

A Study on the Relationship between Degree of Anxiety and PTSD

Zhang Ziqing

Keystone Academy, Beijing 101318, China

xiao-yan.wang@nokia-sbell.com

Keywords: Degree of anxiety, PTSD

Abstract: This study focuses on whether the degree of post traumatic stress disorder (PTSD) is related to the degree of anxiety, and endeavors to solve this problem by comparing anxiety levels in non-PTSD groups, Low-PTSD groups and High-PTSD groups. In this study, by collecting questionnaires from 109 subjects and dividing them into three groups, we finally found a connection between PTSD and anxiety in High-PTSD groups where PTSD is often accompanied by high level of anxiety.

1. Introduction

PTSD refers to mental disorder caused by individuals after experiencing extreme stressful stimuli. Its symptoms include: 1) repeated experiences of trauma: They may experience invasive images or ideas, flashbacks of duplicate events; 2) consistent avoidance of situations, thoughts, or memories associated with trauma, and activities, places or other things that remind them of it; 3) negative changes in thoughts and emotions related to the event: people may not remember every aspect of the trauma, and they may blame themselves or others for this matter out of nowhere. They felt as if they were permanently hurt; 4) over-vigilance and chronic awakening: PTSD patients are always sensitive to the recurrence of traumatic events. They would easily panic and try to escape when sounds or images of trauma occur.

Post-traumatic growth (PTG) refers to positive changes experienced after struggling with a major life crisis or traumatic event. This subject has long existed in ancient spiritual and religious traditions, literature, and philosophy. This phenomenon has been systematically studied by psychologists, social workers, counselors, and other scholars of traditional clinical practice and scientific survey. These researchers found that stressful life events could break one's previous hypothetical beliefs about the world. According to this theory, PTG occurs when individuals try to accept events and have the opportunity to think carefully about how they want to rebuild their lives, and by incorporating these positive changes into their life stories, individuals would realize that they are growing in important and meaningful ways.

Previous studies show that PTSD coexists with depression or anxiety in many cases. Shi Wenlei, a domestic scholar, studied primary and middle school students who had survived the Beichuan Earthquake. 50.73% were suffering from PTSD and depression, 52.94% from PTSD and anxiety, and 36.03% were suffering from PTSD, depression and anxiety at the same time. Therefore, it is also crucial to pay attention to the level of anxiety and depression while checking for the PTSD

symptoms^[1]. Meanwhile, studies show structural and functional abnormalities in many mood-related brain regions in PTSD patients, including the amygdala, prefrontal lobe and thalamus. According to the MRI results, the volume of amygdala of PTSD patient affected by major events was smaller than that of normal people^[2].

While previous studies mainly concern people who have experienced great changes such as September 11 Attack and Wenchuan Earthquake, this study, however, focuses on the daily life of normal people and explores whether the degree of their anxiety in life after experiencing major events is associated with the degree of their PTSD.

Experimental hypothesis: High-PTSD groups are often accompanied by high level of anxiety.

H₀ “Zero hypothesis”: There is no relationship between PTSD and anxiety.

H₁ “Alternative hypothesis”: There is prominent relationship between PTSD and anxiety.

2. Methodology

We obtained 109 responses by sending a questionnaire, and 99 responses are effective (3 rejected, 7 invalid), including 76 women and 23 men. The subjected are individuals aged between 17 and 59 in our country. Samples were selected by self-selection and sent to different group chats, and people would get to decide whether to participate in the survey. These chat groups also include groups of age gaps and groups of different professions. The questionnaire was divided into four parts: personal information, PTSD degree measurement, PTG measurement, and anxiety degree measurement. At the same time, in order to ensure that the subject would fill out the questionnaire carefully, several questionnaires were designed with the question “In order to ensure that you are answering carefully, please choose A”. This can effectively help screen out trash questionnaires and make the results more reliable.

