International Journal for Housing Science and Its Applications
Publish August 10, 2025. Volume 46, Issue 4 Pages 2383-2398

https://doi.org/10.70517/ijhsa464202

Craftsmanship Spirit and Talent Cultivation in Biological Cell Engineering: The Interactive Effects of Character Strengths, Family Upbringing Methods, and Survival Environment

Rong Wang[1,*], Xiaocui Miao[2] and Linke Zheng[3]
[1] College Students' Mental Health Education Center, Shaanxi Institute of Technology, Xi'an, Shaanxi, 710300, China
[2] College Students' Mental Health Education Center, Shanxi Datong University, Datong, Shanxi, 037009, China
[3] Shaanxi University Psychological Quality Education Research Association, Xi'an, Shaanxi, 710300, China
Corresponding authors: (e-mail: mai1989ya@163.com).

Abstract This research explores character strengths in relation to the vocational aspirations of college students with regard to their biological cell engineering excellence aspirations. With a sample of 55,028 undergraduate students across 14 universities in China, this study analyses the influence of gender, parental styles, and survival contexts on character strengths and career aspirations. Results showed that 14 character strengths have a distinct predictive value on students' craftsmanship inclinations, with predictive values being stronger for females than for males. Furthermore, authoritative and permissive parenting positively impacts craftsman-related character strengths, while learners from challenging survival contexts demonstrate greater levels of resilience and determination. In addition, pronounced moderating effects are documented for gender with parenting styles, gender with survival contexts, and parenting styles with survival contexts. The results underpin strategies for biological cell engineering talent development, highlighting the importance of psychological factors in highly specialised occupations.

Index Terms Character strengths, career choice, craftsmanship, parenting styles, survival environment, biological cell engineering.

I. Introduction

I. A. Background

In current biomedicine, the progress of biological cells is a front-line field in precision technology, where high technical competence must be combined with an unshakeable dedication to quality. This field covers several procedures, such as cell culture, tissue engineering, genetic manipulation, and the production of biomaterials, all involving meticulous detail, an unbreakable level of patience, and an unshakeable dedication to quality standards—values that harmonize with the philosophy of craftsmanship [1], [2]. New innovations in biomedicine are increasingly based on the precision and reliability of cell manipulation methodologies, where even the slightest mistakes may lead to major experiment failures or impaired healing outcomes [3]. In turn, the attainment of competence in the field of biological cell manufacturing thus requires technical proficiency as much as certain personal traits that ensure thoroughness and the ability to solve difficult problems in challenging lab settings [4].

The concept of craftsmanship, habitually associated with skilled manual work, has taken on a refined meaning in the field of biological sciences, in which the integration of manual dexterity, persistence, and scientific exactness becomes a hallmark feature [5], [6]. The inherently microscopic scale of cellular activities requires exact control of temperature and humidity, conformity to sterile procedures, and ongoing monitoring over extended periods, thus creating a unique environment in which personal qualities can significantly influence both career selection and professional success [7]. Modern research in the field of positive psychology has shown that character strengths are significantly involved in individual development, psychological well-being, and job satisfaction [8], [9]. However, the specific interplay between character strengths and the pursuit of craftsmanship in the field of biological cell engineering has hitherto remained largely uninvestigated, thus representing a significant gap in our understanding of talent development in this critical field [10], [11].

I. B. Objective

This inquiry will determine the degree to which character strengths influence college students' career choices in becoming a "craft master" of the biological cell engineering field. The investigation seeks to determine which character strengths are the strongest predictors of students' inclination toward the fastidious craftsmanship required in cellular and tissue engineering procedures [2]. Additionally, this analysis considers the impact of gender

differences on the expression and value of character strengths in this technical field, where both technical skills and personality traits may be involved in accomplishing positive outcomes [12]. This research also considers the impact of different parenting styles on college students' development of character strengths related to biological engineering craftsmanship in an effort to determine whether some parenting styles are more likely than others to promote the patience, attention to detail, and scientific rigor essential to cellular manipulation [13]. Finally, we explore how different survival situations—favorable, difficult, or adverse environments—may influence the development of resilience and persistence necessary for the long-term, often challenging work in biological cell engineering [14].

I. C. Research Questions

This study addresses several key questions at the intersection of character development, educational psychology, and biological engineering talent cultivation: How do character strengths influence college students' career choices, particularly in the aspect of choosing to become a "craft master" in biological cell engineering? Which specific strengths most strongly predict interest in the precise, detail-oriented work characteristic of cell culture and tissue engineering? How does gender difference affect the expression and role of character strengths in biological engineering contexts, where both microscopic manipulation skills and scientific analysis are required? How do different parenting styles affect the development of college students' character strengths that support success in biological cell engineering? Finally, how do various survival environments influence students' resilience and determination—traits particularly valuable for the challenges inherent in biological research and development?

I. D. Literature Review

I. D. 1)Relevant Research on Positive Psychology Character Strengths

Martin Seligman and Christopher Peterson developed the Values in Action (VIA) Classification of Character Strengths, a systematic approach to identifying and measuring positive personality traits organized around six core virtues: wisdom and knowledge, courage, humanity, justice, temperance, and transcendence [15]. This framework has proven valuable for understanding how individual strengths influence various life outcomes, including career selection and satisfaction. Studies have demonstrated that recognizing and utilizing one's character strengths can help individuals cope with challenges, improve life satisfaction, and enhance self-efficacy [16]. Research on character strengths has significant implications for education and career development. In educational contexts, understanding students' character strengths enables more effective personalized teaching approaches that stimulate learning interest and potential [17]. In career development, character strengths have been shown to influence career path selection, job satisfaction, and work performance [18]. However, the specific relationship between character strengths and the choice to pursue craftsmanship in high-precision fields like biological cell engineering remains underexplored despite its potential significance for talent cultivation strategies.

I. D. 2)Relevant Research on Parenting Styles

American educator Diana Baumrind proposed four fundamental parenting styles—authoritative, permissive, authoritarian, and neglectful—which have been shown to significantly impact children's cognitive, personality, and social development [7]. Longitudinal studies have established connections between parenting approaches and children's outcomes in various domains, including academic achievement, social competence, and psychological well-being. However, these studies have primarily focused on early childhood development, with less attention given to how parenting influences college students' future career choices, particularly in specialized technical fields like biological engineering where precision and patience are paramount [7,10]. The relationship between parenting styles and the development of specific character strengths relevant to scientific craftsmanship—such as persistence, attention to detail, and methodical approach to complex problems—represents a significant gap in current understanding that this research aims to address.

I. D. 3)Survival Situations

Survival situations refer to the environmental conditions an individual experiences during development. Throughout life, people encounter varying circumstances ranging from prosperity to adversity, including transitions such as higher education, employment, marriage, and facing challenges like epidemics. Research has shown that individuals who develop in adverse conditions may develop greater psychological resilience and stronger coping abilities [13], while other studies indicate that difficult and adverse environments significantly increase vulnerability to depression and other psychological challenges [14]. However, existing research on survival situations has primarily focused on psychological disorders rather than on how these environments might influence character development and career choices. The potential relationship between environmental challenges and the development of persistence, careful observation, and problem-solving abilities relevant to biological cell engineering represents an important area for investigation.

