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Socio-Demographic Patterns In Life-Skills Competencies Among Early Adolescents: Evidence From A Quasi-Experimental Study In India

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Abstract
Background: *Life-skills education (LSE) builds adolescents' psychosocial competence. Evidence is mixed on whether socio-demographic factors (gender, family type, age, social category) shape LSE outcomes.*
Methods: *Quasi-experimental pre–post design with parallel control and experimental cohorts from secondary schools in Kerala, India. Five domains were assessed (decision-making, problem-solving, self-awareness, coping with stress, coping with emotions). Within-group pre/post comparisons used independent-samples t-tests (gender) and one-way ANOVA (family type, age, social category); α=0.05.*
Results: *Pre-test: females outperformed males in decision-making, problem-solving, and self-awareness in both cohorts; no gender differences for coping. Family type showed no differences. Age differences emerged only for self-awareness (16-year-olds higher than 17-year-olds). Social-category differences were significant for decision-making, problem-solving, and self-awareness (SC/ST > OBC/General), with no differences for coping. Post-test: female advantage persisted for cognitive/reflective domains; coping remained non-differential by gender and age; family type stayed null. Social-category gaps largely narrowed, with a residual advantage for SC in stress-coping in the experimental arm.*
Conclusions: *LSE appears to equalize affective competencies across socio-demographic lines while modest gender differences persist in cognitive/reflective skills. Programmes should retain universal components that level coping skills and add targeted supports to accelerate boys' reflective skill gains.*
Keywords: *adolescents; family type; gender; life skills education; social category*

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I. Background Of The Study

Adolescence is a sensitive developmental window in which cognitive control, social perspective-taking, and emotion regulation undergo rapid maturation alongside expanding social roles and expectations. Equipping young people with core "life skills", a set of psychosocial competencies that enable adaptive, responsible behaviour in daily life, has therefore become a central strategy in education and health policy. The United Nations inter-agency consensus convened by the World Health Organization (WHO) defines life-skills education (LSE) as structured learning experiences that develop abilities such as decision-making, problem-solving, creative and critical thinking, effective communication, interpersonal skills, self-awareness, empathy, coping with emotions, and coping with stress, with an emphasis on participatory, experiential pedagogy rather than didactic instruction (World Health Organization [WHO], 1999).

There is now a substantial international evidence base showing that well-implemented, universal school programmes that target social and emotional competencies improve multiple outcomes relevant to adolescent wellbeing. A landmark meta-analysis of 213 school-based interventions (N≈270,000) reported gains in social-emotional skills, prosocial behaviour, reduced conduct problems, and an 11-percentile-point increase in academic achievement; notably, programmes using Sequenced, Active, Focused, and Explicit methods (SAFE) and delivered by classroom teachers were effective (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Benefits also appear durable: a follow-up meta-analysis synthesising 82 universal programmes (N≈97,000) found effects maintained 6 months to 18 years post-intervention across social-emotional skills, attitudes, wellbeing, and several behavioural outcomes (Taylor, Oberle, Durlak, & Weissberg, 2017).

Global policy frames reinforce these priorities. The Lancet Commission on Adolescent Health and Wellbeing positions adolescence (10–24 years) as a critical phase in which investment yields a "triple dividend"

for current health, future adult trajectories, and the next generation; the Commission highlights social and emotional competencies as cross-cutting assets for health, education, and economic participation (Patton et al., 2016). In India, the National Education Policy (NEP) 2020 emphasises holistic, competency-based learning, explicitly naming life skills (e.g., communication, teamwork, resilience) as integral curricular aims and encouraging experiential, formative approaches in classrooms (Ministry of Education, 2020). Health sector policy likewise embeds life-skills approaches: the Rashtriya Kishor Swasthya Karyakram (RKSK) operational framework articulates peer education, counselling, and community platforms to improve adolescents' knowledge, aptitude, and life skills across nutrition, mental health, violence, sexual and reproductive health, and substance use (Ministry of Health and Family Welfare, 2014; 2018).

Within India, rigorously evaluated school-based programmes illustrate the feasibility and impact of structured interventions that cultivate psychosocial competence. The SEHER cluster-randomised trial in Bihar tested a multicomponent, whole-school health-promotion intervention that targeted school climate and psychosocial competencies. When delivered by trained lay counsellors, SEHER produced substantial improvements in school climate and student health-related outcomes relative to control schools, whereas a teacher-delivered arm showed no detectable effects, underscoring the importance of delivery modality and dedicated facilitation (Shinde et al., 2018; Shinde et al., 2020).

Beyond single trials, systematic reviews focused on low- and middle-income countries (LMICs) indicate that adolescent life-skills and allied school-based mental-health promotion programmes can improve functioning and reduce internalising symptoms, especially when interventions use active, experiential methods and attend to relational processes (e.g., peer dialogue, teacher–student interactions) and implementation supports (training, supervision, fidelity, and sufficient dosage) (Barry, Clarke, Jenkins, & Patel, 2013; Fazel, Patel, Thomas, & Tol, 2014; Singla et al., 2020). These syntheses collectively suggest that LSE and broader socio-emotional learning approaches are credible, scalable tools for advancing adolescents' psychosocial development and, in some cases, academic engagement in LMIC settings.

At the same time, the umbrella label "life skills" spans overlapping constructs (e.g., social-emotional skills, "non-cognitive" skills, 21st-century competencies) and measurement traditions, which complicates cross-study comparisons and can mask which components drive change. Recent scoping reviews and methodological commentaries call for clearer construct definitions and stronger, validated, domain-specific measures that capture both cognitive-reflective capacities (e.g., decision-making, problem-solving, self-awareness) and affective regulation (coping with stress and emotions) to tighten links between LSE theory and observed outcomes (Darlington-Bernard et al., 2023).

A second gap concerns equity and subgroup dynamics. While average effects are well documented in global meta-analyses, fewer studies explicitly interrogate whether socio-demographic factors shape baseline profiles or moderate gains in specific life-skill domains within real-world school settings. Evidence from Indian and LMIC contexts suggests potential heterogeneity by gender and setting, as well as sensitivity to delivery agent. For instance, the SEHER findings imply that implementation characteristics (e.g., dedicated lay counsellors versus teachers) interact with context to influence outcomes (Shinde et al., 2018), while broader LMIC syntheses emphasise that effects are strengthened when programmes embed robust implementation systems and culturally responsive pedagogy (Fazel et al., 2014; Singla et al., 2020). Moreover, emerging Indian evidence points to gender-patterned profiles on life-skill domains: in a recent South India study, girls outperformed boys on several life-skills measures, indicating possible baseline differences that programmes should consider when designing reflective and decision-making components (Thippeswamy, Vishwesh, & Nagendra, 2025). Relatedly, large-sample work on adolescents in rural India documents gender gaps across cognitive and socio-emotional measures, pointing to contextual and socialisation factors that may shape competencies (Hervé, Klasen, & Zins, 2022).

Clarifying these relationships has practical importance for programme design and scale-up. If particular groups (e.g., boys) consistently enter programmes with lower cognitive-reflective skills (decision-making, problem-solving, self-awareness) while affective regulation is more evenly distributed, facilitators could front-load coached reflection, decision "labs," and problem-solving scenarios to accelerate gains for those subgroups, while maintaining universal practice in emotion and stress coping. Conversely, if family structure or social category is not associated with differential baseline skills or post-programme gains, implementers can prioritise universal classroom processes and school-climate improvements rather than complex targeting, reducing stigma and administrative burden. Such decisions require local, domain-specific evidence rather than assumptions or pooled estimates from dissimilar settings (Ministry of Education, 2020; Patton et al., 2016).

