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The influence of college students' career exploration on career maturity in Guangdong province, China: The moderating effect of future time perspective and mediated by professional commitment

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Abstract: Based on Social Cognitive Career Theory (SCCT), this study empirically explores how career exploration influences career maturity among college students in Guangdong Province, China, with a focus on the mediating role of professional commitment and the moderating role of future time perspective. Using convenience sampling, 588 valid questionnaires were collected from 16 universities across major cities in Guangdong. The moderated mediation model was tested using the SPSS PROCESS macro (Model 7) to examine both direct and indirect relationships between variables. The results indicate: (1) career exploration significantly and positively predicts career maturity; (2) professional commitment partially mediates the relationship between career exploration and career maturity; (3) future time perspective enhances the positive effect of professional commitment on career maturity, with more pronounced impacts observed in students with a high future time perspective. This study enriches SCCT by validating a context-specific mechanism within Chinese higher education and offers practical insights for optimizing university career guidance to better promote students' career development.

Keywords: *Career exploration, Career maturity, Future time perspective, Professional commitment, Social cognitive career theory.*

1. Introduction

Over the past decade, China has accelerated the popularization of higher education, with a continuous expansion of college student numbers and intensifying competition in the job market. The "employment difficulty" issue has become a focal point of societal concern. In its 2022 document *Guidelines for Promoting High-Quality Development of Modern Vocational Education*, the Ministry of Education explicitly emphasized the need to "strengthen career guidance and employment services for students, enhancing their career planning and employability," underscoring the importance of improving the quality of college students 'career development. Career Maturity, as a core indicator measuring individual preparedness for career advancement, refers to an individual's ability to demonstrate autonomous exploration, planning attitudes, and decision-making execution capabilities regarding future careers based on cognitive foundations [1]. Its level directly impacts the rationality of career choices and the sustainability of career development [2]. Empirical studies show that college students with higher Career Maturity can more accurately identify their career interests and capabilities, formulate reasonable career plans, and demonstrate significantly higher probabilities of successful employment [3, 4]. Therefore, investigating the influencing factors and mechanisms of Career Maturity among college students holds significant theoretical and practical implications for optimizing vocational education strategies and facilitating smooth employment outcomes.

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Career Exploration refers to the process where individuals clarify career goals and plan development paths through self-awareness and environmental information gathering [5]. It specifically includes two dimensions: self-exploration (understanding interests, values, etc.) and environmental exploration (collecting career information, understanding job markets, etc.) Ali, et al. [6]. Super [7] career development theory emphasizes that Career Exploration is a crucial phase in professional growth. Career Exploration behaviors during youth serve as the prerequisite for enhancing Career Maturity, as individuals gradually develop clear career cognition and decision-making abilities by assessing their alignment with the professional world. Empirical studies also show that college students with higher levels of Career Exploration demonstrate clearer career goals, stronger decision-making capabilities, and correspondingly higher Career Maturity [8, 9]. While prior studies (e.g., [8, 9] have confirmed the positive link between Career Exploration and Career Maturity, two critical gaps remain: First, the mediating pathways are underexplored, particularly regarding how Professional Commitment—a key indicator of academic engagement—bridges Career Exploration and Career Maturity. Second, the boundary conditions of this mechanism are unclear, such as whether Future Time Perspective (a stable trait related to long-term planning) moderates the mediating process. By addressing these gaps, this study aims to validate a moderated mediation model, thereby extending Social Cognitive Career Theory [10] in the Chinese higher education context.

Through reviewing relevant theories and literature, this study posits that Professional Commitment may serve as a crucial mediating variable influencing Career Maturity through Career Exploration. Professional Commitment refers to college students 'positive attitudes and behavioral tendencies of identifying with their academic discipline and being willing to invest corresponding efforts in learning [11] specifically encompassing dimensions such as affective commitment, economic commitment, normative commitment, and continuance commitment [12]. The Social Cognitive Career Theory [10] indicates that individuals' Career Exploration behaviors influence career development outcomes by affecting their cognitive understanding and emotional investment in their profession. On one hand, college students with high Career Exploration levels develop stronger emotional attachment and behavioral engagement toward their discipline through deeper understanding of its value and career prospects [13, 14]. On the other hand, individuals with high Professional Commitment are more willing to invest time and effort in enhancing their professional competencies, thereby improving career decision-making abilities and adaptability, ultimately promoting Career Maturity [15, 16]. Therefore, Career Exploration may indirectly promote the development of Career Maturity by increasing college students 'Professional Commitment. Accordingly, this study proposes Hypothesis 1: Professional Commitment mediates the impact of Career Exploration on college students' Career Maturity.