I. D. 4)Previous Research Achievements and Limitations

It has been widely known that individual development is affected by character strengths, parenting style, and survival conditions, yet it seems that few research studies examine the interaction of the factors in the context of the decision by college students to pursue craftsmanship in biological cell engineering. The literature has not extensively analyzed the interaction of those psychosocial factors to develop the traits that are especially important to precision-oriented scientific fields. In addition, although technical training has received much emphasis in biomedical fields, the psychological factors that are relevant to the development of talent in the field of biological cell engineering received relatively little academic consideration [2], [3]. This gap in knowledge marks the essential gap in the understanding of the proper way to develop the upcoming generations of competent professionals in the field. This current research aims to cover these gaps by investigating the character strengths that stimulate the decision by college students to pursue craftsmanship in biological engineering and whether the decisions are affected by parenting style and survival conditions.

I. E. Problem Assumption

Based on the current literature and the suggested theoretical model, this study hypothesizes the following:

Hypothesis 1: Future practitioners of biological cell engineering as an undergraduate student have significant multiple character strengths as found in positive psychology, particularly those related to facets of conscientious work and scientific creativity.

Hypothesis 2: Parenting styles (neglectful/authoritarian/authoritative/permissive) significantly influence college students' choice to become craftsmen in biological cell engineering, with certain styles potentially fostering character strengths more conducive to precision-oriented scientific work.

Hypothesis 3: Survival situations (favorable/difficult/adverse) significantly affect college students' choice to become craftsmen in biological cell engineering, with different environmental challenges potentially cultivating varying levels of resilience and determination relevant to scientific craftsmanship.

By exploring these hypotheses, this current work aims to improve the understanding of the psychosocial factors that determine the creation of a craftsmanship ethos in the field of biological cell engineering with the aim of making more efficient the talent development in this vital field.

II. Methods

II. A. Participants

In keeping with the aims of the study, the participants included students from 14 universities across four major regions in China (Eastern, Central, Western, and Northeastern). This multi-institutional, cross-regional sample was collected over a period of six years (2018-2024) through a comprehensive tracking system designed to monitor character strengths and career development patterns. The target population comprised students pursuing academic programs in various biological disciplines including, but not limited to, biological engineering, biomedical engineering, biotechnology, cellular biology, tissue engineering, molecular biology, and other related fields where the acquisition of technical skill in laboratory settings is crucial to professional progress.

The research employed a stratified sampling approach to ensure proper representation across multiple dimensions. The stratification process occurred in three sequential stages:

(1) Universities were stratified by geographical region (Eastern, Central, Western, and Northeastern China) and institutional classification (comprehensive universities, science and technology institutions, and medical universities). From each stratum, universities with established biological science and engineering programs were selected, resulting in 14 institutions that collectively represent the diversity of biological sciences education in China.

(2) Within each selected university, further stratification was applied based on program level (undergraduate, master's, and doctoral) and academic discipline (covering the spectrum of biological and biomedical sciences relevant to cell engineering). This ensured appropriate representation across educational stages and the diverse specializations that contribute to advances in biological cell engineering.

(3) Within each program level and discipline stratum, random sampling was employed to select participants, with sample sizes proportional to the population size of each stratum. This multi-stage stratified sampling approach yielded a final sample of 55,028 participants, including undergraduate students (72.5%), master's students (22.3%), and doctoral students (5.2%).

Descriptive statistics revealed the sample distribution as follows: The gender distribution included 25,437 men (46.2%) and 29,591 women (53.8%), thus providing adequate representation to study gender differences in character strengths and vocational interests. The age range of the participants averaged 20.58 ± 2.228 years, which represented the standard profile of students at various stages of their academic progress and career planning. This

substantial sample size provided sufficient statistical power for examining the complex relationships between character strengths, parenting styles, survival situations, and career choices in the field of biological cell engineering.

II. B. Instrument

II. B. 1) Career Value Choice

The "Career Value Choice" instrument encompasses 9 indicators designed to measure respondents' patriotic inclinations in their future career paths, with particular attention to career choices requiring precision, dedication, and technical mastery relevant to biological cell engineering. The instrument consists of two main factors:

(1) Willingness to reciprocate family support: This factor includes four items - H1. Aiming to earn money for family support; H2. Aspiring to start a family and establish a career; H3. Intending to contribute to hometown development; H4. Starting a business independently.

(2) Willingness to repay the nation: This factor includes five items - C1. Aiming to pursue higher education and sit for postgraduate entrance exams; C2. Aspiring to become a distinguished scholar; C3. Intending to become a master craftsman; C4. Desiring to work for organizations or enterprises; C5. Committing to lifelong societal contributions.

Each item is scored as 0 or 1, with 0 indicating "no" and signifying the absence of such willingness, and 1 indicating "yes" and representing the presence of such willingness. The overall average score is determined by summing the test indicators and dividing by 9. Factor H (Willingness to reciprocate family support) is calculated as (H1 + H2 + H3 + H4)/ 4, and Factor C (Willingness to repay society) is computed as (C1 + C2 + C3 + C4 + C5)/ 5.

For this study's purposes, test indicator C3 (willingness to become a master craftsman) was extracted as the main target variable or dependent variable (y) for analysis and prediction. In the context of biological cell engineering, this indicator represents students' willingness to pursue the patient, precise, and skilled work required for cell culture, tissue engineering, and other biomedical applications requiring craftsman-like dedication.

II. B. 2) Character Strengths Scale

Based on Martin Seligman's "Values in Action Inventory of Strengths, VIA-IS," this survey questionnaire incorporates a "Character Strengths Scale" consisting of 24 items across 6 major dimensions:

(1) Strengths A "Wisdom" comprises 5 items: Curiosity, Love of Learning, Judgment/Critical Thinking, Creativity, Perspective. These strengths are particularly relevant to the analytical and problem-solving aspects of biological cell engineering work.

(2) Strengths B "Courage" includes 4 items: Bravery, Perseverance/Grit, Honesty/Integrity, Zest/Vitality. Perseverance is especially important for the long-term nature of cell cultivation and biological research.

(3) Strengths C "Humanity" includes 3 items: Love, Kindness/Generosity, Social Skills. These qualities support collaborative laboratory work and knowledge sharing essential in biological research teams.

(4) Strengths D "Justice" includes 3 items: Teamwork/Citizenship, Fairness, Leadership. Teamwork is particularly crucial in modern biological cell engineering projects that often require multidisciplinary collaboration.

(5) Strengths E "Temperance" includes 4 items: Forgiveness & Mercy, Humility/Modesty, Prudence/Discretion, Self-Regulation/Self-Control. Self-regulation and prudence are essential for maintaining the precise conditions required in biological experiments.

(6) Strengths F "Transcendence" includes 5 items: Appreciation of Beauty & Excellence, Gratitude, Hope/Optimism, Humor, Spirituality. Appreciation of excellence and optimism can sustain motivation through the challenges of biological research.

Each item is scored as 0 or 1, with "No" = 0 indicating the absence of the strength and "Yes" = 1 indicating the presence of the strength. The average score for each strength factor is calculated by summing the scores of the indicators within each category and dividing by the number of items. This study utilizes these character strengths as predictive variables or independent variables (x) for analysis and prediction, examining their relationship to students' inclination toward craftsmanship in biological cell engineering.

II. B. 3) Parenting Style Scale

Drawing on American educator Diana Baumrind's theory of "parenting styles," this survey questionnaire is designed with two dimensions and four types.

The two dimensions of parenting are represented along coordinate axes: the x-axis represents the extent to which parents meet their children's needs during growth, with 1 point indicating a low level of meeting these needs and 2 points indicating a high level; the y-axis measures the degree of parental demands on their children's behavior, with 1 point indicating low demands and 2 points indicating high demands.

