

Parent-Child Attachment, Gender Bias, Mate Selection Preference and College Students' Interpersonal Relationships Based on Big Data Analysis

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Abstract: In order to gain a deeper understanding of the current situation of college students' interpersonal relationships and their influencing factors in the context of big data, and to provide college students with a scientific basis for their self-perception, which in turn will help them better improve their interpersonal relationship and quality of life, this paper carries out two studies. Study 1 analyzes the keywords in Sina Weibo platform by using big data crawling, and the results show that from 2021 to 2024, college students pay more attention to the topic of family than other topics related to interpersonal relationships, and at the same time, they show more positive attitudes in three aspects, such as parent-child attachment. Study 2 used the Modern Gender Bias Scale for College Students, the Parent-Child Attachment Scale, the Ideal Partner Scale, and the Comprehensive Diagnostic Scale for Interpersonal Relationships to survey 411 college students. The results showed that college students' gender bias was significantly negatively correlated with interpersonal relationships. College students' mate selection preference was significantly positively correlated with interpersonal relationships. This study provides theoretical basis and data support for mental health education in colleges and universities and for college students to improve their interpersonal relationships.

Keywords: parent-child attachment, gender bias, mate selection preference, relationships, big data capture

I. Introduction

1.1 Background

According to the data released by the Chinese National Bureau of Statistics, in 2023 China's annual birth population of 9.02 million people, the birth rate of 6.39 per thousand, compared with the past few years and a

significant decline. "Do not want to give birth to also dare not give birth to", young people's fertility intention is low, young professional women's willingness to give birth to a decline in the reality of the problem is prominent. The reason involves economic pressure, policy support and other aspects, analyzed from the psychological aspect, and life pressure, interpersonal skills are insufficient, marriage and family life prejudice is closely related. While college is the key period for intimate relationships between men and women, the lack of interpersonal skills and gender bias among college students also lead to low frequency of interaction between men and women and difficulty in fostering intimate relationships.

The pressure of interpersonal communication increases in the new era, college students are difficult to develop intimate relationships, resulting in low self-esteem and fear psychology, selfishness and self-interest psychology, conceited and lonely psychology, isolation and indifference psychology leading to rejection, avoidance, isolation and neglect of interpersonal communication (Jia Yujie, 2024) , the problem of college students' interpersonal relationships in real life is prominent, and the study of college students' interaction problems in the new era is of practical significance. In real life, the way of heterosexual interaction , there is a big difference between men and women, and at the same time, there is a certain obstacle of heterosexual interaction (Li Hao and Pan Qingquan, 2016) . In social media, take Sina Weibo as an example, college students' interpersonal relationship words are hotly discussed, and the topic of gender differences and gender bias is high, in which the frequency of biased remarks about gender bias, mate selection preference, sexism, feminism and other biased remarks about male-female confrontation is also increasing. Internet use significantly improves gender bias identity, and the improvement is stronger in the female group (Gao et al., 2024) , college students as Internet users are significantly influenced by social media networks. Further research is needed to discuss the effects of gender bias and mate selection preferences on college students' interpersonal relationships.

Needs, respect and self-realization and other motivation opportunities, prompting college students to produce the need for interpersonal communication, thus forming different types of interpersonal communication, for college students, the most important and frequent is the relationship between relatives, classmates, and teachers and students, and people in the process of the interaction of a variety of psychological, but also affects the effectiveness of interpersonal communication (Jia Yujie, 2024) . The study of college students' interpersonal relationships has a positive significance on their personal growth and psychological health. Establishing good interpersonal relationships can provide emotional support and psychological health for college students, and at the same time can improve social adaptability and lay a good foundation for entering the society. In reality, college students face many challenges and confusions in interpersonal communication. How to establish and maintain good interpersonal relationships, deal with interpersonal conflicts and contradictions, and improve their interpersonal skills are also the common concerns and needs of college students.

The issue of the Internet and gender bias in society is a complex and profound social issue. As an important platform for information dissemination and communication, the Internet plays a positive role in promoting social progress and gender equality, but at the same time may become a channel and hotbed for gender bias. In recent years about gender bias events hotly debated, gender bias remarks to college students interpersonal

communication to bring cognitive behavioral impact. However, with the development of society, in recent years, both men and women do not quite agree with the statement that it is obvious that there is gender bias against women, and the manifestation of gender bias has also had new changes (Ma Ju, 2022) , and it is worthwhile to explore the impact of gender bias on the interpersonal bias of college students in the new era. At present, the research on the topic of gender bias mostly appears in the topic of career and workplace gender bias and social gender bias, but less about the gender bias of college students and its related research issues.

In recent years, the issue of women's preferences for choosing a spouse has received more attention, along with the Internet's hot topic of "late marriage" and "no marriage". Among them, the number of studies on female college students' mate selection preference has increased, and there are gender differences in mate selection preference, but fewer studies have made an in-depth study of the link between mate selection preference and gender bias. Some studies have shown that the quality of parent-child attachment relationship has a certain effect on the level of gender bias of individuals and is reflected in mate selection preference (Li sang, 2020) And parent-child attachment as one of the important factors affecting interpersonal interactions, the level of college students' school adjustment is significantly related to the quality of their parent-child attachment (Bubayezhemu Niyazi, 2023) . Further research linking parent-child attachment to gender bias and mate selection preference is of practical significance. There is a lack of research comparing gender bias, parent-child attachment and mate selection preference with college students' interpersonal relationships, and further research is needed.

1.2 Literature review

1.2.1. interpersonal relationship

There are three core dimensions in the theoretical interpretation of interpersonal relationships in academia. At the level of the nature of interaction, interpersonal relationships are defined as dynamic psychological associations formed by individuals through social contact and communication (Zheng Quanquan and Yu Guoliang, 2011), further emphasizing the bidirectional character of emotional connection and information transfer in this process (Wen Haifang, 2002). From a semiotic perspective, interpersonal relationships are relational networks that rely on verbal/non-verbal media for thought interaction and emotional transfer (Yu Zhengmin and Song Bei, 2008).