Furthermore, the process by which Career Exploration influences Career Maturity through Professional Commitment may be moderated by Future Time Perspective. Future Time Perspective refers to a relatively stable psychological trait characterized by cognitive awareness, emotional engagement, and behavioral tendencies toward the future [17] encompassing dimensions such as connectivity, speed, and distance [18]. Self-regulation theory [19] posits that an individual's cognitive and planning abilities regarding the future regulate how their intrinsic attitudes (e.g., Professional Commitment) influence behavioral outcomes (e.g., Career Maturity). Specifically, college students with high Future Time Perspective can better align academic pursuits with long-term career goals. High Professional Commitment drives them to proactively accumulate vocational knowledge and engage in practical activities, thereby significantly enhancing Career Maturity [20, 21]. Conversely, students with low Future Time Perspective may lack clear career planning. Even with high Professional Commitment, they struggle to translate it into improved Career Maturity [22, 23]. Therefore, Future Time Perspective may amplify the positive impact of Professional Commitment on Career Maturity. Accordingly, this study proposes Hypothesis 2: Future Time Perspective moderates the effect of Professional Commitment on college students' Career Maturity.

As one of China's most open and economically advanced regions, Guangdong Province offers abundant career opportunities and diverse development environments for college students [24]. Under

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the strategic framework of the Guangdong-Hong Kong-Macao Greater Bay Area, the Career Exploration and Career Maturity characteristics of local students exhibit unique features —— facing both opportunities for cross-cultural career development and heightened competitive pressures [25]. Therefore, investigating the relationships between Career Exploration, Professional Commitment, future time perception, and Career Maturity among college students in Guangdong Province holds significant regional relevance.

In conclusion, this study not only examines the mediating role of Professional Commitment in the relationship between Career Exploration and college students 'Career Maturity, but also investigates whether this mediating model is moderated by Future Time Perspective. Specifically, we constructed a moderated mediation model to examine the mechanism through which Career Exploration influences college students' Career Maturity (Figure 1). The research objectives include: (1) verifying whether Professional Commitment mediates the relationship between Career Exploration and Career Maturity; (2) investigating whether Future Time Perspective moderates the impact of Professional Commitment on Career Maturity. The first question explores how Career Exploration affects Career Maturity, while the second examines when this influence becomes weaker or stronger. By addressing these questions, our study provides empirical evidence to enrich career development theories and optimize career guidance practices in higher education institutions.

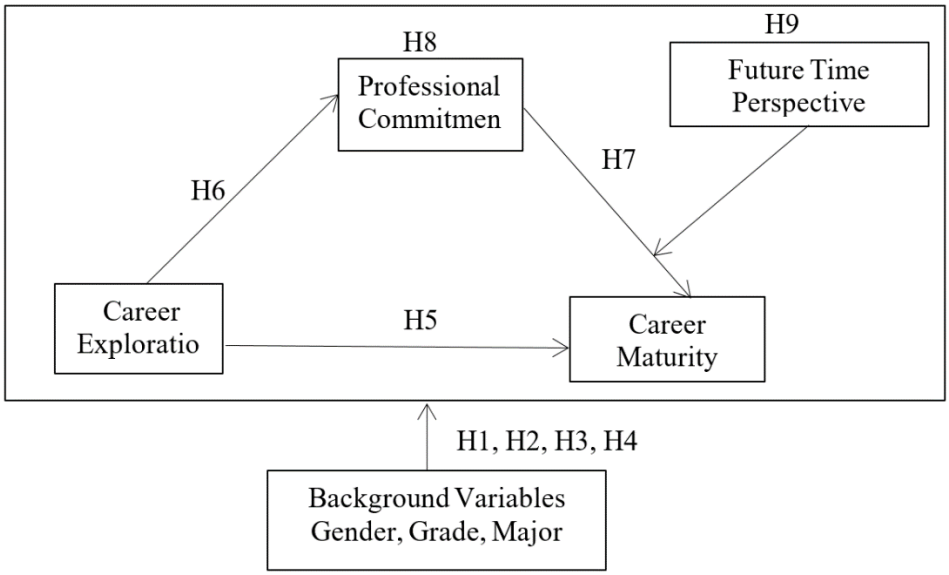

Figure 1.
Research framework diagram.

