



# Self-confidence Group Psychological Intervention of College Students Based on EEG Test Technology - Take Patients with Social Anxiety Disorder as an Example

Xia Hong\*

## ABSTRACT

In order to verify whether the self-confidence group psychological intervention therapy can effectively alleviate psychiatric and neuropathy diseases, this paper takes the college students with social anxiety disorder as the research object and uses the brain evoked potential instrument-P300 detection technology as the research tool to conduct comparative analysis of the latency and amplitude of each P300 index between patients with social anxiety and normal people. At the same time, the self-confidence group psychological intervention plan is designed to perform intervention treatment on the patients with social anxiety to comprehensively investigate the effect of the self-confidence group psychological intervention on relieving the symptoms of patients with social anxiety. The results of the study show that there is a significant change in the latency of P300 indexes in patients with social anxiety disorder after the self-confidence group psychological intervention, which has a certain effect on the improvement of patients' cognitive function. The research in this paper is of great significance to further applying the self-confidence group psychological intervention therapy to the treatment of emotional disorders.

**Key Words:** Self-confidence Group Psychological Intervention, Social Anxiety Disorder, Brain Evoked Potential Instrument - P300 Detection Technology

**DOI Number:** 10.14704/nq.2018.16.6.1595

**NeuroQuantology 2018; 16(6):33-38**

## Introduction

Self-confidence, as one of the most intuitive psychological feelings when an individual is in contact with people or things in the surrounding, is a trust and affirmation of self-ability, achievement, and skill (Clark *et al.*, 1996). With self-confidence, one will be not skeptical about what he has done. And then he can better tap his potential, develop the ability of connecting with people and create good interpersonal relationship (Kok, 1996). Conversely, without self-confidence, it is difficult to satisfy people's self-esteem, self-awareness and self-affirmation and people with social anxiety disorder are such group of people

who extremely lack self-confidence. Their main characteristics are that they tend to be nervous in social situations and they are afraid to make some embarrassing behaviors. They are worried about making a fool of themselves and are often accompanied by strong sense of concerns, anxiety and fear (Polich, 1998; Polich *et al.*, 1998). Social anxiety disorder has been proven by relevant studies to be the third most common human emotional disorder in addition to alcohol abuse and depression (Zhang, *et al.*, 2012; Cunningham *et al.*, 2013).

The current diagnosis and treatment of this kind of emotional anxiety in China mostly

**Corresponding author:** Xia Hong

**Address:** School of Laws and Politics of Lingnan Normal University, Zhanjiang 524048, China

**e-mail** ✉ 13828277667@139.com

**Relevant conflicts of interest/financial disclosures:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Received:** 5 May 2018; **Accepted:** 4 June 2018



rely on experience and drugs but a large number of foreign studies have confirmed that group psychological therapy has obvious effect on the improvement of some neurological disorders and can also prevent the resurgence of diseases (Choi, *et al.*, 2006; Cohen *et al.*, 2014). Group psychological intervention is a kind of treatment technique that focuses on analysis and interpretation (Lee *et al.*, 2014). Compared with the commonly called group psychological counseling, although these two methods often use strategies like role-playing, emotional expression and behavioral drills and other, the difference is that the psychological counseling focuses on daily prophylactic treatment while group psychological intervention places more emphasis on corrective treatment for patients with longer implementation time. Studies have shown that the ERP of patients with social phobia is different from that of normal people, especially extended latency and reduced amplitude (Sachs *et al.*, 2004; Lee *et al.*, 2007).

In recent years, rapid development of EEG testing technology has been widely used in medical clinical tests of neurology and psychiatry due to its characteristics of timeliness and accuracy when recording and evaluating the response of human nervous system to external or environmental stimulus.

Therefore, this paper take patients with social anxiety disorder as the research object and comprehensively investigate the effect of the self-confidence group psychological intervention on relieving the symptoms of patients with social anxiety using the EEG test technology.

### **Self-confidence group psychological intervention of college students**

#### *Research object*

A total of 100 patients with social anxiety disorder are selected from the Department of Psychiatric Consultation Clinic of an affiliated hospital of medical university from January 2015 to December 2016. The average age of the patients is  $18.49 \pm 3.15$  (Min=17, Max=24). Among them, 90 patients volunteer to participate in the brain evoked potential examination; the normal control group recruit 100 students in a university on an open and voluntary basis, with an average age of  $18.42 \pm 3.21$  years (Min=18, Max=23). The patient test group and normal control group have signed informed consent.

