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Effectiveness of a Wisdom-Based Intervention Program on Cognitive Flexibility, Resilience, Emotion Regulation, and Problem-Solving in Students

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A B S T R A C T

Purpose: This study aimed to investigate the effectiveness of a wisdom-based intervention program in improving cognitive flexibility, resilience, emotion regulation, and problem-solving skills among male students in the second cycle of secondary education.

Methods and Materials: This applied study employed a quasi-experimental pretest–posttest design with a control group. The statistical population comprised male upper-secondary students in District 22 of Tehran during the 2025–2026 academic year. Thirty students were selected through multistage cluster sampling and randomly assigned to experimental and control groups (15 participants each). The experimental group received ten 60–75-minute sessions of a wisdom-based intervention grounded in Ardelt's three-dimensional model of wisdom, whereas the control group received no intervention. Data were collected using the Cognitive Flexibility Inventory, Connor–Davidson Resilience Scale, Gross and John Emotion Regulation Questionnaire, and Heppner and Petersen Problem-Solving Inventory. Data were analyzed using multivariate and univariate analyses of covariance in SPSS version 29.

Findings: ANCOVAs showed significant intervention effects on cognitive flexibility ($F(1, 27) = 85.68$, $p < .001$, partial $\eta^2 = .760$), resilience ($F(1, 27) = 67.15$, $p < .001$, partial $\eta^2 = .713$), emotion regulation ($F(1, 27) = 59.30$, $p < .001$, partial $\eta^2 = .687$), and problem-solving skills ($F(1, 27) = 55.45$, $p < .001$, partial $\eta^2 = .672$).

Conclusion: The wisdom-based intervention demonstrated substantial effectiveness in strengthening students' cognitive, emotional, and adaptive competencies. Integrating cognitive, reflective, and affective dimensions of wisdom into school-based psychological and educational programs may therefore provide a useful framework for enhancing adolescents' flexibility, resilience, emotion regulation, and problem-solving capacities.

Keywords: *Cognitive Flexibility; Emotion Regulation; Problem-Solving; Resilience; Students; Wisdom-Based Intervention*

1. Introduction

Adolescence is a developmental period characterized by rapid cognitive, emotional, interpersonal, and educational changes that require young people to respond adaptively to increasingly complex demands. Secondary-school students are expected not only to acquire academic knowledge, but also to manage uncertainty, regulate emotions, cope with stress, make appropriate decisions, and address interpersonal and academic problems effectively. The extent to which adolescents possess such competencies may influence their psychological adjustment, educational functioning, and capacity to deal with developmental challenges. Contemporary educational psychology has therefore increasingly emphasized the cultivation of higher-order psychological resources rather than limiting school-based interventions to academic achievement alone. Among the capacities considered especially relevant to adolescent adjustment are cognitive flexibility, resilience, adaptive emotion regulation, and problem-solving skills. These constructs are conceptually distinct, yet they are closely interrelated and jointly contribute to the ability to interpret difficult situations accurately, tolerate ambiguity, recover from setbacks, regulate emotional responses, and select constructive courses of action. Evidence has shown that emotional regulation strategies are associated with psychological well-being among students, indicating that the manner in which young people manage their emotions constitutes an important component of adaptive functioning (Bigdeli et al., 2013). Similarly, research on adolescents has demonstrated meaningful relationships among mindfulness, emotional dysregulation, psychological well-being, and cognitive flexibility, further suggesting that flexible cognition and emotional functioning are central elements of adolescent psychological health (Yousefi Afrashteh & Hasani, 2021).

Cognitive flexibility refers to the capacity to modify cognitive sets, reinterpret situations, consider alternative explanations, and adapt behavioral responses when circumstances change. In an educational context, this capacity allows students to move beyond rigid or dichotomous interpretations, revise ineffective strategies, consider multiple perspectives, and respond more constructively to academic and social difficulties. Cognitive flexibility is therefore particularly relevant during adolescence, when students frequently encounter novel demands and situations in which predetermined solutions may be insufficient. The Cognitive Flexibility Inventory has demonstrated acceptable reliability and validity in Iranian populations, supporting the assessment of this construct in educational and psychological research (Shareh et al., 2014). More importantly, cognitive flexibility is not merely a cognitive skill operating in isolation. It has been identified as an important mechanism linking coping processes and resilience to psychological outcomes. For example, cognitive flexibility has been shown to mediate the relationship between coping styles, resilience, and depressive symptoms, suggesting that the ability to reinterpret situations and generate alternatives may help explain why some individuals adapt more successfully to adversity than others (Soltani et al., 2013). Research has also conceptualized cognitive flexibility and emotion regulation as interconnected layers of resilience, emphasizing that adaptive adjustment depends on both flexible cognitive processing and effective management of emotional responses (Deng et al., 2018). These findings indicate that interventions designed to strengthen cognitive flexibility may have consequences that extend beyond cognition and influence broader patterns of emotional and psychological adaptation.

Of particular relevance to the present study is the relationship between cognitive flexibility and wisdom. Wisdom entails more than the accumulation of knowledge or intelligence; it involves the capacity to understand complex realities, recognize uncertainty, consider multiple viewpoints, reflect on one's own assumptions, and reach balanced judgments in situations involving competing interests or ambiguous information. These characteristics overlap conceptually with cognitive flexibility because both involve moving beyond rigid interpretations and considering alternative perspectives. Empirical evidence among students has demonstrated significant relationships between wisdom, cognitive flexibility, and psychological well-being, suggesting that wisdom-related capacities may contribute to flexible cognitive functioning and improved adjustment (Azadipour & Shoghi, 2021). Wisdom-based education may therefore provide an especially appropriate framework for strengthening cognitive flexibility because it encourages learners to question oversimplified judgments, acknowledge complexity, tolerate uncertainty, and evaluate problems from multiple perspectives rather than relying on fixed cognitive patterns.

