frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 27 January 2026
DOI 10.3389/feduc.2026.1733490

OPEN ACCESS

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RECEIVED 27 October 2025
REVISED 26 November 2025
ACCEPTED 02 January 2026
PUBLISHED 27 January 2026

CITATION
Fuentealba-Urra S, Céspedes-Carreno C, Rubio A, Roy-Sadradín D, Oyanedel JC, Martínez-Líbano J, Leigh-González C, González-Carrasco M, Zapata SM, Arellano-Correa S, Urrutia-Díaz V and Fuentealba-Martín C (2026) The adaptive role of emotional self-regulation in adolescents' well-being: evidence from Chilean public schools.
Front. Educ. 11:1733490.
doi: 10.3389/feduc.2026.1733490

The adaptive role of emotional self-regulation in adolescents' well-being: evidence from Chilean public schools

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Introduction: Subjective well-being (SWB) serves as a key indicator for assessing psychosocial adjustment and quality of life in adolescence. The established connection between emotional self-regulation (ESR) and well-being is well documented, yet the specific role of short-term ESR strategies and sociodemographic factors remains underexplored. This study examines how short-term ESR and these sociodemographic variables jointly influence the subjective well-being (SWB) of Chilean adolescents.

Methods: A cross-sectional design utilized a stratified probabilistic sample of 917 students (49.2% girls, 50.8% boys), aged 10–19. Participants came from public schools in the Biobío region. All institutions were classified with high or very high vulnerability based on the School Vulnerability Index.

Results: Multiple regression analysis revealed that higher ESR and male gender predicted greater well-being scores. Conversely, lower results emerged for female participants, older age, and high vulnerability. After controlling age, gender, and migration status, very high vulnerability was associated with slightly higher well-being, suggesting a compensatory effect when other conditions were equalized. ESR acts as a protective factor for adolescent well-being amid educational inequality.

Discussion: Integrating socioemotional competencies into school-based psychological services is therefore imperative. Intervention and public policies promoting adolescent well-being must account for gender, age, and vulnerability status in their design.

KEYWORDS

emotional self-regulation, migration, adolescents, psychological health, school vulnerability, socioeconomic status, well-being

1 Introduction

Adolescents' subjective well-being (SWB) has emerged as a major focus of current educational research, reflecting the move away from individual-deficit models and toward methods that take into account the intricate interactions between social, environmental, and personal elements. The term "SWB" describes how individuals assess and feel about their own lives, placing more emphasis on subjective assessments of life quality than on outside metrics (Diener, 1984). According to this viewpoint, SWB entails how people perceive everyday occurrences and how they interpret those experiences when considering their life in their whole (Diener et al., 2018). This construct consists of two complementary dimensions: an affective component that includes everyday emotions that range from positive to negative (Busseri, 2015; Diener, 1984; Diener et al., 1999; Disabato et al., 2016; Lucas et al., 1996) and a cognitive component that reflects how people judge their lives overall and whether they perceive their existence as satisfactory upon reflection. Taking into account both aspects gives us a better understanding of how teenagers perceive their own lives, since their thoughts and feelings combine to form what we consider to be well-being. SWB has become an increasingly important topic in many fields that study human development and adaptability because it connects how people think about their lives with how they feel in everyday situations (Busseri, 2015; Diener et al., 2018; Diener and Seligman, 2002). What started off as a supplementary concept in psychology has progressively become increasingly important, particularly in areas related to learning, motivation, and emotional health. In this study, we focus on the cognitive aspect of subjective well-being, which is defined as adolescents' overall assessments of satisfaction across important life domains. This is operationalized using a well-known life satisfaction index that has been extensively validated and used as a cognitive indicator of adolescents' subjective well-being (Cummins, 2010; Cummins and Lau, 2005).

The majority of the research that has been done in Latin America, however, has come from North American and European contexts and frequently ignores the particular difficulties that the region's youth face due to extreme inequality and social vulnerability (Cabieses et al., 2020; Baquerizo Cabrera et al., 2025; Casas et al., 2022). This gap severely limits our comprehension of how school-based mechanisms and structural conditions function as risk or protective factors for adolescent well-being in high-inequality settings. In addition to pointing out these shortcomings, this study is novel in that it looks at how school-related factors affect teenage wellbeing and explores how they may be used as levers for proactive intervention. This work emphasizes the role of contextual characteristics as modifiable elements–amenable to targeted policies and psychosocial programs–that may mitigate disadvantage and promote resilience in socially vulnerable settings, rather than treating them as static background factors (Cai et al., 2025; López et al., 2017; Podiya et al., 2025).

By centering the Chilean public school context, where vulnerability is pervasive and individual, familial, and community factors converge, this research offers a situated, empirically grounded contribution that advances both theoretical understanding and practical implications for educational policy and intervention. Current perspectives no longer portray well-being as a static condition but as something that evolves through social interaction and experience. Adolescents' sense of well-being tends to mirror the quality of their everyday relationships–how close they feel to their peers, how supported they perceive their teachers to be, and how capable they feel of meeting academic challenges within their school context. These everyday experiences give shape to the emotional atmosphere of the classroom and gradually build what we understand as school climate (Wu and Lee, 2022). From this perspective, SWB cannot be reduced to an individual trait; it also reflects a shared, relational dimension influenced by the practices and values that circulate within educational settings. For this reason, current research identifies SWB as a central indicator for understanding students' holistic development and the overall quality of their learning environments (Bücker et al., 2018; Eckert et al., 2025; López et al., 2017; Renshaw et al., 2015).