Existing studies generally agree that interpersonal relationships are composed of three elements: affect refers to the individual's emotional experience, cognition includes the understanding of the relationship between the self and the other, and behaviour is manifested in the interaction strategies and the results of the interaction. The interaction of these three elements directly affects the state of psychological well-being - positive interactions can alleviate stress and emotional distress. At the same time, dysfunctional relationships can induce the accumulation of negative emotions (Ronghua, 2007).

There are micro and macro differences in research perspectives: the psychological level focuses on the quantitative characteristics of individual spacing and contact frequency (Ronghua Shi, 2007), while the sociological level focuses on the structural and functional analyses of social relationship networks (Quanquan

Zheng and Guoliang Yu, 2011). The material-information exchange theory adds that interpersonal relationships are essentially carriers of social resource flows (Feng Zhengzhi, 2006).

1.2.2 gender bias

Eckes and Trautner (2000) proposed that gender bias is based on social gender classification, and the bias holders have a lower attitude towards the bias target group in terms of their social status. The root cause of gender bias is gender stereotypes, as well as the long-standing social concepts and social realities of gender inequality in history (Shen Shujing, 2023).

In traditional thinking, the bias targets are mostly female groups. Glick and Fiske proposed the contradictory gender bias theory in 1996, dividing the bias against women into hostile gender bias and friendly gender bias. Hostile gender bias is manifested in a direct and public manner, through hostility and derogation towards women, to consolidate male authority and achieve the purpose of bias; friendly gender bias is more subtle, viewing women in an affirmative manner, seeing women as objects that need male protection, and giving meaning to women from a male power perspective, but essentially it is to restrict women's behavior and thereby achieve the goal of benefiting men. With the development of the times and the change of women's concepts, due to the excessive obviousness and intentionality of hostile gender bias, the public gradually became dissatisfied with hostile gender bias, and the frequency of hostile gender bias has decreased in recent years.

In addition, Brinkman and Rickard proposed a different classification method for gender bias targeting women in 2009, categorizing it into three types: traditional gender role stereotypes, objectification and derogatory comments and behaviors of women. Gender role stereotypes are an inherent view of women's identity and abilities, such as women should be more focused on family, women are suitable for learning liberal arts, etc.; objectification is more reflected in the objectification of women, viewing women as objects without considering their feelings, emotions, and values, for example, viewing women as male's appendages or possessions; derogatory comments and behaviors towards women are labeling women, denigrating women, and one-sidedly interpreting women.

1.2.3 parent-child attachment

Research has pointed out that the conceptual definition of parent-child attachment can be divided into broad and narrow parent-child attachment: broad parent-child attachment refers to the object that can cover lovers, husband and wife, friends, etc., and from the dimension of time, it can also run through the entire developmental stage of an individual's life. (Zhu, Ruidong, 2021)The narrow concept refers to the strong and lasting emotional bond established between infants and their caregivers (usually their mothers), through a long period of stable parent-child interactions. The strong and long-lasting established emotional bond that is built up (Bowlby, 1969) . Meanwhile, Feder & Diamond (2016) stated that parent-child attachment is an enduring and strong emotional connection established between parents and children.

Individuals' patterns and experiences with attachment figures during infancy are internalized in the form of

internal working models (Bowlby, 1969). These models influence mental representations and behavioral styles toward others and the self, which in turn affect the individual's interpersonal behaviors, including trusting others and getting along with peers (Yu, Ching-Yuan, 2023).

1.2.4 . mate selection preference

Mate selection preferences are defined as cognitive or psychological representations of people's expectations of certain characteristics of a prospective mate (Shackelford et al., 2005) . (Eastwick et al., 2014) considers mate selection preference as the individual's preferred choice of traits and attributes expected from an ideal partner. In addition to this, the academic terms "mate choice", "ideal criteria", and "ideal partner preference" are often studied as synonyms for mate selection preferences.

Scholars have made different explanations for mate selection preference, among which the following four are more representative: sexual selection theory, parental investment theory, sexual strategy theory, and social role theory. Sexual selection theory originated from Darwin, which mainly refers to the competition of animals to obtain the right to choose and mate. Parental investment theory refers to the investment made by parents to increase their offspring's chances of survival and reproduction at the expense of the parents' ability to invest in other children. Women have a limited number of offspring to produce in their lifetime and choose to rely on male partners to ensure the survival of their offspring and thus optimize reproduction, whereas men prefer to optimize their offspring through short-term alliances with a large number of females and are more inclined to reduce their parental investment (de Vries et al., 2007). Sexual strategy theory suggests that humans have a complex set of sexual strategies that are categorized into short-term and long-term mate choice, which are classified by whether or not they enter into a marital relationship (Buss & Schmitt, 1993). Social role theory suggests that gender differences in preferences for mate characteristics result from the different social roles occupied by men and women (Eagly & Wood, 1999).

1.2.5 A study of the impact of the relationship between interpersonal relationships and other variables

The relationship between interpersonal relationships and parent-child attachment. Parent-child attachment has an important protective role in adolescent mental health (Hair et al., 2008). Research shows that parent-child attachment is an important part of the family environment, which has a great influence on children's pro-social behavior, interpersonal relationship is one of the characteristics that reflect whether or not they have pro-social behavior, and at the same time, the phenomenon of bullying in schools as a kind of undesirable phenomenon in interpersonal relationship, parent-child attachment has an important influence on the protective behavior of bystanders of bullying in schools (Wang Yanhui et al., 2017). Research points out that parent-child attachment has an important impact on comprehending social support and social identity (Yinlu, 2023). There is a significant correlation between parent-child attachment and self-esteem and interpersonal sensitivity in different family situations, including single-parent families and intact families (Haiyan Wang, 2023) . Research shows that parent-child attachment has a disturbing effect on college students' self-esteem as well as on interpersonal relationships (Zhao, Xin, 2020). The parent-child attachment status of college freshmen will be able to

significantly predict their interpersonal relationship formation in the stage of college adaptation (Jin Yijun, 2019). There is a significant positive predictive relationship between high school students' parent-child attachment and interpersonal trust (Zeng Xiaotian, 2024).