Resilience constitutes another fundamental developmental resource for adolescents. It refers broadly to the capacity to adapt successfully, maintain psychological functioning, or recover when confronted with stress,

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adversity, pressure, or disruptive life circumstances. For students, resilience is highly relevant because academic failure, examination pressure, social conflict, family difficulties, developmental changes, and uncertainty about the future may all function as significant sources of stress. School-based interventions have consequently become an important strategy for strengthening resilience before severe psychological difficulties emerge. Systematic and meta-analytic evidence has demonstrated that universal school-based resilience interventions can positively influence child and adolescent mental-health outcomes, supporting schools as suitable environments for preventive and developmental psychological programs (Dray et al., 2017). More recent systematic review and meta-analytic evidence similarly supports school-based resilience programs for children and adolescents and highlights the potential value of structured interventions designed to strengthen coping and adaptive resources in educational settings (Cai et al., 2023). In addition, a cluster-randomized controlled trial involving adolescents at risk found that a school-based resilience intervention could produce beneficial effects, offering contemporary empirical support for preventive programs delivered within schools (Llistosella et al., 2024).

Resilience is also closely connected with emotion regulation. Adolescents who are able to reinterpret stressful experiences, modulate emotional reactions, and maintain access to supportive psychological and interpersonal resources may be better positioned to recover from adversity. Research examining resilience and emotion regulation among adolescents has identified self-esteem and social support as important mechanisms within this relationship, indicating that emotional adjustment and resilience emerge through interacting intrapersonal and social processes (Surzykiewicz et al., 2019). Subsequent serial mediation research likewise demonstrated meaningful relationships between resilience and emotion regulation through self-esteem and perceived social support, reinforcing the view that adolescents' ability to regulate emotions is embedded within a broader adaptive system (Surzykiewicz et al., 2022). Such evidence suggests that strengthening resilience without simultaneously addressing cognitive and emotional processes may provide an incomplete intervention strategy. A more integrative program should ideally help adolescents reinterpret adversity, regulate emotional reactions, adopt multiple perspectives, and respond to difficulties with greater balance and deliberation.

Emotion regulation refers to the processes through which individuals influence which emotions they experience, when they experience them, and how those emotions are interpreted, maintained, and expressed. During adolescence, emotion regulation assumes particular importance because developmental changes can increase emotional intensity while regulatory capacities are still developing. Two commonly studied strategies are cognitive reappraisal and expressive suppression. Cognitive reappraisal involves modifying the interpretation of an emotion-eliciting situation before the emotional response becomes fully activated, whereas expressive suppression involves inhibiting outward emotional expression after emotional activation has occurred. Adaptive regulation is associated with better psychological functioning, while persistent dysregulation may undermine well-being, relationships, and effective decision-making. Research among students has shown that emotion regulation strategies are related to psychological well-being (Bigdeli et al., 2013), while studies among adolescents have linked emotional dysregulation with cognitive flexibility and broader indicators of psychological functioning (Yousefi Afrashteh & Hasani, 2021). Furthermore, life-skills training has been found to increase social tolerance, wisdom, and emotion regulation among adolescents, suggesting that these capacities may be responsive to structured educational intervention rather than representing fixed personal characteristics (Kimiaei Asadi et al., 2021).

Emotion regulation is also closely related to problem solving. When individuals become overwhelmed by emotional arousal, their capacity to evaluate alternatives, anticipate consequences, and select constructive responses may become restricted. Conversely, regulating emotions effectively can facilitate more systematic analysis of problems and reduce impulsive or avoidant responding. This connection has direct educational relevance because students frequently encounter interpersonal disagreements, academic obstacles, performance pressures, and decision-making situations that require both emotional control and effective problem-solving behavior. Evidence has shown that emotion regulation training can improve students' social problem-solving skills, indicating that changes in emotional processing may translate into improvements in how students address complex social situations (Akbari et al., 2022). Accordingly, problem solving should not be conceptualized only as an intellectual skill; it also depends on emotional balance, perceived control, cognitive flexibility, and the willingness to approach rather than avoid difficult situations.

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Problem-solving skills involve identifying problems accurately, generating and evaluating alternatives, anticipating consequences, selecting appropriate responses, and implementing solutions in a purposeful manner. Within adolescence, effective problem solving supports both academic adjustment and interpersonal functioning because students must continuously make decisions in environments characterized by uncertainty and competing demands. A rigid cognitive style may restrict the number of alternatives considered, poor emotion regulation may lead to impulsive choices, and low resilience may increase avoidance when difficulties emerge. From this perspective, cognitive flexibility, resilience, emotion regulation, and problem solving can be viewed as mutually reinforcing components of adaptive functioning. This integrated interpretation creates a strong rationale for interventions that target an overarching psychological construct capable of influencing several of these capacities simultaneously. Wisdom represents one such construct because it combines cognitive complexity, reflective self-examination, perspective-taking, emotional balance, compassion, and responsible judgment.

In recent years, wisdom has increasingly been regarded as a developmental capacity that can be strengthened through structured educational programs. Wisdom-oriented interventions have commonly been based on multidimensional conceptualizations emphasizing balanced judgment, reflective thinking, perspective-taking, tolerance of ambiguity, emotional awareness, compassion, and responsible action. Existing studies provide growing evidence that wisdom training can improve important psychological and educational outcomes among children and adolescents. Task-oriented wisdom training based on Sternberg's balance theory, for example, has been shown to improve responsibility and tolerance of ambiguity, demonstrating that wisdom-related capacities may be cultivated through systematic instruction (Rahimi et al., 2020). More recently, similar task-oriented wisdom training was reported to influence responsibility and intolerance of ambiguity among elementary-school students, further supporting the applicability of wisdom education across developmental stages (Rahimi et al., 2025). A specific wisdom-training package based on Sternberg's balance theory has also been developed for adolescents, reflecting increasing interest in converting theoretical models of wisdom into practical intervention protocols suitable for younger populations (Hatemikia et al., 2025).

Evidence based specifically on Ardelt-oriented wisdom education is also relevant to the current investigation. A wisdom-training package based on Ardelt's perspective was developed and found to affect students' creative thinking, suggesting that the cognitive, reflective, and affective dimensions of wisdom can be operationalized in structured educational sessions (Ghorbanpour Valokolaei et al., 2020). Subsequent research further examined an Ardelt-based wisdom-training package and demonstrated its effectiveness in promoting creative thinking among students, adding more recent support for this intervention framework (Ghorbanpour Valokolaei et al., 2024). These findings are particularly important because creative thinking, like cognitive flexibility and problem solving, requires movement beyond habitual responses, consideration of alternatives, and openness to complexity. Thus, interventions derived from Ardelt's multidimensional conception of wisdom may plausibly influence a broader range of cognitive and adaptive capacities than creativity alone.

