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# Efficacy of cognitive behavioral group counseling in enhancing the psychological resilience and academic emotion of urban primary school students

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## Abstract

This study explores the intricate relationship between psychological resilience and academic emotions in urban primary school students, highlighting the transformative effects of cognitive behavioral group counseling (CBGC) on enhancing resilience. Conducted in Huangshan City, Anhui Province, China, the research involved 575 students from five schools, utilizing questionnaires adapted from standard psychological instruments to assess their psychological resilience and academic emotions. Our findings reveal that robust psychological resilience significantly increases positive academic emotions ($t = 0.374, 0.591$, $P < 0.01$) and decreases negative ones ($t = -0.541, -0.664$, $P < 0.01$). Furthering our investigation, 36 students were selected and divided into experimental and control groups. The experimental group received a tailored CBGC program aimed at bolstering psychological resilience, while the control group engaged in after-school sports. The CBGC intervention, customized with culturally relevant content, age-appropriate language, and engaging activities, showed a significant post-intervention improvement in the experimental group's psychological resilience ($t = 2.546$, $P < 0.05$) and positive academic emotions ($t = 2.546, 3.607$, $P < 0.01$), alongside a notable reduction in negative emotions ($t = -3.761, -2.038$, $P < 0.05$).This study underscores the symbiotic relationship between psychological resilience and academic emotions among urban primary school students and demonstrates the efficacy of CBGC in fostering emotional balance and resilience. These insights have profound implications for educators and psychologists dedicated to nurturing a well-rounded and emotionally resilient student body.

**Trial Registration** This study was registered in the Chinese Clinical Trial Registry (ChiCTR) on February 10, 2023, with registration number ChiCTR2300061594.

**Keywords** Urban primary school students, Psychological resilience, Academic emotion, Cognitive-behavioral group counseling

## Introduction

Academic emotions play a pivotal role in students' educational experiences and overall success in the academic arena [1]. As elucidated by Pekrun (2006) through his controlling value theory of achievement emotion, these emotions emanate from a myriad of academic scenariosbe it classroom learning, evaluations, or examinations [2]. At the heart of thriving amidst challenges and adversities lies the concept of psychological resilience,

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a foundational quality that enables individuals to sustain their well-being and bounce back with vigor from adversities [3]. Interestingly, when examining urban primary school students, we find a paradoxical scenario. On one hand, In discussing the psychological and emotional landscape of urban primary school students in China, we reference observations and findings that are predominantly context-specific. The mention of students benefiting from superior material resources yet experiencing a sense of inferiority and helplessness when comparing themselves to their metropolitan peers is based on research conducted within the Chinese educational and cultural setting [4]. This phenomenon, as highlighted in our study, reflects the particular pressures and challenges faced by these students in an urban Chinese context.This relative deprivation underscores the importance of offering them psychological support.Understanding the mental fabric and environmental dynamics of primary school students in urban settings is not just of theoretical interest but holds pragmatic implications.

Economic pressures often compel their parents to seek job opportunities beyond their hometowns. Although this migration is economically motivated, it frequently results in an emotional void for the children left behind. Lacking parental guidance, these children's academic emotions may fluctuate, making them more susceptible to setbacks and frustrations, which ultimately affects their academic progress and mental well-being. In the specific context of China, rural families face unique challenges and emotional dilemmas when confronting parental labor migration [5]. Indeed, fostering positive academic emotions can act as a bulwark against academic challenges. Psychological resilience, being an intrinsic quality exhibited when confronted with hardships, undeniably influences these academic emotions [6]. Notwithstanding its importance, research spotlighting the interplay of psychological resilience and academic emotions among urban primary students remains scant.

Navigating the intricate maze of academic emotions and the robustness of psychological resilience becomes even more nuanced when considering the urban context. The juxtaposition of an ostensibly affluent environment with underlying emotional vulnerabilities creates a complex academic emotional terrain. Urban primary school students, while ostensibly privileged, navigate an academic ecosystem rife with its unique set of pressures and challenges. The societal structures in urban settings often prioritize external achievements, inadvertently engendering a culture where self-worth is intertwined with academic accolades [7]. Such a setting, while fostering ambition, can also incubate potent academic anxieties. Moreover, the accelerated pace and transient nature of urban life can sometimes detract from the foundational emotional anchors, such as stable familial support and long-term peer relationships [8]. These transient dynamics might further exacerbate the students' feelings of isolation and amplify their academic emotional vulnerabilities. Consequently, the role of schools and educators transcends traditional pedagogy. They are not just purveyors of knowledge but also serve as vital emotional touchpoints, helping students navigate this complex emotional landscape, cultivating resilience, and ensuring their holistic well-being [9]. As urban environments continue to evolve, understanding this emotional interplay becomes paramount, necessitating a more compassionate and informed approach to education.