Four parenting styles emerge from the combination of these dimensions: Neglectful Style (x = 1 low need satisfaction & y = 1 low behavior demand), Autocratic Style (x = 1 low need satisfaction & y = 2 high behavior

demand), Authoritative Style (x = 2 high need satisfaction & y = 2 high behavior demand), and Permissive Style (x = 2 high need satisfaction & y = 1 low behavior demand). By combining the x and y dimensions, the four types or styles of "parenting styles" are constructed.

These parenting styles were analyzed to determine their influence on character strengths relevant to biological cell engineering craftsmanship, where precision, patience, and methodical approach are essential.

II. B. 4) Survival Situations Scale

The survival situations scale is an ordinal scale encompassing nine levels; a higher level indicates a more severe environment. Grades 1-3 are classified as prosperity (favourable conditions), grades 4-6 as dilemma (difficult conditions), and 7-9 as adversity (adverse conditions). Using this scale, one can study how varying levels of environmental stressors may impact the development of resilience, self-control, and coping strategies needed in the biological cell engineering industry.

II. C. Data Analysis

Data was analysed using SPSS version 27.0 and version 18.0, as well as using AMOS for calculating the sophisticated interrelations of character strengths, parenting style, survival conditions, and craftsmanship decisions within biological cell engineering. The methods of SPSS employed were descriptive statistics to summarise the data, comparisons using means to determine whether differences existed between groups, correlation analysis to investigate relationships between character strengths and craftsmanship decisions, regression analysis to establish predictive character strengths, multivariate generalised linear modelling (GLM Multivariate) to evaluate the presence of interaction effects, reliability testing to assess consistency, and validation testing to confirm the research instruments' usefulness. In AMOS, the methods used were path analysis to illustrate directional influences in relationships, effect analysis for main and mediated associations, structural equation modelling (SEM) for overall model evaluation, and goodness-of-fit statistics for model evaluation. The aforementioned analysis enabled examining the role character strengths, moderated by gender, parenting style, and survival conditions, have on propensities towards craftsmanship within biological cell engineering.

II. D. Ethical Considerations

This research was conducted in accordance with the ethical standards of the American Psychological Association which show respect to all participants, including their privacy. In the data collection stage, participants' anonymity was protected, which contributed towards guaranteed confidentiality. All participants received comprehensive information detailing the objectives, methods, and potential impacts of the study's outcomes. Data collection was only done after all participants provided informed consent. Furthermore, participants were informed that they could voluntarily withdraw from the study at any time without experiencing negative repercussions. This research also received approval from the "2024 Shaanxi Province Major Theoretical and Practical Issues in Digital Psychological Education Research Project for Colleges and Universities" (Number: Approval Number: 2024-SP-A007). During the entirety of the research, participants' rights and interests were protected by abiding to strict scientific principles and appropriate ethical guidelines. If any unforeseen circumstances arose that had the potential to influence participant rights, swift measures were implemented to address such concerns. The cultural background of the participants was given utmost respect, and any potential biases relating to culture were carefully neutralised in measuring and interpreting instruments.

III. Results

III. A. Overview of Variables

III. A. 1) Career Value Choice 9 Items Analysis

Descriptive Analysis of "Career Value Choice" Data revealed several key findings relevant to biological cell engineering craftsmanship. The overall average score for "Career Value Choice" (comprising 9 items) was 0.2807. Within this construct, "Repaying the Family" (an average of 4 items) had a mean of 0.3237, and "Repaying the Society" (an average of 5 items) had a mean of 0.2438. The distribution of means ranged from 0.1105 to 0.7083, with the highest mean scores being H1. Earning to Support the Family (0.7083) and C1. Furthering Studies for Postgraduate (0.5158). In the context of this study, the mean score for C3. Being a Master Craftsman was 0.2015, slightly higher than that of C2. Being a Renowned Scholar (0.1948). These values indicate a moderate but notable inclination toward craftsmanship careers among students, which is particularly significant in the context of biological cell engineering where precision and dedication are essential. For a detailed overview, please refer to Table 1 and Figure 1.

Table 1: Descriptive Statistics of Career Value Choice Items

Item	N	Minimum	Maximum	Mean	Std. Deviation
Feelings for Home & Country (9 average)	55028	0.00	1.00	0.2807	0.22740
Repaying the family (average of 4 items)	55028	0.00	1.00	0.3237	0.25254
Repaying the society (average of 5 items)	55028	0.00	1.00	0.2438	0.25670
H1. Earning to Support the Family	55028	0.00	1.00	0.7083	0.45456
H2. Establish Family & Career	55028	0.00	1.00	0.1357	0.34245
H3. Hometown Development	55028	0.00	1.00	0.1886	0.39123
H4. Starting a Business Independently	55028	0.00	1.00	0.2624	0.43994
C1. Furthering Studies for Postgraduate	55028	0.00	1.00	0.5158	0.49975
C2. Be a Renowned Scholar	55028	0.00	1.00	0.1948	0.39602
C3. Be a Master Craftsman	55028	0.00	1.00	0.2015	0.40114
C4. To Organization or Enterprise	55028	0.00	1.00	0.1105	0.31348
C5. Contributing to Society	55028	0.00	1.00	0.1963	0.39723

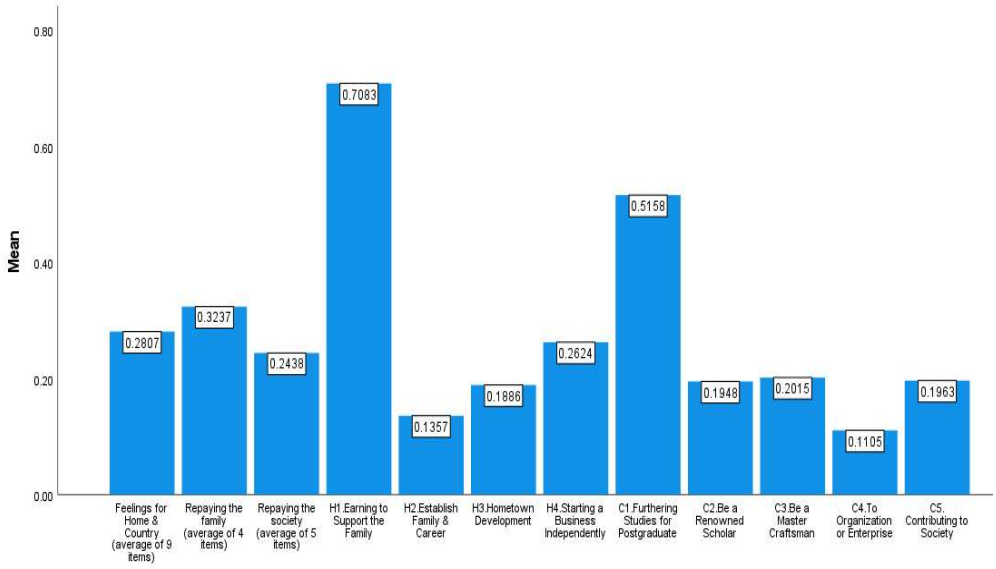

Figure 1: College Students' Feelings for Home & Country

III. A. 2) 24 Character Strengths Mean Value Analysis

Based on the descriptive statistical data, we analyzed the average values, range of means, and the top five personality strengths ranked by the maximum values for the 24-item indicators and the 6-factor descriptions. The analysis showed that the overall average for the 24 personality strengths was 0.5265. The range of means varied from the minimum value of 0.3567 (Zest/Vitality) to the maximum value of 0.6465 (Teamwork/Citizenship). The top five personality strengths ranked by the maximum values were Teamwork/Citizenship (0.6465), Fairness (0.6338), Hope/Optimism (0.6323), Self-Regulation/Self-Control (0.6023), and Prudence/Discretion (0.5924).

