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NAVIGATING ROLE TRANSITIONS IN OPEN EDUCATION: AN ASSOCIATIONAL ANALYSIS OF WORK-FAMILY BALANCE, EMOTIONAL RESOURCES, AND IDENTITY INTEGRATION AMONG ADULT LEARNERS

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Abstract: This study examines how perceived work-family balance—conceptualized as the successful management of digital boundary permeability—relates to identity compatibility among adult learners in China. Drawing upon the Work-Home Resources (WHR) model and the Social Identity Model of Identity Change (SIMIC), we constructed a sequential associational network model. Using an Associational Variable Analysis (AVA) framework to rigorously analyze cross-sectional data, emotional intelligence and psychological capital were positioned as essential "navigational meta-competencies" (sequential volatile and structural resources). Data were collected through an online survey of 471 adult learners enrolled in the Open University of China. Established scales were adopted to measure work-family balance, emotional intelligence, psychological capital, and social identity. Confirmatory factor analysis confirmed the validity of each instrument. The hypothesized sequential associational pathways were tested using an Associational Variable Analysis framework via Hayes' PROCESS macro (model 6). Results indicated three key findings. First, work-family balance was directly and positively associated with social identity (Effect = 0.30, $p < 0.001$). Second, both emotional intelligence (Effect = 0.10, 95% CI = [0.05, 0.16]) and psychological capital (Effect = 0.08, 95% CI = [0.04, 0.13]) served as significant independent associational pathways. Third, the sequential pathway from emotional intelligence to psychological capital was significant (Effect = 0.06, 95% CI = [0.03, 0.09]) These findings demonstrate that perceived work-family balance, acting as a vital contextual resource, is associated with enhanced identity integration through the sequential accumulation of emotional and psychological resources. The study extends the application of the WHR and SIMIC frameworks within educational psychology and provides a theoretical foundation for targeted psychological support in adult distance education.
Keywords: Work-family balance; Social identity, emotional intelligence; Psychological capital; Sequential associational model

1 INTRODUCTION

Lifelong learning has emerged as a cornerstone concept in education, endorsed by major global institutions including the European Commission, UNESCO, and the OECD [1]. The European Commission defines it as any deliberate educational efforts undertaken throughout an individual's life to enhance knowledge [2], abilities, and competencies for personal growth, civic engagement, societal contribution, or professional advancement. This concept has gained widespread acceptance as a vital approach to continuous development in a constantly changing world. UNESCO (n.d.) similarly defines lifelong learning as all purposeful learning activities from birth to death, aimed at improving individuals' knowledge and skills. A critical component of this broad definition is informal learning in diverse settings, including workplaces, homes, and communities, as well as formal education in institutions such as schools, universities, and alternative education centers. Therefore, lifelong learning is characterized by its flexibility, diversity, and accessibility, as it is pursued throughout an individual's life in various contexts and stages. In China, distance education has been instrumental in advancing lifelong learning by offering educational opportunities to individuals who failed the national college entrance examination [3-4].

In 2020, the Ministry of Education reported that 2.779 million students were enrolled in distance learning programs, and open education institutions had an enrollment of 8.465 million learners. Additionally, in 2020, China's working-age population (aged 18–59) exceeded 890 million, of whom approximately 620 million had not completed higher education. To achieve its sustainable development goals, China must expand access to distance education for this population segment [5]. Established in April 2003, open universities in China are tasked with promoting lifelong education. These institutions have attracted significant attention because they enable individuals to access education anytime and anywhere, transcending temporal and spatial barriers [6]. Open education students, mostly continuing education learners, often face significant pressures from the demands of study, work, and family life. Such excessive stress can negatively affect their social identification [7]. Therefore, in China's educational context, it has become increasingly important to explore how to enhance open education students' sense of connection and understand how balancing work and life affects their sense of belonging. In the contemporary landscape of distance education, the widespread adoption of digital technologies has dramatically increased digital border permeability between adult learners' professional, familial, and academic domains[8]. Unlike traditional students, these adult learners face a unique existential challenge: the need to navigate competing role

demands simultaneously [9]. Building upon the Social Identity Model of Identity Change (SIMIC), this study posits that achieving work-family balance is not merely a matter of time management, but rather a profound process of establishing 'identity compatibility' [10]. When multiple identities are highly integrated rather than fragmented, adult learners are better equipped to accumulate essential psychological and emotional resources [11].

Social identity is widely recognized as a psychological framework capturing individuals' feelings of connection, loyalty, and membership within specific social groups [12-13]. It serves as a cornerstone influencing how students view themselves, interact with peers, and navigate social settings, thereby solidifying its status as a key element of human interaction. This concept operates across multiple levels of group affiliation, including personal relationships, cultural ties, and organizational structures [14]. Shifts in social roles can significantly influence social identity. For example, open education students often transition between roles such as student, family member, and worker, which may lead to changes in their social identity [15]. Drawing on these theoretical foundations, this study proposes that work-family balance plays a critical role in shaping the social identity of open education students.

The concept of work-family balance originates from the fields of psychology and management, with the individual serving as the central unit of theoretical and analytical focus. This perspective emphasizes that individuals occupy a variety of social roles that provide meaning and structure to their lives [16]. In the contemporary digital workplace and distance education landscape, ubiquitous connectivity has dissolved traditional physical boundaries, increasing digital boundary permeability[17]. Consequently, work-family balance for adult learners is no longer merely about time allocation, but rather the cognitive compartmentalization of competing role demands[18]. When individuals effectively manage this digital permeability, they create a contextual resource base that facilitates success across domains. Adult learners in higher education face unique challenges as they attempt to navigate the increasing digital border permeability between professional, familial, and academic domains. Unlike traditional students, they must simultaneously manage competing role demands. Building upon the Social Identity Model of Identity Change (SIMIC), this study posits that achieving work-family balance is a profound process of establishing 'identity compatibility'[9]. Life transitions (such as becoming an adult learner) are less cognitively taxing when new identities are successfully integrated with pre-existing ones. Therefore, maintaining a strong, coherent general social identity amidst high digital boundary permeability serves as a robust proxy for successful identity integration, enabling learners to accumulate essential psychological and emotional resources[11].

This study aims to determine whether balancing work and family life enhances students' sense of belonging and to elucidate the underlying mechanisms for students in open education programs. To elucidate the underlying mechanisms for adult learners in open education programs, this study draws on the Work-Home Resources (WHR) model, which explains how personal and contextual resources link demanding aspects of one domain to outcomes in another[19]. The primary hypothesis is that emotional intelligence (acting as a volatile personal resource) and psychological capital (acting as a structural personal resource) form a sequential associational pathway between work-family balance (a contextual resource) and social identity[20-22]. Emotional intelligence, which involves skillfully managing emotions, is considered a crucial mental tool [23-25]. These tools include positive psychological traits that promote well-being, mitigate negative emotions, and provide resilience during stressful situations [26]. Empirical evidence indicates that emotional intelligence enhances students' psychological health, adaptability, and well-being by providing them with the skills needed to navigate daily challenges [27-29]. By facilitating effective emotional regulation[30], emotional intelligence enables open education students to manage negative emotions arising from role transitions, thereby enhancing their sense of social identity.

This study further proposes that psychological capital serves as an intermediary, facilitating the transition from work-family balance to social identity among open education students. Psychological capital significantly influences individuals' behavior, enhancing their work engagement. This, in turn, drives them to excel and promotes positive attitudes and behaviors [31-34]. Psychological capital can be viewed as a positive attitude that fosters self-confidence in challenging times and resilience in the face of adversity [35]. It comprises hope, optimism, resilience, and a proactive spirit [31]. However, psychological capital extends beyond personal development, positively influencing behavior and outcomes [36-37]. Positive emotions derived from psychological capital empower open education students to effectively manage the interplay between work, family, and academic responsibilities, thereby positively influencing their social identity.

Drawing on the theoretical foundations presented above, this study sets forth the following objectives: First, a review of the existing literature reveals a significant gap in empirical research on the social identity of open education students in both international and Chinese contexts. This research explores the complex relationship between maintaining a healthy work-family balance and the social identity of open education students. It also aims to elucidate the underlying mechanisms through which work-family balance enhances social identity. By addressing this research gap, the study aims to contribute to the fields of open education and social identity studies by providing novel insights and expanding the existing knowledge base.

