivating qualities of attentional awareness, compassion cultivation, and purposeful engagement across intrapersonal, interpersonal, and systems domains of experience²⁹.

Compassion can be defined as “a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it” (p. 11)³⁰.



The goal of the SEE Learning framework is to cultivate dispositions and skills necessary for the development of compassionate individuals endowed with ethical discernment and

compassionated engagement with world, others and self (Fig 1). This is hypothesized to be achieved through the cultivation of three different dimensions: awareness, compassion, and engagement, and in relation to three levels of analysis or domains: the personal, social, and systems-level. Through practices such as focused attention or open awareness meditation, the practitioner develops awareness, including awareness of self, others, and the social and natural worlds in which one is embedded^{29,30}. Through compassion practices, one develops empathy and compassion for oneself and others, as well as the recognition of our common humanity in which we value all human beings and all sentient beings^{31,32}. Through engagement with the world and other people, one learns self-regulation and restraint, kindness and other-orientation, and an appreciation of contributing to the welfare of wider and wider communities and social systems^{31,33-35}. Often, the three domains are referred to as the head, the heart, and the hand. Crossing these three dimensions and three domains, we see the nine key conceptual themes and components or competencies of the SEE Learning Framework (Fig 1).

Commencing with the cultivation of awareness and empathy towards the suffering of others, students explore the broader concepts of compassion and kindness. Subsequently, they delve into emotional awareness and resonance as they discover compassion as an intrinsic quality within themselves. This phase of learning is intertwined with the development of tolerance for discomfort, a crucial facet of compassion development. As the program unfolds, students are empowered to harness internal motivation to alleviate suffering and make informed choices for compassionate engagement.

The Current Study

The primary purpose of this study was to investigate the implementation and preliminary impact of the SEE Learning Program on elementary-school aged children. The specific study aims were twofold and included the following:

- 1) To assess the implementation (dosage, feasibility, acceptability) of the SEE Learning Program in classrooms with upper elementary school students; and
- 2) To examine the preliminary impacts of the SEE Learning Program on student outcomes regarding dimensions associated with the SEE Learning Framework (Fig 1).

Materials and methods

Research design

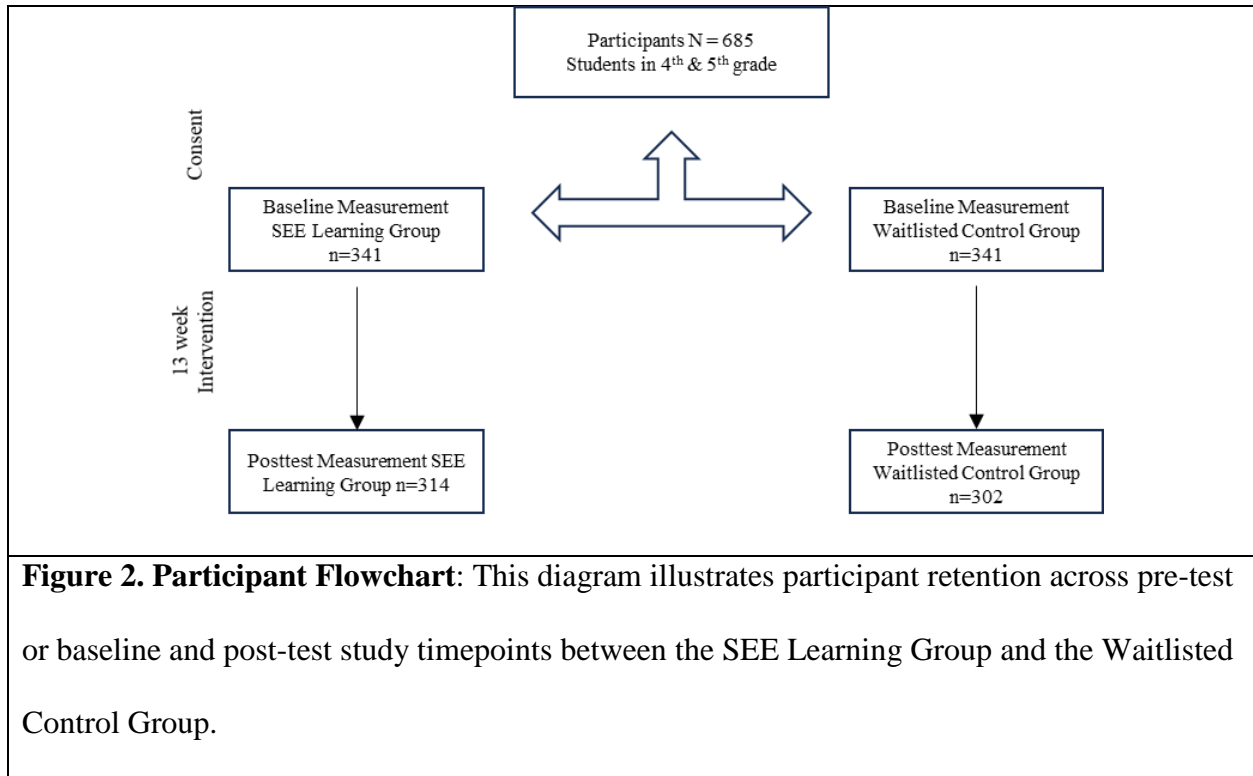
The current study was conducted via a quasi-experimental research design, with pre-tests and post-tests. After pre-test assessments, the SEE Learning program was implemented over 13 weeks to 4th and 5th grade students in 17 classrooms across two schools, while students in 16 classrooms in two other schools served as waitlist controls. The district administrators were contacted and introduced to the SEE Learning program via a short introductory session. After the introduction to the program, the district administrators shared the study flyer with school principals. Recruitment began May 1st, 2022, and continued until October 1st, 2023.

