

# Temperament, personality, and treatment outcome in major depression: a 6-month preliminary prospective study

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**Background:** Despite available treatments, major depression is a highly heterogeneous disorder, which leads to problems in classification and treatment specificity. Previous studies have reported that personality traits predict and influence the course and treatment response of depression. The Temperament and Personality Questionnaire (T&P) assesses eight major constructs of personality traits observed in those who develop depression. The aim of this study was to investigate the influence of T&P's eight constructs on the treatment outcome of depressed patients.

**Patients and methods:** A preliminary 6-month prospective study was conducted with a sample of 51 adult patients with a diagnosis of major depressive disorder (MDD) without remarkable psychomotor disturbance using the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition. All patients received comprehensive assessment including the T&P at baseline. We compared each T&P construct score between patients who achieved remission and those who did not achieve remission after 6 months of treatment for depression using both subjective and objective measures. All 51 (100%) patients received the 6-month follow-up assessment.

**Results:** This study demonstrated that higher scores on T&P personal reserve predicted poorer treatment outcome in patients with MDD. Higher levels of personal reserve, rejection sensitivity, and self-criticism correlated with higher levels of depression. Higher levels of rejection sensitivity and self-criticism were associated with non-remitters; however, when we controlled for baseline depression severity, this relationship did not show significance.

**Conclusion:** Although the results are preliminary, this study suggests that high scores on T&P personal reserve predict poorer treatment outcome and T&P rejection sensitivity and self-criticism correlate with the severity of depression. Longer follow-up studies with large sample sizes are required to improve the understanding of these relationships.

**Keywords:** Temperament and Personality Questionnaire, classification, treatment outcome, personal reserve, self-criticism, rejection sensitivity

## Introduction

Depression is a common mental disorder. Approximately 350 million people suffer from depression globally.<sup>1</sup> Major depressive disorder (MDD) can cause significant distress and impairment in individuals, and it also places a substantial burden on society.<sup>2</sup> Despite available treatments, MDD is a remarkably heterogeneous disorder, causing problems in classification and treatment specificity.<sup>3</sup> Studies have consistently reported that personality traits predict<sup>4</sup> and influence the treatment outcome of depression in both pharmacotherapy<sup>5</sup> and psychotherapy.<sup>6</sup> Existing literature indicates that depressed patients show high scores on neuroticism and low scores for extraversion and conscientiousness.<sup>7</sup> Moreover, depression severity correlates positively with

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neuroticism<sup>8</sup> and inversely with extraversion.<sup>9</sup> Furthermore, higher scores on neuroticism,<sup>10</sup> as well as on measures of harm avoidance<sup>11</sup> and obsessional interference,<sup>12</sup> were associated with poorer outcomes in depression treatment.

Parker and Roy<sup>13</sup> suggested that non-melancholic depression is associated with predisposing personality styles and performed several studies to clarify such personality traits. The researchers performed careful clinical observations and a comprehensive literature review of personality traits overrepresented in those who have depressive disorders to develop the Temperament and Personality Questionnaire (T&P).<sup>14</sup> T&P comprises 109 self-report items and dimensionally assesses eight major constructs of temperament and personality observed in those who have non-melancholic depression.

Therefore, this study investigated the influence of T&P's eight constructs on the treatment outcome of depressed patients. We compared each T&P construct score between patients who achieved remission and those who did not achieve remission after 6 months of treatment in a naturalistic, noncontrolled, treatment setting.

## Patients and methods

### Participants

We recruited depressed patients from April 2014 to June 2016. Patients were eligible to be included in the study if

