

## Temperament and Character Inventory Prediction of Burnout in Residents

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## Abstract

**Objective:** High risk of burnout in healthcare workers has long been recognized. However, there are no methods to predict vulnerability to burnout.

**Methods:** We examined whether temperament and character was associated with burnout and depressive state in residents by using the Temperament and Character Inventory (TCI). The TCI was used for residents at the beginning of clinical training and then the Maslach Burnout Inventory–General Survey (MBI–GS) and the Self-Rating Depression Scale (SDS) were administered at the beginning of clinical training and after four and ten months. Participants were 85 residents who started clinical training after graduating from the University of Miyazaki Hospital in April 2012 and 2013.

**Results:** After ten months, 23.5% of participants were newly diagnosed with burnout using the MBI-GS and 15.3% of participants were newly diagnosed with depressive state using the SDS. We found that residents with high Cooperativeness were significantly more prone to burnout and that residents with high Harm Avoidance and low Self-Directedness were significantly more prone to depressive states.

**Conclusions:** Our results suggest that the TCI can predict not only the risk for future depressive state but also the risk for future burnout. Burnout in residents can be prevented by being conscious of these aspects of temperament and character.

## Introduction

Burnout is a unique stressful situation characterized by mental and physical exhaustion caused by various occupational issues. It has been widely recognized that medical doctors are at a high risk of burnout due to the stressful conditions under which they often work. Doctor burnout can cause personal mental health problems and can also lead to malpractice and unethical medical behavior. An additional serious concern is that medical doctor burnout may lead to a shortage of doctors at clinical sites and a subsequent collapse of the medical system, especially in Japan. The current system for educating medical school graduates in Japan, introduced in 2003, features a matching system in which training hospitals are matched up with a two-year clinical training program. In this work, a medical doctor who is participating in a clinical training program is referred to as a “resident”. Burnout during clinical training has gained significant attention alongside concerns relating to job performance and patient care [1,2]. It seems clear that reducing and preventing resident burnout is key for the avoidance of medical-system collapse in Japan.

Self-administered questionnaires such as the Maslach Burnout Inventory–General Survey (MBI–GS) and the Burnout Measure (BM) are widely used to evaluate burnout, and the reliability and validity of these tests have been verified in different countries and in different types of industries [3,4]. Medical doctor burnout has been extensively studied using these evaluation scales, suggesting that environmental aspects such as overload and role stress as well as personal details such as age and work experience can be risk factors [5]. This means that these evaluation scales are helpful for secondary or tertiary prevention in mental healthcare. However, there have been no studies evaluating vulnerability or predictors as they pertain to resident doctor burnout because they seem to be under almost the same

working conditions (overload, role stress, age, and work experience) in applying each standardized residency program [6].

There have been several reports indicating that certain of the personality profiles classified using the Temperament and Character Inventory (TCI), a self-administered questionnaire, might be predictors for future depressive episodes in workers in specific industries [7,8].

In this study, we investigated whether TCI could be used to predict or to recognize early resident doctor burnout and/or depressive episodes.

## Methods

### 1. Participants

We targeted 89 residents of the center of clinical training after graduation from the University of Miyazaki Hospital between April 2012 and March 2014. The participants were 85 residents included 47 men and 38 women whose average age was  $26.24 \pm 3.81$  (mean  $\pm$  SD) years. This study was approved by the medical ethics committee of the Faculty of Medicine at the University of Miyazaki and conforms to the provisions of the Declaration of Helsinki. Participants gave their written informed consent forms prior to participation. Anonymity of all participants was preserved.

### 2. Procedures

We administered the MBI-GS and the Self-Rating Depression Scale (SDS) at the beginning of clinical training and again after four and ten months. We also examined whether temperament and character are associated with burnout and depressive state in residents by using TCI results at the beginning of clinical training. Procedure of when participants performed TCI, MBI-GS and SDS is presented in Figure 1.

### 2.1 Temperament and Character Inventory (TCI)

Cloninger et al. designed the TCI to evaluate personality structure with a 7-factor model of temperament and character under the assumption that personality structure is composed of temperament and character [9]. They proposed that temperament, which includes four dimensions (Novelty Seeking, Reward Dependence, Harm Avoidance, and Persistence), reflects variations in the dopaminergic, serotonergic, and noradrenergic systems in the central nervous system, is influenced by genes, and contributes to behavioral decisions. In contrast, character, which includes three dimensions (Self-Directedness, Cooperativeness, and Self-Transcendence), matures in adulthood and influences personal and social effectiveness as people develop their self-concepts. In this study, we examined whether temperament and character can be used to evaluate vulnerability to burnout using the short Japanese version of the TCI (125 items), where each item is rated as “Yes” or “No” [10].