Three groups for independent variables (degree of PTSD) were grouped based on the results of the collected questionnaires. Those who checked “No experience of a traumatic event”, that is, not meeting the first PTL-5 standard, would be made the Control Group, also known as the non-traumatic event group. Based on the PTSD diagnostic threshold put forward by previous studies (Score 33 in PCL-5), those who scored less than 33 would be grouped as the Low-PTSD Group, and those who scored not less than 33 as the High-PTSD Group^[3].

2.1 The PTSD Checklist-5, PCL-5^[4]

The purpose of this list is to determine the degree of PTSD, and it is specifically targeted for PTSD according to the criteria of multiple psychiatric disorders described in DMS-5. Subjects shall answer whether they’ve experienced a traumatic event and specify duration of their experience (Standard A). Subjects shall have some traumatic experience for their final scores to be valid. This list also contains four additional sections: re-experience section (standard B), avoidance section (standard C), negative changes in cognition and emotion section (standard D), and arousal section (standard E), which exactly examine typical symptoms of PTSD. A total of 20 self-evaluation questions (Q1-20) were used to measure these four standards with a full score of 80. Each question offers five optional answers-”Never”, “A little bit”, “Medium”, “Often” and “Always”-which correspond to 0-4 scores respectively. The scores of PCL-5 shall be positively correlated with the degree of PTSD.

Meanwhile, the DSM-5 diagnosis of PTSD must conform to at least 1 standard-B question(Q1-5), 1 standard-C question(Q6-7), 2 standard-D questions (Q8-14), and 2 standard-E questions (Q15-20) with scores not less than 2 (intermediate stage). That is to say, the scores of standard B and C shall be not less than 2, and scores of standard D and E shall be not less than 4. According to the results

of previous studies, the diagnosis threshold of PTSD is about 33, but the results are not completely accurate and require further exploration.

2.2 Post-Traumatic Growth Inventory (PTGI)

Post-traumatic growth refers to positive changes experienced after the struggle with traumatic events. In terms of examining the degree of anxiety, this study further explores the overall changes of PTSD patients, and aims to determine whether anxiety dominates among all post-traumatic changes. This Inventory is designed based on several areas of Posttraumatic growth, which include five factors: 1)Changes in relationship with others; 2) New possibilities; 3)Changes in personal strength; 4)Changes in spiritual or religious fields and 5) Appreciation of life. The Inventory includes 21 questions corresponding to the five factors mentioned above. Each question would be scored from 0 to 5, to evaluate subject's changes due to crisis / disaster (low scores represent less change). Sum up scores from respective questions to make a final score.

2.3 Self-Rating Anxiety Scale (SAS)

This is a self-use tool for testing subjective symptoms of the patients. As anxiety is a more common emotional disorder, this scale is usually used to evaluate the anxiety symptoms in the counseling clinics. scale contains 20 questions, including 15 positive questions and 5 reverse questions. Scores are rated from 1 to 4.

2.4 Statistical Methodology

Inter-group comparisons were performed using the one-way ANOVA, and the results were presented by standard error of mean. Related analysis is performed using the Pearson correlation coefficient (r-value) and two-tailed significance (p-value). Pearson correlation coefficient is used to measure linear relationship between two data, and the closer the result is to 1 or -1, the stronger the correlation is; while the closer it gets to 0, the weaker the correlation is. The two-tailed significance is to measure whether the hypothesis is reasonable. The level of chance is generally set at 5%, meaning that the same experiment is repeated 100 times and the difference between the results is caused more than five times by sampling error ($p > 0.05$), then H_0 stands and the difference between the two groups can be considered as insignificant. If the difference between the results caused by the sampling error occurs less than five times ($p \leq 0.05$), then H_0 fails and the difference between the two groups can be considered significant. The difference between the two groups is considered very significant if $p \leq 0.01$.

3. Results

3.1 Subject Information & Questionnaire Scores

According to the results of the questionnaire, 10 subjects without experience of a traumatic event follow into the Control Group, 57 in the Low-PTSD group and 32 in the High-PTSD group. These three groups did not differ significantly in terms of age. The total PCL-5 score and standard B-D score of the High-PTSD group were both significantly higher than that of the corresponding Control Group and also significantly higher than that of the Low-PTSD group. There was no significant difference between PCL-5 scores in the Control Group and Low-PTSD groups.

