

The Influence of Social Comparison on College Students' Depression: The Moderating Effect of Interpersonal Self-Reliance

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Abstract: In order to clarify the relationship among social comparison effect, depression and interpersonal independence of college students, 159 college students were taken as subjects and assessed by questionnaire survey. Convenience sampling method was adopted to conduct an online survey of college students in Zhejiang province from November 10 to 31, 2022. The measurement tools were Interpersonal Self-reliance Scale, Social Comparative Effect Scale and Baker Self-rating Depression Scale. The moderating effect model of Process3.0 plug-in was used to explore the moderating effect of interpersonal independence on social comparison and depression. SPSS 26.0 software was used for statistical analysis. In this study, we examined the moderating effect of interpersonal independence on the process of social comparison affecting the depressive symptoms of individuals. The results showed that the two dimensions of upward comparison and downward identification played a moderating role, but gender did not play a significant role in this process. Conclusions: Depression is common among college students during the COVID-19 epidemic. It is suggested to pay more attention to depression and interpersonal self-regulation strategies under the social comparison effect of college students.

1. Introduction

1.1. An Overview of Social Comparison

Psychologist Festinger^[3] put forward in his classic social comparison theory that people have intrinsic motivation to evaluate their own concepts and abilities, and when there is no objective and direct evaluation method, people will evaluate themselves by comparing with others' concepts and abilities.^[1] Wood (1996) Social comparison is defined as the process in which people compare and think about one or more information related to themselves, Buunk and Gibbons(2006).^[3-4] Then the individual differences of social comparison in comparison degree and frequency are further defined as social comparison tendency. Although most studies have found that social comparison tendency is

related to individual negative emotions, Lyubomirsky.^[4]It is pointed out that social comparison is a positive, dynamic and flexible process, which can both promote and reduce individual emotions. Generally speaking, there are two stages in the process of social comparison, one is the choice of comparison objects, and the other is the individual response after social comparison. In the selection stage, if the comparator chooses to compare with the superior, it is called the upward social comparison mode; If the comparator chooses to compare with the inferior, it is called the downward social comparison mode; The reaction stage can be divided into assimilation and contrast.^[5] Swallow and Kuiper^[6]It is believed that in upward social comparison, if individuals attribute their self-inferiority to low ability, rather than discounting it from other non-ability factors (such as grade differences), it will produce negative self-evaluation and increase the risk of depression.^[2]

1.2. An Overview of Personality Self-reliance

Personality is not only influenced by genetic factors, but also by the individual's environment, especially the local culture^[1]; Yang Xiulian^[8]. China people have a unique personality that is different from westerners^[9]. Xia Lingxiang and Huang Xiting^[10-11] put forward the unique concept of self-reliance personality of Chinese people, which includes two dimensions: interpersonal self-reliance and personal self-reliance. In subsequent studies, Xia Lingxiang^[11] further put forward the theoretical viewpoint that interpersonal self-reliance is a protective personality factor of depression, and verified this hypothesis through empirical research. The following Figure1 is a schematic diagram of the hypothetical model.^[7]

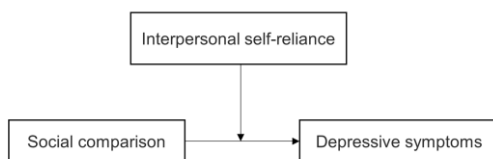


Figure 1: Schematic diagram of hypothetical model

1.3. A Survey of College Students' Interpersonal Self-reliance

Table 1: Sample basic information analysis

		frequency	percentage	Effective percentage	Cumulative percentage
gender	man	59	37.1	37.1	37.1
	woman	100	62.9	62.9	100
	amount to	159	100	100	
grade	freshman	28	17.6	17.6	17.6
	Sophomore	38	23.9	23.9	41.5
	junior	43	27	27	68.6
	senior	48	30.2	30.2	98.7
	Fifth year (five-year undergraduate course)	2	1.3	1.3	100
	amount to	159	100	100	

As shown in the Table1, among the 159 samples, there are 59 male samples and 100 female samples, with a ratio of 4: 6. Among the 159 samples, there are 28 big samples, 38 sophomores, 43 juniors, 48 seniors and 2 freshmen (five-year undergraduate).