### 2.2 Maslach Burnout Inventory–General Survey (MBI–GS)

Burnout was measured with the MBI-GS (developed by Maslach), which consists of 16 items along three dimensions: exhaustion, cynicism, and professional efficacy [11]. All items are scored on a Likert scale from 0 (never) to 6 (every day) based on the frequency with which each indicator occurs. In the process of burnout, exhaustion comes first, followed by cynicism and then diminished professional efficacy. Brenninkmeijer and Van Yperen suggested the “exhaustion + 1” criterion, which states that subjects with intense exhaustion and either a high level of cynicism or a low level of professional efficacy, or both, are considered to be burnt out [12]. In this study, we used the Japanese version of the MBI-GS to evaluate burnout of the residents [13]. For exhaustion, the cut-off value was 4.0 points or higher; for cynicism, the cut-off value was 2.60 points or higher; and for professional efficacy, the cut-off value was 1.50 points or lower.

### 2.3 Self-Rating Depression Scale (SDS)

Zung designed the SDS to evaluate depressive state. The original SDS consists of 16 items including melancholy, disturbance of sleep induction, exhaustion, and others [14]. In this study, we used the Japanese version of the SDS to evaluate depressive state of the residents [15]. In previous research, the cut-off value of SDS was 50 points or higher.

### 2.4 Statistical analysis

Analysis of variance (ANOVA) was used to compare differences between the group that had been newly diagnosed with burnout using the MBI-GS after ten months and the group that had not been diagnosed. Pearson’s product-moment correlation coefficient was used to evaluate the relationship between the presence or absence of burnout and the subordinate items of the TCI in order to determine the

temperament and character traits involved in burnout. We excluded participants ( $n = 6$ ) who had been diagnosed with burnout at the outset.

We also used ANOVA to compare differences between the group that had been newly diagnosed with depressive state with SDS after ten months and the group that had not been diagnosed. Pearson's product-moment correlation coefficient was used to calculate the relationship between the presence or absence of depressive state and the subordinate items of the TCI in order to determine the type of temperament and character traits involved in depressive state. We excluded participants ( $n = 4$ ) who had been diagnosed with depressive state at the outset. We used SPSS version 22.0J for statistical analyses.

## Results

Cumulative incidence rates of burnout and depressive state ten months from the beginning of clinical training are presented in Figure 2. Within ten months, 23.5% of participants had been newly diagnosed with burnout using the MBI-GS and 15.3% of participants had been newly diagnosed with depressive state using the SDS.

Results of the ANOVA on the seven dimensions of the TCI comparing the burnout and non-burnout groups after ten months are listed in Table 1. The burnout group had significantly higher scores on Cooperativeness than did the non-burnout group. The ANOVA results for the Cooperativeness subscales are listed in Table 2. The burnout group had significantly higher scores on Empathy and

Principles than did the non-burnout group. In addition, the burnout group had higher scores on Social Acceptance than did the non-burnout group, a marginally significant effect.

Similarly, results of the ANOVA on the seven dimensions of the TCI comparing the group newly diagnosed with depressive state after ten months and the non-depressive group are listed in Table 3. The depressive group had significantly higher scores on Harm Avoidance and significantly lower scores on Self-Directedness than did the non-depressive group. In addition, the depressive group had higher scores on Self-Transcendence than did the non-depressive group, a marginally significant effect.

## Discussion

In this study, we found that residents with high Cooperativeness in TCI are significantly more prone to burnout. Within the Cooperativeness dimension, we found that residents with high scores in Empathy, Principles, and Social Acceptance are prone to burnout. In addition, we found that residents with high Harm Avoidance and low Self-Directedness are significantly more prone to depressive states.

With regard to TCI scores, the group that was newly diagnosed with burnout using the MBI-GS had significantly higher scores on Cooperativeness than did the non-burnout group. Further, the burnout group had significantly higher scores on Empathy and Principles than did the non-burnout group. In addition, the burnout group had marginally higher scores on Social Acceptance than did the non-burnout group. Cooperativeness is a personality trait related to individual differences in how much people identify with and accept others. Empathy is a subscale of Cooperativeness related to identifying

with and thinking about how others think and feel. Principles reflect the process of ethical decision making, and Social Acceptance is related to accepting others and permitting them their own thoughts and actions. According to the definition proposed by Maslach, burnout includes three dimensions—exhaustion, cynicism, and professional inefficacy—and is the result of prolonged exposure to chronic stressors in the workplace [3]. Furthermore, Edelwich and Brodsky defined burnout as a “progressive loss of idealism, energy, and purpose, experienced by people in the helping professions as a result of the conditions of their work” [16]. The results of this study indicated that residents with high scores in these subscales of Cooperativeness would be more likely to think about their patients, and to pursue ethical behavior, and finally, to make every effort to accept all of their patients in return for less concern of themselves. In other words, the more ideal residents would seem to be in terms of cooperating with doctors and responding to the requests and demands of patients—the more selfless they are—translates into a greater likelihood of them being diagnosed with a “burnout” condition and experiencing a profound lack of a sense of achievement.

