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How does family intellectual-cultural orientation correlate with adolescents' wellbeing literacy? An empirical analysis based on a chain mediation model

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Introduction: Wellbeing literacy(WL), as a promising emerging concept, offers a possible route for addressing global adolescent mental-health problems. Family intellectual-cultural orientation(FICO) shows a significant statistical association with wellbeing literacy, but the underlying mechanisms remain unclear.
Methods: This study used convenience sampling to survey 868 adolescents aged 12–18 years and employed a serial mediation model (PROCESS Model 6) to examine the indirect effects of positive psychological capital and personal growth initiative in the association between family intellectual-cultural orientation and well-being literacy.
Results: Family intellectual-cultural orientation was significantly correlated with well-being literacy (effect = 0.1151, $p < 0.001$). The total indirect effect was significant (effect = 0.2414, 95% CI [0.1893, 0.2975]), accounting for 67.7% of the total effect. The separate mediating effects of positive psychological capital (effect = 0.1254, 95% CI [0.0839, 0.1718]) and personal growth initiative (effect = 0.0417, 95% CI [0.0183, 0.0710]), as well as their chain mediating effect (effect = 0.0743, 95% CI [0.0463, 0.1063]), were all significant.
Discussion: These correlational patterns reveal that family intellectual-cultural orientation is statistically linked to adolescents' wellbeing literacy via the correlational chain of positive psychological capital(PPC) and personal growth initiative(PGI), which aligns with core assumptions of the resource-gain spiral mechanism proposed by conservation of resources theory. The findings provide empirical evidence for family-education interventions and school-based mental-health education.

KEYWORDS
adolescent, chain mediation, family intellectual-cultural orientation, personal growth initiative, positive psychological capital, wellbeing literacy

1 Introduction

Approximately 10% to 20% of adolescents in a critical developmental period experience mental-health problems (1), and the first impact of mental-health problems can lead to adverse consequences such as lower educational attainment and physical-health problems (2). After the COVID-19 pandemic, depression, anxiety and post-traumatic stress disorder (PTSD) among adolescents increased sharply in many countries (3–6). Against this background, researchers in many countries are seeking effective ways to strengthen adolescents' mental health, and wellbeing literacy has become a promising emerging concept.

"Making adolescent well-being a priority" clarifies the central position of well-being in future education systems (1, 7). The ultimate goal of mental-health education is to improve individual wellbeing and help people live "healthy and happy lives" (8). How, then, can adolescents' well-being be effectively improved? Researchers have proposed a new perspective: wellbeing literacy. It refers to the integrated capability to perceive, experience and express a life of well-being, including understanding well-being-related language and being able to use such language across contexts to maintain or enhance the well-being of oneself, others and even the world (9). Existing studies have shown that wellbeing literacy is significantly and positively associated with well-being and uniquely predicts well-being (10). Therefore, a key route for improving adolescents' mental health is to enhance their wellbeing literacy.

Current scholarly attention to adolescent wellbeing literacy has largely centered on its specific dimensions, including emotion, mindset, motivation, and initiative (3). Existing research samples are dominated by university students and adults, while investigations into the predictors and mechanisms of wellbeing literacy among adolescents remain limited. Family-environment characteristics are closely linked to adolescents' positive development (11). Associations between family emotional support or structural resources — such as family cohesion and parenting style — and wellbeing have been extensively documented (12–15). Nevertheless, far less research has focused on family intellectual-cultural orientation. Family intellectual-cultural orientation reflects family members' interest in political, social, intellectual, and cultural activities (16, 17). Family endorsement of curiosity, open discussion, and exploration creates a motivational-nurturing environment for adolescents. As a vital manifestation of the "family cultural environment", this variable serves as a key indicator for assessing family cultural atmosphere (18). Given the growing recognition of family intellectual-cultural orientation in adolescent development, it is worth exploring whether this orientation can offer a solid cognitive foundation and spiritual nourishment for the formation and development of adolescent wellbeing literacy. Furthermore, positive psychological capital and personal growth initiative, two critical intrapersonal psychological variables, correlate positively with individual wellbeing (19–21). Accordingly, both may function as important transmission pathways linking family intellectual-cultural orientation to adolescents' wellbeing literacy. The present study aims to examine the internal association between family intellectual-cultural orientation and adolescent wellbeing literacy, as well as the chained mediating roles of positive psychological capital and personal growth initiative in this relationship.

Taken together, this study focuses on three areas that merit closer attention. First, research on wellbeing literacy has drawn predominantly on university students and adults, so secondary-school adolescents remain comparatively less represented. Second, studies of family factors have concentrated largely on family cohesion, parenting styles, and socioeconomic resources, while family intellectual-cultural orientation has received comparatively little attention. Third, positive psychological capital and personal growth initiative have rarely been examined together as indirect pathways linking the family environment to adolescents' wellbeing literacy. By considering these constructs within a single model, the study seeks to identify potentially modifiable family and individual resources associated with adolescents' wellbeing literacy. Importantly, the cross-sectional analysis tests theoretically informed associations rather than the temporal or causal ordering of these resources.