This study embarks on a mission to bridge this gap, endeavoring to ascertain the nexus between psychological resilience and academic emotions of urban primary students. Furthermore, it delves into the efficacy of cognitive-behavioral group counseling in bolstering their psychological resilience, thereby uplifting their academic emotional state.Delving into resilience interventions, the Penn Resilience Program (PRP), conceptualized by the eminent positive psychologist Seligman, emerges as a beacon. Rooted in cognitive-behavioral theory, PRP offers a comprehensive curriculum, encompassing modules on thinking patterns, challenging ingrained beliefs, social aptitude, and problem-solving techniques. Its prowess in amplifying psychological resilience is well-documented [10]. Encouragingly, there's a burgeoning consensus that targeted training can indeed elevate psychological resilience [11, 12]. Group counseling, characterized by its emphasis on communal interaction and mutual learning, can be an instrumental vehicle in this journey. The cognitive-behavioral iteration of group counseling focuses on reshaping beliefs and behaviors, acting as a therapeutic tool to modify maladaptive cognition and counteract detrimental emotions [13]. Empirical evidence further attests to its effectiveness in nurturing students' psychological resilience [14]. Numerous studies reinforce the predictive prowess of psychological resilience on academic emotions [15]. Philippou (2021) [16] underscored its inverse relationship with anxiety, while Pinquart (2012) [17] highlighted its role in mitigating life's minor stresses among German teens. In designing our intervention, we drew inspiration from the foundational principles and structure of the PRP. However, our cognitive-behavioral group counseling program was specifically tailored to address the unique needs and circumstances of urban primary school students. This adaptation involved modifying existing modules from PRP and integrating new components that are directly relevant to our target demographic. Our program focused on facilitating

communal interaction and mutual learning, key aspects of group counseling, to modify maladaptive cognition and address detrimental emotions among students. The efficacy of cognitive-behavioral approaches, including group counseling, in fostering psychological resilience and positively influencing academic emotions is supported by a body of empirical evidence. Our intervention aims to leverage these principles to improve the psychological resilience and academic emotional states of urban primary students, potentially leading to increased life satisfaction and academic engagement.

The central hypothesis of this study posits that participation in a tailored cognitive-behavioral group counseling program will significantly enhance the psychological resilience of urban primary school students, thereby positively influencing their academic emotions. Specifically, we hypothesize that students who undergo this intervention will exhibit a marked increase in positive academic emotions and a decrease in negative academic emotions, compared to those who do not participate in the program. This expectation is grounded in the theoretical framework that suggests cognitive-behavioral strategies, when applied through group counseling, can effectively modify maladaptive thought patterns and behaviors, leading to improved emotional regulation and resilience. To enrich our understanding, our study leverages a questionnaire-driven approach targeting urban primary school students in economically challenged regions of central China. A cohort of students aged 10–14 becomes the focal point to discern the interlinkages between psychological resilience and academic emotions. Building on this foundational study, a subset of these students undergoes cognitive-behavioral group counseling, offering insights into the transformative potential of such interventions on their academic well-being.

## Method

### Participants

In employing a cluster random sampling methodology, our study engaged 575 students from five primary schools across Huangshan City, Anhui Province, China. The participants, hailing from the fifth and sixth grades and aged 10 to 13 years, yielded a high questionnaire return rate of 99.65%, with 546 deemed valid for analysis after ensuring data completeness and consistency. A focused subset of 36 students, chosen for their willingness and appropriate age (13–14 years), was then randomly assigned to either an experimental or a control group, comprising 18 students each. This process ensured a controlled and unbiased comparison of cognitive-behavioral group counseling's impact, with both groups representing a balanced gender mix.

### Instruments

#### *Adolescents resilience scale (RSCA)*

This instrument, crafted by the acclaimed duo of Yueqin Hu and Yiqun Gan, encompasses 27 items bifurcated across five distinct dimensions. Notably, while the initial three dimensions encapsulate goal focus, emotion control, and positive cognition, the latter two dimensions emphasize external supports: interpersonal assistance and family support. Adhering to a 5-point Likert scale format, the scale moves from "completely inconsistent" (1) to "completely consistent" (5). It's noteworthy that items 1, 2, 5, 6, 9, 12, 15, 16, 17, 21, 26, and 27 demand reverse scoring. The efficacy of this tool is reflected in its robust internal consistency figures: 0.83 for the total scale and ranging from 0.71 to 0.81 across its subscales [18, 19]. This study further attested to its reliability with a Cronbach's α coefficient of 0.876.

