

Temperament and Character Dimensions of Personality in Patients with Generalized Anxiety Disorder

Zeynep Ezgi Bal, MD¹, Mustafa Solmaz, MD¹, Derya Adali Aker, MD¹, Ercan Akin, MSc², Samet Kose, MD, PhD^{2,3}

ABSTRACT:

Temperament and character dimensions of personality in patients with generalized anxiety disorder

Objective: It is known that a complex relationship is present between anxiety and personality. In this study, we aimed to compare the clinical features and personality traits of patients with GAD and healthy controls. We hypothesized that Harm Avoidance scores would be higher and predictive of GAD compared to the healthy controls.

Methods: This study was conducted in outpatients with GAD who presented to the Bagcilar Training and Research Hospital's Outpatient Psychiatry Clinic. The sample was comprised of 40 outpatient (30 women, 10 men) who met Diagnostic and Statistical Manual of Mental Disorders - DSM-5 criteria for GAD, who were not under any medication treatments. The control group comprised of 40 healthy controls (23 women, 17 men). Semi-structured sociodemographic data form, Temperament and Character Inventory (TCI), General Anxiety Disorder Scale (GAD-7), Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), State-Trait Anxiety Inventory (STAI-I and II) were administered to the participants. All statistical analyses were performed using SPSS for Windows, Version 23.0.

Results: Impulsiveness subscale of Novelty Seeking; Harm Avoidance and its subscales of Anticipatory worry, Fear of uncertainty, Shyness with strangers, and Fatigability and asthenia scores were significantly higher in GAD patients compared to the control group. Harm Avoidance and its subscales of Anticipatory worry, Fear of uncertainty, Shyness with strangers, and Fatigability and asthenia scores were significantly highly positively correlated with the BDI, BAI, STAI-I / STAI-II, and GAD-7 scores. When GAD-7 scores was entered as the dependent variable and age and gender were controlled in regression analysis, Harm Avoidance and its subscale of Shyness, Persistence, and Self-Transcendence were significantly predictive of GAD-7 scores.

Conclusions: Temperament and character traits of the GAD patients were significantly different from the healthy control subjects. HA scores were higher and predictive of GAD compared to healthy controls.

Keywords: General Anxiety Disorder, temperament and character inventory, personality, harm avoidance

Journal of Mood Disorders (JMood) 2017;7(1):10-9



¹Bagcilar Research and Training Hospital, Department of Psychiatry, Istanbul, Turkey, ²Hasan Kalyoncu University, Department of Psychology, Gaziantep, Turkey ³University of Texas Medical School of Houston, TX, USA and Center for Neurobehavioral Research on Addictions, Houston, TX, USA.

Corresponding Author:
Samet Kose, MD, PhD,
Franklin, TN, USA

E-mail address:
sametkose@gmail.com

Date of received:
February 1, 2017

Date of acceptance:
February 14, 2017

Declaration of interest:
Z.E.B., M.S., D.A.A., E.A., S.K.: The authors reported no conflicts of interest related to this article.

INTRODUCTION

Generalized Anxiety Disorder (GAD) is a highly distressing disorder characterized by chronic and excessive worry surrounding various aspects of an individual's life. Although there are a number of findings suggesting that certain genetic, biological, psychological, and psychosocial factors may be involved in the development of GAD (1) suggesting multicausality, understanding the etiology of GAD is still extremely limited. However, it is known that a complex relationship is present between anxiety and personality (2,3).

In Cloninger's psychobiological model of temperament and character, relationships between the structure and development of personality and psychiatric disorders are described (4). This model postulates that personality is comprehensively developed with respect to genetic traits, learning, and insight into the self-concept. Cloninger's model consists of four temperament and three character dimensions, all of which are viewed as being the results of continuous interactions during the lifespan (5). Temperament is largely genetically determined, independently manifested in early life, and configures