These findings are particularly noteworthy in the context of biological cell engineering, where teamwork is essential for collaborative research, fairness ensures ethical research practices, optimism helps sustain motivation during long experimental processes, and self-regulation and prudence are crucial for maintaining the precise conditions required for successful cell cultivation and manipulation. See Table 2 and Figure 2.

Table 2: Descriptive Statistics of Character Strengths

Character Strength	N	Minimum	Maximum	Mean	Std. Deviation
Mean Values of 24 Personality Strengths	55028	0.00	1.00	0.5265	0.31268
Strengths A "Wisdom"	55028	0.00	1.00	0.4611	0.34685
Strengths B "Courage"	55028	0.00	1.00	0.4327	0.37508
Strengths C "Humanity"	55028	0.00	1.00	0.5615	0.39932
Strengths D "Justice"	55028	0.00	1.00	0.5741	0.38958
Strengths E "Temperance"	55028	0.00	1.00	0.5324	0.37588
Strengths F "Transcendence"	55028	0.00	1.00	0.5593	0.36413
Curiosity	55028	0.00	1.00	0.5419	0.49825
Love of Learning	55028	0.00	1.00	0.4758	0.49942
Judgment/Critical Thinking	55028	0.00	1.00	0.4374	0.49607
Creativity	55028	0.00	1.00	0.4594	0.49835
Perspective	55028	0.00	1.00	0.3909	0.48797
Bravery	55028	0.00	1.00	0.4502	0.49752
Perseverance/Grit	55028	0.00	1.00	0.4245	0.49426
Honesty/Integrity	55028	0.00	1.00	0.4994	0.50000
Zest/Vitality	55028	0.00	1.00	0.3567	0.47904
Love	55028	0.00	1.00	0.5148	0.49978
Kindness/Generosity	55028	0.00	1.00	0.5832	0.49303
Social Skills	55028	0.00	1.00	0.5864	0.49249
Teamwork/Citizenship	55028	0.00	1.00	0.6465	0.47805
Fairness	55028	0.00	1.00	0.6338	0.48177
Leadership	55028	0.00	1.00	0.4419	0.49662
Forgiveness & Mercy	55028	0.00	1.00	0.4550	0.49797
Humility/Modesty	55028	0.00	1.00	0.4798	0.49960
Prudence/Discretion	55028	0.00	1.00	0.5924	0.49138
Self-Regulation/Self-Control	55028	0.00	1.00	0.6023	0.48942
Appreciation of Beauty & Excellence	55028	0.00	1.00	0.5859	0.49258
Gratitude	55028	0.00	1.00	0.5917	0.49153
Hope/Optimism	55028	0.00	1.00	0.6323	0.48217
Humor	55028	0.00	1.00	0.4349	0.49574
Spirituality	55028	0.00	1.00	0.5520	0.49729

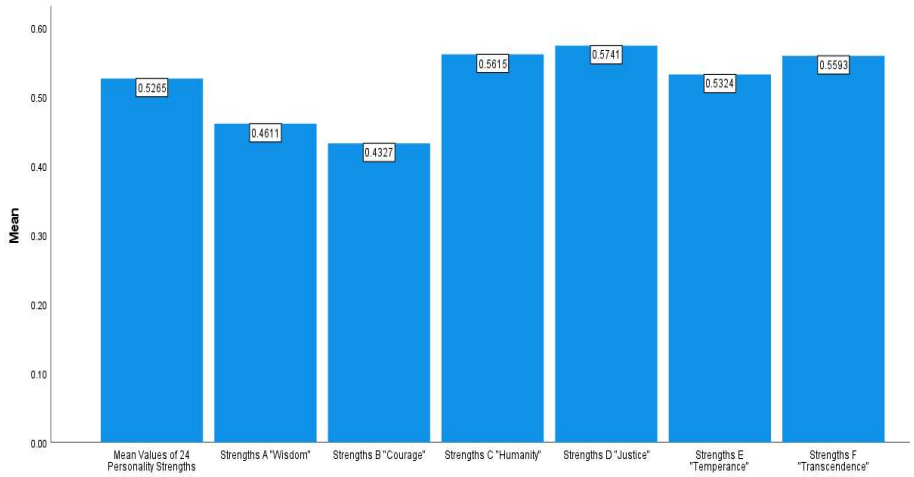

Figure 2: Character Strengths 6 Dimensional Mean

III. A. 3) Adjustment Variable Description Analysis

The distribution of the adjustment variables was as follows.

(1) Gender: There were 25,437 males (46.2%) and 29,591 females (53.8%). This balanced gender distribution allowed for meaningful comparisons of character strengths and career preferences between male and female students. Please refer to Table 3 for more details.

Table 3: Gender Groups

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	25437	46.2	46.2	46.2
Female	29591	53.8	53.8	100.0
Total	55028	100.0	100.0	

(2) Parenting Styles: 10,385 individuals experienced the Neglectful Style (18.9%), 3,445 individuals the Autocratic Style (6.3%), 30,197 individuals the Authoritative Style (54.9%), and 11,001 individuals the Permissive Style (20.0%). The predominance of authoritative parenting in the sample is noteworthy, particularly given its potential relationship to developing character strengths relevant to biological cell engineering. Please refer to Table 4 for more details.

Table 4: Parenting Groups

Parenting Style	Frequency	Percent	Valid Percent	Cumulative Percent
Neglectful Style	10385	18.9	18.9	18.9
Autocratic Style	3445	6.3	6.3	25.1
Authoritative Style	30197	54.9	54.9	80.0
Permissive Style	11001	20.0	20.0	100.0
Total	55028	100.0	100.0	

(3) Survival Situations: 17,525 individuals were in Favorable Situations (31.8%), 30,873 individuals faced Difficult Situations (56.1%), and 6,630 individuals encountered Adverse Situations (12.0%). The majority of participants reporting difficult situations provides valuable insight into how moderate challenges might influence character development relevant to precision-oriented careers like biological cell engineering. Please refer to Table 5 for more details.

Table 5: Growth Situations

Growth Situation	Frequency	Percent	Valid Percent	Cumulative Percent
Favorable Situations	17525	31.8	31.8	31.8
Difficult Situations	30873	56.1	56.1	88.0
Adverse Situations	6630	12.0	12.0	100.0
Total	55028	100.0	100.0	

III. B. Correlation Analysis

A correlation analysis was conducted between the six dimensions of character strengths and the variable of being a craftsman. The results indicated significant relationships relevant to biological cell engineering.

(1) Bivariate correlation: Each dimension of personality advantage was significantly positively correlated with the willingness to be a craftsman, confirming the importance of character strengths in predicting interest in precision-oriented careers.

(2) Correlation ranking: According to the correlation coefficient from high to low, the top three were wisdom ($r = 0.254$), courage ($r = 0.240$), and transcendence ($r = 0.239$), followed by temperance ($r = 0.217$), justice ($r = 0.213$), and humanity ($r = 0.207$).

These findings are particularly noteworthy in the biological cell engineering context, where wisdom (encompassing curiosity, love of learning, judgment, creativity, and perspective) is essential for scientific inquiry and innovation, courage (including perseverance and honesty) supports persistence through experimental challenges, and transcendence (including appreciation of excellence and optimism) helps maintain motivation despite setbacks in cellular research. See Table 6.