Second, whereas previous research has primarily focused on identifying antecedents of social identity and verifying their mediating and moderating roles in fostering social identity, this study expands the scope of student satisfaction research. Furthermore, this study proposes and validates a sequential mediation framework, offering a novel perspective on the relationships among key factors.

Third, although work-family balance is not a novel concept, this study explicitly delineates its role and highlights its significance within the education system, particularly in the context of open and continuing education. Furthermore, the study examines how work-family balance influences emotional intelligence, psychological capital, and social identity, providing an in-depth analysis of these relationships.

Fourth, although psychological capital is often examined as a moderating variable in related studies, this study positions

it as a mediating variable and explores its mediating role in conjunction with its serial multiple indirect associational pathways with emotional intelligence. This study explores the sequential mediating roles of work-family balance in the interplay between emotional intelligence and psychological capital, examining how these variables collectively shape social identity and identifying the elements that foster its growth.

Finally, this research addresses the significant gap in empirical studies related to open education in China by elucidating and analyzing its role within the educational framework. The primary goal is to expand the scope of open education research. To achieve this, the study introduces an innovative model to explore the social identity of students in open education and to uncover how work-family balance positively influences this social identity. This contribution is expected to enrich the domains of work-family balance and social identity. Additionally, the research highlights the levels of emotional intelligence and psychological capital in the Chinese educational landscape and enhances the understanding of social identity by examining the serial multiple mediation effects of emotional intelligence and psychological capital.

2 THEORETICAL BACKGROUND AND HYPOTHESES

2.1 Work-Family Balance

The concept of "work-family balance," which originated in the UK in the 1970s, focuses on achieving an optimal balance between work and personal life (Wikipedia). Researchers have examined this concept from various perspectives. Some view it as merely preventing a complete breakdown between work demands and other life aspects [38]. Frone describes it as a state of minimal friction between work and family, along with strong family support[39].

Most research in this area has examined work-family balance through the lens of conflict [40]. Greenhaus and Beutell defined work-family conflict as a form of tension where job and family demands fail to align[40]. Theories such as role stress theory and the scarcity hypothesis suggest that managing multiple roles can deplete resources, leading to overload and conflict [40-41].

Subsequently, Greenhaus and Powell introduced the concept of "enrichment"[42]. They viewed it as the extent to which one life domain can enhance performance and well-being in another. This is a bidirectional relationship: work can enhance family life (work-to-family enrichment), and family can improve work performance (family-to-work enrichment). This idea is grounded in the expansionist view [41], which posits that having multiple roles is not necessarily a source of stress but can contribute to an overall sense of accomplishment [43].

work-family balance is a multifaceted concept [44]. It essentially depends on how well employees perceive the integration of their work and family lives. This perception is contingent upon whether their emotions, dedication, and success in both work and family domains align with their core values in those areas. Ultimately, the meaning of "balance" is subjective and depends on individual priorities [45]. Moreover, the definition includes the balance of emotions, involvement, and effectiveness. This balance is achieved when individuals experience predominantly positive emotions, perceive themselves as fully engaged, and feel they are performing well in valued roles.

2.2 Emotional Intelligence

Emotional intelligence (EI) originates from the broader concept of "social intelligence." Initially described by Thorndike in 1920, the concept was defined as the "ability to understand people." In 1989, Gardner integrated it into his framework of multiple intelligences, characterizing it as interpersonal intelligence. In 1992, Ruisel expanded on this notion, presenting emotional intelligence as a critical subset of social intelligence that is important in various contexts. In 1990, Salovey and Mayer proposed a comprehensive definition of emotional intelligence, which was later refined to include "the ability to perceive, express, integrate, understand, and manage emotions in oneself and others" [46-47].

Emotional intelligence plays a pivotal role in navigating social dynamics. It enables individuals to interpret nuanced emotional signals and shape interactions through effective emotion management [48]. This skill set is essential for fostering strong leadership and enhancing team cohesion. Although IQ is often considered a key determinant of success, the increasing focus on impactful leadership has prompted researchers to explore other avenues for growth. Goleman found that emotional skills constitute two-thirds of the core abilities required for excelling in diverse roles within international organizations[49]. Similarly, Dulewicz and Higgs emphasized the growing recognition of emotional intelligence's importance in leadership among scholars and senior executives, highlighting the need to address its role in leadership discourse [50-51].

Modern organizations increasingly emphasize the need for leaders to assume multiple roles, particularly in guiding and enabling the actions of their team members. To foster growth, these organizations must not only achieve but also maintain a competitive edge, with a particular focus on personnel-related issues [52-56]. Moreover, the complexity of organizational goals often necessitates teamwork, making work groups a common feature of modern organizations [57]. Research indicates that emotional intelligence significantly influences team dynamics and relationships. Open education students frequently assume multiple roles in family and society and rely on emotional intelligence to navigate the constant transitions between these roles [58]. Effective role coordination through emotional intelligence is a critical factor in fostering sustainable development and enhancing social recognition among open education students.

2.3 Psychological Capital

Psychological capital is comprised of four fundamental elements: self-efficacy, hope, optimism, and resilience [35, 59].

While discussions in contemporary society often focus on economic capital, which includes financial resources and tangible assets, there is increasing recognition of the importance of intangible capital [60]. Unlike material wealth, knowledge, or social affiliations, psychological capital captures the essence of an individual's being. It is fundamentally distinct from other types of capital, such as human capital (which relates to an individual's skills and expertise) and social capital (which centers on interpersonal connections and networks). Robust psychological capital is intricately linked to an individual's current self-conception and capacity for personal development [59, 61]. In contrast, social capital focuses on the value derived from an individual's relationships and social interactions [59].

Self-efficacy refers to an individual's confidence in their ability to accomplish tasks: to motivate themselves, identify their needs, and take steps to achieve specific goals in a given situation [59]. Hope is considered a positive and motivational emotional state that drives individuals to pursue success by working hard and developing plans to achieve their goals [59]. Optimism, based on attribution theory, involves how individuals interpret positive and negative events. Optimists tend to view setbacks as temporary and specific to the situation, such as being tired at a particular moment [62]. Resilience is a highly valued quality that enhances the ability of individuals and society to recover from adversity and regain stability [59].

Experts predict that a substantial amount of positive psychological capital can significantly enhance individual performance. It provides individuals with the additional confidence needed to establish strong and meaningful social connections [63, 64]. Researchers should also investigate factors that may explain the relationship between psychological capital and team performance. Factors such as alignment of team values [65-67], seamless collaboration [68], and team cohesion can all contribute to this relationship[69]. These factors can significantly amplify the impact of a team's collective psychological capital on overall organizational performance. Clearly, psychological capital is crucial for helping students successfully navigate challenging role transitions and positively shape their social identity.

2.4 Social Identity

Psychological scholarship conceptualizes identity as a cognitive self-structure that is fundamentally relational and self-referential, serving to resolve ontological questions regarding self-definition. Within organizational scholarship, the individual-centric paradigm often diverges from observed collective behaviors, prompting the conceptualization of the social self to explain the behavioral differences between personal identity (individual-as-person) and social identity (individual-as-group-member) [70]. As a seminal framework in group dynamics research, social identity theory provides transformative insights into group-mediated phenomena through its three-part analysis of intergroup relations.

Since its inception in the 1970s, the social identity approach has experienced significant development, reinterpretation, and occasional misapplication [71]. The theory posits that social identity arises from an individual's self-conceptualization through perceived group membership [72]. Tajfel and Turner'sfoundational work established three key mechanisms: categorical grouping, identity internalization, and intergroup comparison [72-73].

Categorical grouping involves the cognitive partitioning of social actors into distinct classifications via automatic schematic processing [74]. Experimental evidence confirms that self-categorization processes are rapid and efficient across basic demographic dimensions. Identity internalization refers to the psychological investment in group membership, where individuals derive self-worth from collective affiliation and adopt normative behaviors associated with their designated social category [75]. Comparative evaluation manifests as systematic favoritism toward ingroup members through contrastive analysis with outgroups [72].

In open education contexts, student identification is a critical competency for integrating professional, familial, and academic roles effectively. Positive social identification is significantly correlated with enhanced psychological resilience among adult learners. It mitigates stress-induced pathologies, such as social isolation and clinical depression, by strengthening group affiliation mechanisms.