In the realm of well-being psychology, subjective well-being (SWB) is understood as a dynamic self-regulatory system with homeostatic attributes, defined as the biological and psychological ability to regulate and sustain internal equilibrium that can uphold consistent levels of well-being despite daily stressors. This system engages personal and contextual resources that assist individuals in maintaining a sense of control and balance (Cummins, 2003, 2010; Metler and Busseri, 2017; Caprara et al., 2003). Within this homeostatic system, emotional self-regulation (ESR) constitutes a central personal resource. ESR refers to the collection of automatic and intentional mechanisms by which individuals manage the emotions they experience, when these emotions occur, and how they are expressed (Gross and John, 2003; Thompson, 2019). Through ESR, adolescents can modulate the intensity and duration of their affective states and reinterpret stressful events in ways that help preserve a relatively stable level of life satisfaction (Côté et al., 2010; Cummins, 2010). ESR is defined as a collection of automatic and intentional mechanisms by which humans manage the emotions they feel, the timing of these emotions, and their expression (Gross and John, 2003; Thompson, 2019). Emotional Self-regulation (ESR) constitutes a fundamental psychological resource, substantially contributing to individual's adaptation to environmental demands (Bailen et al., 2019; Gross, 2014, 2015a, 2015b).

During adolescence, this skill enhances emotional stability and signifies a socioemotional competence that fosters school integration, harmonious cohabitation, and social engagement (Aldao et al., 2010; Quoidbach et al., 2010). In this sense, ESR can be conceived as a homeostatic resource within the broader SWB system, as it enables individuals to compensate for emotional imbalances, cognitively reappraise stressful experiences, and sustain life satisfaction even under conditions of vulnerability (Côté et al., 2010; Cummins and Cahill, 2000; Rodríguez et al., 2022; Zapata and Onwuegbuzie, 2023).

Adolescence is a pivotal phase for the establishment of emotional regulation and well-being, marked by significant neurobiological, cognitive, and social changes (Martínez-Líbano, 2025; Sabatier et al., 2017; Silvers et al., 2014; Silvers, 2022). During this stage, a reorganization of brain circuits related to executive control and emotional reactivity takes place, resulting in heightened sensitivity to social contexts and an active pursuit of autonomy (Cracco et al., 2017; Heller and Casey, 2016;

Steinberg et al., 2015). Accordingly, adaptive regulatory strategies such as cognitive reappraisal, planning, and goal persistence are consistently associated with greater well-being and lower levels of negative affect, stress, and behavioral problems (Aldao et al., 2010; Garcia et al., 2015; Kelley et al., 2019). In contrast, maladaptive strategies such as suppression or rumination predict lower life satisfaction and poorer psychosocial adjustment (Gross, 1998; Silk et al., 2003). In this way, emotional regulation functions as a bridge between personal development and the environmental factors influencing adolescent well-being (Gross and John, 2003).

Several studies have shown that the relationship between emotional regulation and subjective well-being is associated by sociodemographic variables such as gender, age, nationality, and socioeconomic status, which modulate both the expression and control of emotions (Jiang et al., 2023; Morosanova et al., 2021; Ricarte Trives et al., 2016; Sanchis-Sanchis et al., 2020). In general, research indicates that adolescent girls report lower levels of subjective well-being and higher negative affect than their male peers (Chen et al., 2020; González-Carrasco et al., 2017; Hezomi and Nadrian, 2018; McKay et al., 2020). These differences are typically attributed to the interaction between gender norms, cultural expectations, and differential emotional socialization (Cracco et al., 2017; González-Carrasco et al., 2020). Likewise, age has been identified as a negative predictor of well-being: as adolescents mature, their life satisfaction tends to decline, reflecting developmental obstacles, increased self-awareness, and academic or social pressures (Casas et al., 2012; González-Carrasco and Casas, 2024; Oyanedel et al., 2014; Steinmayr et al., 2019). Similarly, cross-cultural studies indicate that nationality and migration status influence the perception of well-being, as experiences of displacement or cultural integration can affect adolescents' perceived social support and sense of belonging (Derdikman-Eiron et al., 2011; Neto and Barros, 2007; Yi-Jhen and Lee, 2022).

In addition to these personal factors, educational and socioeconomic contexts also play a significant role. In school environments, social vulnerability constitutes a structural variable that reflects inequalities in access to resources, family support, cultural capital, and psychosocial services–all of which are essential for well-being and emotional regulation skills (Betancourt and Castro Muñoz, 2019; Cabieses et al., 2020; World Health Organization [WHO], 2016). Recent studies show that, in such contexts, adolescent well-being depends not only on material conditions but also on the presence of protective networks, including a positive school climate, a sense of belonging, and the availability of socioemotional support programs (Eckert et al., 2025; López et al., 2017; Podiya et al., 2025; Richter et al., 2022). Consequently, schools can serve as compensatory environments, mitigating the impacts of structural inequality and promoting avenues for resilience (Cai et al., 2025).

Although research on adolescent well-being has gained increasing attention in recent years, evidence from Latin America remains limited and dispersed (Cabieses et al., 2020). Much of what is currently known still comes from European and Anglo-Saxon contexts, which constrains our ability to understand how structural conditions, emotional regulation, and sociocultural factors interact in societies marked by deep inequality gaps (Baquerizo Cabrera et al., 2025; Casas et al., 2022; Meiri et al., 2024). Likewise, studies that simultaneously incorporate emotional regulation strategies and contextual variables, such as school vulnerability or migration, are still scarce. This gap makes it difficult to clearly identify the protective mechanisms that could be reinforced through educational policy or psychosocial intervention.

In Chile, the school system–particularly the public sector–constitutes a strategic setting for examining these relationships, as it concentrates a significant number of students living in conditions of vulnerability and functions as an ecosystem where individual, family, and community factors converge (Donoso et al., 2021; Junta Nacional de Auxilio Escolar y Becas [JUNAEB], 2005; Mieres Brevis, 2020). Viewed from this angle, studying how emotional regulation, subjective well-being, and sociodemographic conditions come together in Chilean adolescents' everyday lives helps to build a richer, more situated understanding of well-being in schools (Canenguez et al., 2023). Looking at these dimensions together not only reinforces the evidence that emotional regulation serves as a protective resource–closely linked to psychological balance and socioemotional development–but also underscores how students' social and demographic backgrounds shape their chances to experience and sustain well-being. Building on these foundations, the present study seeks to explore how emotional regulation and sociodemographic variables shape the subjective well-being of adolescents enrolled in public schools that operate under high and very high levels of social vulnerability.