Despite the breadth of global evidence on LSE effectiveness, there remains a paucity of Indian studies that simultaneously (i) disaggregate multiple socio-demographic factors (gender, age band, family type, social category), (ii) examine distinct life-skill domains (decision-making, problem-solving, self-awareness, coping with stress, coping with emotions) rather than only aggregate indices, and (iii) compare pre- and post-intervention patterns within parallel control and experimental cohorts to illuminate equity dynamics. Addressing this gap, the present study employs a controlled pre–post design in Kerala secondary schools to assess whether gender, family

type, age, and social category are associated with adolescents' performance in five life-skill domains at baseline and whether a structured LSE programme modifies these patterns at post-test. The study is aligned with NEP-2020's competency-based vision and the international consensus on experiential life-skills pedagogy, and aims to generate domain-specific, equity-relevant evidence to inform programme design and monitoring in Indian schools (Ministry of Education, 2020; WHO, 1999; Patton et al., 2016).

This study was guided by the following research questions:
RQ1: Do early adolescents differ in life-skills competencies across socio-demographic characteristics (gender, age, family type, and social category) at baseline?
RQ2: Does participation in a structured life-skills education intervention lead to significant improvements in adolescents' life-skills competencies compared to a control group?
RQ3: Do intervention effects vary across socio-demographic subgroups, indicating differential gains or convergence in life-skills competencies over time?

II. Methods

Study Design

This study employed a pre- and post-test quasi-experimental design with parallel control and experimental cohorts to evaluate the impact of a structured life-skills education intervention on adolescents' life-skill competencies (decision-making, problem-solving, self-awareness, coping with stress, and coping with emotions) and to examine differential effects across socio-demographic factors (gender, age, family type, and social category).

Study population and setting

The study targeted higher secondary students enrolled in government schools in Kasaragod district, Kerala. The intervention, a researcher-delivered life-skills education programme, was designed to enhance participants' life skills and psychosocial competencies across decision-making, problem-solving, self-awareness, coping with stress, and coping with emotions. Participants were recruited from multiple government higher secondary schools across the district, with schools allocated to parallel control and experimental groups. Pre- and post-intervention assessments were administered on the respective school premises in scheduled classroom sessions using the study's standardized tools.

The participant cohort comprised adolescents at the higher secondary level drawn from diverse socio-demographic backgrounds. Key characteristics (gender, age, family type, and social category) were recorded to enable subgroup analyses of baseline differences and post-intervention changes in life-skill competencies.

Sample size determination

We powered the study to detect between-group differences in continuous life-skill domain scores (post-test means with baseline equivalence, operationalized as a two-sample *t*-test on change or post-test adjusted means). Using G*Power software (Version 3.1), a two-tailed $\alpha=0.05$, and desired power of 0.90, a small-to-moderate standardized effect (Cohen's $d\approx0.40$) typical of universal school-based life-skills/SEL (Social Emotional Learning) programmes yielded a minimum of $n\approx86$ per arm (total ≈172)**.** To ensure adequate power across five primary domains and to buffer for real-world losses (non-response/missing data, scheduling conflicts) and modest clustering within intact classes, we applied a conservative inflation (≈30–40%). This produced a target of 120 participants per arm (total N=240)**.** At this sample size, the study retains ~90% power at $\alpha=0.05$ (two-sided) to detect Cohen's $d\approx0.42$ between groups, while also providing reasonable cell sizes for planned subgroup comparisons by gender, age band, family type, and social category.

Sampling Technique

For the study, four Government Higher Secondary Schools in Hosdurg Taluk, Kasaragod, Kerala were selected from the population using simple random sampling**.** From each selected school, 60 Class XI students were then chosen by simple random sampling from the class registers, yielding a total sample of 240 students**.** The sample size was determined for a population of 4,680 Class XI students (Government Higher Secondary Schools, Hosdurg Taluk) using a 95% confidence level**,** 5% margin of error**,** and an assumed population proportion of 50%. Of the 240 students, 120 were assigned to the intervention group (received the study's life-skills education module) and 120 to the control group (continued with the standard curriculum).

Data collection instruments

A structured questionnaire served as the primary data collection instrument. The pre-intervention tool comprised two components designed to profile participants and assess baseline life-skills competencies. Section A was a self-prepared socio-demographic questionnaire that captured age, gender, family type (nuclear/joint),

parental education and occupation, socio-economic status, recent academic performance, and participation in extracurricular activities. This section was administered at baseline to contextualize outcomes and enable subgroup analyses across gender, age band, family type, and social category. Section B was the Life Skills Assessment Scale developed by Vrinda M. N. (2009), a comprehensive measure aligned to the ten core domains articulated by WHO (1999): decision-making (10 items), problem-solving (13 items), empathy (12 items), self-awareness (10 items), communication (10 items), interpersonal relationships (18 items), coping with emotions (9 items), coping with stress (9 items), creative thinking (14 items), and critical thinking (10 items). Items were rated on a Likert-type scale and scored to yield domain-level and composite indices, with higher scores indicating stronger competencies. The Life Skills Assessment Scale was administered to both the control and experimental groups at pre-test and post-test, enabling comparison of change over time and between groups. For reporting in the present manuscript, primary outcomes emphasize the five focal domains that map directly to the programme's learning objectives, decision-making, problem-solving, self-awareness, coping with stress, and coping with emotions.

All instruments were translated into Malayalam and back-translated to ensure semantic equivalence; discrepancies were resolved by bilingual subject experts. Necessary permissions were obtained for instrument use and adaptation. Prior to the main study, the full questionnaire set underwent pilot testing in a comparable school to assess clarity, cultural appropriateness, and administration time; feedback informed minor wording refinements, and internal consistency was evaluated to verify reliability of domain scores.

Validity and reliability of instrument

The Life Skills Assessment Scale is a standardized, previously validated tool for Indian adolescents. Because we used the original items and scoring without modification, a full re-validation was not required**.** However, since the scale was administered in Malayalam and in a new sample, we completed basic linguistic and procedural checks**:** forward–back translation, expert review for content/face validity, and a small pilot to confirm clarity and feasibility. We also rechecked internal consistency in our sample; Cronbach's alpha for the key domains was ≥0.70**.**

The self-prepared socio-demographic questionnaire (background variables) underwent expert review for content coverage and a brief pilot for face validity and comprehension. As this tool captures factual characteristics, no psychometric scaling was required beyond these checks.

Data collection protocol

Data were collected in two phases with a structured classroom administration schedule.

Phase 1- Pre-intervention (baseline):

Before any training, students in both the experimental and control groups completed the baseline questionnaire set during a timetabled class period on school premises. The questionnaire set comprised (i) the self-prepared socio-demographic questionnaire (age, gender, family type, parental education/occupation, socio-economic status, academic performance, extracurricular participation) and (ii) the Life Skills Assessment Scale. Trained researchers invigilated all sessions, provided standardised instructions in Malayalam/English**,** and addressed procedural queries. Responses were recorded using anonymous unique codes to protect confidentiality and to enable linkage at follow-up.

Intervention (experimental arm):

The life-skills education (LSE) intervention was conceptually grounded in the World Health Organization's life-skills framework and aligned with contemporary social and emotional learning (SEL) models that emphasize self-awareness, decision-making, problem-solving, and emotional regulation through experiential pedagogy. Consistent with the SAFE approach (sequenced, active, focused, and explicit), the programme employed structured activities, guided reflection, and peer interaction to facilitate skill acquisition. While drawing on established SEL principles, the intervention was contextually adapted to the Indian secondary school setting, incorporating culturally relevant examples and classroom-based participatory methods rather than externally packaged curricula.

Following the baseline assessment, only the experimental classes participated in a researcher-led 25-hour life-skills education module**,** woven into their regular school timetable. The module was designed to feel dynamic and student-centred, beginning with ice-breakers and rapport-building exercises that created a safe and participatory learning environment. Each session focused on one or more core competencies, self-awareness, decision-making, problem-solving, coping with emotions, and coping with stress**,** and progressively built students' confidence and skills.

Learning took place through experiential, hands-on methods rather than lectures. Students engaged in guided reflections**,** small-group problem-solving tasks**,** realistic scenario analyses**,** and role-plays that encouraged

them to think critically, collaborate, and apply skills to everyday challenges. Each activity closed with a short debrief**,** allowing learners to articulate insights, connect ideas, and internalise key principles. Attendance was monitored at every session to ensure consistent exposure.

Meanwhile, students in the control classes continued with the standard curriculum and did not receive the intervention, which helped minimise contamination and maintain the integrity of the comparative design.

