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Career adaptability and graduates' mental health: the mediating role of occupational future time perspective in higher education in China

Lei Gao^{1,2}, Yan Li^{1,3*}  and Wenqi Pang²

Abstract

This study examines the mediating role of Occupational Future Time Perspective (OFTP) in the relationship between Career Adaptability and Mental Health among college graduates. Using a three-month, three-time-point survey of Chinese graduates ($N=905$, ages 25–30), we found that Career Adaptability has a significant direct effect on Mental Health. Among OFTP dimensions, Focus on Opportunities emerged as a key mediator, highlighting its role in linking Career Adaptability to positive mental health outcomes. However, Perceived Remaining Time and Focus on Limitations did not show significant mediation effects. These findings underscore the value of fostering opportunity-focused perspectives in career counseling and educational interventions to support graduates' mental health.

Keywords Career adaptability, Occupational future time perspective (OFTP), Chinese graduates from higher education, College graduates' mental health

Introduction

Career adaptability, as outlined by Savickas in his foundational works [1–3], involves an individual's readiness and resources to manage current and future tasks, transitions, and challenges in their occupational roles throughout their lifespan [4, 5]. This construct encompasses various psychological resources—concern, control, curiosity, and confidence—which enable individuals to navigate

complex and evolving career landscapes [6]. Career adaptability has emerged as a critical factor influencing mental health during the transition from university to the workforce, a significant life event marked by uncertainty, high expectations, and competition, all of which can exacerbate stress, anxiety, and depression [7]. The situation in China is particularly intense, given the highly competitive job market and strong cultural expectations for career success [8]. Chinese graduates face immense pressure to secure employment and establish career stability, often reporting high levels of psychological distress driven by job search stress, perceived lack of control, and societal expectations. Increasingly, research suggests that career adaptability can buffer the mental health impacts of these transitions by equipping individuals to manage stressors more effectively [9, 10].

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Occupational Future Time Perspective (OFTP) refers to an individual's perception of their remaining time and future opportunities within their career [11]. OFTP encompasses how individuals view their career futures in terms of available opportunities, perceived remaining time, and anticipated career trajectory, and it is increasingly recognized as an important predictor of mental health outcomes [12]. A positive OFTP, characterized by ample perceived remaining time and a multitude of future career opportunities, is associated with lower levels of career-related stress and anxiety. In the context of Chinese society, where career achievements are closely tied to personal and familial expectations, OFTP may play an especially critical role. Graduates who hold a positive OFTP may be better equipped to navigate the competitive job market, as a forward-looking perspective can bolster their adaptability, promote resilience, and mitigate stress related to employment uncertainties. Given the intense societal expectations and the importance of career success in China, understanding how OFTP intersects with career adaptability to influence mental health is especially pertinent [13].

The present study aims to examine the mediating role of OFTP in the relationship between career adaptability and mental health outcomes among college graduates. Specifically, this research investigates how different dimensions of OFTP—Focus on Opportunities, Perceived Remaining Time, and Focus on Limitations—mediate the impact of career adaptability on mental health. By exploring these mediation pathways, this study seeks to clarify the mechanisms through which career adaptability affects mental health and highlight the distinct role that each OFTP dimension plays in either enhancing or buffering against stress. In doing so, the study not only deepens the theoretical understanding of career adaptability and OFTP but also provides practical insights for career counselors and educators, particularly in contexts where societal pressures amplify the challenges of transitioning from education to employment.

Background

Career adaptability and Chinese graduates' mental health

Career adaptability is a crucial concept in vocational psychology, referring to an individual's readiness and resources for coping with current and anticipated tasks, transitions, and traumas in their occupational roles [2]. It comprises four dimensions: concern, control, curiosity, and confidence [3]. Concern involves planning and preparing for the future, control reflects the responsibility for shaping one's career, curiosity pertains to exploring possible selves and alternative scenarios, and confidence is self-belief in executing career-related tasks successfully.

Research has consistently demonstrated the positive impacts of career adaptability on career-related

outcomes. For instance, Hirschi [14] found that higher levels of career adaptability are associated with better career decision-making, job satisfaction, and career success. Moreover, it has been shown to buffer the negative effects of job insecurity and enhance employability, suggesting its crucial role in navigating the modern, dynamic job market [15].

The transition from university to the workforce is a significant life event that can greatly impact mental health. Graduates often face uncertainty, high expectations, and intense competition, which can lead to stress, anxiety, and depression [16]. In China, the situation is particularly pronounced due to the highly competitive job market and cultural expectations for success. Chinese graduates often report high levels of psychological distress, largely driven by job search stress, perceived lack of control over their career paths, and societal pressures [17].

A growing body of research indicates that career adaptability can play a protective role in mental health during career transitions. High career adaptability helps individuals manage career-related stress and uncertainty, thereby reducing negative mental health outcomes [18]. Each dimension of career adaptability contributes uniquely to mental health. For example, career concern helps individuals feel prepared and optimistic about their future, reducing anxiety. Career control fosters a sense of agency and self-efficacy, which can mitigate feelings of helplessness and depression. Career curiosity encourages exploration and openness, which can buffer against the stress of uncertainty. Career confidence provides the resilience to overcome challenges and setbacks, enhancing overall psychological well-being [6].

In the Chinese context, career adaptability is particularly relevant due to the unique pressures faced by graduates. Studies have found that Chinese graduates with higher career adaptability exhibit lower levels of career-related stress and better mental health outcomes [19, 20]. Furthermore, interventions aimed at enhancing career adaptability, such as career counseling and training programs, have shown promising results in improving both career readiness and mental health among Chinese students and graduates [17].

The literature underscores the importance of career adaptability as a critical factor influencing the mental health of graduates, especially in high-pressure environments like China. Understanding the specific ways in which each dimension of career adaptability impacts mental health can inform targeted interventions to support graduates in their career transitions. This body of research highlights the need for comprehensive strategies that incorporate career adaptability skills training to foster resilience and well-being among new entrants to the workforce.

Occupational future time perspective mediating role among career adaptability and graduates' mental health

Occupational Future Time Perspective (OFTP) refers to an individual's perception of their remaining time and opportunities within their occupational career [11]. It encompasses the extent to which individuals see their future in terms of opportunities, the perceived time left to achieve career goals, and the anticipated trajectory of their professional lives. OFTP influences how individuals plan, set goals, and engage in career-related behaviors.