Based on previous literature, it is hypothesized that: (a) emotional regulation will have a positive and significant influence on subjective well-being; and (b) gender and age will be associated with levels of well-being and, together with nationality and school vulnerability, may exert effects on adolescents' well-being. In this way, the study seeks to provide empirically grounded and contextually relevant evidence to better understand the psychosocial mechanisms that sustain adolescent well-being in socially vulnerable settings.

2 Materials and methods

This investigation employed a non-experimental, cross-sectional design with a descriptive-correlational scope.

2.1 Participants and sampling

The study involved a stratified probabilistic sample of 917 adolescents, consisting of 451 girls (49.2%) and 466 boys (50.8%), aged between 10 and 19 years (M = 14.27, SD = 2.14). It is focused on students enrolled in public schools across the Biobío Region, the third most densely populated area in Chile. Participants represented a broad academic range, spanning from fifth grade of primary education to the final year of secondary school. A two-tiered probabilistic sampling method was employed: first, schools were randomly selected, subsequently, one classroom per academic grade was selected in coordination with school authorities, aiming to balance random selection with organizational feasibility (e.g., timetable availability and concurrent school activities). The selection process was grounded in the official 2022 directory of public educational institutions issued by Chile's Ministry of Education. Importantly, the selected schools presented high

(44.4%) or very high (55.6%) levels of vulnerability according to the national School Vulnerability Index, which reflects socioeconomic conditions, family background, and access to support services. In total, eight public schools were included in the study, with class sizes ranging from approximately 70 to 180 students per institution, thereby creating a naturally clustered data structure (students nested within schools). The sampling frame was restricted a priori to public schools classified as having high or very high social vulnerability according to the national School Vulnerability Index (SVI). Within this stratum, schools were randomly selected to ensure that the final sample represented adolescents attending educational settings systematically exposed to socioeconomic risk.

2.2 Instrument

2.2.1 Emotional self-regulation (ESR)

Emotional regulation was assessed as an indicator of self-regulatory capacity using an adapted abbreviated version of Moilanen's self-regulatory inventory (Moilanen, 2007). This version comprises five items that capture adolescents' control over emotions and management of short-term goal (e.g., activation, inhibition, monitoring, and adaptive persistence). The items cover aspects of emotional control and short-term goal management, including mood regulation, staying focused after interruptions, calming down after emotional arousal, adapting to unexpected changes, and maintaining composure during conflicts. Responses were recorded on a 5-point Likert scale (1 = never, 5 = very often), with the total score computed as the mean of all items. Higher scores denote stronger emotional self-regulation. This version has demonstrated acceptable psychometric properties in Chilean adolescent samples (López-Gil et al., 2020; Oriol et al., 2017). In the present study, confirmatory factor analysis and internal consistency reliability indices supported its use [$\chi^2(49) = 148.14$, $p < 0.001$; GFI = 0.98; NNFI = 0.91; CFI = 0.93; SRMR < 0.001; RMSEA = 0.047; Cronbach's $\alpha = 0.82$].

2.2.2 Subjective well-being (SWB)

Adolescents' subjective well-being was measured using the Personal Wellbeing Index–School Children (PWI-SC), a seven-item instrument developed by Cummins and Lau (2005). The scale assesses satisfaction across core life domains–standard of living, health, personal achievements, interpersonal relationships, safety, sense of belonging, and future security–and is widely used as a cognitive indicator of subjective well-being in child and adolescent populations (Cummins, 2010). Participants responded on an 11-point Likert scale ranging from 0 (completely dissatisfied) to 10 (completely satisfied). Example items include: "How happy are you with your health?" and "How happy are you with the money you have and the things you own?" Prior validation studies with Chilean adolescents confirmed the instrument's reliability and construct validity (Bilbao Ramírez et al., 2016), and in the current study, it showed solid internal consistency (Cronbach's $\alpha = 0.86$).

2.2.3 Socioeconomic levels, gender, and age

Socioeconomic status was estimated through the School Vulnerability Index (SVI), which reflects various institutional indicators, including family income, living conditions, household size, parents' education, and official records related to social support systems (e.g., National Health Fund [FONASA], civil registry, Chilean National School Assistance and Scholarship Board [JUNAEB]). Schools with more than 90% of students classified as vulnerable were categorized as "very high vulnerability," whereas those with proportions between 75% and 89% were categorized as "high vulnerability." For analytical purposes, vulnerability was treated dichotomously (0 = high, 1 = very high). Gender was coded as 0 = male and 1 = female, and age was collected via self-reported birthdate and treated as a continuous variable. Migration status was determined by place of birth, distinguishing Chilean-born adolescents (0) from those born abroad (1). Gender, migration status, and SVI were treated as categorical variables.

2.3 Procedure

Data collection was finalized during the 2022 academic year. Initial institutional approval was obtained only after selected schools were contacted through a random procedure. Self-administered questionnaires were issued during regular class hours. These instruments constituted a segment of a broader study that incorporated various contextual and psychological measures. Strictly standardized administration procedures were guaranteed by a fully trained research team. Questionnaire completion occurred under the combined supervision of research staff and teachers. This approach ensured a controlled and supportive environment for the gathering of data. Ecological validity was strongly reinforced; assessments were conducted within the natural educational setting, during the regular school day, and under conditions that directly paralleled the typical interactions between students and school support professionals. The presence of teachers and the cooperation of school staff thus mirrored common practices in program evaluation and school-based psychological assessment. Such a methodology not only facilitated reliable data acquisition but also validated that the procedures accurately reflected the operational limits and genuine dynamics of school contexts.

All procedures were conducted in accordance with the ethical standards of the Andrés Bello University Bioethics Committee and the Declaration of Helsinki. The study protocol was approved by the institutional ethics committee (Resolution 031/2022, 15 December 2022), and written informed consent was obtained from parents or legal guardians, along with written assent from all adolescent participants before data collection.