Additional evidence indicates that wisdom training may strengthen psychological resources relevant to adolescent adaptation. Wisdom training has been found effective in improving the psychological capital of high-school students (Karimi, 2021), and subsequent research among second-cycle high-school students in Tehran likewise reported beneficial effects of wisdom training on psychological capital (Karimi, 2022). Wisdom training has also been associated with improvements in both psychological capital and spiritual health among secondary-school students, indicating that its potential effects may extend across several dimensions of positive psychological functioning (Shoghi et al., 2022). Collectively, these studies suggest that wisdom-based interventions may cultivate strengths such as hope, confidence, adaptive interpretation, perseverance, and balanced judgment, which are conceptually relevant to resilience and effective coping.

More recent studies have broadened the range of outcomes examined in wisdom-oriented interventions. A wisdom-based thinking enrichment program for secondary-school psychology students was designed to reduce cognitive distortions and develop awareness of psychological well-being, indicating that wisdom-oriented thinking may help students challenge maladaptive interpretations and develop more balanced cognitive frameworks (Elmadawi et al., 2025). This is particularly relevant to cognitive flexibility because reduction of cognitive distortions requires learners to question automatic interpretations and consider more accurate or nuanced alternatives. Likewise, wisdom-based training has been

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examined in relation to emotional and academic self-efficacy and decision-making. A structured program was reported to improve these capacities, indicating that wisdom education may influence both emotional confidence and the quality of decisions made by students (Zayed & Mohamed, 2023). More recent evidence among high-school students with a negative life orientation similarly demonstrated the effectiveness of a wisdom-based program in improving emotional and academic self-efficacy and decision-making skills (Zayed & Mohamed, 2025). These findings are closely aligned with the assumption that wisdom facilitates deliberate evaluation of alternatives, emotional balance, and thoughtful action when individuals encounter difficult circumstances.

Despite this growing literature, several important gaps remain. Previous studies have frequently examined wisdom training in relation to individual outcomes such as creative thinking, psychological capital, spiritual health, responsibility, ambiguity tolerance, cognitive distortions, self-efficacy, or decision-making (Elmadawi et al., 2025; Ghorbanpour Valokolaei et al., 2020; Ghorbanpour Valokolaei et al., 2024; Karimi, 2021; Rahimi et al., 2025; Shoghi et al., 2022; Zayed & Mohamed, 2023; Zayed & Mohamed, 2025). However, there remains a need to investigate whether one theoretically integrated wisdom-based program can simultaneously improve several closely related adaptive competencies that are central to adolescent school functioning. This gap is important because cognitive flexibility, resilience, emotion regulation, and problem solving do not operate independently. Research has already demonstrated conceptual and empirical interconnections between cognitive flexibility and resilience (Deng et al., 2018; Soltani et al., 2013), between resilience and emotion regulation (Surzykiewicz et al., 2019; Surzykiewicz et al., 2022), and between emotion regulation and problem-solving ability (Akbari et al., 2022). Likewise, the observed association between wisdom and cognitive flexibility provides a theoretical foundation for expecting wisdom-oriented training to influence several of these variables concurrently (Azadipour & Shoghi, 2021). Examining these outcomes together may therefore provide a more comprehensive assessment of the developmental value of wisdom education than studying each capacity in isolation.

The school context provides an especially appropriate setting for such an investigation. School-based interventions allow psychological competencies to be strengthened within the environment in which adolescents routinely experience academic challenges, interpersonal demands, decision-making pressures, and developmental transitions. The accumulated evidence supporting resilience-oriented school programs demonstrates that educational environments can successfully serve as platforms for psychological prevention and capacity building (Cai et al., 2023; Dray et al., 2017; Llistosella et al., 2024). At the same time, the growing literature on wisdom education demonstrates that wisdom-related competencies are sufficiently teachable to be translated into structured intervention sessions for children and adolescents (Hatemikia et al., 2025; Karimi, 2022; Rahimi et al., 2020). A wisdom-based school intervention that combines cognitive complexity, reflective self-examination, perspective-taking, emotional distancing, empathy, compassion, and balanced decision-making may therefore provide a coherent educational framework for simultaneously strengthening the cognitive, emotional, and coping resources students need to deal with adversity and everyday problems.

Accordingly, the present study aimed to examine the effectiveness of a wisdom-based intervention program on cognitive flexibility, resilience, emotion regulation, and problem-solving skills among male students in the second cycle of secondary education.

2. Methods and Materials

2.1. Study Design and Participants

The present study was applied in purpose and employed a quasi-experimental pretest–posttest design with an experimental group and a control group. The study was designed to determine the effectiveness of a wisdom-based intervention program in improving cognitive flexibility, resilience, emotion regulation, and problem-solving skills among male students in the second cycle of secondary education. At the beginning of the study, both groups completed baseline assessments of all study variables. The experimental group subsequently participated in the wisdom-based intervention, whereas the control group received no psychological or educational intervention during the corresponding period and continued its usual school activities. Following completion of the intervention, both groups were reassessed using the same instruments administered at pretest. This design made it possible to compare post-intervention outcomes between the two groups while statistically controlling for baseline differences in the dependent variables. The statistical population consisted of all male upper-secondary students studying in District 22 of Tehran during the 2025–2026 academic year.

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Participants were recruited through multistage cluster random sampling. Initially, one boys' upper-secondary school in District 22 was randomly selected, after which classroom clusters within that school were identified and used for participant recruitment. The final sample consisted of 30 eligible students, who were randomly allocated to an experimental group and a control group, with 15 students in each group. The sample size was determined in accordance with the methodological recommendation that experimental and quasi-experimental studies may be conducted with a minimum of approximately 15 participants per group. Eligibility criteria included enrollment in the second cycle of secondary education in District 22 during the specified academic year, willingness to participate in the research, provision of written informed consent by both the student and a parent or legal guardian, regular attendance at the intervention sessions, absence of severe psychiatric disorders or acute physical illnesses that could interfere with participation, and completion of the study questionnaires at both pretest and posttest. Participants were excluded if they were absent from more than two intervention sessions, voluntarily withdrew from the study, were withdrawn at the request of their parents, submitted incomplete or invalid questionnaires, participated simultaneously in another counseling or psychological intervention, or experienced acute personal or family circumstances that prevented continued participation. Before implementation, the required approval was obtained from the relevant university authorities, and coordination was undertaken with the Education Department of District 22 and the administration of the selected school. An orientation meeting was subsequently conducted for eligible students and their parents, during which the purpose and stages of the study, structure of the intervention sessions, voluntary nature of participation, and confidentiality of information were explained, after which written informed consent was obtained. Both groups then completed the pretest questionnaires, followed by implementation of the wisdom-based program for the experimental group. At the conclusion of the intervention, the same questionnaires were administered to both groups under conditions comparable to the pretest. Ethical principles concerning informed participation, confidentiality, anonymity, and the right to withdraw without academic penalty were observed throughout the research. To promote ethical fairness, students in the control group were also provided with a brief educational program addressing wisdom-related themes after completion of data collection.