2.5 Work-Family Balance and Emotional Intelligence

Cross-sectional analyses have demonstrated that work-family balance and emotional intelligence play crucial roles in predicting overall quality of life [76]. Emotional intelligence is fundamentally understood as the combination of personal and social skills [77]. The personal aspect involves the ability to control one’s own emotional responses, while the social aspect involves adeptly navigating interactions with others [78]. This integrative framework serves as a critical antecedent to work-family equilibrium [79]. Neuropsychological studies have demonstrated enhanced stress resilience and adaptive emotion regulation strategies in individuals with elevated emotional quotients [27]. Notably, Carmeli's structural equation modeling revealed that emotionally intelligent individuals strategically prioritize competing demands across professional and domestic spheres [80], fulfilling role expectations in both domains. Complementing these findings, Mayer demonstrated in an 18-year longitudinal investigation that emotional intelligence development predicts enhanced social capital accumulation in work-family interface contexts [51]. Synthesizing these theoretical foundations, we posit the following hypothesis:

Hypothesis 1. Work-Family Balance is positively associated with Emotional Intelligence.

2.6 Work-Family Balance and Psychological Capital

Work-family balance is a multidimensional construct that involves harmonizing occupational obligations with domestic commitments, including relational health maintenance, caregiving duties, and personal development activities [81-82].

Scholarly investigations conceptualize this equilibrium as a dynamic cognitive appraisal process, characterized by temporal fluidity aligned with shifting life priorities [83]. Through the lens of positive psychology, individuals with elevated psychological capital employ cognitive reappraisal mechanisms when negotiating cross-domain demands, framing role integration as developmental challenges rather than threats [84-85]. This adaptive coping enhances resource acquisition across professional and domestic spheres, fostering perceived mastery over multifactorial stressors [26]. Coutu's resilience theory posits that psychological capital engenders constructive reality acceptance and value-congruent behavioral persistence [86], mediating equilibrium attainment in polyrole environments. Neuropsychological evidence further indicates that these resources serve as protective factors against resource depletion cycles in work-family interface scenarios [87]. Synthesizing these theoretical propositions through the conservation of resources framework, we formulate the second hypothesis:
Hypothesis 2. Work-Family Balance is positively associated with Psychological Capital.

2.7 Work-Family Balance and Social Identity

Family identity formation occurs through the internalization of normative expectations specific to kinship roles, such as parental or spousal roles [88]. Empirical studies using role theory frameworks have shown that identity prominence creates tensions in cross-domain resource allocation, with individuals having multiple salient identities showing reduced capacity for uniform role investment [89-90]. The accumulation of role obligations triggers processes of identity hierarchy reconstruction [91], predisposing individuals to allocate resources preferentially to familial domains [92]. This dynamic of resource reallocation manifests temporally as reduced occupational engagement intensity [93]. Longitudinal analyses reveal a curvilinear relationship between professional and familial identity integration [94]. Moderate work-family conflict stimulates identity negotiation strategies, while chronic imbalance erodes social identification coherence. In open education ecosystems characterized by role fluidity and asynchronous participation patterns, learners develop meta-competencies in identity switching through repeated exposure to polycontextual demands. This adaptive capability enhances social identity complexity via cognitive schema differentiation mechanisms [95]. Building upon these theoretical premises, we advance the third hypothesis:
Hypothesis 3. Work-Family Balance is positively associated with Social Identity.

2.8 Emotional Intelligence and Psychological Capital

Extensive research has explored the link between emotional intelligence and psychological capital. The concept of emotional intelligence has its roots in Thorndike's work on social intelligence (1920), Wechsler's emphasis on non-cognitive skills (1940s), and Gardner's investigations into personal intelligence (1983). Salovey and Mayer solidified the idea in 1990, defining emotional intelligence as the capacity to understand, manage, and leverage emotions to solve problems. They reframed it, viewing it through both a cognitive and emotional lens, as they clarified in 1997. Drawing on Fredrickson's work (1998, 2001), which suggests that a positive disposition can build resilience, spark hope, and encourage an interconnected worldview, and considering the established link between psychological capital (a mix of self-efficacy, hope, optimism, and resilience) and emotional intelligence, with the latter empowering individuals to handle challenges, as well as their functional interplay [96], this study hypothesizes that:
Hypothesis 4. Emotional Intelligence is positively associated with Psychological Capital.

2.9 Emotional Intelligence and Social Identity

A growing body of research supports the notion that emotional intelligence, as a cluster of skills, possesses construct validity [97-98]. Confirmatory factor analysis strongly supports the four-branch model proposed by Mayer and Salovey in 1997 [99]. Individuals with high emotional intelligence scores tend to exhibit better social adjustment, characterized by increased prosocial tendencies [100], enhanced empathy [101], and reduced negative behaviors in social interactions [97]. In a study by [102], college students with higher scores on the MSCEIT's emotion management subscale reported less conflict and hostility with their close friends, and a stronger sense of companionship, emotional connection, and support with their parents. Notably, these correlations remained significant even after accounting for the Big Five personality traits. This process fundamentally enables the sorting, pinpointing, and comparison of individuals and groups, thereby laying the groundwork for social identity. Drawing on these theoretical models and the empirical evidence discussed, the current study proposes the following hypothesis:
Hypothesis 5. Emotional Intelligence is positively associated with Social Identity.

2.10 Psychological Capital and Social Identity

Psychological capital, comprising elements such as hope, self-efficacy, optimism, and resilience, has become a pivotal concept for integrating positive psychology into the workplace [103]. Wood and Wood noted that individuals exhibiting emotional stability [104], a steady temperament, agreeableness, and calmness tend to foster strong interpersonal connections, resulting in numerous social relationships. These traits enable them to cultivate social capital more effectively than those who experience mood swings, irritability, nervousness, anxiety, and a tendency to worry. Individuals with high levels of hope, optimism, self-efficacy, and resilience are more likely to embrace learning opportunities and focus on shared goals. Notably, attributes such as confidence, calmness, agreeableness, and self-regulation often stem

from substantial training and personal development. Social networks play an essential role in their lives, as career growth significantly depends on the robustness of these connections. Goldsmith illustrated that individuals with psychological capital can easily establish connections with others [105], expanding their social capital and gaining social recognition more rapidly. Drawing on the aforementioned theories and perspectives, the present study proposes the following hypothesis:
Hypothesis 6. Psychological Capital is positively associated with Social Identity.

2.11 The Serial Multiple Mediation Effect of Emotional Intelligence and Psychological Capital

Work-family conflict can significantly disrupt people's lives, and studies have shown that emotional intelligence can help mitigate these disruptions [106]. Thus, emotional intelligence is also crucial for achieving a healthy work-family balance. handle stress and keep negative feelings in check [27]. Individuals with higher emotional intelligence are better equipped to manage stress and regulate negative emotions [27]. Emotional intelligence, which involves understanding and expressing emotions and using them to manage oneself and others, is crucial for navigating social situations. It is also essential for effective leadership and teamwork [47]. Clearly, emotional intelligence influences team dynamics. Social identity refers to how individuals perceive themselves in relation to different social groups. When an individual is part of a group, a significant portion of their identity is often tied to that group [72]. Emotional intelligence can bridge the gap between individual self-perception and social group perception, thereby influencing social identity. Open learning students often face significant pressure, balancing work, family, and school responsibilities. Emotional intelligence can help them manage their work-family balance and enhance their sense of identity and social perception.
Individuals continuously weigh their options, striving to manage work, family, and other life demands effectively. Ultimately, they aim to manage their resources effectively to achieve work-family balance [85]. This sense of control stems from psychological capital, which comprises hope, confidence, a positive outlook, and resilience [103]. Strong psychological capital is essential for establishing a place in social circles, facilitating connections, building social networks, and gaining recognition for contributions [105].
Individuals with high-quality work-family balance can significantly enhance their emotional intelligence to address issues arising from multiple roles and improve their social recognition. Moreover, individuals with high-quality work-family balance can clearly perceive the needs of work and family roles and manage resource allocation through efficacy, optimism, resilience, and hope. This is beneficial for building relationships between individuals and groups and achieving social recognition. Additionally, open education students facing mental pressure from switching between family, work, and student roles can enhance their emotional intelligence to self-regulate emotions and leverage psychological capital to manage resource allocation between work, family, and study. This strengthens connections between individuals and groups and accelerates social recognition. Drawing on the aforementioned theories and perspectives, this study proposes the following hypotheses:
Hypothesis 7. Emotional Intelligence serves as an indirect associational pathway between Work-Family Balance and Social Identity.
Hypothesis 8. Psychological Capital serves as an indirect associational pathway between Work-Family Balance and Social Identity.
Hypothesis 9. Emotional Intelligence and Psychological Capital form a sequential associational pathway linking Work-Family Balance to Social Identity.