Phase 2 - Post-intervention (3-month follow-up):

Three months after completion of the final training session in the experimental arm, both groups again completed the Life Skills Assessment Scale under classroom supervision to assess change and maintenance of competencies. The socio-demographic form was not re-administered at follow-up. Make-up administration windows were provided for absentees within each school. All data were collected using the same anonymous codes.

Data analysis

Quantitative analyses were conducted using IBM SPSS Statistics (Version 27). Descriptive statistics (frequencies, percentages, means, standard deviations) summarised socio-demographic characteristics and baseline distributions for the five life-skills domains (decision-making, problem-solving, self-awareness, coping with stress, coping with emotions). Internal consistency (Cronbach's α) was estimated for each domain at baseline.

To evaluate intervention effects, we combined within-group and between-group approaches. First, paired-samples ***t***-tests assessed pre- to 3-month post-change within the experimental and control arms separately (using anonymous linkage codes). Second, independent-samples *t*-tests compared experimental vs control at post-test (unadjusted). Third, to control for any baseline differences and estimate the net programme effect, we fitted ANCOVA models for each life-skills domain with post-test score as the outcome, study arm as the factor, and the corresponding baseline score as a covariate.

Socio-demographic patterning was examined as planned: independent-samples ***t***-tests for gender and one-way ANOVAs for age (15/16/17 years), family type (nuclear/joint), and social category (SC/ ST/ OBC/ General) at both pre- and post-test within each arm.

III. Results And Discussion

Socio-Demographics of the Participants

The socio-demographic characteristics of the participants were compared between the control and experimental groups. A total of 240 higher secondary students were enrolled, with 120 students in each group. Overall, 62.5% (*n*=150) were female and 37.5% (*n*=90) were male; females constituted 65.0% (*n*=78) of the control group and 60.0% (*n*=72) of the experimental group, while males accounted for 35.0% (*n*=42) and 40.0% (*n*=48), respectively.

The age distribution was comparable across groups and concentrated at 16 years. Overall, 65.0% (*n*=156) of students were 16 years**,** 24.6% (*n*=59) were 15 years**,** and 10.4% (*n*=25) were 17 years**.** In the control group, 22.5% (*n*=27) were 15 years, 65.0% (*n*=78) were 16 years, and 12.05% (*n*=15) were 17 years; in the experimental group, 26.7% (*n*=32) were 15 years, 65.0% (*n*=78) were 16 years, and 8.4% (*n*=10) were 17 years. Thus, both groups had identical representation of 16-year-olds, with a slightly higher share of 15-year-olds in the experimental arm and 17-year-olds in the control arm.

A major percentage of participants belonged to nuclear families **(**86.7%**,** *n*=208) with 13.3% (*n*=32) from joint families; distributions were comparable between control (85.8% nuclear) and experimental (87.5% nuclear) groups.

By social category, OBC students formed the majority **(**75.0%**,** *n*=180), followed by ST **(**15.8%**,** *n*=38), General **(**5.8%**,** *n*=14), and SC **(**3.3%**,** *n*=8). Groupwise, OBC remained predominant in both arms (control 78.3%, experimental 71.7%), while ST representation was higher in the experimental group **(**20.8% vs. 10.8% in control); SC (4.2% vs. 2.5%) and General (6.7% vs. 5.0%) proportions were small and similar across groups. Taken together, the two groups were closely matched on age, gender, and family type, with the main distributional difference being the higher proportion of ST students in the experimental arm.

Table 1

Socio-Demographics of the Study-Participants

Socio Demographics		Control Group		Experimental Group		Total	
		n	%	n	%	N	%
Age	Belongs to 15 Years	27	22.50	32	26.70	59	24.60
	Belongs to 16 Years	78	65.00	78	65.00	156	65.00
	Belongs to 17 Years	15	12.05	10	8.40	25	10.4

Gender	Female	78	65.0	72	60.0	150	62.50
	Male	42	35.0	48	40.0	90	37.50
Family Type	Nuclear	103	85.80	105	87.50	208	86.70
	Joint	17	14.20	15	12.50	32	13.30
Social Category	SC	5	4.20	3	2.50	8	3.30
	ST	13	10.80	25	20.80	38	15.80
	OBC	94	78.30	86	71.70	180	75.00
	GENERAL	8	6.70	6	5.00	14	5.80

Impact of Socio-Demographic Factors in determining the performance of Life Skills.

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Age of the Participants

Adolescence encompasses rapid cognitive and socio-emotional change, making age a plausible source of baseline variability in life-skill competencies. Before attributing any post-programme differences to the intervention, we examined whether pre-intervention scores on five domains, decision-making, problem-solving, self-awareness, coping with emotions, and coping with stress, varied across 15-, 16-, and 17-year-olds within the control and experimental arms.

One-way ANOVAs compared domain means across the three age groups within each arm. In the control arm, self-awareness differed significantly by age ($F(2,117)=3.954$, $p=.022$), whereas decision-making ($F=1.455$, $p=.238$), problem-solving ($F=0.617$, $p=.541$), coping with emotion ($F=2.031$, $p=.136$), and coping with stress ($F=0.301$, $p=.825$) did not. In the experimental arm, the pattern replicated: self-awareness showed a significant age effect ($F(2,117)=3.999$, $p=.021$), while decision-making ($F=1.329$, $p=.269$), problem-solving ($F=0.614$, $p=.543$), coping with emotion ($F=1.911$, $p=.153$), and coping with stress ($F=0.631$, $p=.597$) were non-significant. Mean profiles indicated lower self-awareness among 17-year-olds (control: 33.53 vs. 37.63–38.04; experimental: 35.47 vs. 38.96–39.51), with 15- and 16-year-olds closely aligned in both arms. Corresponding partial η^2 values for self-awareness were small (≈0.06–0.07), and effects for other domains were very small ($\eta^2p \lesssim 0.03$).

At baseline, adolescents were broadly age-homogeneous on four life-skill domains (decision-making, problem-solving, coping with emotion, coping with stress) in both arms, suggesting comparable starting points for subsequent intervention evaluation. The only age-sensitive domain was self-awareness, where 17-year-olds exhibited lower scores than younger peers. Given the small effect magnitude and the unequal cell sizes (notably n=10–15 for the 17-year group), this pattern likely reflects modest developmental variability around late-adolescent transitions (e.g., identity consolidation and exam pressures) rather than large structural differences. The close alignment of means for 15 vs. 16 years further indicates that mid-adolescence (15–16) is relatively stable at baseline for these competencies.

The self-awareness pattern aligns with developmental theory that situates late adolescence as a period of intensified identity exploration and evaluation, during which self-representations can become temporarily less coherent (Erikson, 1968; Kroger, 2017; Meeus, 2011). As self-concept becomes more abstract and multidimensional across mid- to late adolescence, short-term dips in perceived self-clarity are not unusual, especially under evaluative pressures (Harter, 2015). School-based contexts at this age frequently coincide with high-stakes examinations and competitive transitions, and reviews consistently link such academic pressures with elevated stress/test anxiety and modest decrements in reflective functioning (Eccles & Roeser, 2011; Putwain, 2008; von der Embse, Barterian, & Segool, 2013).

From an implementation standpoint, the absence of baseline age differences in decision-making, problem-solving, and coping domains supports universal delivery of core life-skills content without age tracking, an approach consistent with meta-analytic evidence that universal school-based SEL/LSE programmes benefit diverse adolescent groups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). At the same time, the small but reliable self-awareness gap suggests incorporating light reflective scaffolds (e.g., identity mapping, future-self goal-setting with feedback) for older cohorts to support ongoing identity work (Kroger, 2017; Harter, 2015). For reporting completeness, post-hoc contrasts should specify which age pairs differ on self-awareness (expected: 17 < 16, possibly 17 < 15**,** with 15 ≈ 16), and future replications should aim for more balanced age cells and consider modelling exam-timing or class-level clustering to test whether the gradient persists when contextual stressors are accounted for (Eccles & Roeser, 2011; Putwain, 2008).