2. Research methods

2.1. Research Objectives

This study employed convenience sampling to survey students from 16 universities across Guangdong Province: 8 universities in the Pearl River Delta (economically developed), 3 in eastern Guangdong, 3 in western Guangdong, and 2 in northern Guangdong (less developed). A total of 640 questionnaires were distributed, with 588 valid responses (effective rate = 91.88%). Exclusion criteria included: (1) response time < 3 minutes (speedy answering); (2) >70% identical options (careless responding). Demographic characteristics were as follows: 24.1% male (n=142), 75.9% female (n=446); 5.1% freshmen, 16.8% sophomores, 23.3% juniors, 54.8% seniors; 18.7% science, 35.5% liberal arts, 31.0% engineering, 14.8% arts majors.

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To effectively minimize information bias during the formal administration, a group testing approach was implemented following the recommendations of Podsakoff, et al. [26]. Prior to the survey, teachers distributing the questionnaire received professional training. Throughout the process, consent was obtained from school administrators, teachers, and participants themselves, with all assessments conducted collectively in class settings.

2.2. Research Tools

2.2.1. Career Exploration Scale

This study employed the revised Career Exploration Scale developed by Chen, et al. [13]. The scale comprises two dimensions: environmental exploration (6 items) and self-exploration (5 items), totaling 11 questions. Using a 5-point Likert scale (ranging from "1=hardly ever" to "5=often"), the scale measures participants 'Career Exploration initiative and depth, where higher scores indicate greater engagement. The Cronbach's alpha coefficient of .920 demonstrates the scale's well-established reliability and validity.

2.2.2. Occupational maturity scale

The "Career Maturity Scale" developed by Savickas and Porfeli [27] was adopted. This scale comprises three dimensions: attention, curiosity, and confidence, with 18 items using a 5-point Likert scale ranging from "1=strongly disagree" to "5=strongly agree". Higher total scores indicate greater Career Maturity. The scale demonstrates excellent reliability with a Cronbach's alpha coefficient of .860, confirming its strong validity and consistency.

2.2.3. Professional Commitment Scale

The "College Student Professional Commitment Scale" developed by Xu et al. [12] was adopted. This scale comprises four dimensions—emotional commitment, economic commitment, normative commitment, and continuance commitment—with a total of 15 items. Using the Likert 5-point scale (ranging from "1=strongly disagree" to "5=strongly agree"), higher total scores across all four dimensions indicate greater Professional Commitment. The Cronbach's Alpha coefficient for this scale is.870, with specific coefficients for each dimension being.831,.833,.812, and.839 respectively.

2.2.4. Future Time Perspective Power Table

This study employed the revised Future Time Perspective Scale by Hilpert, et al. [18] which consists of 14 items across three dimensions: connectivity, speed, and distance. Using a 5-point Likert scale (ranging from "1= strongly disagree" to "5= strongly agree"), higher total scores indicate stronger future time perception. The Cronbach's Alpha coefficients for the three subscales were.810 (connectivity),.790 (speed), and.720 (distance), demonstrating good reliability and validity.

3. Research Results

3.1. Test of Reliability and Validity of Measurement Tools

3.1.1. Results of Confirmatory Factor Analysis

Table 1.
Adaptation Indices for Various Scale Models.

Scale	Dimensional Numbers	χ^2/df	RMSEA	CFI	TLI	SRMR
Career Exploration Scale	2	2.736	0.053	0.967	0.959	0.034
Career Maturity Scale	3	3.804	0.063	0.964	0.957	0.038
Professional Commitment Scale	4	3.827	0.069	0.965	0.958	0.053
Future Time Perspective Scale	3	3.804	0.063	0.961	0.954	0.042

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This study conducted confirmatory factor analysis (CFA) to validate the structural validity of four psychometric scales, with results presented in Table 1. The analysis demonstrated that all scales met ideal fit criteria: χ^2/df ratios ranged between 2.736 and 3.827 (<5), RMSEA values fell within the range of.053 to.069 (<.08), CFI and TLI indices exceeded the .95 threshold, while SRMR indicators remained below the .08 standard. Notably, the Career Exploration Scale exhibited optimal model fit (χ^2/df=2.736, RMSEA=.053, SRMR=.034), likely due to its relatively simple two-dimensional structure. In contrast, the Professional Commitment Scale with multiple dimensions (four-dimensional) showed slightly lower fit indices (RMSEA=.069, SRMR=.053), aligning with the common principle in CFA that model complexity compromises fit. Overall, the CFA results fully support the structural validity of these measurement tools, providing a robust theoretical foundation and methodological assurance for subsequent variable measurement studies.