Table 1 - Basic Info & Questionnaire Scores of the Subjects

Variables	No Traumatic Event	Has experience of traumatic event		Total
		Low-PTSD<33	High-PTSD≥33	
Count	10	57	32	99
-Male	2	11	10	23
-Female	8	46	22	76
Age	27.20±1	27±0.25	27.34±1.86	27.13±0.952
PCL-5	13.1±5.16	17.9±1.03	47.22±1.82***###	26.88±1.72
Standard A	No	Yes	Yes	
Standard B	3.7±1.758	4.67±0.37	11.4±0.64***###	6.75±0.48
Standard C	1.5±0.7782	2.79±0.26	5.63±0.27***###	3.58±0.24
Standard D	4.4±1.875	5.35±0.44	16.31±0.67***###	8.8±0.65
Standard E	3.5±1.057	5.07±0.43	13.88±0.67***###	7.76±0.55
SAS	43.2±1.511	40.8±1.04	51.75±1.8*###	44.61±0.98
PTGI	40±8.1	50.9±3.05	58.75±2.67*	52.34±2.17
Factor 1	2.14±0.46	2.39±0.17	2.65±0.18	
Factor 2	2.1±0.38	2.40±0.15	2.74±0.16	
Factor 3	1.8±0.45	2.76±0.16*	3.06±0.14**	
Factor 4	1.15±0.28	1.67±0.13	2.53±0.2***###	
Factor 5	1.67±0.39	2.6±0.18	3.06±0.19**	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, compared with Control Group;### $p < 0.001$, Compared with Low-PTSD Group.

As shown in Table 1, the anxiety index (51.75±1.8) of the High-PTSD Group is significantly higher than the anxiety index (40.8±1.04) of the Low-PTSD Group ($P < 0.001$). With high PTSD, people would show low level of anxiety (score 50-59), while the anxiety level is normal for Low-PTSD Group and Control Group. The SAS is 43.2±1.511 and 40.8±1.04 for Control Group and Low-PTSD Group respectively. The anxiety level of the Control Group is slightly higher than that of the Low-PTSD group, but the difference is of no prominent significance.

Judging from the results of post-traumatic growth, Factors 3 (changes in personal strength) of High-PTSD Group is significantly higher than that of the Low-PTSD Group; Factor 4 (changes in mental or religious field) of the High-PTSD group is significantly higher than that of the Low-PTSD Group and the Control Group; Factor 5 (appreciation of life) of the High-PTSD Group is significantly higher than that of the Control Group; while Factor 1 (altered relationship with others) and Factor 2 (new possibilities) differ insignificantly among all three groups.

3.2 Correlation Analysis between Scale Scores

Firstly, we performed a correlation analysis of the overall data to examine the changing trends in the degree of anxiety and post-trauma growth of all subjects along with the PCL-5 score changes. The results are shown in Figure 1, and there is a significant positive correlation between the PTSD degree and the SAS score, with the correlation coefficient being 0.5021 and the p-value less than 0.0001. A significant positive correlation is also revealed between PTSD degree and post-traumatic growth. As suggested by the overall trend, subjects obtain more post-traumatic growth as the degree of PTSD increases. However, there was no significant correlation between post-traumatic growth and anxiety scores.