Relationships and gender bias. There is no research on gender bias and interpersonal relationships in the academic world, and the related research is relatively vacant. (Ma Ju, 2022) Through the questionnaire method and experimental method, the study shows that there is a significant effect of the sense of power on ambivalent gender bias under the moderating effect of social dominance tendency. (Li Sing, 2020) The study shows that there is a significant link between college students' ambivalent gender bias, parent-child attachment and mate selection preference. (Cai, Xueqing, 2010) found that the dimension of "patriarchal protection" in hostile gender bias and benevolent gender bias is significantly negatively related to their achievement motivation, while the dimension of "gender complementarity" in benevolent gender bias is significantly positively related to their achievement motivation.

The relationship between interpersonal relationships and mate selection preferences. At present, there is no research on mate selection preference and interpersonal relationships in the academic world for the time being, and the related research is relatively vacant. There are a small number of studies on the impact of romantic relationships on interpersonal relationships (Li Lu, 2019). The study shows that college students' romantic satisfaction affects their aggressiveness, and interpersonal sensitivity will play a certain mediating role. The study concluded that relationship attitude and interpersonal communication are closely related (Zhang Tao et al., 2012). The study proved that under the influence of the Internet, college students' attitudes toward marriage and love and interpersonal interaction patterns have changed (Xu Xueye, 2014).

1.3 research significance

Theoretical significance: to explore the current status of topics related to college students' interpersonal relationships in the context of big data, college students' gender bias, mate-choice preference, parent-child attachment, the current status of interpersonal interactions as well as the impact of gender bias, mate-choice preference, parent-child attachment on college students' interpersonal interactions, and whether there is a mediating and moderating role.

To deepen the understanding of the relationship between parent-child attachment, gender bias and mate selection preference, and to enrich theories related to the integration of psychology, sociology, big data technology and social psychology. To explore the mechanisms of different factors influencing college students' interpersonal relationships, providing new perspectives for understanding the complexity of interpersonal relationship formation and development. To deeply analyze the relationship between gender bias, parent-child attachment and mate selection preference on college students' interpersonal relationships, and to provide theoretical support for related research.

Practical significance: to deepen the understanding of the current situation of college students' interpersonal relationship-related topics in the context of big data, to provide college students with self-knowledge tools, to help them understand their parent-child attachment, gender bias and mate-choice preference, to better deal with

interpersonal relationships and improve the quality of life.

1.4 Research design

Conduct a word frequency analysis using Sina Weibo as the data source to obtain a word cloud of topics related to college students' interpersonal communication on Sina Weibo. Carry out data analysis on the number of topics related to parent-child attachment, gender bias, and mate selection preferences as well as the average emotional value, and explore the big data environment.

Clarify the issues and objectives of studying parent-child attachment, gender bias, and mate selection preferences. Search for relevant literature, design questionnaires, select appropriate question types for questionnaire compilation, and release the questionnaires to college student groups for data collection. Use quantitative methods for data processing and analyze the results. Finally, write the thesis.

In summary, the following research hypotheses can be derived. There are significant differences and significant correlations in the scores of parent-child attachment, gender bias, and mate selection preference among college students. There are significant differences in the scores of parent-child attachment, gender bias, and mate selection preference of college students on the scores of interpersonal relationships.

II. Study 1: Microblogging Word Frequency and Affective Direction of Parent-Child Attachment, Gender Bias, and mate selection preferences and Interpersonal Relationships

2.1 research purpose

By using the method of big data scraping web crawler technology, this paper examines the themes of concern and emotional preferences of college students regarding parent-child attachment, gender bias and mate selection preferences in interpersonal relationships.

III. Research methodology

3.1 Research data

Sina Weibo is one of the social media platforms with the largest number of online active users and the widest influence. According to the "2023 Weibo Young Users Development Report" released by the Weibo Data Center, as of the third quarter of 2023, the number of monthly active users on Weibo reached 605 million, of which more than 130 million were between the ages of 16 and 22, showing a clear trend of youthfulness. Among this young user group, college students occupy an important position, and their active performance on Sina Weibo makes the use of this platform for the analysis of college students' interpersonal relationships of significant research value.

In this study, we used Sina Weibo as the data source, and Python programming language to capture the original microblog text data for the three-year period from September 30, 2021 to September 30, 2024, involving the topics of "college students' interpersonal relationships" and "college students' gender bias", totaling 5,808 items. The total number of blog posts is 5808. These data provide rich analytical materials for this study.

3.2 Data preprocessing

In order to improve the data quality and meet the demands of subsequent analysis tasks, this study systematically preprocessed the collected raw microblog data. First, duplicate records and non-textual information in the dataset, such as URL links, HTML tags, and emoticons, were removed, and irrelevant interfering information was eliminated by using regular expressions, to ensure the accuracy of the text data. Next, punctuation marks and other special characters in the text that had no substantial impact on semantic understanding were removed. In order to improve the accuracy of the data analysis, the data processing referred to the deactivation word list and screened the deactivated words in the microblog text to reduce the interference of these common but non-critical words on the results of word frequency statistics and sentiment analysis.