2.4 Statistical procedures

The continuous study variables, SWB, ESR, and age, were described using mean, standard deviation, and coefficient of variation (CV = [SD/Mean] $\times 100$). For categorical variables (gender: 0 = male, 1 = female; nationality: 0 = Chilean, 1 = migrant; SVI: 0 = high, 1 = very high), absolute and relative frequencies (%) were reported.

Before conducting inferential analyses, assumptions of normality (Kolmogorov-Smirnov), homoscedasticity (Levene's test), and multicollinearity (VIF) were assessed. Given the

sensitivity to sample size, results of the normality tests were interpreted alongside residual inspection and sensitivity analyses. For group comparisons (gender, adolescence stage: 0 = early adolescents [10–14 years], 1 = late adolescents [15–19 years], SVI, and nationality), independent sample tests were used on SWB and ESR (Student's *t*-test with Welch's correction for unequal variances). Effect sizes were also reported (Hedges' g; equivalent to Cohen's d, with bias correction; 95% CI). Interpretation followed Cohen's (1988) recommendations: small (≈0.2), medium (≈0.5), and large (≈0.8).

The bivariate relationship between SWB and ESR was examined using Spearman's correlation coefficient, reporting 95% CI and magnitude according to Cohen: |r| trivial (≈0.10), small (≈0.30), moderate (≈0.50), strong (≈0.70), and very strong (>0.90).

To test the main hypothesis, a hierarchical linear regression (OLS) was performed in two blocks: (1) covariates (gender, age, SVI, and nationality as a sensitivity variable), and (2) ESR. R^2 values for each block and ΔR^2 after adding ESR were reported, along with unstandardized (B) and standardized (β) coefficients, 95% CI, and multicollinearity diagnostics (VIF > 5). Given the sample size and strengthening inference under mild heteroscedasticity, robust standard errors with HC3 correction were estimated.

Considering recruitment occurred across different schools, inference was complemented with two models accounting for clustered data. Generalized Estimating Equations (GEE) with normal distribution, identity link, robust errors, Wald tests, and school as the clustering subject (reporting Quasi-likelihood under the Independence Model Criterion, QIC), and a linear mixed-effects model (REML) with random intercept by school to estimate variance components and the Intraclass Correlation Coefficient (ICC). In the exploration of theoretically plausible interactions (ESR × SVI), continuous covariates were mean centered to facilitate interpretation of main effects. Since ICC was ≈ 0, OLS, GEE, and mixed models yielded virtually identical inference; for conciseness, OLS results are presented, with GEE and mixed models retained as sensitivity analyses.

All analyses were conducted in IBM SPSS® software v25, with a significance level of $\alpha < 0.05$ and 95% confidence intervals.

2.5 Ethical considerations

This study was executed in full compliance with the ethical principles set forth in the Declaration of Helsinki. Prior to any data gathering, written informed consent was mandatorily obtained from both the adolescent participants and their legal guardians. Participation was strictly voluntary, and absolute confidentiality of participant data was maintained throughout the entire research period. Furthermore, all study procedures received explicit approval and rigorous review by the institutional ethics committee.

Consent procedures were efficiently managed through direct coordination with school administrations to ensure clear and transparent communication with all involved families. During the data collection phase, trained researchers collaborated with school support teams and teachers to guarantee a safe and supportive setting for all participants. This procedural alignment with established school-based practices is consistent with the professional ethical obligations of educational researchers and school psychologists, who are fundamentally responsible for safeguarding the well-being, dignity, and rights of children and adolescents within educational environments.

3 Results

3.1 Descriptive analysis

The sample of 917 school adolescents was distributed almost equally between boys (50.8%) and girls (49.2%). The mean age was 14.3 ± 2.08 years, with participants drawn from primary (625, 68.2%) and secondary (292, 31.8%) levels across eight selected schools, which represented between 4.3% and 20.6% of the total student population. The sample also included a substantial number of adolescents born outside Chile (92, 10.0%), consistent with the country's current migration rates. Among migrant students, 80.4% came from South America, particularly Venezuela. Overall, participants attended schools classified as high (407, 44.4%) or very high (510, 55.6%) on the national School Vulnerability Index.

Regarding study variables, adolescents reported a mean score of 3.49 ± 0.34 points on short-term Emotional Self-Regulation (ESR), a value close to the midpoint of the scale with low variability (CV = 9.7%). The mean score for subjective well-being was 7.76 ± 1.70 points, a relatively high value but with greater variability (CV = 21.9%).

3.2 Comparative analysis

Differences were observed by gender, developmental stage, and SVI (Table 2). Girls reported lower SWB than boys (7.43 ± 1.75 vs. 8.08 ± 1.58). Given unequal variances (Levene's test, $p = 0.006$), Welch's correction was applied ($t = 5.96$, $p < 0.001$), with a small effect size ($g = -0.40$, 95% CI [−0.53, −0.27]).

TABLE 1 Participants'characteristics (*N* = 917).

Categorical variables	*n* (%)
Boys	466 (50.8)
Girls	451 (49.2)
Early adolescents	610 (66.5)
Late adolescents	307 (33.5)
High SVI	407 (44.4)
Very high SVI	510 (55.6)
Chileans	825 (90.0)
Migrant	92 (10.0)
Continuous variables	*M* (SD); CV
Age (years)	14.3 (2.08); 14.5
ESR	3.49 (0.34); 9.7
SWB	7.76 (1.70); 21.9

SVI, School Vulnerability Index; SWB, subjective well-being (Personal Well-Being Index); ESR, emotional self-regulation. CV, coefficient of variation.

TABLE 2 Group comparisons on ESR and SWB.