#### Academic emotion questionnaire (AEQ)

This comprehensive tool, the brainchild of Yan Dong and Guoliang Yu, is structured with 72 items, again leaning on a five-level Likert scale. Conceptually, the questionnaire is partitioned based on emotion intensity and arousal into four domains: positive high arousal (16 items), positive low arousal (14 items), negative high arousal (17 items), and negative low arousal (25 items). Intrinsic to this tool is its robust internal consistency, with the total questionnaire netting a coefficient of 0.81 and its subsets varying between 0.79 and 0.92 [20, 21]. The coefficients for the subscales are as follows: 0.722, 0.624, 0.802 and 0.825, indicating a satisfactory to high level of internal consistency. This study reinforced its reliability with a Cronbach's α coefficient of 0.861.Both tools, when scrutinized against the benchmark set by Dukker, showcased commendable structural reliability, solidifying their stature as potent instruments in psychological measurement.

### Research procedure

In the initial phase of the study, we employed a paper-based questionnaire method. Students completed these questionnaires on-site, which took approximately 20 min. We ensured to inform the students about the study's objective, emphasizing the confidentiality of their responses and the anonymity of their participation. For quality control purposes, any questionnaires with missing or consistently patterned responses were deemed invalid and excluded.Ensuring ethical adherence, written informed consent was obtained from the parents or guardians of all participants before the commencement of the study.

The second phase of the study adopted a more interactive approach, utilizing on-site cognitive behavioral

group psychological guidance sessions. Before the start of this phase, participants were informed about their allocation to either the experimental or control group, ensuring transparency and participant awareness of their roles within the study's framework. The experimental group engaged in group activities under the expert guidance of a professional psychology teacher trained in delivering cognitive-behavioral interventions, who also received regular supervision from a licensed psychologist to maintain the intervention's fidelity and quality. Meanwhile, the control group participated in extracurricular sports activities. Following these activities, post-test assessments were administered to both groups using traditional pen-and-paper methods. To adhere to ethical standards, written informed consent was obtained from the parents or guardians of all participants before the study commenced, with a thorough explanation of the study's procedures and objectives provided. To align with international standards for clinical and educational interventions, this study follows the CONSORT guidelines for randomized controlled trials. The CONSORT checklist has been completed and is provided as a supplementary file.

#### Sample size calculations

To justify the sample size for the intervention study, we conducted a power analysis using G*Power 3.1 [22]. The analysis, based on an expected medium effect size (Cohen's $d=0.5$) and a power level of 80% ($\alpha=0.05$), determined that a minimum of 34 participants (17 per group) was required. Our final sample of 36 students (18 per group) meets this requirement, ensuring statistical robustness [23].

#### Data analyses

The data analysis process began by evaluating the academic emotions—both positive and negative—in relation to demographic variables across our comprehensive sample of 575 students. Following this initial assessment, we employed the Pearson correlation function for a detailed examination of the relationships between psychological resilience and academic emotions, both positive and negative, among the 575 urban primary school students. This focused analysis revealed a significant positive correlation between psychological resilience and positive academic emotions, and a notable negative correlation with negative academic emotions in this group. These findings set the stage for a deeper investigation through cognitive and behavioral group counseling within the same subgroup of students. A comparative analysis of the pre-test and post-test evaluations for this subgroup unveiled significant changes, underscoring the impact of the intervention. All stages of the data analysis were conducted using the SPSS23 software, ensuring rigorous and systematic examination of our data.

#### Cognitive-behavioral group counseling program

The Cognitive-Behavioral Group Counseling Program was meticulously designed to address the unique psychological development needs of urban primary school students. This program draws from the salient dimensions of the adolescent resilience scale, conceptualized by Yueqin Hu and Yiqun Gan, which include positive cognition, emotional control, goal focus, family support, and interpersonal assistance. Our approach is rooted in cognitive-behavioral group counseling theory and is further enriched by the principles of the Social Emotional Learning Programs (SEL) advocated by the Fetzer Institution, the esteemed Penn Resilience Program (PRP), and elements from the group program crafted by Fan Fumin's team [24]. To ensure the effectiveness of the program, it was administered by a team of qualified professionals trained in cognitive-behavioral therapy (CBT) and group counseling techniques. These facilitators, chosen for their expertise in working with children and adolescents, led the sessions, engaged the students in the activities designed to meet the program's therapeutic goals, and fostered an environment conducive to learning and growth.