they met the following criteria: 1) they were outpatients who had a diagnosis of MDD as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV) criteria for single or recurrent depression; 2) their age was between 20 and 75 years; and 3) they were competent and able to provide informed consent. Patients were excluded from the study if they presented remarkable psychomotor disturbances (a core feature of melancholia)<sup>15</sup> at baseline based on clinical assessment by the study's psychiatrists. We initially contacted 74 patients and 56 met the criteria. Among the 56 patients, five declined to participate in the study; therefore, 51 received the baseline assessment. All 51 (100%) patients received the 6-month follow-up assessment (Figure 1). For the total sample, the mean age of the patients was 40.9 years (SD=11.5), and 68.6% (n=35) were women. The mean years of education was 14.5 years (SD=2.3). A total of 33 patients (64.7%) were employed; 24 patients (47.1%) were married; and 39 patients (76.5%) were cohabiting. The average total number of depressive episodes was 1.6 (SD=1.2), and the median duration of current depressive episode was 9 months (interquartile range =4–27). The mean baseline 21-item GRID-Hamilton Depression Rating Scale (GRID-HAMD<sub>21</sub>) score was 13.9 (SD=8.2), indicating that the participants were experiencing a mild- to moderate-level depression. The study was conducted at a depression clinic at two hospitals, where the patients received clinical consultation and management;

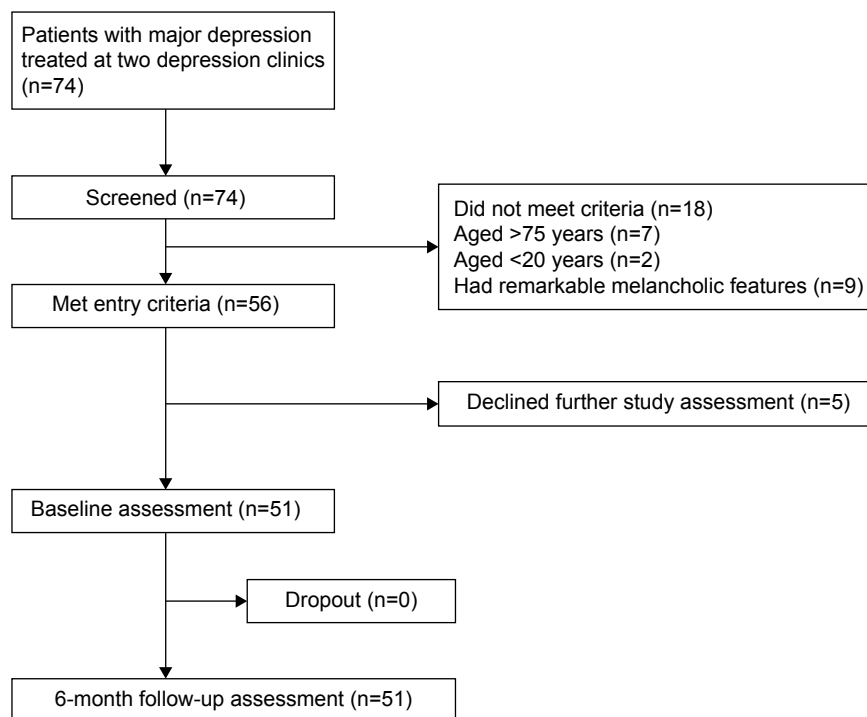


Figure 1 Flowchart of patient selection process for the study.

one was a university hospital located in central Tokyo, and the other was a psychiatric hospital located in the northern part of the Greater Tokyo Area. Written informed consent was obtained from all patients prior to participating in the study. The study was approved by the ethics committees of Keio University School of Medicine and Gunma Hospital.

## Procedure

At baseline, all participants received a comprehensive semi-structured clinical interview by the study psychiatrists and completed an assessment battery that included the T&P. The diagnostic interview was conducted using the Structured Clinical Interview for DSM-IV (SCID).<sup>16</sup> Demographic data and clinical characteristics including age, sex, total education in years, employment status, marital status, habitation setting, total number of depressive episodes, and duration of current depressive episodes were collected. Depression severity was assessed using the observer-rated GRID-HAMD<sub>21</sub>,<sup>17,18</sup> the self-report Beck Depression Inventory-Second Edition (BDI-II),<sup>19,20</sup> and the 16-item Quick Inventory Depressive Symptomatology (Self-Report) (QIDS-SR<sub>16</sub>).<sup>21,22</sup> The Sheehan Disability Scale (SDS)<sup>23,24</sup> was used to measure the degree of disability and functional impairment due to depression. Depression severity and functional impairment were reassessed at 6-month follow-up. Patients with a GRID-HAMD<sub>21</sub> score  $\leq 7$  were considered as achieving remission.<sup>25</sup>