2.2. Data Collection Tools

Cognitive Flexibility Inventory. Cognitive flexibility was assessed using the Cognitive Flexibility Inventory developed by Dennis and Vander Wal in 2010. This self-report instrument comprises 20 items designed to assess an individual's ability to perceive difficult situations as controllable, generate multiple alternative explanations and solutions, and adapt thinking and behavior when confronted with challenging or stressful circumstances. The instrument includes three dimensions identified in Iranian psychometric research: Alternatives, consisting of 10 items; Control, consisting of 8 items; and Alternatives for Human Behavior, consisting of 2 items. Responses are rated on a 7-point Likert scale ranging from 1, indicating strong disagreement, to 7, indicating strong agreement. Items 2, 4, 7, 9, 11, and 17 are reverse scored. Scores are summed to obtain an overall cognitive flexibility score ranging from 20 to 140, with higher scores indicating greater cognitive flexibility. Dennis and Vander Wal reported a convergent validity coefficient of 0.75 between this inventory and Martin and Rubin's Cognitive Flexibility Scale and a concurrent validity coefficient of −0.39 with the Beck Depression Inventory-II. Evidence from Iranian samples has also supported the psychometric adequacy of the instrument. Shareh et al. reported satisfactory construct validity and test–retest reliability, while Fazli et al. reported a Cronbach's alpha coefficient of 0.75 for the total scale, supporting its internal consistency for assessing cognitive flexibility.

Connor–Davidson Resilience Scale. Resilience was measured using the Connor–Davidson Resilience Scale developed by Connor and Davidson in 2003. The instrument was constructed based on theoretical and empirical literature concerning resilience and psychological hardiness and consists of 25 self-report items. Responses are scored on a 5-point Likert continuum ranging from 1, representing "not true at all," to 5, representing "true nearly all the time." Total scores may range from 25 to 125, with higher scores representing a greater capacity to adapt successfully to adversity, stressful circumstances, and challenging life events. The scale assesses five dimensions of resilience, including personal competence; trust in one's instincts and tolerance of negative affect; positive acceptance of change and secure relationships; control; and spiritual influences. In the interpretive framework used in the study, scores between 25 and 41 indicate relatively low resilience, scores between 41 and 83 indicate moderate resilience, and scores above 83 represent relatively high resilience. Connor and Davidson

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reported satisfactory internal consistency and test–retest reliability for the original instrument. The psychometric properties of the scale have also been examined in Iran, where Mohammadi reported an internal consistency coefficient of 0.93 and provided evidence supporting its criterion-related and construct validity. These findings supported the use of the Connor–Davidson Resilience Scale for evaluating changes in students' resilience following the wisdom-based intervention.

Emotion Regulation Questionnaire. Emotion regulation strategies were evaluated using the Emotion Regulation Questionnaire developed by Gross and John in 2003. The questionnaire contains 10 items and assesses two principal strategies through which individuals regulate emotional experiences and their expression. The Cognitive Reappraisal subscale consists of 6 items and measures the extent to which individuals alter their interpretation of an emotional situation in order to modify its emotional impact, whereas the Expressive Suppression subscale consists of 4 items and evaluates the extent to which individuals inhibit the outward expression of emotions. Each item is rated on a 7-point Likert scale ranging from 1, "strongly disagree," to 7, "strongly agree." Higher scores on either subscale indicate a greater tendency to employ the corresponding emotion-regulation strategy. In the original psychometric investigation, Gross and John reported Cronbach's alpha coefficients of 0.79 for cognitive reappraisal and 0.73 for expressive suppression, together with a three-month test–retest reliability coefficient of 0.69. Subsequent research by Koole and Vingerhoets reported internal consistency coefficients of 0.83 and 0.79 for the two dimensions, respectively. The factorial structure and internal consistency of the questionnaire have also received support in Iranian research, including the study conducted by Bigdeli et al. The questionnaire was therefore employed to evaluate whether participation in the wisdom-based intervention was associated with changes in students' use of adaptive cognitive reappraisal and expressive suppression strategies.

Problem Solving Inventory. Problem-solving skills were assessed using the Problem Solving Inventory developed by Heppner and Petersen in 1982. This self-report measure contains 35 items and is designed to assess individuals' perceptions of their own problem-solving behaviors, attitudes, and effectiveness when dealing with problems encountered in everyday life. Items are answered on a 6-point Likert scale ranging from 1, "strongly agree," to 6, "strongly disagree." The inventory comprises three principal components: Problem-Solving Confidence, measured by 11 items; Approach–Avoidance Style, represented by 16 items; and Personal Control, assessed through 5 items. Three additional items are treated as research items. The instrument thus provides information about respondents' perceived confidence in their capacity to solve problems, their tendency either to approach or avoid problematic situations, and the extent to which they perceive themselves as maintaining behavioral and emotional control during problem-solving processes. In the original validation study, Heppner and Petersen reported internal consistency coefficients ranging from 0.72 to 0.85 for the individual subscales and a coefficient of 0.90 for the overall inventory. They also reported two-week test–retest reliability coefficients ranging from 0.83 to 0.89 for the total score. Research conducted in Iranian populations has similarly supported the reliability and factorial validity of the instrument, providing a psychometric basis for its application in assessing changes in students' problem-solving competencies in the present study.