3.3 Data analysis methods

In this study, a sentiment dictionary-based approach is used to analyze the sentiment of web texts. The core of this method is to compare the text data with the keywords expressing emotional tendencies in the sentiment dictionary, so as to categorize the emotion type of the text or calculate its emotion intensity. In this study, we have mainly applied this method for sentiment analysis of text data, including the matching process of the sentiment dictionary and the invocation of the SnowNLP sentiment analysis tool. By cross-referencing the analysis results with keywords, this study aims to explore the emotional trends and hot topics of multiple factors affecting college students' interpersonal relationships in a big data environment.

IV. Results and analysis

4.1 word frequency analysis

The preprocessed data were subjected to jieba segmentation and statistical analysis, and the first 200 high-frequency words were intercepted to obtain the content of college students' interpersonal communication-related topics, in which the frequency of occurrence of words related to parent-child attachment, gender bias and mate selection preference is shown in Table 1. The high-frequency words are visualized in the form of word cloud diagrams, as shown in Figure 1, the higher the word frequency the larger the shape of the words, and the lower the word frequency the smaller the shape of the words.

Table1 Related Glossary

term (e.g. technical term)	word frequency	term (e.g. technical term)	word frequency	term (e.g. technical term)	word frequency
household	1523	parity	53	matrimonial	146
father and mother	785	distinguish between the sexes	52	economics	143
head of a household	528	agnosia	22	stabilise	110
parent-child (relationship)	223	mom's baby	7	abilities	110

sentiment value (sentiment). The range of the sentiment value is between 0 and 1, with 0.5 as the neutral limit; the closer the sentiment value is to 1, the more positive the sentiment of the text, and conversely, the closer the sentiment value is to 0, the more negative the sentiment of the text.

In this study, based on the microblog data related to college students' interpersonal relationships, we selected three topics of "parent-child attachment", "gender bias" and "mate selection preference" for sentiment calculation. The results are shown in Table 2. During the three-year observation period from 2021 to 2024, the sentiment analysis of the influence of these three topics on college students' interpersonal interactions on microblogs shows a more positive attitude on the whole.

Table2 Number of related topics and average sentiment value

	Total number of topics	Number of active topics	Number of negative topics	Average emotional value
parent-child attachment	1156	1136	20	0.97399
gender bias	546	503	43	0.83928
mate selection preference	1915	1885	30	0.98003

V. Study 2: Relationships between parent-child attachment, gender bias and mate selection preference and interpersonal relationships

5.1 research purpose

To explore the current status of parent-child attachment, gender bias, and mate selection preference among college students, the relationships among the three factors, as well as the impacts of these three factors on interpersonal relationships.

5.2 research hypothesis

- (1) There are significant differences in the parent-child attachment, mate selection preference and gender bias of college students in terms of demographic variables.
- (2) There are significant correlations among the parent-child attachment, mate selection preference and gender bias of college students.
- (3) The parent-child attachment, mate selection preference and gender bias of college students have a significant impact on interpersonal relationships.

VI. Research methodology

6.1 research target

The purpose of this study is to explore the impacts of college students' gender bias, parent-child attachment and mate selection preference on interpersonal relationships. A questionnaire survey was adopted, and the participants were college students. A total of 411 questionnaires were distributed, and finally 365 valid questionnaires were retrieved. Among them, there were 87 male college students (23.8%), and 278 female

college students (76.2%); 91 students were freshmen (24.9%), 194 students were sophomores (53.2%), 52 students were juniors (14.2%), 15 students were seniors (4.1%), and 13 postgraduate students (3.6%); 141 students were only children (38.6%), and 224 students were not only children (61.4%); 334 students had non-divorced parents (91.5%), 31 students had divorced parents (8.5%); 75 students were not single (20.5%), 290 students were single (79.5%).

6.2 Research tools

1) Gender Bias Measurement Questionnaire

By combining the 15-item Attitudes Toward Women Scale (AWS) developed by Spence and Hahn (1997) and the General Modern Sexism Scale (GMSS) for college students. A total of 10 typical questions were selected from the five dimensions of marital and family gender bias (FSS) (3 questions), parental role gender bias (PSS) (2 questions), occupational gender bias (OSS) (1 question), social behavioral gender bias (SSS) (2 questions), and educational gender bias (ESS) (2 questions), and 10 typical questions were used for the measurement of the proposed dimension of "gender bias", and the "gender bias" dimension of the "gender bias" dimension was measured using the General Modern Sexism Scale for College Students (GMSS). A total of 10 typical questions were selected to measure the proposed "gender bias" dimension, and a 5-point Likert scale was used to rank "completely disagree", "somewhat disagree", "indifferent", "somewhat agree", "somewhat agree", "somewhat agree", "somewhat agree", "somewhat agree", "somewhat agree", "somewhat agree", "somewhat agree", and "somewhat agree". "agree more" and "agree completely", assigned values of 1, 2, 3, 4 and 5, respectively, and the total score of the dimension was counted. Subsequently, 38 subjects were selected for test statistics and reliability analysis, using the total correlation method and homogeneity test principal component analysis, the total correlation (Pearson's correlation coefficient) was less than 0.4, the correlation between the corrected items and the total in the reliability analysis was less than 0.4, the alpha coefficient of the deleted clone Bach was significantly increased, the factor analysis of the variance of the common factor was less than 0.3, and the coefficient of the matrix of the components was less than 0.4. (when and only when one of the above conditions is met) the questions were deleted. The final result was the Gender Bias Scale (see Appendix 1) (9 questions). The results of the reliability test showed that the Cronbach's alpha statistic for the corrected questions was 0.901, indicating that the question design has good internal consistency and can be used to measure the degree of gender bias. In this study, a 5-point Likert scale was used, ranging from "totally disagree" to "totally agree" corresponding to a score of 1 to 5, with a higher total score indicating a higher degree of gender bias in individual subjects' perceptions.

