Temperament and Character Inventory (TCI) as Predictors of Depression among Japanese College Students

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To examine the predictive power of Cloninger's psychobiology model of depression, 167 Japanese college students were studied on two occasions, with an interval of approximately three months. At Time 1 (T1), the Temperament and Character Inventory (TCI) and Self-rating Depression Scale (SDS) were distributed. At Time 2 (T2), the SDS was distributed again. The T2 SDS score was positively correlated with Harm Avoidance and negatively correlated with Reward Dependence and Self-directedness at T1. However, after controlling for the T1 SDS score, the T2 SDS score was predicted only by T1 Self-directedness. These data suggest that lower Self-directedness can be predictive of depression, whereas higher Harm Avoidance and lower Reward Dependence are state-dependent. © 2000 John Wiley & Sons, Inc. J Clin Psychol 56: 1579–1585, 2000.

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Many etiological models of depression have been postulated at different times. Among many risk factors (for review, see Kendler, Kessler, Neale, Heath, & Eaves, 1993; Lewinsohn, Hoberman, & Rosenbaum, 1988), personality is the one that has attracted the attention of many researchers. For example, Hirschfeld, Klerman, Lavori, Keller, Griffith, and Coryell (1989) found that depression was associated with personality traits such as high Neuroticism on the Maudsley Personality Inventory (Eysenck, 1962); Thoughtfulness and low Emotional Stability Objectivity on the Guidford-Zimmerman Temperament Survey (Guilford & Zimmerman, 1949); Hysterical pattern on the Lazare-Klerman-Armor Personality Inventory (Lazare, Klerman, & Armor, 1966); and Ego-Control on the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1951). Angst and Clayton (1986) have shown the High Depressiveness on the Freiburg Personality Inventory (Fahrenberg, Selg, & Hampel, 1970) to be a premorbid personality factor of depression. Boyce, Parker, Barnett, Cooney, and Smith (1991) and Kendler et al. (1993) have shown that high Neuroticism on the Eysenck Personality Inventory (Eysenck & Eysenck, 1964) was associated with depression. Boyce at al. (1991) have also proposed that high Interpersonal Sensitivity (Boyce & Parker, 1989) is a risk factor for depression.

The study of personality as a precursor of depression has two advantages (Sato & Uehara, 1995). First, by examining premorbid personality, it is possible to identify individuals who have a high risk for depression and thus to commence treatment in its early stage. Second, knowledge of premorbid personality can help us to understand the etiology of depression. Premorbid personality may reflect the biological or psychological factors that either trigger or inhibit the onset of depression.

The Temperament and Character Inventory (TCI) by Cloninger, Svrakic, and Przybeck (1993) seems promising to further our understanding of the relationship between personality and depression. The TCI is based on psychobiological theory—a seven-factor model of temperament and character. Cloninger et al. (1993) hypothesized that temperament underlies the development of character and that personality is an end-product of interaction between the two. Temperament consists of four heritable dimensions which are manifest early in life: Novelty-Seeking (NS), Harm-Avoidance (HA), and Reward-Dependence (RD), from which the fourth dimension, Persistence (P), emerged. These temperament dimensions are hypothesized to be determined genetically and to correlate with dopaminergic, serotonergic and noradrenergic activity, respectively. Character consists of three dimensions which mature in adulthood: Self-Directedness (SD), Cooperativeness (C), and Self-Transcendence (ST). The character dimensions are hypothesized to be determined more environmentally.

Studies using the Tridimensional Personality Questionnaire (TPQ; Cloninger, 1986, 1987), a precursor of the TCI, measuring only the temperament dimensions, have indicated that HA is related to depression. Thus, Svrakic, Przybeck, and Cloninger (1992) have shown in 86 college students that HA was correlated with mood states, defined by the Profile of Mood States-bipolar form ($r = -.39$ to $-.57$). Similarly, Brown, Svrakic, Przybeck, and Cloninger (1992) distributed the TPQ to a population of psychiatric outpatients. They found a significant positive correlation of the Beck Depression Rating Scale (Beck, Ward, & Mendelson, 1961) score with HA, but not with Novelty Seeking or Reward-Dependence. Although these results have shown cross-sectional correlations of HA with depression, it remains to be answered whether TPQ scores are antecedents of depression, since a cross-sectional correlation does not necessarily imply causative links. For example, personality assessment measures may covary with the mood of the subjects (Akiskal, Hirschfeld, & Yerevanian, 1983). Indeed, although Cloninger, Przybeck, and Svrakic (1991) have shown good test-retest reliability for HA ($r = .79$) in a sample of 1,019 adults, Strakowski, Dunayevich, Keck, & McElroy (1995) have shown that 42% of

the variance in the changes in HA was due to changes in depression scale of the Brief Psychiatric Rating Scale (Overall & Gorham, 1962) in a psychiatric population.