2. Interpersonal Self-reliance Scale

2.1. A Survey of College Students' Interpersonal Self-reliance

We adopted the interpersonal self-reliance subscale of the Adolescent Personality Self-reliance Scale, which was developed by Xia Lingxiang.^[12] There are 21 items in total, and the score is 5 points: 1 means "very non-conformity" and 5 means "very conformity", and the 11th question of measurement impression management is excluded when scoring. Xia Lingxiang^[17] found that the consistency reliability of the self-supporting personality scale was .62 ~ .81, and the retest reliability was .75 ~ .85. To provide data support for our follow-up research. The questionnaire is scored by 5 points. The higher the score, the higher the level of interpersonal self-reliance. The total score of each data is calculated and sorted. We define the top 50% in descending order as high interpersonal self-reliance and the last 50% as low interpersonal self-reliance. Descriptive statistics using spss can get the statistical results of the total score and five independent dimensions of interpersonal self-reliance, such as Table 2:

Table 2: Statistical Results Table of Total Score and Dimension Score of Interpersonal Self-reliance

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Aggregate score	159	50.00	92.00	68.9874	9.84838
Interpersonal independence	159	1.00	5.00	2.9324	.98151
Interpersonal responsibility	159	2.00	5.00	3.8223	.76739
Interpersonal initiative	159	1.20	5.00	2.9094	.80715
Interpersonal openness	159	1.00	5.00	3.3569	.85936
Interpersonal flexibility	159	1.00	5.00	3.3920	.71702
Valid N (listwise)	159				

It can be seen from the table that the average score of interpersonal self-reliance is 68.9874.

2.2. Reliability and Validity Test of Questionnaire

We use factor analysis to test and analyze the validity of the questionnaire. Firstly, we use KMO and bartlett spherical test in spss to get it. According to this result, $KMO=0.792>0.6$ of the questionnaire, which indicates that it is suitable for factor analysis. In addition, the chi-square statistic of bartlett spherical test is 1612.869, the degree of freedom is 253, and its significance level is 0, that is, less than 0.01. Therefore, the null hypothesis that "correlation coefficient matrix is an identity matrix" should be rejected, indicating that there are common factors among the original variables, so the factor analysis method is suitable. We use Alpha model to test the reliability. As can be seen from the above table, $\alpha=0.742>0.7$, which shows that the reliability coefficient basically meets the

requirements of psychological measurement.

3. Survey on Depression of College Students (Baker Self-Rating Depression Scale)

Beck Depression Inventory II (BDI-II) is one of the most widely used self-rating scales for depressive symptoms at present, which can be used to evaluate depressive symptoms and severity of both normal people and mental patients, with a total of 21 questions.^[13] There were 21 versions of BDI in the early years, and Beck introduced 13 versions with good quality.^[14] Its development marks the transformation of health care professionals. Because there is a big difference in the sex ratio in the collected data, we sampled the data of girls (N=100) in the sample to keep consistent with the number of boys (N=59). We used Baker Depression Scale to investigate the depression tendency of college students, which provided data support for our follow-up research. All the items in the questionnaire are rated as 0-4, and none of the symptoms =0; Mild =1 point; Moderate =2 points; Severity =3 points, specifically, there are 4 short sentences for each item (problem), so that the subject can choose the one that best suits his mood or situation at that time. BDI only has two statistical indicators: single item score and total score. Beck suggested that the total score can be used to distinguish the existence and severity of depressive symptoms, with 0-4 points: (basically) no depressive symptoms, 5-7 points: mild depressive symptoms, 8-15 points.

3.1. Descriptive Statistics of College Students' Depression

Descriptive statistics by spss can be used to get the distribution of depression in different grades and genders. This is shown in the Table 3 and Table 4 below:

Table 3: Correlation table between gender and depression

Correlation table between gender and depression						
		Depressive state				amount to
		No depression	Mild depression	Moderate depression	Severe depression	
gender	man	26	seven	15	11	59
		49.1%	36.8%	60.0%	52.4%	50.0%
	woman	27	12	10	10	59
		50.9%	63.2%	40.0%	47.6%	50.0%

Table 4: Correlation table between grade and depression

Correlation table between grade and depression							
			Depressive state				Amount to
			No depression	Mild depression	Moderate depression	Severe depression	
grade	freshman	count	12	2	six	three	23
		proportion	22.6%	10.5%	24.0%	14.3%	19.5%
	Sophomore	count	10	five	seven	eight	30
		proportion	18.9%	26.3%	28.0%	38.1%	25.4%
	junior	count	14	six	seven	2	29
		proportion	26.4%	31.6%	28.0%	9.5%	24.6%
	senior	count	16	six	five	seven	34
		proportion	30.2%	31.6%	20.0%	33.3%	28.8%
	Fifth year	count	one	0	0	one	2

	(five-year undergraduate course)	proportion	1.9%	0.0%	0.0%	4.8%	1.7%
amount to		count	53	19	25	21	118
		proportion	44.9%	16.1%	21.2%	17.8%	100.0%

$P < 0.01$ which means that there is a significant difference on depression level among college students. Through Table 3.2-2. According to the statistical description, the average value of the questionnaire is $7.75 >$ the critical value of 4, so the final conclusion is that there is a difference between the score of Baker Depression Scale and the critical score of depression, which is mainly higher than the critical score. It shows that the mental health status of college students should be paid attention to.