#### *Research tool*

**P300 potential detection:** In order to test the alleviating effect of self-confidence group psychological intervention on patients with social anxiety disorder, this paper mainly uses a brain evoked potential instrument - P300 detection technology. By applying a specific stimulus to the brain of patients with social disorder, the potential changes in the detected brain area are recorded at the time of stimulus provision and removal to objectively reflect the EEG physiological characteristics of the brain (Wassermann *et al.*, 2001; Hanagasi *et al.*, 2002).

This method is simple and easy to use, and it is non-invasive to the participants, which has been widely used in neurology, psychiatry and other clinical medicine and psychological researches. The experiment is required to be conducted in a quiet room. The experimenters close their eyes and sit quietly in a chair, keeping their head awake and muscle relaxed and staying concentrated (Russo *et al.*, 2000; Liebowitz *et al.*, 2005). The P300 potential detection needs to be performed before the self-confidence group psychological intervention, 3 months after the intervention and six months after the intervention to compare the therapeutic effect of the group psychological intervention.

**SPSS.19.0:** The statistical analysis is performed on the sample data. Chi-square statistics and tests are used to compare the data between the patient group and the normal group. The t-test and is used to compare the P300 data between the patient group and the normal group and the test standard  $\alpha=0.05$  (Cruikshank, L, 2010).

#### *Scheme and mechanism of self-confidence group psychological intervention of college student's university*

**Experimental scheme:** The combination of psychological intervention and effect evaluation. Namely, the self-confidence group psychological intervention treatment is firstly conducted for patients with social anxiety disorder and the therapeutic effect is evaluated through EEG test technology after the treatment;

**Number of interventions:** Group psychological intervention for patient groups is performed twice a week for 3 hours each time, with a total of 10 times in 5 weeks and no intervention is conducted on the normal control group;

**Table 1.** Scheme and mechanism of self-confidence group psychological intervention

Group intervention	Theoretical basis	Intervention content	Effects of Intervention
1. Form a team	Group therapy, humanism	Acquaintance activities; Sign contracts; Read the oath; Name groups.	Build a sincere, empathy and safety team, and obtain the group psychological support.
2. Spiritual exploration	Cognitive therapy, behavioral therapy, psychoanalysis, humanism	Analyze the impact of experiences on social anxiety and the impact of current social anxiety problem on oneself.	A profound understanding of the self, clarifying the self and creating a willingness to change.
3. Self-quest	Cognitive therapy, behavioral therapy, humanism	Analyze self-consciousness, and oneself and others in the heart; Express the training feeling	Analyze self-consciousness, analyze and change irrational ideas and improve self-confidence
4. Facial expression training	behavioral therapy,	Analyze the communication elements; Exercise facial expressions, language, walking, listening and expressing	Learn to express language and emotions accurately, and learn to listen.
5. Golden key of association	Cognitive therapy, behavioral therapy	Analyze the pyramid diagram of man-machine relationship; Master the principles of interpersonal communication.	Establish the reasonable communication concept and the confident intercourse behavior.
6. Self-confidence training(1)	Cognitive therapy, behavioral therapy, social skills training	Analyze the act of communicating with confidence; Learn how to deal with social problems; Self-directed training	Cognitive reconstruction; Establish self-confident and effective social coping style; Train self-confident behavior.
7. Self-confidence training(2)	Cognitive therapy, behavioral therapy	Put forward the trilogy of association; Practice assertive behavior.	Build social confidence.
8. Self-confidence training(3)	Cognitive therapy, behavioral therapy	Review the treatment of social anxiety; Group discussion, role-playing, and training confidence behavior.	Strengthen social confidence and provide social support.
9. Self-confidence training(4)	Cognitive therapy, behavioral therapy	Review the treatment of anxiety; Group discussion, role-playing, and training confidence behavior.	Strengthen social confidence and provide social support.
10. Review and summary	Group therapy, humanism	Review and summarize the experience in-group activities.	Strengthen social confidence and provide social support.