Table 6: Correlations Between Character Strengths and Craftsman Career Choice

Variable	Correlation	C3	A	B	C	D	E	F
C3. Be a Master Craftsman	r	--						
	N	55028						
Strengths A "Wisdom"	r	0.254**	--					
	Sig. (2-tailed)	0.000						
	N	55028	55028					
Strengths B "Courage"	r	0.240**	0.717**	--				
	Sig. (2-tailed)	0.000	0.000					
	N	55028	55028	55028				
Strengths C "Humanity"	r	0.207**	0.608**	0.672**	--			
	Sig. (2-tailed)	0.000	0.000	0.000				
	N	55028	55028	55028	55028			
Strengths D "Justice"	r	0.213**	0.596**	0.646**	0.706**	--		
	Sig. (2-tailed)	0.000	0.000	0.000	0.000			
	N	55028	55028	55028	55028	55028		
Strengths E "Temperance"	r	0.217**	0.544**	0.599**	0.617**	0.702**	--	
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		
	N	55028	55028	55028	55028	55028	55028	
Strengths F "Transcendence"	r	0.239**	0.631**	0.663**	0.701**	0.747**	0.719**	--
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
	N	55028	55028	55028	55028	55028	55028	55028

Note: ** Correlation is significant at the 0.01 level (2-tailed).

III. C. Regression Analysis

III. C. 1) Regression Model Summary

The regression model examining the relationship between character strengths and the choice to become a master craftsman in biological cell engineering yielded an R-value of 0.285, with an R-Square of 0.081, explaining 8.1% of the total variability in the model. While this indicates that other factors also influence career choices, it confirms that character strengths play a significant role in predicting interest in craftsmanship careers requiring precision and dedication. See Table 7.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
14	0.285	0.081	0.081	0.38454

Note: Predictors: (Constant), Leadership, Creativity, Spirituality, Perspective, Humor, Love of Learning, Honesty/Integrity, Judgment/Critical Thinking, Prudence/Discretion, Curiosity, Zest/Vitality, Forgiveness & Mercy, Gratitude, Humility/Modesty, Teamwork/Citizenship. Dependent Variable: C3. Be a Master Craftsman.

III. C. 2) Regression Coefficients

In a linear regression analysis (stepwise method) with 24 personality trait indicators as independent variables and the trait 'Be a Master Craftsman' as the dependent variable, 14 personality strengths were found to have a significant positive effect on 'Being a Master Craftsman' ($p < 0.001$). These strengths, particularly relevant to biological cell engineering, include Creativity ($\beta = 0.067$), which is essential for innovative approaches to cell cultivation; Perspective ($\beta = 0.044$), which supports comprehensive understanding of complex biological systems; Leadership ($\beta = 0.038$), which facilitates collaborative research; and Judgment/Critical Thinking ($\beta = 0.033$), which is crucial for experimental design and data interpretation. The results are presented in Table 8.

Table 8: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
15 (Constant)	0.038	0.003		11.479	0.000
Leadership	0.031	0.005	0.038	6.701	0.000
Creativity	0.054	0.004	0.067	13.387	0.000
Spirituality	0.033	0.004	0.041	7.353	0.000
Perspective	0.036	0.004	0.044	8.769	0.000
Humor	0.029	0.004	0.036	6.979	0.000
Love of Learning	0.025	0.004	0.031	6.177	0.000
Honesty/Integrity	0.024	0.004	0.030	5.964	0.000
Judgment/Critical Thinking	0.026	0.004	0.033	6.697	0.000
Prudence/Discretion	0.019	0.004	0.023	4.576	0.000
Curiosity	0.020	0.004	0.025	5.195	0.000
Zest/Vitality	0.021	0.004	0.026	4.863	0.000
Forgiveness & Mercy	0.015	0.004	0.019	3.644	0.000
Gratitude	0.018	0.004	0.022	4.231	0.000
Humility/Modesty	0.016	0.004	0.019	3.532	0.000

Note: Dependent Variable: C3. Be a Master Craftsman

III. C. 3) Regression Formula

Based on the regression coefficients, the following formula was established to predict a student's inclination toward becoming a master craftsman in biological cell engineering:

(y) Be a Master Craftsman = 0.038 + (0.031 × Leadership) + (0.054 × Creativity) + (0.033 × Spirituality) + (0.036 × Perspective) + (0.029 × Humor) + (0.025 × Love of Learning) + (0.024 × Honesty/Integrity) + (0.026 × Judgment/Critical Thinking) + (0.019 × Prudence/Discretion) + (0.020 × Curiosity) + (0.021 × Zest/Vitality) + (0.015 × Forgiveness & Mercy) + (0.018 × Gratitude) + (0.016 × Humility/Modesty)

This formula highlights the particular importance of creativity, perspective, and leadership in predicting interest in craftsmanship careers requiring the precision and dedication characteristic of biological cell engineering.

III. C. 4) Regression Predicted Value

In this study, the regression y (Be a Master Craftsman) non-standard predicted value (a function of 14 character strengths as independent variables) was used as a causal predictive variable, named "Character Strengths of a Craftsman Selector." This variable was stored in the database to generate a new variable that was used to continue with the analysis of moderating effects and interaction effects, particularly examining how gender, parenting styles, and survival situations might influence the relationship between character strengths and interest in biological cell engineering craftsmanship.

III. D. Univariate Analysis of Variance

III. D. 1) Between-Subjects Factors

The sample sizes for the Between-Subjects Factors in this GLM analysis are the same as those described in the previous analysis, with 25,437 males and 29,591 females; 10,385 individuals with Neglectful Parenting, 3,445 with Autocratic Parenting, 30,197 with Authoritative Parenting, and 11,001 with Permissive Parenting; and 17,525 individuals in Favorable Situations, 30,873 in Difficult Situations, and 6,630 in Adverse Situations. See Table 9.

Table 9: Between-Subjects Factors

Factor	Value Label	N
Gender	1 male	25437
	2 female	29591
Parenting style	1 Neglectful Style	10385
	2 Autocratic Style	3445
	3 Authoritative Style	30197
	4 Permissive Style	11001
Survival situations	1 Favorable Situations	17525
	2 Difficult Situations	30873
	3 Adverse Situations	6630

III. D. 2) Tests of Between-Subjects Effects

The GLM multivariate analysis of variance was conducted with the new dependent variable "Character Strengths of a Craftsman Selector" (predicted value of "Be a Master Craftsman" based on 14 character strengths) and the fixed factors of gender, parenting style, and survival situations. The results of the inter-subject effects test showed that the model as a whole was significant ($F = 109.514$, $p < 0.05$). Significant interaction effects were observed between gender and parenting style ($F = 10.868$, $p < 0.05$), gender and growth context ($F = 6.807$, $p < 0.05$), and parenting style and context ($F = 5.831$, $p < 0.05$).

The R Squared value was 0.033, indicating that the model explained 3.3% of the variability in the "Character Strengths of a Craftsman Selector." While this suggests that other factors also influence the formation of craftsman-relevant character strengths, it confirms that gender, parenting styles, and survival situations play significant roles in moderating the relationship between character strengths and interest in precision-oriented careers like biological cell engineering. See Table 10.

