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Career maturity, self-efficacy and mental health among college students: Group counseling intervention efficacy

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Abstract: This study explored the efficacy of a career group counseling intervention for students with low career maturity for their improved career maturity, self-efficacy, and mental health. Participants included two groups: 548 Chinese college students survey study (female = 31.93%, mean age = 20.836, SD = 1.215 years), and 30 college students with low career maturity for the intervention study (female = 50.00%) selected from the first group. The participants completed surveys on career maturity, self-efficacy, and mental health. Results from Hayes regression-based PROCESS with Amos 26.0 for structural equation modeling revealed that career maturity is associated with high self-efficacy, mental health, and self-efficacy. The intervention group results indicated efficacy of the group counselling after 6 weeks of (1 h/week), and significantly higher post-test scores in career maturity, self-efficacy, and mental compared to random case control group from the total study participants. These findings provide the evidence for theory based on group counseling applying a social cognitive career theory–driven modular intervention approach that integrates career maturity development, self-efficacy enhancement, and mental health promotion within a structured six-week group program. The current study validates the applicability of social cognitive career theory in explaining how career maturity promotes mental health through self-efficacy, thereby strengthening theoretical pathways linking career development to psychological well-being. Based on these findings, a structured career group counseling approach that targets career concern, curiosity, and confidence can effectively improve college students' career maturity, self-efficacy, and mental health.

Keywords: College students; career maturity; mental health; self-efficacy; experimental intervention

Introduction

Career maturity is an important indicator of the degree of individual career development, which refers to the readiness of individuals to make suitable career choices when facing different career development stages (Lim & Jung, 2024). Career maturity is not only important for students' career choices and future development, but also has an important impact on their current academic life (Hsu et al., 2021). At present, most universities have set up career planning courses, but due to the reasons of coping teaching and low attention, some teachers and parents are still skeptical about career education, thinking that career education takes time and energy away from students' learning time and energy, and does not have a good impact on students' learning and even psychological development (Mallinson & Burns, 2018). Therefore, it is of practical importance to explore the relationship between career maturity and mental health and to conduct an intervention study.

Career maturity and self-efficacy

Career maturity (also called vocational maturity) (Chen et al., 2023) presumes age-appropriate attitudinal and cognitive readiness (Savickas et al., 2002). People with career maturity are adept at defining career goals, selecting, planning, and executing to the defined goals (Kustanti et al., 2018), anticipating future development trends, as well as their expectations of their future career development (Li et al., 2023). Most college students are in the pre-employment period and have little formal contact with the professional world (Linnemeyer & Brown, 2010). They would vary by their self-efficacy with pre-cognitive planning of the task and taking action in advance, which emphasizes the degree of subjective efforts and enthusiasm (Savickas & Porfeli, 2011).

Self-efficacy is a person's personal beliefs about his or her ability to engage in a particular behavior or action (Wright et al., 2014). Unlike overall self-confidence or self-esteem, self-efficacy beliefs are relatively dynamic and specific to a particular domain of activity (Jia & Wang, 2024). People's self-efficacy beliefs about the behaviors required in different occupational fields vary. For example, a person may have high confidence in their ability to accomplish tasks that will allow them to successfully enter and excel in the sciences, but low confidence in their ability to excel in social or business domains.

Mental health effects

Zhang (2022) argued that with the increasing pressure of employment in society, the psychological pressure of college students is increasing leading to the frequent occurrence of mental health problems, in order to solve this problem, he proposes that schools should increase the policy support to the relevant aspects and provide more psychological counseling services for students. Cao et al. (2021) conducted a study on mental health from the perspective of time perception in online learning, and its

