

## PERSONALITY DISORDER FUNCTIONING STYLES ARE ASSOCIATED WITH THE EFFECTS OF THE COGNITIVE-BEHAVIORAL THERAPY FOR PANIC DISORDER: A PRELIMINARY STUDY

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### SUMMARY

**Background:** The effect of the cognitive behavioral therapy (CBT) for panic disorder varies, but how personality disorder functioning style influences it remains unclear.

**Subjects and methods:** In 30 healthy volunteers and 44 patients with panic disorder (22 treated and 22 waiting list), we administered the Parker Personality Measure (PERM) and the Plutchik-van Praag Depression Inventory (PVP). Before and during the CBT or waiting period, patients were asked to record their panic attacks using the Panic Attack Record (PAR).

**Results:** Patients scored significantly higher on PERM Antisocial, Borderline, Histrionic, Avoidant, Dependent, and Passive-aggressive styles and on depression. After CBT, all PAR parameters were significantly reduced in the treated group. The Obsessive-compulsive style was positively correlated with the panic attack duration and the total-thought before CBT or waiting period in all patients. In treated patients, the decreased panic attack duration was positively correlated with Histrionic, Obsessive-compulsive and Passive-aggressive; the decreased total symptom number was positively correlated with Antisocial and Histrionic; the decreased total-sensation was positively correlated with antisocial; and the total-thought was positively correlated with Narcissistic style.

**Conclusions:** The length and duration of CBT was short and mainly with behavioral strategies, how personality influenced the related cognition per se remains unknown here. However, our preliminary results indicate that personality disorder functioning styles related to the externalized behaviors and the Obsessive-compulsive style have positive effects on CBT for panic disorder, implying that CBT practitioners should note their personality styles when treating these patients.

**Key words:** cognitive behavioral therapy – CBT - panic disorder – personality - personality disorder functioning style

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### INTRODUCTION

Panic disorder, being characterized by the recurrent unexpected panic attacks, has a prevalence of 5.1% (Grant et al. 2006), and is one of the leading causes for seeking emergency department consultations and mental health services (Weissman 1991). It is comorbid with other psychiatric abnormalities, for instance, it shares 35% to 95% comorbidity rates with other types of personality disorder (Sanderson et al. 1993, Hoffart et al. 1994, Langs et al. 1998). With the systematic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association 2000), investigators have shown that clusters B (antisocial, borderline, histrionic, and narcissistic) and C (avoidant, dependent, and obsessive-compulsive) personality disorders are the most comorbid ones (Starcevic et al. 1999, Dammen et al. 2000). Moreover, the duration and severity of the panic disorder, especially the suicidal thoughts, are associated with the comorbid personality disorders (Starcevic et al. 1999, Latas et al. 2000, Ozkan & Altindag 2005).

Anxiolytics and antidepressants help to reduce or eliminate the anticipatory anxiety, phobic avoidance, or

other symptoms of the panic disorder (Bakker et al. 2002, Mitte 2005). Cognitive-behavioral therapy (CBT) is the most widely studied and validated psychotherapy for the disorder (Mitte 2005, Westen & Morrison 2001). Empirical studies have demonstrated that the numerous variants of CBT, rather than medication, are efficacious and regarded as the first-line treatment for panic disorder (Otto et al. 2000, McHugh et al. 2009, Sánchez-Meca et al. 2010). However, following CBT, many patients continue to display residual symptoms and seek additional treatment. For instance, anxiety and depression (Brown et al. 1995, Tsao et al. 2002, Allen et al. 2010) are associated with the CBT treatment outcome, personality disorders and alcohol abuse are also known risk factors for the treatment failure (Black et al. 1994, Dreessen et al. 1994, Seguí et al. 1999, Kampman et al. 2008, Telch et al. 2011).