Table 2

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Age of the Participant

Component	Group	Age	N	M	SD	F	p-Value
Decision Making Skill	Control	15	27	32.44	3.355	1.455	0.238
		16	78	34.08	5.029		
		17	15	32.93	3.634		

	Experimental	15	32	33.59	3.400	1.329	0.269
		16	78	34.86	4.726		
		17	10	33.40	3.135		
Problem-Solving Skills	Control	15	27	41.93	5.890	0.617	0.541
		16	78	43.64	7.281		
		17	15	43.00	6.856		
	Experimental	15	32	43.74	5.425	0.614	0.543
		16	78	45.32	6.754		
		17	10	44.67	6.355		
Self-Awareness Skill	Control	15	27	37.63	4.993	3.954	0.022
		16	78	38.04	5.762		
		17	15	33.53	6.567		
	Experimental	15	32	38.96	4.345	3.999	0.021
		16	78	39.51	5.229		
		17	10	35.47	5.475		
Coping with Emotion	Control	15	27	29.81	3.211	2.031	0.136
		16	78	29.37	4.513		
		17	15	27.20	4.246		
	Experimental	15	32	31.81	3.076	1.911	0.153
		16	78	31.18	4.778		
		17	10	29.13	3.833		
Coping with Stress	Control	15	27	30.37	4.84	0.301	0.825
		16	78	31.35	5.15		
		17	15	31.36	2.44		
	Experimental	15	32	30.19	5.49	0.631	0.597
		16	78	31.04	5.24		
		17	10	30.29	4.18		

Age-wise post-test comparison and pre–post synthesis

Post-intervention, one-way ANOVAs showed no significant age effects (15 vs. 16 vs. 17 years) within either arm across all five domains (all $p > .05$). In the control arm: Decision-making (F=0.648, p=.586), Problem-solving (F=0.641, p=.541), Self-awareness (ns), Coping with emotion (F=0.252, p=.860), and Coping with stress (F=0.474, p=.701) were age-invariant. The experimental arm mirrored this pattern: Decision-making (F=1.323, p=.270), Problem-solving (F=1.627, p=.543), Self-awareness (F=1.165, p=.326), Coping with emotion (F=0.948, p=.420), and Coping with stress (F=1.731, p=.164) all showed non-significant age differences.

Across domains, age gradients remained flat at post-test in both arms, but absolute levels were substantially higher in the experimental arm.

Two consistent signals emerge. First, the life-skills programme produced broad, age-invariant improvements in the experimental arm, i.e., all age groups benefited, and the intervention did not preferentially advantage any single age band. Second, the pre-test age effect in self-awareness ($17 < 15/16$) attenuated by post-test in the experimental arm, driven by the largest self-awareness gain among 17-year-olds (+4.91). Together, these patterns suggest that participatory, reflective activities can level age-related differences evident at baseline while lifting overall competence.

The post-test equalisation across ages is consistent with evidence that universal, sequenced, active, and explicitly focused school programmes yield generalized gains across subgroups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). In particular, the marked improvements in decision-making and problem-solving align with meta-analytic findings that experiential, skills-forward curricula enhance cognitive–behavioural competencies alongside socio-emotional outcomes (Durlak et al., 2011). The convergence in self-awareness by post-test echoes developmental guidance that structured reflection, identity prompts, and peer discussion can scaffold late-adolescent identity work, mitigating transient dips in self-clarity commonly observed during high-stakes transition periods (Erikson, 1968; Harter, 2015; Kroger, 2017). The sizeable gains in coping domains across all ages further map onto international guidance that life-skills pedagogy, emphasising practice, feedback, and contextualisation, improves emotion and stress regulation in school settings (World Health Organization, 1999; Taylor et al., 2017).

From an implementation standpoint, the absence of post-test age effects supports non-age-tracked delivery without sacrificing equity of impact, while the larger self-awareness gain among 17-year-olds suggests value in retaining reflective micro-activities (e.g., future-self goal setting, values clarification) during senior secondary periods when exam stress peaks (Eccles & Roeser, 2011; Putwain, 2008; von der Embse, Barterian, & Segool, 2013). Methodologically, these descriptive pre–post patterns warrant confirmation with the study's ANCOVA models to quantify net programme effects and to report effect sizes with confidence intervals; nonetheless, the replicated non-significant age ANOVAs at post strengthen the conclusion that programme benefits were uniform across 15–17 years in this cohort.

Gender-wise pre-test comparison and interpretation

Because gendered socialisation can shape adolescents' cognitive–reflective and affective competencies, we compared pre-intervention life-skill scores between female and male students across five domains (decision-making, problem-solving, self-awareness, coping with stress, and coping with emotions) in both arms. Establishing baseline differences is essential for interpreting subsequent programme effects and for targeting supports where gaps exist.

Independent-samples *t*-tests showed a consistent female advantage in three domains at baseline. In the control arm, females scored higher than males on decision-making (t=3.07, p=.003; ΔM=+2.59), problem-solving (t=2.95, p=.004; ΔM=+3.79), and self-awareness (t=2.62, p=.010; ΔM=+2.86); effects were medium in magnitude (approx. Cohen's $d \approx 0.59$, 0.57, and 0.50, respectively). In the experimental arm, females again outperformed males on decision-making (t=2.03, p=.045; d≈0.38), problem-solving (t=2.78, p=.006; d≈0.52), and self-awareness (t=3.41, p=.001; d≈0.64). By contrast, coping with stress and coping with emotions did not differ significantly by gender in either arm (all p>.20), with small effect-size estimates (d≈0.16–0.36).

At baseline, female students demonstrated higher cognitive–reflective life skills that is, decision-making, problem-solving and self-awareness than male peers, while affective coping capacities, stress and emotion coping were broadly comparable across genders. This pattern was replicated across arms and characterised by small-to-moderate effects in the cognitive, reflective domains and trivial-to-small effects in coping, indicating meaningful but not large differences.

The observed female advantage in cognitive–reflective skills accord with broader evidence that girls often show stronger self-regulatory and academic behaviours, including sustained effort and organization, which are proximal to decision quality and problem-solving (Duckworth & Seligman, 2006; Voyer & Voyer, 2014). It is also consistent with findings that adolescent girls tend to report higher self-evaluative/reflection indices in school contexts, although mean differences are typically moderate and vary by measure (Kling, Hyde, Showers, & Buswell, 1999). At the same time, the absence of gender differences in coping domains aligns with the gender similarities perspective, which shows that many psychological constructs exhibit small or negligible average sex differences**,** and that coping is strategy- and context-dependent rather than uniformly gendered (Hyde, 2005; Tamres, Janicki, & Helgeson, 2002). Meta-analytic work on emotion regulation similarly points to mixed, small effects that are sensitive to age, context, and measurement, which may explain null differences on our aggregated coping indices (Chaplin & Aldao, 2013).

Programmatically, these baseline findings suggest two complementary moves. First, maintain universal delivery of core life-skills content, consistent with evidence that sequenced, active, and explicit school programmes benefit diverse student groups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). Second, add targeted coaching opportunities that may be especially beneficial for boys in the cognitive–reflective strands to narrow baseline gaps while preserving whole-class pedagogy. For reporting completeness, the final manuscript should present effect sizes and 95% CIs for each contrast and, where possible, explore measurement invariance across gender for the life-skills scale to ensure that observed differences reflect true score variance rather than response styles.

Table 3

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Gender of the Participants

Component	Group	Gender	N	M	SD	t-Score	p-Value
Decision Making Skill	Control	Female	78	34.47	4.245	3.068	0.003
		Male	42	31.88	4.723		
	Experimental	Female	72	34.08	3.942	2.026	0.045
		Male	48	32.35	5.401		
Problem-Solving Skills	Control	Female	78	44.50	6.554	2.949	0.004
		Male	42	40.71	6.989		
	Experimental	Female	72	45.42	5.404	2.776	0.006
		Male	48	42.21	7.243		
Self-Awareness	Control	Female	78	38.38	5.735	2.619	0.010
		Male	42	35.52	5.654		
	Experimental	Female	72	38.06	5.467	3.414	0.001
		Male	48	34.08	7.264		
Coping with Stress	Control	Female	78	31.17	4.566	1.192	0.236
		Male	42	30.02	5.941		
	Experimental	Female	72	31.38	4.610	0.831	0.408
		Male	48	30.62	5.170		
Coping with Emotion	Control	Female	78	29.73	4.371	1.879	0.063
		Male	42	28.21	3.911		
	Experimental	Female	72	29.24	4.065	1.273	0.205
		Male	48	28.19	4.906		

Gender-wise post-test comparison and pre–post synthesis

Given the gendered socialisation of classroom participation and self-regulatory behaviours, we compared female–male differences in post-intervention life-skill scores and integrated these with pre-test baselines to understand whether the intervention lifted both genders and whether any baseline gaps narrowed.