## Measures

### T&P

The T&P comprises 109 self-report items that dimensionally assess eight personality trait constructs observed in those who develop non-melancholic depression.<sup>14</sup> Each item on the questionnaire was rated on a 4-point Likert scale. Higher scores indicate a greater tendency of the personality trait. The eight constructs of T&P are 1) anxious worrying (a tendency to become stressed, worried, and anxious); 2) personal reserve (a tendency to keep one's inner feelings to oneself); 3) perfectionism (a tendency to be very responsible, to have high standards for oneself, and to be highly committed to tasks and duties); 4) irritability (a tendency to be quick tempered and to "externalize" stress by becoming "snappy" and irritated by little things); 5) social avoidance (a tendency to be introverted and to keep to oneself, while those low on this dimension tend to be very sociable); 6) rejection sensitivity (a tendency to worry about rejection or abandonment); 7) self-criticism (a tendency to be very tough on oneself); and 8) self-focused (a tendency to

prioritize one's needs over others).<sup>26</sup> The eight constructs of the T&P crossmatch with the constructs of the five-factor model (FFM), neuroticism, extraversion, openness, agreeableness, and conscientiousness, which is the most widely accepted model of the personality traits.<sup>27,28</sup> The FFM construct of neuroticism corresponds to the T&P constructs of anxious worrying, irritability, self-criticism, and rejection sensitivity; FFM introversion (the other end of the extroversion dimension) corresponds to T&P personal reserve and social avoidance; FFM conscientiousness corresponds to T&P perfectionism; and FFM agreeableness inversely corresponds to the T&P self-focused construct.<sup>27</sup> The Japanese version of T&P had high test-retest reliability (intra-class correlations of 0.77–0.89), internal consistency (Cronbach's  $\alpha$  of 0.67–0.91), and an adequate level of convergent validity ( $\rho=0.2$ –0.4).<sup>29</sup>

### GRID-HAMD<sub>21</sub>

The GRID-HAMD<sub>21</sub> has been the gold standard assessment for observer-rated depressive symptomatology. The GRID-HAMD was developed to set standards for scoring and administering the original HAMD.<sup>30</sup> The GRID-HAMD is scored between 0 and 4, with larger numbers indicate greater severity, based upon the assessment of symptom intensity and symptom frequency over the past 7 days. Support for the validity and reliability of the GRID-HAMD has been shown.<sup>17,18</sup>

### BDI-II

The BDI-II is a widely used self-report instrument to assess the severity of depressive symptoms and was developed by Beck et al,<sup>19</sup> with its first version published in 1961. The BDI-II is a 21-item questionnaire, and each item is answered by circling a number between 0 and 3, with larger numbers indicating greater severity. Symptom severity for BDI-II is assessed for the previous 2 weeks to better coincide with DSM criteria. Good reliability and validity have been reported for the Japanese version.<sup>20</sup>

### QIDS-SR<sub>16</sub>

The QIDS-SR<sub>16</sub> is an abbreviated self-report version of the clinician-rated 30-item Inventory of Depressive Symptomatology (IDS), designed to assess the severity of depressive symptoms, which was developed by Rush et al.<sup>21</sup> The QIDS-SR<sub>16</sub> is a 16-item questionnaire and assesses all the DSM criterion symptoms for diagnosing a major depressive episode. Symptom severity is assessed for the previous 7 days before assessment. The total scores range from 0 to 27, with larger

numbers indicating greater severity. The internal consistency is excellent, and the validity is very good,<sup>21</sup> which was consistent with the Japanese version.<sup>22</sup>

## SDS

The SDS is a self-report measure that assesses impairment from panic, anxiety, phobic, or depressive symptoms in three domains: 1) work, 2) social life or leisure activities, and 3) home life or family responsibilities. Each item was rated on a 10-point visual analog scale. The three items can be summed into a single dimensional measure of global functional impairment ranging from 0 (unimpaired) to 30 (highly impaired).<sup>23</sup> Support has been found for the validity and reliability of the Japanese version of the SDS.<sup>24</sup>