3.1.2. Common method bias test

Considering the rigor of the study, this study adopts confirmatory factor analysis to compare whether the difference between single-factor model and multi-factor model is significant to illustrate whether common variance deviation exists. If there is a significant difference between the two models, it indicates that the common method deviation is not serious [28].

Harman's single-factor test revealed that the unrotated exploratory factor analysis extracted six factors with eigenvalues>1. The first factor explained 43.6% of the variance, below the 50% threshold [26] indicating insignificant common method bias. Further comparison of the fit between single-factor and multiple-factor CFA models showed that the multiple-factor model's chi-square value (χ^2=3562.520) was significantly lower than the single-factor model's (χ^2=7667.561), with the multiple-factor model demonstrating superior applicability ($\Delta\chi^2$=3962.284, Δdf=6, p<.001). These results confirm that common method bias in this study is not a significant issue.

3.2. Descriptive Statistics and Correlation Analysis

The mean values, standard deviations, and correlation matrices for Career Exploration, Career Maturity, Professional Commitment, and Future Time Perspective are presented in Table 2. The results demonstrate that Career Exploration shows a significant positive correlation with Career Maturity (r=.265, p<.001). Professional Commitment exhibits strong positive correlations with both Career Exploration (r=.449, p<.001) and Career Maturity (r=.635, p<.001). Notably, Future Time Perspective demonstrates significant positive correlations with Career Exploration (r=.234, p<.001), Career Maturity (r=.716, p<.001), and Professional Commitment (r=.558, p<.001). All correlation coefficients remain below .8, indicating no multicollinearity issues.

Table 2.
Descriptive Statistics and Pearson Correlation Analysis of Study Variables.

Variable	M	SD	1	2	3	4
Career Exploration	2.86	0.71	——			
Career Maturity	3.04	0.72	0.265**	——		
Professional Commitment	3.32	0.56	0.449***	0.635***	——	
Future Time Perspective	3.35	0.72	0.234**	0.716***	0.558***	——

Note: *p<0.05, **p<0.01, ***p<0.001.

3.3. Test of the Mediating Effect of Professional Commitment

This study hypothesizes that college students 'Career Exploration serves as the independent variable, Career Maturity as the dependent variable, and Professional Commitment acts as the mediating variable. Following Baron and Kenny [29] mediation effect testing procedure: First, examine the impact of Career Exploration on Career Maturity; second, incorporate Professional Commitment between Career Exploration and Career Maturity. If the influence of Career Exploration on Career Maturity

weakens, it indicates that Professional Commitment partially mediates the relationship. If the path coefficient of Career Exploration's impact on Career Maturity remains insignificant, it suggests that Professional Commitment fully mediates the relationship.

In this study, three background variables—gender, grade level, and major—require control in regression analysis. Following the principle of maintaining a moderate sample size for reference groups, male students were selected as the gender variable reference group, freshman year as the grade level reference group, and science and engineering disciplines as the major reference group. The study employed the SPSS PROCESS macro model (Model 4; Hayes [30]) to conduct mediation effect tests, with analysis results presented in Table 3.

This study investigates the mediating effect of college students' Professional Commitment on the relationship between Career Exploration and Career Maturity, controlling for demographic variables including gender, grade level, and major. Model 1 shows that Career Exploration significantly positively predicts Career Maturity (B=.270, p<.001). In Model 2, Career Exploration becomes a significant predictor of Professional Commitment (B=.360, p<.001). When Professional Commitment is introduced as a mediating variable in Model 3, Career Exploration still significantly predicts Career Maturity (B=.130, p<.001), though with reduced explanatory power compared to Model 1. Notably, Professional Commitment itself also shows a significant positive correlation with Career Maturity (B=.329, p<.001). These findings indicate that Professional Commitment partially mediates the relationship between Career Exploration and Career Maturity. The results confirm Hypothesis 1: Professional Commitment acts as a mediating factor in the relationship between Career Exploration and Career Maturity among college students in Guangdong Province, China.

Table 3.
Summary of Mediation Effect Tests including Direct, Indirect, and Total Effects.

