

Environmental Influences on Teenagers' Mental Health: The Mediating Roles of Resilience and Self-Efficacy

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ABSTRACT

This cross-sectional study examined the impacts of family, school, and societal environments on teenagers' mental health among 384 junior high school students in Heze City, China, with resilience and self-efficacy as independent and serial mediators. Data were collected using six validated self-report scales via an online WeChat questionnaire and analyzed using partial least squares structural equation modeling (PLS-SEM). Results showed that school environment and societal environment had significant direct effects on mental health, whereas family environment had no significant direct effect. Resilience and self-efficacy independently mediated the associations between all three environmental domains and mental health. Serial mediation was confirmed: school and societal environments influenced mental health sequentially through resilience and then self-efficacy. The overall model explained 35.8% of the variance in mental health. These findings support social cognitive theory and resilience theory and provide empirical evidence for promoting teenagers' mental health via environmental improvement and psychological strength training.

Contribution/Originality: This study contributes to clarifying the environmental and psychological structure of teenagers' mental health in an under-researched Chinese city by assessing how family, school, and societal dynamics influence junior high school students' mental health, with resilience and self-efficacy as key mediators, using PLS-SEM analysis.

1. Introduction

Teenagers' mental health has become a critical global public health concern. In China, the prevalence of mental health problems among children and teenagers' s has reached 19.3% according to recent large-scale epidemiological data (The Lancet Regional

Health–Western Pacific, 2025). High academic pressure, rapid social transformation, and excessive social media use have led to rising depression, anxiety, and stress among junior high school students (China Daily, 2025). Heze City, a prefecture-level city undergoing rapid socioeconomic development, faces similar challenges, yet few studies have systematically explored the joint influences of family, school, and societal environments on local teenagers' mental health.

Ecological systems theory suggests that teenagers' development is shaped by nested environmental systems, including family, school, and society (Bronfenbrenner, 1979; updated in WHO, 2025). However, most existing studies focus on a single environmental domain and lack integrated psychological mechanisms. Resilience—the ability to recover from adversity—and self-efficacy—the belief in one's capability to cope with challenges—are regarded as critical protective factors for mental health (Li et al., 2025; Zhang et al., 2025). According to social cognitive theory and resilience theory, positive environments may enhance resilience and self-efficacy, which in turn reduce psychological distress (Bandura, 2020; Zimmerman, 2021).

Despite the theoretical importance of these mediators, few studies have tested both independent and serial mediation simultaneously (Frontiers in Psychology, 2025). Moreover, no local research has examined this comprehensive model in Heze City. Therefore, this study aimed to investigate how family, school, and societal environments affect teenagers' mental health through resilience and self-efficacy as mediators.

1.1. Research Objectives

- i. To identify the teenagers' family, school and societal environments, teenagers' levels of resilience and self-efficacy, and teenagers' mental health.
- ii. To examine the relationship between the influence of family, school and societal environments on teenagers' mental health.
- iii. To investigate the relationship between the influence of the family, school and societal environments on teenagers' levels of resilience and self-efficacy.
- iv. To determine the mediating effects of teenagers' levels of resilience and self-efficacy on the relationship between family, school and societal environments and the teenagers' mental health.
- v. To verify a comprehensive framework on the influence of the family, school and societal environments on teenagers' mental health via teenagers' levels of resilience and self-efficacy.

1.2. Hypotheses

- i. Teenagers' have low resilience and self-efficacy levels against stressors impacting their mental health.
- ii. Family, school, and society have direct influences on the mental health of teenagers'.
- iii. The family, school, and society have direct influences on the resilience and self-efficacy levels of teenagers' against mental health stressors.
- iv. Resilience and self-efficacy play a mediating role in the relationship between the family, schools, and society, and the mental health of teenagers'.

2. Literature Review

This study aims to examine how family, school, and societal environments affect adolescent mental health. Reviews relevant theories and empirical literature, identifies research gaps, proposes a conceptual framework, and states 21 hypotheses based on studies in psychology and public health.