Variable	ESR *M* (SD)	|g|	SWB *M* (SD)	|g|
Girls	3.43 (0.59)	0.21	7.43 (1.75)	0.39
Boys	3.55 (0.58)**		8.08 (1.58)*	
Early adolescents	3.51 (0.58)	0.05	7.86 (1.66)	0.19
Late adolescents	3.47 (0.59)		7.54 (1.75)	
High SVI	3.51 (0.59)	0.06	7.52 (1.74)**	0.25
Very high SVI	3.47 (0.58)		7.94 (1.64)	
Chilean	3.48 (0.59)	0.11	7.73 (1.71)	0.21
Migrant	3.55 (0.55)		8.07 (1.51)	

Values are M (SD). |*g*| = absolute Hedges' g (group 1 − group 0). When Levene $p < 0.05$, Welch is reported. Mann–Whitney U used as sensitivity analysis. *$p < 0.05$, **$p < 0.01$.

Subjective well-being was lower among late adolescents compared to early adolescents ($t = 2.75$, $p = 0.006$), with a trivial-to-small effect size (−0.19). The group with very high SVI showed higher SWB than the group with high SVI ($t = -3.72$, $p < 0.001$; $g = 0.25$). Regarding nationality, no statistically significant differences were found in SWB ($p = 0.061$; $g = 0.21$). This effect became significant after covariate adjustment in the regression model (see Table 3).

For ESR, a small difference was found by gender, favoring boys ($t = 3.19$, $p = 0.001$; $g = 0.21$). No differences were observed by adolescence stage, SVI, or nationality ($p > 0.32$). In all comparisons, the Mann–Whitney U test was reported as a sensitivity analysis, yielding consistent conclusions. When Levene's test was significant, Welch's correction was applied (see Table 2).

3.3 Regression analysis

Preliminary diagnostics indicated that the assumptions of normality, homoscedasticity, and multicollinearity were satisfactorily met. Variance inflation factors (VIFs) ranged from 1.02 to 1.06, well below commonly accepted thresholds, indicating no substantive multicollinearity among predictors. Additionally, an unconditional mixed-effects model with a random intercept for school produced an intraclass correlation coefficient (ICC) close to zero, suggesting minimal between-school variance in SWB and supporting the use of OLS regression as the primary analytical strategy.

Primary analysis showed a positive and trivial correlation in terms of strength between SWB and ESR in adolescents ($r = 0.11$, 95% CI [0.04, 0.17], $p = 0.001$). The hypothesis was then tested using a hierarchical linear regression (OLS) in two blocks. The first block included covariates: gender, age, SVI, and nationality. This model explained 6.7% of the variance in SWB ($R^2 = 0.067$, adj. $R^2 = 0.063$). The inclusion of ESR in the second block increased the explained variance to $R^2 = 0.074$, adj. $R^2 = 0.069$, representing a small but statistically significant increment ($\Delta R^2 = 0.008$; F-change (1, 900) = 7.31, $p = 0.007$). Despite the small bivariate correlation, the unique association of ESR with SWB became statistically significant once covariates were included, a pattern compatible with a modest suppression effect.

In the final model, greater ESR (see Table 3) was associated with higher SWB ($B = 0.25$, SE(HC3) = 0.10, $t = 2.52$, $p = 0.012$, 95% CI [0.06, 0.45], $\beta = 0.09$). Additional effects included a negative effect of age ($B = -0.07$, SE(HC3) = 0.03, $t = -2.52$, $p = 0.012$, 95% CI [−0.12, −0.01], $\beta = -0.08$), a positive effect of SVI ($B = 0.41$, SE(HC3) = 0.11, $t = 3.67$, $p < 0.001$, 95% CI [0.19, 0.63], $\beta = 0.12$), and a negative effect of gender ($B = -0.66$, SE(HC3) = 0.11, $t = -6.03$, $p < 0.001$, 95% CI [−0.87, −0.44], $\beta = -0.19$). Nationality showed a smaller positive effect ($B = 0.41$, SE(HC3) = 0.17, $t = 2.46$, $p = 0.014$, 95% CI [0.08, 0.73], $\beta = 0.07$; this effect was not significant in unadjusted comparisons; see Table 2).

Collinearity diagnostics were adequate (VIF = 1.02–1.06). To account for clustering by school, GEE models (Gaussian/identity, robust errors, subject = school) and a REML mixed-effects model with random intercept by school reproduced the same pattern of effects; in the mixed model, intercept variance was ≈ 0 and ICC ≈ 0, supporting the inferential equivalence of OLS, GEE, and mixed models.

4 Discussion

This study's primary goal was to investigate the relationship between sociodemographic characteristics and short-term emotional self-regulation (ESR) and subjective well-being (SWB) in teenagers attending public schools in socially vulnerable settings. Overall, the results show a little but steady positive correlation between ESR and SWB: even after controlling for age, gender, school vulnerability, and immigration status, adolescents who report having superior short-term regulating skills are generally happier with their life. Simultaneously, a statistically significant

TABLE 3 Hierarchical OLS regression predicting subjective well-being (SWB) (Blocks 1 and 2; HC3 robust standard errors).

Predictor	B (SE HC3) Model 1	β Model 1	95% CI Model 1	*p* Model 1	B (SE HC3) Model 2	β Model 2	95% CI Model 2	*p* Model 2
Gender (1 = girls)	−0.69 (0.11)	−0.20	[−0.90, −0.47]	<0.001	−0.66 (0.11)	−0.19	[−0.87, −0.44]	<0.001
Age (years)	−0.07 (0.03)	−0.08	[−0.12, −0.02]	0.011	−0.07 (0.03)	−0.08	[−0.12, −0.01]	0.012
SVI (1 = very high)	0.40 (0.11)	0.12	[0.18, 0.62]	<0.001	0.41 (0.11)	0.12	[0.19, 0.63]	<0.001
Migrant (1 = yes)	0.43 (0.17)	0.08	[0.10, 0.75]	0.010	0.41 (0.17)	0.07	[0.08, 0.73]	0.014
ESR (mean score)	–	–	–	–	0.25 (0.10)	0.09	[0.06, 0.45]	0.012