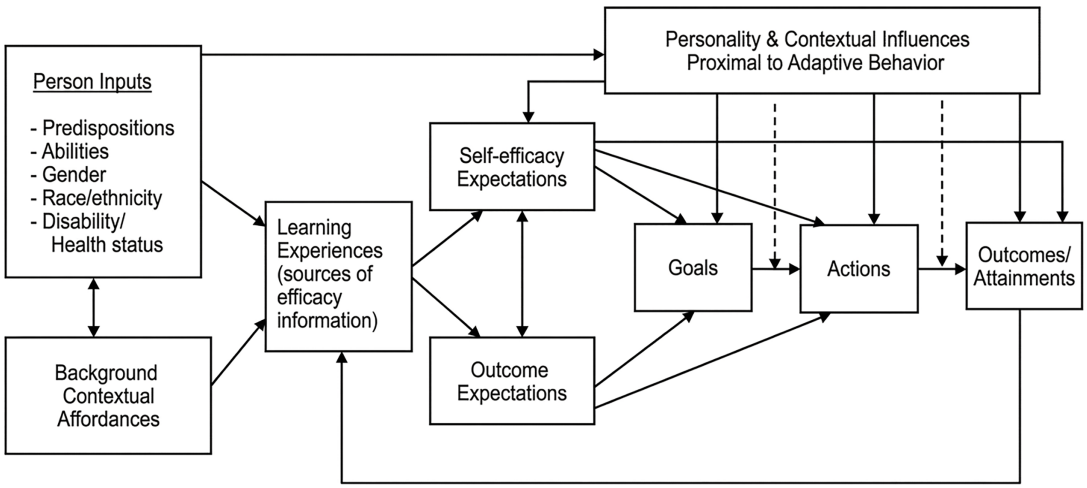

Figure 1. A framework for social cognitive career theory

results showed that the number of college students with mental health problems was high during COVID-19, with 65.93% of college students reporting moderate to severe mental health problems. Career maturity can enhance an individual's self-efficacy, thereby reduce the occurrence of career-related anxiety and depressive emotions while simultaneously increase subjective well-being.

Theoretical basis

Social Cognitive Career Theory (SCCT) was developed based on Albert Bandura's Social Cognitive Theory (Wang et al., 2022), an influential theory of cognitive and motivational processes that has been extended to psychosocial functioning in many domains, such as academic performance, health behavior, and organizational development, and its specific framework is shown in Figure 1 below (Lent & Brown, 2011). It focuses on how individuals form career interests, choose career paths, and make adjustments in the face of career challenges (Medugorac et al., 2020). SCCT emphasizes the importance of an individual's self-efficacy, outcome expectations, and personal goals in career decision-making and career development (Rogers & Creed, 2011).

Self-efficacy beliefs, outcome expectations, and goals are fundamental components of SCCT. The SCCT hypothesizes that, as long as people have both the skills and the environmental support necessary to engage in these activities, they are likely to develop an interest in the activities for which they have strong self-efficacy beliefs, to choose to engage in these activities, and perform better in them (Wang et al., 2022).

Based on SCCT, career maturity serves as a core indicator of individual career development. As its subdimensions, career concern, career curiosity, and career confidence directly influence an individual's self-efficacy beliefs regarding career tasks (Lent & Brown, 2011). When students possess clear career awareness, they are more likely to believe in their ability to accomplish career-related tasks, reflecting the heightened self-efficacy associated with high career maturity. Furthermore, as extended applications of SCCT suggest, self-efficacy not only serves as a critical variable in career development but also positively related mental health by reducing perceived stress and enhancing coping abilities (Wright et al., 2014). Furthermore, existing research indicates that insufficient career maturity can trigger career anxiety and decision-making dilemmas, thereby undermining mental health (Kawai & Yamazaki, 2006). The mediating role of self-efficacy can explain the underlying mechanism of this association. Therefore, this study adopts the research pathway of career maturity → self-efficacy → mental health, which aligns with the theoretical logic of SCCT while addressing the practical need of how career education influences mental health.

Goals of the study

This study explored the efficacy of a career group counseling intervention for students with low career maturity for their improved career maturity, self-efficacy, and mental health with college students. Accordingly, this study tested the following three research hypotheses:

Hypothesis 1: *College students' career maturity is associated higher with self-efficacy and mental health.*

Hypothesis 2: *Self-efficacy plays a mediating role in the relationship between college students' career maturity and mental health for improved mental health, which is shown in Figure 2 below.*

Hypothesis 3: *A brief career group counseling intervention can improve college students' higher career maturity, self-efficacy and mental health.*

Many countries continue to introduce new educational policies and guidance documents, emphasizing the importance of career education during the university period. Moreover, schools have the responsibility to help students improve their understanding of the real society, increase their knowledge of career interests, personality and other personal aspects, develop their abilities in various fields, set up the correct career value orientation, and improve their career choice or decision-making ability (Chen et al., 2021). In support of these initiatives, studies are needed on career counselling interventions that would deliver to promise.