Table 10: Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	23.566	17	1.386	109.514	0.000
Intercept	769.938	1	769.938	60824.963	0.000
Gender(2) * Parenting Style(4)	0.413	3	0.138	10.868	0.000
Gender(2) * Survival Situations(3)	0.172	2	0.086	6.807	0.001
Parenting Style(4) * Survival Situations(3)	0.443	6	0.074	5.831	0.000
Error	696.331	55010	0.013		
Total	2954.504	55028			
Corrected Total	719.897	55027			

Note: R Squared = 0.033 (Adjusted R Squared = 0.032); Dependent Variable: Character Strengths of a Craftsman Selector

III. D. 3) Grand Mean

Marginal effect analysis revealed that the dependent variable 'Character Strengths of a Craftsman Selector' had a grand mean of 0.493, with a standard error of 0.001. The 95% confidence interval ranged from 0.491 to 0.495, indicating a moderate but stable level of character strengths associated with interest in craftsmanship careers across the sample. See Table 11.

Table 11: Grand Mean

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
0.493	0.001	0.491	0.495

Note: Dependent Variable: Character Strengths of a Craftsman Selector

III. D. 4) Interaction of Survival Situations * Gender * Parenting Style

The GLM multivariate analysis of variance for the interaction of Survival Situations * Gender * Parenting Style revealed the means and differences in "Character Strengths of a Craftsman Selector" among the various interactive groups. The findings show complex interactions between these factors in influencing character strengths relevant to biological cell engineering craftsmanship. See Table 12.

Table 12: Survival Situations * Gender * Parenting Groups

Survival Situations	Gender	Parenting Style	Mean	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Favorable Circumstances	male	Neglectful Parenting	0.433	0.003	0.427	0.438
		Authoritarian Parenting	0.489	0.006	0.477	0.501
		Authoritative Parenting	0.500	0.002	0.496	0.504
		Permissive Parenting	0.504	0.004	0.497	0.511
	female	Neglectful Parenting	0.459	0.003	0.453	0.465
		Authoritarian Parenting	0.490	0.006	0.478	0.502
		Authoritative Parenting	0.513	0.002	0.510	0.516
		Permissive Parenting	0.511	0.002	0.507	0.515
Difficult Circumstances	male	Neglectful Parenting	0.450	0.002	0.446	0.455

		Authoritarian Parenting	0.493	0.003	0.486	0.499
		Authoritative Parenting	0.505	0.001	0.503	0.508
		Permissive Parenting	0.505	0.003	0.500	0.510
	female	Neglectful Parenting	0.468	0.002	0.463	0.472
		Authoritarian Parenting	0.482	0.004	0.475	0.490
		Authoritative Parenting	0.511	0.001	0.508	0.513
		Permissive Parenting	0.503	0.002	0.500	0.507
Adverse Circumstances	male	Neglectful Parenting	0.463	0.004	0.455	0.470
		Authoritarian Parenting	0.488	0.006	0.476	0.499
		Authoritative Parenting	0.519	0.002	0.515	0.524
		Permissive Parenting	0.526	0.006	0.515	0.537
	female	Neglectful Parenting	0.463	0.006	0.452	0.474
		Authoritarian Parenting	0.493	0.009	0.475	0.510
		Authoritative Parenting	0.522	0.004	0.515	0.529
		Permissive Parenting	0.520	0.006	0.509	0.532

Note: Dependent Variable: Character Strengths of a Craftsman Selector

III. D. 5) Main Effect and Interaction Effect Statistical Chart

(1) Gender Effect

In the regression prediction values for "Be a Master Craftsman" among college students, as generated by the new variable "Character Strengths of a Craftsman Selector," the predicted value for females was significantly higher at 0.4946 compared to 0.4896 for males, and it was also higher than the Estimated Marginal Means of 0.4920. This gender difference is particularly noteworthy in the context of biological cell engineering, where precision, patience, and attention to detail—traits that may be more encouraged in female socialization—are highly valued. See Figure 3.

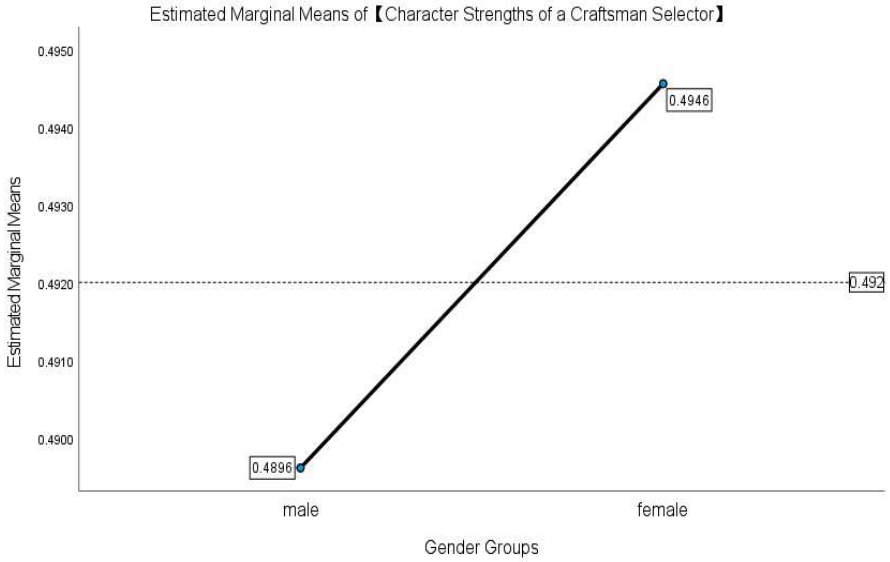

Figure 3: Gender Moderation Effect

(2) Parenting Style Effect

In the new variable "Character Strengths of a Craftsman Selector" derived from the regression prediction of "Be a Master Craftsman" in the "14 Character Strengths," parenting style also exhibited a significant effect. The Estimated Marginal Means was 0.4920. The main effect for Neglectful Parenting was 0.4559, which was significantly lower than the overall mean ($p < 0.001$). The main effect for Authoritarian Parenting was 0.4900, showing no significant difference from the overall effect. The main effects for Authoritative Parenting and Permissive Parenting were 0.5200 and 0.5100, respectively, which were significantly higher than the overall mean ($p < 0.001$).

Moreover, the "Character Strengths of a Craftsman Selector" for males under Authoritative Parenting and Permissive Parenting was significantly higher than those under Neglectful Parenting and Authoritarian Parenting ($p < 0.001$). These findings highlight the particular importance of supportive parenting approaches in developing

character strengths relevant to biological cell engineering, where both structure (from authoritative parenting) and freedom to explore (from permissive parenting) may contribute to developing the precision skills and creativity needed in cellular research. See Figure 4.

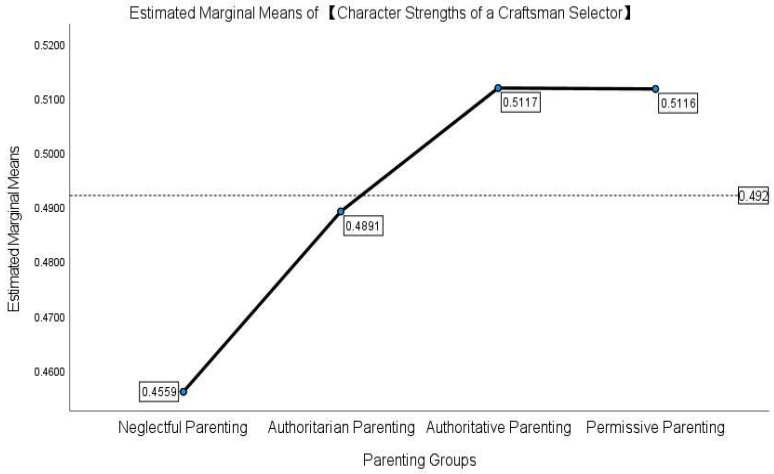

Figure 4: Parenting 4 Groups Effect

(3) Survival Situations Effect

In the new variable "Character Strengths of a Craftsman Selector" derived from the regression prediction of "Be a Master Craftsman" in the "14 Character Strengths," Growth Situations also exhibited a significant effect. The Estimated Marginal Means was 0.4920. The main effects for Favorable Situations and Difficult Situations were 0.4873 and 0.4993, respectively, which were significantly lower than the overall mean ($p < 0.001$). The main effect for Adverse Situations was 0.4980, which was significantly higher than the overall mean ($p < 0.001$).