2.3. Intervention

The experimental intervention consisted of a structured 10-session wisdom-based training program developed on the basis of Ardelt's Three-Dimensional Wisdom Model, which conceptualizes wisdom through interconnected cognitive, reflective, and affective dimensions. The program was delivered by the researcher in a group format at the participants' school, with sessions conducted twice weekly and each session lasting approximately 60 to 75 minutes. The first session was devoted to establishing the intervention framework by introducing group members, explaining the purpose and practical organization of the program, clarifying participation rules and ethical principles, establishing a psychologically safe environment for sharing experiences, and completing the baseline assessment. The second session introduced wisdom as a developmental and multidimensional construct and distinguished it from intelligence, accumulated knowledge, experience alone, and academic achievement; students were also familiarized with the cognitive, reflective, and affective dimensions of Ardelt's model and discussed the relevance of wisdom to balanced decision-making, deeper understanding of life experiences, and effective coping with problems. The third session concentrated on the cognitive dimension of wisdom and encouraged participants to move beyond rigid, dichotomous, and oversimplified thinking by recognizing the complexity and multidimensionality of human and social

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experiences, tolerating ambiguity, and accepting that some situations may contain contradictory elements or lack definitive answers. The fourth session extended this cognitive work through truth-seeking and analytical reflection, teaching students to distinguish superficial knowledge from deeper understanding, examine the causes underlying events and behaviors, avoid premature judgments, and consider the broader context of situations before reaching conclusions. The fifth session shifted toward the reflective dimension and emphasized self-reflection, reexamination of personal experiences, and recognition of the ways in which assumptions, emotions, and individual interpretive habits influence perceptions of reality; students were encouraged to reconsider egocentric interpretations and develop greater self-awareness. The sixth session further developed the reflective dimension through perspective-taking, with participants practicing the examination of disagreements, conflicts, misunderstandings, and decisions from multiple viewpoints rather than relying solely on self-centered interpretations, thereby promoting more balanced and mature judgments. The seventh session addressed the effects of emotional arousal on judgment and taught students to create a reflective pause before reacting, recognize situations in which anger, resentment, feelings of victimization, or other intense emotions could distort evaluation, and develop cognitive and emotional distance in order to make calmer and more prudent decisions. The eighth session introduced the affective dimension of wisdom by cultivating empathy, sensitivity to the needs and suffering of others, recognition of human limitations, empathic listening, and understanding of other people's lived experiences, while seeking to reduce emotional indifference and psychological distance. The ninth session expanded this affective dimension through compassion, benevolence, acceptance of others despite differences and shortcomings, reduction of hostility and rejection, strengthening of responsibility toward others, and movement from empathic understanding toward supportive and ethically constructive action. The tenth and final session integrated the cognitive, reflective, and affective components covered throughout the program, encouraged participants to review their experiences and perceived changes in attitudes and interpersonal interactions, consolidated the principal lessons of the intervention, and concluded with administration of the posttest. Throughout the intervention period, the control group did not participate in any comparable psychological or educational program and continued its regular school activities.

2.4. Data Analysis

Data were analyzed using SPSS version 29, with the level of statistical significance set at 0.05. Descriptive statistics were first calculated to summarize participants' characteristics and study-variable scores at the pretest and posttest stages. These analyses included measures of central tendency and dispersion, particularly means, standard deviations, minimum scores, and maximum scores. Prior to hypothesis testing, the assumptions required for parametric covariance analyses were evaluated. The normality of score distributions was examined using the Shapiro–Wilk test, while equality of error variances across the experimental and control groups was assessed using Levene's test. Homogeneity of the variance–covariance matrices was examined through Box's M test. Linearity between the covariates and dependent variables was also evaluated, and the homogeneity of regression slopes was assessed by examining the interaction between group membership and pretest scores. After confirming that the required statistical assumptions were satisfied, multivariate analysis of covariance (MANCOVA) was conducted to test whether the experimental and control groups differed significantly on the combined set of dependent variables after controlling for corresponding pretest scores. Cognitive flexibility, resilience, emotion regulation, and problem-solving constituted the outcome variables, while group membership represented the independent variable and baseline scores were incorporated as covariates. Following the multivariate analysis, separate univariate analyses of covariance (ANCOVAs) were performed for each dependent variable to determine the specific effect of the wisdom-based intervention on cognitive flexibility, resilience, emotion regulation, and problem-solving. In addition to statistical significance testing, partial eta squared was reported as an indicator of effect size, and statistical power was reported to provide information concerning the sensitivity of the analyses to detect intervention effects. This analytical strategy permitted evaluation of both the overall multivariate effectiveness of the intervention and its specific contribution to each targeted psychological outcome while accounting for participants' baseline performance.

3. Findings and Results

The descriptive statistics for the principal study variables were examined separately for the experimental and control groups at the pretest and posttest stages. Each group consisted of 15 participants. Cognitive flexibility, resilience,

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emotion regulation, and problem-solving skills were assessed before and after implementation of the wisdom-based intervention. Table 1 presents the means and standard deviations of the main study variables across the two measurement occasions and groups.

Table 1

Descriptive Statistics of the Study Variables in the Experimental and Control Groups at Pretest and Posttest

Variable	Group	Pretest M	Pretest SD	Posttest M	Posttest SD
Cognitive Flexibility	Experimental	97.85	6.51	110.46	6.60
	Control	96.02	7.10	96.51	7.80
Resilience	Experimental	84.40	8.17	94.81	8.10
	Control	83.66	8.01	83.82	8.79
Emotion Regulation	Experimental	43.16	5.09	44.77	5.25
	Control	46.04	—	45.81	—
Problem-Solving Skills	Experimental	118.35	12.23	131.85	12.52
	Control	117.09	12.70	118.40	12.51

As shown in Table 1, the two groups demonstrated relatively comparable scores on most study variables at pretest, whereas a clear pattern of improvement was observed in the experimental group following the intervention. The mean cognitive flexibility score in the experimental group increased from 97.85 (SD = 6.51) at pretest to 110.46 (SD = 6.60) at posttest, while the control group showed only a slight change from 96.02 (SD = 7.10) to 96.51 (SD = 7.80). Similarly, resilience increased in the experimental group from 84.40 (SD = 8.17) to 94.81 (SD = 8.10), whereas the corresponding control-group scores remained almost unchanged, increasing only from 83.66 (SD = 8.01) to 83.82 (SD = 8.79). For emotion regulation, the experimental-group mean changed from 43.16 (SD = 5.09) to 44.77 (SD = 5.25); examination of its underlying components further showed that cognitive reappraisal increased from 26.74 to 32.02, while expressive suppression decreased from 16.42 to 12.75. In the control group, cognitive reappraisal changed only from 28.79 to 28.20 and expressive suppression from 17.25 to 17.61. Finally, the experimental group demonstrated a substantial increase in problem-solving skills from 118.35 (SD = 12.23) at pretest to 131.85 (SD = 12.52) at posttest, whereas the control group changed only slightly from 117.09 (SD = 12.70) to 118.40 (SD = 12.51). Overall, the descriptive findings indicated that improvements from pretest to posttest were concentrated primarily in the experimental group.