1.1 Tracing the shift from well-being to well-being literacy

Well-being is significantly influenced by both internal psychological factors and social contexts (22). Since the 1960s, well-being, with an emphasis on internal psychological mechanisms, has gradually become a core scientific issue in psychology (23). Well-being mainly refers to the direct experience of positive emotions and evaluations of satisfaction with life, oneself and social relationships based on quality of life (8). Catalyzed by the flourishing development of positive psychology in recent years, the concept, forms, mechanisms and appropriate intervention strategies of well-being have become current research hotspots (12, 24, 25). Existing research has found that high well-being is not only an important protective factor against depression among adolescents but also a key factor in improving academic performance and promoting creative thinking (26). However, the cultivation path of well-being remains controversial. Some researchers have clearly pointed out that well-being cannot be cultivated directly (9, 10), and positive psychology interventions (PPIs) have also been questioned in recent years. A meta-analysis showed that such interventions have relatively small effects in improving well-being (27). The core reason is that these interventions do not focus on enhancing individuals' capability for well-being, and their effects gradually fade over time (9). On this basis, Oades first explicitly proposed the core concept of "wellbeing literacy", defining it as "the ability to understand and construct wellbeing-related language, across contexts, with the aim of using such language to maintain or enhance the well-being of oneself, others or the world (9)." From a positive construction perspective, this definition establishes the core meaning of wellbeing literacy as "self-construction" and highlights the foundational position of language and text in the formation of wellbeing literacy.

At present, research on wellbeing literacy mainly focuses on three dimensions. First, studies have examined the internal psychological mechanisms linking wellbeing literacy and well-being: wellbeing literacy is significantly and positively correlated with well-being, confirming its unique predictive effect on well-being and related internal and external mediating mechanisms (28).

Second, studies have tested cross-cultural adaptation: scholars have adapted the Wellbeing Literacy Scale into a Turkish version, examined its reliability and validity, and confirmed significant positive correlations between wellbeing literacy and socioeconomic status, perceived success and health status. Third, studies have explored practical application paths in educational settings: wellbeing literacy can promote the optimized implementation and scientific evaluation of positive psychology interventions and is a key link between positive education interventions and intervention outcomes (10). In summary, academic discussion of wellbeing literacy is becoming increasingly rich, but empirical studies on its internal and external influencing mechanisms remain scarce, especially systematic inquiry from the perspective of family environment.

1.2 The mechanism linking family intellectual-cultural orientation and wellbeing literacy

Well-being is always rooted in specific environments (29), and environment constitutes an important correlate of individual development (30).As the most direct and enduring microsystem for individual growth, the family environment is a multidimensional construct. It encompasses objective structural features such as family socioeconomic status and family structure; psychosocial and process-oriented characteristics including family functioning, parenting style, parent-child interaction quality, and emotional expression; as well as family cultural atmosphere shaped by cultural resources, cognitive stimulation, and value systems (14). The family offers adolescents long-term care and support (31), and is closely associated with their mental health and subjective wellbeing through the formation of cognitive patterns, emotion-regulation capacities, self-concept, and socialization pathways. Although existing studies have extensively explored associations between family-related factors and wellbeing (12), there remains no unified academic definition of "family environment". This inconsistency leads to considerable variation in measurement indicators adopted across empirical investigations (32). For instance, constructs such as family income, parenting style, and family support are sometimes conflated in prior work, which partly accounts for highly heterogeneous research outcomes (33). A systematic review and meta-analysis indicated that family cohesion yielded the strongest correlation with wellbeing among family-environment variables (34); meanwhile, family socioeconomic status and positive parenting styles have also been reported to correlate significantly and positively with adolescents' wellbeing (33).

It is worth noting that the aforementioned studies largely concentrate on family-based emotional support or structural resources, yet give limited attention to the unique role of the intellectual-cultural dimension in the family environment. This dimension differs from a static stock of family cultural resources, such as household book holdings. Rather, it is a dynamic process variable: through family members' (especially parents') interest in intellectual topics, participation in cultural activities and engagement with intellectual challenges, it continuously "activates" the family microsystem. From Bourdieu's cultural capital theory perspective (35), strong family interest in intellectual-cultural activities facilitates the transmission of a stronger and more active cultural habitus, that is, a cognitive and expressive schema oriented toward curiosity, critical thinking and the pursuit of meaning. This habitus correlates not only with academic achievement but also the deeper ways in which individuals perceive themselves, others and well-being. As a multidimensional capacity relevant to personal and interpersonal wellbeing, wellbeing literacy requires individuals to master rich vocabulary and knowledge systems for expressing emotions and well-being experiences, possess receptive language ability, and achieve multimodal communication in family interaction. By shaping individuals' cognitive-linguistic schemas through interest in knowledge and cultural activities, stimulating reciprocal parent-child interaction and providing diverse communication-practice scenarios, family intellectual-cultural orientation offers important ecological conditions for the emergence and development of wellbeing literacy.

1.3 The mediating roles of positive psychological capital and personal growth initiative

Favorable environmental resources, namely high family intellectual-cultural orientation, can promote the development of individual wellbeing, and this process often involves complex indirect pathways. The improvement of individual wellbeing is affected not only by contextual factors but also by one's own psychological factors, among which positive psychological capital and personal growth initiative are especially prominent (36). Positive psychological capital refers to a system of psychological strengths formed during individual self-development, whose core dimensions include self-efficacy, optimism, resilience and hope (37). As a key psychological resource for coping with stress and adapting to the environment, positive psychological capital has long been a research focus in positive psychology. A large body of empirical research shows that adolescents in positive and harmonious families directly accumulate initial positive psychological resources (11) and are more likely to grow into persistent and determined individuals (14). At the same time, positive psychological capital is significantly and positively correlated with adolescents' well-being (38); it can not only directly improve individual well-being but also serve as a mediating factor that weakens the adverse effects of negative factors on well-being (39).