Recruitment of participants

The participating schools were in the Southeastern USA. The demographic profiles of the public and private schools in this study demonstrate similarities in minority student enrollment, gender distribution, and student-teacher ratios across the participating classrooms. After approval by the relevant University Institutional Review Board, school principals who received flyers and agreed to meet participated in a one-on-one meeting with research study team personnel. Once the principals agreed to participate in the research, they provided the study team with a letter of support and gave the study team permission to reach out to teachers. Teachers' participation across all schools and classrooms was voluntary. After administrator approval, teachers received a recruitment flyer describing the research study. Teachers who expressed interest in participating met with a member of the research study team for a one-on-one meeting. During this time, teachers went through the consent process with the study team member.

Of the 33 teachers, 17 were selected to receive the SEE Learning program training, and 16 were selected to serve as wait-listed controls and receive the program training in the subsequent school year. The selection of schools participating in this study involved a convenience sample of schools interested in the SEE Learning program. Teachers were recruited on a first come first serve basis with the first schools approached being recruited to implement SEE Learning in the classrooms. We then approached teachers for recruitment to serve as wait-listed controls. If the teacher agreed to have their classroom participate in either group, they participated in an additional meeting with a member of the study team to discuss logistics and planning for data collection.

After the teachers were consented into the study, the project was described to parents/guardians via email communication, school newsletters, and an open question and answer session that was conducted virtually with research study team members. Information about the research study was also shared with students through in-person classroom visits by members of the research team. All 4th and 5th grade students in participating classrooms were invited to participate in the student assent and parental/guardian consent process. Parental/guardian consent occurred via a passive consent procedure in which parents/guardians were notified of the research study and had the opportunity to proactively decline to allow their children's participation.



Overall, there was a 99% participation rate regarding parent/guardian passive consent across all classrooms. On the day of pre-test data collection, students were guided through a process of student assent by members of the research study team. After a review of the study purpose and participation guidelines, all students completed a form that indicated whether they chose to participate in the study. Student assent ranged from 85%-99% across all classrooms at pre-test. At post-test, there was a 9% participant attrition in the intervention group and an 11% participant attrition in the control group (Fig 2).

Power analysis

We used G*Power to compute the sample size, considering a medium effect size (0.25), $\alpha=0.05$, and $\beta=0.2$ ³⁶. We were also guided by the National Center for Education Evaluation³⁷.

The standard target for an education-based intervention study is a sample size of 300 students

(150 in each group) to ensure statistical significance at a 0.05 alpha level, assuming only a 1 in 20 chance of a null effect. To meet the requirements of our main study while considering potential attrition, we aimed for an equivalent sample of 350 students in each group. However, to better reflect the nuances of Social Emotional Learning (SEL) research, we revised our sample size calculations based on recent meta-analytic findings. We adopted a conservative effect size of Cohen's $d = 0.15$, informed by a comprehensive meta-analysis of SEL programs. This adjustment, coupled with an alpha level of $\alpha = 0.05$ and a power of $1 - \beta = 0.775$, led us to a target sample size of 400 students (200 per group). This increase accounts for potential attrition and bolsters our study's capacity to detect statistically significant effects, thereby enhancing the validity of our findings.

Participants

Table 1: Descriptive Statistics for Demographic Variables with T-test for Mean Comparisons and Chi-Squared Test for Group Difference of Percentages.