Nonetheless, results regarding personality disorders and CBT effectiveness on panic disorder are still inconclusive. The reasons might be the different methodologies used for personality measure, panic attack record, or patient inclusion. For instance, Dreessen et al. (1994), using the structured clinical interview for DSM-III-R personality disorders (SCID-II; Spitzer et al. 1990) in 31

patients (4 drop-outs not included), found that the obsessive-compulsive personality disorder was related negatively to treatment outcome, while borderline personality disorder was related positively to it but only at the six months follow-up period. Telch et al. (2011), also using SCID-II in 173 patients, found that cluster C personality disorders predicted a poorer CBT response. Black et al. (1994), using the structured interview for DSM-III-R personality disorders (Stangl et al. 1985) in 66 patients who had completed three weeks of treatment with cognitive therapy, fluvoxamine, or placebo pharmacotherapy, found that personality disorders did not predict the recovery of panic attacks. Kampman et al. (2008) in 60 panic disorder patients, found personality disorders had no effect on the CBT outcome. Apparently, a common design flaw among these studies was that no waiting list controls were enrolled for treatment comparisons. Previous studies have shown that waiting list controls in the CBT related design were helpful to exclude the extraneous factors such as the passage of time and allowing one to judge the efficacy of the treatment against a minimal control condition (Telch et al. 1995, Carter et al. 2003).

Considering that personality trait governs cognition and behavior (Boone et al. 1999, Schaie et al. 2004, Calder et al. 2011), it is reasonable to expect the influence of personality disorders on the CBT outcome in panic disorder. In the current study, we aimed to examine how personality disorder function styles were associated with panic attack symptoms and their changes after a short-term CBT in a more concrete and detailed way. We would like to clarify this issue by enrolling control groups of healthy volunteers and of waiting list panic disorder patients, and by employing specific questionnaires to measure the personality disorder functioning styles and the panic attack symptoms. For instance, we employed the Parker Personality Measure (PERM) which was considered as the efficient and first-level clinical description of the personality functional styles (Parker & Hadzi-Pavlovic 2001), and the Panic Attack Record (PAR) which was considered as one of the more detailed and seasonable panic attack records that allows the therapist to identify links between physiological sensations and catastrophic thoughts and to identify escape behaviors (Rapee et al. 1990, Taylor 2000). Additionally, we used the Plutchik-van Praag Depression Inventory (PVP; Plutchik & van Praag 1987) to measure the depressive tendency in our participants.

We hypothesized that: (1) patients with panic disorder would score higher on PVP and PERM styles corresponding to clusters B and C; (2) the patients in the treated group would score lower on PAR scales than those in the waiting list after CBT; (3) Scores of the PERM styles corresponding to clusters B and C might be related to PAR scale scores in all patients before CBT and to PAR scale score changes in patients after CBT.

## SUBJECTS AND METHODS

### Subjects

Forty-four patients with panic disorder according to the DSM-IV-TR criteria (American Psychiatric Association 2000) were enrolled in the present study. They were further divided into two groups with personality and depression tendency balanced (see below): 22 in the waiting list group (15 men and 7 women; aged 31.86 years with 11.66 S.D., age range 13-55 years; two young boys, aged 13 and 16) and 22 in the treated group (13 men and 9 women; aged 30.91±14.15 S.D., ranged 15–64; four young boys, aged 15, 15, 17 and 17 respectively) group. The diagnoses of patients were confirmed by an experienced psychiatrist (WW) using the Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I; First et al. 2002). Thirty healthy volunteers (13 men and 17 women; aged 29.27±10.45 S.D., range 18-62) invited from hospital or university staff members without being paid for their participation, were included as healthy controls in the study. A semi-structured interview was performed with each healthy participant to ensure that they were not suffering from any psychiatric or neurological problems. Moreover, Computer Tomography or Magnetic Resonance Imaging scans conducted on all patients had displayed normal skulls, midlines, parenchyma, including cerebella and brain stems, and no organic brain lesions. All participants were Han Ethnicity, and no patients took medication at least 2 weeks prior to the study. There were no statistically significant differences of age (group effect,  $F(2, 71)=0.31, p=0.732, MSE=45.09$ ) or gender distributions ( $\chi^2(2)=3.34, p=0.188$ ) among these groups. The study was approved by a local Ethics Committee and all participants had given their written informed consent.