3 METHODS

3.1 Sample Characteristics

This study, focusing on students attending Open Universities throughout China, utilized an online questionnaire administered via SoJump. We gathered data over a two-day period, October 7th and 8th, 2024, initially collecting 513 responses. After weeding out 42 questionnaires due to suspiciously similar answers or completion times that were just too quick, we ended up with a final sample size of 471 for analysis, giving us a solid response rate of roughly 91.8%.
The study demographic breakdown revealed a fairly balanced gender split, with 218 participants (46.3%) identifying as male and 253 (53.7%) as female. When it came to age, the majority—190 individuals, or 40.3%—fell into the 20 to 29-year-old bracket, followed by 117 (24.8%) in the 30 to 39 range. Those aged 40 to 49 made up 29.3% of the sample, totaling 138 participants, while 26 individuals (5.5%) were 50 or older. As for marital status, 301 participants (63.9%) were married, compared to 170 (36.1%) who were single. Concerning employment status, 321 individuals (68.2%) were employed, and 150 individuals (31.8%) were seeking employment. In terms of the duration of open education received, 124 individuals (26.3%) had been enrolled for one year or less, 156 individuals (33.1%) for two years, 126 individuals (26.8%) for three years, and 65 individuals (13.8%) for four years or more.

3.2 Measurement

work-family integration reflects an individual’s role involvement and contentment across professional and familial domains [106-107]. To assess students' work-family balance, this study utilized a measurement tool referenced from the research of Major, Fletcher, Davis, and Germano [108]. The scale had an alpha reliability coefficient of 0.824, which indicated a satisfactory level of reliability. Examples of such statements are, "My job eats into my personal life way too

much, stirring up a lot of tension, and that tension pushes me to do something about it," and "The clout and perks I get from my career make up for the time I don't spend with my family."

Emotional intelligence, often described as the ability to navigate and regulate emotions in various contexts, is a competency that can be cultivated through social interactions and learning [109]. In this research, a measurement tool adapted from the work of Law, Wong, and Song was utilized to assess students' emotional intelligence [77]. The questionnaire, tailored to the Chinese cultural framework by Liu [110], demonstrated a reliability score of 0.789. Example statements from the survey include "I am adept at keeping my emotions in check" and "I usually understand why I feel the way I do."

Psychological capital refers to key mental attributes like optimism, hope, resilience, and self-belief, as highlighted by Gupta and Shukla [111]. To assess students' levels of psychological capital, this research employed a measurement tool inspired by Fred Luthans' 2008 study [112]. Examples of the survey questions include statements such as, "I trust my skills to tackle complex problems and find effective solutions," and "When faced with challenges, I can brainstorm multiple ways to push through and succeed."

Social identity pertains to self-descriptions related to group memberships or self-categorizations [113]. To measure students' social identity, this study utilized a tool referenced from the studies of Xue [114]. Sample items include "My identity as a Chinese citizen is highly significant to me" and "Being a participant in open education constitutes an essential aspect of my identity."

All items were assessed using a 7-point Likert scale (ranging from 1 = strongly disagree to 7 = strongly agree). Consequently, based on the aforementioned variables and the PROCEE model 6, this study constructed its own model, as depicted in Figure 1.

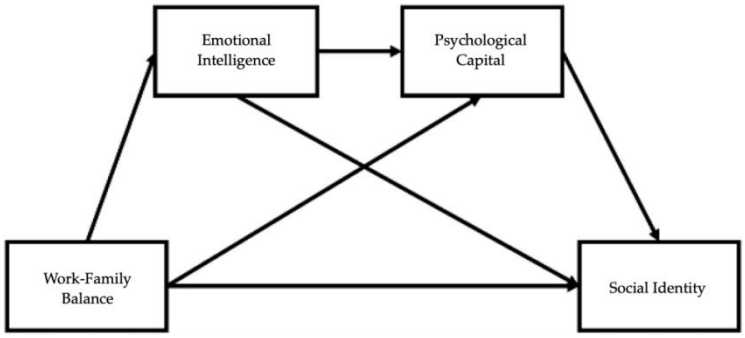

Figure 1 Research Model (Process Model 6)

3.3 Statistical Analysis

The statistical analysis for this study unfolded in a step-by-step manner. We kicked things off with a demographic breakdown. After that, we ran an Exploratory Factor Analysis (EFA) and then followed it up with a Confirmatory Factor Analysis (CFA). To ensure our measurement tool was up to snuff, we then conducted a reliability analysis. Next, we delved into descriptive statistics and the relationships between our variables, looking at correlations. Finally, we put our hypotheses to the test. For the demographic analysis, EFA, reliability assessment, descriptive stats, and correlation work, we leaned on SPSS version 26.0. When it came to the CFA, AMOS version 23.0 was our tool of choice. And to wrap things up, we dug into the Sequential Associational Model using the SPSS PROCESS Macro, version 4.2, Model 6.

Given the non-experimental cross-sectional nature of our survey data, we strictly adopted an associational framework to analyze our variables[115]. We explicitly acknowledge that cross-sectional data cannot establish temporal precedence, rendering traditional causal mediation claims mathematically and theoretically problematic[116]. Therefore, our utilization of the PROCESS macro (Model 6) does not claim definitive causal mediation. Rather, it serves as a robust statistical approach to conceptualize and map the synergistic, concurrent associational network of personal resources as outlined by the Work-Home Resources (WHR) model[117].

4 RESULTS

4.1 Confirmatory Factor Analysis

Exploratory factor analysis is a statistical technique used to assess whether the variables intended for measurement can be grouped into underlying factors through suitable assessment methods and instruments [118]. The results of exploratory factor analysis (EFA) are shown in Table 1.

The variables used in the study were work-family balance, emotional intelligence, psychological capital and social identity which were classified into four independent factors. Work-family balance consists of 17 questions, and the values of the measured questions range from .501 to .742 as factor 1, emotional intelligence consists of 16 questions, and the values of the measured questions range from .522 to .753 as factor 2, psychological capital consists of 24 questions, and the values of the measured questions range from .588 to .755 as factor 3, social identity consists of 9 questions, and the values of the measured questions range from .603 to .759 as factor 4. All factor loadings are above .5.

Table 1 The Result of Exploratory Factor Analysis

Variable	Item	Component			
		1	2	3	4
Work-family Balance	1	.368	.338	.603	.235
	2	.419	.360	.512	.283
	3	.427	.337	.501	.358
	4	.471	.334	.506	.253
	5	.369	.357	.639	.265
	6	.377	.342	.634	.242
	7	.333	.288	.729	.256
	8	.302	.305	.704	.245
	9	.318	.286	.742	.282
	10	.304	.304	.652	.259
	11	.300	.341	.678	.287
	12	.342	.307	.675	.249
	13	.322	.317	.698	.247
	14	.364	.342	.692	.289
	15	.389	.312	.683	.268
	16	.340	.327	.730	.271
	17	.426	.306	.639	.291
Emotional Intelligence	1	.357	.653	.296	.238
	2	.393	.617	.342	.254
	3	.413	.572	.358	.234
	4	.440	.522	.306	.303
	5	.335	.710	.282	.261
	6	.287	.647	.327	.305
	7	.344	.665	.292	.229
	8	.370	.671	.336	.227
	9	.361	.689	.305	.261
	10	.382	.657	.330	.273
	11	.310	.739	.282	.245
	12	.314	.699	.334	.259
	13	.343	.690	.349	.220
	14	.350	.753	.285	.219
	15	.350	.698	.326	.203
	16	.413	.652	.285	.228
Psychological Capital	1	.588	.327	.327	.270
	2	.663	.311	.296	.212
	3	.648	.338	.323	.263
	4	.653	.331	.311	.283
	5	.743	.333	.283	.252
	6	.733	.328	.287	.227
	7	.720	.343	.247	.248
	8	.680	.277	.251	.123
	9	.744	.249	.286	.203
	10	.755	.308	.315	.235
	11	.660	.275	.343	.296
	12	.649	.305	.356	.258
	13	.617	.329	.285	.301
	14	.659	.284	.271	.344
	15	.684	.282	.302	.309
	16	.663	.289	.327	.269
	17	.661	.309	.296	.286
	18	.636	.347	.364	.228
	19	.658	.344	.321	.237

	20	.675	.257	.296	.288
	21	.649	.316	.316	.286
	22	.677	.328	.316	.273
	23	.687	.340	.298	.252
	24	.662	.351	.283	.259
	1	.395	.285	.359	.611
	2	.405	.318	.305	.610
	3	.371	.327	.318	.603
	4	.353	.312	.317	.675
Social Identity	5	.321	.331	.279	.712
	6	.314	.311	.297	.755
	7	.318	.232	.312	.759
	8	.306	.240	.318	.734
	9	.320	.281	.318	.662
Eigenvalues		42.228	2.417	2.090	1.750
Dispersion(%)		63.981	3.662	3.167	2.652
Cumulative(%)		63.981	67.643	70.810	73.462
KMO=.979(sig=.000)					

Although Harman's single-factor test suggested a potential concern regarding common method variance (with the first unrotated factor accounting for an elevated percentage of variance), relying solely on this exploratory technique is considered insufficient in modern psychometric evaluations[119]. To rigorously control for this, we employed the Unmeasured Latent Method Construct (ULMC) technique using AMOS[120]. A common method factor, which represents the variance shared among all items due to the measurement method, was introduced into the CFA model. After controlling for this latent method factor, the structural path coefficients of our core theoretical constructs remained statistically significant, demonstrating that common method bias did not substantially confound our primary associational findings[121].