2.1. Teenagers' Mental Health in China

Recent national surveys indicate that nearly one in five Chinese teenagers suffer from clinically significant mental health problems, with anxiety and depression being the most prevalent (The Lancet Regional Health–Western Pacific, 2025). Academic pressure, family changes, social media exposure, and urbanization contribute to rising distress levels (Li & Gao, 2020; updated by Wang et al., 2025).

2.2. Environmental Influences on Mental Health

Family environment provides emotional support and safety. Positive family climate reduces distress, but harsh parenting and high academic pressure increase risks (Li et al., 2025). School environment includes teacher support, peer relationships, and school climate. Supportive schools reduce anxiety and improve well-being (Hu et al., 2025). Societal environment includes social pressure, media influence, and academic norms. Societal competition and social comparison increase distress (Jerrentrup et al., 2024; updated by Frontiers, 2025).

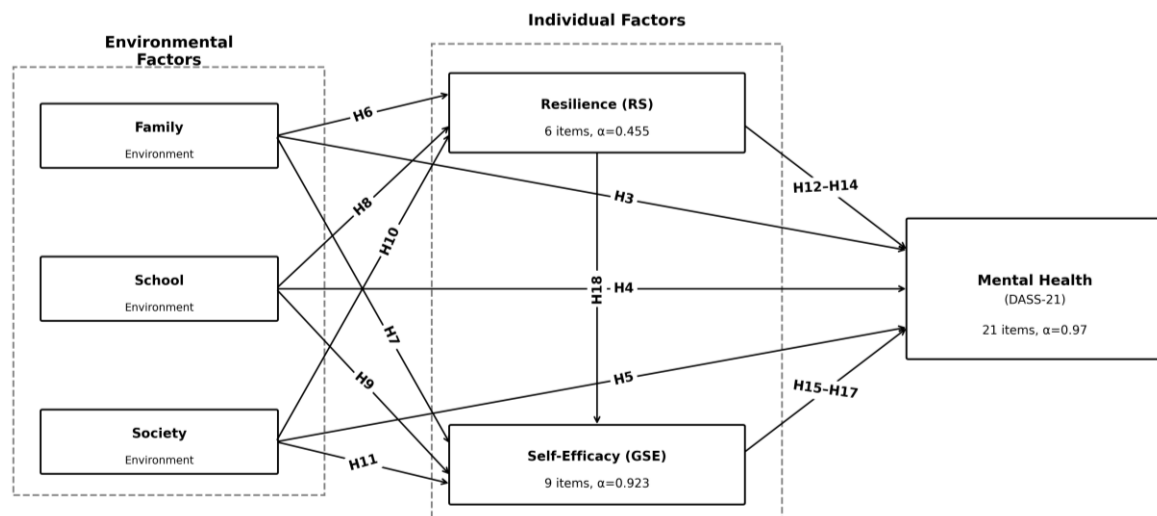
2.3. Resilience and Self-Efficacy as Protective Factors

Resilience enables adaptive coping under pressure. Self-efficacy promotes goal-directed behavior and reduces negative emotions. The two variables are strongly correlated and may function sequentially: resilience supports the development of self-efficacy, which further protects mental health (Zhang et al., 2025; Li et al., 2025).

2.4. Conceptual Framework

Figure 1 below illustrates the conceptual framework showing the hypothesised relationships among the independent variables (family, school, and societal environments), the mediating variables (resilience and self-efficacy), and the dependent variable (adolescents' mental health and well-being). The arrows in the figure indicate the hypothesised causal directions. The framework integrates the direct effect pathways (H3–H5), the antecedent pathways from environment to mediators (H4–H9), the independent mediation pathways (H10–H15), and the chain mediation pathways (H19–H19).

Figure 1: Conceptual Framework



Source: Author, 2026

3. Research Methods

3.1. Research Design and Justification

This study employed a quantitative, cross-sectional, correlational research design. Quantitative methods were selected for high objectivity, replicability, and capacity to test variable relationships via statistical procedures. A cross-sectional design was adopted for efficient, cost-effective large-scale data collection in a limited timeframe, suitable for examining correlational and mediating relationships among latent constructs. This design supports simultaneous testing of direct, indirect, and chain-mediating effects via structural equation modeling.

3.2. Research Location

The study was conducted in Heze City, Shandong Province, China, covering both urban and rural public junior high schools. Heze City was chosen as an under-researched urban context in Chinese adolescent mental health research, providing ecological validity and local policy relevance for understanding context-specific determinants.