## Statistical analysis

T&P construct scores were compared between remitters (patients who achieved remission) and non-remitters with Student's *t*-tests or Mann–Whitney *U* tests. Pearson correlations were used to assess relationships between the eight T&P construct scores and depression severity scores at 6-month follow-up. A paired-samples *t*-test was used to evaluate treatment improvement from baseline to 6 months later. To address the potential confounds between T&P constructs and depression severity, we performed logistic regression analyses with remitters/non-remitters as the dependent variable. Independent variables were T&P constructs that differed significantly in the univariate tests and baseline GRID-HAMD<sub>21</sub> scores. The significance level was set at 0.05 (two-tailed) for all analyses. All statistical analyses were performed using SPSS Version 22.0 (IBM Corporation, Armonk, NY, USA).

## Results

### Demographic and clinical characteristics

The comparison of sociodemographics and clinical characteristics between remitters (*n*=23, 45.1%) and non-remitters (*n*=28, 54.9%) is shown in Table 1. The depression severity and functional impairment scores of non-remitters were higher than those of remitters. During the 6-month period, 45 patients (88.2%) received antidepressant therapy only, five (9.8%) received a combination of antidepressant therapy and cognitive behavioral therapy, and one (2.0%) received cognitive behavioral therapy only (Table 1).

### Treatment outcomes

Treatment outcomes are summarized in Table 2. At the 6-month assessment, depressive symptoms improved based on

both observer-rated GRID-HAMD<sub>21</sub> scores and self-reported BDI-II and QIDS-SR<sub>16</sub> scores. All three domains of SDS scores also showed significant improvement.

## Comparison of the eight T&P construct scores between remitters and non-remitters

The comparison of the eight T&P construct scores between remitters and non-remitters is shown in Table 3. Non-remitters at the 6-month assessment showed higher scores than remitters on personal reserve, rejection sensitivity, and self-criticism. On the other hand, anxious worrying, perfectionism, irritability, social avoidance, and self-focused did not show a significant difference between remitters and non-remitters.

We then reran the analyses substituting the subjective measure of BDI-II  $\leq 10$  for the objective measure of GRID-HAMD<sub>21</sub>  $\leq 7$  as the remission criteria. Again, personal reserve ( $P=0.009$ ), rejection sensitivity ( $P=0.049$ ), and self-criticism ( $P=0.02$ ) showed higher scores among non-remitters (*n*=21, 41.2%).

Next, we examined the association between T&P constructs and remitters/non-remitters in a subgroup of 18 patients with moderate–severe depression (baseline GRID-HAMD<sub>21</sub> score  $\geq 17$ ),<sup>31</sup> and found that personal reserve approached significance ( $P=0.05$ ), but rejection sensitivity ( $P=0.17$ ) and self-criticism ( $P=0.86$ ) did not.

## Multivariate analysis

Table 4 provides a summary of the multivariate analyses. In a logistic regression with remitters/non-remitters as the dependent variable, and personal reserve and baseline GRID-HAMD<sub>21</sub> scores as the independent variables, both personal reserve and baseline GRID-HAMD<sub>21</sub> scores were independently associated with remitters/non-remitters. Using the same model, substituting rejection sensitivity and self-criticism for personal reserve, baseline GRID-HAMD<sub>21</sub> scores were independently associated with remitters/non-remitters but not with rejection sensitivity or self-criticism.

## Association between T&P constructs and the severity of depression

Among the three T&P constructs that showed associations with non-remitters in univariate analyses, moderate correlations were found between T&P construct scores and GRID-HAMD<sub>21</sub> scores at 6 months: personal reserve ( $r=0.32$ ), rejection sensitivity ( $r=0.30$ ), and self-criticism ( $r=0.41$ ). Similar correlations were found when we substituted the