2) Parent-Child Attachment Measurement Questionnaire

The questionnaire was originally revised from the Parent and Peer Attachment Questionnaire (PPAQ) (Li et al., 2013; Li et al., 2009). The questionnaire consists of 13 questions reflecting the quality of parent-child attachment through the three dimensions of parent-child trust, parent-child communication, and parent-child detachment, and was used to measure the proposed dimension of "parent-child attachment". A 5-point Likert scale was used to rank "completely disagree", "somewhat disagree", "indifferent", "somewhat agree",

"completely agree", "somewhat agree" and "completely agree". ", "disagree more", "don't care", "agree more", "agree more", and "agree completely", which were assigned values of 1, 2, 3, 4, and 5, respectively, and the total score of the dimension was counted. Subsequently, 38 subjects were selected for test statistics and reliability and validity analyses, using the question total correlation method and homogeneity test principal component analysis, the question total correlation (Pearson's correlation coefficient) is less than 0.4, the corrected item and total correlation in the reliability analysis is less than 0.4, the deletion of the Cronbach alpha coefficient is significantly increased, the factor analysis of the variance of the common factor is less than 0.3, and the coefficients of the component matrices are less than 0.4 (when and only when one of the above conditions is met) the questions were deleted. The Parent-Child Attachment Scale (see Appendix 2) was finally obtained (10 questions in total). The results of the reliability test showed that the Cronbach's alpha statistic value of the corrected items was 0.930, indicating that the item design has good internal consistency and can be used to measure the degree of parent-child attachment. In this study, a 5-point Likert scale was used, with scores ranging from 1 to 5 corresponding to "completely disagree" to "completely agree" (questions with opposite meanings were scored in reverse), and higher scores indicated higher levels of parent-child attachment in individual subjects' perceptions.

3) Questionnaire to measure mate selection preferences

The questionnaire was originally quoted from the Chinese version of the Ideal Partner Scale developed by Fletcher (1999), (Cui, Chao, 2011) translated and revised, including the dimensions of attractiveness-vitality, warmth-trust, and status-resources, with a total of 17 traits in the original scale, and 14 traits in the revised Chinese version. Subjects evaluated the importance of each feature word according to the criteria of their ideal partner on a scale of 1 to 5, with very unimportant scoring 1 and very important scoring 5, and the total scores of the dimensions were tallied. Subsequently, 38 subjects were selected for trial statistics and reliability and validity analyses, using the total question correlation method and the homogeneity test principal component analysis, the total question correlation (Pearson's correlation coefficient) was less than 0.4, the corrected item and total correlation in the reliability analysis was less than 0.4, the deletion of the Cronbach alpha coefficient was significantly increased, the factor analysis of the variance of the common factor was less than 0.3, and the coefficients of the component matrices were less than 0.4 (when and only when one of the above conditions is met) the questions were deleted. The spouse choice preference scale (see Appendix 3) was finally obtained (12 questions in total). The results of the reliability test showed that the Cronbach's alpha statistic value of the corrected items was 0.917, indicating that the item design has good internal consistency and can be used to measure the degree of mate selection preference. In this study, a 5-point Likert scale was used, from "totally disagree" to "totally agree" corresponding to a score of 1 to 5 respectively, the higher the score for a single question indicates that the participant believes that this characteristic is more important in choosing a partner, and the higher the total score indicates that the participant is more demanding in choosing a partner. The higher the total score, the more demanding the partner is.

4) **Interpersonal Relationship Measurement Questionnaire**

The Interpersonal Relationships Comprehensive Diagnostic Scale for College Students (1994) was used to measure college students' interpersonal relationships, which consists of 28 questions (see Appendix 4). The scale is a two-point scale ("yes" is scored as 2 points and "no" is scored as 1 point) with 4 factors, including conversation aspect, interpersonal and friendship aspect, treating people well, and interacting with friends of the opposite sex. In this study, the internal consistency reliability of the scale was 0.866, indicating that the question item design has good internal consistency and can be used to measure the degree of interpersonal relationships. Higher total score scores on this dimension indicate poorer interpersonal relationships.

6.3 data processing

365 valid questionnaires were obtained, after which the reverse scoring questions were re-scored and the data were imported into SPSS27 for statistical analysis, including descriptive statistical analysis, independent samples t-test, ANOVA, and correlation analysis.

VII. Results

7.1 Descriptive statistical analysis and comparison of differences on demographic variables

As shown in Table 3, the mean gender bias scores of college students were on the low side of the total scores of under the conditions of each demographic variable, indicating that college students have a low level of gender bias. There is a significant difference in gender ($t = 8.124, p < .001$), which is manifested by the fact that males are significantly higher than females in gender bias scores; gender bias among college students does not have a significant difference in different grades ($F = .602, p = .661, p > .05$); gender bias among college students does not have a significant difference in being an only child or not ($t = .744, p = .457, p > .05$); college student gender bias did not differ significantly on whether parents were divorced or not ($t = -.631, p = .528, p > .05$); and college student gender bias differed significantly on whether they were single or not ($t = 2.605, p = .010, p < .05$), which was shown by the fact that non-single college students scored higher on gender bias than single.

The total scores of college students' parent-child attachment scores were high in the conditions of each demographic variable, indicating that the degree of parent-child attachment among college students was generally high, and there was no significant difference between the gender of college students' parent-child attachment ($t = -1.392, p = .165, p > 0.05$); there was a significant difference between college students' parent-child attachment in different grades ($F = 2.766, p = .027, p < 0.05$), as evidenced by significantly lower parent-child attachment scores for freshmen ($M = 34.07$) than for seniors ($M = 38.73$) and graduate students ($M = 40.46$), and significantly lower parent-child attachment scores for sophomores ($M = 35.51$) than for graduate students ($M = 40.46$); and significant differences between college students' parent-child attachments in terms of only-children or no-children ($t = 3.575, p < .001$), as evidenced by the fact that only children had higher parent-child attachment scores than non-only children; there was no significant difference between college students' parent-child attachment on whether their parents were divorced or not ($t = 1.068, p = .286, p > 0.05$); and there was no significant difference between college students' parent-child attachment on whether they were

single or not ($t = .712, p = .477, p > .05$).