Studying patients with unipolar nonpsychotic major depression before and after antidepressant treatment, Joffe, Bagby, Levitt, Regan, and Parker (1993) and Chien and Dunner (1996) found that the HA score was high before the treatment (when the subjects were depressed) and that it was reduced after the treatment. Neither NS nor RD changed significantly during the course of antidepressant treatment. A significant correlation between HA and a depression score was also reported by Strakowski et al. (1995), who studied 32 patients with a psychotic episode. Although these studies have suggested that HA but not NS or RD may be a precedent (or a predictor) of depression, this interpretation can be rejected for the same reason as above. Thus, it would be desirable to explore the predictive capacity of personality variables on the severity of depression, after controlling for the possible bias of the mood state on the personality measures themselves.

Furthermore, the TCI has rarely been used. Tanaka, Kijima, and Kitamura (1997) used the TCI to measure both temperament and character dimensions in terms of their correlation with depression. They reported that depression assessed by Self-rating Depression Scale (SDS; Zung, 1965) was related to high HA and low SD and C in a sample of Japanese undergraduates. Cloninger, Svrakic, Bayon, and Przybeck (1998) reported significant correlation between the score of the Center of Epidemiologic Study Depression Scale and high HA, low SD, and low C. These studies suggested that low character dimensions—particularly SD—are linked to depression, but they were again cross-sectional investigations. It seems to be feasible to hypothesize a link between low SD and depression because according to Cloninger et al. (1993) the basic concept of SD is "self-determination and 'willpower,' or the ability of an individual to control, regulate, and adapt behaviour to fit the situation in accord with individually chosen goals and values." We are not aware of any report, which used the TCI in a longitudinal research.

The present study, therefore, tested whether TCI scores would be predictors of depression in a two-stage design. The potential antecedents of depression (TCI) were measured prior to the assessment of the criterion variable (depression). The data collected were analyzed by hierarchical multiple regression analyses so that the effects of the mood state on the personality measures could be controlled for.

Methods

Subjects and Procedure

We administered a set of questionnaires twice to a sample of Japanese undergraduates. A total of 220 subjects responded, including 105 men (48%), 111 women (50%), and 4 of unrecorded sex (2%). Their mean age was 20.9 years, $SD = 1.8$ years. At Time 1 (T1), TCI, SDS, and demographic variables (age and sex) were measured. We distributed the second questionnaire to measure SDS among those who responded at T1, of which 169 responded. The average time that elapsed between the first and second waves was 95.3 days, $SD = 10.0$ days. Two subjects were excluded from this study because their Time 2 SDS scores were incomplete. Thus, the data of 167 undergraduates were used in this study, including 81 men (48%), 84 women (50%), and 2 of unrecorded sex. The mean age was 21.0 years, $SD = 1.8$ years. Excluded subjects differed little from those included here: 24 men (45%) and 27 women (51%); the mean age was 20.5, $SD = 2.0$.

Measurements

Personality. The Japanese version of Temperament and Character Inventory (TCI) was used. This was a 125-item short version instead of the 240-item full version. The

original dichotomous response scale was changed into a four-point scale in this study; each item was rated 1 ("strongly disagree") to 4 ("strongly agree") (Kijima, Saito, Takeuchi, Yoshino, Ono, Kato, & Kitamura, 1996).

Depression. The respondents answered the Japanese version of the SDS (Fukuda & Kobayashi, 1973) twice to measure depression. This consists of 20 items with a four-point scale from 1 ("a little of the time") to 4 ("most of the time"). The range of score is from 20 to 80. A higher score means more severe depression.

Results

The correlation coefficients among all variables used in this study are shown in Table 1 with their Means and *SD*s. Time 2 SDS was positively correlated with HA ($r = .39$, $p < .01$) and Time 1 SDS ($r = .57$, $p < .01$), negatively with RD ($r = -.19$, $p < .05$) and SD ($r = -.46$, $p < .01$).

To predict Time 2 SDS score by a regression analysis (see Table 2), demographic variables (sex and age) were entered first, showing no significant contribution, $F(2, 164) = 2.26$, *ns*. Then, Time 1 SDS was entered in the second step, significantly predicting Time 2 SDS, $F(3, 164) = 70.66$, $p < .001$. In the third step, a set of the four temperament (NS, HA, RD, and P) and three character (SD, C, and ST) scale scores were entered. They significantly predicted Time 2 SDS, $F(10, 156) = 2.38$, $p < .05$.