**Table 1** Comparison of demographics and clinical characteristics between remitters and non-remitters

Demographics and clinical characteristics	Remitter (n=23)	Non-remitter (n=28)	Total (n=51)
Age (years)	40.3 (12.6)	41.5 (10.8)	40.9 (11.5)
Women	17 (73.9%)	18 (64.3%)	35 (68.6%)
Education (years)	14.9 (2.4)	14.1 (2.2)	14.5 (2.3)
Employed	13 (56.5%)	20 (71.4%)	33 (64.7%)
Unemployed	3 (13.0%)	5 (17.8%)	8 (15.7%)
Housewife and student	7 (30.4%)	3 (10.7%)	10 (19.6%)
Marital status			
Married	13 (56.5%)	11 (39.3%)	24 (47.1%)
Separated, divorced, widowed	1 (4.3%)	4 (14.3%)	5 (9.8%)
Single	9 (39.1%)	13 (46.4%)	22 (43.1%)
Cohabiting	20 (87.0%)	19 (67.9%)	39 (76.5%)
Family history of psychiatric disorders	8 (34.7%)	13 (46.4%)	21 (41.2%)
Total number of lifetime depressive episodes	1.4 (0.8)	1.7 (1.4)	1.6 (1.2)
Median duration of current depressive episode (months)	7	13.5	9
Depression severity at baseline			
GRID-HAMD <sub>21</sub>	10.0 (7.9)	17.1 (7.0)	13.9 (8.2)
BDI-II	17.8 (12.1)	27.8 (11.0)	23.6 (12.6)
QIDS-SR <sub>16</sub>	8.8 (6.9)	14.0 (5.1)	11.6 (6.5)
Degree of functional impairment at baseline			
SDS total	11.8 (7.8)	16.2 (7.3)	14.2 (7.8)
SDS work domain	4.5 (3.2)	6.1 (2.9)	5.3 (3.1)
SDS social life domain	4.5 (2.8)	5.9 (2.8)	5.3 (2.8)
SDS family life domain	2.9 (2.7)	4.2 (2.7)	3.6 (2.7)
Number of antidepressant treatment courses for current episode			
0	0 (0.0%)	1 (3.6%)	1 (2.0%)
1–2	20 (87.0%)	14 (50.0%)	34 (66.7%)
3–4	2 (8.7%)	11 (39.2%)	13 (25.4%)
5 or more	1 (4.3%)	2 (7.1%)	3 (5.9%)
Duration of antidepressant treatment for current episode			
<6 months	16 (69.6%)	12 (42.9%)	28 (54.9%)
6 months to 1 year	4 (17.3%)	3 (10.7%)	7 (13.7%)
1–2 years	1 (4.3%)	6 (21.4%)	7 (13.7%)
>2 years	2 (8.7%)	7 (25.0%)	9 (17.6%)
Used antidepressant at baseline			
SSRI			
Sertraline	15 (65.2%)	13 (46.4%)	28 (54.9%)
Paroxetine	0 (0.0%)	2 (7.1%)	2 (3.9%)
Fluvoxamine	1 (4.3%)	0 (0.0%)	1 (2.0%)
Escitalopram	2 (8.7%)	0 (0.0%)	2 (3.9%)
SNRI			
Duloxetine	2 (8.7%)	3 (10.7%)	5 (9.8%)
Milnacipran	1 (4.3%)	1 (3.6%)	2 (3.9%)
TCA			
Amoxapine	0 (0.0%)	1 (3.6%)	1 (2.0%)
Nortriptyline	0 (0.0%)	1 (3.6%)	1 (2.0%)
Amitriptyline	1 (4.3%)	1 (3.6%)	2 (3.9%)
Other			
Mirtazapine	1 (4.3%)	3 (10.7%)	4 (7.8%)
Trazodone	0 (0.0%)	1 (3.6%)	1 (2.0%)
Mianserin	0 (0.0%)	1 (3.6%)	1 (2.0%)
Treatment modality at 6 months post baseline			
Antidepressant therapy only	20 (87.0%)	25 (89.3%)	45 (88.2%)
Combination of antidepressant therapy and CBT	3 (13.0%)	2 (7.1%)	5 (9.8%)
CBT only	0 (0.0%)	1 (3.6%)	1 (2.0%)

**Notes:** Data are shown as mean (SD) or n (%). Remitters means patients who achieved remission by the 6-month assessment (GRID-HAMD<sub>21</sub> ≤ 7).