Variable	Career Maturity (Model 1)		Professional Commitment (Model 2)		Career Maturity (Model 3)	
	B	***t***	***B***	***t***	***B***	***t***
Woman	0.070	1.040	-0.020	-0.300	0.080	1.530
Sophomore	-0.310	-2.480**	-0.070	-0.730	-0.250	-2.550**
Junior	-0.290	-2.470**	-0.130	-1.500	-0.180	-1.960*
Senior	-0.390	-3.670***	-0.100	-1.260	-0.310	-3.640***
Liberal Arts	0.080	0.970	0.050	0.840	0.040	.590
Engineering	-0.060	-0.740	-0.010	-0.150	-0.060	-0.810
Arts	0.090	0.530	0.190	1.600	-0.070	-0.540
Other	0.100	0.890*	0.090	1.170	0.020	0.230
Career Exploration	0.270	6.590***	0.360	12.250***	0.130	3.645***
Professional Commitment					0.329	8.871***
R^2	0.317		0.461		0.651	
$\Delta R2$	0.100		0.212		0.424	
F	7.202***		17.340***		42.475**	

Note: * p <0.05; ** p <0.01; *** p <0.001.
B is a non-standardized value
Gender, grade and major are dummy variables. Female students are the experimental group and male students are the control group; sophomore, junior and senior students are the experimental group and freshman students are the control group; liberal arts, engineering, art and other categories are the experimental group and science category is the control group.

Following the methodology proposed by Nevitt and Hancock [31] this study employed a bias-corrected non-parametric percentile Bootstrap method to more accurately test mediation effects. Specifically, we conducted 5,000 repeated random sampling trials using this method to further validate the mediating role of Professional Commitment between Career Exploration and Career Maturity. The results are presented in Table 4: The direct effect of Career Exploration on Career Maturity is.225 with a 95% confidence interval of [.139,.311], indicating statistical significance. The indirect effect from Career Exploration → Professional Commitment → Career Maturity is.118 with a 95% confidence

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interval of [.112,.148], also showing statistical significance. The total effect is.256 with a 95% confidence interval of [.164,.348], demonstrating statistical significance. Mediation effects account for 46.094% of the total effect. These findings confirm that Professional Commitment among college students in Guangdong Province, China partially mediates the relationship between Career Exploration and Career Maturity, thereby validating Hypothesis 1.

Table 4.
Summary of Bootstrap Mediation Effect Tests for Direct, Indirect, and Total Effects.

Way	Effect	S0. E0.	*P* price	Confidence Interval (95%) [Lower, Upper]
Direct Effect	0.225	0.044	0.000	[0.139, 0.311]
Indirect Effect	0.118	0.009	0.001	[0.112, 0.148]
Gross Effect	0.256	0.047	0.000	[0.164, 0.348]

Note: Bootstrap method was randomly repeated 5000 times.
S.E.= Standard Error.
Indirect Effect = college students' Career Exploration → Professional Commitment → Career Maturity.

3.4. Test of moderating effect of Future Time Perspective

This study employed Model 1 of PROCESS statistical techniques to test moderating effects [30], with Table 5 presenting the results of the moderated pathway. Through a bias-corrected non-parametric percentile Bootstrap analysis, it was concluded that the interaction of Professional Commitment×Future Time Perspective in predicting Career Maturity is both positive and statistically significant (B=.117, t=1.818, p<.01), indicating that the impact of Professional Commitment on Career Maturity is moderated by Future Time Perspective.

Table 5.
The moderating effect of future time perspective on the relationship between professional commitment and career maturity.

Variable	Career Maturity			
	B	*t*	S.E.	Confidence interval (95%) [Lower, Upper]
Woman Student	0.019	0.418	0.045	[-0.069, 0.107]
Sophomore	0.017	0.201	0.084	[-0.148, 0.182]
Junior	0.144	10.798	0.080	[-0.013, 0.301]
Senior	0.019	0.251	0.074	[-0.126, 0.164]
Liberal Arts	0.023	0.407	0.055	[-0.085, 0.131]
Engineering	-0.032	-0.550	0.058	[-0.146, 0.082]
Arts	-0.172	-10.601	0.107	[-0.382, 0.038]
Other	-0.006	-0.087	0.073	[-0.149, 0.137]
Professional Commitment	0.176	10.464*	0.120	[-0.059, 0.411]
Future Time Perspective	0.316	30.09***	0.102	[0.116, 0.516]
Professional Commitment × Future Time Perspective	0.117	10.818***	0.032	[0.010, 0.136]
R2	0.605			
ΔR2	0.598			
F Price	8.323			

Note: B is the unstandardized regression coefficient; SE is the standard error.
*p <0.05; **p <0.01; ***p <0.001.
Bootstrap random sampling 5000 times.