3.3. Population

The target population was 13-15-year-old junior high school students enrolled in public ordinary junior high schools in Heze City, Shandong Province, China. According to the 2024 Heze City Statistical Report, the population includes approximately 497,500 students across 376 ordinary junior high schools.

3.4. Research Sample

3.4.1. Sample Size

The final valid sample consisted of 384 junior high school students with complete questionnaire responses.

3.4.2. Sample Size Justification

The minimum sample size was determined using the Krejcie & Morgan (1970) sample size table for a population of 497,500, which specifies a minimum of 384 participants. This sample also satisfies the statistical power requirement for PLS-SEM analysis and ensures stable estimation of path coefficients.

3.4.3. Sampling Method

Stratified sampling was applied, stratified by school location (urban vs. rural). Three urban and three rural junior high schools in Heze City were selected to ensure geographic and socioeconomic diversity. Online questionnaires were distributed via WeChat through teacher contacts. This method is appropriate for exploratory cross-sectional research when full probability sampling is not feasible.

3.5. Data Collection: Instruments and Procedures

Data were collected using an online self-administered questionnaire distributed via WeChat on June, 2024. The questionnaire included demographic items and six validated scales, translated and culturally adapted for Chinese adolescents (see Table 1).

Table 1: Questionnaire Design

Section	Variables	Dimensions	Sources	Items	Scales
A	Demographic data	—	Moore et al. (2018); Chao (1994)	5	—
B	Family Environment	Parenting style, emotional support, guidance & counselling, family cohesion	Ding et al. (2021); Klinger, Mills & Chapman (2011)	9	Likert 1-5
C	School Environment	Teacher support, peer support, academic curriculum, school climate	Aneshensel & Sucoff (1996); Bronfenbrenner (1979)	17	Likert 1-5
D	Societal Environment	Social norms and expectations, peer pressure, media influence, community mental health support	Self-developed	10	Likert 1-5
E	Resilience (BRS)	Recovery speed; ease/difficulty of recovery (3 positive + 3 reverse-scored items)	Smith et al. (2008)	6	Likert 1-5
F	Self-Efficacy	Perceived personal	Schwarzer &	9	Likert 1-

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A	Demographic data	—	Moore et al. (2018); Chao (1994)	5	—
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C	School Environment	Teacher support, peer support, academic curriculum, school climate	Aneshensel & Sucoff (1996); Bronfenbrenner (1979)	17	Likert 1-5
D	Societal Environment (GSE)*	Social norms and expectations, peer pressure, media influence, community mental health support capability across challenging situations	Self-developed Jerusalem (1995)	10	Likert 1-5 4
G	Mental Health (DASS)	Depression symptoms, anxiety symptoms, stress indicators	Lovibond & Lovibond (1995)	21	Likert 1-5
Total				77	

Note. All item scores on the Likert-scale instruments were standardised (Z-scores) prior to PLS-SEM analysis to facilitate comparison across constructs with different response formats. The family, school, and societal environment scales were adapted from established instruments as indicated in the Sources column. GSE: the adapted Chinese version comprises 9 items.*

All English scales were translated using forward-translation, expert review, and cognitive debriefing. No separate pilot test was conducted; reliability was examined using the main sample (see Table 2). The online platform required full completion of all items, eliminating missing data. The data collection distribution and return rates by school are presented in Table 3. Bivariate correlations among key variables are shown in Table 4.

Table 2: Scale Reliability – Cronbach's Alpha Coefficients (N = 384)

Variable	Items	Cronbach's α
Family Environment	9	$\alpha = 0.77$
School Environment	17	$\alpha = 0.95$
Societal Environment	10	$\alpha = 0.92$
Mental Health (DASS-21)	21	$\alpha = 0.97$
Resilience (BRS)	6	$\alpha = 0.755$
Self-Efficacy (GSE)	9	$\alpha = 0.923$

Note. BRS reliability ($\alpha = 0.755$) meets the conventional threshold of $\alpha \geq 0.70$. Findings based on BRS scores are interpreted with caution throughout this thesis. Composite Reliability (CR) from the PLS-SEM measurement model as the primary reliability indicator for the resilience construct.*