College students' mate selection preference scores were high across all demographic variables, indicating that college students are more demanding in their mate choice. There was a significant difference in the gender of college students' mate selection preference ($t = -6.185, p < .001$), which is reflected by the fact that females had significantly higher scores than males in their mate selection preference scores; there was no significant difference in college students' mate selection preference across grades ($F = 1.551, p = .187, p > 0.05$); there was a significant difference in college students' mate selection preference in terms of whether they were only one-born or not ($t = -2.239, p = .026, p < .05$), which is shown by the fact that non-only children have significantly higher scores in mate selection preference than only children; there is no significant difference in mate selection preference between college students on whether their parents are divorced or not ($t = 1.452, p = .147, p > 0.05$); there is no significant difference in mate selection preference between college students on whether they are single or not ($t = .967, p = .334, p > .05$);

College students' interpersonal communication scores were high in total across all demographic variable conditions, indicating that college students have poorer interpersonal relationships. There is a difference in interpersonal communication between college students by gender ($t = 2.266, p = .024, p < 0.05$), which is manifested by the fact that males have higher interpersonal scores than females; there is a significant difference in interpersonal communication between college students by grade level ($F = 2.837, p = .024, p < 0.05$), which is manifested by the fact that freshmen students have significantly lower scores on interpersonal communication ($M = 46.46$) than senior students ($M = 51.13$), and sophomores' scores ($M = 47.39$) are significantly lower than seniors' scores ($M = 51.13$), and sophomores' interpersonal score ($M = 47.39$) was significantly lower than that of senior students ($M = 51.13$); there was no significant difference between college students' interpersonal scores on being an only child or not ($t = .413, p = .680, p > 0.05$); and there was no significant difference between college students' interpersonal scores on having divorced or not having divorced parents ($t = 1.775, p = .009, p > 0.05$); there was a significant difference in college students' interpersonal interactions on whether they were single or not ($t = 2.183, p = .030, p < 0.05$), which was demonstrated by the fact that non-single college students scored more highly on interpersonal interactions than did single college students.

Table 3 Differences in demographic variables

Demographic variables	gender bias (M±SD)	parent-child attachment (M±SD)	preference for spouse (M±SD)	interpersonal communication (M±SD)
freshman	13.11±4.75	34.07±7.996	46.91±5.990	46.46±5.102
sophomore	13.73±5.84	35.51±7.634	46.56±7.022	47.39±5.489

	junior	14.08±5.71	35.81±7.784	48.69±6.424	48.13±5.3
	8				51
	senior	13.73±5.82	38.73±9.654	44.67±5.191	51.13±5.4
	4				62
	postgr aduate studen t	15.38±7.06	40.46±5.516	47.15±3.912	48.30±5.2
	5				97
	<i>F</i>	.602	2.766*	1.551	2.837*
dist	male	18.667±7.100	34.482±8.376	43.276±7.292	48.598±5.954
inguishi ng	femal e	12.122±3.923	35.824±7.666	48.025±5.890	47.097±5.203
between the sexes	<i>t</i>	8.124***	-1.392	-6.185***	2.266*
	<i>h</i> ²	.248	.005	.095	.014
Only child	only child	13.957±5.823	37.326±7.900	45.929±6.783	47.361±5.661
	not only child	13.508±5.469	34.357±7.615	47.500±6.361	47.361±5.275
	<i>t</i>	.744	3.575***	-2.239*	.413
	<i>h</i> ²	.002	.034	.014	.000
Divorce d parents or not	two-p arent family single parent family	13.625±5.585	35.637±7.914	47.045±6.582	47.608±5.329
	<i>t</i>	-.631	1.068	1.452	1.775
	<i>h</i> ²	.001	.003	.006	.009
Single or not	non-si ngle single	15.173±6.181	36.080±7.708	47.546±6.005	48.667±5.679
	<i>t</i>	2.605*	.712	.967	2.183*
	<i>h</i> ²	.018	.001	.003	.013

7.2 Correlation analysis between variables

In order to understand the relationship between the four components of gender bias, parent-child attachment, mate selection preference and interpersonal relationships among college students, each of their variables was analyzed and the results of the study are shown in Table 4:

Table 4 Correlation analysis of variables

	gender bias	parent-child attachment	preference for spouse
gender bias	1		
parent-child attachment	.022	1	
mate selection preference	-.069	.084	1
interpersonal relationship	-.109*	.158**	-.075

Note: ** $p < 0.01$

As shown in Table 4, gender bias was significantly negatively correlated with interpersonal relationships among college students ($r = -.109, p = .039, p < .05$) and parent-child attachment was significantly positively correlated with interpersonal relationships ($r = .158, p = .003, p < .05$).

7.3 Regression analysis between variables

The variables were analyzed by regression as independent variables and interpersonal relationships as dependent variables and the results of the study are presented in Table 5:

Table 5 Regression analysis between variables

regression equation	predictor variable	Overall fit index			Significance of regression coefficients	
		<i>R</i>	<i>R</i> ²	<i>F</i>	<i>B</i>	<i>t</i>
interpersonal relationship	gender bias				-.032	-.630
	parent-child attachment				.129	3.611***
	mate selection preference				-.100	-2.307*

Note: ** $p < 0.01$

Table 5 shows that parent-child attachment positively predicted college students' interpersonal relationships ($B = .129, t = 3.611, p < .001$) and mate selection preference negatively predicted college students' interpersonal relationships ($B = -.100, t = -2.307, p = .022, p < .05$). However, a post hoc test revealed that there was no significant mediating and moderating relationship between the variables.