automatic behavior responses. Four dimensions of temperament are Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD), and Persistence (P). Novelty Seeking (NS) refers to a heritable bias in the activation and initiation of behavior and higher levels of NS are linked with curiosity, enthusiasm, and engagement with something new and unfamiliar, but also with impulsivity, anger, and disengagement when felt frustrated (6). Harm Avoidance (HA) indicates a heritable bias for inhibition and cessation of behaviors and higher levels of HA are linked to caution, care and good planning skills, but also with avoidance, passivity, insecurity, wariness, pessimism, and low energy (6). Reward Dependence (RD) refers to a heritable bias for maintenance of ongoing behavior and higher levels of RD are linked to sensibility, sociability, and empathy (6). Persistence (P) refers to the perseverance and eagerness of effort in response to signals of anticipated reward vs. laziness, ambitious overachieving in response to intermittent frustrating non-reward vs. underachieving and higher levels of P are linked to stability, industriousness, sense of duty, and perfectionism (6). Character involves individual differences in higher cognitive processes. Character regulates the cognitive processes of sensory perception and emotion provoked by temperament, leading to the development of a mature concept of the self in the personal, social, and spiritual arenas. These traits are mostly determined by the environment rather than being inherited. Self-Directedness (SD) refers to identification with the autonomous self and the ability of an individual to control, regulate, and adapt his or her behavior to fit the situation in accordance with one's individually chosen goals and values to deal with any situations encountered and higher levels of SD are linked to maturity, efficiency, self-sufficiency, responsibility, and high self-esteem and self-reliance (6). Cooperativeness (C) indicates the extent to which individuals view other people as a part of the self and higher levels of C are linked to tolerance, sympathy, sociability, and empathy (6). Self-Transcendence (ST) refers to identification with a unity of all things in the world and higher levels of ST are linked to patience, selflessness, spirituality, idealism, and creativity (6).

In terms of his personality model, Cloninger proposed that anxiety disorders were correlated with higher HA, lower NS and RD scores (7). He described three forms of anxiety. First one is 'chronic somatic anxiety' which is

related to higher NS, lower HA and RD as in panic disorder, the second one is 'chronic cognitive anxiety' related to higher HA, lower NS and RD as in Generalized Anxiety Disorder. The last form is 'mixed somatic and cognitive anxiety' which is proposed to be related to higher HA and NS (7). Generalized anxiety disorder patients, with their heightened anticipatory anxiety and feeling afraid as if something awful might happen, clinically fit the definition of 'chronic cognitive anxiety' (7). Both HA and GAD refer shared features of feeling habitually tense and worried. The relationship between anxiety disorders and personality traits, with respect to temperament and character dimensions, has been the subject of numerous studies using the dimensional approach to the psychobiological model of personality. Previous studies, comparing temperament and character dimensions of GAD patients and healthy controls, revealed controversial results. It seems that the only consistent finding is that report of higher HA scores (8-11). Starcevic et al. reported higher HA and lower RD scores in GAD patients and no differences between the NS scores (11). Piero et al. reported higher HA and NS scores and lower RD and SD scores in GAD patients (9). There were also previous reports of lower SD scores in GAD patients (12,13).

In this study, we aimed to examine the clinical features and personality traits of patients with General Anxiety Disorder compared to healthy controls. Our study hypothesis was that the temperament and character traits of the patients would be different from the healthy group. We hypothesized that HA scores would be higher and predictive of GAD compared to healthy controls. In other words, we predict that it would be more common for an individual to express higher levels of harm avoidance in the presence of GAD relative to the healthy controls.

MATERIAL AND METHODS

Study Participants

This study was conducted in outpatients with generalized anxiety disorder who were admitted to the Psychiatric Unit of Bagcilar Training and Research Hospital. The sample was comprised of 40 outpatient (30 women, 10 men) with a mean age of 38.25 years ($SD \pm 8.2$ years) who met Diagnostic and Statistical Manual of Mental Disorders - DSM-5 criteria (14) for General Anxiety Disorder (GAD), who were not

under any medication treatments. The control group comprised of 40 healthy controls (23 women, 17 men), with a mean age of 36.2 years ($SD \pm 11.17$) years. Both study groups had no history of any psychotic disorders and were free of any medical illnesses and neurological disease. The current study was approved by the Ethics Committee of our hospital, and all of the patients gave written informed consent before participation.

Psychometric Measurements

Sociodemographic Data Form. This form includes demographic variables including gender, age, marital status, the number of children, education, location, household members, occupation, employment status, the number of siblings, family history of chronic disease, other known physical illnesses, and previous psychiatric treatments.

General Anxiety Disorder Inventory (GAD-7). General Anxiety Disorder severity was evaluated with a self-report scale, specifically the 7-item General Anxiety Disorder Inventory (GAD-7) (15), the 21-item Beck Anxiety Inventory (BAI) (16) and the State-Trait Anxiety Inventory (STAI-I and II) (17).