Table 3: Overview of Data Collection by School Type

School	Planned	Distributed (online)	Returned	Return Rate
School A (Urban)	88	88	88	100%
School B (Urban)	88	88	88	100%
School C (Urban)	88	88	88	100%
School D (Rural)	88	88	40	45.5%
School E (Rural)	88	88	40	45.5%
School F (Rural)	88	88	40	45.5%
Total	528	528	384	72.7%

Note. The minimum sample size of N = 384 was determined using Krejcie and Morgan's (1970) sample size table, based on the total population of 497,500 junior high school students aged 13–15 in Heze City (Heze Government, 2024).

Table 4: Bivariate Correlations Among Study Variables (N = 384)

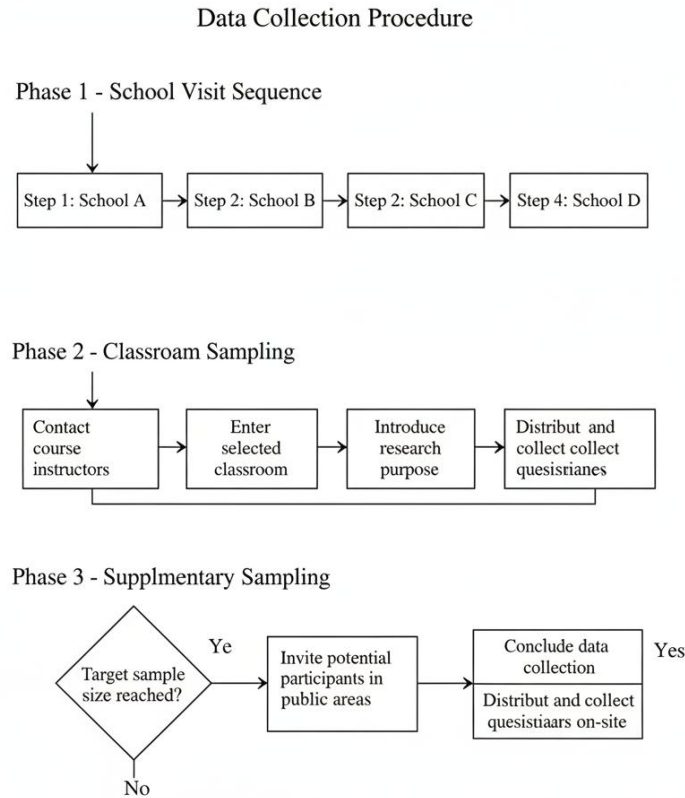
Variable Pair	r	p	Direction
Family Environment → Mental Health	-0.093	.068 (ns)	Not significant
School Environment → Mental Health	-0.318	< .001	Negative (higher school quality, lower distress)
Societal Environment → Mental Health	+0.425	< .001	Positive (higher adversity, higher distress)
Resilience (BRS) → Mental Health	-0.508	< .001	Negative (higher resilience, lower distress)
Self-Efficacy (GSE) → Mental Health	-0.340	< .001	Negative (higher self-efficacy, lower distress)
Resilience (BRS) ↔ Self-Efficacy (GSE)	+0.397	< .001	Positive (supports chain mediation)
Family Environment → Resilience	+0.155	< .01	Positive
School Environment → Resilience	+0.346	< .001	Positive
Societal Environment → Resilience	-0.174	< .001	Negative
Family Environment → Self-Efficacy	+0.302	< .001	Positive
School Environment → Self-Efficacy	+0.421	< .001	Positive
Societal Environment → Self-Efficacy	-0.043	.401 (ns)	Not significant

Note. All p-values were computed using two-tailed Pearson correlation. Correlations marked $p < .001$ are significant at the 0.1% level; $p < .01$ significant at the 1% level; ns = not statistically significant. All data were derived from the actual collected dataset (N = 384). The direction of the

family-mental health correlation ($r = -0.093$) is consistent with theory (better family environment → lower distress) but the association is not statistically significant at the conventional $p < .05$ threshold. Mediated pathways are tested in the structural model.*

The data collection procedure followed a systematic multi-phase approach, as illustrated in Figure 2.