Two patterns are clear from the results that substantial, parallel improvements for girls and boys in the experimental arm across all five domains; and narrowing female–male gaps in the cognitive–reflective domains despite females remaining higher at post-test. Coping domains showed gender parity at both time points, with larger absolute gains in the experimental arm.

Relative to baseline, both genders improved across all five domains, with markedly larger gains in the experimental arm. In decision-making**,** control means rose modestly (females 34.47→35.09, Δ=+0.62; males 31.88→33.10, Δ=+1.22), whereas experimental means increased substantially (females 34.08→42.35, Δ=+8.27; males 32.35→40.85, Δ=+8.50). A similar pattern held for problem-solving (control: females 44.50→46.10, Δ=+1.60; males 40.71→42.62, Δ=+1.91; experimental: females 45.42→54.92, Δ=+9.50; males 42.21→52.06, Δ=+9.85) and for self-awareness (control: females 38.38→43.04, Δ=+4.66; males 35.52→41.27, Δ=+5.75; experimental: females 38.06→43.04, Δ=+4.98; males 34.08→41.27, Δ=+7.19). In the affective domains, coping with emotion improved slightly in the control group (females 29.73→31.58, Δ=+1.85; males 28.21→30.12, Δ=+1.91) but rose sharply in the experimental group (females 29.24→37.06, Δ=+7.82; males 28.19→36.31, Δ=+8.12). Coping with stress followed the same trend (control: females 31.17→33.81, Δ=+2.64; males 30.02→32.57, Δ=+2.55; experimental: females 31.38→35.22, Δ=+3.84; males 30.62→34.96, Δ=+4.34). Collectively, these shifts indicate broad, parallel benefits for girls and boys, with the intervention arm exhibiting consistent, domain-wide gains of substantially greater magnitude than routine schooling alone.

The programme produced broad-based benefits that were gender-invariant in magnitude (i.e., both females and males gained substantially), while residual female advantages persisted in decision-making, problem-solving, and self-awareness. Importantly, the gender gaps narrowed, most visibly for self-awareness, suggesting that the intervention's reflective and practice activities supported catch-up gains among boys without diminishing girls' levels. The non-significant gender differences in coping domains at post-test, coupled with sizeable absolute improvements for both sexes in the experimental arm, indicate that affect-regulation skills were equally teachable for girls and boys.

These results align with meta-analyses showing that universal, sequenced, active, and explicit school-based life-skills/SEL programmes yield generalised gains across student subgroups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). The persistent but shrinking female advantage in cognitive–reflective domains is consistent with literature documenting small-to-moderate mean differences favouring girls in self-regulatory and scholastic behaviours, constructs proximal to decision quality, problem formulation, and reflective monitoring (Duckworth & Seligman, 2006; Voyer & Voyer, 2014). At the same time, the gender-similarity in coping with stress and emotions echoes syntheses indicating small or negligible average sex differences on many psychological traits, and underscores that coping is strategy- and context-dependent rather than uniformly gendered (Hyde, 2005; Tamres, Janicki, & Helgeson, 2002; Chaplin & Aldao, 2013). From an implementation perspective, these data support universal delivery with targeted micro-supports that may particularly assist boys in cognitive–reflective strands (e.g., structured decision "labs," coached problem scenarios, brief reflective prompts with feedback), while maintaining whole-class pedagogy for coping components, an approach congruent with the broader SEL evidence base (Durlak et al., 2011; Taylor et al., 2017).

Table 4

Post -Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Gender of the Participants

Component	Group	Gender	N	M	SD	t-Score	p-Value
Decision Making Skill	Control	Female	78	35.09	3.981	2.471	0.015
		Male	42	33.10	4.627		
	Experimental	Female	72	42.35	2.707	2.809	0.006
		Male	48	40.85	3.060		
Problem-Solving Skills	Control	Female	78	46.10	6.174	2.927	0.004
		Male	42	42.62	6.301		
	Experimental	Female	72	54.92	7.359	2.460	0.015
		Male	48	52.06	3.938		
Self-Awareness	Control	Female	78	43.04	3.213	2.850	0.005
		Male	42	41.27	3.511		
	Experimental	Female	72	43.04	3.213	2.850	0.005
		Male	48	41.27	3.511		
Coping with Stress	Control	Female	78	33.81	4.355	1.466	0.145
		Male	42	32.57	4.506		
	Experimental	Female	72	35.22	3.127	0.423	0.673
		Male	48	34.96	3.655		

Coping with Emotion	Control	Female	78	31.58	4.329	1.755	0.082
		Male	42	30.12	4.363		
	Experimental	Female	72	37.06	2.500	1.612	0.110
		Male	48	36.31	2.433		

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Type of Family of the Participants

Baseline comparisons by family structure showed no statistically significant differences between adolescents from nuclear and joint families on any life-skill domain in either arm. In the control group, mean scores were marginally higher for joint-family students in decision-making (M=35.18 vs. 33.30; t=1.577, p=0.117), self-awareness (M=39.65 vs. 37.01; t=1.738, p=0.085), and coping with stress (M=32.65 vs. 30.86; t=1.423, p=0.157), but these contrasts did not reach significance. The experimental group displayed the same non-significant pattern—decision-making (M=35.82 vs. 34.16; t=1.487, p=0.140), self-awareness (M=40.88 vs. 38.55; t=1.724, p=0.087), and coping with stress (M=35.00 vs. 33.11; t=1.645, p=0.103)—while problem-solving and coping with emotion were virtually identical across family types in both arms (all p>0.60). Although several effects trended in the same direction, the corresponding magnitudes were only small to small-to-moderate (e.g., d≈0.39–0.46 for the largest contrasts), and precision was limited by the much smaller joint-family cell (n=17 vs. n=103).

Taken together, these results indicated that, prior to the intervention, adolescents from nuclear and joint families entered the study with comparable decision-making, problem-solving, self-awareness, and coping capacities. Any observed numerical advantages for joint-family students were insufficiently large and too imprecise to conclude true baseline differences in this cohort. Substantively, this pattern was consistent with ecological accounts in which proximal school contexts and pedagogy exerted strong and immediate influences on competencies during adolescence, often overshadowing distal structural differences such as household form (Bronfenbrenner, 1979). It also aligned with scholarship on the convergence of family functions under social change in India, where joint and nuclear households can provide overlapping developmental affordances, particularly in urbanising and school-centred settings (Saraswathi & Larson, 2002; Uberoi, 2004). The small, non-significant tendency for joint-family youth to score higher on decision-making, self-awareness, and stress coping could plausibly reflect distributed support and shared decision practices typical of interdependent family models (Kagitcibaşi, 2007); however, the effect sizes and wide confidence intervals cautioned against strong inferences in the present sample.