Intervention content: The first time is the acquaintance; the second and the third time is cognitive reconstruction; the fourth time is expressional communication training; the fifth to the ninth time is social behavioral training; and the tenth time is summary. At the same time, the implication training and after-school assignment are integrated to help patients gradually correct their self-perception of negative energy, alleviate inferiority complex and further consolidate the therapeutic effect. The specific intervention content is shown in Table 1.

Mechanism: By constructing a real life situation, the patients are guided to learn self-understanding, self-analysis, self-expression, self-management, self-summary self-evaluation in the treatment team. They also learn to get along with others and establish good relationship with others, which can help them restore the social function, reshape the self-confidence system, achieve continuous self-growth and self-change so as to effectively relieve the degree of social anxiety. (Costa *et al.*, 2000; Blanco *et al.*, 2014).

The intervention scheme and its mechanism are shown in steps, as is shown in Table 1.

## Test results and analysis

### *Analysis of P300 index of the patient group and the normal group before intervention*

Before the intervention, the P300 index of the patient experimental group and the normal control group is detected and this data is taken as the basic data before the group psychological intervention, as is shown in Table 2 and Table 3.

The latency index in Table 2 represents the speed with which the brain recognizes, classifies, and encodes external stimulus. It can be seen that the  $N_1$  and  $P_2$  latency of patients with social anxiety is shorter than those of normal people, which is because  $N_1$  and  $P_2$  are exogenous indexes, indicating that patients with social anxiety are very sensitive to external stimulus and are to generate excessive fear; The  $N_2$ ,  $P_{3a}$  and  $P_{3b}$  latency of patients with social anxiety is longer than those of normal people, which is because  $N_2$ ,  $P_{3a}$  and  $P_{3b}$  are endogenous indexes, representing the transmission speed between the two hemispheres of the human brain, indicating the problems of impaired cognitive function and reduced information processing speed of patients with social anxiety.

The amplitude index in Table 3 represents the degree of participation of various effective resources at the information processing of the brain. It can be seen that the amplitude of the  $P_{3a}$  and  $P_{3b}$  of patients with social anxiety is smaller

than that of the normal people, which is consistent with the existing research. The value indicates that the patients with social disorder are faced with external stimulus, the information processing ability of the brain is worse than that of the normal person; the amplitude of  $N_1$  and  $P_2$  is higher than that of the normal person, reflecting that there is abnormal in patients with social disorder in terms of the degree of alertness to external stimulus and the function of selecting and filtering information.

The values in the above two tables show that the P300 latency and amplitude index of patients with social anxiety are different from those of normal people through the P300 potential detection. Then, the self-confidence group psychological intervention is conducted on this group of patients with social anxiety patients and relevant P300 indexes after the intervention are tested.

**Table 2.** Comparison of latency of P300 before intervention

Index	Experimental group	Control group	t	P
$N_1$	55.87±22.12	57.21±17.49	-5.581	<0.0001
$N_2$	184.12±27.96	177.13±49.98	2.589	0.0138
$P_2$	124.89±23.87	118.29±28.59	-3.679	0.002
$P_{3a}$	329.28±26.89	323.85±54.90	6.853	<0.002
$P_{3b}$	391.48±21.83	386.36±21.14	13.781	<0.003

**Table 3.** Comparison of amplitude of P300 before intervention

Index	Experimental group	Control group	t	P
$N_1$	4.47±1.49	4.69±2.69	-0.287	0.866
$N_2$	4.59±1.71	3.27±2.14	2.218	0.019
$P_2$	5.54±1.27	2.01±1.79	7.581	<0.0001
$P_{3a}$	5.48±1.39	9.37±3.41	-4.749	<0.0001
$P_{3b}$	5.17±1.31	9.14±2.65	-5.779	<0.0001

**Changes of P300 indexes after intervention**

Latency index: Firstly, the repeated measurement variance for the latency of P300 index is analyzed, as is shown in Table 4.