Variables	Intervention (<i>n</i> = 344)	Control (<i>n</i> = 341)	Total (<i>N</i> = 685)	Difference X2 (p-value)
Age (mean, SD)				
	10 (1)	10 (1)	10 (1)	0.99
Grade (%)				
4 th	60.4	47.4	53.8	11.6 (0.00)
5 th	39.6	52.6	46.2	11.6 (0.00)
Gender (%)				
Girls	52.5	53.1	53.0	0.03 (0.88)
Boys	44.5	44.1	44.1	0.03 (0.87)
Nonbinary	3.0	2.8	2.9	0.00 (0.98)
English Proficiency (%)				
Low	1.8	1	1.5	0.99 (0.32)
High	98.2	99	98.5	0.98 (0.32)
Race (%)				
Asian	9.9	4.1	7.0	0.00 (8.77)
Black	15.5	21.4	18.4	0.04 (4.11)
Hispanic	2.91	2.93	2.92	0.98 (0.00)
White	41.9	42.8	42.3	0.80(0.01)
Other*	23.9	17.3	20.6	0.03(4.47)
Family Composition (%)				

Single Parent	14.2	16.4	15.3	0.63(0.43)
Two or More Parents	85.8	83.6	85.7	4.63(0.43)

The final sample included 685 4th and 5th grade children and their classroom teachers in two public schools and one private school. A total of 344 4th and 5th grade students were in the SEE Learning implementation group, and 341 4th and 5th grade students served as waitlist controls (Table 1). The intervention group included a higher percentage of 4th graders (60.4%) compared to the control group, which had a larger representation of 5th graders (52.6%). This difference in grade distribution was statistically significant, as indicated by a chi-squared test ($X^2 = 11.6, p < 0.001$). Gender distribution was similar in both groups. Similarly, there were marginal and non-significant differences in English proficiency between the groups, with high-proficiency students being predominant in both the intervention group (98.2%) and the control group (99%). When considering race and ethnicity, differences emerged. When asked about race, students were able to self-identify, and they were not limited to one choice. The intervention group had a higher percentage of self-identifying Asian students (9.9%) compared to the control group (4.1%). The control group, on the other hand, had a higher percentage of self-identifying Black students (21.4%) compared to the intervention group (15.5%). White students made up a substantial proportion in both groups without significant differences. In terms of family composition, most participants in both groups had two or more parents, and this did not differ significantly. Although differences by race were detected, controlling for race did not affect the outcomes of the analysis, thus only grade level was controlled for in subsequent analyses (Table 1).

Teacher training in the SEE Learning program

Prior to the pre-test data collection, school principals facilitated the release of teachers who were assigned to the SEE Learning intervention to attend a three-day training in the SEE Learning program implementation. The training was facilitated by a certified SEE Learning facilitator. This was a three-day training that lasted for four hours each day. The first day consisted of an overview of the program and the conceptual theories and framework guiding the program. This was also a time when the teachers were introduced to practices they would use for themselves and their own well-being. The following two days included experiential training, where teachers practiced the learning experiences and experienced fishbowl exercises for feedback. During this exercise, teachers had the opportunity to role-play lessons. The final training session was used as planning time for mapping out their classroom implementation of the SEE Learning program. Facilitation quality, participant engagement, and attendance were tracked. Participants' reports regarding the quality of the training facilitation were very high, with mean levels of engagement and quality reported as high to very high among more than 95% of the teachers. All teachers who were in the intervention group attended 90% or more of the training.

The classroom implementation

Table 2. Intervention Scope & Sequence of SEE Learning Curriculum Delivered

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Lesson Title	Exploring Compassion	Exploring Kindness	Class Agreements	Practicing Kindness & Compassion	Recognizing Compassion & Exploring Interdependence	Exploring Sensations	Resourcing	Creating a Resource Kit	Grounding	The Resilience Zone	Exploring the Resilience Zone through Scenarios	How Compassion & Safety Affect the Body	Teachers used this week to complete any LEs or revisit concepts with students
Lesson Objective	Explore the relationship between happiness, kindness, and compassion	Explore how the universal wish for happiness underlies human action, motivation, and emotion	Identify agreements to create a compassionate classroom	Develop ways of exhibiting compassion in the classroom	Recognize how things that meet our needs come from actions of countless others	Develop vocabulary describing body sensations and how to identify them	Track sensations in the body and identify a personal resource that calms their body	Create a resource kit they can use to calm themselves when stressed	Gain proficiency in the practice of grounding through different methods	Understand the zones of wellbeing and recognize which zones they are in at any given moment	Learn to track which zone they are in by tracking body sensations. Use resourcing and grounding to shift.	Recognize how class agreements, kindness, and safety can affect the nervous system, and this can affect physical health	Teacher-Choice

The SEE Learning program was delivered weekly by 4th and 5th grade classroom teachers over the course of 13 weeks during the spring semester of the academic year. This occurred during the COVID pandemic during a time when children had returned to in-person instruction. The scope and sequence of the learning experiences delivered are listed in Table 2. Teachers delivered the learning experiences to their regular classroom students, in their classrooms, during a time determined by them each week. Lessons typically lasted between 30 to 55 minutes. This cadence of delivery was consistent over the intervention period. Students in the waitlist control classrooms were exposed to business-as-usual SEL programs following guidelines of their district or school initiatives. The business-as-usual SEL exposure was comparable across study sites.