The group that was newly diagnosed with depressive state using the SDS had significantly higher scores on Harm Avoidance and significantly lower scores on Self-Directedness than did the non-depressive group. In addition, the depressive group had marginally higher scores on Self-Transcendence than did the non-depressive group. Harm Avoidance is a personality trait related to the inhibition or cessation of behaviors, such as pessimistic worry in anticipation of future problems, passive avoidance behaviors (e.g., fear of uncertainty and shyness of strangers), and rapid fatigability. Self-Directedness is a personality trait referring to self-determination. High Self-Directedness indicates a high sense of responsibility, the ability to set targets and select actions towards a goal, and the ability to motivate oneself, while low Self-Directedness indicates a low sense of responsibility, low self-esteem, and

the inability to take action towards a goal and inspire oneself. Some studies suggest that temperament and character are predictors of depressive state. Naito et al. reported that people with low Self-Directedness are prone to depressive states, and Cloninger et al. reported that people with high Harm Avoidance and low Self-Directedness are prone to depressive states [8,17]. The results of our current study are consistent with these previous reports. There was one difference, however. Self-Transcendence has a strong and consistent effect on the presence of positive emotions, and thus it has a large effect on mental health [18]. People with high Self-Transcendence are more likely to experience life with joyful exaltation. However, in this study, the depressive group had marginally higher Self-Transcendence scores than did the non-depressive group. This may be because the average age of the participants was  $26.24 \pm 0.41$  years. Cloninger suggested that spirituality and other phenomena measured by Self-Transcendence are important for the adjustment and personal satisfaction of many people, particularly those over 35 years of age [9]. This study suggested that Self-Transcendence has little impact on the major mental tasks that characterize early adulthood among residents.

To assess vulnerability to burnout using the TCI, Stoyanov et al. suggest that decreased personal performance is a crucial manifestation of burnout and that low personal performance and negative emotions among healthcare professionals who are often overly perfectionistic and compulsive are related to low Self-Directedness and high Harm Avoidance [6]. Stoyanov et al. also suggest that burnout is associated with feelings of social alienation or inadequacy of support, which are related to low Cooperativeness [6]. The results of our present study suggest that people with high Harm Avoidance and low Self-Directedness are prone to depressive states, consistent with previous reports. However, no significant correlation was found between burnout and the personality profile (low Self-Directedness and high Harm Avoidance) in the present study. One possible explanation for this discrepancy could be that

depressive state and burnout were originally considered different psychological matters mainly focused on personality traits, although they are frequently discussed as closely related issues in terms of health problems in the workplace, not to mention the fact that burnout could actually lead to depression.

Interestingly, we found that high Cooperativeness and three of its subscales—Empathy, Principles, and Social Acceptance—are significantly related to burnout. However, Pejušković et al. reported that low Cooperativeness is related to fully developed burnout among doctors [19]. Although the two studies seem to contradict each other on the matter of strong relationship between burnout and personality traits, we suggest that the two can be resolvable. Specifically, our present study was administered prospectively while the previous study was not. This difference of study design may be what caused the contradiction. High Cooperativeness in the present study is likely to be considered to relate with burnout as a cause, rather than an effect, while in contrast, low Cooperativeness in the previous study seems to be considered an effect, rather than a cause, of burnout. Furthermore, in this context, we speculate that high Cooperativeness could be a major cause to elicit resident burnout and that subsequent full-blown burnout could severely impair Cooperativeness through deteriorated relationships among co-workers.

The limitation of the present study is that only a small number of samples and job types (residents only) are discussed. This might make it difficult to apply the findings of this study to other types of job. Although further research is necessary and much remains to be done, we believe that TCI has potential as a useful tool to predict and prevent burnout, at least in human service professions.

In conclusion, we found that residents with high Cooperativeness are significantly more prone to burnout. Within the Cooperativeness dimension, high Empathy, Principles, and Social Acceptance seem most relevant to burnout. These results suggest that the TCI can predict not only the risk of future

depressive state but also the risk of future burnout. The TCI shows promise as a tool to prevent the burnout of residents.