Turkish TCI. Temperament and Character Inventory (TCI) is a self-administered, 240-item true/false questionnaire. The depressed patients completed a Turkish version of the 240-item self-questionnaire (Turkish-TCI) at the end of the psychiatric interview, and the control group received the instruction to complete the questionnaire at home. All participants gave informed consent. The TCI is a 240-item self-administered questionnaire that measures the four temperament dimensions and the three character dimensions (4). The Turkish-TCI has been validated by Kose et al., in a Turkish sample of 683 healthy volunteers (18). All diagnostic assessments and clinical ratings were performed by two staff psychiatrists.

General Anxiety Disorder Inventory (GAD-7). The 7-item Generalized Anxiety Disorder Scale (GAD-7) was developed by Spitzer et al. based on the GAD criteria found in the DSM-5. The GAD-7 score is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of 'not at all', 'several days', 'more than half the days', and 'nearly every day', respectively, and adding together the scores for the

seven questions. Scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate and severe anxiety, respectively (15). Further evaluation is recommended when the score is 10 or greater. Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% for GAD. The Turkish GAD-7 has been validated by Konkan et al. (19).

Beck Depression Inventory (BDI). Beck Depression Inventory (BDI) is a self-report scale composed of 21 items and measures somatic, emotional, cognitive, and impulsive symptoms of depression. Each item takes a point between 0 and 3. The point that can be taken from inventory varies between 0 and 63 and high points indicate a rise in the depressive mood. The scale aims not to diagnosis but converts the symptoms level to the objective number (20). Overall scores for all questions is evaluated as followed: a score between 10-16 shows low depression symptom, a score between 17-29 is middle depressive symptom, and a score between 30-63 is severe depressive symptom. BDI has been adapted into Turkish, and the reliability and validity have been examined by Hisli (21).

Beck Anxiety Inventory (BAI). The BAI is a 21-item self-report questionnaire that lists the symptoms of anxiety. The respondent is asked to rate how much each symptom has bothered him/her in the past week. The symptoms are rated on a four-point scale, ranging from "not at all" (0) to "severely" (3). The instrument has excellent internal consistency of Chronbach's $\alpha = 0.92$ and high test-retest reliability ($r = 0.75$) (22).

State-Trait Anxiety Inventory. State-Trait Anxiety Inventory was developed by Spielberger et al. in 1970, and it is a Likert-type scale that measures the level of state and trait anxiety with 20 questions for each. While State Anxiety Inventory evaluates the sensational reaction that shows sudden changes Trait Anxiety Inventory at the second part of the inventory measures the continuity of the anxiety that people generally show tendency throughout life. Higher scores show higher anxiety level, and lower scores show lower anxiety level. The items are ranked between 1 (never) and 2 (completely). The total score obtained from both inventories changes between 20 and 80. Inventory has been introduced to Turkish with reliability and validity study conducted by Oner and Le Compte (17).

Statistical Analysis

All statistical analyses were performed using SPSS for Windows, Version 23.0. The variables in the present study were examined with the Kolmogorov-Smirnov's test of normality. All variables were normally distributed. An independent sample t-test was used for comparisons between the patient and the control groups. Within-group correlations between TCI scores were performed using the Pearson's correlation coefficient. Hierarchical Multiple Regression analysis was performed to examine the association between the Generalized Anxiety Disorder Scale (GAD-7) scores and TCI's temperament and character

dimensions. A p value less than 0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics of Sample

The mean age of the study participants was 37.23 ± 9.786 years ($X \pm SD$); 33.8% ($n=27$) of participants were male; 66.3% ($n=53$) were female. The majority of the participants in the study were married (76.3%) and 15% of participants were single, 3.8% were divorced, 1.3% were widowed. 31 participants (38.8%) were graduated from elementary school, 20 (25.0%) from high school, 20 (25.0%) from college, and 8 (10.0%) participants were graduated from middle school. The majority of participants in the study were housekeeper (31.3%), and 22.5% of participants were workers. Other participants were government employees ($n=9$), retired ($n=4$), student ($n=2$), freelancer ($n=6$), and 9 participants (11.3%) in the study were unemployed. Among the participants in the study, 24 (30.0%) had psychiatric family history [generalized anxiety disorder ($n=3$), panic disorder ($n=4$), major depressive disorder ($n=15$), bipolar disorder ($n=1$), and schizophrenia ($n=1$)]. A half of participants were smoking cigarettes (50%) and the other half were not (%50). 32% of participants were alcohol users, and %32.5 of the participants had alcohol use history in the past. 13.8% of participants attempted suicide. Sociodemographic characteristics of participants were presented in Table 1.