Procedure

Students completed self-report measures before their teachers underwent training. Throughout the implementation phase, teachers monitored program delivery by providing weekly feedback on its extent and quality. The final assessment took place at the conclusion of the spring semester, aligning with the academic year's end and the administration of end-of-year exams, for both intervention and wait-list control groups. All assessments were conducted by research team members.

Measures

Implementation dosage and fidelity

Given the importance of monitoring dosage and fidelity in SEL program implementation^{38,29}, teachers implementing the SEE Learning program were asked to complete weekly implementation diaries⁴⁰. Each week, implementation dosage and fidelity were tracked via implementation feedback diaries that teachers completed after the delivery of each lesson. For example, preparation time gauged the average duration teachers dedicated to lesson planning, ensuring it was manageable and consistent. Lesson fidelity measured the adherence to the lesson plans, with higher percentages indicating fewer deviations from the intended curriculum. Teacher comfort reflected the comfort level of teachers delivering the lessons. Teachers also rated the quality of student engagement during each lesson on a 5-point scale ranging from 1 (“*not engaged*”) to 5 (“*very engaged*”). Lastly, lesson duration provided information on the time spent on each lesson, highlighting the efficiency of lesson delivery within the classroom setting (S1 Table).

Student outcome measures

The following are the measures administered to all student participants (S2 Table).

Interpersonal Reactivity Index - Perspective-taking

Students’ perspective-taking was assessed via the Interpersonal Reactivity Index⁴¹ (IRI), which has been modified for children⁴². The IRI is a self-report measure consisting of 28 items with four subscales (7 items per subscale): perspective-taking, empathic concern, personal distress, and fantasy. For the purposes of the present study, only the perspective-taking and empathic concern subscales were used. Examples of questions from the perspective-taking

subscale include “It’s easy for me to understand why other people do the things they do” and “Even when I’m mad at someone, I try to understand how they feel.” Students rated each item on a 5-point rating scale, ranging from 1 = *Not at all like me* to 5 = *Always like me*. Scores were computed by averaging item scores within subscales so that higher scores signified greater perspective-taking. Supportive evidence for the construct validity of the perspective-taking subscale of the IRI has been obtained in previous research²⁷, including significant correlations with related constructs in expected directions²⁸. For the present study, the perspective-taking subscale demonstrated adequate internal consistency both at the pre-test and post-test. Specifically, Cronbach alphas were 0.76 at the pre-test and 0.76 at the post-test.

Interpersonal Reactivity Index - Empathic concern

The Empathic Concern subscale of the IRI²⁷ modified for children²⁸ was used to assess students’ empathy. The Empathic Concern subscale includes seven items that assess the affective component of empathy, specifically the feelings of warmth, compassion, and concern for others. This subscale evaluates the emotional response of individuals to the experiences of others. Example items include “I often feel sorry for people who don’t have the things I have” and “I often feel sorry for other children who are sad or in trouble,” which measure the respondent’s feelings of sympathy and concern. Students rated each item on a 5-point rating scale, ranging from 1 = *Not at all like me* to 5 = *Always like me*. Scores were computed by averaging item scores so that higher scores signified greater empathic concern. As with the perspective-taking subscale of the IRI, there is empirical evidence supporting the construct validity of the empathic concern subscale⁴⁴, including significant correlations with empathy-related constructs in predicted directions⁴⁴. For the present study, the empathic concern subscale

demonstrated adequate internal consistency both at the pre-test and post-test. Specifically, Cronbach alphas were 0.81 at the pre-test and 0.83 at the post-test.

Emotional Expression Scale for Children (EESC)

We utilized the Emotional Expression Scale for Children⁴³ (EESC) to assess students' ability to tolerate uncomfortable feelings. The EESC serves as a valuable measure of emotional tolerance. The scale used in this study consists of 8 items and utilizes a 5-point Likert scale, ranging from 1 = *Not at all true* to *Extremely true*. Example questions include “I have feelings that I can’t figure out” and “I often do not know how I am feeling.” Scores are averaged, with higher scores indicating poorer emotional awareness and greater reluctance to express emotions. In the present study, the scale’s internal consistency is reflected in Cronbach alphas of 0.78 at the pre-test and 0.83 at the post-test.

The Intrinsic Prosocial Motivation Scale

The Intrinsic Prosocial Motivation scale⁴⁵ is a self-report measure consisting of three items. The scale assesses individuals' motivation to engage in prosocial behaviors. Intrinsic motivation reflects an internal desire to help others based on *students' inclination to act in prosocial ways because of personal feelings of empathy, concern for the others, or commitment to interpersonal growth*. An example of intrinsic motivation is “I help because I think it is good to help,” and an example for extrinsic motivation is “I help because I want to get a reward or praise from the teacher.” In this sample, the Cronbach alphas coefficients for this construct were 0.63 at the pre-test and 0.67 at the post-test.