VIII. Talk over

8.1 Significant group characteristics of gender bias among college students

8.1.1 Gender differences in gender bias among college students

Gender differences in gender bias among college students: the results of this study showed that gender bias among male students was significantly higher than that of female students, which is partially consistent with the studies conducted by Wenjia Cai (2019) and (Glick & Fiske, 1996) , both of whom noted that male hostile gender bias scores were significantly higher than those of females. This finding reveals differences in gender bias across genders and emphasizes the prevalence and severity of gender bias among men. (Glick & Fiske, 1996) theory of ambivalent gender bias states that gender bias consists of two dimensions, hostile and benevolent, with hostile gender bias manifesting itself in the denial of women's abilities and rights, and benevolent gender bias restricting women to traditional gender roles. The present study supports the idea that hostile gender bias is more prevalent among men and may be related to gender role expectations in the socialization process of men. It is important to note that hostile gender bias is essentially a restriction and stereotype reinforcement of women, and although not directly measured in this study, it can be hypothesized that men may also score higher on hostile gender bias and exhibit more covert complexity. Cai Wenjia (2019) also showed that high male gender bias scores are associated with socio-culturally shaped gender roles, and that men's desired traits such as strength, bravery, and independence are often associated with control and dominance over women, which influences men's perceptions of women and the way they behave in social interactions.

8.1.2 Differences in gender-biased marital status among college students

The results of the study show that there is a significant difference between college students' gender bias in terms of whether they are single or not. In her study on the relationship between gender ambivalence bias and college students' marital values, He Ling argues that well-intentioned and hostile gender biases have different degrees of significant predictive effects on college students' individual traditional marital values, respectively. Single college students may be more susceptible to external influences in their social interactions due to the lack of stable partner relationships, which may form or reinforce certain gender biases. Non-single college students, on the other hand, may gradually recognize the importance of gender equality in the process of getting along with their partners through common learning and life experiences, thus reducing gender bias. Specifically, single college students may be more inclined to believe that men are superior to women in certain aspects or that women should play specific roles in certain aspects. This bias may stem from a variety of factors such as traditional social attitudes, family background, and educational experience. However, when college students enter into a relationship or marriage, they may gradually discover each other's strengths and values in their interactions with their partners , thus breaking the original gender stereotypes. In addition, modern means of communication such as the Internet and social media may also have an impact on college students' gender bias. Single college students may be more easily influenced by various remarks and information on the Internet, while non-single college students may form more rational and objective gender concepts in common discussions with

their partners.

8.1.3 Group Characteristics of College Students' Parent-Child Attachment

The study showed significant grade-level differences in parent-child attachment among college students. Specifically, freshmen students had significantly lower parent-child attachment scores than seniors and graduate students, and sophomores had significantly lower parent-child attachment scores than graduate students. Parent-child attachment scores showed a trend of first increasing and then decreasing. (Zeng, 2009) The results of the study show that the overall level of parent-child attachment is relatively stable at the university level, and there is no obvious upward or downward trend, and this discrepancy may be due to the inconsistency of the measurement tools. Freshman students' attachment scores were at the lowest level, which may be related to the fact that college students' sense of self as well as their life priorities have shifted. Having just entered college, they face a brand new living environment and learning style, and need to adapt to a new social circle and independent life. At this time, they may focus more on self-growth and exploration, with relatively less emotional communication with their parents, resulting in lower parent-child attachment scores. Senior students face the pressure of graduation and employment, while graduate students may face more in-depth academic research and career planning. Students at these stages may value their emotional connection with their parents more and seek their support and advice. At the same time, as they grow older and accumulate life experience, they may have a better understanding of their parents' care and dedication, thus enhancing parent-child attachment.

There was a significant difference in the parent-child attachment of college students on whether they were only child or not. The parent-child attachment scores of only children were significantly higher than the parent-child attachment scores of non-only children. This result can be interpreted to mean that only child is the only child in the family and enjoys all the love and care from the family, so only child's attachment with parents is higher than that of non-only child.

IX. Group Characteristics of College Students' Mate Selection Preferences

9.1 Gender Differences in Spouse Choice Preferences of College Students

Research has shown that girls place a higher value on the warmth-trust and status-resource attributes of potential partners, consistent with the results of Fletcher et al. (2004). Parental Investment Theory (Trivers, 1996) suggests that females place a higher value on status and resources because they are more involved in nurturing and raising children and have a limited number of children. Warmth-trust qualities are key to maintaining stable relationships, and girls are more sensitive to this. Previous studies have shown that there are significant gender differences in mate selection preferences between men and women, with men preferring partners who are attractive in appearance, but this was not verified in this study. This may be due to the small sample size of males or the fact that the questionnaire's characterizing words, such as "sexy" and "good figure," influenced the subjects' true expressions.

9.2 Differences in college students' preference for an only child or not in choosing a spouse

The results of the study show that non-only children pay more attention to their future partner's characteristics in terms of status-resources compared to only children. This is due to the fact that non-only children have siblings in their families of origin where competition exists. This upbringing makes them more concerned about the ability to provide adequate material conditions in their expectations of their future partners.

9.3 Group characteristics of college students' interpersonal relationships

The study found that college students' interpersonal communication scores had high total scores under the conditions of each demographic variable, which indicated that college students had poorer interpersonal relationships. On the one hand, college students have more free time in college, resulting in less regular time with peers and less in-depth communication, which is mostly superficial daily communication. At the same time, competition among peers is common, and group cooperation is prone to conflicts. On the other hand, some college students are living in the dormitory for the first time, and it takes a long time for them to adapt to the dormitory life, which makes it difficult for them to form a close relationship in the dormitory.