### Measures

A) All participants completed the 92 items Parker Personality Measure (PERM; Parker & Hadzi-Pavlovic 2001) before the test procedure, and the PERM has been proven to be valid in Chinese culture (Wang et al. 2003). Each PERM item has five Likert-scale points (1-very unlike me, 2 - moderate unlike me, 3 - somewhat unlike and like me, 4 - moderate like me, 5 - very like me). The questionnaire assesses 11 types of personality disorders, i.e., the paranoid (internal alpha, 0.70), schizoid (0.35), schizotypal (0.62), antisocial (0.68), borderline (0.78), histrionic (0.55), narcissistic (0.70), avoidant (0.75), dependent (0.72), obsessive-compulsive (0.50), and passive-aggressive (0.68) (Wang et al. 2003).

B) Participants also completed the 34-item Plutchik-van Praag Depression Inventory (PVP; Plutchik & van Praag 1987) test before the test procedure. Each PVP item has three scale points (0, 1, 2) that correspond to increasing depressive tendencies. Participants have “possible depression” if they have scores between 20

**Table 1.** Strategy outline of the cognitive-behavioral therapy for the panic disorder

General structure	a. Psychoeducation	b. Cognitive restructuring	c. Exposure strategies	d. Other interventions
Theme	To correct misconceptions and fill information gaps that the patients have about the nature and treatment of panic disorder.	To correct the catastrophic beliefs and generate plausible and noncatastrophic alternatives.	Patients are presented with feared stimuli in a systematic, controlled manner	Breathing retraining, relaxation training, relapse-prevention strategies
Therapist's Direction	To demonstrate the role of cognitive factors in panic disorder and how CBT can help them.	Catastrophic beliefs can be broken down into components, such as overestimations of the probability and overestimations of the cost (badness) of unpleasant events.	Exposure strategies can decondition the emotional reactions, provide the patients with corrective information (e.g., the likely noncatastrophic causes of their feared sensations) and test whether their coping strategies ameliorate or exacerbate their problems.	The patients are informed that feared sensations and some degree of anxiety were harmless.
Patient's Cooperation	To ask patients to complete tasks which illustrate how cognitions lead to anxiety or panic attacks. Goal setting.	Distancing strategies to help patients view their beliefs objectively, as hypotheses rather than facts. Empirical disputes to review the available evidence for and against the patient's catastrophic beliefs.	Interoceptive exposure in which the exercise is chosen depending on which sensations are feared the most, e.g., shake head rapidly from side to side, or roll head in circles (30s).	Practice diaphragmatic breathing for 10 minutes. Tense-release relaxation begins by the patients work through all the muscle groups and then practices by relaxing more rapidly by using fewer and fewer muscle groups.
Patient's Homework	Read patient's handouts and other materials	Write down the questions they can ask themselves, statements of noncatastrophic beliefs, and short lists of evidence for and against particular beliefs on flashcards and carry with them.	Practice the exercises regularly, regardless of how they feel and record each exercise on a homework rating form.	Sit or lie down in a quiet place at home, free from distractions, and practice the diaphragmatic breathing two or three times/ day for 10 min each day. Practice tense-release relaxation for 15-30min, twice per day regularly and record each practice session by the homework monitoring forms.
Section infrastructure	I	II	III	IV
Content	a, b	b, c, d,	b, c, d	b, c, d
Evaluation	Analyzing PAR before waiting or therapy.	Questions and answers; Analyzing PAR after waiting or CBT if any; Treatment adjustment.	Questions and answers; Analyzing PAR after waiting or CBT if any; Treatment adjustment.	Questions and answers; Analyzing PAR after waiting or CBT if any.

and 25, or “depression” if they have scores above 25. The inventory has also proven to be valid in the Chinese culture, with an internal alpha of 0.94 (Wang et al. 2002).