Discussion

The results of this suggest that HA is the result of depression, rather than the other way round. Two pathways could be suggested for the relationship between depression and HA. First, as noted earlier, it is known that personality measures are often biased by the current mood state. Our data may be interpreted as showing that depressive mood state at Time 1 increased the score of HA. Second, HA may reflect neurobiological changes in the depressive patients. In either case, high HA may be better interpreted as reflecting a state rather than a trait.

Table 1
Means, SD, and Correlations of SDS and TCI Scores

	SDS1	SDS2	NS	HA	RD	P	SD	C	Mean	SD
SDS1	—								41.8	8.3
SDS2	.57**	—							42.7	7.3
NS	−.04	−.04	—						49.4	7.4
HA	.52**	.39**	−.41**	—					52.4	10.0
RD	−.16*	−.20*	.11	−.03	—				44.0	6.4
P	.04	−.13	−.11	−.21**	.19*	—			13.0	2.8
SD	−.48**	−.46**	.08	−.51**	.09	.04	—		67.1	10.0
C	−.20*	−.15	−.09	−.22**	.55**	.18*	.19*	—	71.1	8.0
ST	.02	−.06	.30**	−.24**	.20*	.25*	−.10	.17*	31.5	8.3

Note. SDS1, Self-rating depression scale score at Time 1; SDS2, Self-rating depression scale score at Time 2; NS, novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; C, co-operativeness; ST, self-transcendence.
*$p < .05$; **$p < .01$.

Table 2

Hierarchical Multiple Regression Analysis of T2 SDS by T1 TCI and Other Scores

Step variables	R^2 change	F change	(df)	β
Demographics	.027	2.26	(2,164)	
Sex				.049
Age				−.150
SDS1	.294	70.66***	(3,163)	.555***
TCI Temperament	.066	2.38*	(10,156)	
NS				.056
HA				.080
RD				−.133
P				−.058
TCI Character				
SD				−.224**
C				.085
ST				−.054

Note.   SDS1, self-rating depression scale score at Time 1; NS, novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; C, cooperativeness; ST, self-transcendence.
*$p < .05$; **$p < .01$; ***$p < .001$.

Unlike previous investigations, our study showed that not only HA but also RD was correlated with Time 1 depression. Although low RD was not a predictor of subsequent depression, the link between low RD and depression among a Japanese population may warrant further study. Because our study suggested that this link was a reflection of depressive state, it may be hypothesized that different constellations of depressive symptoms show a different influence on the personality measures.

In our study, SD was related to the severity of depression at Time 2, even when the Time 1 depression was controlled for. Thus, low SD may be a risk factor for depression, but it is not clear how low SD can trigger depression. We may assume that the developmental process of SD includes some immunity to depression. SD includes the ability of a subject to have command of his/her own behavior to accommodate to the current situation so as to meet individually chosen goals and values (Cloninger et al., 1993). In the process of nurturing this ability, one may come to possess the psychological facility to avoid the onset of depression. It may be that those high in SD are more capable of coping efficiently and successfully with difficult life situations. Problem-solving and cognitive appraisal are coping strategies to overcome negative life events. Those high in SD may be better in coping, so that the onset of depression after a negative life event becomes less likely.

SD was also related to the number of supportive people in the subject's network (Kitamura, Kijima, Watanabe, Takezaki, & Tanaka, 1998). Terry, Rawle, & Callan (1995) showed that a better perception of social support by pregnant women could predict efficient coping behavior after childbirth. Therefore, high SD may be related to both better social support and better coping behavior. On the other hand, it may be that individuals low in SD have poorer perception of social support, are less skillful in coping with difficult situations, and thus are more likely to develop depression when they are faced with the negative (depression-provoking) life events.

There are several limitations of our study. First, we did not measure the severity of anxiety. Anxiety is often co-existing with depression, but it may have specific links with

the personality profile. Second, we did not use any diagnostic criteria of clinical depression. Our approach was to treat depression as a continuum, rather than a diagnostic category. Third, our samples are nonclinical students; a clinical population may yield different results. The onset of depression is also related to the current psychosocial situation. Although we measured some of them (e.g., life events and social support), we did not incorporate them in the present analyses. More insight may be obtained if these are analyzed together. Finally, the subjects themselves measured both mood and personality. This is inherent in studies like ours, and we should be cautious in interpreting the results. Further studies are necessary to conclude the role of character dimensions in the onset of depression, but our results have made such studies more feasible.

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