3.2. Correlation Analysis between Depression and Gender of College Students

Independent sample t test was used to analyze the correlation between depression and gender, and the results were as follows Table 5 shown:

Table 5: Correlation analysis table between depression and gender

		Independent sample t-test									
		Levene variance equality test		T-test of average equality							
		F	Sig.	t	df	Sig. (2-tailed)	mean deviation	Standard error difference	99% confidence interval of the difference		
										Lower	Upper
Scale score	Assuming that the variance is equal	.702	.404	.059	116	.953	.085	1.427	-3.652	3.822	
	Do not assume that the variance is equal.			.059	115.834	.953	.085	1.427	-3.652	3.822	

Table 6: Group Statistics result table

Group Statistics					
	gender	N	Mean	standard deviation	Standard error mean
Y	man	59	7.80	7.895	1.028
	woman	59	7.71	7.602	.990

Symbol 1 denotes a boy, and symbol 2 denotes a girl, from Table 6. It can be seen that the Mean and standard deviation of boys' depression scale scores in the sample are 7.8 and 7.895, while the Mean and standard deviation of girls' depression scale scores in the sample are 7.71 and 7.602, with a mean difference of 0.085, a standard deviation of no more than 0.2 and a standard deviation of no more than 0. The following is a further verification from the Independent Samples Test table of two independent samples, and finally the conclusion that there is no significant difference in the overall depression between men and women is drawn.

3.3. Correlation analysis between depression and grade

There is no correlation between the scale score and the grade of the respondents, and the Kendall's tau_b correlation coefficient is -0.017, which is basically not correlated, and it is not significant at the significance level of 0.01, that is, this correlation in the sample data is equally effective in the whole.

3.4. Reliability and Validity Test of Questionnaire

3.4.1. Reliability Test

We use Alpha model to test the reliability. You can get results, such as Table 7.

Table 7: Reliability statistics

Reliability statistics		
Cronbach's α value	Cronbach's α value based on standardization project	number of entry
.920	.922	13

As can be seen from the above table, Cronbach's α and Cronbach's α based on standardized items are both greater than 0.920 and 0.922, respectively, which have good internal consistency, so it can be seen that the reliability coefficient basically meets the requirements of psychological measurement.

3.4.2. Validity Test

We use factor analysis to test and analyze the validity of the questionnaire. Firstly, we use KMO and bartlett spherical test in spss to get Table 8 and Table 9.

Table 8: KMO and bartlett Spherical Inspection Table

KMO and bartlett Spherical Test		
KMO sampling suitability quantity		.913
Bartlett sphericity test	Approximate chi-square	800.599
	freedom	seventy-eight
	significance	.000

It can be seen from the table that $KMO=0.913>0.6$ of the questionnaire, which indicates that it is suitable for factor analysis. In addition, the chi-square statistic of bartlett spherical test is 800.599, the degree of freedom is 78, and its significance level is 0, that is, less than 0.01, so the null hypothesis that "correlation coefficient matrix is an identity matrix" should be rejected, indicating that there are common factors among the original variables, so the factor analysis method is suitable.

Table 9: Explained total variance table

Component	Total Variance Explained					
	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.776	52.125	52.125	4.192	32.249	32.249
2	1.009	7.765	59.890	3.593	27.641	59.890
3	.736	5.661	65.551			
4	.701	5.391	70.943			
5	.675	5.189	76.132			
6	.575	4.424	80.556			

7	.540	4.154	84.710			
8	.470	3.617	88.327			
9	.402	3.090	91.417			
10	.339	2.604	94.022			
11	.324	2.496	96.517			
12	.249	1.918	98.435			
13	.203	1.565	100.000			
Extraction Method: Principal Component Analysis.						

Table 9 show the contribution rate of factors to the explanation of variables, and nine factors can express variables to 91.417%.

4. Social Comparison Effect Scale

4.1. Survey on Social Comparative Effect of College Students

The social comparative effect scale used in this study was developed by Karen et al. (2000) in university of groningen, the Netherlands.^[15] Co-edited, a total of 12 items, divided into four sub-tables: uplink-identity, uplink-contrast, downlink-identity and downlink-contrast, which are used to measure the contrast effect and assimilation effect in uplink comparison, and the contrast effect and timely assimilation effect in downlink comparison respectively. Before the questionnaire was adopted, it was translated into Chinese by two psychological professionals and back into English. The signifier and signifier of the project content are as consistent as possible for people in two cultures. The work stress scale is the same as that of study 1.