4.2 Confirmatory Factor Analysis

Using confirmatory factor analysis, we validated the suitability of the data and various models [122]. The results of confirmatory factor analysis are as follows. First, the absolute fit index was $X^2(p)= 5918.42(.000)$, $X^2/df=2.894$, and RMSEA=.063. Second, the incremental fit index was IFI=.903 and CFI=.903. Third, the parsimonious adjusted index was PNFI=.819 and PGFI =.648.

To rigorously establish discriminant validity, we employed the Heterotrait-Monotrait (HTMT) ratio of correlations, as recent methodological advancements suggest it is superior to the traditional Fornell-Larcker criterion. As shown in Table 2, all HTMT values were evaluated against the established conservative threshold of 0.85. The results confirmed that all HTMT ratios were well below the 0.85 threshold, indicating acceptable discriminant validity for the measurement model.

Table 2 The Result of Confirmatory Factor Analysis

Variables	Work-family Balance	Emotional Intelligence	Psychological Capital
Emotional Intelligence	0.562	-	-
Psychological Capital	0.569	0.565	-
Social Identity	0.528	0.601	0.524

For convergent validity assessment, the standardized regression coefficients for work-family balance were within the range of 0.697 to 0.847; for emotional intelligence, they were between 0.706 and 0.811; psychological capital had values from 0.639 to 0.835; and for social identity, the range was 0.698 to 0.804. These coefficients reflect a substantial convergence towards the theoretical constructs. The results of confirmatory factor analysis (CFA) are shown in Table 3.

Table 3 The Result of Confirmatory Factor Analysis

Variables		Estimate	S.E.	C.R.	*p*	Standardized Regression Weights	AVE	C.R
Work-family Balance (A)	A17	1				.762	.586	.918
	A16	1.218	.035	34.882	***	.847		
	A15	1.174	.036	32.67	***	.821		
	A14	1.255	.037	34.233	***	.841		
	A13	1.137	.039	29.435	***	.777		

	A12	1.141	.041	27.979	***	.755		
	A11	1.091	.038	28.949	***	.769		
	A10	1.085	.042	25.76	***	.717		
	A9	1.164	.036	32.421	***	.818		
	A8	1.103	.039	28.429	***	.762		
	A7	1.161	.038	30.752	***	.796		
	A6	1.083	.04	27.182	***	.742		
	A5	1.078	.038	28.271	***	.759		
	A4	0.985	.04	24.853	***	.700		
	A3	1.118	.043	25.871	***	.718		
	A2	1.061	.043	24.646	***	.697		
	A1	1.048	.041	25.527	***	.714		
	B1	1				.706		
	B2	1.162	.041	28.024	***	.765		
	B3	1.074	.04	26.717	***	.745		
	B4	1.063	.043	24.639	***	.710		
	B5	1.099	.038	28.971	***	.783		
	B6	1.072	.042	25.479	***	.723		
	B7	1.066	.041	26.14	***	.735		
Emotional Intelligence (B)	B8	1.215	.04	30.055	***	.797	.589	.917
	B9	1.137	.038	30.244	***	.801		
	B10	1.168	.039	30.116	***	.799		
	B11	1.049	.037	28.515	***	.775		
	B12	1.092	.038	28.718	***	.777		
	B13	1.121	.039	29.045	***	.782		
	B14	1.053	.034	30.973	***	.811		
	B15	1.049	.036	29.42	***	.789		
	B16	1.152	.041	28.412	***	.773		
	C24	1				.686		
	C23	1.109	.035	31.324	***	.759		
	C22	1.183	.04	29.426	***	.783		
	C21	1.132	.042	27.133	***	.747		
	C20	1.096	.043	25.752	***	.723		
	C19	1.119	.042	26.816	***	.741		
	C18	1.135	.042	27.141	***	.746		
	C17	1.156	.043	27.049	***	.746		
	C16	1.117	.041	27.042	***	.746		
	C15	1.122	.04	27.936	***	.76		
Psychological Capital (C)	C14	1.036	.039	26.288	***	.732	.568	.909
	C13	1.050	.041	25.585	***	.72		
	C12	1.082	.039	27.742	***	.757		
	C11	1.165	.042	27.605	***	.755		
	C10	1.232	.037	32.87	***	.833		
	C9	1.028	.038	27.2	***	.748		
	C8	0.870	.041	21.403	***	.639		
	C7	1.241	.042	29.743	***	.789		
	C6	1.215	.039	31.122	***	.809		
	C5	1.289	.039	33.063	***	.835		
	C4	1.217	.042	28.871	***	.774		
	C3	1.187	.043	27.754	***	.756		

	C2	1.061	.043	24.951	***	.709		
	C1	1.070	.045	23.779	***	.686		
	D1	1				.698		
	D2	1.182	.043	27.194	***	.757		
	D3	1.141	.045	25.13	***	.724		
	D4	1.226	.043	28.492	***	.782		
Social Identity (D)	D5	1.255	.043	29.192	***	.796	.585	.905
	D6	1.223	.044	27.592	***	.799		
	D7	1.245	.042	29.676	***	.804		
	D8	1.199	.043	28.061	***	.777		
	D9	1.156	.045	25.449	***	.732		
Model Fit Index	$X^2(p)$=5918.42(.000), X^2/df=2.894, RMSEA=.063, IFI=.903, CFI=.903, PGFI=.648, PNFI=.819							

4.3 Reliability Analysis

A reliability assessment examines the dependability and uniformity of measurement instruments and evaluation metrics, guaranteeing that participants' answers demonstrate a consistent trend over time or under varying circumstances [123]. In light of this, the research employed Cronbach's alpha coefficient to assess the reliability of the variables. The findings from the reliability analysis are outlined below:

First, work-family balance was assessed using 17 items rated on a 7-point Likert scale to evaluate participants' perceptions related to work-family balance. The results indicated that Cronbach's alpha for this construct was 0.977. Second, emotional intelligence was measured using 16 items rated on a 7-point Likert scale to gauge participants' level of emotional intelligence. The results showed that Cronbach's alpha for emotional intelligence was 0.975. Third, psychological capital was evaluated using 24 items rated on a 7-point Likert scale to measure participants' level of psychological capital. The results revealed that Cronbach's alpha for psychological capital was 0.982. Fourth, social identity was measured using 9 items rated on a 7-point Likert scale to assess participants' degree of social identity. The results indicated that Cronbach's alpha for social identity was 0.962. All Cronbach's alpha coefficients were confirmed to be higher than 0.7, thereby demonstrating the significant and valid reliability of the variables. The reliability analysis results are presented in Table 4.

Table 4 Reliability Analysis Results

Variables	Item	Cronbach's Alpha
Work-family Balance (A)	1. Work takes up too much family time, leading to a sense of conflict, and this sense of conflict makes me want to change this state.	.977
	2. Family takes up too much family time, leading to a sense of conflict, and this sense of conflict makes me want to change this state.	
	3. Work makes me feel tired, which prevents me from doing family matters, and I hope to change this state.	
	4. Family tasks make me feel tired, which prevents me from doing work matters, and I hope to change this state.	
	5. I consciously adjust the distribution of time and energy between work and family.	
	6. My family has no objections to the way I handle work and family relationships.	
	7. I feel there is no conflict between work arrangements and family arrangements.	
	8. I bring emotions (positive and negative) from work home.	
	9. Emotions (positive and negative) generated at home affect my work.	
	10. I discuss work matters with my family.	
	11. The support, understanding, and help from my family in my work contribute to the smooth progress of my job.	
	12. I believe that success at work contributes to family harmony.	
	13. If there are financial difficulties at home, I would spend more time and energy on work to earn more compensation.	
	14. The understanding and support from my supervisor help me deal with family relationships.	
	15. The social status and resources obtained from work can compensate for my lack of investment in the family.	
	16. The compensation obtained from work can compensate for my lack of investment in the family.	
	17. I feel that all my work-related needs are met.	