Model fit. Model 1: $R^2 = 0.067$, adj. $R^2 = 0.063$. Model 2: $R^2 = 0.074$, adj. $R^2 = 0.069$; $\Delta R^2 = 0.008$; F-change (1, 900) = 7.31, $p = 0.007$. B, unstandardized coefficients estimated with heteroskedasticity-robust (HC3) standard errors; β, standardized coefficients; SWB, subjective well-being; ESR, emotional self-regulation; SVI, School Vulnerability Index.

adjusted coefficient in the hierarchical model and a trivial zero-order correlation between ESR and SWB are consistent with what has been called a classic suppression effect in regression analysis. Gender was associated with both variables in our data, while age, school vulnerability, and migrant status showed stronger correlations with SWB than with ESR (see Table 2). When combined, these covariates probably function as suppressor-like variables, absorbing parts of the variance in SWB that are unrelated to the regulatory abilities of teenagers. Once this variance is eliminated, the adjusted model shows the distinct contribution of ESR to wellbeing. Furthermore, the findings support established developmental patterns, such as the decrease in SWB with age and the lower well-being levels reported by girls. The adjusted models show a positive relationship between very high school vulnerability and SWB at the contextual level, suggesting that schools may play a compensating role as regular settings that activate protective relational and psychosocial resources.

Frameworks that view subjective well-being (SWB) as a dynamic system with homeostatic features are compatible with the observed effects' magnitude and direction. According to this viewpoint, people's well-being is sustained by ongoing interactions between their own abilities and the assistance they receive from their environment, which enables them to maintain a fundamental sense of balance in the face of daily challenges (Cummins, 2010). As a proximal homeostatic resource in this system, short-term ESR affects the strength, duration, and meaning of emotions, hence impacting how they are perceived and expressed (Gross, 2014, 2015a). Adolescents who employ adaptive strategies like cognitive reappraisal, planning, and attentional control report higher levels of life satisfaction, more stable emotional states, and fewer internalizing or behavioral issues (Aldao et al., 2010; Garcia et al., 2015; Quoidbach et al., 2010; Rodríguez et al., 2022). Our findings indicate that ESR primarily supports the cognitive component of SWB while also favoring more frequent positive emotional experiences, which is consistent with tripartite models of SWB that integrate life satisfaction, positive affect, and negative affect (Busseri, 2015; Diener, 1984; Diener et al., 1999; Metler and Busseri, 2017; Pavot and Diener, 2008). This supports the notion that both exterior environmental factors and interior psychological resources contribute to subjective well-being.

Older adolescents tended to report lower levels of subjective well-being (SWB), a result that echoes what has been described in other international and regional studies. As adolescents grow older, they often become more self-aware and face increasing academic and social demands, which together can place pressure on their emotional balance (Casas et al., 2012; González-Carrasco and Casas, 2024; Oyanedel et al., 2014; Steinmayr et al., 2019). Gender differences followed a comparable pattern. Girls generally reported lower levels of well-being, consistent with research that links this gap to gender norms, emotional socialization, and differences in the kinds of stressors each group faces (Hezomi and Nadrian, 2018; Snedden et al., 2019). Part of this difference may stem from how emotions are managed. For example, girls report greater reliance on maladaptive forms such as rumination, which can amplify negative feelings and disturb emotional equilibrium (González et al., 2023; Goubet and Chrysikou, 2019). Within this framework, strengthening ESR may operate as a compensatory mechanism, buffering the normative decline in SWB associated with age and mitigating gender disparities. Such efforts could focus on fostering adaptive strategies (e.g., cognitive reappraisal, problem-solving) and attentional skills (e.g., inhibition and focus-shifting) that are sensitive to developmental change (D'Souza and Smyth, 2025; Phan et al., 2022; Sharma et al., 2025; Zhu et al., 2025). Given that ESR is a developing competence rooted in executive functioning–which continues to mature during adolescence, particularly within the prefrontal cortex (Fernandes et al., 2023)–its capacity should be understood as dynamic and highly trainable (Heller and Casey, 2016).

In both bivariate comparisons and the adjusted models, very high school vulnerability (SVI) was found to be a minor but positive predictor of SWB. After adjusting for age, gender, ESR, and nationality (B = 0.41, SE(HC3) = 0.11, 95% CI [0.19, 0.63], β = 0.12, $p < 0.001$; see Table 3), adolescents attending schools classified as very high in vulnerability reported somewhat higher levels of well-being than those in high-vulnerability schools (see Table 2). This pattern is more likely to be seen as proof of compensatory mechanisms at work in extremely vulnerable schools rather than as evidence that vulnerability is intrinsically advantageous. In these situations, resilience is better understood as the outcome of dynamic interactions between young people and the social ecologies that surround them, such as peers, community organizations, and supporting adults (Masten and Reed, 2002; Luthar, 2021). Material resources, psychosocial programs, and regular relational practices frequently function as protective components in schools and communities with high levels of vulnerability, allowing kids to preserve their sense of stability and connection when life gets challenging. According to an ecological perspective (Bronfenbrenner, 1979), schools situated in extremely vulnerable areas may therefore serve as important microsystems where peer networks, teacher-student relationships, and institutional practices come together to foster a sense of community and care (López et al., 2017).

The most obvious conclusion from these findings seems to be that a school's environment, including the relationships it creates and the sense of security it provides, influences how kids learn to manage their emotions and, eventually, how they feel about their life. According to Guzmán-Pozo et al. (2025), when young people perceive their school as a respected and caring environment, it becomes more than just a place to learn; it becomes a daily setting that aids in stress management and the development of social and emotional confidence. Initiatives that combine social-emotional learning with psychosocial support tend to promote engagement and emotional stability in schools facing social or economic hardship, according to research on resilience (Cai et al., 2025; Llistosella et al., 2024; van Loon et al., 2023). International initiatives like the RULER and FRIENDS programs demonstrate how long-term, context-sensitive instruction in emotional regulation can enhance students' wellbeing and the standard of regular classroom interactions (Barrett, 2010; Brackett, 2019). School psychologists and interdisciplinary teams frequently modify more general mental-health frameworks to fit the needs of their communities in Chile's many public schools, which operate under difficult and precarious circumstances (Richter et al., 2022). Their work demonstrates that providing emotional support as a stand-alone initiative is less beneficial than integrating it into regular school activities.