Table 10: Analysis of variance of gender differences in social comparative assimilation-contrast effect of college students

	Upward-assimilation		Uplink-contrast		Descending-assimilation		Downlink-contrast	
	M	SD	M	SD	M	SD	M	SD
Male (N=59)	9.68 ±3.39		9.12 ±3.28		8.83 ±2.93		8.73 ±3.16	
Female (N=59)	10.14 ±2.44		10.54 ±2.77		10.00 ±3.19		9.25 ±2.86	
F	0.710		6.502*		4.059*		2.628	

Note: * p < .05

By Table 10, it can be seen that the upward-contrast effect and downward-assimilation effect of female college students' social comparison are significantly higher than those of male college students. There is no significant difference between male and female college students in the upward-assimilation effect of social comparison.

Table 11: Variance analysis of grade differences in social assimilation-contrast effect of college students

	Upward-assimilation		Uplink-contrast		Descending-assimilation		Downlink-contrast	
	M	SD	M	SD	M	SD	M	SD
Freshman (N=28)	10.18 ±3.45		9.64 ±3.43		9.36 ±3.52		9.18 ±3.42	
Sophomore	9.92 ±2.68		9.87 ±3.09		9.53 ±2.89		9.89 ±3.14	

(N=38)				
Junior year (N=43)	9.81 ±2.53	10.44 ±2.36	9.88 ±2.12	8.60 ±2.80
Senior year (N=48)	10.25 ±2.50	10.38 ±2.94	9.85 ±2.58	10.58 ±2.74
Fifth year (N=2)	4.00 ±1.41	9.00 ±8.49	4.00 ±1.41	7.00 ±5.66
F	2.590*	0.524	3.056*	2.382

Note: * p < .05

By Table 11, it can be seen that the upward-assimilation effect and downward-assimilation effect of college students in different grades are significantly different.

4.2. Reliability and Validity Test of Questionnaire

Table 12: KMO and bartlett Spherical Test

KMO and bartlett test		
KMO sampling suitability quantity		.830
Bartlett sphericity test	Approximate chi-square	1107.241
	freedom	66
	significance	.000

By Table 12, it can be known that the statistical value of bartlett spherical test is 1107.241, and the corresponding probability p value is 0. At the level of significance, we should reject the original hypothesis and think that the correlation coefficient matrix is significantly different from that of identity matrix. At the same time, the KMO value is 0.830. According to Kaiser's index of measuring KMO, the questionnaire items are suitable for factor analysis. In this study, SPSS was used to carry out exploratory factor analysis on 12 items of the Social Comparative Assimilation-Contrast Effect Scale, and the factors were extracted by principal component analysis, and orthogonal rotation was carried out by using Varimax, thus a clear four-factor structure was obtained, as follows. Table 13 Exploratory factor analysis shown:

Table 13: Exploratory factor analysis

Title serial number	I	II	III	IV
8	.871			
9	.863			
7	.763			
2		.885		
3		.858		
1		.818		
5			.865	
4			.813	
6			.753	
11				.818
10				.814
12				.801
Extraction method: principal component analysis.				
Rotation method: Caesar normalization maximum variance method.				
A. the rotation has converged after 6 iterations.				

The following Table 14 is a reliability test.

Table 14: Social Comparative Identity-Homogeneous Reliability, Mean and Standard Deviation of Comparative Questionnaire

	Upward-assimilation	Uplink-contrast	Descending-assimilation	Downlink-contrast
α	0.849	0.865	0.885	0.835
M	9.96	10.13	9.59	9.62
SD	7.771	8.895	9.534	7.717

5. Results and Analysis

In view of the fact that all the research methods are self-evaluated, there may be a common method deviation, which needs to be tested accordingly to determine whether the common method deviation may have a significant impact on the research. Exploratory factor analysis was carried out on all the scale items, and 112 factors with characteristic roots greater than 1 were extracted. The explanation rate of variance of the first factor was 17.556%, which was far lower than the evaluation standard of common method deviation of 40%. It can be considered that the influence of common method deviation was not significant.

