

Development of the Empathy Ability Questionnaire in Intimate Relationships among College Students

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Abstract. Empathy ability is the ability to share and understand others' feelings and experiences. It is how a person feels when they watch or imagine how someone else feels. Close relationships are relationships where people depend on each other a lot. They include many kinds, such as romantic relationships, marriage, family ties, classmate relationships and friendships. Empathy ability is a key thing in close relationships. We combined empathy ability with close relationships. We made a questionnaire called "Empathy Ability in Close Relationships Questionnaire". We wanted to find out if college students' empathy ability is different when they face different close relationships. We collected study data in three ways: looking at many papers, asking experts to judge and discuss, and giving out the questionnaire. We used some statistical methods, like exploratory factor analysis, independent - samples t - test and repeated measures analysis of variance. We also used the Toronto Empathy Questionnaire to test the effect. We wanted to know how good our questionnaire was and test its reliability and validity. Finally, we made the "College Students' Empathy Ability in Close Relationships Questionnaire". It has 22 questions. It includes 3 parts: family empathy, friend empathy and lover empathy. The Cronbach's alpha coefficient is 0.896. The split - half reliability is 0.918. The results show two things. First, girls' empathy ability is much stronger than boys'. Second, empathy ability is very different in the three parts: family, friendship and love. College students have the highest empathy ability in friendship. They have the lowest empathy ability in family relationships. In short, this questionnaire has good reliability and validity. It meets the standards of psychometrics. It can be used as a tool to measure college students' empathy ability in close relationships.

Keywords: College students, Empathy, Close relationships, Questionnaire development, Reliability and validity

1. Introduction

1.1. Empathy

Empathy is a part of positive psychology. In past studies, scholars usually define empathy from two parts: feelings and thinking. From the feeling side: Empathy is how a person feels when they see others' hard times [1]. Some people say empathy is feelings like caring, pity, and kindness. These feelings match what others feel and what is good for others [2]. Other researchers say empathy is the ability to share and understand others' experiences and feelings. It means a person has a feeling. This feeling comes from watching or imagining how others feel. The person knows this feeling comes

from others [3,4]. From the thinking side: Researchers say empathy is forgetting about your own feelings for a while. You put yourself in others' situations and think from their side [5,6].

1.2. Close relationships

There are two ways to define close relationships: narrow and broad. Narrow sense: Close relationships are mainly romantic relationships. The two people are called partners. Broad sense: Close relationships are relationships where people depend on each other a lot. They include many kinds, like romantic relationships, marriage, family ties, classmate relationships, and friendships [7]. Besides, some foreign researchers say close relationships are also about cooperation and understanding. These relationships need trust as the base. They help people with different needs and life goals. After working together and compromising, these people can make their relationship stable and reach common close relationship goals [8].

In Chinese culture: Close relationships have a strong automatic empathy process. Because people mix their own feelings with others' feelings a lot, the feelings they get from empathy are mostly pain [9]. Another study found: Girls' emotional empathy ability is higher than boys'. Girls' empathy for their lovers is higher because of close relationships. But this does not happen to boys [10].

1.3. Measuring empathy

There are many different ways to measure empathy for different parts and people. The main ways are: self-report method, observer rating method, experimental induction method, etc. Based on the purpose of this paper, we mainly talk about using scales to measure empathy.

This scale measures a person's own empathy. It is made based on the multi-dimensional theory of empathy. It has 22 questions. You score from 0 (totally not true) to 4 (totally true). The higher the score, the better the empathy ability. It has 4 sub-scales: Perspective Taking (PT): Measures how often a person naturally thinks from others' side. Fantasy Scale (FS): Measures how a person feels for made-up characters (like in books or movies). Empathetic Concern (EC): Measures how a person feels sorry for and cares about people who are having hard times. This is a "other-focused" emotional reaction. Personal Distress (PD): Measures the anxiety and discomfort a person feels in stressful social situations. This is a "self-focused" emotional reaction. PT and FS are part of cognitive empathy. EC and PD are part of emotional empathy. But IRI is still controversial. Even though it looks at many parts, it does not tell the difference between sympathy and empathy [11].