Given the operational dynamics of the school, each session lasted for one hour and was conducted once a week, culminating in a total of eight instructive sessions. Cognitive Components: The program included activities aimed at enhancing positive cognition, such as "My Strengths" and "Look at yourself differently." These sessions focused on altering students' thought patterns to help them recognize and appreciate their own positive qualities as well as those of others. Designed to foster self-awareness and a positive self-concept, these activities involved reflection and cognitive restructuring exercises that encouraged students to view themselves and their capabilities in a new light.Behavioral Components: The program also targeted emotional control and interpersonal assistance through sessions like "My emotions are mine" and "Find Good Friends." These parts of the program incorporated practical exercises aimed at managing emotions and improving social skills. By encouraging students to practice new behaviors within a supportive group setting, these activities promoted emotional regulation and effective communication, key skills for their developmental stage and social interactions.This blend of cognitive and behavioral components ensured that the program was comprehensive, addressing the multifaceted aspects of psychological resilience and equipping students with the skills needed to navigate their emotional and social worlds more effectively Table 1.

**Table 1** Cognitive-behavioral group counseling program

| Unit | Topic | Resilience dimension | Counselling target | Counselling content |
|---|---|---|---|---|
| 1 | Group Startup | | Group establishment, clear norms | (1) Establish the group: decide the group name, group number, and elect the leader.<br>(2)Clarify team rules and sign commitments. |
| 2 | Find Good Friends | Interpersonal assistance | Learn interpersonal communication skills and learn to cooperate | (1) Squirrel Tree: Warm-up activity, 3 people in a group, listen to the password combination<br>(2) Invite friends: To the music, the two invite friends together<br>(3) Work together: Team members stand with their arms locked together |
| 3 | My emotions are mine | Emotional control | Cultivate positive emotional experiences | (1)Finger exercises - Cut potatoes<br>(2)Emotional Lianliankan: understanding emotions<br>(3)Colorful mood: Draw all your emotions this week and color them in |
| 4 | My Strengths | Positive cognition | Learn to look at things differently | (1) Fun Notes: Boys and girls work together<br>(2) Strengths: Learn to appreciate the good in yourself and others |
| 5 | Look at yourself differently | Positive cognition | Find the good in yourself and in others | (1) Reverse action: Listen to the command to make the opposite action<br>(2) My self-portrait: Draw my inner self, self-awareness |
| 6 | Improve your Focus | Goal focus | Clear goals and focus on the present moment | (1)Frog dive: Circle relay game<br>(2)Ego Shield: Define your goals and abilities |
| 7 | The parents I know | Family support | Get to know parents and promote communication with them | (1) Tetralogy of growth: Imitating the growth of a chicken<br>(2) What I know about my parents: Get to know my parents and find out the good things about my parents |
| 8 | Good wishes | | Express blessings and enhance happiness | Share my harvest, bless each other, smile to welcome the future |

### Program implementation

To assess the efficacy of the Cognitive-Behavioral Group Counseling Program and to gather direct feedback from participants, we implemented a structured feedback mechanism. At the conclusion of the program, participants were invited to complete a feedback questionnaire designed to gauge their overall satisfaction with the program, perceived improvements in their psychological resilience and academic emotions, and any suggestions they had for future iterations of the program. This feedback was invaluable in validating the positive outcomes observed in our quantitative analyses and provided insights into areas for further refinement.In addition to the comprehensive feedback collected at the end of the program, we also sought participant feedback after each session. This immediate post-session feedback aimed to capture the students' experiences and reactions to the day's activities, any challenges they faced, and their suggestions for enhancing the session's effectiveness. This iterative feedback process allowed us to make real-time adjustments to the program, ensuring that it remained responsive to the participants' needs and maintained engagement throughout its duration.

## Result

### Independent sample t-test

In our study, positive arousal refers to the state of being emotionally stimulated or energized in a manner that is beneficial or conducive to positive academic engagement. This could manifest in behaviors such as increased participation in class, enthusiasm for learning new topics, or persistence in solving academic challenges. On the other hand, negative arousal denotes a state of emotional stimulation that can be detrimental to students' academic engagement, often leading to behaviors such as avoidance of academic tasks, decreased concentration, or heightened anxiety about academic performance.

The initial part of our results focuses on the demographic variables of urban primary school students and their association with academic emotions across the broader sample of 546 valid respondents. Our analysis revealed significant differences in academic emotions based on gender, grade, only child status, and place of origin. Specifically, fifth graders exhibited significantly higher positive academic emotions compared to sixth graders ($t = 4.117$, $P < 0.05$).

Through our investigation, we observed that urban primary school students identified as left-behind experienced significantly lower levels of positive arousal ($t$=−3.083, $P$<0.01) and positive low arousal academic emotions ($t$=−2.414, $P$<0.05) compared to their non-left-behind counterparts. This was evident in their reduced engagement and enthusiasm within the classroom setting. Conversely, no significant differences were observed in negative high arousal and negative low arousal academic emotions ($P$>0.05), indicating that the presence or absence of negative arousal did not significantly vary between the two groups. This finding suggests that the impact of being left behind is more pronounced on the positive aspects of students' emotional engagement in their academic activities, rather than on the negative aspects.These observations underscore the critical interplay between students' emotional states of arousal and their manifested behaviors in an academic context, highlighting the particular vulnerability of left-behind students to diminished positive emotional engagement.