OFTP includes different dimensions. The Perceived Remaining Time dimension reflects how much time individuals believe they have left in their careers. It affects their urgency in pursuing career goals and adapting to career changes. Focus on Opportunities dimension pertains to the extent to which individuals perceive opportunities for growth, advancement, and development in their future careers. A higher perception of future opportunities can lead to greater motivation and proactive career behaviors. Anticipated career trajectory involves individuals' expectations and plans regarding their career path, including their aspirations and anticipated achievements. This dimension influences their career planning and goal-setting processes. The last dimension is a Focus on Limitations, which introduces a restrictive perspective within OFTP by centering attention on barriers or constraints instead of potential opportunities.

Both cognitive and motivational factors influence the OFTP, and its traits change with age and over time [21]. Research has provided significant insights into the outcomes associated with OFTP, showing that a well-defined OFTP is positively linked to career planning, job satisfaction, and engagement [22], as well as conflict management and other performance-related competencies [23]. For instance, some studies demonstrated that OFTP was a strong predictor of work engagement and career satisfaction over time among older workers [24]. Despite the extensive empirical research, including a systematic review [25] and a meta-analysis on OFTP [26], certain areas remain underexplored. Specifically, while the relationship between OFTP and late-career outcomes has been established, the relevance of OFTP for younger individuals' mental health warrants further investigation. Recent studies involving Chinese participants have shown that workers with an expansive OFTP tend to use problem-focused and proactive strategies to manage stressful situations at work [27]. In contrast, workers with a limited OFTP consistently preferred passive strategies, regardless of the emotional context. Additionally, the mediating role of OFTP dimensions has been examined in the relationship between age and conflict management strategies at work [28]. These studies provide initial evidence of the impact of OFTP dimensions among Chinese participants. Although much of the research on

OFTP has been conducted in Western contexts, applying this concept to the Chinese context offers promising new avenues for exploration.

OFTP significantly influences the relationship between career adaptability and personal outcomes, functioning through their three distinct dimensions: focus on opportunities, perceived remaining time, and focus on limitations. Each dimension represents a unique mediator, yet they contribute differently to shaping adaptive career behaviors and personal well-being. Focus on opportunities serves as the most impactful mediator in this relationship because it directly fosters proactive and exploratory career behaviors. Individuals who emphasize opportunities within their OFTP tend to display elevated career concerns and actively plan and prepare for future career tasks. This outlook enhances career control, enabling individuals to feel empowered and capable of influencing their career trajectories. Moreover, by nurturing a sense of ample future possibilities, a focus on opportunities encourages career curiosity, motivating individuals to explore new paths and accumulate diverse experiences. This proactive stance also bolsters career confidence, instilling resilience in the face of career-related challenges [12].

In contrast, perceived remaining time reflects an individual's sense of temporal resources but may not necessarily drive the same level of proactive engagement. Although individuals who perceive a longer remaining time may feel they have room to influence their career paths, this perception alone does not actively motivate them to explore or seek new experiences unless paired with a strong focus on opportunities. As a result, perceived remaining time acts more as a supportive background factor rather than a direct catalyst in career adaptability. Finally, a focus on limitations represents a constraining outlook within OFTP, where individuals emphasize barriers or constraints over potential opportunities. This perspective can lead to increased career-related stress and anxiety, particularly as individuals perceive restricted future possibilities or limited time. A strong focus on limitations can hinder career adaptability by reducing self-efficacy and curtailing exploratory behaviors, yet it does not facilitate positive adaptive outcomes like career concern or confidence. In sum, while all three dimensions of OFTP are relevant, focus on opportunities stands out as the key mediator that actively promotes adaptive career behaviors. By distinctly contributing to career exploration and a resilient career mindset, this dimension substantiates the conceptual framework. It justifies the hypotheses, underscoring its central role in connecting career adaptability to both career and mental health outcomes.

In the Chinese cultural context, time orientation plays a crucial role in shaping individuals' career perspectives

and behaviors. Chinese culture traditionally emphasizes long-term orientation, future planning, and perseverance [29]. These cultural values align with the concept of OFTP, as they encourage individuals to focus on their long-term career goals and opportunities.

The high value placed on education and career success in Chinese society further reinforces the importance of a positive OFTP. Societal expectations often drive Chinese graduates to achieve career success, which can influence their career adaptability and mental health. A positive OFTP can help Chinese graduates navigate the competitive job market by enhancing their career adaptability, reducing career-related stress, and promoting mental health.

OFTP is a vital construct that mediates the relationship between career adaptability and graduates' mental health. Its dimensions of perceived remaining time, future opportunities, and anticipated career trajectory influence how individuals adapt to career-related challenges and maintain their mental health. In the Chinese cultural context, the emphasis on long-term orientation and career success further highlights the importance of a positive OFTP. Understanding this mediating role can inform interventions aimed at enhancing career adaptability and mental health among Chinese graduates, helping them to navigate their career transitions successfully. To sum up, the main aim of the present study was to test the mediating role of OFTP in the relationship between Career Adaptability and College Graduates' Mental Health. The study sought to advance the understanding of how Career Adaptability affects Mental Health through mediators such as Focus on Opportunities, Perceived Remaining Time, and Focus on Limitations.

Hence, based on the revised evidence, the present study is aimed to test the following hypotheses:

H1 There is a positive relationship between career adaptability (T1) and college graduates' mental health (T3). Graduates with higher career adaptability will report better mental health.

H2 OFTP Focus on Opportunities (T2) mediates the relationship between career adaptability (T1) and college graduates' mental health (T3). Specifically, higher career adaptability will be associated with a greater focus on future opportunities, which in turn will be associated with better mental health.

H3 OFTP Perceived Remaining Time (T2) mediates the relationship between career adaptability (T1) and college graduates' mental health (T3). Specifically, higher career adaptability is associated with a greater perception of remaining time in one's career, which in turn is associated with better mental health.

H4 OFTP Focus on Limitations (T2) mediates the relationship between career adaptability (T1) and college graduates' mental health (T3). Specifically, higher career adaptability will be associated with a lower focus on limitations in the future, which in turn will be associated with better mental health.

Conceptual model

The conceptual Model for these hypotheses can be summarized as follows:

Career Adaptability (T1) → College Graduates' Mental Health (T3): Direct positive relationship.

Career Adaptability (T1) → OFTP Focus on Opportunities (T2) → College Graduates' Mental Health (T3): Indirect positive relationship through an increased focus on future opportunities.

Career Adaptability (T1) → OFTP Perceived Remaining Time (T2) → College Graduates' Mental Health (T3): Indirect positive relationship through an increased perception of remaining time in one's career.

Career Adaptability (T1) → OFTP Focus on Limitations (T2) → College Graduates' Mental Health (T3): Indirect positive relationship through a decreased focus on future limitations.

These hypotheses are displayed in Fig. 1.