Programmatically, these findings supported a universal implementation approach at baseline: facilitators did not need to tailor content by family structure, and both groups could engage with the same sequenced, active, and reflective activities, an approach that cohered with evidence that school-based life-skillsprogrammes deliver generalised benefits across diverse subgroups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

Table 5

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Type of Family of the Participants

Component	Group	Type of Family	N	M	SD	t-Score	p-Value
Decision Making Skill	Control	Nuclear	103	33.30	4.612	1.577	0.117
		Joint	17	35.18	4.066		
	Experimental	Nuclear	105	34.16	4.297	1.487	0.140
		Joint	15	35.82	4.202		
Problem-Solving Skills	Control	Nuclear	103	43.05	7.224	0.491	0.624
		Joint	17	43.94	4.789		
	Experimental	Nuclear	105	44.83	6.721	0.243	0.808
		Joint	15	45.24	4.221		
Self-Awareness	Control	Nuclear	103	37.01	6.050	1.738	0.085
		Joint	17	39.65	3.807		
	Experimental	Nuclear	105	38.55	5.339	1.724	0.087
		Joint	15	40.88	3.839		
Coping with Stress	Control	Nuclear	103	30.86	5.037	1.423	0.157
		Joint	17	32.65	2.668		
	Experimental	Nuclear	105	33.11	4.621	1.645	0.103
		Joint	15	35.00	2.550		
Coping with Emotion	Control	Nuclear	103	29.15	4.340	0.343	0.732
		Joint	17	29.53	3.859		
	Experimental	Nuclear	105	30.99	4.414	0.469	0.640
		Joint	15	31.53	4.259		

Post-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Type of Family of the Participants

At post-test, comparisons by family structure showed no statistically significant differences between adolescents from nuclear and joint families on any life-skill domain in either arm. In the control group, decision-making (M=33.54 vs. 32.33; t=0.944, p=.347), problem-solving (44.31 vs. 42.87; t=0.822, p=.413), self-awareness (36.79 vs. 34.20; t=1.446, p=.151), coping with stress (30.86 vs. 32.65; t=1.423, p=.157), and coping with emotion (28.95 vs. 27.87; t=0.887, p=.377) did not differ by family type. The experimental arm mirrored this pattern: decision-making (41.87 vs. 40.93; t=1.154, p=.251), problem-solving (53.99 vs. 52.27; t=0.982, p=.328), self-awareness (42.37 vs. 42.07; t=0.320, p=.749), coping with stress (33.11 vs. 35.00; t=1.645, p=.103), and coping with emotion (36.79 vs. 36.53; t=0.373, p=.710) all showed non-significant differences. Where present, effects were trivial to small, and precision was constrained by the much smaller joint-family subsample (n=17).

Relative to baseline, both family types improved in the experimental arm, whereas changes in the control arm were small or negative. In decision-making, experimental nuclear students rose from 34.16 to 41.87 (+7.71) and joint from 35.82 to 40.93 (+5.11); in problem-solving, nuclear increased from 44.83 to 53.99 (+9.16) and joint from 45.24 to 52.27 (+7.03). Self-awareness gains were +3.82 (38.55→42.37) for nuclear and +1.19 (40.88→42.07) for joint; coping with emotion improved by +5.80 (30.99→36.79) for nuclear and +5.00 (31.53→36.53) for joint. Coping with stress means for both family types in the experimental arm remained at their baseline levels (nuclear 33.11; joint 35.00), indicating stability rather than decline. By contrast, the control arm showed modest increases for nuclear students (e.g., problem-solving +1.26) but declines for joint students in several domains (e.g., decision-making −2.85; self-awareness −5.45; coping with emotion −1.66).

Taken together, the post-test profile indicated that the intervention's benefits were family-type invariant**:** adolescents from nuclear and joint families reached comparable post-levels across all domains, and both groups showed clear gains in the experimental arm. The slightly larger absolute improvements among nuclear students in the experimental arm (especially in decision-making, problem-solving, and self-awareness) likely reflected their much greater representation in the sample rather than a systematic advantage of nuclear households; conversely, the declines observed among joint-family students in the control arm underscored that routine schooling alone did not produce consistent growth for this subgroup.

In discussion, this pattern was consistent with an ecological view in which proximal school experiences and pedagogy exerted strong influence on adolescent competencies, often overshadowing distal structural differences such as household form (Bronfenbrenner, 1979). It also aligned with evidence of functional convergence between joint and nuclear families under contemporary social change in India, whereby both family types can provide overlapping developmental affordances when schooling is central (Saraswathi & Larson, 2002; Uberoi, 2004). The absence of post-test differences by family type, alongside broad gains in the experimental arm, further matched meta-analytic findings that universal, sequenced, active, and explicitly focused school-based life-skills/SEL programmes deliver generalised benefits across diverse subgroups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). Where small numerical advantages for one family type appeared, they were plausibly attributable to proximal family processes rather than structure per se (Kagitcibaşi, 2007); future work would benefit from measuring such processes directly and testing family type as a moderator within adjusted models.

Table 6

Post-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Type of Family of the Participants

Component	Group	Type of Family	N	M	SD	t-Score	p-Value
Decision Making Skill	Control	Nuclear	103	33.54	4.626	0.944	0.347
		Joint	17	32.33	4.746		
	Experimental	Nuclear	105	41.87	2.825	1.154	0.251
		Joint	15	40.93	3.615		
Problem-Solving Skills	Control	Nuclear	103	44.31	6.381	0.822	0.413
		Joint	17	42.87	6.402		
	Experimental	Nuclear	105	53.99	6.654	0.982	0.328
		Joint	15	52.27	3.432		
Self-Awareness	Control	Nuclear	103	36.79	6.125	1.446	0.151
		Joint	17	34.20	8.728		
	Experimental	Nuclear	105	42.37	3.395	0.320	0.749
		Joint	15	42.07	3.807		
Coping with Stress	Control	Nuclear	103	30.86	5.037	1.423	0.157
		Joint	17	32.65	2.668		
	Experimental	Nuclear	105	33.11	4.621	1.645	0.103
		Joint	15	35.00	2.550		

Coping with Emotion	Control	Nuclear	103	28.95	4.388	0.887	0.377
		Joint	17	27.87	4.764		
	Experimental	Nuclear	105	36.79	2.483	0.373	0.710
		Joint	15	36.53	2.615		

Social-category–wise pre-test comparison

We examined baseline differences across social categories (SC, ST, OBC, General) within each arm using one-way ANOVAs. In the control arm, there were significant omnibus effects for decision-making (F=3.166, p=.027), problem-solving (F=3.353, p=.021), and self-awareness (F=4.021, p=.009), while coping with emotion (F=0.761, p=.518) and coping with stress (F=0.553, p=.647) were non-significant. In the experimental arm, decision-making (F=4.243, p=.007), problem-solving (F=3.130, p=.028), and self-awareness (F=2.687, p=.050) were significant, coping with emotion was non-significant (F=1.013, p=.389), and coping with stress showed a significant effect (F=5.368, p=.002). Inspection of means indicated a pattern of higher cognitive–reflective scores among SC/ST relative to OBC/General at baseline: for example, in the control arm decision-making averaged SC=37.40, ST=36.15, OBC=33.06, General=32.88; problem-solving ST=47.38, SC=46.40, General=46.25, OBC=42.16; and self-awareness ST=41.69, General=40.38, SC=37.60, OBC=36.52**.**

In the experimental arm the pattern was similar. For coping with stress (experimental arm), SC showed the highest mean (34.80) and General the lowest (24.63)**,** with ST/OBC clustered near 31**.** By contrast, coping with emotion was broadly comparable across categories in both arms at baseline.

At entry, adolescents differed by social category on cognitive–reflective life-skills (decision-making, problem-solving, self-awareness), whereas affective coping (emotion) was uniform and stress coping differed only in the experimental arm. The direction of differences, SC/ST ≥ We examined baseline differences across social categories (SC, ST, OBC, General) within each arm using one-way ANOVAs. In the control arm, there were significant omnibus effects for decision-making (F=3.166, p=.027), problem-solving (F=3.353, p=.021), and self-awareness (F=4.021, p=.009), while coping with emotion (F=0.761, p=.518) and coping with stress (F=0.553, p=.647) were non-significant. In the experimental arm, decision-making (F=4.243, p=.007), problem-solving (F=3.130, p=.028), and self-awareness (F=2.687, p=.050) were significant, coping with emotion was non-significant (F=1.013, p=.389), and coping with stress showed a significant effect (F=5.368, p=.002). Inspection of means indicated a pattern of higher cognitive–reflective scores among SC/ST relative to OBC/General at baseline: for example, in the control arm decision-making averaged SC=37.40, ST=36.15, OBC=33.06, General=32.88**;** problem-solving ST=47.38, SC=46.40, General=46.25, OBC=42.16; and self-awareness ST=41.69, General=40.38, SC=37.60, OBC=36.52**.** In the experimental arm the pattern was similar. For coping with stress (experimental arm), SC showed the highest mean (34.80) and General the lowest (24.63)**,** with ST/OBC clustered near 31. By contrast, coping with emotion was broadly comparable across categories in both arms at baseline.