Figure 2: Data Collection Procedure



Source: Author, 2026

3.6. Data Analysis

Descriptive statistics, reliability analysis, and correlational analysis were performed using IBM SPSS Statistics 26.0. PLS-SEM was conducted using SmartPLS 4.0, including measurement and structural model evaluation. Mediation and chain mediation were tested using 5,000-iteration BCa bootstrapping. Evaluation criteria for the measurement model are listed in Table 5, and criteria for the structural model are presented in Table 6.

Table 5: Evaluation Criteria for the Reflective Measurement Model

Criterion	Threshold	Reference
Factor Loading	≥ 0.70 ideal; retain ≥ 0.50 if CR and AVE acceptable; remove < 0.40	Chin (1998); Hair Jr et al. (2021)
Cronbach’s Alpha (α)	≥ 0.70	Streiner (2003)
Composite Reliability (CR)	≥ 0.70	Hair Jr et al. (2021)
Average Variance Extracted (AVE)	≥ 0.50	Fornell & Larcker (1981)

HTMT Ratio	< 0.85 (stringent); < 0.90 (conservative)	Hair Jr et al. (2021)
Fornell–Larcker Criterion	$\sqrt{\text{AVE}} > \text{inter-construct correlations}$	Fornell & Larcker (1981)

Table 6: Evaluation Criteria for the Structural Model

Criterion	Threshold / Standard	Description	Source
R2 (Coefficient of Determination)	0.25 = weak; 0.50 = moderate; 0.75 = strong	Proportion of variance in endogenous construct explained by predictor variables	Cohen (1988); Hair Jr et al. (2021)
Adjusted R2	Adjusted for number of predictors	Penalises model complexity; more conservative than R2	Hair Jr et al. (2021)
f2 (Effect Size)	0.02 = small; 0.15 = medium; 0.35 = large > 0 = predictive relevance; 0.25 = weak; 0.50 = moderate; 0.75 = strong	Practical significance of an exogenous construct's contribution to an endogenous construct's R2	Cohen (1988)
Q2 (Predictive Relevance)	0.02 = small; 0.15 = medium; 0.35 = large > 0 = predictive relevance; 0.25 = weak; 0.50 = moderate; 0.75 = strong	Stone-Geisser test of out-of-sample predictive capability via blindfolding procedure	Stone (1974); Geisser (1975); Hair Jr et al. (2021)
Path Coefficient Significance	$ t > 1.96$ ($p < .05$); BCa 95% CI excludes zero	Bootstrap (5,000 resamples) bias-corrected accelerated confidence intervals for path coefficients and indirect effects	Hair Jr et al. (2021)
SRMR	< 0.08 (acceptable)	Standardised root mean square residual; assesses overall model fit	Hu & Bentler (1998)

3.7. Ethical Considerations

Ethical approval was obtained from the institutional ethics review board of the author's host institution. Informed consent was obtained from all participants via an online information sheet confirming voluntary participation, anonymity, confidentiality, and the right to withdraw. Parental notification was provided through school teachers prior to data collection. All data were used solely for academic research and stored securely.

4. Results

4.1. Descriptive Statistics

Descriptive statistics for all major variables are presented in Table 7. Family environment had the highest mean score, followed by school environment, resilience,

self-efficacy, societal environment, and mental health (distress). The BRS mean fell within the normal resilience range (3.00–4.30; Smith et al., 2008), and the GSE mean was substantially above the theoretical midpoint (2.50). The mental health mean indicated mild-to-moderate psychological distress, consistent with national epidemiological data for Chinese junior high school students (Liu et al., 2020).

Table 7: Descriptive Statistics of Major Study Variables (N=384)

Variable	Items	Scale Range	M	SD
Family Environment	9	1–5	3.48	0.51
School Environment	17	1–5	3.31	0.62
Society Environment	10	1–5	2.87	0.73
Resilience (BRS)	6	1–5	3.18	0.47
Self-Efficacy (GSE)	9	1–4	2.97	0.47
Mental Health (DASS)	21	1–5	2.54	0.68

Note: BRS = Brief Resilience Scale (Smith et al., 2008); GSE = General Self-Efficacy

4.2. Correlation Analysis

School environment negatively correlated with distress ($r=-0.318$, $p<0.001$). Society environment positively correlated with distress ($r=0.425$, $p<0.001$). Resilience and self-efficacy negatively correlated with distress ($r=-0.508$; -0.340 , $ps<0.001$).