Comparing TCI scales and subscales between GAD patients and healthy controls

An independent-samples t-test was conducted to compare TCI scales and subscales scores for patient and control groups. The results revealed that there was a statistically significant difference between the patients and controls in terms of Impulsiveness subscale scores of Novelty Seeking ($t(78)=3.698$, $p=0.000$); Harm Avoidance ($t(78)=15.962$, $p=0.000$) and its subscales of Anticipatory worry ($t(78)=11.840$, $p=0.000$), Fear of uncertainty ($t(78)=8.441$, $p=0.000$), Shyness with strangers ($t(78)=12.410$, $p=0.000$), and Fatigability and asthenia ($t(78)=10.996$, $p=0.000$), Exploratory Excitability ($t(78)=-3.989$, $p=0.000$); Reward Dependence ($t(78)=-2.359$, $p=0.21$) and its subscale of

Table 1: Sociodemographic characteristics of the sample

	n	%
Gender		
Female	53	66.3
Male	27	33.8
Marital status		
Married	61	76.3
Single	15	18.8
Divorced	3	3.8
Widowed	1	1.3
Education		
Elementary School	31	38.8
Middle School	8	10.0
High School	20	25.0
College	20	25.0
Other	1	1.3
Profession		
Unemployed	9	11.3
Worker	18	22.5
Government Employee	9	11.3
Housekeeper	25	31.3
Other	19	23.6
Psychiatric Family History		
Present	24	30.0
Absent	56	70.0
Psychiatric Illness in Family		
None	56	70.0
GAD	3	3.8
Panic Disorder	4	5.0
MDD	15	18.8
Bipolar Disorder	1	1.3
Schizophrenia	1	1.3
Nicotine Use		
Present	40	50.0
Absent	40	50.0
Past Alcohol Substance Use		
Neither	54	67.5
Alcohol	26	32.5
Suicide Attempt		
Present	11	13.8
Absent	69	86.3

Attachment ($t(78)=-4.479, p=0.000$); Persistence ($t(78)=-4.071, p=0.000$); Self-Directedness ($t(78)=-8.302, p=0.000$) and its subscales of Responsibility ($t(78)=-6.043, p=0.000$), Purposefulness ($t(78)=-4.759, p=0.000$), Resourcefulness ($t(78)=-8.892, p=0.000$), and Congruent Second Nature ($t(78)=-6.028, p=0.000$); Social Acceptance subscale of Cooperativeness ($t(78)=-4.245, p=0.000$). Impulsiveness subscale of Novelty Seeking ($\bar{X}_{\text{patient}}=4.45, SD_{\text{Patient}}=1.947; \bar{X}_{\text{Control}}=3.00, SD_{\text{Control}}=1.536$); Harm Avoidance ($\bar{X}_{\text{patient}}=28.30, SD_{\text{Patient}}=3.681; \bar{X}_{\text{Control}}=12.40, SD_{\text{Control}}=5.113$) and its subscales of Anticipatory worry ($\bar{X}_{\text{patient}}=8.85, SD_{\text{Patient}}=1.861; \bar{X}_{\text{Control}}=3.85, SD_{\text{Control}}=1.916$), Fear of uncertainty ($\bar{X}_{\text{patient}}=6.20, SD_{\text{Patient}}=0.966; \bar{X}_{\text{Control}}=3.60, SD_{\text{Control}}=1.692$), Shyness with strangers ($\bar{X}_{\text{patient}}=6.25, SD_{\text{Patient}}=1.354; \bar{X}_{\text{Control}}=1.88, SD_{\text{Control}}=1.771$), and Fatigability and asthenia ($\bar{X}_{\text{patient}}=7.00, SD_{\text{Patient}}=1.485; \bar{X}_{\text{Control}}=3.08, SD_{\text{Control}}=1.700$) scores were significantly higher