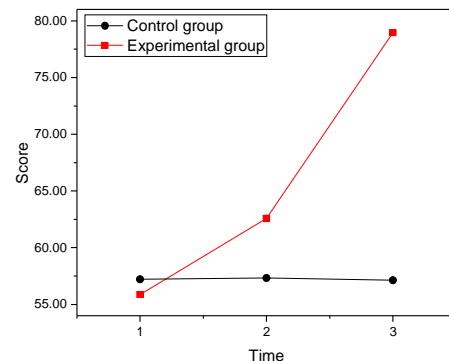
**Table 4.** Repeated measurement variance results for the latency of P300 Index after intervention

Index	Treatment effect		Time effect		Treatment * Time effect	
	F	P	F	P	F	P
$N_1$	6.817	0.017	4.412	0.019	4.799	0.015
$N_2$	8.111	0.006	19.013	<0.002	7.023	0.002
$P_2$	4.510	0.039	4.239	0.015	4.341	0.016
$P_{3a}$	5.849	0.019	6.122	0.002	4.549	0.012
$P_{3b}$	8.121	0.006	3.692	0.031	12.759	<0.002

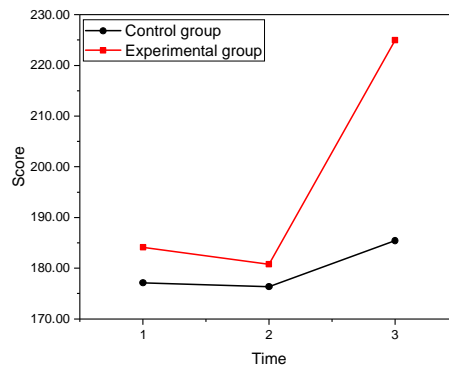
It can be seen from the analysis of Table 4 that there are significant differences in the latency indexes of  $N_1$ ,  $N_2$ ,  $P_2$ ,  $P_{3a}$  and  $P_{3b}$  in the test group and the control group in the experiment ( $F=6.817$ ,  $P=0.017$ ;  $F=8.111$ ,  $P=0.006$ ;  $F=4.510$ ,  $P=0.039$ ;  $F=5.849$ ,  $P=0.019$ ;  $F=8.121$ ,  $P=0.006$ ), each P300

latency varies with time ( $F=4.412$ ,  $P=0.019$ ;  $F=19.013$ ,  $P<0.002$ ;  $F=4.239$ ,  $P=0.015$ ;  $F=6.122$ ,  $P=0.002$ ;  $F=3.692$ ,  $P=0.031$ ); and time is related to the effect and group of each index ( $F=4.799$ ,  $P=0.015$ ;  $F=7.023$ ,  $P=0.002$ ;  $F=4.341$ ,  $P=0.016$ ;  $F=4.549$ ,  $P=0.012$ ;  $F=12.759$ ,  $P<0.002$ ).

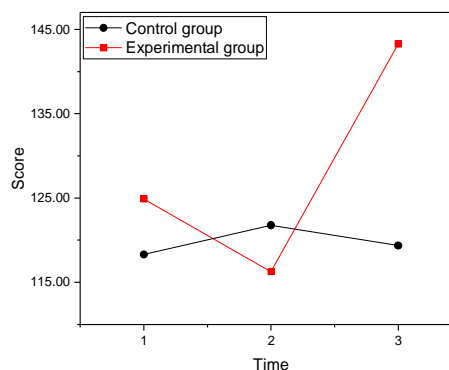
The P300 indexes at different times are further compared (3 months, 6 months after intervention), as is shown in Table 5 and Figure 1 to Figure 5.