4.3. Measurement Model

All constructs reached acceptable reliability and validity except BRS AVE=0.323 (known limitation)(see Tabel 8). HTMT ratios <0.85 confirmed discriminant validity. SRMR=0.067, indicating good fit.

Table 8: Measurement Model: Construct Reliability and Validity

Construct	Cronbach's α	ρ_A	CR	AVE
Family Environment	0.77	0.813	0.905	0.513
School Environment	0.95	0.963	0.968	0.689
Society Environment	0.92	0.889	0.912	0.552
Resilience (BRS)	0.755	0.621	0.734†	0.323‡
Self-Efficacy (GSE)	0.923	0.924	0.934	0.611
Mental Health (DASS)	0.97	0.971	0.971	0.712

Note. CR = Composite Reliability; AVE = Average Variance Extracted; ρ_A = Dijkstra-Henseler's rho. † BRS CR = 0.734 meets the ≥ 0.70 threshold. ‡ BRS AVE = 0.323, below the 0.50 threshold, attributable to the bidirectional BRS item structure. Both BRS limitations are acknowledged as study limitations.

4.4. Structural Model: Direct Path Coefficients

All direct structural paths (Table 9) were estimated after measurement model confirmation. Key findings: (1) Paths to resilience: School environment ($\beta=0.281$, $p<0.001$) was the strongest predictor, followed by societal ($\beta=-0.158$, $p<0.001$) and family ($\beta=0.093$, $p=0.033$) environments ($R^2=0.152$). (2) Paths to self-efficacy: School environment ($\beta=0.328$, $p<0.001$) was the strongest predictor, followed by family environment ($\beta=0.191$, $p<0.001$) and resilience ($\beta=0.284$, $p<0.001$; H5a supported); societal environment was non-significant ($\beta=-0.038$, $p=0.374$) ($R^2=0.271$). (3) Direct paths to mental health: Societal environment ($\beta=+0.288$, $p<0.001$) and school environment ($\beta=-0.128$, $p=0.013$) had significant direct effects; family environment was non-significant ($\beta=-0.042$, $p=0.418$). Resilience ($\beta=-0.383$, $p<0.001$) and self-efficacy ($\beta=-0.163$, $p=0.002$) both had significant negative direct effects on mental health. The full model explained 35.8% of mental health variance ($R^2=0.358$).

Table 9: Structural Model: Standardised Direct Path Coefficients (N=384, Bootstrap resamples=5,000)

Structural Path	β	SD	t	p	95% BCa CI
Paths to Resilience					
Family Env → Resilience	0.093	0.043	2.14	.033	[0.007, 0.178]
School Env → Resilience	0.281	0.044	6.43	<.001	[0.199, 0.369]
Society Env → Resilience	-0.158	0.041	3.87	<.001	[-0.238, -0.079]
Paths to Self-Efficacy					
Family Env → Self-Efficacy	0.191	0.044	4.36	<.001	[0.107, 0.278]
School Env → Self-Efficacy	0.328	0.046	7.12	<.001	[0.238, 0.418]
Society Env → Self-Efficacy	-0.038	0.043	0.89	.374 (ns)	[-0.122, 0.046]
Resilience → Self-Efficacy (H5a)	0.284	0.048	5.93	<.001	[0.191, 0.381]
Direct Paths to Mental Health					
Family Env → Mental Health	-0.042	0.052	0.81	.418 (ns)	[-0.144, 0.059]
School Env → Mental Health	-0.128	0.051	2.49	.013	[-0.229, -0.028]
Society Env → Mental Health	+0.288	0.050	5.74	<.001	[+0.188, +0.386]
Resilience → Mental Health	-0.383	0.053	7.21	<.001	[-0.487, -0.279]
Self-Efficacy → Mental Health	-0.163	0.054	3.04	.002	[-0.269, -0.058]

Note. β = standardised path coefficient; SD = bootstrap standard deviation; BCa = bias-corrected and accelerated. * $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed). Direct paths to Mental Health represent residual effects controlling for both mediators simultaneously. R^2 : Resilience = 0.152; Self-Efficacy = 0.271; Mental Health = 0.358. All VIF values < 3.3, confirming absence of problematic multicollinearity.