Personal growth initiative refers to the tendency and ability of individuals to consciously and proactively improve and perfect themselves during the growth process (40). The goal theory of well-being holds that individuals can achieve a high level of wellbeing when they fully realize their potential and self-worth (20). Empirical findings suggest that adolescents' personal growth initiative correlates with contextual factors such as the family environment, and may serve as a mediating variable linked to well-being (36). Family intellectual-cultural orientation directly shapes the family's cultural atmosphere and level of cognitive stimulation, providing individuals with knowledge resources and learning opportunities. Self-determination theory suggests that when the family environment encourages exploration and learning

and provides rich knowledge resources, it helps satisfy adolescents' needs for autonomy and competence, thereby stimulating their intrinsic motivation for growth, namely personal growth initiative (41).

Ecological systems theory emphasizes that the family is the most central and enduring microsystem relevant to adolescent development (42). Social cognitive theory states that environmental factors operate through individuals' internal cognitive and emotional processes (43). Family intellectual-cultural orientation is significantly correlated with adolescents' self-efficacy by providing cultural-cognitive scenarios and knowledge transmission (44), and self-efficacy is a core element of positive psychological capital. Self-determination theory further reveals that when the family environment encourages exploration and learning, it is more likely to satisfy children's needs for autonomy and competence, thereby stimulating the intrinsic motivation for active growth, that is, personal growth initiative. This pathway from external interest-guided cultural activities to internal psychological resources (positive psychological capital), and then to active behavioral tendency (personal growth initiative), is linked to enhanced wellbeing via self-realization, accomplishment, and positive interpersonal relationships (41). In other words, when individuals achieve knowledge accumulation, ability improvement and goal attainment through active growth, their well-being experience is significantly enhanced through autonomy, competence and meaning.

1.4 The present study

Based on the theoretical and empirical logic above, and on the significant positive correlation between wellbeing literacy and well-being, this study proposed the following hypotheses: family intellectual-cultural orientation is significantly and positively correlated with adolescents' wellbeing literacy (Hypothesis 1); positive psychological capital mediates the association between adolescents' family intellectual-cultural orientation and wellbeing literacy (Hypothesis 2); personal growth initiative mediates the association between adolescents' family intellectual-cultural orientation and wellbeing literacy (Hypothesis 3); and positive psychological capital and personal growth initiative have a chain mediating effect in the association between family intellectual-cultural orientation and wellbeing literacy (Hypothesis 4). This study examined the associations between family intellectual-cultural orientation and adolescent well-being literacy, with particular attention to the indirect pathways through positive psychological capital and personal growth initiative. These findings offer empirical evidence and theoretical insights for adolescent mental-health education and family-environment optimization, and may inform practices aimed at fostering well-being literacy and mental health in adolescent populations.

2 Methods

2.1 Participants and procedure

Using convenience sampling, this study selected six secondary schools in Hunan Province, China (three regular senior high schools, two regular junior high schools and one secondary vocational school), and selected several classes as sampling units. A total of 934 students participated in the survey. After excluding invalid questionnaires with many missing answers, failure to follow questionnaire instructions and patterned responses, 868 valid responses were obtained. Among them, 290 were regular senior high-school students, 334 were regular junior high-school students and 244 were secondary vocational students. All participants were 12–18 years old. There were 412 girls (47.5%) and 456 boys (52.5%); 529 lived in nuclear families (60.9%), 62in single-parent families (7.1%), 26 in reconstituted families (3%), 216 in extended family(25%) and 35 in other family types (4%); 615 lived in urban areas (70.9%) and 253 in rural areas (29.1%).

This study was approved by the Ethics Committee of Hunan University of Science and Technology, the researchers' institution (protocol number:202601). All participants provided informed assent, and informed consent was obtained from their guardians. Data collection was continuously conducted at all stages by two trained master's students, who provided participants with necessary support.

The present study involved school-age adolescents and was approved by the Academic Ethics Committee of the School of Education, Hunan University of Science and Technology(202601). It was conducted in accordance with the principles of respect, beneficence, justice, and the best interests of the child. Before data collection, informed consent was obtained from guardians, and age-appropriate assent was obtained from the adolescents themselves. Even when guardians consented, adolescents who did not wish to participate were not included. Participation was voluntary: students could skip any item or withdraw at any time without explanation and without penalty, and this did not affect their academic assessment or access to school services. Data were labelled only with research codes. No names, student numbers, or other identifying information were collected. Paper records were stored under lock, and electronic data were encrypted. Access was restricted to trained personnel who had signed confidentiality agreements, and raw data were not publicly released. Trained graduate students administered the questionnaires and provided support during data collection. If a student experienced discomfort, the process was paused and the student was referred to a school counsellor. If risks such as self-harm or abuse emerged, confidentiality was limited as required by law. The relevant protection agency or guardian was notified, with the student's safety given priority. Where the guardian was the source of risk, the case was referred to a child protection agency. These procedures remain subject to the ethics approval and applicable local laws.

2.2 Measures

Family intellectual-cultural orientation

The intellectual-cultural orientation subscale of the Chinese version of the Family Environment Scale, developed by Moos et al. (16) and revised by Fei Lipeng, Zheng Yanping and Zou Dinghui (17), was used to assess participants' family intellectual-cultural orientation. It contains nine items measuring the degree of interest in political, social, intellectual and cultural activities. Cronbach's alpha for this scale was 0.88.

Positive psychological capital

The Positive Psychological Capital Questionnaire developed by Zhang Kuo et al. (45) was used for assessment. It contains 26 items and uses a 7-point scoring method, from 1 (completely inconsistent) to 7 (completely consistent). Higher scores indicate a higher level of positive psychological capital. In this study, Cronbach's α for the scale was 0.92.