Self-compassion Scale (short form) for children

To assess students' self-compassion, we utilized the Self-Compassion Scale for Children³¹ (SCS-C). The SCS-C was developed for use with children and adolescents by adapting the SCS-Short Form⁴⁶, which primarily has been used with adults. Items from the SCS-SF were modified to use with younger populations by altering the language to be age-appropriate. For example, Item 1 on the SCS-SF, "When I fail at something important to me, I become consumed by feelings of inadequacy" was changed to "When I fail at something important to me, I feel like I'm not good enough"⁴⁷. The measure consists of 12 items assessing self-compassion across six 2-item subscales: self-kindness (e.g., "I try to be kind towards those parts of myself I don't like"), self-judgment (e.g., "I am hard on myself about my own flaws"), common humanity (e.g., "When I fail at something, I try to remember that everybody fails sometimes too"), isolation (e.g., "When I fail at something that's important to me, I feel like I'm all alone"), mindfulness (e.g., "When something upsets me I try to stay calm"), and over-identification (e.g., "When I'm feeling down, I can't stop thinking about everything that's wrong"). Responses were given on a 5-point Likert-type scale, ranging from 1 (*almost never*) to 5 (*almost always*). Previous work identified two subscales based on factor analysis³¹.

Confirmatory factor analysis was used to validate the two-factor structure in this sample. The fit of the two-factor model for self-compassion was found to be good, as indicated by the following fit indices: RMSEA = 0.048, CFI = 0.988, TLI = 0.891, and SRMR = 0.040. The two factors were identified as positive domains of self-compassion (common humanity, mindfulness, and self-kindness) and negative domains of the self-compassion measure (isolation, self-judgment, and overidentification). In this sample, the scale's internal consistency is reflected in Cronbach alphas of 0.83 at the pre-test and 0.81 at the post-test for positive self-compassion. The scale's

internal consistency was also demonstrated via Cronbach alphas of 0.82 at the pre-test and 0.81 at the post-test for negative self-compassion.

Classroom supportiveness

To assess students' perceptions of general supportiveness in the classroom, students were asked to respond to the 14-item Classroom Supportiveness subscale of the Sense of Classroom as a Community Scale⁴⁸. This subscale assesses the degree to which students evaluate their classmates as supportive and helpful (e.g., "Students in this class help each other learn"). Students responded to the items using a 5-point Likert-type scale from 1 (*disagree a lot*) to 5 (*agree a lot*). Evidence for the validity and reliability of this subscale has been demonstrated in previous research⁴⁸. For the present study, internal consistency, as assessed via Cronbach alphas, was 0.86 at the pre-test and 0.87 at the post-test.

Academic Goals Questionnaire

To assess academic growth mindset, students completed the Academic Goals Questionnaire, a measure that assesses students' academic goals⁴⁹. The measure comprises five items, and students rated each item on a 5-point Likert scale. Example questions include "If I have enough time, I can do a good job on all my schoolwork" and "Even if the work in school is hard, I can learn it." In this sample, the Cronbach alphas coefficients for this construct were 0.83 at the pre-test and 0.88 at the post-test.

Satisfaction with Life Scale for Children

Students' life satisfaction was assessed with the 5-item Satisfaction with Life Scale for Children⁵⁰ (SWLS-C). Example questions include "In most ways my life is close to the way I would want it to be" and "If I could live my life over, I would have it the same way." Students rated the items on a five-point Likert-type scale ranging from 1 (*Disagree a lot*) to 5 (*Agree a lot*). Ratings were averaged to produce a total score with higher scores indicating higher levels of life satisfaction. Evidence supporting the validity and reliability of the SWLS-C has been documented with samples of children and early adolescents⁵⁰. In the present study, Cronbach alpha's coefficient for this contrast was 0.83 at the pre-test and 0.87 at the post-test.

Measuring group difference

In this paper, we conducted a comprehensive analysis to assess the effectiveness of the SEE Learning program in which 4th and 5th grade students who received the program were compared to students in a waitlist control group. We conducted an Analysis of Covariance (ANCOVA). For the ANCOVA, we reported the F-statistic and its corresponding p-value to gauge the statistical significance, along with the post hoc estimate of Cohen's d to quantify the effect size. This provided a robust method to assess the impact of the SEE Learning program, with adjustments for key demographic variables and baseline differences.