**Figure 1.**  $N_1$  Comparison between the test group and the control group

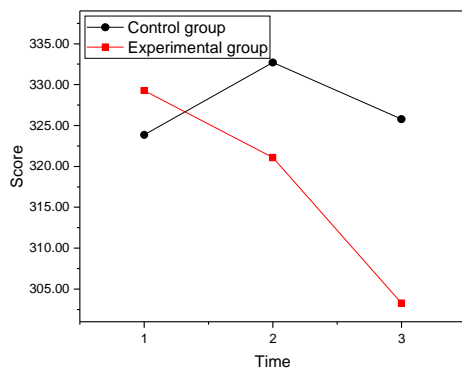


**Figure 2.**  $N_2$  Comparison between the test group and the control group

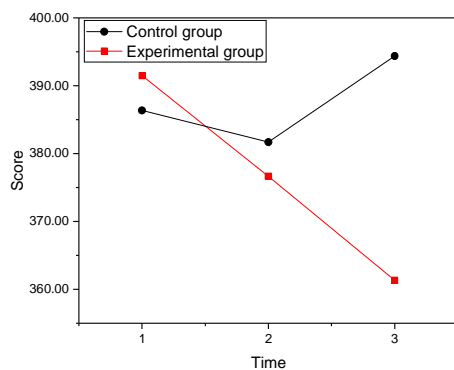


**Figure 3.**  $P_2$  Comparison between the test group and the control group





**Figure 4.** P<sub>3a</sub> Comparison between the test group and the control group



**Figure 5.** P<sub>3b</sub> Comparison between the test group and the control group

It can be seen from Table 5 and Figure 1 to Figure 5 that there are significant difference in P300 latency data of the test group before and after the self-confidence group psychological intervention and that the numerical difference 3 months after the intervention is more representative. On the contrary, there is no difference in the data of the control group before and after the intervention, which initially proves the effectiveness of the self-confidence group psychological intervention on patients with social anxiety.

**Table 5.** Detection value of the latency of P300 indexes after intervention

Index	Groups	3 months after intervention	6months after intervention
N1	Experimental group	62.57±18.79	78.95±17.32
	Control group	57.21±16.89	57.14±19.24
N2	Experimental group	180.76±33.79	224.97±20.69
	Control group	176.37±27.64	185.43±28.77
P2	Experimental group	116.27±24.29	143.27±17.99
	Control group	121.78±24.23	119.37±11.97
P3a	Experimental group	321.07±14.86	303.28±15.02
	Control group	332.71±15.88	326.71±15.02
P3b	Experimental group	376.66±10.21	361.32±14.78
	Control group	381.66±23.12	394.37±20.12

**Amplitude Index:** Then, the repeated measurement of the amplitude of P300 indexes after intervention is analyzed, as is shown in Table 6. It can be seen from the analysis of the table that there is no significant difference between the N<sub>1</sub>, N<sub>2</sub>, P<sub>2</sub>, P<sub>3a</sub> and P<sub>3b</sub> amplitude index of the test group and the control group in the test (F= 0.054, P= 0.798; F= 2.239, P= 0.148; F= 0.005, P= 0.927; F= 0.386, P= 0.705; F= 1.512, P= 0.213) and that there is no change with time (F= 0.273, P=0.698; F= 0.719, P=0.455; F= 0.927, P=0.359; F= 0.245, P=0.712; F=0.647, P=0.327).

**Table 6.** Measurement variance results of the amplitude of P300 indicators after intervention

Index	Treatment effect		Time effect		Treatment * Time effect	
	F	P	F	P	F	P
N <sub>1</sub>	0.054	0.798	0.273	0.698	0.258	0.674
N <sub>2</sub>	2.239	0.148	0.719	0.455	1.5788	0.220
P <sub>2</sub>	0.005	0.927	0.927	0.359	1.572	0.223
P <sub>3a</sub>	0.386	0.705	0.245	0.712	0.249	0.773
P <sub>3b</sub>	1.512	0.213	0.647	0.327	0.379	0.112

**Analysis of results**

It can be obtained from the above data comparison analysis that there is a significant change in the latency of P300 indexes of patients with social anxiety by applying the self-confidence group psychological intervention method, which has a certain effect on the improvement of the cognitive function of patients with social anxiety. At the same time, the comparison of data 6 months and 3 months after intervention shows that the improvement of self-cognitive function and self-confidence in patients with social anxiety is a gradual process.

**Conclusions**

This paper conducts the study of the self-confidence group psychological intervention on college students with social anxiety disorder, and the conclusions are as follows:

(1) Compared with normal people, there is an abnormality in event-related potential P300 in patients with social anxiety disorder and their function of self-recognition, self-affirmation and self-evaluation are weak;

(2) The self-confidence group psychological intervention therapy can help improve the self-confidence of patients with social anxiety, alleviate their anxiety symptoms, improve their distress and avoidance emotions in in the process of dealing with people and have significant effect on satisfying their self-esteem.



(3) After the self-confidence group psychological intervention, there is obvious change in the latency of P300 indexes of patients with social anxiety, which fully shows that the group psychological intervention therapy has certain effect on improving self-cognition and evaluation function of patients with social anxiety. Moreover, the monitoring of P300 indexes at different time nodes after the intervention also shows that the treatment effect is gradual and continuous.