Method

Participants

Initially, at Time 1, 1,632 students participated in the survey, though the number decreased over time. The analyses focus on the participants who consistently provided complete data across all phases: Time 1, 2, and 3. The current study surveyed college graduates ($N=905$) between 25 and 30 years (mean age = 27.78; $SD=1.69$), with 57.4% identifying as females. This research collected data at three intervals during 2023 from graduates of Chinese colleges, specifically in October, November, and December. Distributing data collection over multiple time points serves to reduce the length of each survey and address potential biases associated with common-method variance.

The choice of these time points aligns with key transitional phases for recent graduates entering the workforce, allowing us to capture dynamic shifts in their career perspectives and mental health over a short but meaningful period. Collecting data during these consecutive months enabled us to observe changes shortly after graduation, a critical phase for studying career adaptability and mental health. The longitudinal design, with intervals spaced one month apart, was chosen to minimize recall bias. At the same time, participants should be ensured that they can provide updates on their evolving career perceptions and mental health without the burden of frequent data collection. Distributing data collection across multiple

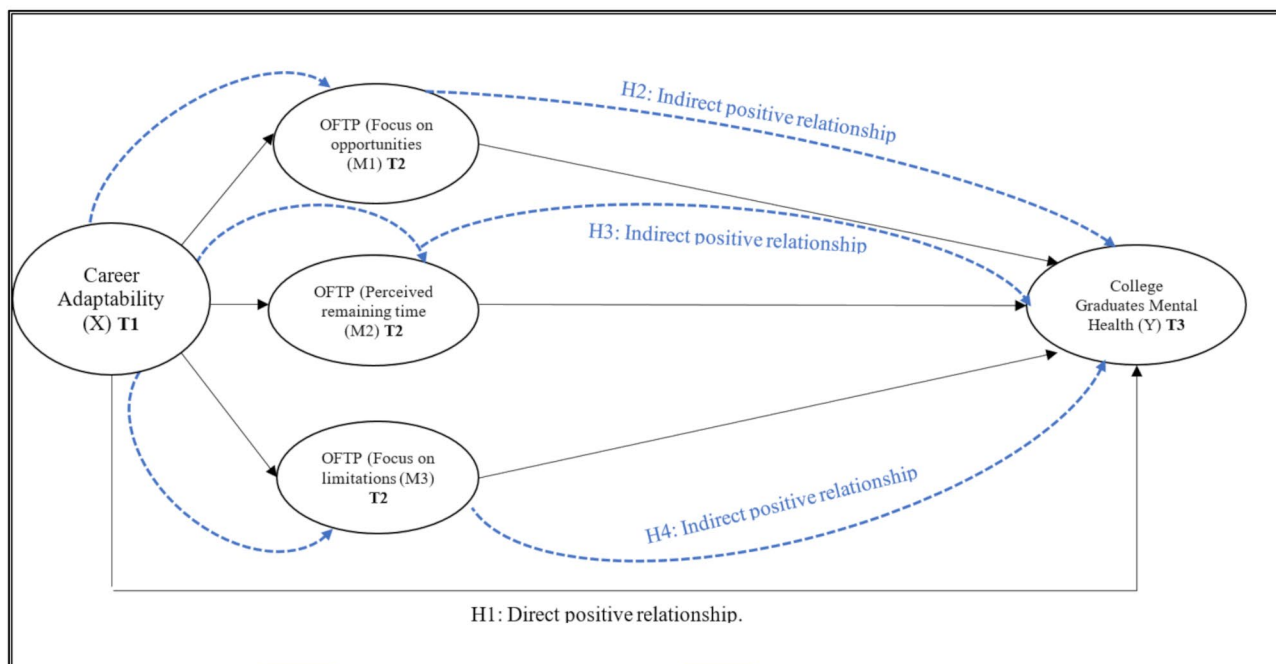


Fig. 1 Full conceptual model with the hypotheses

Note: Direct effects are in black, and indirect effects are in blue dotted lines

time points also reduces the length of each survey, helping to address potential biases associated with common-method variance. To retain participants throughout the study, we implemented strategies such as regular reminders, incentives for completion, and flexible survey timing to accommodate their schedules. Despite these efforts, we acknowledge some participant dropouts, which we monitored throughout each phase. Addressing dropout is an inherent challenge in longitudinal studies, and we have accounted for this in our analysis to ensure the robustness of our findings.

In the first survey phase (T1), participants provided demographic details and assessed their career adaptability. In the subsequent phase (T2), they reported on their Occupational Future Time Perspective. In the final phase (T3), participants evaluated their mental health. Those participants who showed more than 15% of missing data have been excluded, making up a total of 1.5% of the sample at Time 3.

Procedure

The study received ethical clearance from the Ethical Board of the Henan Normal University. The study was designed and conducted following the recommendations of the Declaration of Helsinki, revised in Fortaleza to guide research involving human participants. Prior to the collection of data, all participants were required to provide informed consent for participation, analyze the data, and share them in an anonymized form with third parties. The recruitment of participants for the

study was conducted using a comprehensive approach, leveraging both direct invitations and social media outreach to engage recent graduates from Chinese colleges. Invitations were sent via email to students' networks, targeting individuals who had recently transitioned from university to the workforce. In addition, we posted recruitment messages on popular social media platforms such as WeChat, QQ, Weibo, and Bilibili to broaden our reach and ensure a diverse participant pool. These platforms were selected due to their popularity among recent graduates, allowing us to connect with individuals in this demographic effectively. Potential participants who expressed interest were sent a link to an online survey, accompanied by information about the study's purpose, confidentiality assurances, and instructions for completing the survey. As part of a broader project on career performance, participants were informed that the study involved multiple data collection phases, enabling them to make an informed commitment to the longitudinal nature of the research. This recruitment strategy helped maximize participation while ensuring that respondents were representative of the target demographic.

The research team employed Wenjuanxing, commonly known as Questionnaire Star, a popular online tool for survey distribution. The survey targeted a wide range of respondents, including professionals, through networks, social media, and forums used by remote workers. To maintain consistency in survey administration, detailed guidelines were provided to the participants before they commenced the survey. They were informed about the

objectives of the study and reassured of the anonymity of their responses. Following the acquisition of informed consent, participants filled out the survey. Efforts were made to ensure the data remained confidential and anonymous and in compliance with ethical standards designed to safeguard participant privacy and rights.

Instruments

Career adaptability was measured at Time 1 using the super-short form of the Career Adapt-Abilities Scale (CAAS-SSF) Chinese version [30]. This Scale consists of four items, each evaluating a different dimension of the career adaptability construct (concern, item: “I think about what my future will be like”; control, item: “I make decisions by myself”; curiosity, item: “I look for opportunities to grow”; and confidence, item: “I take care to do things well”), and offers an overall assessment of career adaptability. Recent research by Wang et al. [31] has validated the CAAS-SSF’s reliability and its alignment with the unidimensional Model of career adaptability. Reliability in the present study was adequate; Cronbach’s $\alpha=0.79$). Participants responded on a scale from 1 (Not strong) to 7 (Strongest).