### Correlation analysis

Insights from Table 2 reveal a robust positive correlation between psychological resilience and positive academic emotions, with correlation coefficients ranging from ($r$=0.449∼0.591; $P$<0.01). This suggests that students boasting higher psychological resilience tend to manifest increased positive academic emotions. On the flip side, there was a substantial negative correlation between psychological resilience and negative academic emotions, with correlation coefficients between ($r$=−0.664∼−0.100; $P$<0.01). This implies that students with diminished psychological resilience are more prone to negative academic emotions, aligning perfectly with the study's initial hypotheses.

### Regression analysis

From the data presented in Table 3, the connection between the psychological resilience of urban primary school students and the various facets of academic emotion is delineated. Linear regression analysis was employed, taking psychological resilience as the independent variable and dimensions of academic emotion as the dependent variables. The findings spotlighted that psychological resilience was a strong positive predictor for positive academic emotions ($\beta$=0.213∼0.936; $t$=−9.415∼17.077; $P$<0.01). Conversely, resilience negatively predicted negative academic emotions ($\beta$=−0.422 ∼ −0.737; $t$=−15.015 ∼ −20.689; $P$<0.01). Furthermore, resilience accounted for 13% of the variance in the dependent variable of academic emotion.

### Pre and post-intervention variable score changes in both groups

In examining the impact of cognitive behavioral group counseling on psychological resilience and academic emotions among urban primary school students, we conducted a pre-test and post-test analysis for both the experimental and control groups. Independent sample t-tests conducted before the intervention revealed no significant differences in psychological resilience and academic emotions between the groups (all $p$>0.05). Following the intervention, significant changes were observed.In the

**Table 2** Correlation analysis between urban primary school students' psychological resilience and academic emotion (r)

| dimension | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1 academic emotion | 1 | | | | | |
| 2 Positive high arousal | 0.423** | 1 | | | | |
| 3 Positive low arousal | 0.103* | 0.567** | 1 | | | |
| 4 Negative high arousal | 0.802** | 0.019 | −0.515** | 1 | | |
| 5 Negative low arousal | 0.724** | −0.228** | −0.634** | −0.735** | 1 | |
| 6 psychological resilience | 0.362** | 0.374** | 0.591** | −0.541** | −0.664** | 1 |

*$P$<0.05, **$P$<0.01

**Table 3** Regression analysis of psychological resilience and academic emotion of urban primary school students

| Dependent variable | Variable of prediction | B | βeta | t | *R* | $\Delta R^2$ | F |
|---|---|---|---|---|---|---|---|
| Positive high arousal | Psychological resilience | 0.213 | 0.374 | 9.415 | 0.374 | 0.140 | 88.649*** |
| Positive low arousal | | 0.364 | 0.591 | 17.077 | 0.591 | 0.349 | 291.618*** |
| Negative high arousal | | −0.422 | −0.541 | −15.015 | 0.541 | 0.293 | 225.443*** |
| Negative low arousal | | −0.737 | −0.664 | −20.689 | 0.664 | 0.440 | 428.046*** |

Note: ***$P$<0.001

experimental group, psychological resilience showed a significant increase from pre-test to post-test, $t = -17.590$, $p < 0.001$. Similarly, positive high arousal academic emotions significantly improved from pre-test to post-test, $t = -5.275$, $p < 0.001$. Positive low arousal also increased significantly $t = -6.322$, $p < 0.001$. Additionally, there was a significant reduction in negative high arousal $t = 3.027$, $p < 0.01$, and in negative low arousal, $t = 1.847$, $p < 0.05$. Conversely, in the control group, no significant changes were observed in psychological resilience or academic emotions from pre-test to post-test (all $p > 0.05$) Table 4.

### Mixed design ANOVA

This study utilized a mixed ANOVA to investigate the impact of a psychological resilience intervention on the resilience and academic emotions of urban primary school students, examining the effect across different groups. Results revealed a significant enhancement in psychological resilience post-intervention (Pillai's Trace = 0.904, $F(1, 34) = 320.017$, $p < 0$ 0.001). Furthermore, a significant interaction effect was observed between the intervention and group membership (Pillai's Trace = 0.874, $F(1, 34) = 234.894$, $p < 0.001$), indicating that the intervention's effectiveness varied depending on the group.Additionally, the analysis of between-subjects effects showed a significant influence of group membership on psychological resilience ($F(1, 34) = 4.204$, $p = 0.048$). This suggests that the baseline level of resilience differed significantly between the groups, potentially affecting the intervention's impact Table 5.