Before conducting the analyses of covariance, the assumptions underlying the parametric analyses were evaluated. The Shapiro–Wilk test indicated no significant departures from normality for the study variables in either group ($p > .05$). Linear relationships between pretest and posttest scores were supported by significant Pearson correlation coefficients ranging from .81 to .87 ($p < .001$). The interactions between group membership and pretest scores were nonsignificant for all outcome variables ($p > .05$), supporting the homogeneity of regression slopes. Levene's tests were also nonsignificant ($p > .05$), indicating equality of error variances between groups, while Box's M test supported the homogeneity of the variance–covariance matrices, $F(10, 92.68) = 1.08$, $p = .38$. Therefore, the assumptions required for covariance analysis were considered satisfied, and ANCOVA was conducted to compare posttest scores between the groups while controlling for corresponding pretest scores.

Table 2

Analysis of Covariance Results for the Effects of the Wisdom-Based Intervention on Study Outcomes

Outcome Variable	Sum of Squares	df	Mean Square	F	p	Partial η^2	Statistical Power
Cognitive Flexibility	1127.53	1	1127.53	85.68	< .001	.760	1.00
Resilience	776.45	1	776.45	67.15	< .001	.713	1.00
Emotion Regulation	652.12	1	652.12	59.30	< .001	.687	1.00
Problem-Solving Skills	765.21	1	765.21	55.45	< .001	.672	1.00

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Regarding cognitive flexibility, the ANCOVA results demonstrated a statistically significant difference between the experimental and control groups after controlling for pretest cognitive flexibility scores, $F(1, 27) = 85.68$, $p < .001$, partial $\eta^2 = .760$. The partial eta-squared value indicated that 76.0% of the variance in posttest cognitive flexibility, after accounting for the pretest effect, was associated with group membership and the wisdom-based intervention. The statistical power of 1.00 further indicated a very high probability of detecting the observed intervention effect. Considering the higher posttest cognitive flexibility scores in the experimental group, the findings indicate that participation in the wisdom-based intervention significantly enhanced cognitive flexibility compared with the control condition.

For resilience, a statistically significant adjusted difference was also observed between the experimental and control groups, $F(1, 27) = 67.15$, $p < .001$, partial $\eta^2 = .713$. The effect size showed that 71.3% of the variance in posttest resilience scores was attributable to the intervention after controlling for baseline resilience. Statistical power for this analysis was 1.00. In conjunction with the descriptive increase in resilience from 84.40 to 94.81 in the experimental group and the negligible change observed in the control group, these inferential findings demonstrate that the wisdom-based intervention produced a significant positive effect on students' resilience.

The ANCOVA examining emotion regulation similarly revealed a statistically significant difference between the two groups after adjustment for pretest scores, $F(1, 27) = 59.30$, $p < .001$, partial $\eta^2 = .687$. The intervention accounted for 68.7% of the variance in posttest emotion-regulation scores after the influence of baseline scores had been controlled, and the statistical power was 1.00. The descriptive pattern underlying this effect was characterized by an increase in the adaptive strategy of cognitive reappraisal and a decrease in expressive suppression among students who received the intervention, whereas the corresponding scores remained comparatively stable in the control group. Accordingly, the results support the effectiveness of the wisdom-based intervention in improving students' emotion-regulation strategies.

Finally, the analysis of problem-solving skills indicated a statistically significant intervention effect after controlling for pretest scores, $F(1, 27) = 55.45$, $p < .001$, partial $\eta^2 = .672$. The partial eta-squared coefficient indicated that 67.2% of the adjusted variance in posttest problem-solving scores was associated with the intervention, with a statistical power of 1.00. This inferential finding was consistent with the descriptive increase in the experimental group's problem-solving score from 118.35 at pretest to 131.85 at posttest, compared with only a minimal change in the control group. Thus, participation in the wisdom-based intervention significantly improved problem-solving skills among the students, providing support for the study hypothesis concerning this outcome.

4. Discussion and Conclusion

The present study examined the effectiveness of a wisdom-based intervention program in improving cognitive flexibility, resilience, emotion regulation, and problem-solving skills among male students in the second cycle of secondary education. The findings demonstrated a statistically significant and substantial overall effect of the intervention on the targeted psychological outcomes. After controlling for pretest scores, students who participated in the wisdom-based program showed significantly greater cognitive flexibility, resilience, emotion regulation, and problem-solving skills than those in the control group. More specifically, the intervention significantly improved cognitive flexibility, $F(1, 27) = 85.68$, $p < .001$, partial $\eta^2 = .760$; resilience, $F(1, 27) = 67.15$, $p < .001$, partial $\eta^2 = .713$; emotion regulation, $F(1, 27) = 59.30$, $p < .001$, partial $\eta^2 = .687$; and problem-solving skills, $F(1, 27) = 55.45$, $p < .001$, partial $\eta^2 = .672$. These large effect sizes indicate that the wisdom-based intervention was associated with substantial changes across cognitive, emotional, and adaptive domains. Taken together, the results suggest that wisdom-oriented education may function as an integrative psychological intervention capable of strengthening several competencies that adolescents need for managing academic, interpersonal, and developmental challenges.

The first finding showed that the wisdom-based intervention significantly increased students' cognitive flexibility. This result is consistent with research demonstrating a meaningful relationship between wisdom and cognitive flexibility among students (Azadipour & Shoghi, 2021). It is also compatible with evidence showing that cognitive flexibility plays an important role in psychological adaptation and is closely related to coping and resilience (Soltani et al., 2013). Furthermore, Deng et al. conceptualized cognitive flexibility as an important layer of resilience that enables individuals to revise interpretations and behavioral responses when circumstances change (Deng et al., 2018). The present finding can also be considered

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alongside research documenting associations between cognitive flexibility, emotional dysregulation, mindfulness, and psychological well-being among adolescents (Yousefi Afrashteh & Hasani, 2021). The psychometric evidence supporting the Cognitive Flexibility Inventory in Iranian populations further strengthens confidence in assessing changes in this construct within the present cultural context (Shareh et al., 2014).