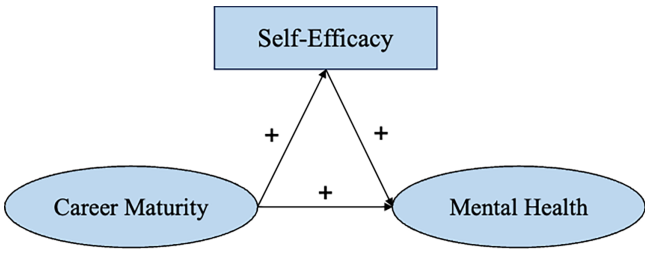

Figure 2. Diagram of the research hypothesis model

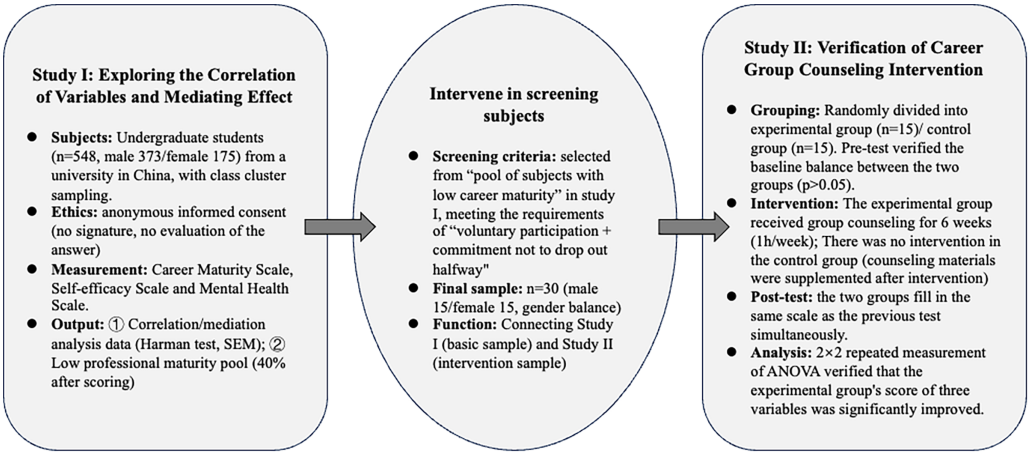

Figure 3. Experimental process

Method

Research design, participants and setting

This study adopted a two-stage design to explore the relationships among college students' career maturity, self-efficacy, and mental health, and verify intervention effectiveness (as in Figure 3 below).

Participants and setting. Participants were 548 undergraduate students (female = 31.93%, mean age = 20.836, SD = 1.215 years) from a Chinese science and engineering university (Study 1). From these 30 eligible students (15 males, 15 females) were selected for the career group counselling efficacy study (Study 2).

This study employed G*Power for sample size power analysis Faul et al. (2007) to ensure the validity and reliability of statistical tests. For the correlation analysis in Study I, referencing Cohen (2013) effect size classification criteria, a medium effect size $f^2 = 0.15$, significance level $\alpha = 0.05$, and test power $(1\text{-}\beta) = 0.95$ were set. The results indicated a minimum required sample size of 110 participants. For the SEM analysis, following the academic norms proposed by Hair et al. (2009), the ratio of sample size to the number of observed variables must satisfy ≥5:1. This study had 69 observed variables, leading to a calculated minimum required sample size of 345 participants. The effective sample size of 548 participants met this requirement. For the intervention study in

Study II, a 2 (group: experimental/control) × 2 (time: pretest/posttest) repeated measures ANOVA was conducted. Referencing Cohen (2013) effect size classification criteria, a large effect size $\eta^2 = 0.14$, significance level $\alpha = 0.05$, and power $(1\text{-}\beta) = 0.90$ were set. The power analysis indicated a minimum required sample size of 26 participants. This study ultimately included 30 participants with low career maturity (15 in the experimental group and 15 in the control group), meeting the statistical power requirements for the analysis.

Procedure

Ethics approval and participant consent

This study was approved by the Ethics Committee of Nanjing University of Posts and Telecommunications (protocol code 20230168). Participants consented to the study in compliance with the Declaration of Helsinki.

***Debriefing*:** After data collection, participants were informed of the study's preliminary findings. The control group was provided with the same career counseling materials as the experimental group to ensure educational equity.

Study 1. Survey study on the relationship between career maturity, self-efficacy, and mental health among college students

A cross-sectional survey design was adopted to examine the associations among career maturity, self-efficacy, and mental health in a large sample of undergraduate students. Standardized self-report scales were used to assess key variables, and correlational analyses were conducted to test the predictive roles of career maturity and self-efficacy on mental health. This study aimed to clarify the internal mechanism linking career-related factors to psychological well-being.