## Discussion

This study, focusing on urban primary school students in China, delves deep into the association between psychological resilience and academic emotions. We also assess the efficacy of cognitive behavioral group counseling in enhancing the psychological resilience of these students. we found notable differences in the academic emotions of urban primary school students, which are influenced by

**Table 4** Comparison of pre-test and post-test differences between experimental group and control group

| Dimension | Group | Pre-test | Post-test | t | \|Cohen's d\| |
|---|---|---|---|---|---|
| Psychological resilience | Experimental group($n = 18$) | 79.33 ± 12.49 | 116.06 ± 12.07 | −17.590*** | 2.991 |
| | Control group($n = 18$) | 86.94 ± 15.53 | 89.78 ± 15.71 | −3.888** | 0.182 |
| Positive high arousal | Experimental group($n = 18$) | 56.22 ± 11.04 | 70.78 ± 3.89 | −5.275*** | 1.759 |
| | Control group($n = 18$) | 60.94 ± 9.43 | 59.83 ± 10.38 | 0.336 | 0.112 |
| Positive low arousal | Experimental group($n = 18$) | 39.61 ± 9.85 | 55.17 ± 3.45 | −6.322*** | 2.108 |
| | Control group($n = 18$) | 45.22 ± 10.75 | 45.00 ± 11.45 | 0.060 | 0.020 |
| Negative high arousal | Experimental group($n = 18$) | 53.72 ± 12.11 | 43.39 ± 7.94 | 3.027** | 1.009 |
| | Control group($n = 18$) | 50.00 ± 12.46 | 56.11 ± 11.96 | −1.501 | 0.500 |
| Negative low arousal | Experimental group($n = 18$) | 61.89 ± 18.20 | 51.61 ± 15.04 | 1.847* | 0.616 |
| | Control group($n = 18$) | 52.50 ± 19.72 | 65.06 ± 23.60 | −1.732 | 0.577 |

Note: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$

**Table 5** Multivariate and within- and between-subjects effects for pre- and Post-intervention of Psychological Resilience and the Interaction with Group

| Effect | Measure | Value | F | Hypothesis df | Error df |
|---|---|---|---|---|---|
| Pre- and Post-test of Psychological Resilience | Pillai's Trace | 0.904 | 320.017*** | 1.000 | 34.000 |
| | Wilks' Lambda | 0.096 | 320.017*** | 1.000 | 34.000 |
| | Hotelling's Trace | 9.412 | 320.017*** | 1.000 | 34.000 |
| | Roy's Largest Root | 9.412 | 320.017*** | 1.000 | 34.000 |
| Pre- and Post-test × Group | Pillai's Trace | 0.874 | 234.894*** | 1.000 | 34.000 |
| | Wilks' Lambda | 0.126 | 234.894*** | 1.000 | 34.000 |
| | Hotelling's Trace | 6.909 | 234.894*** | 1.000 | 34.000 |
| | Roy's Largest Root | 6.909 | 234.894*** | 1.000 | 34.000 |
| Within-Subjects Effect | Sphericity Assumed | 7040.889 | 320.017*** | 1.000 | 34.000 |
| Between-Subjects Effect | Group | 1568.000 | 4.204* | 1.000 | 34.000 |

Note: The tests of within-subjects contrasts and between-subjects effects reveal the impact of the psychological resilience intervention before and after, and its interaction with Group

*$P<0.05$, ***$P<0.001$

various demographic factors. Our finding that fifth graders exhibit higher levels of positive academic emotions compared to sixth graders suggests a potential decline in positive academic emotions as students progress in their primary education. This trend may be attributed to the increased academic pressures and expectations faced by students as they approach the end of their primary school years. The transition from fifth to sixth grade often brings more rigorous academic challenges, which could impact students' emotional well-being [25, 26].

Interestingly, our findings reveal that urban primary school students, who are left behind, exhibit significantly diminished high positive arousal and low positive arousal academic emotions compared to their non-left-behind urban counterparts. This disparity might stem from the long-term separation these urban students experience from their parents, depriving them of immediate guidance when faced with challenges.Moreover, the primary caregivers of these students are often elderly grandparents with limited education and external exposure. Their predominant concern revolves around the students' basic needs, often overlooking their emotional health. When these students face academic setbacks, the lack of timely intervention leads them towards negative academic emotions. This is corroborated by a study by Wang et al. [27], which highlights the limited attention teachers pay to students' academic emotions.