This is a main scale to measure basic empathy. It is made based on the definition of empathy: "understanding and sharing others' emotional states and content". It fixes the problems of old empathy scales. It does not mix empathy with sympathy, social desirability, or social skills. It has good reliability and validity. It is also proved to be consistent across cultures in places like France and Italy. Each question is scored on a 5-point scale. The higher the score, the more you agree with the question. Studies in China show: BES has good reliability, meeting psychometric standards. It has a strong relationship with IRI and the Alexithymia Scale. It has no strong relationship with social desirability. This means BES has good reliability and validity.

At present, many experiments have compiled corresponding empathy scales for different objects: Jefferson Scale of Empathy - Health Professions (JSE-HP): It is used in health care settings. Researchers start from the cognitive characteristics of empathy. They believe empathy is the ability to understand patients' inner experiences and perspectives. It was developed in 2001 by Dr. Mohammadreza Hojat and his research team at the Center for Medical Education and Health Care Research of Thomas Jefferson University in the United States. It has good reliability and validity. The Chinese version translated by An Xiuqin et al. is widely used in health care at home and abroad [12].

College Students' Empathy Scale: In recent years, researchers have begun to study college students' interpersonal communication ability and empathy ability from the perspective of college students' mental health. It was compiled by Zhang Xinwei et al. It has 46 items from four dimensions: perspective taking, insight, emotional contagion and emotional isolation. It has good reliability and validity [13].

1.4. Empathy and close relationships

1.4.1. Empathy and family ties

Family ties are the most basic form of close relationships. They usually exist between family members. Empathy plays a vital role in family relationships, especially between parents and children. Studies by Zhang Xianying et al. found [14]: Parents' empathy ability is closely related to their children's emotional development and behavioral performance. Parents with high empathy ability can better understand and respond to their children's emotional needs, thus promoting their children's emotional security and social adaptability [15]. In addition, empathy also plays a role in interactions between brothers and sisters. It helps them solve conflicts and establish deep emotional bonds.

1.4.2. Empathy and romantic love

Romantic relationship is the core form of adult close relationships. Empathy plays an important role in it. Studies show [16]: Partners with strong empathy ability can better understand and respond to each other's emotional needs, thus enhancing relationship satisfaction and stability. Empathy can promote emotional communication and conflict resolution, reducing misunderstandings and contradictions. In addition, empathy is closely related to trust and attachment in close relationships. Individuals with strong empathy ability are more likely to establish and maintain trust relationships, thus enhancing the quality of romantic relationships.

1.4.3. Empathy and friendship

Friendship is a close relationship based on equality and mutual benefit. Empathy also plays an important role in it [17]: Friends with high empathy ability can better understand and support each other, thus enhancing the depth and durability of friendship. Empathy can promote emotional connection and cooperation between friends. It helps them support each other when facing challenges and difficulties. In addition, empathy also plays a key role in the formation and maintenance of friendship. Individuals with strong empathy ability are more likely to attract and keep friends, thus forming a stable social network.

1.5. The correlation and influence between empathy and close relationships

The correlation between empathy and close relationships can be understood through many aspects: First, empathy helps with emotional understanding and response, thus enhancing emotional connection and intimacy. Second, empathy can promote trust and attachment, reducing conflicts and misunderstandings, thus improving relationship stability and satisfaction. Finally, empathy is also closely related to an individual's mental health and social adaptability. Individuals with strong empathy ability are more likely to establish and maintain healthy close relationships, thus improving their overall quality of life.