Baseline equivalence

In the study, controlling for baseline differences in pre-test responses were achieved using ANCOVA. ANCOVA is a statistical technique that adjusts for initial differences between groups. In this context, it allowed for the comparison of post-test scores between the intervention and control groups while accounting for any baseline discrepancies. By using pre-test scores as a

covariate, the ANCOVA analysis effectively controlled for initial group differences on the final outcomes, focusing on the effects of the intervention. The covariate - grade – was included to account for differences observed between the groups at baseline.

Missing data

In our analysis, we handled missing data using multiple imputation. We had less than 10% missing data, accounting for 30 missing at post-test in the intervention group and 11%, or 39, missing at endline in the comparison group. We assumed that the data was missing at random. Based on this level of missing data and the results of this analysis, we determined that 15 imputations would be adequate for the baseline data. To ensure the robustness of our findings, we chose to perform 15 cycles of imputation. This decision was based on using as many imputations as the percentage of incomplete cases, and by the desire to capture the variability introduced by the missing data comprehensively. The imputation method we used was the imputation of means into the dataset, a technique that is well-suited for handling missing at random (MAR) data.

Results

The aims of the present study were twofold: 1) to assess the implementation (dosage and fidelity) of the SEE Learning program, and 2) to examine the preliminary student outcomes of the SEE Learning program on multiple social and emotional competencies.

Aim 1: Intervention dosage, feasibility, and acceptability

In the implementing classrooms, teachers engaged in the program with minimal preparation time, as all lessons required “30 minutes or less” of preparation, except for Lesson 12, which required “15 minutes or less.” Data were not collected for the learning experience 11. All teachers (100%) completed at least some of each learning experience, ensuring comprehensive coverage of the curriculum across all implementing classrooms. Lesson fidelity was high, with adherence to lesson plans ranging from 63% to 100%, reflecting strong commitment to the program standards. Teacher comfort levels were also notable, with most lessons reporting above 85%, indicating that teachers felt well-prepared and confident in delivering the content. Student engagement mirrored this positive trend, with most lessons achieving over 85%, showcasing a highly interactive and engaging learning atmosphere. The average lesson duration spanned 30 to 50 minutes, with an absolute range of 20 to 120 minutes. But, most lessons were completed within a 60-minute window of time. These numbers highlight the program’s feasibility within the late elementary setting (Table 3).

Table 3. Implementation Feasibility Based on Weekly Teacher Feedback from Implementing Classrooms.

Lesson	Preparation Time [@]	% Complete ^{\$}	Lesson Fidelity (% Moderate High to High) [^]	Teacher Comfort (% Moderate High to High Comfort) ^{&}	Student Engagement (% Positively Engaged) ^{&}	Lesson Duration Avg (Min/Max)
1	30 min or less	100	85	77	100	41 min (20/60)
2	30 min or less	100	85	100	92	40 min (20/60)
3	30 min or less	100	92	85	100	45 min (20/60)
4	30 min or less	85	91	73	100	30 min (20/60)
5	30 min or less	92	91	67	100	50 min (20/120)
6	30 min or less	100	85	92	100	30 min (20/60)
7	30 min or less	75	100	78	100	40 min

8	30 min or less	91	82	91	100	(20/60) 50 min
9	30 min or less	100	63	75	88	(20/60) 42 min
10	30 min or less	88	86	100	100	(20/60) 35 min
12	15 min or less	100	80	100	100	(20/60) 30 min
						(20/30)

@“Preparation Time” indicates the average time teachers spent preparing for the lesson.

\$“% Classes Completed” shows the percentage of classes that completed the lesson.

^ “Lesson Fidelity” reflects the adherence to the lesson plan, with “Moderate” indicating some deviations.

& “Teacher Comfort” and “Student Engagement” percentages represent the proportion of classes reporting moderately high to high levels of comfort and engagement, respectively.

*“Lesson Duration” provides the average time spent on the lesson, with a range indicating the shortest and longest durations observed.

Aim 2: Preliminary youth outcomes

The results of the study, using ANCOVA, demonstrate significant impacts of the SEE Learning program on various domains (Table 3). The intrapersonal domains of perspective-taking, empathic concern, intrinsic prosocial motivation, and self-compassion all demonstrated notable improvements in the intervention group compared to the wait-list control group, as indicated by significant F-statistics and Cohen’s D values. Student’s perception that their classroom feels supportive decreased in both groups, but the level of decrease was significantly lower in the intervention group when compared with the control group. This suggests that the intervention might be protective against declines in feelings of supportiveness that may happen in the absence of the intervention. The more distal outcome of a student’s academic goals setting ability, and perception that they are able to achieve in school, also increased in the intervention group in contrast to students in the wait-list control group.

Table 3. Intervention ANCOVA Results Table for Program Impact Over Time, Controlling for Grade.