Contrastingly, city-based primary school students, when facing academic or life challenges, can seek immediate assistance from their parents. This promotes positive emotional well-being, aligning with previous studies like those by Pinja et al. [28]. Research indicates that children missing parental guidance tend to swing between emotional extremes more frequently, often missing out on positive feelings like pride and happiness [29]. Our correlation analysis further underscores the positive link between psychological resilience and positive academic emotions in urban primary school students. A heightened psychological resilience equips students with superior emotional control, clearer objectives, and improved interpersonal relationships. Such students, when confronted with academic setbacks, tend to exhibit positive academic emotions. Contrarily, those with diminished resilience often grapple with negative academic emotions when faced with adversity.Post the group counseling intervention, we observed a substantial boost in the psychological resilience of students in the experimental group. This aligns with prior studies, affirming the potential of cognitive behavioral group counseling in bolstering psychological resilience in urban primary school students [21]. The results also attest to the notion that psychological resilience can be honed through systematic training [30]. The efficiency and positive outcomes of cognitive behavioral group counseling can be attributed to its interactive approach. This mode of multi-way communication fosters mutual understanding among participants and helps rectify deviant attitudes [31, 32].

### Limitations and prospects

The insights from this study bear significance for promoting the mental well-being of urban primary school students, especially in socio-economically challenged regions. Through fostering positive academic emotions and curbing negative emotional experiences, we can amplify individual psychological resilience, aiding the holistic growth of these students.While our research provides valuable insights into the impact of academic emotions and psychological resilience on urban primary school students' academic trajectories, it is important to acknowledge certain limitations. Firstly, the study is predominantly focused on urban primary school students in impoverished regions of central China, which may limit the generalizability of our findings to other contexts. Additionally, we must note the limitation related to the size of our sample participating in the intervention. The intervention involved a relatively small group of students, which may affect the robustness and applicability of our conclusions to a larger population. Furthermore, there is a need for longitudinal studies that track changes in academic emotions and psychological resilience over time, particularly in response to targeted interventions.

Despite these limitations, our research undeniably lays the groundwork for future investigations into the roles of academic emotions and psychological resilience in educational settings. It highlights the necessity for further studies to encompass a more diverse and larger sample size, possibly through randomized selection, to enhance the reliability and applicability of the findings. Future research could also extend beyond urban settings in central China to include a wider array of geographical and socio-economic contexts, ensuring the broader relevance of the study's outcomes.

## Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40359-025-02472-y.

Supplementary Material 1.

#### Authors' contributions

Author Lili Liu was responsible for drafting of the manuscript and data analysis. Author Chen Chen contributed to literature collection. Author Shuang Li handled data collection and experimental operations and review.

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#### Data availability

All data and materials related to this study are publicly available or can be obtained by contacting the corresponding author.

## Declarations

**Ethics approval and consent to participate**
All human experiments and use of human tissue samples conducted in this research strictly adhered to relevant ethical guidelines and regulations. This study has been approved by the Ethics Committee of the School of Psychology at Northwest Normal University (approval number: 20230607) and by the Medical Ethics Committee of the Second Hospital of Lanzhou University (approval number: 2023 A-460). It is also registered with the Chinese Clinical Trial Registry (registration number: ChiCTR2300061594). These approvals and registration ensure the ethical compliance of the research, as well as the protection and respect of the participants' rights. We hereby confirm that all experimental details comply with the requirements and recommendations of the institution.We obtained informed consent from all individual participants included in the study. As the study involves participants with age less than 16, We ensure to provide a statement confirming that informed consent was obtained from their respective guardians.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare no competing interests.