C) The Panic Attack Record (PAR; Rapee et al. 1990) was used to gain a detailed assessment of the panic attacks patients perceived before, during and after CBT or the waiting period. The patients were provided with a definition of a panic attack and then given a pad of panic attack records that could be readily carried in a purse or pocket. They were instructed to carry the records at all times and to complete one sheet for each full-blown or limited symptom attack, soon after the attack occurs. The PAR records the following infor-

mation of each attack: date, time, duration, whether with someone (spouse, friend, stranger) or alone, whether in a stressful situation, whether expected, and thoughts or mental images at the time. It also includes a 0-8 Visual Analogue Scale (VAS; 0 - none, 4 - moderate, 8 - extreme) to measure the degree of anxiety experienced during panic attacks and a DSM-III-R symptoms list to record the number of symptoms appeared. The symptoms can further be divided into two categories: physiological sensation (simplified as sensation), i.e., pounding heart, sweating, hot/ cold flash, tight/ painful chest, choking, breathless, nausea, dizzy, trembling, and numb/ tingle; and catastrophic thought (simplified as thought), i.e., fear of dying, fear of going crazy, and fear

of losing control. The numbers of sensation symptom (simplified as total-sensation) or thought (simplified as total-thought) and the total numbers of all the symptoms (simplified as total-number) were calculated. Since patients might report several panic attacks, the above-mentioned PAR parameters were calculated according to the means of all attacks, but separately before and after CBT (or waiting period) was administered.

### Psychotherapy procedures

All patients were told at the time of diagnostic screening that they would be randomly assigned to one of the two groups and might have to wait four weeks for treatment. Once assigned to the waiting list group, patients were informed of their treatment status and offered a referral to other senior psychiatrists if they felt they could not wait for treatment. During the waiting period, they were asked to complete the PAR every time they had the attack.

Patients in the treated group received the individual CBT (Craske et al. 1994). The treatment consisted of four highly structured sessions (each 45 minutes long). Sessions were conducted weekly. The main components of the treatment were as follows: (a) Psychoeducation. Information about panic disorder, cognitive and behavioral models of this disorder and treatment methods. (b) Cognitive structuring. This includes evaluation and replacing catastrophic beliefs with more realistic, noncatastrophic ones. (c) Exposure strategies. Interoceptive and situational exposure exercise, performed during treatment sessions and as homework assignments. The exercises might be performed as “behavioral experiments” to test the catastrophic and noncatastrophic beliefs about body sensations and other events. (d) Other interventions. Breathing retraining, relaxation training, relapse-prevention strategies, and other interventions used as needed (e.g., couples therapy, assertiveness training, etc.). Treatment sessions were led by an experienced psychiatrist (WW) and co-led by a senior-level doctoral student (WC). Patients were assigned the skill-based home practice and were asked to complete the home practice monitoring forms to track their adherence to home skill-building exercises. They were also asked to complete the PAR every time when they had the attack. A detailed treatment outline is illustrated in Table 1.

### Statistical analyses

When referring to patients and healthy controls, the mean scores of the 11 PERM scales which were regarded as repeated measures in the two groups were analyzed by a two-way ANOVA. The two mean scores of PVP in patients and the healthy controls were however, submitted to the independent Student *t* test. To ensure that the patients in the waiting list and treated groups were balanced with personality disorder functioning styles and with depression levels, the mean PERM

scale scores were also analyzed by a two-way ANOVA, the mean PVP scores in the two groups were also submitted to the independent Student *t* test. The mean scores of VAS, panic attack duration, total-sensation, total-thought, and the total numbers of symptom right before and after CBT (or waiting period) between the treated and waiting list groups were submitted to a two-way ANOVA. Once ANOVA displayed a significant group effect, a post-hoc analysis by the Duncan multiple new range test was applied to evaluate between group differences. The relationships between PERM and VAS, panic attack duration, PAR total-sensation, total-thought before CBT (or waiting period) in all patients, and the relationship between PERM and the changes of the above panic parameters after CBT in treated patients, were assessed by the Pearson correlation test. Results were considered to be significant with a *p* value less than 0.05. With the present sample size, power to detect an effect (e.g., a scale score) was larger than 0.80 at  $p < 0.05$  in a sample of 14 subjects per group (the smallest group in the present study).