Personal growth initiative

The Personal Growth Initiative Scale-II developed by Robitschek et al. (46), containing 16 items, was used. It uses a 6-point scoring method, from 1 (very inconsistent) to 6 (very consistent). Higher scores indicate a higher level of personal growth initiative. In this study, Cronbach's alpha for the scale was 0.97.

Wellbeing literacy

This study employed the Chinese version of the Wellbeing Literacy Self-Rating Scale, translated by Wu (28). The scale is a unidimensional structure consisting of 6 items, rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), with higher total scores indicating higher levels of wellbeing literacy. The original scale was developed by Hou et al. (10) and demonstrated good reliability and validity in a sample of Australian junior high school students (N = 1,392; Cronbach's α = 0.84). Wu translated and back-translated the original scale, and the translation was reviewed by the original author to ensure content equivalence between the English and Chinese versions. The Chinese version also showed good reliability and validity in a Chinese sample (Cronbach's α = 0.90). In this study, confirmatory factor analysis (CFA) was conducted on the Well-being Literacy Scale using AMOS 24.0. The results showed that the model fit indices were as follows: χ^2/df =2.492, CFI = 0.988, TLI = 0.974, GFI = 0.979, AGFI = 0.937, RMSEA = 0.074, and RMR = 0.032. All fit indices reached acceptable levels, indicating that the one-factor theoretical model of the Well-being Literacy Scale demonstrated a good fit. The Chinese version of the Well-being Literacy Scale exhibited satisfactory construct validity in this study.

2.3 Analytic strategy

SPSS 27.0 was used for statistical analysis in three steps. First, Pearson correlation analysis was used to examine correlations among variables, and normally distributed variables were expressed as means +/- standard deviations. Second, after controlling for demographic variables, hierarchical regression analysis was used to test the relationship between family intellectual-cultural orientation and wellbeing literacy. Third, Hayes' PROCESS macro-Model 6 was used to test the mediation of positive psychological capital and personal growth initiative between family intellectual-cultural orientation and wellbeing literacy. Bootstrap resampling was repeated 5,000 times, with a 95% confidence interval.

3 Results

3.1 Common method bias test

This study relied on self-report questionnaires for data collection, which may raise concerns about common method bias (47). To reduce this risk, several strategies were implemented during data collection. Validated and reliable instruments were selected; researchers clearly informed participants that their responses would be used only for research purposes and guaranteed confidentiality. After data collection, Harman's test was used to assess the presence of common method bias. The results showed that the first factor explained 20.6% of the variance, below the 40% threshold, indicating that no serious common method bias existed in this study.

3.2 Descriptive statistics and correlation analysis

The correlation analysis results (see Table 1) showed that family intellectual-cultural orientation, positive psychological capital, personal growth initiative, and well-being literacy were all significantly and positively correlated with each other ($p < 0.01$), providing a statistical basis for the subsequent mediation analysis.

3.3 Regression analysis and chain mediation effect test

After controlling for gender, grade, family residence, family type, father's educational level and mother's educational level, this study examined the association by which family intellectual-cultural orientation, positive psychological capital and personal growth initiative relate to adolescents' wellbeing literacy. The regression results are shown in Table 2.

Regression analyses revealed that family intellectual-cultural orientation was significantly and positively associated with positive psychological capital (β = 0.357, $p < 0.001$), whereas gender (β = -

TABLE 1 Descriptive statistics and correlation matrix among variables.

Variables	M	SD	1	2	3	4
1. Family intellectual-cultural orientation	4.92	2.04	-			
2. Positive psychological capital	123.64	24.58	.384**	—		
3. Personal growth initiative	67.92	13.49	.384**	.712**	—	
4. Wellbeing literacy	30.36	7.15	.375**	.609**	.622**	—

*P < 0.05, **P < 0.01, ***P < 0.001.

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0.336, p < 0.001) and grade (β = -0.048, p < 0.05) were significantly and negatively associated with positive psychological capital. The model accounted for 19.4% of the variance in positive psychological capital (R^2 = 0.194, F = 27.27, p < 0.001). Positive psychological capital (β = 0.651, p < 0.001) and family intellectual-cultural orientation (β = 0.130, p < 0.001) were both significantly and positively associated with personal growth initiative, with the model explaining 51.7% of the variance (R^2= 0.517, F = 105.836, p < 0.001). Personal growth initiative (β = 0.318, p < 0.001), positive psychological capital (β = 0.350, p < 0.001), family intellectual-cultural orientation (β = 0.115, p < 0.001), and gender (β = 0.201, p < 0.001) were all significantly and positively associated with well-being literacy, with the model accounting for 45.1% of the variance (R^2 = 0.451, F = 72.163, p < 0.001).

Overall, these findings suggest that family intellectual-cultural orientation is positively associated with positive psychological capital, personal growth initiative, and well-being literacy. Moreover, positive psychological capital and personal growth initiative appear to serve as mediators in the relationship between family intellectual-cultural orientation and well-being literacy, pointing to possible pathways linking these variables.