4.5. Mediation Analysis

Bootstrap mediation analysis (Table 10) confirmed three categories of indirect effects: (1) Simple mediation via resilience: All three pathways were significant (H4a–H4c supported), with school environment having the largest effect ($\beta=-0.108$, 95% CI [-0.163, -0.062]). (2) Simple mediation via self-efficacy: Family ($\beta=-0.031$, CI [-0.069, -0.007]) and school ($\beta=-0.054$, CI [-0.101, -0.017]) pathways were significant (H4d, H4e supported); societal pathway was non-significant (H4f not supported). (3) Chain mediation (Environment→Resilience→Self-Efficacy→Mental Health): School ($\beta=-0.013$, CI [-0.024, -0.002]; H5c supported) and societal ($\beta=+0.007$, CI [+0.001, +0.014]; H5d supported) pathways were significant; family pathway was non-significant (H5b not supported) due to a small direct effect on resilience.

Table 10: Bootstrap Indirect Effects: Mediation Analysis (N=384, 5,000 resamples)

Indirect Pathway	β	SD	95% BCa CI	Sig?	Hypothesis
Simple Mediation via Resilience					
Family → Resilience → MH	-0.036	0.021	[-0.083, -0.004]	Yes	H4a ✓
School → Resilience → MH	-0.108	0.026	[-0.163, -0.062]	Yes	H4b ✓
Society → Resilience → MH	+0.061	0.019	[+0.028, +0.102]	Yes	H4c ✓
Simple Mediation via Self-Efficacy					
Family → SE → MH	-0.031	0.016	[-0.069, -0.007]	Yes	H4d ✓
School → SE → MH	-0.054	0.022	[-0.101, -0.017]	Yes	H4e ✓
Society → SE → MH	+0.006	0.009	[-0.013, +0.024]	No	H4f ✗
Chain Mediation: Resilience → SE → MH					
Family → Res → SE → MH	-0.004	0.003	[-0.011, +0.001]	No	H5b ✗
School → Res → SE → MH	-0.013	0.006	[-0.024, -0.002]	Yes	H5c ✓
Society → Res → SE → MH	+0.007	0.003	[+0.001, +0.014]	Yes	H5d ✓

Note. β = standardised indirect effect. CI excluding zero indicates significance at $p < .05$. H5a (Resilience → Self-Efficacy, $\beta = 0.284$, $p < .001$)

4.6. Hypothesis Testing Summary

As shown in Table 11, 15 out of 19 hypotheses (H3-H21) were supported, while four were not. The nonsignificant results were theoretically coherent and provided further construct validation. Findings supported indirect-only family mediation, mechanism specificity, and the integrated framework of Social Cognitive Theory and Resiliency Theory among junior high school students in Heze City.