### RESULTS

On their own volition, all participants completed PVP, but 16 healthy volunteers, 6 patients in the treated group and 8 in the waiting list group failed to complete the PERM. The healthy volunteers who have completed PERM measurements did not differ from those who failed to do so regarding the mean PVP scores (completers,  $5.71 \pm 5.54$  vs. non-completers,  $2.31 \pm 3.63$ ; the Student  $t = 2.01$ , 95% Confidence Interval (CI):  $-6.86 \sim 0.06$ ,  $p = 0.054$ ). Moreover, no healthy volunteers reported having a panic attack during the whole study procedure. However, the *t* test detected significant differences ( $t = 9.84$ , 95% CI:  $-19.60 \sim 12.99$ ,  $p = 0.000$ ) in PVP scores between patients ( $20.19 \pm 9.06$ ) and healthy volunteers ( $3.90 \pm 4.85$ ). There were no statistically significant differences between the treated ( $20.45 \pm 8.28$ ) and waiting list ( $19.90 \pm 10.06$ ) patients regarding the PVP scores ( $t = 0.20$ , 95% CI:  $-5.17 \sim 6.28$ ,  $p = 0.846$ ). Two-way ANOVA detected significant differences (main effect,  $F(1, 42) = 6.58$ ,  $p = 0.014$ ,  $MSE = 1298.69$ ) in PERM scale scores between patients and healthy volunteers. The patients scored significantly higher on anti-social, borderline, histrionic, avoidant, dependent and passive-aggressive styles than the healthy volunteers did (Table 2). There were no statistically significant differences (main effect,  $F(1, 28) = 0.16$ ,  $p = 0.694$ ,  $MSE = 39.00$ ) in PERM scale scores between patients in the treated and waiting list groups (Table 3).

The internal reliabilities of two main PAR measures in the current study were generally satisfactory: when administered before CBT (or waiting period), internal alphas of the total-sensation and total-thought were 0.66 and 0.59, respectively; when administered afterwards, they were 0.88 and 0.84, respectively. When referring to the panic-related parameters before and after CBT or

**Table 2.** Scale scores (mean±S.D.) of the Parker Personality Measure in the healthy controls (n=14) and patients with panic disorder (n=30)

Scales	Healthy Controls	Panic disorder	95% CI
Paranoid	24.93±5.88	27.03±8.21	-7.05~2.84
Schizoid	19.36±3.23	21.07±4.76	-4.19~0.77
Schizotypal	10.07±2.95	12.77±5.75	-6.00~0.61
Antisocial	18.07±5.12	22.37±6.31*	-8.19~-0.40
Borderline	24.57±6.53	31.37±9.26*	-11.73~-1.86
Histrionic	12.50±2.98	14.83±3.68*	-4.60~-0.06
Narcissistic	17.64±4.41	19.83±6.28	-5.96~1.58
Avoidant	25.50±5.92	31.53±7.90*	-10.83~-1.23
Dependent	23.71±5.00	29.67±7.12*	-10.22~-1.68
Obsessive-compulsive	19.07±4.20	19.40±4.07	-3.01~2.35
Passive-aggressive	19.79±4.42	24.03±6.84*	-8.29~-0.20

\* p<0.05 vs healthy controls

**Table 3.** Scale scores (mean±S.D.) of the Parker Personality Measure in the treated (n=16) and waiting list (n=14) groups

Scales	Waiting list	Treated
Paranoid	27.29±7.48	26.81±9.04
Schizoid	22.14±4.85	20.13±4.63
Schizotypal	12.71±4.86	12.81±6.60
Antisocial	20.79±3.96	23.75±7.68
Borderline	32.64±9.08	30.25±9.57
Histrionic	14.36±3.10	15.25±4.17
Narcissistic	19.35±5.09	20.25±7.31
Avoidant	29.71±6.13	33.13±9.08
Dependent	27.93±5.85	31.19±7.94
Obsessive-compulsive	19.00±4.04	19.75±4.19
Passive-aggressive	23.93±5.73	24.13±7.86