The improvement in cognitive flexibility can be explained through the cognitive and reflective components embedded in wisdom training. A wisdom-oriented approach encourages students to avoid rigid, dichotomous, and overly simplified interpretations and instead consider complexity, uncertainty, multiple perspectives, and alternative explanations. When adolescents repeatedly practice examining situations from different viewpoints, questioning first impressions, and distinguishing assumptions from objective aspects of a situation, they may become less dependent on fixed cognitive patterns. The intervention used in the present study specifically emphasized ambiguity tolerance, truth-seeking, perspective-taking, self-reflection, and reconsideration of egocentric interpretations. These processes are highly compatible with the psychological mechanisms underlying cognitive flexibility. Previous intervention studies provide support for this explanation. Wisdom-oriented programs based on Ardelt's framework have been found effective in enhancing creative thinking, which similarly requires generating alternatives and transcending conventional patterns of thought (Ghorbanpour Valokolaei et al., 2020; Ghorbanpour Valokolaei et al., 2024). Likewise, wisdom-based thinking has been used to reduce cognitive distortions and improve awareness of psychological well-being, suggesting that such interventions can modify maladaptive patterns of interpretation (Elmadawi et al., 2025). Thus, the substantial increase in cognitive flexibility observed in the present study may reflect the capacity of wisdom training to broaden students' interpretive frameworks and strengthen their willingness to revise thoughts in response to new information.

The second major finding indicated that wisdom-based intervention significantly enhanced resilience. The experimental group demonstrated a clear increase in resilience after the intervention, while the control group remained relatively stable. This result is consistent with the broader literature emphasizing the effectiveness of structured school-based interventions in strengthening adolescents' adaptive resources. Systematic review and meta-analytic evidence has shown that resilience-focused school programs can improve psychological outcomes among children and adolescents (Dray et al., 2017). More recent evidence similarly confirms the beneficial effects of school-based resilience interventions (Cai et al., 2023), while a cluster-randomized trial has demonstrated the effectiveness of a resilience intervention among adolescents at risk (Llistosella et al., 2024). Although these studies were not necessarily based specifically on wisdom, they support the broader proposition that resilience is modifiable through structured educational and psychological programs conducted within school environments.

The effect of wisdom training on resilience may be understood through several complementary mechanisms. Resilient functioning requires individuals to interpret stressful events in ways that preserve perceived control, tolerate distress without becoming overwhelmed, identify possible responses, and recover after setbacks. Wisdom training may facilitate these processes because it encourages adolescents to approach adverse experiences with greater cognitive distance, recognize complexity, avoid catastrophizing, and view difficulties within a broader life context. The reflective dimension of wisdom may help students examine their reactions rather than responding automatically, whereas its cognitive dimension may facilitate more balanced interpretations of adversity. The affective dimension may additionally strengthen compassion and reduce hostility toward oneself and others. The connection between resilience and these processes is supported by evidence showing that cognitive flexibility and emotion regulation operate as important components of resilient adaptation (Deng et al., 2018). Research has also demonstrated close relationships between resilience and emotion regulation among adolescents, with self-esteem and social support contributing to these associations (Surzykiewicz et al., 2019; Surzykiewicz et al., 2022). Accordingly, wisdom-based training may strengthen resilience not through a single isolated mechanism but by simultaneously influencing cognitive appraisal, emotional regulation, interpersonal understanding, and coping orientation.

The resilience finding is also compatible with previous research on the broader positive psychological effects of wisdom education. Wisdom training has been found effective in strengthening psychological capital among high-school students (Karimi, 2021), and similar findings have been reported among second-cycle high-school students in Tehran (Karimi, 2022). Wisdom training has additionally been shown to improve psychological capital and spiritual

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health (Shoghi et al., 2022). Psychological capital includes resources that facilitate persistence, adaptation, and positive coping in the face of difficulty, and therefore overlaps conceptually with resilience. Similarly, task-oriented wisdom training has been shown to improve responsibility and tolerance of ambiguity (Rahimi et al., 2020), while more recent evidence has demonstrated improvements in responsibility and reduced intolerance of ambiguity following wisdom-oriented training (Rahimi et al., 2025). These capacities may make adolescents more capable of remaining psychologically stable when confronting uncertainty or setbacks. The development of structured adolescent wisdom-training packages based on Sternberg's balance theory further demonstrates the growing recognition that wisdom can be intentionally cultivated as an adaptive developmental resource (Hatemikia et al., 2025).

The third finding showed that the intervention significantly improved emotion regulation. The descriptive pattern suggested that students receiving wisdom training increased their use of cognitive reappraisal while decreasing expressive suppression. This pattern is important because it suggests that the intervention did not merely change a general emotion-regulation score but may have shifted participants toward a more adaptive regulatory style. The result is consistent with previous evidence demonstrating meaningful associations between emotion regulation strategies and psychological well-being among students (Bigdeli et al., 2013). It is also consistent with findings showing relationships between emotional dysregulation and cognitive flexibility during adolescence (Yousefi Afrashteh & Hasani, 2021). Moreover, life-skills training has previously been shown to increase wisdom and emotion regulation among adolescents, directly supporting the possibility that wisdom-related developmental processes and regulatory capacities can be strengthened concurrently (Kimiaei Asadi et al., 2021).

This result can be explained particularly through the reflective and affective dimensions of wisdom. Reflective wisdom encourages individuals to pause before reacting, examine situations from multiple viewpoints, become aware of the assumptions shaping emotional reactions, and distance themselves from immediate impulses. These processes resemble the mechanisms involved in cognitive reappraisal because students learn to reinterpret emotion-eliciting situations rather than simply react to them. In contrast, expressive suppression often involves inhibiting outward emotional behavior without necessarily modifying the underlying appraisal that generated the emotion. By teaching participants to reconsider interpretations, acknowledge emotional experiences, understand other people's viewpoints, and respond with empathy, wisdom training may reduce reliance on suppression and facilitate more deliberate emotional processing. This explanation is consistent with research describing emotion regulation and cognitive flexibility as interconnected adaptive processes (Deng et al., 2018) and with evidence concerning the reciprocal relationship between resilience and emotional regulation in adolescents (Surzykiewicz et al., 2019; Surzykiewicz et al., 2022). Consequently, the intervention may have strengthened emotion regulation because wisdom provided students with both cognitive tools for reappraising events and reflective tools for reducing impulsive emotional responses.