After controlling for six demographic variables, the mediation effects were examined using the Bootstrap method (5,000 resamples), with results presented in Table 3. The total indirect effect was significant (effect = 0.2414, 95% CI [0.1893, 0.2975]), accounting for 67.7% of the total effect. Specifically, the first indirect effect (family intellectual-cultural orientation→positive psychological capital→well-being literacy) had an effect value of 0.1254, with a Bootstrap 95% confidence interval of [0.0839, 0.1718] that did not contain zero, supporting the presence of a significant separate mediating role of positive psychological capital, accounting for 35.17% of the total effect. The second indirect effect (family intellectual-cultural orientation→personal growth initiative→well-being literacy) had an effect value of 0.0417, with a Bootstrap 95% confidence interval of [0.0183, 0.0710] that did not contain zero, supporting the presence of a significant separate mediating role of personal growth initiative, accounting for 11.69% of the total effect. The third indirect effect (family intellectual-cultural orientation→positive psychological capital→personal growth initiative→well-being literacy) had an effect value of 0.0743, with a Bootstrap 95% confidence interval of [0.0463, 0.1063] that did not contain zero, supporting the presence of a

TABLE 2 Regression analysis among variables.

Outcome variable	Predictor	R	R^2	F	β	t
Positive psychological capital	Family intellectual-cultural orientation	0.4409	0.194	27.27***	0.357	10.41***
	Gender				-0.336	-5.20***
	Grade				-0.048	-2.05*
	Family residence				-0.106	-1.16
	Family type				-0.008	-0.35
	Father's education				-0.015	-0.30
	Mother's education				0.083	1.66
Personal growth initiative	Positive psychological capital	0.719	0.517	105.836***	0.651	23.95***
	Family intellectual-cultural orientation				0.130	4.66***
	Gender				0.004	0.08
	Grade				0.022	1.21
	Family residence				-0.091	-1.31
	Family type				-0.008	-0.45
	Father's education				0.015	0.39
	Mother's education				-0.041	-1.09
Wellbeing literacy	Personal growth initiative	0.671	0.451	72.16***	0.318	8.38***
	Positive psychological capital				0.350	9.17***
	Family intellectual-cultural orientation				0.115	3.78***
	Gender				0.201	3.74***
	Grade				0.027	1.40
	Family residence				-0.013	-0.17
	Family type				-0.020	-1.04
	Father's education				0.029	0.69
	Mother's education				-0.040	-0.98

*P < 0.05, **P < 0.01, ***P < 0.001.β refers to standardized regression coefficients. Gender: 1 = Male, 2 = Female; Grade: 1 = Grade 7, 2 = Grade 8, 3 = Grade 9, 4 = Grade 10, 5 = Grade 11, 6 = Grade 12; Residence: 1 = Urban, 2 = Rural; Family type: 1 = Nuclear family, 2 = Single-parent family, 3 = Reconstituted family, 4 = Extended family, 5 = Other; Parental education: 1 = Primary school or below, 2 = Junior high school, 3 = Senior high school (vocational/technical secondary school), 4 = College (bachelor's/associate degree) or above, 5 = Other.

TABLE 3 Results of the chain mediation effect test (standardized).

Effect type	Effect value	Boot SE	95% CI	P	Proportion (%)
Total effect (c)	0.3565	0.0350	**[0.2878,0.4252]**	< 0.001	100
Direct effect (c')	0.1151	0.0304	**[0.0554,0.1747]**	< 0.001	32.3
Total indirect effect	0.2414	0.0278	**[0.1893,0.2975]**		67.7
FICO → PPC→ WL	0.1254	0.0223	**[0.0839,0.1718]**		35.17
FICO → PGI→ WL	0.0417	0.0135	**[0.0183,0.0710]**		11.69
FICO → PPC→PGI → WL	0.0743	0.0151	**[0.0463,0.1063]**		20.84

Bold coefficients indicate that the 95% confidence interval does not include zero, indicating statistical significance.All values reported in this table are standardized estimates. ***p <.001, **p <.01, *p <.05.

significant chain mediating role of positive psychological capital and personal growth initiative, accounting for 20.84% of the total effect. The specific pathways are illustrated in Figure 1.

4 Discussion

4.1 The relationship between family intellectual-cultural orientation and wellbeing literacy

This study found that family intellectual-cultural orientation exhibited a significant positive association with adolescents' wellbeing literacy, supporting Hypothesis 1. According to ecological systems theory (48) and the family and child well-being model (49), the family is the core micro-system of individual development, and family well-being lays the foundation for adolescents' well-being. Family intellectual-cultural orientation has profound significance. A high score on family intellectual-cultural orientation means that family members are willing to learn and care about what is happening in the world. Research shows that the more families participate in political, intellectual and cultural activities, the higher individuals' self-awareness, the more emotionally stable they are, and the more easily they adapt to the external environment (50). Adolescents are in a critical period of rapid cognitive development, significant strengthening of self-concept and social comparison, and face multiple developmental challenges such as academic pressure, interpersonal adaptation and identity exploration (51, 52). Therefore, in the family, they need not only emotional support but also intellectual interest, expression and reflective dialogue. From the perspective of cultural capital theory, family intellectual-cultural orientation is essentially an inter-generational transmission process of "embodied cultural capital". Through interest guidance in political, social, intellectual and cultural activities, parents subtly internalize specific cognitive habits and meaning-construction styles in their children. Conversely, if the family environment is filled with poor knowledge exchange, passive cognitive stimulation and a lack of participation in cultural activities, children will find it difficult to acquire rich vocabulary for emotional and well-being expression or practice multimodal communication in parent-child interaction, thereby weakening their internal literacy for understanding, experiencing and transmitting well-being, and even making them less sensitive to the well-being of themselves and others. In summary, family intellectual-cultural orientation is linked to adolescents' wellbeing literacy by shaping individuals' cognitive-linguistic schemas via exposure to broad reading and cultural-activity guidance, facilitating in-depth parent-child interaction, and offering diverse communicative-practice opportunities, which makes it a vital ecological resource for adolescent wellbeing literacy.