Empathy, as the ability to understand and share others' emotions, plays a vital role in close relationships. Whether it is family ties, romantic love or friendship, empathy can promote emotional connection, enhance trust and attachment, reduce conflicts and misunderstandings, thus improving

the quality and stability of relationships. From the above research results, we can see that there is a correlation between empathy and different close relationships. However, previous researchers have not studied them together. Therefore, we developed this questionnaire to study whether college students have differences in empathy ability when facing different close relationships, and how great these differences are.

2. Participants and methods

2.1. Participants

Sample 1 (Preliminary Test): We used the convenience sampling method. We asked college students from universities in Beijing, Hubei, Shandong, Gansu, Jiangsu, Tianjin, Sichuan, Shaanxi, Anhui, Hainan, Heilongjiang, Yunnan, Hebei, Shanxi and Chongqing to fill in an online questionnaire. Total questionnaires sent out: 262; Valid questionnaires collected: 152; Effective recovery rate: 58%; Average age of participants: 19.96 years old; Male participants: 26 (17.11% of the total); Female participants: 126 (82.89% of the total).

Sample 2 (Formal Test): We used the convenience sampling method. We asked college students from universities in Beijing, Hubei, Shandong, Gansu, Shanghai, Tianjin, Anhui, Shaanxi, Hebei, Jiangsu, Liaoning and Shanxi to fill in an online questionnaire. Total questionnaires sent out: 193; Valid questionnaires collected: 110; Effective recovery rate: 57%; Average age of participants: 20.65 years old; Male participants: 32 (29.09% of the total); Female participants: 78 (70.91% of the total).

All the above participants took part in this study with full knowledge and consent.

2.2. Research procedures

2.2.1. Compilation of the preliminary questionnaire

We looked up theoretical and empirical studies on empathy ability at home and abroad. We read a lot of literature on empathy in the past 5 years, especially analyzing studies on close relationships. Based on the literature and reference scales we found, we decided to divide empathy ability in close relationships into three dimensions: family empathy, friend empathy and lover empathy. We made 60 questionnaire items by referring to literature and existing relevant scales. The questionnaire used a 5-point scale: 1 point = Strongly disagree; 2 points = Disagree; 3 points = Neutral; 4 points = Agree; 5 points = Strongly agree. For reverse-scored items, the scoring was the opposite. We asked psychology experts to check: Whether each item could accurately express the concept of its dimension (delete items that did not fit); Whether the scale's dimensions were reasonable and complete; Whether each item was representative; Whether the item descriptions fit college students' reading habits. Finally, 30 items were kept (including 3 reverse-scored items). This formed the Preliminary Version of the College Students' Empathy Ability in Close Relationships Questionnaire.

2.2.2. Formal test and analysis process

We revised the questionnaire based on the preliminary test results to form the formal questionnaire. Following the principles and methods of item compilation, we conducted item analysis in the following steps: ① Based on the item analysis results of the preliminary test data, we deleted items with non-significant CR values. ② Based on the exploratory factor analysis results of the preliminary test data, we deleted items that did not meet statistical standards. This formed the Formal Scale of Empathy Ability in Close Relationships for College Students.

2.2.3. Criterion tool

We used the Toronto Empathy Questionnaire (TEQ) as the criterion for testing. TEQ is used to measure an individual's empathy level. It has 9 items (2 of which are reverse descriptions of high empathy levels). It uses a 5-point scale: For positive items: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always. For reverse-scored items, the scoring was the opposite. Test results showed: Its Cronbach's alpha coefficient was 0.815. It has good reliability and validity, and is suitable for use in the Chinese cultural context.

2.2.4. Statistical methods

We used SPSS 17.0 for item analysis, reliability and validity tests, exploratory factor analysis, etc. We used AMOS 24.0 for confirmatory factor analysis.

3. Results

3.1. Preliminary test analysis

3.1.1. Item analysis

We divided the samples into a high-score group (27%) and a low-score group (27%) based on their total scores. We used SPSS to calculate the total scores, then conducted an independent-samples t-test. In the preliminary questionnaire: 41 participants in the high-score group, 41 in the low-score group. Analysis showed 3 items had a significance level greater than 0.05. The items were: ① "When my family asks for my help, I may feel afraid." ② "When my friends ask for my help, I may feel afraid." ③ "When my lover asks for my help, I may feel afraid." We deleted these 3 items. All other items met statistical standards and were kept.