Table 1. Course intervention content

Week	Module theme	Core content	Intervention format
1	Career self-cognition	Introduce the concept of career maturity; guide self-assessment of career interests, strengths, and values; establish initial career self-efficacy through "Success Experience Review" (e.g., past academic/practical achievements)	• Group discussion • Self-reflection worksheet • "My Success Moments" sharing session
2	Career environment exploration	Analyze industry trends, occupational characteristics, and major-occupation matching; develop an "Ability Improvement List" by combining industry needs with personal strengths to enhance the sense of efficacy in "being able to be competent in target occupations"	• Case analysis • Guest sharing • "Strengths-Needs" matching exercise
3	Career curiosity cultivation	Explore diverse career paths; break cognitive limitations through "Career Possibility Brainstorming", design "micro-exploration tasks" (e.g., interviewing practitioners), and accumulate small successful experiences to improve efficacy	• Career scenario simulation • Role-play • "Micro-exploration" task assignment
4	Career confidence building	Address career decision-making anxiety; adopt "cognitive restructuring" technology to challenge negative beliefs of "I can't do it", and strengthen self-efficacy through "obstacle-solving simulation" (e.g., coping with interview failures)	• Cognitive-behavioral exercises • Peer support • Successful case review
5	Career goal setting	Formulate short/long-term career plans (SMART principle); decompose big goals into executable small goals, clarify that "achieving each step can prove my ability", and strengthen process-oriented efficacy	• Goal mapping workshop • One-on-one feedback • "Goal-Efficacy" Association Commitment
6	Summary and application	Review key skills (including self-efficacy enhancement techniques); practice applying self-efficacy strategies to cope with challenges through "career dilemma role-play" (e.g., adaptation of new workplace employees)	• Group presentation • Action plan formulation • Distribution of "Self-Efficacy Enhancement Toolkit"

Study 2. Career group counseling intervention

The career group counseling for the experimental group was developed based on three theoretical frameworks: Super's Five-Stage Theory of Career Development, Crites' Career Maturity Model, and Career Adaptability Theory, with a focus on improving career maturity (concern, curiosity, confidence) and transferring these gains to self-efficacy and mental health. The intervention was structured into 6 thematic modules (see Table 1), with interactive formats to enhance engagement.

The intervention was led by a counselor with 8 years of experience in career education, and each session was recorded (with participant consent) to ensure fidelity to the protocol.

Measurements

Career Maturity Scale for College Students. The Career Maturity Scale for college students was measured using the Chinese version of the Career Maturity Questionnaire developed by Savickas and Porfeli (2011). The scale is composed of three dimensions of concern, curiosity, and confidence, totaling 14 questions. The scale was scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate a higher level of career maturity among college students. The scale had a better than ideal item fit and good construct validity and can be used in subsequent studies. In this study, the internal consistency coefficient scores for Attention, Curiosity, and Assertiveness were 0.882, 0.887, and 0.857,

respectively. The Cronbach's alpha coefficient for Career Maturity scores was 0.956.

Self-Efficacy Scale. The self-efficacy scale was measured using the Chinese version of the General Self-Efficacy developed by Schwarzer et al. (1997) as revised by Leung and Leung (2011). The scale consists of a single dimension with a total of 10 questions. The scale is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicate higher self-efficacy among college students. The scale had a better than ideal item fit and good construct validity and can be used in subsequent studies. In this study, the General Self-Efficacy Cronbach's alpha coefficient scores was 0.966.

Mental Health Scale. The mental health scale adopted the Anxiety Scale developed by Zung (1971), the Depression Scale developed by Zung (1965), and the Subjective Well-Being Scale developed by Tov and Diener (2013), which was revised in Chinese version. The scale consists of three dimensions of anxiety, depression, and subjective well-being, totaling 45 questions. The scale is scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scores for both the anxiety and depression dimensions were transformed, with higher scores indicating lower levels of anxiety and depression among college students. Overall, higher scores indicate higher levels of mental health among college students. The item fit of this scale was higher than ideal, with good construct validity, and can be used in subsequent studies. In this study, Mental health the internal consistency coefficient scores for depression, anxiety, and subjective well-being were 0.984, 0.969, and 0.819, respectively. The Cronbach's alpha coefficient for toral Mental health scale scores was 0.982.

Data analysis

The data was analyzed using SPSS 25.0 and Amos 26.0. Study I explored variable relationships through Harman's single factor test (first factor variance explained by 36.44%, with no significant common method bias), descriptive statistics (mean, standard deviation, etc.), Pearson correlation analysis, and used PROCESS (Model 4, 5000 bootstrap tests) to test the mediating effect of self-efficacy. A structural equation model was constructed using Amos 26.0 (with $X^2/df = 2–5$, RMSEA < 0.10, and NFI/IFI/CFI > 0.85 as fitting criteria). Study II used 2 (experimental group/control group) × 2 (time: pre-test/post-test) repeated measures ANOVA to test the main effects and interaction effects between groups and time. LSD post hoc comparison (Bonferroni correction) was used to analyze the differences between pre-test and post-test within and between groups, and to quantify the intervention effect with a bias of η^2 (>0.14 for major effect, 0.06–0.14 for moderate effect, and <0.06 for minor effect).