Emotional Intelligence (B)	1. I have strong control over my emotions. 2. I am very capable of controlling my emotions. 3. When I am angry, I can usually calm down in a very short time. 4. When facing difficulties, I can control my temper. 5. I can keenly perceive the feelings and emotions of others. 6. I have a strong ability to observe others' emotions. 7. I can usually guess my friends' emotions from their behavior. 8. I am well-acquainted with the emotions of those around me. 9. I often encourage myself to do my best. 10. I am someone who can motivate myself. 11. I can usually set goals for myself and try to achieve them. 12. I often tell myself that I am a capable person. 13. I have a good understanding of my own emotions. 14. Usually, I can understand why I have certain feelings. 15. I often give myself reasons for feeling happy or unhappy. 16. I truly understand my own feelings.	.975
Psychological Capital (C)	1. I believe I can analyze long-term issues and find solutions. 2. During meetings with management, I am confident when discussing matters within my job scope. 3. I believe I contribute to discussions about the company's strategy. 4. Within my job scope, I believe I can help set goals/purposes. 5. I believe I can connect with people outside the company (e.g., suppliers, customers) and discuss issues. 6. I believe I can present information to a group of colleagues. 7. If I find myself stuck in my work, I come up with many ways to get out of the situation. 8. Currently, I am energetically completing my work. 9. There are many ways to solve any problem. 10. At the moment, I consider myself quite successful in my work. 11. I can think of many ways to achieve my current work objectives. 12. I am achieving the work goals I have set for myself. 13. When encountering setbacks at work, I find it difficult to bounce back and move forward. 14. In my work, I will solve any problems I encounter no matter what. 15. If I have to, I can handle things independently at work. 16. I am usually able to take work stress in my stride. 17. Having gone through many hardships before, I can now weather difficult times at work. 18. In my current job, I feel capable of handling multiple tasks at once. 19. When faced with uncertainties at work, I usually look forward to the best outcome. 20. If something is going to go wrong, it will go wrong even if I work wisely. 21. I always see the positive side of my work. 22. I maintain an optimistic attitude about what will happen to my work in the future. 23. In my current job, things never develop as I hope. 24. When working, I always believe that "behind the darkness is light, there is no need for pessimism."	.982
Social Identity (D)	1. My identity as a Chinese person is very important to me. 2. I like my identity as a Chinese person. 3. I am proud to be a Chinese. 4. Being a member of open education is an important part of my identity. 5. I enjoy my identity as a student of the open university. 6. I am proud to be a member of the open university. 7. Being a member of the organization is an important part of my identity. 8. I like my identity as a member of the organization. 9. I am proud to be a member of the organization.	.962

4.4 Descriptive Statistics and Correlation Analysis

Table 5 shows the descriptive statistics and correlation analysis. The descriptive statistics analysis included the mean and standard deviation (SD). The means for work-family balance, emotional intelligence, psychological capital, and social identity were 4.614, 4.465, 4.584, and 4.606, respectively. In addition, the SDs of work-family balance, emotional intelligence, psychological capital, and social identity were 1.502, 1.464, 1.516, and 1.648, respectively.
To verify the correlation among variables, this study conducted a correlation analysis. The results were as follows: work-familybalance was positively associated with emotional intelligence (r =.543, p <.001), psychological capital (r =.549, p <.001), and social identity (r =.546, p <.001). Emotional intelligence was positively associated with psychological capital (r=.546, p<.001), and social identity (r=.581, p<.001). Psychological capital was positively associated with social identity (r=.505, p<.001).

Table 5 The Results of Descriptive Statistics and Correlation Analysis

Variables	Mean	SD	Work-family Balance	Emotional Intelligence	Psychological Capital	Social Identity
Work-family Balance	4.614	1.502	-			
Emotional Intelligence	4.465	1.464	.543***	-		
Psychological Capital	4.584	1.516	.549***	.546***	-	
Social Identity	4.606	1.648	.546***	.581***	.505***	-

***: p<.001.

The data reveals positive correlations across the board, meaning that variables generally rise in tandem. Notably, the strong correlation (r=0.543) between work-family balance and emotional intelligence suggests a substantial effect: open education students who juggle work and family effectively tend to display greater emotional intelligence. Similarly, the robust correlation (r=0.549) between work-family balance and psychological capital implies a significant connection; successful strategies for balancing work and family life appear to be tightly interwoven with a student's self-belief, optimism, resilience, and overall sense of hope. The relationship between work-family balance and social identity is notably strong (r=0.546), indicating that students who excel in managing work and family responsibilities are more inclined to cultivate a robust social identity. Additionally, the link between emotional intelligence and psychological capital is significant (r=0.546), suggesting that students with heightened emotional intelligence typically exhibit higher levels of psychological capital. Furthermore, the correlation between emotional intelligence and social identity (r=0.581) is quite substantial, highlighting the critical impact of emotional intelligence on the enhancement of social identity. Finally, the strong correlation between psychological capital and social identity (r=0.505) underscores the essential role that psychological capital plays in fostering a sense of social identity. These findings emphasize the importance of supporting students in open education to achieve work-family balance, enhance emotional intelligence, and build psychological capital, as these not only improve their personal well-being but also foster the formation of social identity.

4.5 Hypothesis Test

This study established a total of nine hypotheses in this research. First, this study verified the effect of work-family balance on emotional intelligence. Second, this study verified the effect of work-family balance on psychological capital. Third, this study verified the effect of work-family balance on social identity. Fourth, this study verified the effect of emotional intelligence on psychological capital. Fifth, this study verified the effect of emotional intelligence on social identity. Sixth, this study verified the effect of psychological capital on social identity. Seventh, this study tested the indirect associational pathway of emotional intelligence on the relationship between work-family balance and social identity. Eighth, this study tested the indirect associational pathway of psychological capital on the relationship between work-family balance and social identity. Ninth, this study tested the serial multiple mediation effects of emotional intelligence and psychological capital on the relationship between work-family balance and social identity. This study tested the nine hypotheses in the way of Bootstraping through SPSS Process Macro v4.2 model 6. The analysis results are shown in Table 6.
Hypothesis 1 established that work-family balance positively influenced emotional intelligence. Work-family balance demonstrated a significant positive association with emotional intelligence (t=15.248, p<0.001). Therefore, Hypothesis 1 was supported, and this result suggests that work-family balance improves emotional intelligence.
Hypothesis 2 established that work-family balance positively influenced psychological capital. Work-family balance had a significant positive influence on psychological capital (t=7.739, p<0.001). Thus, Hypothesis 2 is supported, and this result explains why work-family balance increases psychological capital.
Hypothesis 3 established that work-family balance positively influenced social identity. Work-family balance had a significant positive influence on social identity (t =6.321, p <0.001). Therefore, Hypothesis 3 was supported, and this result suggests that work-family balance increases social identity.
Hypothesis 4 established that emotional intelligence positively influenced psychological capital. Emotional intelligence had a significant positive influence on psychological capital (t=7.223, p<0.001). Thus, Hypothesis 4 is supported, and this result explains why emotional intelligence increases psychological capital.