	Intervention (n=314)		Wait-List Control (n=302)		Group Difference		
	Pre-test	Post-test	Pre-test	Post-test	F-Stat	df	Cohen's D
Intrapersonal Domains of Impact							
Awareness & Appraisal							
Perspective-taking	2.96 (2.87- 3.04)	3.11 (3.02- 3.19)	3.07 (3.0- 3.15)	2.91 (2.82-2.99)	6.45***	1	0.26
Emotional Resonance							
Empathic Concern	3.85 (3.77-3.93)	3.94 (3.77-3.93)	3.93 (3.85-4.00)	3.78 (3.70-3.86)	6.26***	1	0.25
Tolerating Uncomfortable Feelings							
Emotional Expression	3.05 (2.94-3.16)	3.14 (3.02-3.25)	3.09 (2.98-3.20)	3.11 (3.01-3.23)	0.40	1	0.06
Motivation to Act							
Intrinsic Prosocial Motivation	4.07 (3.98-4.16)	4.14 (4.05-4.23)	4.06 (3.97-4.15)	3.92 (3.82-4.01)	12.11***	1	0.33
Action							
Positive Self-Compassion	3.02 (2.93-3.10)	3.03 (2.94-3.12)	3.03 (2.94-3.12)	2.89 (2.80-2.98)	5.15***	1	0.22
Negative Orientation to Self	3.14 (3.03-3.24)	3.12 (3.01-3.22)	3.20 (3.09-3.30)	3.24 (3.13-3.35)	0.48	1	0.07
Interpersonal Domains of Impact							
Relationship Student Class Supportive	3.51 (3.42-3.60)	3.50 (3.38-3.57)	3.25 (3.16-3.34)	3.16 (3.07-3.25)	10.98***	1	0.34
Student Group Respect	3.83 (3.72-3.93)	3.70 (3.59-3.81)	3.44 (3.33-3.54)	3.26 (3.15-3.36)	2.83	0.43	0.17
Distal Outcomes							
Academic Goal Setting	3.63 (3.53-3.74)	3.77 (3.66-3.88)	3.56 (3.46-3.67)	3.55 (3.45-3.66)	8.65***	1	0.28
Life Satisfaction	3.95 (3.84-4.05)	3.98 (3.88-4.09)	3.76 (3.66-3.86)	3.81 (3.70-3.91)	3.96	1	0.19

Standard Deviation in parentheses

*** $p < .01$, ** $p < .05$

Discussion

This is the first quasi-experimental trial to assess the feasibility and preliminary effects of the SEE Learning program with elementary school students. Overall, our findings suggest that SEE Learning (1) is relatively easy for teachers to implement and is well-received by both teachers and students and (2) shows potential to enhance students' compassion-related responses and academic goal setting. Overall, this pilot study supports a model in which combining compassion-based practices with mindfulness practices is associated with positive changes in students' interpersonal and intrapersonal competence.

Our study adds to the existing research on the effectiveness of classroom-based SEL programs in several key ways. Indeed, this initial investigation of the SEE Learning program advances both theory and research in SEL and the development of compassion in school-aged children. It shows that a compassion-based SEL program, which explicitly includes mindfulness practices, can promote empathy-related responses (such as empathic concern and perspective-taking) and self-compassion. Additionally, the study demonstrates that the program can boost students' intrinsic motivation for prosocial behavior. Our findings suggest that the program is particularly effective for late elementary school students, a developmental stage ideal for introducing compassion-based programs.²³

One of the key strengths of our research is that it evaluates a compassion-based SEL program implemented under "real-world" conditions in diverse classrooms typical of many large school districts. This approach provides high ecological validity, as it reflects the actual contexts in which teachers address the needs of a diverse student population in regular classrooms⁵¹.

Research indicates that within a single school, student populations can vary widely in terms of family backgrounds, cultural experiences, and socioeconomic statuses. Therefore, assessing the effectiveness of SEL programs within such diverse, everyday settings provides strong evidence for the program's external validity, demonstrating its impact across different contexts.

Another notable strength of this study is that it enhances both researchers' and educators' understanding of program implementation by showing that a relatively easy-to-use and cost-effective SEL program focused on compassion-based practices can be implemented with high fidelity. Responding to the recent call for researchers to include implementation data in evaluations of SEL programs^{38,39}, we specifically designed our study to collect data on teachers' perceptions of the feasibility and acceptability of the SEE Learning program, as well as their views on student engagement. Teachers reported high levels of student involvement in the SEE Learning lessons; for 9 out of the 12 lessons, 100% of students were reported to be positively engaged. Although we recognize that teachers' perceptions of student engagement may not be as informative as the students' own views, these insights provide valuable information about teachers' experiences with their students' engagement and interest in the program.