Results

Study I: The relationship between career maturity, self-efficacy, and mental health among college students

Descriptive statistics and correlation analysis

According to the results of the analysis shown in Table 2, the career maturity of college students ($M = 3.611$, $SD = 1.064$) is in the medium-high level. Self-efficacy of college students ($M = 3.660$, $SD = 1.089$) is in the medium-high level. College students' mental health ($M = 3.577$, $SD = 0.968$) again at a moderately high level. Overall, college students had comparable levels of career maturity, self-efficacy, and mental health with no significant differences between them. The results of the correlation analysis between the variables showed that there was a significant positive correlation between the career maturity, self-efficacy, and psychological well-being of the college students and their respective sub-dimensions ($p < 0.05$). Thus, it can be concluded that the three variables are suitable for relationship testing and are statistically significant.

Path effects tests

Hayes and Scharkow (2013) pointed out that attention should be paid to the credibility of indirect effects in statistical mediation analysis, and they suggested the bias-corrected bootstrap confidence interval as the most trustworthy test. Therefore, in this study, according to the idea of research hypothesis model, the sense of organizational support and career resilience as independent variables, job satisfaction as dependent variable, and decent work as mediator variable; stepwise regression method was used to analyze the mediation effect of decent work. The results are shown in Table 3.

As can be seen in Table 3, the results of Eq. (1) indicate that career maturity is significantly positively correlates with self-efficacy ($p < 0.001$), thus validating part of the conjecture of hypothesis 1. The results of Eq. (2) indicate that career maturity is significantly positively correlates with mental health ($p < 0.001$), thus validating part of the conjecture of hypothesis 1. The results of Eq. (3) indicate that when both the independent variables career maturity and self-efficacy enter the regression equation, they are significantly positively correlates with mental health ($p < 0.001$) thus verifying hypotheses 1 and 2. Meanwhile, the value of R^2 of the independent variable career maturity on the dependent variable increased from 45.6% to 68.8%, the R^2 changed to 23.2%, and the regression coefficient of the independent variable on the dependent variable decreased. Moreover, the regression coefficient is significant. Therefore, the mental health of college students can be further enhanced after acting on self-efficacy through career maturity.

The mediating effect of self-efficacy was verified in Amos 21.0 using percentile and bias-corrected confidence interval criteria (Hayes & Scharkow, 2013). A total of 5000 samples were randomly selected from the overall population and 95% confidence intervals were used to obtain the results, which are shown in Table 4.

The results in Table 4 indicate that in the direct effect, career maturity significantly positively correlates with self-efficacy and mental health, and none of the 0 were in

Table 2. Results of descriptive statistics and correlation analysis

Items	M	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9
1. Career concerns	3.633	1.098	−0.518	−0.365	–								
2. Career curiosity	3.555	1.118	−0.393	−0.569	0.911**	–							
3. Career confidence	3.644	1.115	−0.558	−0.299	0.857**	0.865**	–						
4. Career maturity	3.611	1.064	−0.498	−0.252	0.962**	0.966**	0.947**	–					
5. Self-efficacy	3.660	1.089	−0.452	−0.462	0.647**	0.638**	0.658**	0.676**	–				
6. Anxiety	3.667	1.059	−0.406	−0.416	0.672**	0.652**	0.676**	0.695**	0.919**	–			
7. Depression	3.546	1.086	−0.234	−0.771	0.539**	0.540**	0.555**	0.568**	0.634**	0.681**	–		
8. Subjective well-being	3.520	1.086	−0.249	−0.752	0.626**	0.646**	0.649**	0.668**	0.593**	0.616**	0.839**	–	
9. Mental health	3.577	0.968	−0.177	−0.403	0.680**	0.681**	0.696**	0.716**	0.794**	0.849**	0.936**	0.912**	–

Note. $^{**}p < 0.01$.

Table 3. Stepwise regression model of the mediating role of job satisfaction

No.	Dependent variable	Predictor variable	R2	β	t	F
Eq. (1)	Self-efficacy	Career maturity	0.456	0.676	21.415***	458.613***
Eq. (2)	Mental health	Career maturity	0.511	0.716	23.941***	573.162***
Eq. (3)	Mental health	Career maturity	0.688	0.330	7.182***	604.289***
		Self-efficacy		0.571		

Note. $^{***}p < 0.001$.