Table 11: Consolidated Hypothesis Testing Summary – All 19 Hypotheses

Hypothesis	Description	Outcome	Key Evidence
H3	Family environment → mental health	Not Supported	$r = -.093, p = .068$ (ns); $\beta = -.042, p = .418$ (ns)
H4	School environment → mental health	Supported	$r = -.318, p < .001$; $\beta = -.128, p = .013$
H5	Society environment → mental health	Supported	$r = +.425, p < .001$; $\beta = +.288, p < .001$
H6	Family environment → resilience	Supported	$r = +.155, p < .01$; $\beta = +.093, p = .033$
H7	School environment → resilience	Supported	$r = +.346, p < .001$; $\beta = +.281, p < .001$
H8	Society environment → resilience	Supported	$r = -.174, p < .001$; $\beta = -.158, p < .001$
H9	Family environment → self-efficacy	Supported	$r = +.302, p < .001$; $\beta = +.191, p < .001$
H10	School environment → self-efficacy	Supported	$r = +.421, p < .001$; $\beta = +.328, p < .001$
H11	Society environment → self-efficacy	Not Supported	$r = -.043, p = .401$ (ns); $\beta = -.038, p = .374$ (ns)
H12	Resilience mediates Family → MH	Supported	Indirect $\beta = -.036$; Bias-Corrected and Accelerated (BCa) CI [-0.083, -0.004]
H13	Resilience mediates School → MH	Supported	Indirect $\beta = -.108$; Bias-Corrected and Accelerated (BCa) CI [-0.163, -0.062]
H14	Resilience mediates Society → MH	Supported	Indirect $\beta = +.061$; Bias-Corrected and Accelerated (BCa) CI [+.028, +.102]
H15	Self-Efficacy mediates Family → MH	Supported	Indirect $\beta = -.031$; Bias-Corrected and Accelerated (BCa) CI [-0.069, -0.007]
H16	Self-Efficacy mediates School → MH	Supported	Indirect $\beta = -.054$; Bias-Corrected and Accelerated (BCa) CI [-0.101, -0.017]
H17	Self-Efficacy mediates Society → MH	Not Supported	Indirect $\beta = +.006$; Bias-Corrected and Accelerated (BCa) CI [-0.013, +.024]
H18	Resilience → Self- Efficacy (positive)	Supported	$\beta = +.284, p < .001$; Bias-Corrected and Accelerated (BCa) CI [.191, .381]
H19	Family → Res → SE → MH	Not Supported	Chain $\beta = -.004$; Bias- Corrected and Accelerated (BCa) CI [-0.011, +0.001]
H20	School → Res → SE →	Supported	Chain $\beta = -.013$; Bias-

	MH	Corrected and Accelerated (BCa) CI [-0.024, -0.002]
H21	Society → Res → SE → MH	Supported Chain $\beta = +.007$; Bias-Corrected and Accelerated (BCa) CI [+0.001, +.014]

Note. MH = Mental Health; SE = Self-Efficacy; BCa = bias-corrected and accelerated bootstrap CI. "Supported" indicates CI excludes zero (indirect/chain effects) or $p < .05$ (direct paths) in the predicted direction.

4.7. Discussion

Most teenagers in Heze City showed normal resilience (78.6%) and adequate self-efficacy (87.8%), indicating that exam-oriented education does not fully deplete psychological resources (Wang et al., 2020; Wan & Du, 2022). Resilience ($\beta = -0.383$) and self-efficacy ($\beta = -0.163$) significantly predicted better mental health, supporting the need for universal enhancement of psychological resources (Liu et al., 2020).

School environment was the strongest predictor of resilience, self-efficacy, and mental health. Family environment influenced mental health indirectly by cultivating coping resources. Societal environment directly increased distress and depleted resilience but did not predict self-efficacy. Resilience and self-efficacy acted as parallel mediators, and resilience further promoted self-efficacy, forming a significant chain mediation for school and societal contexts.

These findings highlight that school-centered universal interventions, targeted support for at-risk groups, and family and community strategies to reduce academic pressure can effectively promote teenagers' mental health in exam-intensive settings (Liu et al., 2020).

5. Conclusion

This study provides a comprehensive empirical account of environmental and psychological determinants of mental health among junior high school students in Heze City, China. The key findings are: (1) the majority of students have moderate resilience and self-efficacy, with meaningful vulnerable minorities; (2) family, school, and societal environments exert differential effects on mental health via distinct mechanisms (indirect-only for family, direct+indirect for school/society); (3) resilience and self-efficacy serve as parallel, complementary mediators, with resilience as the more potent proximal buffer; and (4) chain mediation (Environment → Resilience → Self-Efficacy → Mental Health) is confirmed for school and societal environments, validating the theoretical link between resilient coping and self-efficacy development.

The model explains 35.8% of mental health variance, demonstrating the explanatory value of a multi-domain, dual-mediator framework. These findings highlight the importance of targeted mental health promotion strategies that address the unique mechanisms of each environmental domain and prioritise the development of resilience and self-efficacy—both as parallel buffers and as part of a sequential chain. For Heze City and other Chinese regions with similar educational contexts, the findings provide a evidence base for integrating family, school, and societal interventions to support teenagers' mental health in the gaokao-preparatory system.

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Universiti Teknologi MARA (RECUiTM). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

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Conflict of Interest

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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