**Abbreviations:** BDI-II, Beck Depression Inventory, Second Edition; CBT, cognitive behavioral therapy; GRID-HAMD<sub>21</sub>, 21-item GRID-Hamilton Depression Rating Scale; QIDS-SR<sub>16</sub>, 16-Item Quick Inventory Depressive Symptomatology (Self-Report); SDS, Sheehan Disability Scale; SNRI, serotonin–norepinephrine reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor; TCA, tricyclic antidepressants.

**Table 2** Scores on treatment outcome measures

	Baseline (n=51)	6 months (n=51)	P-value <sup>a</sup>
Depression severity			
GRID-HAMD <sub>21</sub>	13.9 (8.2)	9.9 (7.5)	0.001
BDI-II	23.6 (12.6)	16.9 (13.8)	0.001
QIDS-SR <sub>16</sub>	11.6 (6.5)	8.2 (5.5)	<0.001
Functional impairment			
SDS total	14.2 (7.8)	10.1 (7.9)	<0.001
SDS work domain	5.3 (3.1)	4.0 (3.3)	0.001
SDS social life domain	5.3 (2.8)	3.7 (2.9)	<0.001
SDS family life domain	3.6 (2.7)	2.4 (2.4)	0.001

**Notes:** Data are shown as mean (SD). <sup>a</sup>Paired-samples t-test.

**Abbreviations:** BDI-II, Beck Depression Inventory, Second Edition; GRID-HAMD<sub>21</sub>, 21-item GRID-Hamilton Depression Rating Scale; QIDS-SR<sub>16</sub>, 16-Item Quick Inventory Depressive Symptomatology (Self-Report); SDS, Sheehan Disability Scale.

GRID-HAMD<sub>21</sub> with the BDI-II: personal reserve ( $r=0.33$ ), rejection sensitivity ( $r=0.34$ ), and self-criticism ( $r=0.41$ ).

## Discussion

This study demonstrated that higher scores on T&P personal reserve predict poorer treatment outcome in patients with MDD. Higher levels of personal reserve, rejection sensitivity, and self-criticism were correlated with higher levels of depression. Higher levels of rejection sensitivity and self-criticism were associated with non-remitters; however, when we controlled for baseline depression severity, this relationship did not show significance. To our knowledge, this is the first prospective study that investigated the influence of the eight constructs of T&P on depression treatment outcome.

Our findings are in line with previous studies reporting that higher levels of introversion<sup>32</sup> predicted poorer treatment outcomes and depression severity correlates positively with neuroticism.<sup>8</sup> The neuroticism trait crossmatches with T&P self-criticism and rejection sensitivity traits, and introversion crossmatches with the T&P personal reserve trait.<sup>27</sup>

**Table 3** Comparison of T&P construct scores between remitters and non-remitters (n=51)

Characteristics	Remitter (n=23)	Non-remitter (n=28)	t	P-value <sup>a</sup>
Anxious worrying	14.2 (5.1)	15.3 (4.5)	-0.82	0.42
Personal reserve	8.4 (6.0)	12.3 (5.3)	-2.41	0.02
Perfectionism	12.2 (5.8)	12.7 (5.0)	-0.36	0.72
Irritability	10.2 (6.0)	10.7 (5.6)	-0.28	0.78
Social avoidance	13.8 (4.0)	15.0 (4.5)	-1.03	0.31
Rejection sensitivity	5.8 (4.6)	8.6 (4.8)	-2.14	0.04
Self-criticism	12.8 (4.2)	15.4 (3.5)	-2.46	0.02
Self-focused	4.0 (2.9)	4.4 (3.3)	-0.44	0.66