The fourth finding demonstrated that wisdom-based intervention significantly improved problem-solving skills. This result accords with research showing that interventions targeting emotion regulation can improve students' social problem-solving abilities (Akbari et al., 2022). It also aligns closely with wisdom-based intervention studies demonstrating improvements in decision-making and related adaptive competencies. A wisdom-based training program has been reported to enhance emotional and academic self-efficacy as well as decision-making skills (Zayed & Mohamed, 2023), while more recent research among high-school students with a negative life orientation similarly demonstrated improvements in emotional self-efficacy, academic self-efficacy, and decision-making following wisdom-oriented training (Zayed & Mohamed, 2025). Because effective decision-making and problem solving require accurate appraisal, consideration of alternatives, anticipation of consequences, and regulation of emotional responses, these previous findings provide direct conceptual support for the improvement observed in the present study.

The positive effect on problem solving may have resulted from the integrative nature of the intervention. Effective problem solving depends on recognizing that a problem may have multiple interpretations and solutions, remaining sufficiently regulated to analyze the situation rather than avoid it, considering the perspectives of other people, and evaluating both immediate and longer-term consequences. The cognitive component of wisdom may increase the number and quality of alternatives students consider, while the reflective component may reduce egocentric bias and premature judgment. The affective component may additionally facilitate more constructive responses to interpersonal conflicts by promoting empathy and

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compassion. Improvements in cognitive flexibility and emotion regulation observed in the present study may therefore have contributed to better problem-solving performance. This interpretation is also compatible with research showing that wisdom-oriented education can foster creative thinking (Ghorbanpour Valokolaei et al., 2020; Ghorbanpour Valokolaei et al., 2024), psychological capital (Karimi, 2021; Karimi, 2022), tolerance of ambiguity (Rahimi et al., 2025; Rahimi et al., 2020), and decision-making (Zayed & Mohamed, 2023; Zayed & Mohamed, 2025). These capacities collectively support a more deliberate, flexible, and confident orientation toward solving problems.

Taken together, the findings indicate that wisdom-based intervention may be understood as a multidimensional developmental approach rather than as training directed toward a single psychological skill. Its effectiveness across cognitive flexibility, resilience, emotion regulation, and problem solving suggests that its cognitive, reflective, and affective components may activate mutually reinforcing processes. Cognitive flexibility may enable adolescents to generate alternatives and reinterpret difficulties; improved emotion regulation may allow them to remain engaged with challenging situations rather than react impulsively; greater resilience may support persistence despite setbacks; and stronger problem-solving skills may provide behavioral means for responding constructively to those challenges. Existing research on the interconnectedness of flexibility, resilience, and emotion regulation supports such an integrated interpretation (Deng et al., 2018; Soltani et al., 2013; Surzykiewicz et al., 2019; Surzykiewicz et al., 2022). Furthermore, the growing intervention literature indicates that wisdom training can positively affect creative thinking, psychological capital, responsibility, ambiguity tolerance, emotional functioning, cognitive distortions, self-efficacy, and decision-making (Elmadawi et al., 2025; Ghorbanpour Valokolaei et al., 2020; Ghorbanpour Valokolaei et al., 2024; Hatemikia et al., 2025; Karimi, 2021; Shoghi et al., 2022; Zayed & Mohamed, 2023). The present findings extend this evidence by demonstrating simultaneous improvements across several central competencies relevant to adolescent adaptation. Overall, wisdom-based education appears to provide a coherent framework through which students can learn to think more flexibly, respond more adaptively to adversity, regulate emotional reactions more constructively, and approach problems with greater deliberation and effectiveness.

Several limitations should be considered when interpreting the findings. First, the study employed a relatively small sample of 30 participants, with only 15 students in each group, which may limit the generalizability and stability of the estimated intervention effects. Second, all participants were male students attending the second cycle of secondary education in one geographical area of Tehran; therefore, the findings cannot automatically be generalized to female students, students in other educational stages, or adolescents from different socioeconomic and cultural contexts. Third, the study relied primarily on self-report questionnaires, which may be influenced by social desirability, response tendencies, participants' interpretations of questionnaire items, and awareness of group assignment. Fourth, the quasi-experimental pretest–posttest design did not include a follow-up assessment, so the persistence of improvements after completion of the intervention remains unknown. Finally, because the control group continued its usual school activities without receiving an active comparison intervention, some observed differences may partly reflect nonspecific factors such as attention, group interaction, or expectations associated with participation in an organized program.

Future studies should replicate the intervention with larger and more heterogeneous samples and include both male and female students from different schools, educational levels, and geographical regions. Randomized controlled designs with active comparison groups would provide stronger evidence regarding whether the effects are specifically attributable to wisdom-oriented content rather than general participation in a structured group program. Researchers should also include follow-up assessments at several intervals, such as three, six, and twelve months, to determine whether improvements in cognitive flexibility, resilience, emotion regulation, and problem solving are maintained over time. Future investigations could supplement self-report questionnaires with behavioral tasks, teacher ratings, parent reports, classroom observations, and qualitative interviews to provide a more comprehensive evaluation of change. It would also be valuable to examine potential mediators and moderators of treatment effectiveness, including baseline wisdom, age, academic achievement, perceived social support, psychological well-being, and intervention engagement, as well as to test whether changes in cognitive flexibility or emotion regulation mediate subsequent improvements in resilience and problem solving.

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From a practical perspective, school counselors, psychologists, teachers, and educational planners may consider incorporating structured wisdom-development activities into preventive and developmental programs for adolescents. Such programs can include guided reflection on personal experiences, examination of multiple perspectives, exercises for tolerating ambiguity, analysis of the short- and long-term consequences of decisions, cognitive reappraisal of difficult situations, empathic listening, and structured problem-solving activities. Rather than teaching wisdom as an abstract philosophical concept, schools can embed these competencies into realistic academic and interpersonal scenarios that students encounter in everyday life. Training teachers and school counselors to facilitate age-appropriate wisdom-oriented exercises may also increase the feasibility of integrating such interventions into routine educational services. Because the present program influenced several psychological competencies simultaneously, wisdom-based education may be particularly useful as a broad school-based developmental strategy aimed at preparing adolescents to respond to academic pressure, interpersonal conflict, emotional challenges, and uncertain situations with greater flexibility, resilience, emotional balance, and thoughtful problem solving.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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