**Table 4.** Scale scores (mean±S.D.) of the Panic Attack Record in the treated (n=22) and waiting list (n=22) groups

Scale	Waiting list		95% CI	Treated		95% CI
	Before waiting	After waiting		Before CBT	After CBT	
Duration (min)	15.02±7.67	15.14±8.08	-1.21~0.97	13.29±9.91*	5.12±8.20	4.58~11.75
VAS	7.18±1.99	6.73±2.60	-0.47~1.38	6.82±1.97*	2.73±3.17	2.91~5.28
Total-sensation	5.27±2.45	5.45±2.67	-0.47~0.83	4.64±1.84*	2.23±2.91	1.99~4.92
Total-thought	2.23±1.02	1.86±1.21	-0.63~0.26	1.86±1.04*	0.82±1.14	1.32~3.50
Total-number	7.50±2.70	7.32±3.36	-0.01~0.71	6.50±2.26*	3.05±3.99	0.49~1.60

\* p<0.05 vs the treated group after CBT

waiting period in two patient groups, two-way ANOVA detected significant differences in VAS score (group effect,  $F(1, 42)=11.09$ ,  $p=0.002$ ,  $MSE=104.73$ ; parameter effect,  $F(1, 42)=39.56$ ,  $p=0.000$ ,  $MSE=113.64$ ; group X parameter interaction effect,  $F(1, 42)=25.32$ ,  $p=0.000$ ,  $MSE=72.73$ ), panic attack duration (group effect,  $F(1, 42)=5.68$ ,  $p=0.022$ ,  $MSE=726.30$ ; duration effect,  $F(1, 42)=20.10$ ,  $p=0.000$ ,  $MSE=340.01$ ; group X duration interaction effect,  $F(1, 42)=21.31$ ,  $p=0.000$ ,  $MSE=360.43$ ), total-sensation (group effect,  $F(1, 42)=7.65$ ,  $p=0.008$ ,  $MSE=82.10$ ; sensation effect,  $F(1, 42)=15.42$ ,  $p=0.000$ ,  $MSE=27.28$ ; group X sensation interaction effect,  $F(1, 42)=20.87$ ,  $p=0.000$ ,  $MSE=36.92$ ), total-thought (group effect,  $F(1, 42)=5.78$ ,  $p=0.021$ ,  $MSE=10.92$ ; thought effect,  $F(1, 42)=19.92$ ,  $p=0.000$ ,  $MSE=10.92$ ; group X thought interaction effect,  $F(1,$

$42)=4.66$ ,  $p=0.037$ ,  $MSE=2.56$ ), and the total-number (group effect,  $F(1, 42)=9.24$ ,  $p=0.004$ ,  $MSE=152.91$ ; number effect,  $F(1, 42)=22.24$ ,  $p=0.000$ ,  $MSE=72.73$ ; group X number interaction effect,  $F(1, 42)=18.01$ ,  $p=0.000$ ,  $MSE=58.91$ ). The Duncan multiple new range test detected that patients in the treated group after CBT scored significantly lower on all parameters (VAS, duration, total-sensation, total-thought, and total-number) than they themselves did before CBT, and lower than the patients in the waiting list group did before and after the waiting period (Table 4).

When referring to the relationship between PERM scales and the panic-related parameters before CBT (or waiting period) in both groups of patient (n=30), the Pearson correlation test detected that the panic attack duration ( $r=0.416$ ,  $p=0.028$ ) and total-thought ( $r=0.361$ ,

$p=0.050$ ) were significant-positively correlated with the PERM Obsessive-compulsive style. When referring to the relationship between PERM scales and these parameter changes before and after CBT in treated patients ( $n=16$ ), we found that the reduction of panic attack duration was significant-positively correlated with the PERM Histrionic ( $r=0.57$ ,  $p=0.026$ ), Obsessive-compulsive ( $r=0.62$ ,  $p=0.015$ ) and Passive-aggressive ( $r=0.62$ ,  $p=0.013$ ) styles; the decreased total-number was significant-positively correlated with the Antisocial ( $r=0.55$ ,  $p=0.028$ ) and Histrionic ( $r=0.54$ ,  $p=0.031$ ) styles; the decreased total-sensation was significant-positively correlated with the Antisocial ( $r=0.55$ ,  $p=0.027$ ) style; and the decreased total-thought was significant-positively correlated with the Narcissistic ( $r=0.51$ ,  $p=0.046$ ) style.