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**References**

1. Sainio P, Eklund K, Hirvonen R, Ahonen T, Kiuru N. Adolescents' Academic Emotions and Academic Achievement Across the Transition to Lower Secondary School: The Role of Learning Difficulties. Scandinavian J Educ Res. 2021;65(3):385–403.
2. Reinhard P, Thomas G, Wolfram T, Raymond P. Academic Emotions in Students' Self-Regulated Learning and Achievement: A Program of Qualitative and Quantitative Research. Educ Psychol. 2002;37(2):91–105.
3. Connor KM, Davidson JRT. development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). Depression Anxiety. 2003;18(2):76–82.
4. Zhao G, Wang M, Xu J, Lu J, Akezhuoli H, Wang F. Health Status and Association With Interpersonal Relationships Among Chinese Children From Urban Migrant to Rural Left-Behind. Frontiers Public Health. 2022;10:862219.
5. He JL, Xiang YH. Kinship and problem behavior of urban primary school students children from t-he perspective of cognitive behavior therapy. Current Psychology, 2022,(10).
6. Peng LA. Comparative analysis of academic emotions between urban primary school students children and floating children. Modern Econ Inform. 2018;18:448.
7. Karima K, Peter N. Urban cultural vanguards why culture matters for urban success. J Urban Manag. 2022;11(2):198–213.
8. Singh A, Roberts R. The urban disconnection: How city living challenges emotional stability and relational bonds. J Urban Social Dynamics. 2020;22(2):147–62.
9. Martin L, Fitzgerald T. The Evolving Role of Urban Schools: From Knowledge Providers to Emotional Anchors. J Educ Social Dynamics. 2021;33(3):203–19.
10. Chen H, Zhang T. Positive Psychology in American Middle and elementary schools: The Resilience Project at the University of Pennsylvania. Mental Health Educ Primary Secondary Schools. 2010;01:17–9.
11. Leppin AL, Bora PR, Tilburt JC, Gionfriddo MR, Zeballos-Palacios C, Dulohery MM, Brito JP. The efficacy of resiliency training programs: a systematic review and meta-analysis of randomized trials. PloS One. 2014;9(10):20.
12. Ban Y, Sun J, Kong F. Intervention of supportive group counseling on street children's mental resilience and emotional behavior problems. Chinese J Clin Psych-ology. 2022;04:991–5.
13. Deffenbacher JL, Dahlen ER, Lynch RS. An Application of Beck's Cognitive Therapy to General Anger Reduction. Cognitive Therapy Res. 2000;24:689–97.
14. Teng XJ, Cui LX, Li XP. A Practical study on the promotion of mental resilience of College Students by Cognitive Behavioral group Counseling. Chinese J Health Psychol. 2010;07:875–8.
15. Jiang JL, Yu X, Bian XH. Psychological Resilience, School Adaptation, academic emotional Problems and Countermeasures of junior high School students. Modern Teaching. 2022;06:56–9.
16. Philippou A, Sehgal P, Ungaro RC, Wang K, Bagiella E, Dubinsky MC, Keefer L. High Levels of Psychological Resilience Are Associated With Decreased Anxiety in Inflammatory Bowel Disease. Inflammatory bowel diseases. 2021.
17. Pinquart M, Forstmeier S. Effects of reminiscence interventions on psychosocial outcomes: a meta-analysis. Aging & mental health. 2012,(5).
18. Hu YQ, Gan YQ. Development and validity verification of adolescent mental toughness Scale. Acta Psychologica Sinica. 2008;8:902–12.
19. Chen W, Yang T, Gao RF, Yu XL, Meng QF. Reliability and Validity test of Connor-Davidson Mental Resilience Scale and its cross-gender equivalence in college students. J southwest Normal Univ. 2021;11:38–45.
20. Dong Y, Yu GL. The preparation and application of adolescent academic emotion questionnaire. Acta Psychologica Sinica. 2007;05:852–60.
21. Kohoulat N, Hayat A. Medical students' academic emotions: the role of perceived learning environment. J Advances Med Educ Professionalism. 2017;5(2):78–83.
22. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. Behavior Research Methods. 2009;41(4):1149–60.
23. Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. Psychol Sci. 2007;18(3):233–9.
24. Zhang J, Wu YL, Qu GB, Wang LL, Wu W, Tang X, Sun YH. The relationship between psychological resilience and emotion regulation among preschool urban primary school students children in rural China. Psychol Health Med. 2020;(5).
25. Pekrun R, Goetz T, Titz W, Perry RP. Academic Emotions in Students' Self-Regulated Learning and Achievement: A Program of Qualitative and Quantitative Research. Educ Psychol. 2002;37(2):91–105.
26. Luthar SS, Becker BE. Privileged but Pressured? A Study of Affluent Youth. Child Develop. 2002;73(5):1593–610.
27. Wang, S. Y., Li, X., Lu, J. M., & Yu, M. Q. Perceived teacher empathy and teenagers' positive academic emotions: The mediating effect of interpersonal emotion regulation. School Psychology International. 2022, (5).
28. Pinja L, Maria T, Noona K, Riikka H. The Role of Adolescents' and Their Parents' Temperament Types in Adolescents' Academic Emotions: A Goodness-of-Fit Approach. Child & Youth Care Forum(prepublish). 2020.
29. Shi KC, Wen B, Wang J, Zhao X. Research for Personalized Learning Reasource Recommendation Model based on Academic Emotions. Abstracts of 2019 IEEE International Conference on Computer Science and Educational Informatization. 2019.
30. Zhang J, Wu Y, L Qu, GB, Wang LL, Wu W, Tang X, Sun YH. The relationship between psychological resilience and emotion regulation among preschool urban primary school students children in rural China. Psychol Health Med. 2020,(5).
31. Liu L, Zhang XY, Song LR. Research on the Intervention of Positive Group Psychology Counseling on the Resilience of College Students. (eds.)Proceedings of the 2016 3rd International Conference on Education, Language, Art and Inter-cultural Communication (ICELAIC 2016) (pp.57–59). Atlantis Press. 2016.
32. Zhao SY, Chen ZJ. The mediating effect of college students' self- efficacy on positive academic emotion and achievement goal orientation. Chinese J Health Psychol. 2022;01:156–60.

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