Occupational Future Time Perspective (Time 2): The perception of time in participants’ occupations was assessed using the Chinese version of the 10-item Occupational Future Time Perspective (OFTP) scale [11, 27]. This Scale was adapted from the original Future Time Perspective (FTP) scale [32], which measures the perception of future time in life. Previous exploratory factor analyses have validated a three-factor solution. (Please

see the full list of items in Table 1). Means, standard deviations, skewness, and kurtosis for each item are considered acceptable in order to prove normal univariate distribution [33].

College graduates mental health

The Positive Mental Health Scale (PMHS) is originally composed of 14 items intended to measure various aspects of mental well-being. For this study, a shortened version developed by Lukat et al. is employed [35], featuring nine items. These items are rated using a 4-point Likert scale that ranges from 0 (do not agree) to 3 (agree), with higher scores indicating a more positive and healthier mental state. This abbreviated form focuses on positive health attributes and life experiences, including feelings of carefreeness, life enjoyment, the ability to fulfill one’s needs, and overall good physical and emotional health. In the present study, adhering to the guidelines set forth by Beaton et al. [36], a meticulous translation and adaptation process was executed from the original English version of the PMHS. Two bilingual experts independently carried out the initial forward translation of the PMHS into Chinese. These translations were then evaluated and deliberated upon by both the experts and the research team to finalize the Scale’s version. Two separate back-translations into English were conducted to verify the accuracy of the translated Scale. The research team examined any incongruities between this and the original PMHS, resolving them through collective agreement, which led to the establishment of the final Chinese version. Lukat et al. [35] demonstrated that this condensed

Table 1 Occupational future time perspective for China (OFTP-Chn) scale [11, 34]

Items (English version)	Items (Chinese version)	Mean	Std. Deviation	Skewness	Kurtosis
Focus Opportunities 1: Many opportunities await me in my occupational future	在我职业生涯的未来,有许多机会在等着我	3.53	1.10	-0.41	-0.53
Focus Opportunities 2: I expect to set many new goals in my occupational future	我期望在我职业生涯的未来设定许多新目标	3.81	1.06	-0.76	0.01
Focus Opportunities 3: My occupational future is full of possibilities.	我的职业未来充满无限可能。	3.51	1.15	-0.41	-0.66
Focus Opportunities 4: I could do whatever I like in my occupational future	我可以在未来的职业生涯中做任何我想做的事	3.05	1.17	-0.01	-0.83
Focus Opportunities 5: I only have limited possibilities in my occupational future (Reversed).	我的职业前景有限	3.24	1.20	-0.19	-0.93
Perceived Remaining Time 1: I have lots of time to make new plans for my occupational life	我有很多时间为我的职业生活制定新计划	3.49	1.19	-0.391	-0.80
Perceived Remaining Time 2: Most of my occupational life lies before me	我职业生涯的大部分时间就在眼前	3.52	1.33	-0.47	-0.99
Perceived Remaining Time 3: My occupational future seems infinite to me	在我看来,我的职业前景无限广阔	2.78	1.23	0.16	-0.93
Focus Limitations 1: I have the feeling that my occupational time is running out.	我感觉我的职业生涯时间不多了	2.21	1.24	0.64	-0.75
Focus Limitations 2 As I get older, I have the feeling that my occupational time is limited	随着年龄的增长,我感到自己的职业时间有限	2.93	1.23	-0.00	-0.95

Note: S. D.: Standard Deviation

version is a unidimensional tool, exhibiting strong reliability and validity in assessing positive mental health. A full list of items of the PMHS can be obtained at Lukat et al. [35]. The overall reliability of the OFTP-SP scale was found to be 0.89.

Data analyses

To gain an initial understanding of the data distribution, we calculated descriptive statistics, including means, standard deviations, and ranges for all study variables. In absence of studies on the psychometric properties of the Chinese versions of OFTP Scale, a Confirmatory Factor Analyses have been conducted for the scale using JASP. Pearson's correlation coefficients were then computed using SPSS 29 to evaluate the relationships between the variables, allowing us to identify significant associations for further exploration through multivariate analyses.

To test our hypotheses, we employed Model 4 of the PROCESS macro version 4.3 [37], which is specifically designed to assess both the direct effect of the predictor on the outcome and the mediating effect of an intermediary variable. Model 4 was selected because it provides a straightforward framework for testing single-mediator models, aligning with our primary research focus on examining the independent mediation effects of each dimension of OFTP on the relationship between career adaptability and mental health outcomes. Given the simplicity and clarity of our hypothesized pathways, Model 4 was well-suited to capture these direct and indirect effects without the added complexity of multiple or conditional mediation structures.

The analysis was conducted with 5,000 bootstrap samples to generate bias-corrected confidence intervals for the indirect effects. We chose the bootstrapping method as it does not assume a normal distribution of the indirect effect, making it particularly robust for small to medium sample sizes. The direct and indirect effects were considered statistically significant if the 95% confidence intervals did not include zero. To offer a comprehensive view

of the relationships among the variables, we reported standardized regression coefficients and their corresponding *p*-values for each pathway. Alternative mediation models were not considered, as the goal was to test distinct mediation pathways for each OFTP dimension independently, which Model 4 effectively captures.

Results

Confirmatory factor analysis

For the OFTP scale, CFA was conducted using JASP. The Kaiser-Meyer-Olkin = 0.90 and Bartlett's sphericity test (Chi-Square = 5534.86, d. f. = 45, $p < .001$) showed adequate values. The Average Extracted variance was for OFTP dimensions, Focus Opportunities (0.71), Perceived Remaining Time (0.61), and Focus Limitations (0.67). The factorial loadings showed adequate values for all the factors, as Table 2 shows. The reliability for the OFTP factors was Focus Opportunities (0.89), Perceived Remaining Time (0.82), and Focus Limitations (0.69). Following the proposal of the original study [34], a second-order factor model has been tested. The three dimensions showed adequate factor loadings, being statistically significant, as can be seen in Table 2. The Model with only one factor showed unacceptable values (Chi-Square = 1067.88, d.f. = 27, $p < .001$, RMSEA = 0.20, SRMR = 0.09). The Model with three related factors showed a better fit (Chi-Square = 186.16, d.f. = 24, $p < .001$). Additional fit indices also suggested that the three-factor Model is highly acceptable (Comparative Fit Index (CFI): 0.96, Tucker-Lewis Index (TLI): 0.95, Bentler-Bonett Non-Normed Fit Index (NNFI): 0.95, and Bentler-Bonett Normed Fit Index (NFI): 0.96. RMSEA = 0.08, SRMR = 0.03, as Table 3 shows.