3.1.2. Exploratory factor analysis

We conducted the KMO test and Bartlett's Test of Sphericity on the data. Test results: KMO sampling adequacy value = 0.822; Bartlett's Test of Sphericity: $\chi^2 = 2341.747$, $df = 351$, $p < 0.001$. These results showed the data was suitable for factor analysis. We used principal component analysis to conduct exploratory factor analysis on the remaining 27 items. We deleted 5 items that did not meet statistical standards. 22 items remained, all with factor loadings greater than 0.4. Exploratory factor analysis of the data identified 5 factors of college students' empathy ability. We analyzed and named the factors based on their items: Factor 1: Lover Empathy; Factor 2: Friend Empathy; Factor 3: Family Positive Empathy; Factor 4: Situational Empathy; Factor 5: Family Negative Empathy. (See Table 1 for details). Factor merging and adjustment: We tried deleting 2 factors: Family Negative Empathy and Situational Empathy. We found the questionnaire's internal consistency coefficient decreased after deletion. So we decided to reclassify these factors. Family Positive Empathy and Family Negative Empathy both focus on family. We merged them into one factor (within statistical standards): Family Empathy. Situational Empathy had 3 items: ① "When I see a love tragedy, I may imagine how I would feel if it happened to me." ② "When I see a friendship tragedy, I may imagine how I would feel if it happened to me." ③ "When I see a family tragedy, I may imagine how I would feel if it happened to me." We think the Situational Empathy factor appeared for two reasons: We did not fix the number of factors to 3 during exploratory factor analysis. The system grouped these 3 items by their focus on "tragedy" rather than "close relationships". We chose to refocus on "close relationships". We classified the 3 items into the 3 factors: Family Empathy, Friend Empathy, and Lover Empathy. We tested the reliability of the 3

factors. Their internal consistency coefficients were: Family Empathy: 0.808; Friend Empathy: 0.822; Lover Empathy: 0.836; These values showed good reliability.

Table 1. Exploratory factor analysis of the empathy in intimate relationships questionnaire for college students

Factor1 (lovers' empathy)		Factor2 (friends' empathy)		Factor3 (familial positive empathy)		Factor4 (situational empathy)		Factor5 (familial negative empathy)	
item	loading	item	loading	item	loading	item	loading	item	loading
Q13	0.794	Q8	0.772	Q16	0.866	Q14	0.792	Q22	0.647
Q10	0.786	Q3	0.690	Q19	0.785	Q1	0.790	Q21	0.572
Q15	0.757	Q5	0.607	Q20	0.688	Q18	0.683		
Q12	0.732	Q7	0.598	Q17	0.543				
Q11	0.730	Q4	0.569						
Q9	0.717	Q2	0.569						
		Q6	0.519						

3.1.3. Reliability test

Statistical analysis showed the preliminary questionnaire's overall Cronbach's alpha coefficient was 0.892. After deleting 8 items that failed item analysis and exploratory factor analysis, the questionnaire's Cronbach's alpha coefficient was 0.894. Overall, the preliminary version of the College Students' Empathy Ability in Close Relationships Questionnaire had good reliability.

3.1.4. Preliminary test discussion

We conducted item analysis, exploratory factor analysis, and other tests on the preliminary questionnaire results. Based on the results, we deleted 8 items. The preliminary questionnaire had 5 factors: Lover Empathy, Friend Empathy, Family Positive Empathy, Situational Empathy, and Family Negative Empathy. According to the results and statistical principles, we revised the 5 factors into 3 factors: Family Empathy, Friend Empathy, and Lover Empathy. The internal consistency coefficients of the 3 factors were 0.808, 0.822, and 0.836. These results basically fit the proposed model of empathy ability in the three types of close relationships.