The baseline heterogeneity by social category was congruent with ecological systems perspectives, which posited that adolescents' competencies emerged from dynamic interactions among individual, family, school, and community contexts (Bronfenbrenner, 1979). It also aligned with scholarship on resilience under adversity**,** which showed that youths facing structural constraints developed context-specific problem-solving and self-regulatory skills through repeated demands for adaptation (Masten, 2014; Ungar, 2013). In the Indian context, social stratification structured opportunity and stress exposure, but schooling functioned as a compensatory setting where competencies were cultivated and gaps were narrowed (Saraswathi & Larson, 2002; Drèze & Sen, 2013). The non-difference in coping with emotion at baseline was consistent with evidence that many psychological attributes show small or negligible average group differences when measured broadly, with variability better explained by proximal processes (e.g., teacher climate, peer norms) than by distal categorical labels (Hyde, 2005). The higher stress-coping mean among SC in the experimental arm at baseline plausibly reflected exposure-based adaptation and collective support practices that promoted endurance (Ungar, 2013), but the very small SC/General cells warranted conservative interpretation.

Table 7

Pre-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Social Category of the Participants

Component	Group	Social Category	N	M	SD	F	p-Value
Decision Making Skill	Control	SC	5	37.40	5.505	3.166	0.027
		ST	13	36.15	2.193		
		OBC	94	33.06	4.720		
		GENERAL	8	32.88	2.588		
	Experimental	SC	3	38.80	5.020	4.243	0.007
		ST	25	37.00	2.550		
		OBC	86	33.88	4.340		
		GENERAL	6	33.38	2.875		

Problem Solving Skill	Control	SC	5	46.40	3.507	3.353	0.021
		ST	13	47.38	4.925		
		OBC	94	42.16	7.204		
		GENERAL	8	46.25	3.370		
	Experimental	SC	3	46.00	3.808	3.130	0.028
		ST	25	48.77	4.323		
		OBC	86	44.00	6.696		
		GENERAL	6	48.25	3.284		
Self-Awareness Skills	Control	SC	5	37.60	3.507	4.021	0.009
		ST	13	41.69	4.211		
		OBC	94	36.52	6.026		
		GENERAL	8	40.38	2.504		
	Experimental	SC	3	39.40	2.702	2.687	0.050
		ST	25	42.08	4.010		
		OBC	86	38.23	5.449		
		GENERAL	6	41.00	2.070		
Coping with Emotion Skills	Control	SC	5	32.00	2.000	0.761	0.518
		ST	13	29.31	4.347		
		OBC	94	29.05	4.331		
		GENERAL	8	29.00	4.342		
	Experimental	SC	3	33.00	3.162	1.013	0.389
		ST	25	32.38	4.874		
		OBC	86	30.71	4.344		
		GENERAL	6	31.88	4.518		
Coping with Stress	Control	SC	5	32.60	1.52	0.553	0.647
		ST	13	32.38	3.73		
		OBC	94	30.91	5.15		
		General	8	30.50	3.02		
	Experimental	SC	5	34.80	2.59	5.368	0.002
		ST	13	30.92	5.65		
		OBC	94	30.98	4.79		
		General	8	24.63	5.90		

Social-category–wise post-test comparison and pre–post synthesis

At post-test, one-way ANOVAs showed no significant differences by social category (SC, ST, OBC, General) in either arm for decision-making**,** problem-solving**,** self-awareness**,** or coping with emotion (control: *F*s=0.075–0.842, all *p*>.47; experimental: *F*s=0.364–0.917, all *p*>.43). The only significant post-test effect appeared in the experimental arm for coping with stress (*F*=3.002, *p*=.033), with means SC=37.20, ST=35.08, OBC=35.27, General=32.13. All other post-test contrasts were trivial to small in magnitude, and precision was constrained for **SC** and General due to very small cells.

Relative to baseline, category gaps that were significant at pre-test largely attenuated by post-test**,** especially in the experimental arm. For decision-making (experimental)**,** categories converged upward from SC=38.80, ST=37.00, OBC=33.88, General=33.38 at pre-test to tightly clustered post-test means (43.33, 41.00, 41.91, 41.83), with the range shrinking from 5.42 to 2.33 points as OBC (+8.03) and General (+8.45) made the largest gains. For problem-solving (experimental)**,** OBC rose sharply (44.00→55.20, +11.20), ST increased moderately (48.77→52.33, +3.56), and General improved (48.25→53.38, +5.13); the small SC cell showed a slight decline (46.00→44.13, −1.87), consistent with sampling volatility. For self-awareness (experimental)**,** OBC moved from 38.23 to 42.28 (+4.05) and General from 41.00 to 42.40 (+1.40), while SC and ST dipped marginally (−2.23 and −1.75, respectively); the omnibus became non-significant**,** indicating overall convergence. For coping with emotion (experimental)**,** ST, OBC, and General increased by ~5 points (to 37.67, 36.32, 36.84), whereas SC (n=3) decreased (33.00→28.00), again suggesting cell-size sensitivity. For coping with stress (experimental)**,** all categories improved, SC +2.40, ST +4.16, OBC +4.29, General +7.50, and the gap halved (pre range ≈10.17 to post ≈5.07), yet a residual difference remained (SC≈top, General≈lowest), sustaining the small but significant omnibus. In the control arm**,** previously significant pre-test differences (decision-making, problem-solving, self-awareness) dissipated by post-test (all *p*>.47), reflecting a mix of modest gains (e.g., OBC problem-solving +2.10) and declines in small cells (e.g., ST problem-solving −3.78), consistent with regression-to-the-mean and measurement noise in underpowered groups.

The intervention equalised post-test outcomes across social categories for four of five domains, with uniform improvements regardless of social location**.** The single exception, coping with stress, still showed meaningfully narrowed disparities**,** driven by a disproportionate gain among General-category students (+7.50), though SC remained highest and General lowest at post-test. Given the very small SC/General samples, the surviving omnibus for stress coping likely reflected a small residual gradient amplified by sampling variability rather than a robust structural divide. Overall, the data supported the conclusion that the programme's benefits

were social-category invariant in practical terms, and that initial stratification observed at baseline was largely neutralised after training.

Convergence across categories after the life-skills module was consistent with evidence that universal, sequenced, active, and explicit school-based programmes yield generalised gains across student subgroups (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011; Taylor, Oberle, Durlak, & Weissberg, 2017). From an ecological systems perspective, intensive pedagogical inputs in the school microsystem can override distal structural differences such as social category, particularly when instruction emphasises practice, feedback, and reflection (Bronfenbrenner, 1979). In the Indian context, schooling often functions as a compensatory setting that cultivates competencies and narrows social gradients (Drèze & Sen, 2013), which aligns with the observed attenuation of pre-test disparities here. The residual post-test variation in stress coping likely indexed proximal processes (e.g., perceived support, exposure to stressors) rather than social category per se; resilience literature cautions that such coping differences are context-dependent and sensitive to small-sample volatility (Masten, 2014; Ungar, 2013). Programmatically, these findings supported universal delivery with strength-based messaging across categories, while suggesting light micro-supports for stress-coping in groups that still lagged slightly at post-test (e.g., brief rehearsal of adaptive strategies, peer modelling).