To assess discriminant validity between the constructs, Henseler et al. (2015) recommended the Heterotrait-Monotrait (HTMT) matrix of correlations (See Table 4). Applying the threshold criterion [38], which suggests that all the values of the HTMT matrix should be lower than 0.90, it is concluded that the constructs assessed in the

Table 2 Factor loadings of OFTP items

Factor	Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
						Lower	Upper
Focus Opportunities	FO 1	0.69	0.02	26.71	< 0.001	0.65	0.75
	FO 2	0.57	0.02	23.07	< 0.001	0.52	0.62
	FO 3	0.75	0.02	27.10	< 0.001	0.70	0.81
	FO 4	0.64	0.02	23.09	< 0.001	0.59	0.70
	FO 5	0.53					
Perceived Remaining Time	PRT 1	0.15	0.18	0.55	0.58	-0.26	0.47
	PRT 2	0.17	0.21	0.55	0.58	-0.30	0.54
	PRT 3	0.13	0.17	0.55	0.58	-0.24	0.42
Focus Limitations	FL 1	0.64	0.04	15.64	< 0.001	0.57	0.73
	FL 2	0.54	0.03	16.47	< 0.001	0.49	0.62

Note: N = 891. FO: Focus Opportunities; PRT: Perceived Remaining Time; FL: Focus Limitations

Table 3 Second-order factor loadings

Factor	Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
						Lower	Upper
Second Order	Focus Opportunities	0.99	0.06	15.08	< 0.001	0.86	1.11
	Perceived Remaining Time	9.18	16.85	0.54	0.58	-23.86	42.22
	Focus Limitations	-1.33	0.11	-11.87	< 0.001	-1.55	-1.11

Table 4 Heterotrait-monotrait ratio

Focus Opportunities	Perceived Remaining Time	Focus Limitations
1.00		
0.74	1.00	
0.60	0.78	1.00

Table 5 Descriptive statistics and Pearson's correlations (N=891)

Variable	Mean	S. D.	1.	2.	3.	4.
1. Career Adaptability (T1)	3.44	0.52	—			
2. OFTP Focus Opportunities (T2)	3.62	1.00	0.50***	—		
3. OFTP Perceived Remaining Time (T2)	3.2	1.07	0.29***	0.62***	—	
4. OFTP Focus Limitations (T2)	2.57	1.12	-0.34***	-0.52***	-0.64***	—
5. College Graduates Mental Health (T3)	3.42	0.84	0.52***	0.42***	0.25***	-0.25***

Note: *** $p < .001$

Table 6 Model summary for OFTP focus opportunities

R	R ²	MSE	F	df1	df2	p
0.50	0.25	0.68	306.18	1	889	< 0.001

Table 7 Coefficients for OFTP focus opportunities

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	0.22	0.18	1.22	0.22	-0.13	0.59
Career Adaptability (T1)	0.93	0.05	17.49	< 0.001	0.82	1.03

Table 8 Model summary for OFTP perceived remaining time

R	R ²	MSE	F	df1	df2	p
0.29	0.08	1.06	85.54	1	889	< 0.001

Model have discriminant validity, as Table 4 shows. Additionally, if we apply the most restrictive criterion of Kline, which states that all the values included in the confidence interval should be lower than 0.85, all the constructs assessed in the Model showed adequate discriminant validity [39].

Descriptive and correlational analyses

Before testing our Model, a correlation analysis was conducted among the study variables. These results are reported in Table 5. Pearson's correlations indicated that all significant relationships between the variables were in the expected direction.

Hypotheses testing

To test Hypothesis 1, we examined the direct effect of career adaptability (T1) on college graduates' mental health (T3). The results showed a significant positive relationship, indicating that higher career adaptability is

associated with better mental health ($b = 0.84$, $SE = 0.04$, $t = 18.14$, $p < .001$). The standardized coefficient was 0.52, suggesting a strong effect size. To test Hypothesis 2, we examined whether OFTP Focus Opportunities (T2) mediated the relationship between career adaptability (T1) and mental health (T3). The results indicated that higher career adaptability was significantly associated with a greater focus on future opportunities ($b = 0.93$, $SE = 0.05$, $t = 17.49$, $p < .001$, standardized coefficient = 0.50). The statistical values are displayed in Tables 6 and 7.

Hypothesis 3 posited that OFTP Perceived Remaining Time (T2) would mediate the relationship between career adaptability (T1) and mental health (T3). The results showed that higher career adaptability was significantly associated with a greater perception of the remaining time in one's career ($b = 0.61$, $SE = 0.06$, $t = 9.24$, $p < .001$, standardized coefficient = 0.29). The statistical values are displayed in Tables 8 and 9.

Table 9 Coefficients for OFTP perceived remaining time

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	1.15	0.23	4.96	< 0.001	0.69	1.60
Career Adaptability (T1)	0.61	0.06	9.24	< 0.001	0.48	0.74

Table 10 Model summary for OFTP focus limitations

R	R ²	MSE	F	df1	df2	p
0.34	0.11	1.12	117.38	1	889	< 0.001

Table 11 Coefficients for OFTP focus limitations

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	5.12	0.23	21.51	< 0.001	4.65	5.59
Career Adaptability (T1)	-0.74	0.06	-10.83	< 0.001	-0.87	-0.60

Table 12 Model summary for mental health

R	R ²	MSE	F	df1	df2	p
0.55	0.30	0.50	97.94	4	886	< 0.001

Table 13 Coefficients for mental health

Predictor	Coeff	SE	t	p	LLCI	ULCI
Constant	0.40	0.23	1.75	0.07	-0.04	0.85
Career Adaptability (T1)	0.66	0.05	12.50	< 0.001	0.56	0.77
OFTP Focus Opportunities	0.19	0.03	5.52	< 0.001	0.12	0.26
OFTP Perceived Remaining Time	0.00	0.03	0.16	0.86	-0.05	0.06
OFTP Focus Limitations	0.00	0.02	0.27	0.78	-0.04	0.06

Table 14 Total, direct, and indirect effects of career adaptability on mental health

Effect Type	Effect	SE	t	p	LLCI	ULCI
Total Effect	0.84	0.04	18.15	< 0.001	0.75	0.94
Direct Effect	0.66	0.05	12.50	< 0.001	0.56	0.77
Indirect Effect (Total)	0.18	0.03				

Hypothesis 4 suggested that OFTP Focus Limitations (T2) would mediate the relationship between career adaptability (T1) and mental health (T3). The findings indicated that higher career adaptability was significantly associated with a lower focus on limitations in the future ($b = -0.74$, $SE = 0.06$, $t = -10.83$, $p < .001$, standardized coefficient = -0.34). The statistical values are displayed in Tables 10 and 11.