Additionally, the "Character Strengths of a Craftsman Selector" for individuals under Adverse Situations was significantly higher than the means for Favorable and Difficult Situations ($p < 0.001$). This finding suggests that experiencing challenges may foster resilience and determination—traits particularly valuable in biological cell engineering, where experiments often require persistence through setbacks and adaptation to unexpected results. See Figure 5.

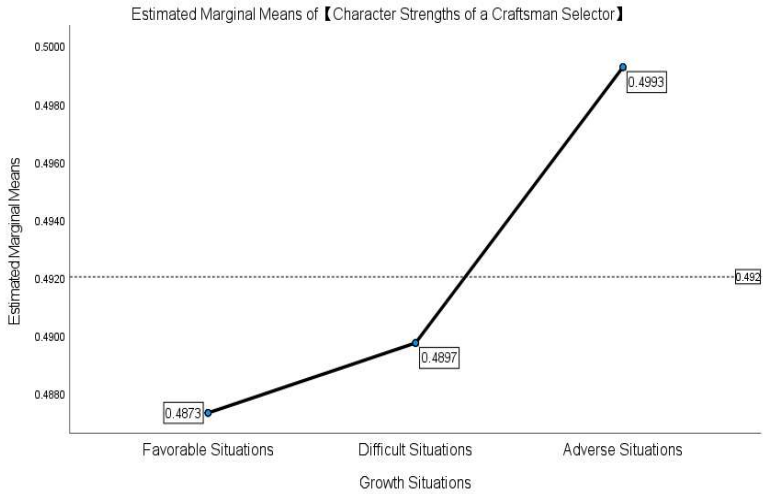

Figure 5: Survival Situations Effect

(4) Interaction Effect of Gender and Parenting Style

In the new variable "Character Strengths of a Craftsman Selector" derived from the regression prediction of "Be a Master Craftsman" in the "14 Character Strengths," significant interaction effects were observed between Gender and Parenting Styles. Referring to the Estimated Marginal Means of 0.4920, males showed an increase from the

lowest value of 0.4487 under Neglectful Parenting Style to 0.5082 and 0.5115 under Authoritative and Permissive Parenting Style, respectively. Females also showed an increase from the lowest value of 0.4630 under Neglectful Parenting Style to 0.5153 and 0.5117 under Authoritative and Permissive Parenting Style.

The marginal means for Authoritative Parenting Style were higher than the overall mean (0.5200 > 0.4920), while the marginal means for Neglectful Parenting Style were lower than the overall mean (0.4487 < 0.4920). The interaction effect of gender and Parenting Style indicates that both males and females exhibit significantly higher "Character Strengths of a Craftsman Selector" under Authoritative and Permissive Parenting Style compared to Neglectful and Authoritarian Parenting Style. These interactive effects are particularly relevant to biological cell engineering, where supportive yet structured parenting may foster both the disciplined approach needed for precise cellular manipulation and the creative thinking required for innovative research approaches. See Figure 6.

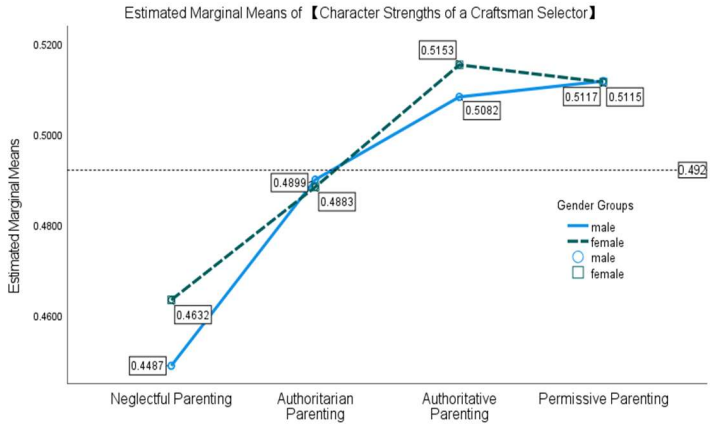

Figure 6: Interaction Effect of Gender * Parenting

(5) Interaction Effect of Gender and Survival Situations

In adversity, the mean scores for males and females on the 'Character Strengths of a Craftsman Selector' were 0.4995 and 0.4990, respectively, significantly higher than the overall mean of 0.4920. In contrast, in favorable conditions, the male mean score of 0.4815 was the lowest and significantly below the overall mean. Meanwhile, females' scores in both favorable and unfavorable conditions were 0.4931 and 0.4911, respectively, close to the overall mean.

This interaction effect suggests that adverse conditions may have a particularly strong influence on developing character strengths relevant to biological cell engineering craftsmanship in males, potentially fostering resilience and determination that contribute to success in precision-oriented scientific work. Females, in contrast, appear to maintain more consistent character strengths across different survival situations, which may reflect different socialization patterns or coping strategies. See Figure 7.

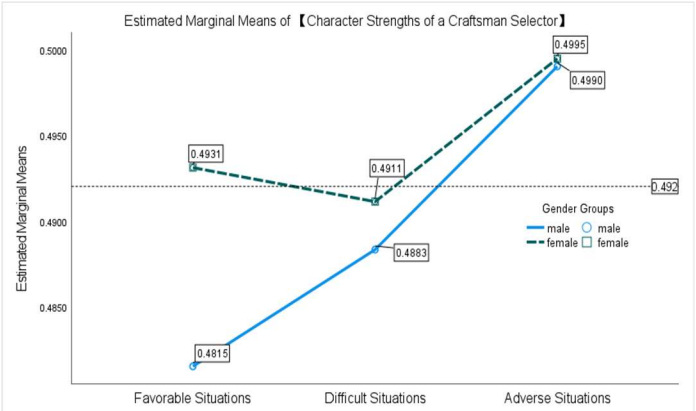

Figure 7: Interaction Effect of Gender * Survival Situations

IV. Discussion

Insights into elements influencing students' decisions to pursue furniture craftsmanship within biological cell engineering are well detailed in the findings of the present study. It also shows the impact of personal attributes, parenting styles, and other external aspects on the selected domain. The results not only confirm prior studies but also expand research scope in this complex area.

Analysis of correlation revealed a notable correlation across all character strength domains and craftsmanship interest, with the highest correlation coefficients being linked to wisdom, courage, and transcendence. Supporting previous work shows the character's positive contributions towards psychological well-being, physical health, and job selection [8], [9]. In cell biology, these strengths are even more relevant as wisdom involves the thought and creativity of devising new ways to run experiments, while courage suggests the tenacity to pursue cell research for sustained periods of time.