Hypothesis 5 established that emotional intelligence positively influenced social identity. Emotional intelligence had a significant positive influence on social identity (t=4.064, p<0.01). Therefore, Hypothesis 5 was supported, and this result suggests that emotional intelligence can be increases social identity.
Hypothesis 6 established that psychological capital positively influenced social identity. Psychological capital had a significant positive influence on social identity (t=5.526, p<0.001). Thus, Hypothesis 6 is supported, and this result explains why psychological capital increases social identity.
Hypothesis 7 tested the indirect associational pathway of emotional intelligence linking work-family balance and social identity. The indirect association of emotional intelligence in the relationship between work-family balance and social identity is .1025, LLCI=.0466, and ULCI=.1584. Therefore, since it is found that there is no zero between the Boot LLCI and Boot ULCI, the mediation effect can be regarded as no significant. Therefore, Hypothesis 7 was supported.
Hypothesis 8 tested the indirect associational pathway of psychological capital on the relationship between work-family balance and social identity. The indirect association of psychological capital in the relationship between work-family balance and social identity is .0845, LLCI=.0423, and ULCI=.1267. Therefore, since it is found that there is no zero between the Boot LLCI and Boot ULCI, the mediation effect can be regarded as significant. Therefore, Hypothesis 8 was supported.
Hypothesis 9 tested the serial multiple mediation effects of emotional intelligence and psychological capital on the relationship between work-family balance and social identity. The serial multiple mediation effects of emotional intelligence and psychological capital in the relationship between work-family balance and social identity, the indirect association is .0592, LLCI=.0282, and ULCI=.0902. Therefore, since it is found that there is no zero between the Boot LLCI and Boot ULCI, the serial multiple mediation effect can be regarded as significant. Therefore, Hypothesis 9 was supported.

Table 6 The Results of Serial Multiple Mediation (Work-family Balance → Emotional Intelligence → Psychological Capital → Social Identity)

Direct effect	Effect	S.E.	t	p	LLCI	ULCI
Work-family Balance → Emotional Intelligence	.5215	.0342	15.248	.0000	.4543	.5887
Work-family Balance → Psychological Capital	.3235	.0418	7.739	.0000	.2414	.4056
Work-family Balance → Social Identity	.2996	.0474	6.321	.0000	.2065	.3927
Emotional Intelligence → Psychological Capital	.3164	.0438	7.223	.0000	.2304	.4024
Emotional Intelligence → Social Identity	.1967	.0484	4.064	.0002	.1016	.2918
Psychological Capital → Social Identity	.2614	.0473	5.526	.0000	.1685	.3543
indirect association		Effect	Boot S.E.	Boot LLCI	Boot ULCI	
Total indirect association ($X\rightarrow M_1\rightarrow Y$, $X\rightarrow M_2\rightarrow Y$, $X\rightarrow M_1\rightarrow M_2\rightarrow Y$)		.2462	.0360	.1756	.3168	
Work-family Balance →Emotional Intelligence →Social Identity ($X\rightarrow M_1\rightarrow Y$)		.1025	.0285	.0466	.1584	
Work-family Balance →Psychological Capital →Social Identity ($X\rightarrow M_2\rightarrow Y$)		.0845	.0215	.0423	.1267	
Work-family Balance →Emotional Intelligence →Psychological Capital →Social Identity ($X\rightarrow M_1\rightarrow M_2\rightarrow Y$)		.0592	.0158	.0282	.0902	

***: p<.001, **: p<.01, *: p<.05, †: p<.1

5 DISCUSSION

This study investigates the experiences of Chinese students in open education, examining how emotional intelligence and psychological capital, as sequential mediators, influence the relationship between work-family balance and social identity. The key takeaway is that work-family balance enhances students' social identity, moving beyond previous simpler explanations. This study clarifies how work-family balance strengthens students' social identity through a serial multiple mediation model. Ultimately, this research aims to expand the scope of inquiry in this area. By offering a fresh perspective on how work-family balance enhances students' social identity, the study adds considerable value to the existing body of knowledge.

5.1 Conclusions

Drawing on the limited existing research, this study integrates insights into the interplay between work-family balance, emotional intelligence, psychological capital, and social identity. It specifically investigates how work-family balance influences the social identity of open education students. The primary aim of this research is to examine the connections between work-family balance and social identity, with emotional intelligence and psychological capital as mediating

factors. Furthermore, by examining the serial multiple indirect associational pathways, this study expands the discourse on work-family balance and social identity. The findings demonstrate that emotional intelligence and psychological capital indirectly affect the association between work-family balance and social identity, highlighting the significance of social identity among open education students. Improving work-family balance for these students could significantly enhance their social recognition. Finally, this study underscores the need for future research to introduce diverse theoretical frameworks to enhance social recognition among open education students. Based on the empirical findings, the study proposes both theoretical and practical implications.

5.2 Theoretical Implications

This research examines the influence of work-family balance on the social identity of students in open education in China, exploring the sequential mediating roles of emotional intelligence and psychological capital. By analyzing the interplay between these factors, the study reveals how work-family harmony shapes students' sense of belonging and self-perception. The findings provide valuable theoretical insights, highlighting the intricate connections between personal well-being, emotional resilience, and social identity in open education.

First, work-family balance positively impacts the emotional intelligence of students in open education environments. This suggests that as individuals achieve a better equilibrium between their professional and personal responsibilities, their emotional intelligence also tends to improve. Achieving this balance requires individuals to skillfully navigate their work and family duties, a skill enhanced by emotional intelligence. Individuals with high emotional intelligence are adept at recognizing crucial tasks in both their professional and family lives, enabling them to meet expectations in these areas [80]. Additionally, Anhange found that the dimensions of work-family balance [76], such as time management, engagement, and satisfaction, and the facets of emotional intelligence, including perceiving, utilizing, understanding, and regulating emotions, are significant predictors of overall life quality for married individuals in Makurdi metropolis. Work-family balance also positively influences emotional intelligence.

Second, achieving a healthy work-family balance can significantly enhance the psychological well-being of students in open education. The better students are at balancing work and family, the more resilient and confident they appear to be. Given the increasing pressures of modern life, these students experience higher levels of stress than ever. Therefore, a good work-family balance is crucial for their mental health. A recent study by Toprak in Siirt [124], Turkey, suggests that psychological capital plays a key two-way role in the interaction between work-family balance and stress. Students with a balanced work-family life can allocate more resources to their academic life, manage the interplay between work, family, and study, and enhance their resource management abilities.

Third, achieving a good work-family balance can significantly enhance students' sense of self, particularly in open education programs. The better students are at balancing work and family, the stronger their social identity becomes. When individuals effectively allocate their time and energy between work and family, it significantly impacts their social identity. As they assume more responsibilities in both areas, their social identity becomes more prominent, as noted by [93]. Yan confirmed a significant association between work-family balance and social identity through their research on team virtuality and employee behavior [125]. Open education students, who are working adults, continuously reallocate their roles and responsibilities between family, work, and study, thereby positively influencing their social identity through work-family balance.

Fourth, emotional intelligence enhances the psychological capital of students in open education. In other words, students with higher emotional intelligence tend to exhibit greater psychological resilience. The interplay between emotional intelligence and psychological capital significantly influences behavior, likely rooted in the positive psychological state fostered by personal growth [126]. By cultivating optimism and engaging in meaningful activities, individuals can reduce stress and enhance their emotional regulation skills [127]. Self-regulation capacity is largely influenced by self-esteem, perceived competence, and the significance assigned to various life aspects. This collaborative process amplifies one's potential, facilitating the pursuit of well-being and fulfillment across diverse areas of life, including social and professional spheres [128].

Fifth, emotional intelligence positively influences the social identity of students in open education. This indicates that as students' emotional intelligence increases, their social identity also evolves. It plays a crucial role in shaping individuals' character and narratives, acting as a lens through which social norms and cultural expectations are perceived [129]. Higher emotional intelligence is associated with increased prosocial behaviors, heightened empathy, and reduced negative actions[97, 100-101]. These factors contribute to a stronger social identity among individuals within various groups through categorization, identification, and comparison processes. Open education students who enhance their emotional intelligence can integrate more rapidly into social life, strengthen their social identity, and avoid negative psychological states such as isolation and depression.

Sixth, psychological capital significantly enhances students' social identities in open education environments. This suggests that increased psychological capital is associated with a stronger social identity among these learners. Drawing on the principles of positive psychology, psychological capital and its key components are understood as advantageous psychological states [130-131]. This collection of resources, including hope, resilience, optimism, and self-efficacy, is collectively referred to as psychological capital [61]. Psychological capital represents a favorable state of personal development, encompassing self-confidence (self-efficacy), positive interpretations of achievements (optimism), goal-oriented motivation (hope), and the capacity to withstand and overcome challenges (resilience) in the pursuit of success [132]. Individuals with elevated levels of psychological capital can more easily form connections within groups, leading

to greater social recognition [105].