Regarding the mediational analyses, a greater focus on future opportunities was positively associated with mental health ($b = 0.19$, $SE = 0.03$, $t = 5.52$, $p < .001$, standardized coefficient = 0.22). The indirect effect of career adaptability on mental health through OFTP Focus Opportunities was significant (Effect = 0.18 , BootSE = 0.03 , BootLLCI = 0.10 , BootULCI = 0.25), supporting H2. The statistical values are displayed in Tables 12, 13 and 14.

However, the perception of the remaining time was not significantly associated with mental health ($b = 0.00$, $SE = 0.03$, $t = 0.16$, $p = .86$, standardized coefficient = 0.00). The indirect effect of career adaptability on mental health through OFTP Perceived Remaining Time was

not significant (Effect = 0.00 , BootSE = 0.01 , BootLLCI = -0.03 , BootULCI = 0.04), thus H3 was not supported.

However, the focus on limitations was not significantly associated with mental health ($b = 0.00$, $SE = 0.02$, $t = 0.27$, $p = .78$, standardized coefficient = 0.01). The indirect effect of career adaptability on mental health through OFTP Focus Limitations was not significant (Effect = -0.00 , BootSE = 0.02 , BootLLCI = -0.04 , BootULCI = 0.03), thus H4 was not supported.

Figure 2 displays the unstandardized coefficients for the variables in the Model.

Discussion

The present study aimed to test the mediating role of OFTP in the relationship between Career Adaptability and College Graduates' Mental Health. The results offer a robust statistical base that advances our understanding of how Career Adaptability influences Mental Health, mediated by factors such as Focus Opportunities, Perceived Remaining Time, and Focus Limitations. These findings add nuance to the existing literature and provide practical implications for educational and professional settings.

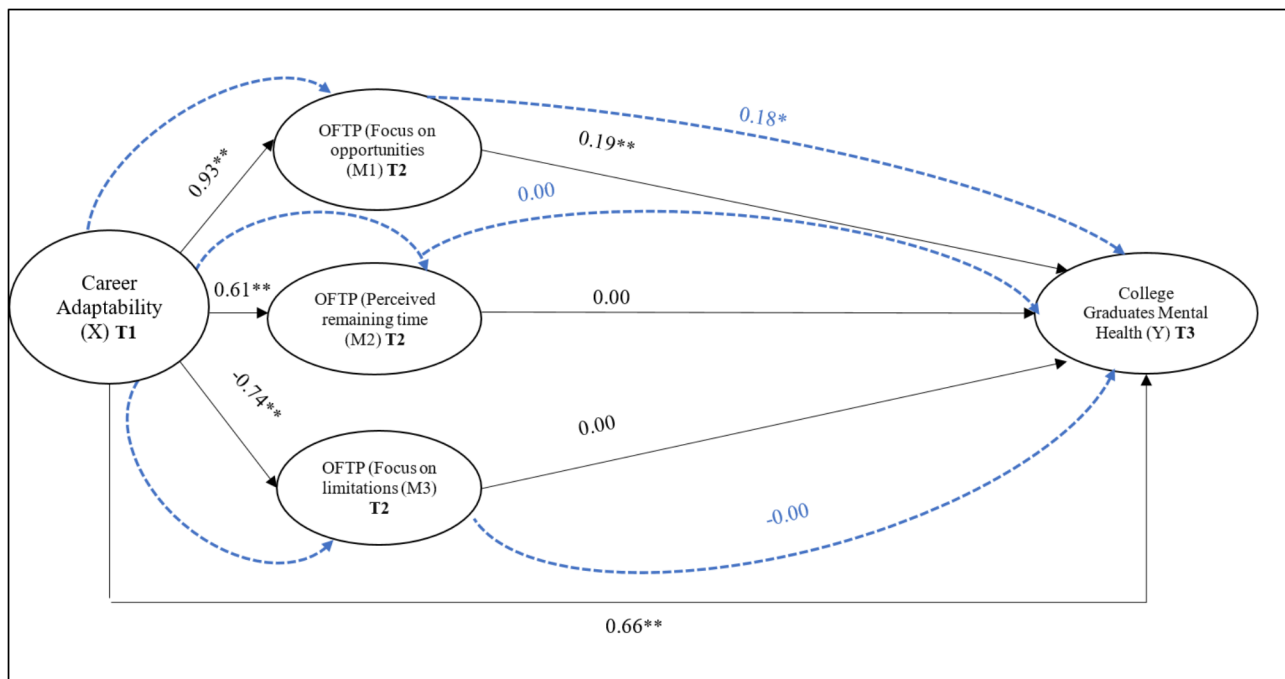


Fig. 2 Research model with unstandardized coefficients

Note: Direct effects are in black, and indirect effects are in blue dotted lines

The mediation analysis revealed significant insights. Career Adaptability showed a direct and robust effect on College Graduates' Mental Health, thereby confirming the first hypothesis. This result is highly consistent with existing literature that emphasizes the role of career adaptability in shaping mental health outcomes [40]. More interestingly, the study highlights the mediating role of Focus Opportunities in the relationship between Career Adaptability and Mental Health. This finding extends the scope of Career Adaptability beyond its direct effects, underlining the importance of one's focus on opportunities as a significant pathway for improving mental health. This finding aligns with recent studies that have emphasized the role of Focus Opportunities in influencing future career-related outcomes [41]. Our findings concur with previous research indicating the positive influence of OFTP on citizenship behaviors. For instance, Weikamp & Göriz [42] showed that people perceiving themselves as having open-ended time exhibit more citizenship behaviors.

However, the other two mediating factors, Perceived Remaining Time and Focus Limitations, did not show significant mediation effects, thereby not supporting hypotheses 3 and 4. These results suggest that while graduates may be aware of the time remaining for career activities or the limitations they face, these factors do not significantly alter the relationship between their career adaptability and mental health. Several factors could explain these non-significant results. One possible reason

is the cultural context of the participants, as cultural attitudes toward time perception and limitations can vary significantly. In certain cultural settings, individuals may adopt a more collective or contextualized view of career trajectories, where external factors (such as family or societal expectations) may weigh more heavily than individual time perception or perceived limitations. Consequently, the impact of Perceived Remaining Time and Focus on Limitations may be moderated by cultural values, which could reduce their salience in shaping mental health outcomes.

Another potential explanation lies in measurement challenges. Perceived Remaining Time and Focus on Limitations may be more challenging to quantify accurately than Focus on Opportunities, as they involve more subjective appraisals of constraints and time. The influence of these dimensions may also fluctuate based on situational changes or transitional phases, such as the shift from university life to the employment market, potentially making them less stable predictors of mental health outcomes in this study's context.