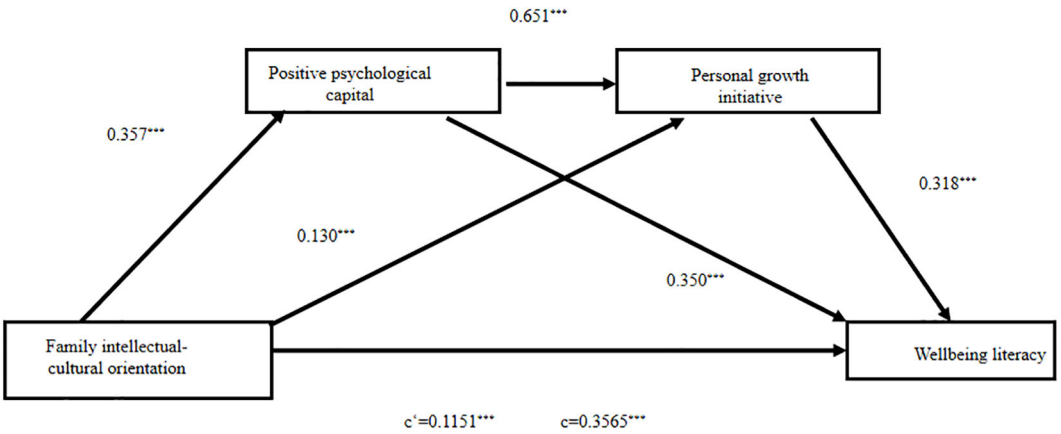


FIGURE 1
Chain mediation model. All data in the model are standardized path coefficients derived from Hayes' PROCESS Model 6 with demographic covariates controlled.

4.2 The mediating role of positive psychological capital

This study found that positive psychological capital mediated the relationship between family intellectual-cultural orientation and adolescents' wellbeing literacy, supporting Hypothesis 2. Based on conservation of resources theory, individuals are motivated to acquire, maintain and protect valued resources, and resource gain and loss jointly shape psychological adaptation and wellbeing (53). Positive psychological capital, as a higher-order composite psychological resource, maintains individuals' dynamic balance through stress adjustment and resource compensation mechanisms (54). Family intellectual-cultural orientation provides adolescents with continuous cognitive stimulation and opportunities for meaning construction, and the sufficient supply of this external resource helps adolescents acquire and internalize positive psychological capital.

At the horizontal level, high family intellectual-cultural orientation means that the family is intellectually and culturally rich and stimulates curiosity, exploration and new experiences. Such environments are often associated with psychological and cognitive benefits (55, 56). Frequent parent-child discussions, cultural participation and intellectual challenges in the family environment provide adolescents with sufficient cognitive scaffolding and social support. Studies have shown that positive psychological capital mediates the relationship between family socioeconomic status and adolescents' subjective wellbeing (57). Although that study focused on the structural resource of family socioeconomic status, its theoretical core and mediating logic are consistent with the present study's focus on a process resource, namely family intellectual-cultural orientation, correlating with wellbeing literacy through positive psychological capital. At the vertical level, according to conservation of resources theory, existing resources promote individuals' investment of resources to acquire new resources, forming a resource-gain spiral (53). Accordingly, positive psychological capital was positively associated with adolescents' initiative in participating in family intellectual activities, and such participation was further associated with greater psychological capital reserves. A meta-analysis showed a significant positive correlation between positive psychological capital and subjective well-being (58), providing overall empirical support for the mediating role of positive psychological capital. Furthermore, positive psychological capital directly correlates with the formation of wellbeing literacy. Wellbeing literacy, as a multidimensional capability requiring rich emotional vocabulary, multimodal communication ability and meaning-construction skills, is highly dependent on individuals' internal psychological resources (59). This means that positive psychological capital is essentially a key mediating carrier through which external family intellectual-cultural resources are transformed into individuals' internal wellbeing literacy.

In summary, positive psychological capital is a key mediating bridge linking family intellectual-cultural orientation and adolescents' wellbeing literacy. When the level of positive psychological capital is high, adolescents can effectively transform the external resources provided by the family intellectual-cultural environment into their own ability to experience and transmit wellbeing.

4.3 The mediating role of personal growth initiative

This study found that personal growth initiative mediated the relationship between family intellectual-cultural orientation and adolescents' wellbeing literacy, supporting Hypothesis 3. Families actively promote open discussion, cultural and intellectual exploration and creative pursuit, viewing them as important components of personal development (60). Families with this cultural orientation cultivate adolescents' curiosity, learning and exploratory spirit beyond formal education. In other words, families with high family intellectual-cultural orientation provide adolescents with continuous cognitive stimulation, value guidance and meaning-construction contexts, making it easier for them to internalize behavioral patterns of "active learning and reflection" and thereby show higher levels of personal growth initiative (61). In addition, higher personal growth initiative helps adolescents actively seek wellbeing experiences, respond positively to challenges and continuously optimize their emotional and social abilities (62, 63), thereby positively associated with wellbeing literacy.