3.2. Formal test analysis

3.2.1. Item analysis

We divided the samples into a high-score group (27%) and a low-score group (27%) based on their total scores. We used SPSS to calculate the total scores, then conducted an independent-samples t-test. In the formal questionnaire: 30 participants in the high-score group, 30 in the low-score group. Analysis showed: The significance level of all items was less than 0.05. The average score of the high-score group was higher than that of the low-score group. Each item's score was significantly correlated with the total score.

3.2.2. Confirmatory factor analysis (construct validity)

We conducted confirmatory factor analysis on the formal questionnaire data to test the construct validity of the College Students' Empathy Ability in Close Relationships Questionnaire. Results showed: The three-factor model had an acceptable fit. $\chi^2/df = 2.09$; GFI = 0.75; AGFI = 0.69; NFI = 0.67; CFI = 0.79; IFI = 0.79; RMSEA = 0.10. (See Figure 1 for details)

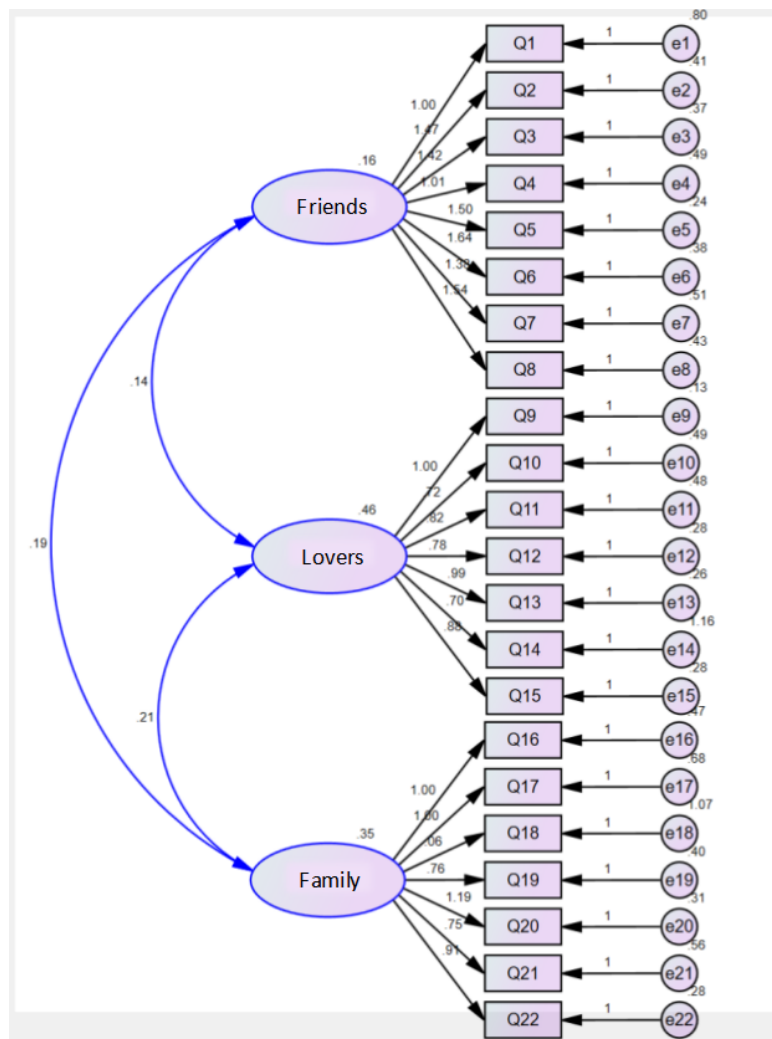


Figure 1. Validation factor analysis of the empathy in intimate relationships questionnaire for college students

3.2.3. Reliability test

Statistical analysis showed: The formal questionnaire's Cronbach's alpha coefficient = 0.896; Split-half reliability = 0.918. Overall, the formal version of the questionnaire had good reliability.