Despite the two dimensions of OFTP failing to account for mental health outcomes, recent studies have indicated that the general future time perspective is associated with health, cognitive functioning, and well-being [43]. Additionally, the influence of OFTP on motivation to learn among workers has been noted [44]. Furthermore, recent empirical research has provided evidence that future time perspective is a unique predictor of intended

academic engagement and students' grade point average [45]. In that study, intended academic engagement was found to mediate the relationship between future time perspective and students' grade point average after one semester. These discrepancies could be explained by the shift in focus between previous studies and the current study, highlighting that different variables may affect students while they remain at the university and graduates as they transition to the employment market and adult life.

This study's focus on Chinese graduates offers valuable insights into career adaptability and OFTP within a unique cultural and economic context. In China, societal expectations around career progression and the rapid pace of economic development exert distinct pressures on young professionals, potentially shaping how they perceive career opportunities and limitations. For instance, a high value is often placed on stable employment, and family expectations can strongly influence career decisions. These cultural dynamics may enhance the relevance of certain OFTP dimensions, such as a strong focus on opportunities, as individuals aim to meet both personal and familial career goals [46]. However, these dynamics could differ considerably in other cultural contexts, where factors such as individualism, labor market flexibility, and diverse educational structures might yield different patterns in career adaptability and OFTP.

The findings in this study may not fully generalize to other cultural contexts where career adaptability and time perspective are influenced by varying job market conditions and societal norms. In Western contexts, for example, individuals may experience greater autonomy in career decisions, potentially altering the significance of perceived remaining time or focus on limitations in shaping mental health outcomes. Similarly, educational systems that emphasize flexible career paths and interdisciplinary skills could influence how individuals perceive their future career trajectories and adaptability. Understanding these cross-cultural differences is essential, as they can reveal how cultural and structural factors shape the career experiences and psychological well-being of graduates entering the workforce.

Future research could build on this study by conducting cross-cultural comparisons to explore the constructs of career adaptability and OFTP across diverse cultural settings. Such research would not only enhance the generalizability of these findings but also help identify universal versus culture-specific aspects of career adaptability. Cross-cultural studies could also examine how varying societal expectations and labor market structures influence the way individuals perceive career opportunities, remaining time, and limitations. This approach would offer a richer understanding of the role cultural context plays in shaping career adaptability and mental

health outcomes, ultimately contributing to a more globally applicable model of career development.

In summary, the present study not only confirms the direct positive effect of Career Adaptability on College Graduates' Mental Health but also enriches this understanding by introducing Focus Opportunities as a significant mediator. However, the non-significant mediating roles of Perceived Remaining Time and Focus Limitations indicate that these factors might not be instrumental in the context of graduates' well-being [47].

Limitations and suggestions for future research

The current study, while providing valuable insights into the relationship between career adaptability, occupational future time perspective, and mental health among Chinese college graduates, has several limitations that should be addressed in future research.

One primary limitation of this study is the reliance on self-reported data, which may introduce bias, particularly due to participants' tendencies to respond in socially desirable ways. This risk is heightened by the multiple time-point data collection, as participants may become increasingly aware of the study's aims over time, potentially influencing their responses to align with perceived expectations. Although measures were taken to assure anonymity and reduce response bias, it is possible that social desirability affected some of the self-reported outcomes.

Additionally, the study's sample is restricted to graduates from Chinese colleges, which may limit the generalizability of the findings to other cultural or educational contexts. Future research should aim to include more diverse samples, incorporating disadvantaged students [48] as well as participants from varied geographical and cultural backgrounds [49], to enhance the applicability of the results across different populations. Expanding beyond a single cultural context would allow for a more comprehensive understanding of how factors like social desirability bias and self-perception may vary and influence responses across diverse groups.

Another limitation is the potential for attrition bias, as the number of participants decreased from the initial Time 1 to the final phase of the survey. This drop in participation could skew the results if the characteristics of those who dropped out differ systematically from those who remained. The descriptive statistics reveal patterns in the characteristics of participants who completed different stages of the study, offering insight into potential attrition factors. The data suggests that age may play a role in participants' engagement and commitment levels throughout the longitudinal study. Participants who dropped out after the first or second survey exhibit certain age-related patterns, with specific age groups showing higher rates of early attrition. In contrast, those who

completed all three surveys display a more balanced age distribution, indicating that some age groups may be more inclined to stay engaged in longitudinal research over time. These observations imply that certain age-related factors might influence participation stability, with some age groups demonstrating greater consistency and commitment to the study. Participants who completed only the first survey (Time 1) scored slightly higher on the Career Adaptability Assessment Scale (CAAS) compared to those who completed two or all three surveys, suggesting that participants with marginally lower career adaptability may have been more committed to seeing the study through to completion. Additionally, those who completed only the first two surveys (Time 2) reported the highest levels of focus on opportunities and perceived remaining time, indicating that participants with a more optimistic and abundant view of future career opportunities and time were more likely to discontinue participation after the second phase. In contrast, participants who completed all three surveys (Time 3) demonstrated lower scores for focus on opportunities and perceived remaining time but higher scores for focus on limitations. This pattern suggests that individuals who perceived fewer future career opportunities or time and who were more attuned to limitations were more likely to maintain their participation throughout the study. These findings reflect the possibility that a heightened focus on limitations or constraints contributes to a more persistent approach to engaging with the study. At the same time, an optimistic outlook on opportunities and available time could lead to early dropout. This analysis offers valuable insights into attrition patterns, emphasizing the importance of considering how individual perspectives on career adaptability and occupational future time perspective might influence participation in longitudinal research. These findings could be relevant to the discussion of potential attrition bias and may also serve as a basis for future studies to investigate retention strategies for longitudinal designs.

Future studies might employ strategies to minimize attrition, such as providing incentives or follow-up reminders to participants, to ensure a more consistent and representative sample.

The timing of data collection, while staggered to reduce common-method variance, may still be affected by external factors specific to the Fall Semester of 2023. For instance, seasonal work pressures or societal events could influence participants' responses. Future research should replicate the study across different periods to verify the stability of the findings.

Moreover, while the use of established scales like the Career Adapt-Abilities Scale, Occupational Future Time Perspective scale, and Positive Mental Health Scale strengthens the study's reliability, the study could benefit

from incorporating additional qualitative data to provide deeper insights into participants' experiences and perceptions. Mixed-method approaches could complement the quantitative data and offer a more nuanced understanding of the constructs under investigation.