Table 4. Bootstrap analyses for significant tests of path effects

Path	Direct/intermediate effect values	S.E.	C.R.	95% bootstrap confidence interval	
				Boot LLCI	Boot ULCI
Direct effect					
Career maturity–self-efficacy	0.691	0.032	21.415	0.628	0.755
Career maturity–mental health	0.300	0.030	10.187	0.242	0.358
Self-efficacy–mental health	0.508	0.029	17.621	0.451	0.564
Indirect effect					
Career maturity–self-efficacy–mental health	0.351	0.032	9.576	0.289	0.417

the interval in the test of 95% confidence intervals, which further verified the research hypothesis 1. Meanwhile, in the indirect effect, the result was not in the interval in the test of 95% confidence intervals, and 0s were not in the interval, which also verified the research hypothesis 2.

Meanwhile, this study constructed a structural equation model of self-efficacy, which further verified the mediating role of self-efficacy. In order to verify the degree of fit of the model, we analyzed the specific fit indicators using Amos 26.0. The results showed that: $\chi^2 = 41.347$, $df = 10$, $\chi^2/df = 4.135$, which satisfied the criteria of 2–5. RMSEA = 0.076, which satisfied the requirement of being less than 0.06–0.10; NFI = 0.990, IFI = 0.993, CFI = 0.993, all of which satisfy the requirement of 0.85 or more, indicating a good model fit. Therefore, the final structural equation model was as shown in Figure 4.

Study II: Results of the experimental intervention of group counseling

After analyzing the experimental results of Study I, this study carried out the experimental intervention of Study II. The data of 30 student subjects with low career maturity were finally obtained, and the changes in the experimental pre-test data and post-test data of career maturity, self-efficacy and mental health of these subjects are shown in Figure 5. From the trend of changes, it can be found that after the intervention, the experimental group's growth in the three dimensions is significantly higher than that of the control group, and in order to explore the specific reasons for this, this study will analyze each dimension specifically.

Test of variance for career maturity

The corresponding data on career maturity were analyzed by a two-factor repeated measures ANOVA of 2 (group: experimental group/control group) × 2 (time: pre-test/post-test), where group was the between-subjects variable and time was the within-subjects variable. The results of the analyses were as follows: a significant main effect of group, a significant main effect of time, and a significant interaction between group and time. Further post hoc comparative analyses showed that the mean career maturity posttest scores of the experimental group (3.272 ± 0.511) were significantly higher than the mean career maturity pretest scores of the experimental group (1.824 ± 0.332), whereas the mean career maturity posttest scores of the control group (1.980 ± 0.366) and the mean career maturity pretest scores of the control group (1.787 ± 0.340) were not significant difference. This indicates that career group counseling has a significant