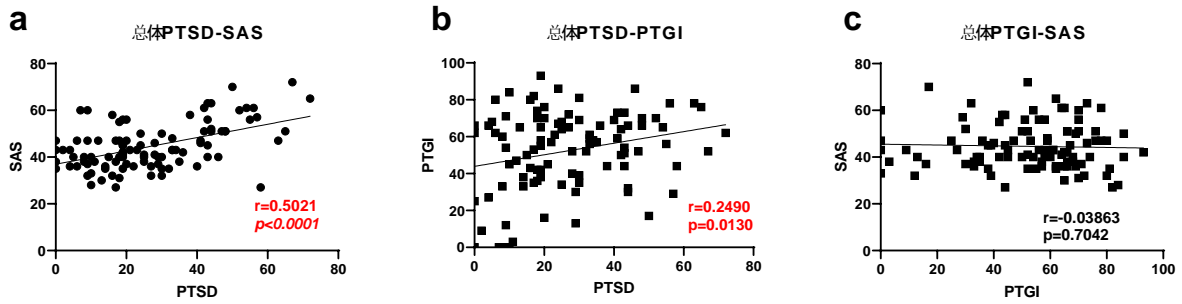


Figure 1 - Correlations between the three scales across all subjects. (a) Results of correlation analysis between PCL-5 score and SAS score; (b) Results of correlation analysis between PCL-5 score and PTGI score; and (c) Results of correlation analysis between SAS score and PTGI score. $n=99$.

In further analyses, we also examined the correlation between three questionnaire scores within each group separately, and the results are shown in Table 2.

Table 2 - Correlation Between Ptsd, Sas and Pgti

	PCL-5	SAS	PTGI
Control Group	PCL-5	1	
	SAS	0.340	1
	PTGI	0.116	-0.209
Low-PTSD Group	PCL-5	1	
	SAS	-0.026	1
	PTGI	0.172	-0.137
High-PTSD Group	PCL-5	1	
	SAS	0.398*	1
	PTGI	0.054	-0.238

* $p < 0.05$, with prominent difference

In the Control Group, the correlation coefficient for PCL-5 and SAS values is 0.340, and the p-value is 0.336, larger than 0.05, so H_0 stands and there is no association between PTSD and anxiety values, as shown in Figure 2a. The correlation coefficient of SAS and PCL-5 in Low-PTSD group is -0.026. A very weak inverse correlation is revealed, and the correlation is not significant ($p=0.849 > 0.05$), which means there is no association between PTSD changes and SAS changes, as shown in Figure 2b. The correlation coefficient of SAS and PCL-5 in High-PTSD group is 0.398, and a positive correlation appears. Its two-tailed p-value is 0.024, less-than 0.05, So H_0 fails and there is a significant correlation between the degree of anxiety and the degree of PTSD. As shown in Figure 2c, when the PTSD level increases in High-PTSD group, the level of anxiety increases at the same time.

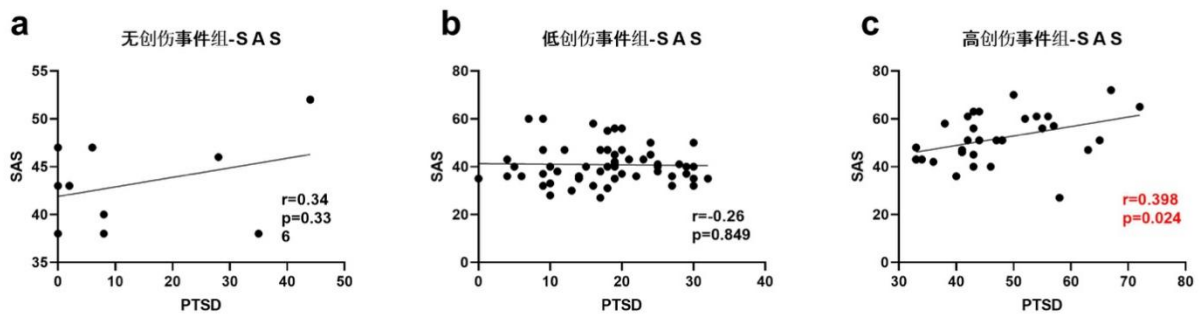


Fig.2 - Ptsd and Sas Scores. (a) Control Group, n=10; (B) Low-Ptsd Group, n=57; (C) High-Ptsd Group, n=32.