3.2.4. Validity test

We used the Toronto Empathy Questionnaire (TEQ) to test the criterion validity of our scale. TEQ has 9 items. Statistical analysis showed: The correlation coefficient between our scale's total score and TEQ's total score was 0.714; $p < 0.001$. This result indicated the questionnaire had good criterion validity.

3.2.5. Difference analysis of family empathy, friend empathy, and lover empathy

Step 1: Repeated Measures Analysis of Variance (Three Types of Empathy): We conducted a repeated measures analysis of variance on the scores of Family Empathy, Friend Empathy, and Lover Empathy. Results showed: There was a significant difference in college students' empathy ability across the three close relationships. $F [2,108] = 39.042$, $p < 0.001$; Further multiple comparison

analysis found: College students' empathy ability in family relationships (26.12 ± 3.87 SE) was significantly lower than in friendship relationships (29.65 ± 4.79 SE; $p < 0.001$, Bonferroni correction). College students' empathy ability in family relationships was significantly lower than in romantic relationships (27.93 ± 4.40 SE; $p < 0.001$, Bonferroni correction). College students' empathy ability in friendship relationships was significantly higher than in romantic relationships ($p < 0.001$, Bonferroni correction).

Step 2: Gender Difference Analysis (Total Score and Three Empathy Types): We tested gender differences in the total score, Family Empathy score, Friend Empathy score, and Lover Empathy score. Results showed: Males' overall empathy ability (83.56 ± 8.42 SE) was significantly lower than females' (83.74 ± 11.85 SE; $t = -0.090$, $p = 0.049$, independent-samples t-test). There were no significant differences between males and females in the three types of close relationships ($p > 0.05$, independent-samples t-test).

3.2.6. Formal test discussion

We conducted item analysis, reliability and validity tests, and other analyses on the formal questionnaire results. Based on the results, all 22 items were kept. Difference analysis found: College students had the highest empathy ability in friendship relationships, followed by romantic relationships, and the lowest in family relationships. There was a significant gender difference in overall empathy ability. There were no significant gender differences in any of the three close relationships. Using TEQ as the criterion, the results showed a significant correlation between our scale and TEQ. This indicated the questionnaire had good criterion validity.

4. Analysis and discussion

4.1. General discussion

Through data analysis, we drew the following conclusions: When facing the three different dimensions of close relationships, contemporary college students showed significant differences in their empathy ability. College students' empathy ability toward friends was higher than that toward lovers and family members. College students' empathy ability toward lovers was higher than that toward family members. From this, we can conclude: College students have the relatively highest empathy ability in friendship-based close relationships, and the relatively lowest empathy ability in family-based close relationships.

In terms of gender, we also found significant differences: Consistent with previous studies, females' overall empathy ability was significantly higher than males'. However, we found no significant gender differences across the three dimensions of close relationships.

4.2. Limitations and shortcomings

Although this questionnaire achieved some results, it still has many shortcomings due to limitations in ability, time, and other factors. In future research, we should continuously improve our abilities, make up for these shortcomings, and further perfect the questionnaire.

Sample source and representativeness: Due to manpower and time constraints, although we collected data from college students in most provinces and cities across the country, a large amount of data came from college students of a sports university in Beijing. The effective rate of our questionnaire was low, so it cannot significantly represent the broad college student group. In addition, there was a large gender ratio imbalance. These issues may lead to a decrease in external validity and insufficient evidence for some inferences. Sample size difference: The number of participants used in the preliminary test and formal test of our questionnaire was quite different. The

sample size for the formal test was relatively small, which may have affected the results. Therefore, in future research, we should expand the scope and size of sampling to make the sample larger, more comprehensive, and more representative, thereby improving the scientificity of the research. Exclusion of specific groups: During participant screening, we excluded college students without romantic experience. Therefore, we cannot explore whether these individuals have differences in empathy ability when facing family and friendship relationships, and the degree of such differences if they exist.