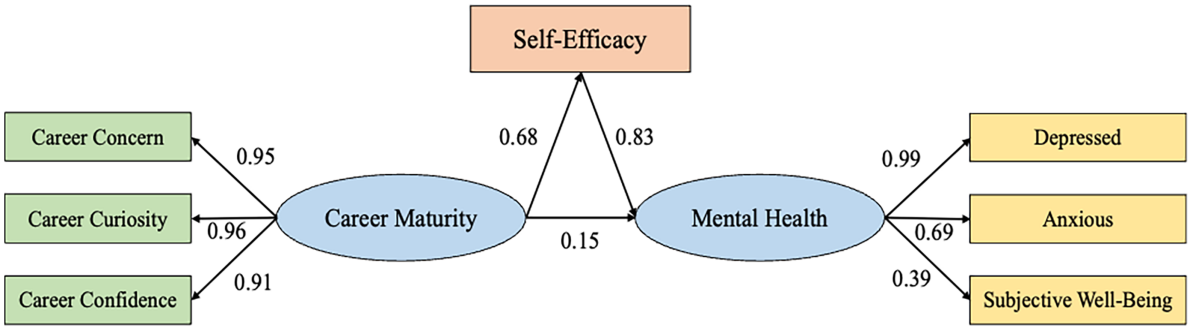

Figure 4. Model path analysis diagram

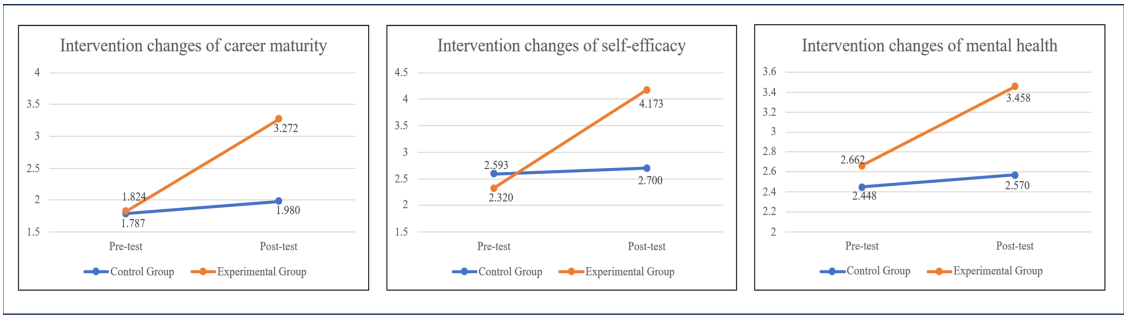

Figure 5. Trends in pre- and post-test data for each variable intervention

Table 5. Results of repeated measures ANOVA for career maturity

Experimental group vs. control group	F	Partial η^2
Group	26.469***	6.627
Time	168.460***	10.091
Time × Group	98.404***	5.895

Note. ***$p < 0.001$.

Table 6. Results of repeated measures ANOVA for self-efficacy

Experimental group vs. control group	F	Partial η^2
Group	6.206**	5.400
Time	100.522***	14.406
Time × Group	79.831***	11.441

Note. ***$p < 0.001$; **$p < 0.01$.

effect on the intervention of career maturity. See Table 5 for details.

Test of variance for self-efficacy

The corresponding data on self-efficacy were analyzed by a two-factor repeated measures ANOVA of 2 (group: experimental group/control group) × 2 (time: pre-test/post-test), where group was the between-subjects variable and time was the within-subjects variable. The results of the analyses were as follows: a significant main effect of group, a significant main effect of time, and a significant interaction between group and time. Further post hoc comparative analyses showed that the mean self-efficacy posttest scores of the experimental group (4.173 ± 0.512) were significantly higher than the mean self-efficacy pretest scores of the experimental group (2.320 ± 0.911), whereas the mean self-efficacy posttest scores of the control group (2.700 ± 0.644) and the control self-efficacy pretest scores (5.593 ± 0.722) did not have a significant difference. This indicates that career group counseling has a significant effect on self-efficacy intervention. See Table 6 for details.

Test of variance for mental health

A two-factor repeated measures ANOVA with 2 (group: experimental group/control group) × 2 (time: pre-test/post-test) was conducted on the corresponding data of mental health, where group was the between-subjects variable and time was the within-subjects variable. The results of the analyses were as follows: a significant main effect of group, a significant main effect of time, and a significant interaction between group and time. Further post hoc comparative analyses showed that the mean mental health posttest scores of the experimental group (3.458 ± 0.357) were significantly higher than the mean mental health pretest scores of the experimental group (2.662 ± 0.552), whereas there was no significant difference between the mean mental health posttest scores of the control group (2.570 ± 0.479) and the mean mental health pretest scores of the control group (2.448 ± 0.580). This indicates that career group counseling has a significant effect on the intervention of career maturity. The details are shown in Table 7.

From the above results, it can be seen that career group counseling can play a significant role in promoting career maturity, self-efficacy, and mental health of college

Table 7. Results of repeated measures ANOVA for mental health

Experimental group vs. control group	F	Partial η^2
Group	9.774**	4.554
Time	96.051***	3.163
Time × Group	51.591***	1.699

Note. ***$p < 0.001$; **$p < 0.01$.

students, respectively, which also verifies Hypothesis 3 of this study.

Discussion

This study systematically explored the relationships among career maturity, self-efficacy, and mental health in Chinese college students, and verified the effectiveness of career group counseling as a targeted intervention. The findings not only validate the theoretical hypotheses derived from SCCT but also provide empirical support for integrating career education and mental health promotion. Below is a detailed discussion of the core results, theoretical implications, non-significant findings, methodological limitations, and practical applications.

Consistent with Social Cognitive Career Theory (SCCT), the results demonstrated that career maturity was positively associated with college students' mental health. Students with higher levels of career maturity showed more adaptive career planning, clearer self-understanding, and greater proactive engagement in career preparation, which collectively reduced career-related uncertainty and emotional distress. This pattern is consistent with previous research indicating that career readiness serves as a protective factor for mental health by enhancing predictability, control, and goal orientation (Kawai & Yamazaki, 2006; Lim & Jung, 2024). Higher career maturity allows individuals to form realistic expectations, engage in effective problem-focused coping, and maintain emotional stability, thereby promoting psychological well-being.