The correlation coefficient between PCL-5 and PTGI values of the Control Group is 0.116 and the p-value is 0.749, which indicates no significant correlation between these two values, as shown in Figure 3a. There is also no significant correlation between PTGI and SAS in the Control Group ($r = -0.209$, $p > 0.05$), as shown in Table 2. The correlation between PCL-5 and PTGI in Low-PTSD group is also very weak, the correlation coefficient being only 0.172 and $p = 0.2$, which suggests no significant correlation as shown in Figure 3b. The correlation coefficient between SAS and PTGI in this group is -0.137 , indicating a weak negative correlation and no significance as shown in Table 2. There is also no significant correlation between PCL-5 and PTGI values of the High-PTSD group, the correlation coefficient being only 0.054 and p-value 0.77, as shown in Figure 3c. No certain correlation between SAS and PTGI is found in this group, as shown in Table 2, the r-value being -0.238 and p-value 0.19.

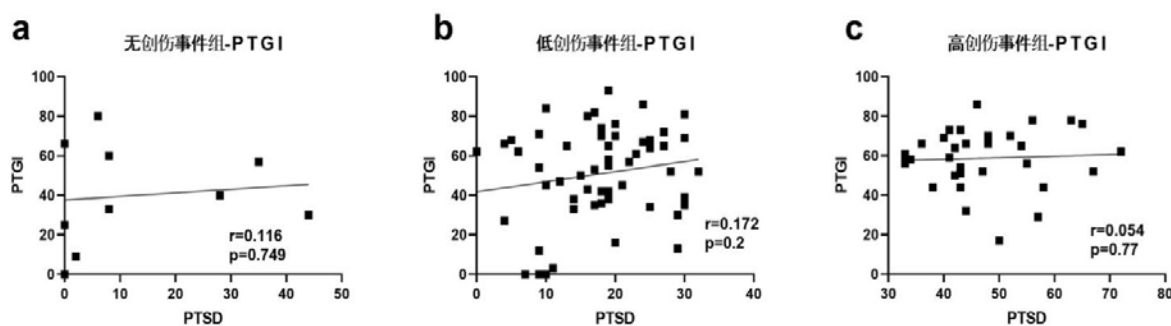


Fig.3 - Ptsd and PtgI Scores. (a) Control Group, n=10; (B) Low-Ptsd Group, n=57; (C) High-Ptsd Group, n=32.

These results suggest that if three groups were observed separately, there was no correlation between the degree of PTSD and post-trauma growth, nor between post-traumatic growth and anxiety level.

4. The final data results support the preset hypothesis that a high degree of PTSD is usually accompanied by a high level of anxiety

4.1 Degree of PTSD and Degree of Anxiety

Comparing the SAS scores between the three groups, the anxiety score of High-PTSD group is significantly higher than that of the other two groups, suggesting that High-PTSD group tends to have a significantly higher degree of anxiety. Through the correlation analysis of the subjects, we found a more significant correlation between the PCL-5 score and the degree of anxiety among all three groups, and we also confirmed a close relationship between the degree of PTSD and the degree of anxiety. The results of the correlation analysis indicate that only High-PTSD Group shows a significant positive correlation between the PCL-5 score and the SAS score, which also indicates increased anxiety in such groups with an increased degree of PTSD, as is consistent with the hypothesis. However, no such correlation is found in the Control Group or Low-PTSD Group. This is probably because of the DSM-5 method of PTSD where every standard shall be met for diagnosing PTSD. Standard C did not reach requested score for the Control Group; and Standard C score of Low-PTSD group didn't even reach the lowest score. Therefore, averagely speaking, these

two group could not be diagnosed with PTSD. The degree of anxiety may accordingly be altered due to PTSD detection failure. The Low-PTSD Group did not reach the level of clinical PTSD diagnosis, so this degree of anxiety could not reflect the degree of anxiety of clinical PTSD patients. It could only be used as a reference, or for anxiety judgment in the general population.

4.2 Degree of PTSD and Post-Traumatic Growth

The overall PTGI score of High-PTSD Group is significantly higher than that of the Control Group and the Low-PTSD Group. Through factor comparison, and the difference is found in factors 3,4 and 5, namely “altered personal strength”, “changes in the spiritual or religious field” and “appreciation of life”. The reason may be because the High-PTSD Group has a greater chance of greater positive growth in personal aspects after experiencing setbacks, while the Control Group is apparently growing naturally without PTSD. The High-PTSD Group did not differ significantly from other groups in factors 1 and 2, namely “altered relationship with others” and “new possibilities”, indicating that its major positive growth is in spirit.