The positive correlation between well-being and school vulnerability (SVI) does not negate the importance of inequality.

Instead, it likely indicates that specific protective elements inside schools and their communities begin to function when other conditions remain mostly same. While having a stable peer group, feeling like one belongs, or receiving attention from a teacher may not eliminate disadvantage, these modest forms of support can help students maintain emotional stability even in challenging situations, which is consistent with the homeostatic protection feature of the well-being system (Allen et al., 2024; Cummins, 2010; Shum et al., 2025). However, these patterns need to be interpreted in the context of a larger social framework. Many of the constraints and opportunities that young people encounter are still defined by structural inequality, and closing such disparities is crucial if gains in well-being are to be long-lasting (Medel et al., 2025; United Nations Children's Fund, 2018, 2023). This study adds that schools can function as compensating ecosystems in real life, creating environments where kids can find some stability and connection in spite of external pressures through regular acts of support and acknowledgment.

It is evident from a closer examination of these results that emotional self-regulation (ESR) cannot be viewed as a fixed personal characteristic. Instead, it functions as a collection of abilities that may be acquired and improved over time. This implies that kids who receive guidance and support are more equipped to handle pressure, bounce back from frustration, and maintain emotional equilibrium when things do not go as planned in day-to-day school life. This process probably involves a number of processes. One is cognitive reappraisal, which is the practice of viewing social or academic circumstances from a different perspective in order to make them seem less daunting (Quoidbach et al., 2010; Volkaert et al., 2018). Another is attentional and inhibitory control, which supports students' sense of calm and self-efficacy by assisting them in stopping harmful ideas and refocusing on their objectives (Gross, 2014; Li et al., 2022; McKay et al., 2022; Silvers et al., 2014). Persistence and planning, or the ability to carry on after errors and refocus when demands become too great, constitute a third mechanism (Bae et al., 2024; Huttunen et al., 2024; Rodríguez et al., 2022). The explanation of these mechanisms explains why ESR is still a useful and flexible target for intervention even though it only accounts for a modest but statistically significant incremental proportion of explained variance in SWB ($\Delta R^2 = 0.008$). Practically speaking, this implies that emotional control is a skill that schools can deliberately develop through real-world encounters, thoughtful discussion, and encouraging connections that allow children to grow from emotional difficulties.

Finally, based on the hypothesis that (a) emotional regulation positively influences subjective well-being and (b) gender, age, nationality, and school vulnerability are associated with adolescents' well-being, current research provides strong empirical support. Multiple studies consistently show that adaptive emotional regulation strategies, especially cognitive reappraisal, are significantly linked to higher life satisfaction and overall well-being in adolescents, acting as protective factors against depression and anxiety. Sociodemographic variables like gender and age yield predictable patterns, with girls and older adolescents typically reporting lower well-being, while school vulnerability interacts as a contextual factor influencing well-being outcomes. These findings align with the hypothesis and confirm that emotional regulation, combined with sociodemographic and contextual influences, sustains adolescent subjective well-being in vulnerable social settings. Interventions focusing on emotional regulation can thus be effective in improving adolescents' psychosocial adjustment and resilience (Ryff and Singer, 1998).

In the aftermath of the pandemic, many adolescents continue to face new layers of social and emotional strain that put their coping abilities to the test (Loades et al., 2020; Ellis et al., 2020). These experiences have made it clear that schools must do more than provide academic instruction, they must also help students learn how to manage their emotions and rebuild a sense of stability in daily life. Strengthening these skills is not simply preventive; it is part of preparing young people to recover from disruption and to adapt to ongoing change. Viewed from this standpoint, the present findings shed light on how emotional regulation interacts with age, gender, and vulnerability to shape well-being among Chilean adolescents attending high- and very-high-vulnerability public schools. They point to the importance of developing interventions that are both multidimensional and sensitive to students' developmental stage, programs grounded in resilience, in the brain's capacity to adapt, and in the social environments that make such growth possible. Ultimately, promoting adolescent well-being requires long-term efforts that link emotional learning with the everyday realities of schools and communities.

4.1 Strengths

This study presents several methodological, analytical, and conceptual strengths. The decision to work with a stratified probabilistic sample drawn from public schools serving highly vulnerable communities provided a realistic base for the analysis. It allowed the study to represent a diverse group of Chilean adolescents attending public schools in highly vulnerable communities in the Biobío region, while minimizing the selection bias that often affects school research. Rather than relying on a single analytic path, the study used a combination of approaches to test the consistency of its results. Hierarchical models with robust standard errors (HC3) were the main framework, but the data were also checked through GEE and mixed-effects models with ICC ≈ 0, which reinforced the inferential stability of the OLS estimates and limits potential biases due to school-level clustering. In addition, sensitivity analyses, including Welch's corrections and nonparametric tests, confirmed the stability of the results and reinforced the transparency of the analytical process. The instruments used in this study showed solid internal validity, which strengthened the overall consistency of the findings. Both the PWI-SC and the abbreviated version of the ESR scale reached satisfactory reliability ($\alpha = 0.82$), providing confidence in the measures applied and, in the interpretations, drawn from them.

Analytically, the results show that a minor but statistically significant amount of the variation in subjective well-being (SWB) was explained by emotional self-regulation (ESR) ($\Delta R^2 = 0.008$; $\beta = 0.09$). This finding shows that teenagers' capacity to control their emotions still makes a distinct contribution to their level of life satisfaction, even when sociodemographic variables like age, gender, school vulnerability, and nationality are taken into consideration. Homeostatic theory (Cummins, 2010), emotion-regulation models (Gross, 2014, 2015a), and resilience theory

(Masten and Reed, 2002) provide conceptual depth to the interpretation by elucidating the ways in which contextual and personal resources interact to maintain well-being even in challenging circumstances. From this angle, integrating ESR with the compensating mechanisms that function in schools that are at risk adds a useful, practice-oriented component. It implies that schools serve as both educational and protective spaces that can help kids who encounter daily hardship develop psychosocial resilience and emotional competence.