**Notes:** Data are shown as mean (SD). <sup>a</sup>Student's t-test.

**Abbreviation:** T&P, Temperament and Personality Questionnaire.

**Table 4** Logistic regression analysis of remitters and non-remitters for major depression (n=51)

Variables	Odds ratio	95% CI	$\chi^2$ (df=1) <sup>a</sup>	P-value
Personal reserve	1.15	1.02–1.31	7.84	0.03
GRID-HAMD <sub>21</sub> score at baseline	1.17	1.05–1.30	4.97	0.01
Rejection sensitivity	1.08	0.93–1.25	5.91	0.30
GRID-HAMD <sub>21</sub> score at baseline	1.14	1.03–1.27	1.09	0.02
Self-criticism	1.10	0.93–1.30	5.13	0.28
GRID-HAMD <sub>21</sub> score at baseline	1.14	1.02–1.27	1.16	0.02

**Note:** <sup>a</sup>Likelihood ratio test.

**Abbreviations:** CI, confidence interval; GRID-HAMD<sub>21</sub>, 21-item GRID-Hamilton Depression Rating Scale.

Neuroimaging studies have demonstrated that degree of introversion is associated with activations in regions of the anterior cingulate cortex, dorsolateral prefrontal cortex, middle temporal gyrus, and the amygdala.<sup>33–36</sup> Yet, the process underlying the predictive association between personality traits and treatment outcome is not entirely clear; further understanding of lower-order dimensions and their neurobiological background may contribute to making further progress in elucidating the predictors of treatment outcome.

In our sample, T&P personal reserve scores were higher in the non-remitter group than they were in the remitter group and they correlated with measures of depression severity. Furthermore, T&P personal reserve was associated with non-remitters even after controlling for baseline depression severity. T&P personal reserve is a personality style characterized by a tendency to dislike other people getting too close at an emotional or personal level.<sup>27</sup> Verbalizing one's conflicts to others via interpersonal engagement is a key psychological process for addressing one's mood; however, people who have a personal reserve personality style have been reported to have difficulty engaging with others at a deeper, emotional level.<sup>27</sup> Interestingly, studies have shown that extraversion, an inverse personality dimension of introversion including lower-order dimensions such as T&P personal reserve, has a significant effect on the reduction of depression severity via the therapeutic alliance.<sup>37</sup> Perhaps poorer treatment outcomes found in patients with high personal reserve may in part be explained by the effect it has on the therapeutic alliance.

T&P rejection sensitivity and self-criticism scores did not show significant associations with treatment outcome in our logistic regression analyses. However, the two T&P constructs showed association with depression severity in the univariate analysis and correlated with both objective and subjective depression severity measures (GRID-HAMD<sub>21</sub> and BDI-II). Thus, rejection sensitivity and self-criticism

may be manifestations of more severe depressive symptomatology rather than independent traits. In fact, rejection sensitivity and self-criticism showed moderate correlations with depression severity in our previous T&P validation study ( $r=0.35$  and  $r=0.49$ , respectively).<sup>29</sup> In addition, rejection sensitivity is one of the core symptoms of atypical depression in the DSM-IV, which is positively associated with depression severity.<sup>38,39</sup>

When we examined the association between T&P constructs and remitters/non-remitters in a subgroup of patients with moderate–severe depression, T&P personal reserve approached significance ( $P=0.05$ ). Although we could not detect significant associations due to limited power, the trend association of T&P personal reserve with non-remitters found in our study suggests that this relation may also be observed in patients with moderate–severe depression.

Several limitations of this study deserve mentioning. First, this study was conducted at only two sites with a relatively small sample size, which limits the power of our analyses. However, study sites included a typical university hospital and a psychiatric hospital in an urban/suburban city in Japan. In addition, our sample had some similarities with regard to sex ratio, age, partner status, and employment status with other samples drawn from larger cohort studies such as the Netherlands Study of Depression and Anxiety.<sup>40</sup> Second, treatment outcome was analyzed only for a 6-month period. Third, participants' characteristics such as duration of current depressive episodes and depression severity at baseline varied.

## Conclusion

Although our results are still preliminary, this study revealed that higher scores of T&P personal reserve predicted poorer treatment outcome in patients with MDD. Consequently, longer observations in naturalistic treatment settings with larger sample sizes including a wide range of demographic characteristics are required to advance our understanding of the personality factors affecting treatment outcomes.

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## Disclosure

The authors report no conflicts of interest in this work.

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