#### Implications for Educators

TCI can predict the risk for future depressive state and burnout in residents.

Residents with high Cooperativeness were significantly more prone to burnout.

Residents with high Harm Avoidance and low Self-Directedness were significantly more prone to depressive states.

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#### Disclosures

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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Figure legend

Figure 1

Procedure of when participants performed TCI, MBI-GS and SDS, and number of participants who had been newly diagnosed with burnout or depressive state.

Figure 2

Cumulative incidence rates of burnout and depressive state ten months after beginning of clinical training.

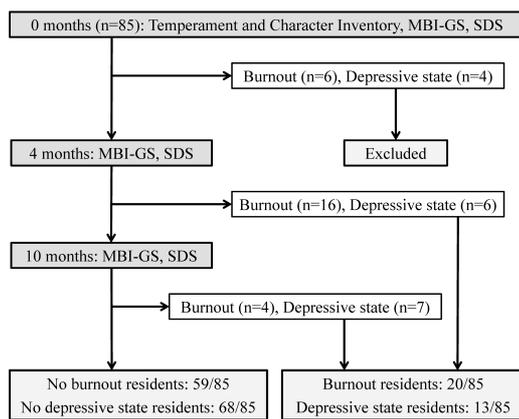


Figure 1

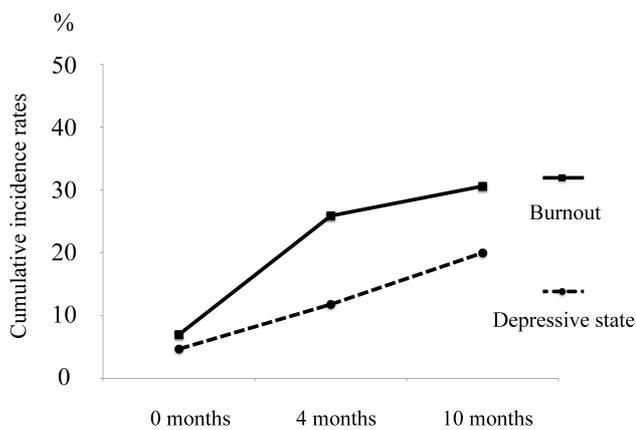


Figure 2

Table 1: Differences in Temperament and Character Inventory based on existence of burnout

Dimensions	Burnout	No burnout	p-value
Novelty-Seeking	8.45 ± .91	9.32 ± .53	.411
Harm Avoidance	13.90 ± .90	12.19 ± .52	.102
Reward Dependence	10.75 ± .50	11.20 ± .29	.436
Persistence	2.70 ± .32	2.37 ± .19	.383
Self-Directedness	16.25 ± .90	17.17 ± .52	.377
Cooperativeness	19.50 ± .59	17.88 ± .35	.021 *
Self-Transcendence	2.95 ± .47	2.71 ± .27	.661

ANOVA. Data are mean and standard error of mean (burnout: n = 20, not diagnosed: n = 59, \*p<.05).

Table 2: Differences in Cooperativeness based on existence of burnout

Cooperativeness	Burnout	No burnout	p-value
Social Acceptance vs Intolerance	4.35 ± .17	4.00 ± .10	.086 †
Empathy vs Social Disinterest	2.40 ± .24	1.83 ± .14	.040 *
Helpfulness vs Unhelpfulness	4.10 ± .19	4.19 ± .11	.693
Compassion vs Revengefulness	4.20 ± .17	3.93 ± .10	.179
Principles vs Self-Advantage	4.45 ± .17	3.93 ± .10	.012 *

ANOVA. Data are mean and standard error of mean (burnout: n = 20, not diagnosed: n = 59, †p<.10, \*p<.05).

Table 3: Differences in Temperament and Character Inventory based on existence of depressive state

Dimensions	Depressive state	No Depressive state	p-value
Novelty-Seeking	7.39 ± 1.13	9.27 ± .49	.130
Harm Avoidance	15.62 ± 1.06	12.10 ± .46	.003 **
Reward Dependence	10.39 ± .61	11.19 ± .27	.233
Persistence	2.54 ± .40	2.47 ± .17	.875
Self-Directedness	14.08 ± 1.07	17.37 ± .47	.006 **
Cooperativeness	18.62 ± .75	18.18 ± .33	.595
Self-Transcendence	3.69 ± .57	2.57 ± .25	.075 †

ANOVA. Data are mean and standard error of mean (depressive state: n = 13, not diagnosed: n = 68, †p<.10, \*\*p<.01).