Findings revealed that the career curiosity of career maturity had a weak predictive effect on the depression of mental health ($\beta = 0.08$, $p = 0.12$), failing to reach statistical significance. This may be attributed to the multidetermined nature of depression, which is influenced by factors beyond career cognition, such as personality traits, life stressors, and social support (Liu et al., 2022). As a cognitive tendency toward career exploration, career curiosity may exert an indirect protective effect through the chain mediation of self-efficacy and subjective well-being, rather than directly influencing depression. Future studies could further explore this more complex mediating pathway.

Besides, the intervention's effect on the subjective well-being of mental health (partial $\eta^2 = 1.699$) was smaller than its effect on self-efficacy (partial $\eta^2 = 11.441$). This discrepancy may stem from the short intervention cycle (only 6 weeks). Unlike self-efficacy, which can be rapidly enhanced through targeted skill training and accumulation of successful experiences, subjective well-being is a more stable psychological construct that requires long-term behavioral practice and cognitive restructuring to improve. Additionally, subjective well-being is influenced by broader life domains (e.g., interpersonal relationships, academic achievement), while the intervention focused primarily on career-related factors, limiting its impact on this dimension. Extending the intervention cycle or integrating positive psychology techniques (e.g., gratitude practice, strengths-based intervention) could potentially enhance the effect on subjective well-being.

Implications for Research and Practice

The dual validation through related research and intervention studies underscores the theoretical value of this investigation. Extending the application of SCCT to the domain of college students' mental health clarifies the specific pathways through which career-related factors influence psychological well-being. By validating the mediating role of self-efficacy, this study complements existing research on the relationship between career maturity and mental health (Kawai & Yamazaki, 2006), providing a clear theoretical framework for understanding how career education indirectly promotes mental health. Based on core findings and theoretical mechanisms, this study offers targeted practical implications for career education, student self-development, and psychological counseling in higher education. For higher education career educators, given self-efficacy's strong mediating role for improved elf-efficacy the 6-week modular intervention program developed in this study is highly operational and cost-effective, allowing direct integration into existing career planning curricula. Modules such as Week 1's Success Experience Review, Week 4's Obstacle-Solving Simulation, and Week 5's Small Goal Decomposition particularly embody these characteristics. For STEM-focused colleges with a higher male enrollment, intervention case studies can be adapted to technical contexts (e.g., engineering project practice, technical career exploration) to enhance relevance and engagement. Additionally, institutions should optimize the timing of career education interventions, implementing them during sophomore or junior years (critical periods for career exploration) to maximize their protective effects on mental health.

For counselors addressing career-related psychological distress (e.g., career choice anxiety, employment pressure), interventions integrating cognitive restructuring with career support should be employed. Drawing from this study's approach to building career confidence, counselors can help students eliminate negative beliefs like "I am not competent" and replace them with evidence-based self-efficacy beliefs. Simultaneously, counselors should collaborate with career services departments to provide personalized career guidance, helping students translate enhanced self-efficacy into concrete career planning and mental health gains.

Limitations, Future Directions and Conclusions

This study has several limitations that should be objectively noted to inform future research. First, the representativeness of the sample could be improved. Convenience sampling was employed to select participants, and the sample size for the intervention study (Study II) was relatively small (n = 30), potentially limiting the generalizability of the findings. Second, the sample exhibited gender imbalance, with male students significantly outnumbering females (68.1%) due to the selection of students from science and engineering universities. This imbalance may result in differing applicability of the findings across gender groups. Additionally, the analysis did not account for potential confounding variables such as age, socioeconomic status, and personality traits (e.g., neuroticism). Existing research indicates these variables may correlate with college students' career maturity (Lim & Jung, 2024) and self-efficacy (Jia & Wang, 2024), while also independently influencing mental health levels (Liu et al., 2022). Failure to statistically control for these variables may result in incomplete model saturation, leaving potential interference from these factors on core variable relationships unaccounted for. Finally, constrained by ethical norms, the intervention study supplemented the control group with identical career guidance materials post-intervention to ensure educational equity. Moreover, the intervention period was limited to 6 weeks, potentially insufficient to fully reveal long-term effects. Extending the follow-up period and rigorously controlling experimental conditions would enhance the persuasiveness of the findings. These limitations provide clear directions for future research improvements. Subsequent studies can enhance the generalizability and reliability of findings by expanding sample coverage, balancing gender ratios, extending intervention periods with stricter experimental controls, and incorporating key confounding variables.

In summary, this study confirms that career maturity promotes mental health through the mediating effect of self-efficacy and validates the effectiveness of integrated career group counseling incorporating self-efficacy enhancement. Despite limitations, this research provides a theoretical framework and practical tools for integrating career education with mental health promotion, while also identifying clear directions for future research improvements.

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