To further elucidate the moderating role of Future Time Perspective, we conducted a simple slope analysis using the mean ± one standard deviation (M-1SD, Mean, M+1SD) method. The results in Table 6 demonstrate that compared to the group with lower Future Time Perspective levels (B=.011,95% confidence interval [.052,.074]), the group with higher Future Time Perspective levels (B=.281,95% confidence interval [.091,.481]) exhibited stronger Professional Commitment effects on Career Maturity. In summary, compared to college students with low Future Time Perspective, those with higher levels of Future Time Perspective showed more significant impacts of Professional

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Commitment on Career Maturity. Therefore, Hypothesis 2 is validated: Future Time Perspective in college students from Guangdong Province, China moderates the relationship between Professional Commitment and Career Maturity. The higher the Future Time Perspective level of college students, the stronger the positive correlation between Professional Commitment and Career Maturity becomes, which is supported by these findings.

Table 6.
Analysis of the Moderated Mediation Effect of Future Time Perspective on the Relationship Between Professional Commitment and Career Maturity.

Model	Future Time Perspective	Effectiveness	S.E.	Confidence Interval (95%) [Lower, Upper]
M-1SD	2.502	0.011	0.102	[0.052, 0.074]
Mean	2.948	0.146	0.034	[0.079, 0.213]
M+1SD	3.394	0.281	0.032	[0.091, 0.481]

Note: The data source is collated from this study.
M= mean; SD= standard deviation.

To examine whether Future Time Perspective moderates the relationship between Career Exploration and Career Maturity among college students, this study employed SPSS PROCESS Model 14 to test a moderated mediation model controlling for gender, grade, and major. As shown in Table 7, Model 1 demonstrates that Career Exploration has a significant positive effect on Professional Commitment (B=.363, p<.001). Model 2 reveals that Career Exploration significantly enhances Career Maturity (B=.026, p<.01), while Professional Commitment itself positively influences Career Maturity (*B*=.436, *p*<.001). Notably, the interaction term between Professional Commitment and Future Time Perspective significantly boosts Career Maturity (*B*=.074, *p*<.05), indicating that Future Time Perspective moderates the relationship between Professional Commitment and Career Maturity.

Table 7.
Summary of Moderation Effect Tests for the Relationship Between Professional Commitment and Career Maturity.

Variable	Model 1 Professional Commitment			Model 2 Career Maturity		
	B	***t***	**S.E.**	***B***	***t***	**S.E.**
Woman Student	-0.015	-0.303	0.050	0.019	0.410	0.045
Sophomore	-0.066	-0.729	0.090	0.012	0.148	0.084
Junior	-0.127	-10.504	0.084	0.144	10.796	0.080
Senior	-0.098	-10.259	0.078	0.016	0.221	0.074
Liberal Arts	0.050	0.837	0.060	0.019	0.348	0.056
Engineering	-0.009	-0.149	0.064	-0.034	-0.576	0.058
Arts	0.189	10.599	0.118	-0.184	-10.698	0.108
Other	.094	1.170	.080	-0.013	-0.180	0.073
Career Exploration	.363	12.246***	.030	0.026	0.869**	0.030
Professional Commitment				0.436	9.699***	0.045
Future Time Perspective				0.559	16.185***	0.035
Professional Commitment × Future Time Perspective				0.074	2.335*	0.032
R2	0.461			0.778		
ΔR2	0.213			0.606		
F Price	17.340***			73.661***		

Note: * *p* <.05; ** *p* <.01; *** *p* <.001
B is a non-standardized value
Gender, grade and major are dummy variables. Female students are the experimental group and male students are the control group; sophomore, junior and senior students are the experimental group and freshman students are the control group; liberal arts, engineering, art and other categories are the experimental group and science category is the control group.

This study further employed a bias-corrected non-parametric percentile Bootstrap method to validate the moderated mediation effect. The results indicate that Future Time Perspective moderates

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the indirect impact of college students' Career Exploration on Career Maturity through Professional Commitment. The moderated mediation index (IMI) was .027 with a 95% confidence interval of [.007,.049], excluding zero, indicating significant moderated mediation. These findings demonstrate that Future Time Perspective positively moderates the mediating role of Professional Commitment in the relationship between Career Exploration and Career Maturity among college students in Guangdong Province, China. Notably, the mediating effect becomes stronger when Future Time Perspective levels are high rather than low.