in GAD patients compared to the controls. On the other hand, Exploratory Excitability ($\bar{X}_{\text{patient}}=4.15, SD_{\text{Patient}}=1.718; \bar{X}_{\text{Control}}=5.70, SD_{\text{Control}}=1.757$); Reward Dependence ($\bar{X}_{\text{patient}}=7.00, SD_{\text{Patient}}=1.485; \bar{X}_{\text{Control}}=3.08, SD_{\text{Control}}=1.700$) and its subscale of Attachment ($\bar{X}_{\text{patient}}=3.65, SD_{\text{Patient}}=1.718; \bar{X}_{\text{Control}}=5.18, SD_{\text{Control}}=1.299$); Persistence ($\bar{X}_{\text{patient}}=4.25, SD_{\text{Patient}}=1.850; \bar{X}_{\text{Control}}=5.70, SD_{\text{Control}}=1.285$); Self-Directedness ($\bar{X}_{\text{patient}}=21.85, SD_{\text{Patient}}=6.302; \bar{X}_{\text{Control}}=31.73, SD_{\text{Control}}=4.107$) and its subscales of Responsibility ($\bar{X}_{\text{patient}}=3.43, SD_{\text{Patient}}=2.147; \bar{X}_{\text{Control}}=6.03, SD_{\text{Control}}=1.672$), Purposefulness ($\bar{X}_{\text{patient}}=4.50, SD_{\text{Patient}}=1.854; \bar{X}_{\text{Control}}=6.23, SD_{\text{Control}}=1.349$), Resourcefulness ($\bar{X}_{\text{patient}}=1.83, SD_{\text{Patient}}=1.318; \bar{X}_{\text{Control}}=4.05, SD_{\text{Control}}=0.876$), and Congruent Second Nature ($\bar{X}_{\text{patient}}=6.70, SD_{\text{Patient}}=2.174; \bar{X}_{\text{Control}}=9.35, SD_{\text{Control}}=1.733$); Social Acceptance subscale of Cooperativeness ($\bar{X}_{\text{patient}}=5.38, SD_{\text{Patient}}=1.659; \bar{X}_{\text{Control}}=6.80, SD_{\text{Control}}=1.324$) scores were significantly lower

Table 2: Comparing TCI Scales and Subscales between Patients and Healthy Controls

	Group	n	\bar{X}	SD	t	df	p
NOVELTY SEEKING							
Impulsiveness	Patient	40	4.45	1.947	3.698	78	0.000
	Healthy	40	3.00	1.536			
Exploratory Excitability	Patient	40	4.15	1.718	-3.989	78	0.000
	Healthy	40	5.70	1.757			
HARM AVOIDANCE							
Anticipatory Worry	Patient	40	28.30	3.681	15.962	78	0.000
	Healthy	40	12.40	5.113			
Fear of Uncertainty	Patient	40	8.85	1.861	11.840	78	0.000
	Healthy	40	3.85	1.916			
Shyness	Patient	40	6.20	0.966	8.441	78	0.000
	Healthy	40	3.60	1.692			
Fatigability	Patient	40	6.25	1.354	12.410	78	0.000
	Healthy	40	1.88	1.771			
REWARD DEPENDENCE	Patient	40	7.00	1.485	10.996	78	0.000
	Healthy	40	3.08	1.700			
Attachment	Patient	40	14.05	2.961	-2.359	78	0.021
	Healthy	40	15.63	3.010			
PERSISTANCE	Patient	40	3.65	1.718	-4.479	78	0.000
	Healthy	40	5.18	1.299			
SELF-DIRECTEDNESS	Patient	40	4.25	1.850	-4.071	78	0.000
	Healthy	40	5.70	1.285			
Responsibility	Patient	40	21.85	6.302	-8.302	78	0.000
	Healthy	40	31.73	4.107			
Purposefulness	Patient	40	3.43	2.147	-6.043	78	0.000
	Healthy	40	6.03	1.672			
Resourcefulness	Patient	40	4.50	1.854	-4.759	78	0.000
	Healthy	40	6.23	1.349			
Congruent Second Nature	Patient	40	1.83	1.318	-8.892	78	0.000
	Healthy	40	4.05	0.876			
COOPERATIVENESS	Patient	40	6.70	2.174	-6.028	78	0.000
	Healthy	40	9.35	1.733			
Social Acceptance	Patient	40	5.38	1.659	-4.245	78	0.000
	Healthy	40	6.80	1.324			

in GAD patients compared to the controls. The results of TCI scales and subscales differences between GAD patients and controls are presented in Table 2.