Regarding teachers' reports on the feasibility of implementing SEE Learning, our analysis of the SEE Learning teacher diaries showed that lesson dosage and fidelity were relatively high. All SEE Learning teachers (100%) completed at least some part of each learning experience, with adherence to lesson plans ranging from 63% to 100%. This implementation fidelity is higher than what is typically reported in other evaluations of classroom-based SEL programs. As noted by Durlak and DuPre (2008) in their meta-analysis on the impact of implementation on program outcomes: "Expecting perfect or near-perfect implementation is unrealistic. Positive results have often been obtained with levels around 60%; few studies have

attained levels greater than 80%" (p. 331). Taken together, we are encouraged that teachers found the SEE Learning program relatively easy to implement and that their students were highly engaged in the lessons. Overall, the results of this study demonstrate some modest yet significant positive impacts of the SEE Learning program on various social and emotional outcomes among students. Notably, students in the SEE Learning classrooms exhibited improvements in perspective-taking, empathic concern, intrinsic prosocial motivation, and positive self-compassion. These enhancements are underscored by significant declines in these same constructs that occurred in the wait-list control group over the study period.

The significant enhancement in academic growth mindset is a promising finding, as it suggests that SEE Learning may positively influence students' attitudes and motivation towards their academic goals. The relationship between prosocial behaviors, empathy-related responding, and academic success has been well-established⁵²⁻⁵⁴. The findings of this study align with these existing insights, providing further evidence that compassion training can contribute to improved academic outcomes and overall well-being among students.

Limitations

The data presented here suggest that further investigation into the effectiveness of the SEE Learning program is warranted. However, several limitations should be considered when interpreting the results. The first limitation is the use of a quasi-experimental design rather than a randomized controlled trial. Although the sample size was moderate to large, classrooms were not randomly assigned to the study conditions. Our study was conducted during the post-COVID return to school, and school administrators were hesitant to offer the program to only a portion of their students. Consequently, while schools agreed to participate in either the intervention or wait-listed control groups, they did not permit randomization at the classroom level. This

recruitment method may have biased both groups towards schools that were highly motivated to implement the program, making it difficult to generalize the findings to schools with moderate or low motivation.

The lack of random assignment complicates the ability to draw causal inferences between the SEE Learning program and improvements in children's social and emotional competence without further evidence. The observed effects could be due to specific elements of the SEE Learning curriculum, the characteristics of the teachers who volunteered, or a combination of both.

Despite these limitations, there are reasons to be confident in our findings. First, children were not assigned to teachers based on the SEE Learning program, so there is no reason to believe that the children who received the program differed from those in the wait-list control classrooms. Second, the patterns of change observed across several dimensions of social behavior align with the criteria outlined by Shadish, Cook, and Campbell⁵⁵ (2002) for making causal claims in quasi-experimental designs. Notably, our significant findings regarding perspective-taking, empathic concern, self-compassion, intrinsic prosocial motivation, and academic goal setting showed patterns of change from pre-test to post-test in opposite directions for the SEE Learning and wait-list control groups, suggesting that alternative explanations for these results are unlikely.

Another second limitation of our study is that analyses were conducted at the individual child's level, even though the selection was made at the classroom level. Unfortunately, the small number of classrooms did not provide enough statistical power for multi-level modeling. This clustering of children within classrooms creates non-independence among subjects, which could bias the statistical tests used to assess intervention effects. This is a common challenge in

evaluating universal, school-based interventions when resources are insufficient to recruit a large number of classrooms or schools⁵⁶.

Nonetheless, as noted by Slavin (2008), although analyzing data at the child level when randomization is done at the classroom level is discouraged by methodologists because the findings can exaggerate statistical significance “. . . their effect sizes are unbiased (Raudenbush & Bryk, 2002) and therefore are of value . . . ” (p. 9)⁵⁷.

Conclusion and Directions for Future Research

The SEE Learning intervention consistently yielded positive effects across various domains, particularly in perspective-taking, empathic concern, self-compassion, and intrinsic prosocial motivation. These results highlight the potential of compassion training to foster intrapersonal growth and promote positive social and emotional development among elementary school students. Future research should delve deeper into the reasons behind the observed trends, exploring potential moderating and modifying factors. Additionally, randomized longitudinal studies are needed to assess the long-term effects of the SEE Learning intervention on students' social and emotional development, well-being, and academic achievement to determine whether the positive impacts are durable.

Overall, this study contributes to the growing body of evidence supporting the integration of compassion cultivation within educational settings to enhance both students' personal development and academic success. Recent reviews have³⁸ have called for a greater understanding of childhood and compassion training in the context of childhood apart from other age groups. This study contributes to this call by providing a preliminary demonstration of the impact of compassion training within schools on elementary students' social and emotional development.

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Supporting Information

S1 Table. Teacher Feedback Diaries. This is the table of feedback that each teacher was asked to complete after the delivery of a learning experience. This data was used to determine fidelity, acceptability, and engagement.

S2 Table. Student Measures Key. This table is a list of all measures that were administered to all student participants.