Table 8.
Analysis of the Moderated Mediation Effect of Future Time Perspective on the Relationship Between Professional Commitment and Career Maturity.

Model	Future Time Perspective	Indirect Effect	Boot SE	Bootstrap 95% CI	
				Lower	Upper
M-1SD	-0.716	0.139	0.034	0.073	0.208
Mean	0.000	0.158	0.032	0.097	0.224
M+1SD	0.716	0.178	0.032	0.117	0.243

Note: M= mean; SD= standard deviation.

To visually demonstrate the moderating effect of Future Time Perspective, this study categorized participants into high and low groups using the mean ± one standard deviation (-1SD, Mean, +1SD) and conducted simple slope analysis, as illustrated in Figure 2. Data from Table 8 reveals that compared with college students with lower levels of Future Time Perspective (*B*=.139,95% CI [.073,.208]), those with higher levels (*B*=.178,95% CI [.117,.243]) exhibited more significant indirect effects of Career Exploration through Professional Commitment on Career Maturity.

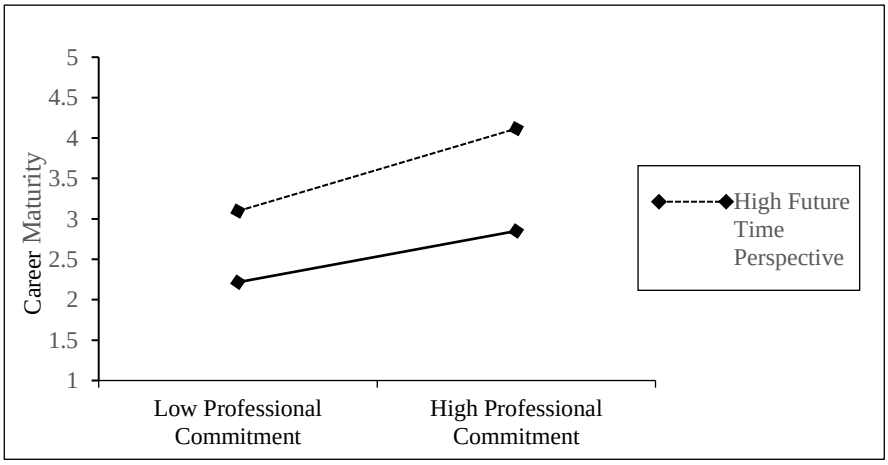

Figure 2.
Moderation Effect Diagram.

In conclusion, the results show that Career Exploration can affect college students' Career Maturity through Professional Commitment, and Future Time Perspective also plays a positive moderating role between Professional Commitment and Career Maturity.

4. Discussion

Based on the social cognitive career theory, this study deeply explores the influence mechanism of college students' Career Exploration on Career Maturity in Guangdong Province, China, and focuses on the mediating role of Professional Commitment and the moderating role of Future Time Perspective. The research results have important theoretical and practical significance.

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4.1. The Direct Correlation between Career Exploration and Career Maturity

Research findings demonstrate that Career Exploration significantly enhances college students' Career Maturity, aligning with extensive academic evidence [8, 32]. Grounded in Social Cognitive Career Theory, this process enables students to accumulate vocational knowledge and gain deep insights into industry environments, thereby clarifying their interests, competencies, and career values [33]. Through active participation in Career Exploration activities—including internships, job interviews, and industry research—students gain firsthand exposure to diverse work responsibilities, career prospects, and skill requirements. This firsthand experience helps them establish clear career goals during decision-making processes, ultimately elevating their Career Maturity [34]. For instance, internships allow students to immerse themselves in workplace environments, apply their academic expertise in real-world scenarios, identify personal strengths and weaknesses, and refine their career plans accordingly, thereby enhancing their Career Maturity.

4.2. The mediating role of Professional Commitment

This study confirms that Professional Commitment partially mediates the relationship between Career Exploration and Career Maturity, a finding consistent with research by Hutson, et al. [35] and Jackson and Tomlinson [36]. During Career Exploration, college students gain deeper understanding of the connection between their academic major and future careers. Upon recognizing the critical role of professional knowledge and skills in career development, their sense of professional identity and belongingness intensifies, leading to enhanced Professional Commitment [37, 38]. The increased Professional Commitment motivates students to actively engage in academic pursuits, proactively plan career development, master solid professional knowledge and skills, and participate in related practical activities and competitions. These experiences contribute to higher maturity levels during their career preparation phase [39]. Theoretically, the Social Cognitive Career Theory emphasizes how individuals 'perceptions of their capabilities and career goals influence decision-making and behavior [33]. As a psychological identification with one's profession, Professional Commitment strengthens college students' confidence in future career development, motivating them to persistently strive for career goals and thereby enhance Career Maturity.