When we put the results of all three groups together and compare PTGI along with PCL-5 changes, a significant positive correlation is revealed between the two indexes. Judging from the overall range of PTSD changes, PTSD shall increase along with PCL-5 increases. However, we find no significant correlation between PTGI and PTSD when we see each group respectively, which indicates that the changes in PTGI with the degree of PTSD within each group is not significant. Therefore, the significant correlation among all subjects is mainly detected between low PCL-5 group and high PCL-5 group. As for the high PCL-5 Group, namely the High-PTSD Group, increasing level of PTSD does not invite changes in post-traumatic growth.

4.3 Limitations of This Study

Limitations of this study include the use of materials and methods. The experimental method is the questionnaire. Questionnaires could be delivered to subjects in different regions and collect data efficiently. This way, samples could better represent the national population. However, the sampling method of voluntary registration may lead to uneven population allocation, which may lead to sampling bias. Because PTGI only focuses on positive post-traumatic growth, cases with no positive growth or with only negative growth won't be reflected in the secondary results, and the accuracy of the relationship with anxiety and PTSD will be compromised.

The choices of the subjects made could also cause inaccuracy in the results. Individual bias may result into different questionnaire results and overall scores. For example, everyone has a self-assumed understanding of “smaller” and “larger”. Different definitions of “traumatic events” and “major events” will also affect the results, making the data not necessarily objective. Meanwhile, the questionnaire involves 4 sections of choice questions, and subjects may feel too tired to produce a good estimate of their real emotions and feelings, in which case, the final result may differ from the genuine fact.

These are factors that may cause inaccuracies.

4.4 Results

The results show that PTSD is not related with SAS in Low-PTSD Group, but that is not the case with the High-PTSD Group: people with high PTSD have higher levels of anxiety. The reason for this result may be that people with a low PTSD degree may not necessarily be diagnosed with PTSD, and it may require more following studies and investigations. Meanwhile, taking 33 points as the threshold for PTSD is not necessarily reliable, because threshold shall differ due to varied

groups and purposes, and this study does not take these two factors into consideration when choosing the threshold point^[5].

5. Conclusion

High-PTSD is usually accompanied by high level of anxiety, and the degree of anxiety and PTSD levels are correlated. When one is diagnosed with PTSD, the level of anxiety shall increase when PTSD level increases and decrease when PTSD level declines. High-PTSD group would also obtain better post-traumatic growth; however, correlations between PTGI and SAS and between PTGI and PTSD were not detected in High-PTSD Group.

In future experiments, I would like to study more detailed factors that affect post-traumatic growth. For example, whether social relationships will affect post-traumatic growth. Furthermore, I would like to apply more professional experimental tools other than questionnaire so that the final results would be more reliable.

References

- [1] Xue Chenxia, Zhang Zhiqiang, Qi Ming, Lu Keke, Dong Yuanjun, Zhang Guiqing. *Relationship between Symptoms and Anxiety and Depression in PTSD Patients [J]. Shandong Pharma*, 2015, 55 (34): 78-80.
- [2] Xue Chenxia. "Study on Mood and Functional Changes in Corresponding Brain Regions in Patients with PTSD [D]." Shihezi University.
- [3] Krüger-Gottschalk, A., Knaevelsrud, C., Rau, H., Dyer, A., Schäfer, I., Schellong, J., & Ehring, T. (2017). The German version of the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Psychometric properties and diagnostic utility. *BMC Psychiatry*, 17(1), 1–9. <https://doi.org/10.1186/s12888-017-1541-6>
- [4] Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2010). *The Posttraumatic Growth Model: Sociocultural considerations*. In T. Weiss & R. Berger (Eds.), *Posttraumatic growth and culturally competent practice* (pp. 1-14). Hoboken, NJ: Wiley & Sons.
- [5] Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). *The PTSD Checklist for DSM-5 (PCL-5)*. Scale available from the National Center for PTSD at www.ptsd.va.gov.