On the cognitive level, family intellectual-cultural orientation supplies adolescents with cognitive templates regarding "what constitutes a good life" and "how to improve oneself", which may contribute to the formation of clear growth goals and action plans (64). At the motivational level, family members' interest and investment in intellectual activities are themselves a form of social modeling. Such observational learning may reinforce adolescents' intrinsic motivation for self-improvement, making them more inclined to actively seize opportunities for growth (65). Existing studies also show that personal growth initiative is significantly and positively correlated with a range of positive psychological variables, such as wellbeing and life satisfaction, and can correlate positively with individuals' mental-health level (63). Thus, personal growth initiative relates to wellbeing literacy through a unique association: adolescents with high personal growth initiative are more likely to actively discuss emotional experiences with family and friends, participate in activities that bring meaning and continuously adjust their behavior to pursue higher wellbeing. This is consistent with the wellbeing literacy framework proposed by Oades (55): wellbeing literacy requires not only vocabulary and knowledge but also the ability to actively and appropriately use such knowledge in different contexts.

In summary, family intellectual-cultural orientation correlates with adolescents' wellbeing literacy, and this association is linked to their personal growth initiative. This finding expands the application boundary of family cultural capital theory and suggests that personal growth initiative is an important psychological mechanism linking family intellectual-cultural orientation and adolescents' well-being.

4.4 The chain mediating role of positive psychological capital and personal growth initiative

Positive psychological capital and personal growth initiative are closely and dynamically interrelated, collectively constituting a

critical psychological resource chain through which family intellectual-cultural orientation translates into adolescents' well-being literacy, thereby confirming Hypothesis H4. According to the resource gain spiral theory (53), initial resources can generate subsequent resources, forming a progressively accumulative resource process. In this study, this resource transformation process is realized through multiple levels of synergistic interplay.

Family intellectual-cultural orientation—characterized by parents' optimistic embrace of life and their active involvement in children's learning, recreational activities, and emotional support—provides adolescents with rich cognitive stimulation and emotional feedback. These external resources, in turn, facilitate the development of positive psychological capital in adolescents, enabling them to experience more positive emotions (66). The accumulation of psychological capital further drives personal growth initiative—that is, the individual's tendency to proactively plan, reflect, and pursue self-improvement. Specifically, a high level of hope encourages individuals to set challenging growth goals; optimism strengthens confidence in the attainability of these goals; self-efficacy provides the motivational reserve for action; and resilience sustains growth motivation even in the face of setbacks.

Notably, positive psychological capital and personal growth initiative are not merely in a unidirectional sequential relationship; rather, they form a dynamic "resource gain spiral." On one hand, positive psychological capital, as an initiating resource, activates individuals' growth-initiative behavioral tendencies. On the other hand, the achievement experiences and capacity gains derived from active planning, action, and reflection reciprocally nurture and reinforce psychological capital. This mutually reinforcing, cumulatively cyclic process continuously expands adolescents' overall psychological resource reservoir, thereby enhancing their overall well-being literacy—manifested not only as feeling good but also as functioning well socially (67).Empirical evidence supports this sequential logic. A longitudinal study of Argentine secondary school students found that positive psychological capital and personal growth initiative were significantly positively correlated at three time points across the secondary school period, indicating that individuals with higher psychological capital are more likely to benefit from opportunities for change and growth (68). In addition, a study on impoverished secondary vocational nursing students revealed that personal growth initiative partially mediated the relationship between psychological capital and mental health—that is, psychological capital not only directly influenced mental health but also exerted an indirect effect through stimulating personal growth initiative (69). Together, these findings corroborate the transformation of positive psychological capital into personal growth initiative and its positive association with well-being literacy.

In summary, positive psychological capital and personal growth initiative form a sequential resource-transformation chain between family intellectual-cultural orientation and wellbeing literacy. This finding suggests that improving adolescents' wellbeing literacy requires both strengthening psychological-capital reserves and cultivating active growth habits, so as to fully transform external environmental resources into internal wellbeing capability. Nevertheless, given the cross-sectional design of the present study, we cannot empirically verify such reciprocal causal loops; longitudinal research is required to test these feedback dynamics.

4.5 Contributions and implications

At the theoretical level, this study offers three contributions. First, to our knowledge, it is among the first studies to integrate family intellectual-cultural orientation, positive psychological capital, personal growth initiative, and wellbeing literacy into a single chain mediation model, delineating a sequential association from external family cultural participation to internal psychological resources, active growth tendencies, and ultimately wellbeing literacy. This finding extends cultural capital theory and conservation of resources theory to the domain of adolescent wellbeing literacy research and responds to Oades' call for research on the correlational mechanisms underlying wellbeing literacy. Second, the findings point to a meaningful dissociation between two constructs that are easily conflated. Gender correlated negatively with positive psychological capital but positively with wellbeing literacy (gender coded 1 = male, 2 = female): girls reported lower psychological capital yet higher wellbeing literacy than boys. As a *post-hoc* interpretation, social role theory holds that gender-differentiated role expectations shape socialization (70). In the Chinese context, traditional gender-role norms encourage boys toward challenge-seeking and risk-taking, whereas girls' participation in such activities is less encouraged, potentially constraining the accumulation of hope and confidence; girls also face greater social expectations regarding appearance and emotion management, together with more complex multiple-role pressures, which may deplete psychological resources. Wellbeing literacy, by contrast, centers on the ability to understand, experience, and communicate wellbeing and is closely tied to emotional and linguistic expression. Research consistently indicates that adolescent girls outperform boys in emotional expression and empathy (71), equipping them with a richer vocabulary for wellbeing and greater facility in constructing wellbeing experiences within interpersonal interaction. In short, psychological capital captures self-directed motivational resources, whereas wellbeing literacy captures communicative-expressive resources; the divergent gender patterns suggest these are distinct resource domains rather than interchangeable strengths.