4.3. The moderating effect of Future Time Perspective

Future Time Perspective positively moderates the relationship between Professional Commitment and Career Maturity, a finding consistent with studies by Chen, et al. [13]; Liguori, et al. [40] and Valéau, et al. [41]. College students with stronger Future Time Perspective demonstrate clearer career planning, effectively aligning their current academic pursuits with long-term professional goals [42]. Recognizing the vital importance of accumulating professional knowledge and skills for career advancement, they approach academic tasks with greater motivation and enthusiasm, capitalizing on the positive effects of Professional Commitment to enhance Career Maturity [43]. For instance, when selecting elective courses, students with high Future Time Perspective strategically choose programs that boost career competitiveness based on their plans, while those with low Future Time Perspective tend to make more casual course selections driven by difficulty levels or personal interests [44]. Research by Boo, et al. [45] further indicates that Future Time Perspective strengthens individuals' planning and decision-making capabilities, enabling them to better navigate challenges and seize opportunities throughout their career development journey. In this study, college students with high Future Time Perspective can make more rational and mature choices by considering various factors when facing career decisions, thus strengthening the promoting effect of Professional Commitment on Career Maturity.

Although this study has deeply investigated the influence mechanism of Career Exploration on Career Maturity and helped to deepen the understanding of the relationship between the two, there are still some shortcomings in this study. In the future, the research can be further deepened from the following directions:

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(1) Given the limitations of cross-sectional survey methods in revealing dynamic causal relationships between variables, this study recommends adopting longitudinal tracking designs to follow the career development trajectories of college students from enrollment to graduation. This approach will enable in-depth analysis of dynamic changes in variables such as Career Exploration and Professional Commitment, along with their impacts on Career Maturity. Furthermore, qualitative methods including interviews and case studies should be employed to thoroughly investigate the intrinsic psychological mechanisms underlying college students' career development.

(2) As this study's sample was limited to 16 universities in Guangdong Province, future research could expand to universities of various levels and types nationwide. This would facilitate comparative analysis of career development disparities among college students across different regions (e.g., eastern versus western China, first-tier versus second-and third-tier cities), thereby enhancing the generalizability of the findings. Additionally, targeted studies could be conducted on specific groups such as vocational college students and international students, enriching the research perspectives on Career Maturity development.

(3) As this study focuses on the mediating role of Professional Commitment and the moderating effect of Future Time Perspective, future research could incorporate additional variables (such as career decision self-efficacy and social support) to construct more complex theoretical models. For instance, we may explore whether social support mediates the relationship between Career Exploration and Professional Commitment, or investigate whether career decision self-efficacy interacts with Future Time Perspective.

(4) Based on the conclusions of this study, targeted intervention programs such as vocational exploration training courses, Professional Commitment improvement programs and Future Time Perspective cultivation programs can be developed in the future, and their effectiveness can be tested through experimental research to provide specific and feasible strategies for college career guidance work.

(5) In the context of digitization and globalization, emerging occupations are emerging and their forms are increasingly flexible. Future research can focus on the influence of emerging occupational environment on college students' Career Exploration and Career Maturity, as well as how individuals adapt to occupational changes by adjusting Professional Commitment and Future Time Perspective.

5. Conclusion

Through the empirical study of college students in Guangdong Province, China, this study draws the following conclusions:

(1) Career Exploration has a significant positive impact on college students 'Career Maturity, that is, active participation in Career Exploration activities can effectively improve college students' Career Maturity;

(2) Professional Commitment plays a partial mediating role between Career Exploration and Career Maturity. Career Exploration enhances college students' Professional Commitment, and then promotes the improvement of their Career Maturity;

(3) Future Time Perspective plays a positive moderating role between Professional Commitment and Career Maturity. College students with high Future Time Perspective can better play the promoting effect of Professional Commitment on Career Maturity.

In conclusion, this study has enriched theoretical research in college students 'career development, providing crucial theoretical foundations and practical references for universities to enhance career guidance programs. Higher education institutions should prioritize cultivating students' awareness and capabilities in Career Exploration, strengthen the integration of specialized education with vocational training, and focus on developing students' future-oriented foresight. These efforts will help improve Career Maturity among college students and better equip them to adapt to future professional development.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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