Regression analysis revealed that there is a wide range of 14 character strengths, including creativity, perspective, leadership, and judgment/critical thinking, that strongly predict an individual's desire to develop mastery in different crafts. This finding emphasizes the multi-dimensionality of character traits that enable individuals' accomplishment in detail-oriented biological engineering work. Creativity ($\beta = 0.067$) emerged as the strongest predictor, highlighting its central role in coming up with creative approaches towards cell culture methods and innovations in biomaterials. Likewise, perspective ($\beta = 0.044$) and critical thinking ($\beta = 0.033$) are essential for the holistic observation and interpretation of the complexities in cellular interactions and experimental findings.

Univariate analysis, on the other hand, suggested that both the parenting style and the survival context contributed towards moderating the correlation value for the character strengths versus the selection of craftsmanship. Permissive and authoritative parenting, as opposed to neglectful and authoritarian, had higher values for "Character strengths of a craftsman selector". This suggests that parenting practices incorporating aspects of autonomy with structure are likely to ensure a balanced development of the precision and creativity necessary in the science of biological engineering. According to Long Kebing, parenting style has a significant effect on personality and cognitive development; we generalize this hypothesis to the particular context of scientific craftsmanship [7].

A highly interesting finding was that participants who faced adverse circumstances manifested significantly greater levels of character strengths pertaining to craftsmanship than those in advantageous or challenging circumstances. This finding agrees with the work of Bonanno, which theorizes that adversity can strengthen coping and resilience [13]. In biological cell engineering, where experimental roadblocks and technical challenges are common, such resilience can lead to greater persistence in implementing exacting techniques and following complicated protocols over extended periods of time.

The discovered gender disparities are significant, as women show slightly higher expected scores on the selection of craftspersons. This result challenges the assumption that gender division exists in technical fields and suggests that the traits of precision, patience, and meticulous detail, traditionally encouraged through female socialization, are specifically commensurate with the high standards of biological cell engineering.

The interaction between gender, parenting, and survival contexts highlights the complex dynamics involved in the determinants of character development with regards to craftsmanship within the field of biological engineering. For instance, noting that adversity has a stronger positive effect on character traits related to craftsmanship in males suggests the presence of differing resilience development trajectories between the genders that should be further examined.

The results reported here have important implications for the development of talent in the field of biological cell engineering. Educational programs could benefit from actively encouraging the personality traits most strongly associated with interest in craftsmanship, namely creativity, perspective, and critical thinking. In addition, mentoring approaches that mimic authoritative parenting—by providing structure while also encouraging autonomy—may be especially effective at developing the next generation of professionals in biological engineering.

This study's findings should be considered within its limitations. The cross-sectional design cannot establish causal relationships, and future longitudinal research could better track the development of character strengths over time. Additionally, measuring actual technical skills in biological cell engineering alongside character strengths would provide more direct evidence of how these psychological factors translate into practical craftsmanship.

V. Conclusion

This study focused on exploring the influence of character strengths on college students' career choices, particularly in becoming a "craftsman master" in biological cell engineering, while also conducting an in-depth analysis of the impact of gender, parenting styles, and survival situations on these choices. Through comprehensive research and analysis, several significant conclusions emerged. The correlation between character strengths and career choices

in biological cell engineering is substantial, with fourteen character strengths including creativity, perspective, leadership, and critical thinking demonstrating significant positive impacts on students' craftsman career choices. Gender distinctions create a notable impact with female performances outperforming males in the specific competence of craftsman mastery, thus defying the traditional gender patterns within technical occupations. Parenting style has a marked impact on the development of character strengths relevant to craftsman skills, as authoritative and permissive styles foster more pronounced character strengths compared to the authoritarian and neglectful styles. Survival situations also matter because people who faced hardships exhibited significantly higher craftsman-related character strengths than those in others promising or difficult contexts, indicating that enduring adversity enhances the resilience and determination critical for biological investigation. The sharp interactions among gender, parenting style, and survival situation portray a character development complex in regard to craftsmanship Ecology of tools in biological engineering. These results underscore the answer to the question about psychosocial influences on fostering the spirit of craftsmanship in biological cell engineering and underscore more efficient processes of talent management in this important sphere.

Funding

This work was supported by The Influence of Future Self-Continuity on the Craftsman Spirit of Higher Vocational College Students and Its Intervention (Gfy23-30).

Reference

[1] Fu, Y. (2023). Regional circulation symbiosis: Study on the sustainable development of regional traditional handicraft. Journal of Cultural Studies, 14(3), 102–115.
[2] Yan, S., Shumin, H., Pengjun, L., & Zuohua, C. (2023). Research on biopharmaceutical talent cultivation assessment based on OBE model. Frontiers in Educational Research, 6(10).
[3] Lu, S., Dong, W., Shen, Y., & Han, C. (2021). Discipline construction and talent cultivation of tissue restoration and regenerative medicine. Regenerative Medicine in China, 447–461.
[4] Feng, C. (2022). Talking about the cultivation of innovation and entrepreneurship of biomedical college students under the era of Internet. Higher Education Research, 5(4), 45–56.
[5] Mazur-Włodarczyk, K., Rajchel, A., & Ruszczak, B. (2024). Perception and use of new technologies in crafts education and craftsmanship among young craftsmen: A study of sustainable practices. Economics and Environment, 91(4), 946–946.
[6] Shi, D., Liu, W., & Wang, Y. (2023). Has China's Young Thousand Talents program been successful in recruiting and nurturing top-caliber scientists? Science, 379(6627), 62–65.
[7] Long, K. (2023). The influence of parenting styles on children's cognition, personality, and socialization development. Journal of Child Psychology, 34(1), 78–89.
[8] Wang, H. (2024). The impact of character strengths on individual mental health and well-being. Journal of Psychology, 45(2), 123–135.
[9] Janapati, G. (2024). The significance of character strengths for future self-choice and development. Journal of Career Development, 36(3), 234–246.
[10] Park, N. (2018). Classifying and measuring strengths of character. In S. J. Lopez (Ed.), The Oxford Handbook of Positive Psychology (pp. 1–19). Oxford University Press.
[11] Ruch, W., Gander, F., Wagner, L., & Giuliani, F. (2021). The structure of character: On the relationships between character strengths and virtues. The Journal of Positive Psychology, 16(1), 116–128. https://doi.org/10.1080/17439760.2020.1789700
[12] Wang, J., Chen, C., & Gong, X. (2021). The impact of family socioeconomic status and parenting styles on children's academic trajectories: A longitudinal study comparing migrant and urban children in China. New Directions for Child and Adolescent Development, 2021(176), 81–102. https://doi.org/10.1002/cad.20419
[13] Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? American Psychologist, 59(1), 20–28. https://doi.org/10.1037/0003-066X.59.1.20
[14] Wang, L., & Chen, H. (2021). How parenting styles link career decision-making difficulties in Chinese college students? The mediating effects of core self-evaluation and career calling. Frontiers in Psychology, 12, 647722. https://doi.org/10.3389/fpsyg.2021.647722
[15] Seligman, M. E. P. (2004). Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment. Simon & Schuster.
[16] Littman-Ovadia, H. (2021). The role of character strengths in coping with life challenges. Journal of Positive Psychology, 16(4), 567–578. https://doi.org/10.1080/17439760.2021.1871935
[17] Sari, M. (2019). The application of character strengths in education: Enhancing students' learning interest and potential. Educational Research, 50(3), 213–225.
[18] Park, N. (2004). The relationship between character strengths and career satisfaction. Journal of Vocational Behavior, 65(2), 314–325. https://doi.org/10.1016/j.jvb.2003.10.002.