Third, grade correlated negatively with positive psychological capital, suggesting that students in higher grades hold fewer psychological resources—speculatively, a pattern plausibly linked to escalating academic pressure and entrance-examination anxiety, though this interpretation requires direct testing.

Conceptually, this study distinguishes an active intellectual-cultural family climate from structural family advantage and identifies two correlated intrapersonal resources that may jointly account for part of its association with wellbeing literacy. This extension of the ecological and resource-based perspectives is particularly relevant to adolescent education because it identifies specific, measurable constructs as entry points for longitudinal and intervention research, and it implies that family-focused efforts need not await structural change, since the target is practices rather than socioeconomic position. We emphasize, however, that the statistical indirect effects do not constitute evidence that altering family orientation would change wellbeing literacy through the proposed sequence; the implications below are derived from observational associations and should be treated as provisional rather than causal or intervention effects.

At the family level, parents can foster an intellectual–cultural atmosphere through age-appropriate dialogue about books, cultural events, values, and wellbeing, combining intellectual and emotional experiences. Accessible activities should be prioritised over costly cultural consumption, with attention to families with limited time, income, or cultural resources to avoid widening educational inequalities.

At the school level, a dual-track approach may support psychological capital and personal growth initiative, such as a "four-dimensional curriculum" (VR adversity simulation, goal decomposition, attribution diaries, micro-success portfolios; (72) and stepwise growth plans (37, 73). Teachers and counsellors can integrate emotional language, reflective dialogue, strengths-based goal setting, and help-seeking practice into existing family–school programmes, while evaluating reach, acceptability, and outcomes.

At the community and policy levels, libraries, youth centres, and community education providers could collaborate with schools and parents on inclusive reading groups, cultural activities, and parent–adolescent workshops. Policymakers could test low-cost family–school–community pilots, promote equitable access to cultural and psychosocial resources, and include wellbeing literacy measures in rigorous evaluations. Support should prioritise girls and higher-grade students, with differentiated strategies: for boys, emotional awareness and wellbeing expression; for girls, psychological capital while maintaining their wellbeing-literacy advantage.

These actions were not directly evaluated in this observational study and require experimental testing before wider implementation.

4.6 Limitations and future research

Several limitations should be acknowledged. First, the cross-sectional design and correlational mediation analysis cannot establish temporal precedence, causality, or reciprocal resource-gain processes. The ordering of positive psychological capital and personal growth initiative is theoretically motivated but cannot be verified with these data; longitudinal, cross-lagged, or experimental designs are required. Second, all focal variables were assessed through adolescent self-reports. Social desirability, shared-method variance, and perceptual bias remain possible; Harman's single-factor test alone does not exclude common method bias. Future work should incorporate parent and teacher reports, behavioural measures, and more rigorous method-bias sensitivity analyses. Third, convenience sampling from six schools in one Chinese province limits generalizability to other regions, family contexts, and educational systems. School-level clustering was not explicitly accommodated in the reported analyses and should be considered in future multilevel or cluster-robust analyses. Fourth, unmeasured contextual factors such as socioeconomic resources and school environments could confound the observed associations, despite adjustment for selected demographic covariates. Finally, the current study did not evaluate an intervention or measure community-level outcomes; therefore, the proposed family, school, community, and policy applications should be considered testable implications, not demonstrated effects. Future studies should examine feasibility, equity, potential adverse effects, and outcomes in ethically designed interventions with adolescents.

5 Conclusion

Although existing research has examined the associations between family environment and adolescents' psychological development and well-being, the serial indirect effects of family intellectual-cultural orientation on well-being literacy via positive psychological capital and personal growth initiative warrant further investigation. This study revealed that family intellectual-cultural orientation significantly and positively correlated with adolescents' wellbeing literacy, and that positive psychological capital and personal growth initiative form a chain mediation in this relationship. Specifically, family intellectual-cultural orientation first associated with adolescents' positive psychological capital, which is further associated with their personal growth initiative, and all of these are ultimately positively associated with wellbeing literacy. At the same time, gender and grade significantly and negatively correlated with positive psychological capital, while gender significantly and positively correlated with wellbeing literacy. These findings highlight the statistical association of family intellectual-cultural orientation in adolescents wellbeing literacy and the importance of the chain mediating mechanism of psychological capital and growth initiative. Considering gender and grade differences, along with fostering positive psychological capital and personal growth initiative, might be positively associated with adolescents' wellbeing literacy.

Data availability statement

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

Ethics statement

The studies involving humans were approved by Ethics Committee of Hunan University of Science and Technology. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

KL: Data curation, Formal analysis, Funding acquisition, Investigation, Validation, Writing – original draft, Writing – review & editing. QT: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing. SZ: Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing. WL: Data curation, Formal analysis, Funding acquisition, Investigation, Validation, Writing – original draft, Writing – review & editing. YW: Data curation,

Formal analysis, Funding acquisition, Investigation, Validation, Writing – original draft, Writing – review & editing. JY: Data curation, Formal analysis, Funding acquisition, Investigation, Validation, Writing – original draft, Writing – review & editing.

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Conflict of interest

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

Generative AI statement

The author(s) declared that generative AI was used in the creation of this manuscript. This manuscript is an original work, has not been published in any language and is not under consideration elsewhere. All authors made meaningful contributions to this study. The order of authors is consistent with their relative contributions to the research reported in the manuscript. Statement on generative AI and AI-assisted technologies in the writing process: during preparation of this manuscript, the authors used Doubao and DeepSeek for proofreading. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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