9.4 Correlations between ambivalent gender bias, parent-child attachment, mate selection preference, and interpersonal relationships among college students

The results show that college students' gender bias is significantly negatively correlated with interpersonal relationships, and mate selection preference is significantly positively correlated with interpersonal relationships. First, there is a significant negative correlation between college students' gender bias and interpersonal relationships. Gender bias, as a stereotype, prejudice or discrimination held by individuals towards a certain gender, may originate from the influence of multiple factors such as family, society and culture. This bias may not only lead individuals to negatively evaluate others who do not conform to traditional gender roles, but may also further exacerbate interpersonal tensions and conflicts. According to social identity theory, gender bias may reinforce an individual's perception of in-group and out-group differences, thus hindering the establishment of positive interpersonal relationships. This was confirmed in a study by (Eagly & Karau, 2002) who found that female leaders often suffer from prejudice that may extend to college students' general attitudes toward gender, which in turn affects their interpersonal relationships. Additionally, Rudman and Fairchild's (2004) research also suggests that successful women face negative reactions, including jealousy and rejection from the same sex, which are associated with gender bias and may further undermine women's interpersonal relationships.

Second, there is a significant positive correlation between college students' mate selection preferences and interpersonal relationships. Mate selection preferences refer to the traits and conditions that individuals value when choosing a partner, and these preferences may be based on a variety of aspects such as appearance, personality, educational background, and social resources. Individuals are more likely to have positive interpersonal relationships when their mate selection preferences match the traits of others. Attachment theory and social exchange theory provide theoretical support for this phenomenon. Attachment theory suggests that individuals seek patterns similar to their early attachment experiences when establishing interpersonal relationships, so mate selection preferences may be related to an individual's attachment patterns. When mate selection preferences are fulfilled, individuals may feel more secure and satisfied, and thus more willing to

establish positive interpersonal relationships with others. Social exchange theory, on the other hand, states that people seek to maximize their gains in interpersonal relationships, such as emotional support and social status. Mate selection preferences serve as an important means of achieving this goal, and when preferences are fulfilled, individuals may be more willing to interact and cooperate with others, resulting in positive interpersonal relationships. This is confirmed in cross-cultural research by (Buss, 1989) who found that gender differences in mate selection preferences have a significant impact on relationship building.

X. Conclusion

10.1 Findings

In order to gain an in-depth understanding of the current situation of college students' interpersonal relationships and their influencing factors in the context of big data, provide college students with a scientific basis for their self-perception, and then help them to better improve their interpersonal relationships and quality of life, this paper carries out two studies.

Study 1 used big data crawling to capture keywords in the Sina Weibo platform to analyze them, and the results showed that:

- (1) During the three-year observation period from 2021 to 2024, on the microblogging platform, in relation to relationships, college students pay much more attention to the topic of family than to other topics.
- (2) From 2021 to 2024, the sentiment analysis of Weibo on the impact of the topics of "parent-child attachment", "gender bias" and "mate selection preference" on college students' interpersonal interaction. The overall positive attitude is shown on Weibo.

Study 2 surveyed 411 college students using the Modern Gender Bias Scale for College Students, the Parent-Child Attachment Scale, the Ideal Partner Scale, and the Comprehensive Diagnostic Scale for Interpersonal Relationships. The results showed that:

- (1) College students' spouse preference scores were high across all demographic variables, indicating that college students are more demanding in their choice of spouse. The interpersonal communication scores of college students were high across all demographic variables, indicating that college students have poorer interpersonal relationships.
- (2) There were significant gender differences in gender bias, mate selection preference, and interpersonal interactions among college students; significant grade level differences in parent-child attachment and interpersonal interactions; significant differences in parent-child attachment and mate selection preference on whether or not they were born alone; and significant differences in gender bias and interpersonal interactions on whether or not they were single.
- (3) Gender bias of college students is significantly and negatively related to interpersonal relationships. Mate preference of college students is significantly and positively related to interpersonal relationships.

This study provides theoretical basis and data support for mental health education in colleges and universities and college students in terms of improving interpersonal relationships.

10.2 innovation point

Currently, research in psychology is less commonly studied in conjunction with interdisciplinary combinations of computers, and even fewer studies have been conducted in conjunction with big data crawling web crawler technology in relation to it (Ye Yonghao, 2016). With the advent of the big data era, a new field of research has arisen - computational cultural psychology, a branch of psychology that studies cultural symbols and their interactive processes through computational tools and big data repositories (Neuman et al., 2012). This study innovatively combines big data technology with social psychology, which has important reference value for future research. This study takes Sina Weibo as an example, and analyzes it based on the frequency of feature dictionaries, for example, by analyzing key features in terms of language, and analyzing the emotional direction of the text to determine whether the emotion of the text is skewed towards positive or negative. Big data crawling web crawler technology is a powerful and effective qualitative research method, the current psychological research in China focuses on quantitative research such as experiments and questionnaires, and pays less attention to qualitative research such as text analysis (Zhang Xinyong, 2015), so it can be seen that the present study has a more important significance in qualitative research.

10.3 Research limitations and perspectives

This study explores the current situation of parent-child attachment, gender bias and mate-choice preference and their impact on college students' interpersonal relationships by means of big data and questionnaire analysis, which has certain theoretical and practical significance, but still has the following shortcomings, and we hope to further study them in the future. First, the data source is only Sina Weibo, which is a single source of data. Secondly, the subjects of this study are mainly selected from our university, the number of subjects is small, and at the same time, limited by the characteristics of our university with many female students, there is an uneven distribution of male and female sample ratio results. Then, although this study provides some material and data support for the study of college students' interpersonal relationship through the combination of questionnaire and SPSS data analysis, its more complex principles and how to improve the parent-child attachment relationship of college students, adjust the awareness of mate selection preference, reduce gender bias, and improve the interpersonal skills of college students need to be further researched. Finally, the questionnaire design logic of each variable in this study is relatively scattered and fragmented, the scope of variables is relatively rough, the questionnaire results can not well interpret the definition of variables, and it is difficult for the results to illustrate the expected relationship between variables, which may potentially affect the results of the mediator and moderating model, so it is desirable to further refine the variables that have a clear relationship through a new questionnaire research methodology.

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