Data Analysis: Due to time constraints, we did not conduct a test-retest reliability analysis. Therefore, the data analysis results need to be further improved.

4.3. Innovations and prospects

We placed college students' empathy ability within the context of close relationships, and explored whether college students show different levels of empathy ability when facing different close relationship objects. This questionnaire may provide more variables and possibilities for future research on human close relationships. If we balance the gender ratio in future studies, we may be able to measure the gender differences in empathy ability within close relationships.

5. Conclusions

(1) The College Students' Empathy Ability in Close Relationships Questionnaire has a total of 22 items. It is composed of 3 dimensions.

(2) The questionnaire has a good theoretical design and excellent reliability and validity indicators. It is an effective tool for studying college students' empathy ability in close relationships.

(3) Two key findings: Females' empathy ability is significantly stronger than males'. There are significant differences in empathy ability across the three dimensions (family relationships, friendship, and romantic love). College students have the relatively highest empathy ability in friendship-based close relationships, and the relatively lowest empathy ability in family-based close relationships.

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Appendix

Empathy Ability Questionnaire in Intimate Relationships among College Students

Instructions: Thank you for participating in our questionnaire! This survey is for research purposes only, and your responses will be kept strictly confidential. Starting from item 5, the statements are presented in the first-person perspective. Please put yourself in the situation and answer honestly according to your own views. Thank you!

- 1、Your Age: ____
- 2、Your Gender: Male ☐ Female ☐
- 3、Your Major (Full Name) : ____
- 4、Do you have any romantic relationship experience: Yes ☐ No ☐

① = Strongly Disagree; ② = Disagree; ③ = Neutral; ④ = Agree; ⑤ = Strongly Agree

Part One: The following 8 statements refer to your friends. Please read carefully and choose the most appropriate answer.

1. When I see some friendship tragedies, I may imagine how I would feel if it happened to me.	①	②	③	④	⑤
2. My friends' emotions can affect me.	①	②	③	④	⑤
3. I can respond actively to my friends' emotional needs.	①	②	③	④	⑤
4. I can quickly perceive when my friends' emotions change.	①	②	③	④	⑤
5. I believe I can resonate with my friends' emotions.	①	②	③	④	⑤
6. When my friends are ill, I am able to take care of them.	①	②	③	④	⑤
7. When my friends receive recognition, good grades, or achievements, I feel happier than they do.	①	②	③	④	⑤
8. I can seriously prepare for my friends' birthdays.	①	②	③	④	⑤

Part Two: The following 7 statements refer to your romantic partner. Please read carefully and choose the most appropriate answer.

9. I can respond actively to my partner's emotional needs.	①	②	③	④	⑤
10. My partner's emotions can affect me.	①	②	③	④	⑤
11. When my partner is ill, I am able to take care of them.	①	②	③	④	⑤
12. I can quickly perceive when my partner's emotions change.	①	②	③	④	⑤
13. I believe I can resonate with my partner's emotions.	①	②	③	④	⑤
14. When I see some romantic tragedies, I may imagine how I would feel if it happened to me.	①	②	③	④	⑤
15. I can seriously prepare for my partner's birthday.	①	②	③	④	⑤

Part Three: The following 7 statements refer to your family members. Please read carefully and choose the most appropriate answer.

16. I believe I can resonate with my family members' emotions.	①	②	③	④	⑤
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17. I can seriously prepare for my family members' birthdays.	①	②	③	④	⑤
18. When I see some family tragedies, I may imagine how I would feel if it happened to me.	①	②	③	④	⑤
19. My family members' emotions can affect me.	①	②	③	④	⑤
20. I can respond actively to my family members' emotional needs.	①	②	③	④	⑤
21. When I have conflicts with my family members, I usually try to see things from their perspective.	①	②	③	④	⑤
22. When my family members are ill, I am able to take care of them.	①	②	③	④	⑤