### Acknowledgements

Humanities and Social Science Research Project of Lingnan Normal University for Youths, Cultural Confidence of College Students in the view of Civic Awareness, QW1501).

### References

- Blanco C, Schneier FR, Okuda M, Liebowitz MR. Psychopharmacology for social anxiety disorder. *Social Anxiety* 2014; 625-59.
- Choi YH, Park KH. Therapeutic factors of cognitive behavioral group treatment for social phobia. *Journal of Korean Medical Science* 2006; 21(2): 333-36.
- Clark CR, Mcfarlane AC, Weber DL, Battersby M. Enlarged frontal p300 to stimulus change in panic disorder. *Biological Psychiatry* 1996; 39(10): 845-56.
- Cohen GL, Sherman DK. The psychology of change: self-affirmation and social psychological intervention. *Annual Review of Psychology* 2014; 65(1): 333-71.
- Costa L, Bauer L, Kuperman S, Porjesz B, O'Connor S, Hesselbrock V. Frontal p300 decrements, alcohol dependence, and antisocial personality disorder. *Biological Psychiatry* 2000; 47(12): 1064-71.
- Cruikshank L, Caplan J, Singhal A. Event-related potential (erp) reflections of perceptual requirements during the planning of delayed action. *Journal of Vision* 2010; 10(7): 1065.
- Cunningham MA, Swanson V, Holdsworth RJ, O'Carroll RE. Late effects of a brief psychological intervention in patients with intermittent claudication in a randomized clinical trial. *British Journal of Surgery* 2013; 100(6): 756-60.
- Hanagasi HA, Gurvit IN, Kaptanoglu G, Karamursel S, Idrisoglu HA, Emre M. Cognitive impairment in amyotrophic lateral sclerosis: evidence from neuropsychological investigation and event-related potentials. *Cognitive Brain Research* 2002; 14(2): 234-44.
- Kok A. Event-related-potential (erp) reflections of mental resources: a review and synthesis. *Biological Psychology* 1997; 45(1-3): 19-56.
- Kudielka BM, Buchtal J, Uhde A, Wüst S. Circadian cortisol profiles and psychological self-reports in shift workers with and without recent change in the shift rotation system. *Biological Psychology* 2007; 74(1): 92-103.
- Lee S, Lam IM, Kwok KP, Leung CM. Research article: a community-based epidemiological study of health anxiety and generalized anxiety disorder. *Journal of Anxiety Disorders* 2014; 28(2): 187-94.
- Lee S, Tsang A, Chui H, Kwok K, Cheung E. A community epidemiological survey of generalized anxiety disorder in Hong kong. *Community Mental Health Journal* 2007; 43(4): 305-19.
- Liebowitz MR, Ninan PT, Schneier FR, Blanco C, Ginsberg DL, Hollander E. Integrating neurobiology and psychopathology into evidence-based treatment of social anxiety disorder. *CNS Spectrums* 2005; 10(10): 805a-805b.
- Polich J, Hoffman LD. P300 and handedness: on the possible contribution of corpus callosal size to erps. *Psychophysiology* 1998; 35(5): 497-507.
- Polich J. P300 clinical utility and control of variability. *Journal of Clinical Neurophysiology* 1998; 15(1): 14-33.
- Russo FD, Zaccara G, Ragazzoni A, Pallanti S. Abnormal visual event-related potentials in obsessive-compulsive disorder without panic disorder or depression comorbidity. *Journal of Psychiatric Research* 2000; 34(1): 75-82.
- Sachs G, Anderer P, Margreiter N, Semlitsch H, Saletu B, Katschnig H. P300 event-related potentials and cognitive function in social phobia. *Psychiatry Research* 2004; 131(3): 249-61.
- Wassermann EM, Greenberg BD, Nguyen MB, Murphy DL. Motor cortex excitability correlates with an anxiety-related personality trait. *Biological Psychiatry* 2001; 50(5): 377-82.
- Zhang J, Wei W, Wang CM. Effects of psychological interventions for patients with systemic lupus erythematosus: a systematic review and meta-analysis. *Lupus* 2012; 21(10): 1077-87.