The statistical methods employed, including the use of the PROCESS macro for mediation analysis, are robust; however, the reliance on time-lagged data limits the ability to draw causal inferences. Longitudinal studies, where all the variables were assessed at each time, are recommended to better capture the temporal dynamics and potential causal relationships between career adaptability, occupational future time perspective, and mental health.

Finally, the study's focus on positive mental health aspects may overlook other important dimensions of mental well-being, such as negative affect, stress, or anxiety [50]. Future research should consider a more comprehensive assessment of mental health to provide a balanced view of how career adaptability and occupational future time perspective influence overall mental well-being.

In summary, while the present study offers significant contributions to understanding the interplay between career adaptability, occupational future time perspective, and mental health among Chinese college graduates, addressing the aforementioned limitations in future research will enhance the robustness and generalizability of the findings. Future studies should aim for more diverse and representative samples, employ longitudinal designs, and incorporate both qualitative and quantitative methods to provide a comprehensive understanding of these relationships.

Suggestions for intervention at colleges and post-graduate associations

Based on the findings of the present study, several targeted interventions can be proposed for colleges and post-graduate associations to enhance the mental health and career adaptability of their students and graduates.

Firstly, integrating comprehensive career adaptability training into existing career counseling programs can significantly benefit students. These programs should focus on developing key adaptability resources such as concern, control, curiosity, and confidence. Emphasizing the importance of OFTP during these sessions is crucial. By guiding students and graduates to identify and seize career opportunities, counselors can play a vital role in improving their mental health and overall well-being [51].

Additionally, educational workshops should be organized to address the concept of OFTP specifically. These workshops can provide students with a deeper understanding of how maintaining a positive focus on future

career opportunities can significantly influence their mental health. Practical training sessions within these workshops can further help students and graduates set realistic and achievable career goals, understand the benefits of a future-oriented mindset, and develop effective strategies to overcome career-related challenges [52].

Moreover, establishing mentorship programs can provide continuous support and guidance to students and graduates. Peer and alumni mentoring can be particularly beneficial, as individuals who have successfully navigated their career paths can share their experiences and strategies for maintaining a focus on opportunities, given that recent research continues to show the relevance of social support in career-related processes [53]. Additionally, professional mentoring can connect students and graduates with industry professionals who can offer insights and advice, further enhancing their career adaptability and mental health.

The findings from this study offer several actionable insights for career counselors, educators, and policymakers working with recent graduates. One key recommendation is to implement targeted interventions that help young professionals enhance their focus on opportunities. For example, career counseling programs can incorporate goal-setting exercises and future-oriented planning workshops, which encourage individuals to visualize potential career paths and identify concrete steps toward achieving them. Counselors could also use positive reframing techniques to help graduates focus on growth and development opportunities, even in challenging situations. Educators in university settings might integrate these practices into career readiness courses, fostering a mindset that emphasizes exploration and adaptability before students enter the workforce. These approaches aim to enhance graduates' optimism and proactive engagement with their careers, which has been shown to influence mental health and career adaptability positively.

To mitigate the negative effects of a strong focus on limitations, career practitioners could offer cognitive-behavioral interventions aimed at reshaping unproductive thought patterns. For instance, workshops or individual counseling sessions could help graduates reframe perceived limitations as challenges that can be managed or overcome. Additionally, resilience-building programs can equip individuals with coping strategies to handle setbacks, thereby reducing the impact of limiting beliefs on their career outlook. For policymakers, funding initiatives that support mental health resources and career counseling programs in higher education institutions could be instrumental in providing these resources to graduates on a larger scale. By addressing both the enhancement of opportunity focus and the reduction of limitations focus, these interventions can better prepare

young professionals to navigate the complexities of modern career paths with greater confidence and adaptability.

In summary, by focusing on enhancing career adaptability and promoting an opportunity-focused temporal perspective, colleges, and post-graduate associations can significantly improve the mental health and career readiness of their students and graduates. These interventions, through career counseling, educational workshops, and mentorship programs, provide practical and sustainable methods to support students in their transition from academia to the professional world.

Conclusion

The present study offers valuable contributions to the understanding of how Career Adaptability influences College Graduates' Mental Health, mediated by factors such as Focus Opportunities, Perceived Remaining Time, and Focus Limitations. Among the key findings, the direct and substantial effect of Career Adaptability on College Graduates' Mental Health stands out, thereby confirming the theoretical underpinning that career adaptability is a significant determinant of mental health outcomes. More importantly, the study identifies Focus Opportunities as a significant mediator in this relationship, extending the discourse beyond merely understanding the direct effects of Career Adaptability.

The relevance of these findings for interventions with students and graduates is manifold. Primarily, educational institutions and educators can develop programs aimed at enhancing students' Career Adaptability, thereby fostering their mental health. This could be particularly impactful in curricula that are designed to be self-directed, where students' adaptability and mental health can significantly affect educational and career outcomes. Furthermore, given the mediating role of Focus Opportunities, intervention strategies can also be designed to help students identify and leverage opportunities in their career pursuits. This could range from mentorship programs to workshops aimed at goal-setting and future planning.

Moreover, the study's findings have implications for the broader educational psychology literature, particularly in the context of supporting graduates transitioning to the employment market and adult life. The study provides empirical evidence that can inform educational policy, particularly those policies aimed at student engagement and welfare. For instance, curriculum designers can integrate components that not only enhance career skills but also foster a positive focus on future opportunities.

While the study does have its limitations, including sample specificity and methodological constraints, its contributions to both theory and practice are significant. Future research in this area would do well to address these limitations, possibly through longitudinal designs

or more diverse samples, to validate further and extend these findings. In summary, the study not only adds to the academic discourse on the determinants of College Graduates' Mental Health but also offers actionable insights for educational interventions aimed at enhancing student and graduate outcomes.

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Author contributions

LG, YL and WP have made substantial contributions to the conception and design of the work; contributed to the acquisition, analysis, and interpretation of data; and have drafted the work and substantively revised it. LG, YL and WP have approved the submitted version and agreed both to be personally accountable for the author's own contributions.

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Data availability

The datasets generated and analyzed during the current study are not publicly available due to individual respondents' privacy but are available (in an anonymized form) from the corresponding author on reasonable request.

Declarations

Ethics approval

The study received ethical clearance from the Henan Normal University's ethical board. It was designed and conducted following the recommendations of the Declaration of Helsinki, revised in Fortaleza to guide research involving human participants.

Consent for participation

Prior to the collection of data, all participants were required to provide informed consent for participation, analyze the data, and share them in an anonymized form with third parties. The recruitment of participants for the study was conducted using a comprehensive approach that included sending invitations via email and posting on social media platforms such as WeChat, QQ, Weibo, and Bilibili. Those who expressed interest were sent a link to an online survey, which was part of a project focused on assessing their career performance.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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