It is found that depression is positively correlated with upward comparison and downward identification effect, but not with upward identification and downward comparison. In addition, interpersonal self-reliance is negatively correlated with depression, upward comparison and downward identification effect, but not with upward identification and downward comparison. Because the correlation between upward identity and interpersonal self-reliance and depression is not significant (see Table 15), considering the similarity of college students in age and education level, the upward identity and downward contrast dimensions are no longer included in the hypothetical model in the follow-up analysis.

Table 15: Exploratory factor analysis

correlation							
	gender	grade	Ascending identity	Uplink contrast	Downlink identification	Downlink comparison	Total score of interpersonal self-reliance
grade	.264**						
Ascending identity	0.079	0.042					
Uplink contrast	.260**	0.085	.240**				
Downlink identification	.215**	0.090	.289**	.614**			
Downlink comparison	.220**	0.015	.395**	.485**	.470**		
Total score of interpersonal self-reliance	-0.072	-0.127	0.077	-.307**	-.308**	-.212**	
Total score of depression	0.036	0.055	-0.064	.233**	.196*	-0.005	-.317**
* *. At the level of 0.01 (double tail), the correlation is significant.							
*. At the level of 0.05 (two-tailed), the correlation is significant.							

5.1. Modelling Verification

The adjustment effect was analyzed by SPSS 20.0 plug-in Process 3.0. Depression is the predicted variable, ability society comparison is the predicted variable, interpersonal self-reliance is set as the first regulating variable, gender is the second regulating variable, and grade is taken as the control variable, and Bootstrap sampling number is 5000. See for the output results of the regulatory effect model. Table 16. The results show that the second-order interaction between upward contrast and interpersonal self-reliance is significant ($\beta=.0627$, $t=2.9064$, $p=.0044$). In order to clarify the specific effect of the second-order interaction between upward contrast and interpersonal self-reliance, the results show that the upward contrast effect with low interpersonal self-reliance is very significant, while the upward contrast with high interpersonal self-reliance level is very significant. Figure 2 as shown.

Table 16: Effect diagram of interpersonal self-reliance regulation model

	coeff	se	t	p	LLCI	ULCI
constant	73.1815	17.0309	4.2970	.0000	39.4402	106.9229
Uplink contrast	-4.3266	1.5702	-2.7554	.0068	-7.4375	-1.2157
Interpersonal self-reliance	-.9189	.2302	-3.9927	.0001	-1.3749	-.4630
Int_1	.0627	.0216	2.9064	.0044	.0200	.1054
grade	-.4532	.5773	-.7850	.4341	-1.5970	.6906

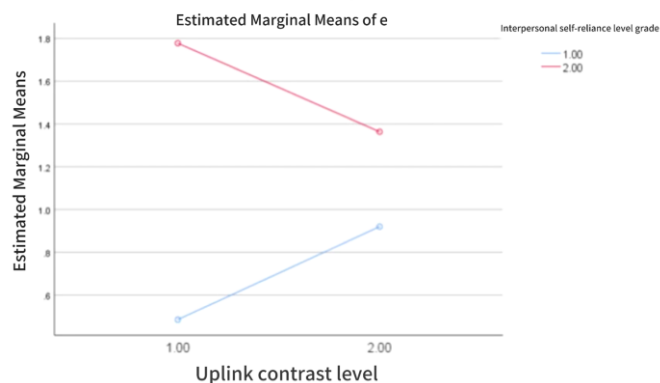


Figure 2: The Interaction between Upward Contrast and Interpersonal Self-reliance on Depression.

6. Conclusion

The impact of the social comparison effect on depression in college students is significant, and interpersonal self-reliance plays a crucial moderating role in this process. This area has received considerable attention, particularly in light of the COVID-19 pandemic. To reduce the prevalence of depression among college students, it is important to consider not only the influence of the social comparison effect but also the role of interpersonal self-reliance as a key factor. Previous research has shown that college students with more positive social comparisons experience higher levels of depression (Ding Qian et al., 2016^[16]), highlighting the negative impact of the social comparison effect on mental health. However, it is important not to overlook the role of interpersonal self-reliance in this process. Interpersonal self-reliance refers to an individual's ability to be independent in

interpersonal interactions, which can help the individual to more accurately understand and cope with social comparisons. Individuals with strong interpersonal self-reliance are more likely to think and judge independently, and are more likely to receive positive feedback from social comparisons, thus reducing the risk of depression. In contrast, individuals with weak interpersonal self-reliance may be more susceptible to the evaluations of others, which can lead to negative emotions in social comparisons and increase the risk of depression. Therefore, interpersonal self-reliance plays a crucial moderating role in the correlation between social comparison and depression.

In conclusion, the social comparison effect has a significant positive impact on college students' depression. Interpersonal self-reliance plays an important moderating role in this process.

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