Seventh, the analysis using Process Model 6 validates the findings, showing that emotional intelligence and psychological capital act as sequential mediators in the relationship between work-family balance and social identity among open education students. This study underscores the interconnectedness of these factors in shaping students' sense of belonging and self-perception. Open education students in China are working adults who persist in on-the-job learning. This mode of learning requires them to manage the balance between work, family, and study. The role scarcity hypothesis is a source of work-family balance theory [41], suggesting that the degree to which individuals combine their work and family roles is influenced by their emotional experiences, involvement, and role values [44]. This sense of balance is a subjective psychological state, achieved when individuals experience more positive emotions, feel fully engaged, and perform well in valuable roles. Emotional intelligence can enhance a positive mental attitude. It helps individuals understand, express, and manage their emotions, connect them to their thoughts, and use them to guide their decisions. Additionally, it enables individuals to manage both their own emotions and those of others [47]. Enhancing emotional intelligence also strengthens psychological capital. Consider it as a mental and emotional reservoir, filled with confidence, hope, optimism, and resilience. Psychological capital aids in navigating multifaceted shifts in responsibility, and high levels of psychological capital influence various factors related to the connection between individuals and teams. The relationship between individuals and teams involves categorization, identification, and comparison [72], which together constitute social identity. High levels of psychological capital promote social identification with groups. This study explores the relationship between work-family balance and social identity among open education students in China, holding significant reference value and broadening the perspective on social identity in open education.

Beyond the theoretical insights, this study's findings, which suggest a positive link between work-family balance and emotional intelligence, align with Anhange observations regarding the overall quality of life for married individuals in Makurdi [76]. Furthermore, the research supports Toprak conclusions regarding psychological capital among residents of Siirt [124], Turkey, by demonstrating that work-family balance enhances psychological well-being. Additionally, the results confirm Zhang proposition that psychological capital enhances social identity [133], based on their study of 3,147 teachers in Chinese primary and secondary schools. Lastly, this study confirms that emotional intelligence and psychological capital serve as serial multiple mediators between work-family balance and social identity among students in open education in China.

5.3 Practical Implication

First, there is a need to enhance the focus on open education within China's existing education system. The COVID-19 pandemic, which first emerged in Wuhan, China, in 2019, prompted the Chinese government to issue stay-at-home orders for all individuals, including students, to curb the spread of the virus. Consequently, nearly 276 million students were unable to return to school [134]. Consequently, education experts at China's Ministry of Education began exploring ideas for transforming the education system, leveraging information and communication technologies to launch remote learning initiatives. In the 1960s, China first ventured into distance education with the China Radio and Television University. In 2012, it was rebranded as the China Open University, maintaining the same mission to teach and research via distance learning [135]. Due to the impact of COVID-19, China's education system has begun to focus on open education, an open, flexible, high-quality, and convenient mode of education that can enhance the quality of the citizenry and build a learning society for lifelong learning.

Second, the importance of balancing work and family for students in on-the-job training must be recognized. Mental health issues are prevalent among students globally, with numerous university reports indicating an increase in the number of students seeking mental health support [136]. As mental health concerns among college students gain increasing attention, work-family balance is emerging as a potential predictor of student mental health. work-family balance helps students navigate their various roles and experiences more easily, assisting them in forming positive life attitudes [137]. For open education students balancing work and study, achieving a balance between their professional and personal lives is crucial for fostering mental well-being and preventing anxiety and depression [138].

Third, emotional intelligence significantly impacts work-family balance. With the rapid development of the tertiary sector, particularly finance and service industries, interpersonal relationships have become increasingly important in modern society, highlighting the value of understanding others. Emotional intelligence enables individuals to understand others in social contexts and detect subtleties, thereby affecting team relationships. Balancing the demands of work and family life often leads to conflicts over how to allocate one’s time and energy. Achieving the balance between career ambitions and personal responsibilities underscores the importance of emotional intelligence. In China’s open education framework, many learners are working adults who balance family responsibilities with academic pursuits during their limited free time. This creates a constant struggle to manage competing priorities, leaving little room for balance between professional, personal, and educational commitments. Under such circumstances, it becomes increasingly important to conduct training to enhance emotional intelligence for open education students.

Fourth, robust emotional intelligence significantly enhances psychological capital. Research has demonstrated a positive association between emotional intelligence and psychological capital [139-141]. These investigations aim to explore the relationship between these overarching research concepts and their interconnectedness. Emotional intelligence shapes individuals' thought processes and plays a key role in managing emotional interactions both within individuals and within groups. Defined from both intellectual and emotional perspectives, emotional intelligence can build psychological resilience and ignite hope, thereby helping individuals build confidence and contributing to a positive life and the

development of personal psychological capital.
Fifth, the significance of social identity for students in open education. The relationship between individuals and groups forms the social identity system, where an individual's self-awareness and perceived sense of responsibility within social groups define the social identity approach [72]. Open education students often balance work, family, and studies, making it crucial for them to form strong connections with peers and establish their place in the wider world. This sense of belonging serves as a vital buffer against negative emotions such as depression and anxiety. Open education students categorize themselves, identify with their open university student identity, and compare with other social identities to find a sense of belonging. This process helps them avoid discouragement and depression under the pressure of role-switching and forms a self-cognitive structure that fundamentally answers the question of who they are [75]. Similarly, this helps them balance work and family, develop high levels of emotional intelligence, and form positive psychological capital.

5.4 Limitations and Future Research

Although this study has made significant contributions through verifying the serial indirect associational pathways of emotional intelligence and psychological capital between work-family balance and social identity, it is not without limitations, which are detailed below.
First, the cross-sectional design of this study precludes definitive causal inferences[142]. While our associational variable analysis provides a robust test of concept for the proposed resource accumulation pathways, it cannot establish strict temporal precedence. Future research utilizing longitudinal or cross-lagged panel designs is necessary to precisely track the developmental trajectory of work-family balance, emotional intelligence, and psychological capital in shaping adult learners' social identity over time[143]. Additionally, addressing common method bias through multi-informant surveys would further enhance the credibility of the findings[143].
Second, this study focused exclusively on Chinese students within their open education system. However, it raises the question of whether similar findings would emerge among open education students from diverse global regions and cultural backgrounds. Future research should investigate the experiences of open education students in other countries and compare these findings with the current results to identify similarities and differences.
Third, the data analysis confirmed that emotional intelligence and psychological capital mediate the observed relationships. This indirect associational pathway is likely valid given that open education students possess unique characteristics, such as extensive real-world experience, flexible schedules, and diverse learning pathways. These factors likely complicate their emotional intelligence and psychological capital, thereby enhancing the observed indirect associational pathways. To further explore this, future studies should consider adopting a longitudinal approach. Tracking the evolution of work-family balance in open education students over time can provide a clearer understanding of the development of emotional intelligence and psychological capital and their dynamic influence on students' social identity.
Fourth, this study examined social identity solely as a dependent variable, yet other variables associated with social identity warrant further investigation and attention. For example, Lintumäki employed social identity as an independent variable [144], examining the social identity perspectives of local and distant fans across 16 Finnish ice hockey clubs, and reached positive conclusions.

6 CONCLUSIONS

In conclusion, this research highlights the importance of emotional intelligence and psychological capital in achieving work-family balance and shaping social identity among students in China's open education system. The findings indicate that a harmonious work-family balance enhances emotional intelligence, psychological capital, and social identity. Moreover, emotional intelligence and psychological capital mediate the relationship between work-family balance and social identity. Additionally, these factors exhibit a sequential indirect associational pathway in the interplay between work-family balance and social identity.
This research elucidates how balancing work and family, coupled with emotional intelligence and psychological resilience, enhances the sense of belonging among Chinese open education students. It further highlights the critical importance of work-family balance to their social identity. By demonstrating the benefits of effectively managing work and home life, and the key role of emotional intelligence and psychological capital, this study strengthens the current research on these factors in the context of Chinese open learning. Practically, it suggests that Chinese open education should focus on assisting students in better managing their work-family commitments. In turn, this could enhance their emotional intelligence, bolster their psychological resilience, and ultimately reinforce their sense of connection and identity as students.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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AUTHOR CONTRIBUTION

YL and CG designed the whole study; YL, CG and XT conducted data collection, modeling and results analysis; YL wrote the paper.

INFORMED CONSENT STATEMENT

This study has been approved by the Ethics Review Committee of Shandong Open University. All procedures involving human participants are conducted in strict compliance with the ethical guidelines of the Committee and the Declaration of Helsinki of 1964 and its subsequent amendments or similar ethical standards. Informed consent was obtained from all subjects prior to the start of the experiment. All participants completed an informed consent form prior to participating in the experiment.

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