Table 8

Post-Test Comparison Between Performance of Control Group and Experimental Group in The Components of Life Skills With respect to the Social Category of the Participants

Component	Group	Social Category	N	M	SD	F	p-Value
Decision Making Skill	Control	SC	5	35.33	9.238	0.683	0.564
		ST	13	33.76	4.910		
		OBC	94	33.37	4.493		
		GENERAL	8	31.17	3.189		
	Experimental	SC	3	43.33	3.512	0.917	0.435
		ST	25	41.00	3.428		
		OBC	86	41.91	2.721		
		GENERAL	6	41.83	3.601		
Problem Solving Skill	Control	SC	5	44.33	4.041	0.075	0.973
		ST	13	43.60	6.305		
		OBC	94	44.26	6.621		
		GENERAL	8	44.50	4.764		
	Experimental	SC	3	44.13	6.375	0.580	0.629
		ST	25	52.33	2.887		
		OBC	86	55.20	11.467		
		GENERAL	6	53.38	4.119		
Self-Awareness Skills	Control	SC	5	54.17	4.956	0.842	0.474
		ST	13	30.67	6.351		
		OBC	94	36.32	8.235		
		GENERAL	8	36.66	6.069		
	Experimental	SC	3	37.17	4.665	0.364	0.779
		ST	25	40.33	1.528		
		OBC	86	42.28	3.143		
		GENERAL	6	42.40	3.605		
Coping with Emotion Skills	Control	SC	5	42.67	2.944	0.232	0.874
		ST	13	28.67	8.083		
		OBC	94	28.32	4.811		
		GENERAL	8	29.02	4.322		
	Experimental	SC	3	28.00	3.098	0.433	0.730
		ST	25	37.67	3.055		
		OBC	86	36.32	2.824		
		GENERAL	6	36.84	2.410		
Coping with Stress	Control	SC	5	35.40	2.51	0.722	0.541
		ST	13	34.46	3.91		
		OBC	94	33.11	4.64		
		General	8	33.50	3.34		
	Experimental	SC	5	37.20	2.39	3.002	0.033
		ST	13	35.08	3.40		
		OBC	94	35.27	3.27		
		General	8	32.13	3.18		

Across age, gender, family type, and social category, the 25-hour life-skills module produced broad, equitable gains with minimal evidence of systematic moderation by socio-demographics. Age-wise, pre-test profiles were largely homogeneous except for a small disadvantage in self-awareness among 17-year-olds; by post-test, all age effects attenuated and 17-year-olds showed catch-up gains, indicating that late-adolescent dips in reflective functioning were amenable to structured, participatory activities. Gender-wise, females outperformed

males at baseline on decision-making, problem-solving, and self-awareness, while coping domains were comparable; after the intervention, both sexes improved substantially, the female advantage narrowed in the cognitive–reflective strands, and gender parity in coping was maintained alongside large absolute improvements. Family structure showed no meaningful differences at either time point, and both nuclear and joint-family adolescents improved similarly under the programme. Social-category contrasts that were evident at baseline (higher cognitive–reflective means for SC/ST vs. OBC/General, with broadly similar emotion-coping) largely converged by post-test; the lone residual difference appeared in stress-coping within the experimental arm, where all categories improved but a small gradient persisted (SC highest, General lowest) while narrowing considerably. Taken together, the pattern supported the interpretation that the intervention functioned as an "equaliser": it lifted overall competence across subgroups, reduced initial disparities where they existed, and did not preferentially advantage any socio-demographic segment. Caution is warranted for cells with very small Ns (e.g., SC and General in some analyses; joint-family subgroup), but the weight of evidence pointed to socio-demographic invariance in practical terms.

IV. Implications For Practice And Policy

These findings support universal, non-tracked delivery of life-skills education in higher-secondary government schools, with the expectation of comparable gains across ages, genders, family types, and social categories. Implementation can remain whole-class and sequenced, but micro-supports may optimise equity: brief identity-mapping and future-self exercises for senior students during exam periods; coached "decision labs" and structured problem-scenarios to sustain catch-up gains among boys in cognitive–reflective skills; and short, skills-rehearsal boosters targeting stress-coping in subgroups that lag slightly at post-test. At the systems level, integrating the module into routine timetable slots, training teachers as facilitators, and scheduling a 3-month booster (as in this study's second phase) should help consolidate effects and guard against fade-out. For monitoring and evaluation, future cohorts should report adjusted effects (e.g., ANCOVA with baseline covariates), effect sizes with confidence intervals, and planned subgroup analyses with adequately powered, balanced cells; they should also measure proximal processes (perceived support, test stress, classroom climate) to explain *why* some residual gradients persist. Policy makers can treat life-skills education as a feasible, low-cost lever for psychosocial equity, capable of raising average competence while narrowing pre-existing socio-demographic gaps, provided programmes remain participatory, practice-rich, and include scheduled reinforcement.

Limitations and future research directions

This study has several limitations. The quasi-experimental pre- and post-test design was appropriate for evaluating a school-based life-skills intervention; however, the absence of individual-level randomization and the clustering of students within four government higher secondary schools in a single district may limit internal validity and generalizability. Although baseline equivalence was examined, residual confounding cannot be fully ruled out, and standard errors may be underestimated if school-level intraclass correlation was not fully accounted for. Future work should consider randomized allocation (e.g., cluster randomized trials), multilevel analyses that model clustering explicitly, and stratified sampling to improve balance across subgroups.

Additionally, several subgroup cells (e.g., joint-family, SC, and General categories) were small, reducing statistical power for moderation analyses and producing unstable mean estimates. The outcome battery relied on self-report, which is susceptible to social desirability and demand characteristics, and we did not include performance-based tasks or administrative indicators (e.g., attendance, grades, disciplinary referrals) to triangulate behavioural change. Future studies should employ larger, better-balanced samples, incorporate objective or performance outcomes, and pre-register analytic plans with corrections for multiple testing to mitigate Type I error inflation.

The measurement approach presents further constraints. While the Life Skills Assessment Scale (Vrinda, 2009) is a validated instrument and was translated/back-translated into Malayalam, we did not test measurement invariance across age, gender, family type, or social category; consequently, observed subgroup differences may partially reflect differential item functioning rather than true score differences. Moreover, only five WHO-referenced domains were analysed (decision-making, problem-solving, self-awareness, coping with emotion, coping with stress); omitting other domains (e.g., empathy, communication, interpersonal relationships, creative and critical thinking) narrows construct coverage. Future research should assess invariance, broaden domain coverage, and report effect sizes with confidence intervals to enhance interpretability.

Finally, although the intervention totalled 25 hours with a three-month follow-up, the study did not formally assess implementation fidelity (adherence, dosage by session, facilitator effects) or classroom climate, and the follow-up window was relatively short for judging durability and transfer of skills beyond the classroom. Potential spillover between arms (peer sharing of strategies) cannot be excluded given the shared educational ecosystem. Future investigations should include fidelity monitoring, booster sessions with longer-term follow-

ups, and mixed-methods process evaluations to identify active ingredients. Employing cluster-randomized designs across multiple districts, representative sampling, and longitudinal assessments would strengthen causal inference and provide deeper insights into how to scale equitable, high-impact life-skills education.

V. Conclusion

This study demonstrates the effectiveness of a structured, 25-hour life-skills education module in improving higher-secondary students' competencies in decision-making, problem-solving, self-awareness, and coping with emotions and stress. Compared with routine schooling, the intervention produced substantially larger gains and reduced several baseline disparities: age effects flattened by post-test, gender gaps in cognitive-reflective skills narrowed (while remaining modestly in favor of girls), and social-category differences largely converged. A small residual gradient in stress-coping and the persistence of a modest female advantage in cognitive-reflective domains highlight the value of targeted reinforcement alongside universal delivery.

These findings underscore the importance of integrating life-skills education into the regular school timetable at the higher-secondary level, using sequenced, active, and reflective pedagogy. Implementation should be universal but paired with light, equity-focused supports, e.g., brief identity-mapping for senior students during examination periods, coached decision/problem "labs" to sustain catch-up gains among boys, and short boosters for stress-coping where needed. Embedding a scheduled booster (e.g., at three months) and training teachers as facilitators can help consolidate learning and promote durable, school-wide benefits.

Future research should evaluate long-term retention and behavioural transfer beyond the classroom (e.g., attendance, conduct, academic engagement), assess implementation fidelity, and test measurement invariance across subgroups. Multi-site, cluster-randomized trials with representative sampling and planned moderation analyses would strengthen causal inference and inform scalable models for equitable, high-impact life-skills education across diverse school settings.

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