It is important to note, however, that these patterns are associational rather than causal; the cross-sectional design does not allow us to determine the temporal ordering of ESR, contextual conditions, and SWB, and longitudinal designs are needed to clarify directionality and change over time.

4.2 Limitations

A few important limitations need addressing. First, the study's cross-sectional design fundamentally prevents us from drawing causal inference; hence, we recommend longitudinal or cross-lagged follow-up studies. These would be necessary to properly uncover directionality and capture the developmental trajectories of SWB and ESR over time. Second, the current study solely used a cognitive indicator (the PWI-SC), despite the fact that SWB is typically thought of as having both cognitive (life satisfaction) and affective (good and negative feelings) components (Diener et al., 1999; Busseri, 2015). Therefore, rather than the complete experiential profile of teenagers' affective states, our findings mainly represent their overall contentment with important life areas. In order to fully capture the tripartite structure of SWB, future research should use explicit measurements of positive and negative affect. Third, although the abbreviated five-item ESR scale is efficient and internally reliable, it might not fully reflect the whole spectrum of emotional regulation processes. Future research must employ more comprehensive instruments that can differentiate between adaptive (like reappraisal) and maladaptive strategies (e.g., suppression or rumination), as well as assessing measurement invariance across gender and age groups. Fourth, the restricted regional scope of this work limits generalizability. Replications across other regions and countries are encouraged to clarify if contextual differences–such as school resources, community cohesion, or cultural norms–might influence the patterns we have observed. Where it is possible, multilevel designs that incorporate school climate, teaching practices, and psychosocial resources as moderators or mediators would be beneficial. Fifth, although the ESR × SVI interaction was explored, future studies should explicitly model moderation (e.g., school climate × ESR) and serial mediation pathways (e.g., social support → ESR → SWB). Integrating classroom observational data and multi-informant reports (teachers/peers) is vital to better explore these ecological variables and understand how they interact with ESR to shape well-being outcomes.

5 Conclusion

In short, the findings show that short-term emotional self-regulation (ESR) is a pivotal, trainable factor. It supports the homeostatic stability of adolescents' subjective well-being (SWB), even in socioeconomically vulnerable school settings. Therefore, this work also highlights the strong need for schools to start systematically assessing well-being and emotional regulation.

The incremental impact of ESR on SWB remains clear after adjusting for age, gender, and the compensatory pattern linked to school vulnerability defines a direct path for psychoeducational work. Teaching emotional regulation simply means reducing the negative effects of school vulnerability and improving overall well-being. We must prioritize universal interventions that also include selective and indicated targeting. This can boost the resilience resources already present in highly vulnerable school communities, converting compensatory potential into sustainable well-being gains and real improvements in school coexistence and classroom climate. Significantly, the positive association between SVI and well-being, observed after statistically controlling for sociodemographic and emotional factors, suggests schools may indeed serve as compensatory ecosystems. These institutions are crucial; they activate communal and relational resources that enable well-being to persist despite considerable challenges. This fact highlights the considerable promise inherent in school-based programs designed to systematically embed emotional regulation training within daily educational practice. Therefore, subsequent research should be primarily concerned with determining the effects of these intervention types on both long-term well-being and institutional outcomes.

For future work, researchers must expand on these findings by utilizing longitudinal and multilevel methods to precisely gauge how the development of ESR shapes long-term outcomes for both student well-being and the institutions themselves. Ultimately, supporting emotional regulation within supportive, inclusive school climates offers the most viable, sustained approach to improve adolescent mental health and foster educational equity within socially vulnerable public school systems to improve adolescent mental health and foster educational equity in vulnerable contexts.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Bioethics Committee, Universidad Andrés Bello (UNAB), Chile (Approval No. 031/2022, 15 December 2022). The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardians/next of kin, and written informed assent was obtained from the adolescent participants.

Author contributions

SF-U: Writing – original draft, Project administration, Visualization, Data curation, Conceptualization, Funding acquisition, Methodology, Writing – review & editing, Formal analysis, Investigation. CC-C: Funding acquisition, Writing – review & editing, Writing – original draft, Methodology, Investigation. AR: Conceptualization, Methodology, Investigation, Writing – original draft, Formal analysis, Software, Visualization. DR-S: Supervision, Writing – review & editing, Resources, Project administration. JCO: Investigation, Resources, Writing – review & editing, Formal analysis, Methodology, Writing – original draft, Funding acquisition, Supervision. JM-L: Resources, Funding acquisition, Project administration, Writing – original draft. CL-G: Writing – review & editing, Investigation. MG-C: Writing – review & editing, Supervision. SMZ: Conceptualization, Writing – review & editing. SA-C: Funding acquisition, Writing – review & editing. VU-D: Validation, Funding acquisition, Writing – original draft. CF-M: Investigation, Funding acquisition, Methodology, Writing – original draft, Resources.

Funding

The author(s) declared that financial support was received for this work and/or its publication. This research received internal funding from the Jorge Millas Project DI-06-JM/22 and Youth Studies Center (CEJ; P.2024.2), Andrés Bello University.

Acknowledgments

We would like to thank the Research Group on Education and Emotional Health and the Chilean Observatory of Physical Education and School Sports at Andrés Bello University for their valuable support and collaboration in the development of this research (SCIA ANID CIE160009). This article was previously posted as a preprint on Research Square (DOI: 10.21203/rs.3.rs-4889591/v). The preprint was not peer reviewed.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that generative AI was used in the creation of this manuscript. The authors declare that generative AI technology (ChatGPT, OpenAI, GTP5 model) was used exclusively to assist with language editing and stylistic improvement of the manuscript. All content generated was carefully reviewed, verified, and approved by the authors to ensure accuracy and originality.

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