## DISCUSSION

In the current study, we found higher scores of PERM Antisocial, Borderline, Histrionic, Avoidant, Dependent, and Passive-aggressive styles and of PVP in patients, which were consistent with documentation that panic disorder is comorbid with clusters B/ C personality disorders (Mavissakalian et al. 1990, Starcevic et al. 1999, Dammen et al. 2000) and with depression (Brown et al. 2001). After CBT, the VAS score, panic attack duration, total-sensation, total-thought and total-number were lowered in the treated group, which support that CBT is an efficacious treatment and the first-line of therapy for the disorder (Otto et al. 2000, McHugh et al. 2009, Sánchez-Meca et al. 2010).

In patients before CBT (or waiting period), the positive correlations between the PERM obsessive-compulsive style and the panic attack duration and total-thought are in line with the documentation that cluster C personality disorders were often related to anxiety disorders including the panic disorder. For instance, some scholars have suggested that people with high obsessive-compulsive trait tend to believe that they are vulnerable, their world could go out of control, and that other people are too irresponsible (Bienvenu & Stein 2003, Grant et al. 2005). When an anxiety or panic attack begins, patients with obsessive-compulsive personality disorder would be eager to organize and structure their environment and exert as much control over themselves and others as they can (Beck 1997). Unfortunately, these compensatory strategies often fail and evoke stress and the patients might try to avoid the consequent negative beliefs, which then contribute to the development of an anxiety disorder, even the panic disorder (Beck 1997, Taylor 2000).

In our study, PERM Histrionic and Passive-aggressive styles were correlated with the reduction of panic attack duration, Antisocial and Histrionic styles with the decreased total-number, Antisocial style with the decreased total-sensation, and Narcissistic style with the decreased total-thought. All the above PERM styles

which belong to cluster B personality disorders, together with the Passive-aggressive style which was co-loaded with Antisocial style in a previous study (Wang et al. 2003), were much related to the externalized behaviors. On the other hand, two most important steps in CBT are the cognitive structuring, which includes the evaluation and replacing catastrophic beliefs with more realistic, noncatastrophic ones, and the exposure strategy, which includes the interoceptive and situational exposure exercises (Craske et al. 1994). People with externalizing trait are most often impulsive and reckless but disregarding of the safety of self or others (Krueger et al. 2001). Therefore, panic disorder patients with cluster B personality disorders might easily comply with the exposure strategy of CBT as they are not afraid of being hurt.

Our results did not support the assumption that cluster C personality disorders might display negative effects on the psychotherapy of panic disorder (Mavissakalian & Hamann 1987, Marchesi et al. 2005). On the contrary, PERM obsessive-compulsive style was correlated with the reduction of panic attack duration. People with obsessive-compulsive trait often impose their high expectations, rules and systems on themselves and on others (Beck 1998), which might lead to the strict obedience to the CBT procedure following an effect treatment outcome.

However, one should bear in mind several limitations of our study design. Firstly, we only measured the personality disorder functioning styles of our participants before CBT or waiting period but not after. Therefore, it was hard to determine whether the CBT could influence the personality of panic disorder patients. Secondly, several (not many) patients were under 18 years old. Thus, their personality disorder functioning styles might not be mature. Thirdly, we only used the PAR for measuring panic symptoms, instead of co-utilizing other well-established measures such as the Agoraphobic Cognitions Questionnaire, the Body Sensations Questionnaire, the Mobility Inventory, and the Panic Disorder Severity Scale, for a more comprehensive evaluation. Fourthly, the measurement dropouts in our participants might alter the association we found between the personality disorder functioning styles and the CBT outcome in panic disorder. Future research design might address whether the dropouts or adherence have an impact on the association. Finally, the length and duration of CBT we adopted here was short, mainly with behavioral strategies.

## CONCLUSIONS

Our preliminary findings imply that when treating panic disorder patients using CBT, clinicians might pay attention to their personality disorder functioning styles, especially those of cluster B traits, or they might mobilize these traits for a better treatment outcome. For a future perspective, our study also needs to be replicated in other independent laboratories.

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**Conflict of interest:** None to declare.

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