Correlation of TCI scales and Subscales with Other Scales Scores

There were statistically significant and strong positive correlations between Harm Avoidance scale and its subscales with BDI, BAI, GAD-7, and State Anxiety and Trait Anxiety scores. Harm Avoidance was statistically significantly and positively correlated with BDI ($r=0.808$, $p<0.01$), BAI ($r=0.851$, $p<0.01$), GAD-7 ($r=0.861$, $p<0.01$), State Anxiety ($r=0.843$, $p<0.01$) and Trait Anxiety ($r=0.879$, $p<0.01$) scores. Anticipatory worry was positively and statistically significantly correlated with BDI ($r=0.807$, $p<0.01$), BAI ($r=0.800$, $p<0.01$), GAD-7 ($r=0.791$, $p<0.01$), and State Anxiety ($r=0.831$, $p<0.01$) and Trait Anxiety ($r=0.713$, $p<0.01$). Fear of uncertainty subscale of Harm Avoidance was positively and statistically significantly correlated with BDI ($r=0.606$, $p<0.01$), BAI ($r=0.669$, $p<0.01$), GAD-7 ($r=0.719$, $p<0.01$), State Anxiety ($r=0.688$, $p<0.01$) and Trait Anxiety ($r=0.713$, $p<0.01$). Shyness with strangers subscale of Harm Avoidance was positively and statistically significantly correlated with BDI ($r=0.722$, $p<0.01$), BAI ($r=0.752$, $p<0.01$), GAD-7 ($r=0.783$, $p<0.01$), State Anxiety ($r=0.789$, $p<0.01$) and Trait Anxiety ($r=0.776$, $p<0.01$). Similarly, Fatigability and asthenia scores subscale was positively and statistically significantly correlated with BDI ($r=0.694$, $p<0.01$), BAI ($r=0.779$, $p<0.01$), GAD-7 ($r=0.756$, $p<0.01$), and State Anxiety ($r=0.713$, $p<0.01$) and Trait Anxiety ($r=0.781$, $p<0.01$).

On the other hand, there were statistically significant and strong negative correlations between Self-Directedness

scale (including all of its subscales except for Self-acceptance) and the BDI, BAI, STAI-I / STAI-II, and GAD-7 scores. Self-Directedness scale was statistically significantly and negatively correlated with BDI ($r=-0.665$, $p<0.01$), BAI ($r=-0.726$, $p<0.01$), GAD-7 ($r=-0.668$, $p<0.01$), State Anxiety ($r=-0.641$, $p<0.01$) and Trait Anxiety ($r=-0.689$, $p<0.01$). Responsibility subscale was statistically significantly and negatively correlated with BDI ($r=-0.620$, $p<0.01$), BAI ($r=-0.653$, $p<0.01$), GAD-7 ($r=-0.597$, $p<0.01$), State Anxiety ($r=-0.593$, $p<0.01$) and Trait Anxiety ($r=-0.608$, $p<0.01$). Purposefulness subscale of Self-Directedness was statistically significantly and negatively correlated with BDI ($r=-0.511$, $p<0.01$), BAI ($r=-0.520$, $p<0.01$), GAD-7 ($r=-0.475$, $p<0.01$), State Anxiety ($r=-0.418$, $p<0.01$) and Trait Anxiety ($r=-0.537$, $p<0.01$). Resourcefulness subscale was statistically significantly and negatively correlated with BDI ($r=-0.669$, $p<0.01$), BAI ($r=-0.712$, $p<0.01$), GAD-7 ($r=-0.689$, $p<0.01$), State Anxiety ($r=-0.728$, $p<0.01$) and Trait Anxiety ($r=-0.692$, $p<0.01$). Congruent Second Nature subscale of Self-Directedness was statistically significantly and negatively correlated with BDI ($r=-0.669$, $p<0.01$), BAI ($r=-0.712$, $p<0.01$), GAD-7 ($r=-0.689$, $p<0.01$), State Anxiety ($r=-0.728$, $p<0.01$) and Trait Anxiety ($r=-0.692$, $p<0.01$). The results of Pearson's correlation between TCI scales and subscales and BDI, BAI, GAD-7, STAI-I / STAI-II scores are presented in Table 3.

The Predictors of GAD-7 Scores

The hypothesized relationship between GAD-7 scores and TCI scales were tested in two separate hierarchical multiple regression. The demographic variables (age, gender) were entered in the first step of the hierarchical multiple regression. TCI scales were entered in the second steps of

Table 3: Correlations between TCI and Other Scale Scores

	BDI	BAI	GAD-7	STAI-I	STAI-II
HARM AVOIDANCE	0.808**	0.851**	0.861**	0.843**	0.879**
Anticipatory Worry	0.807**	0.800**	0.791**	0.785**	0.831**
Fear of Uncertainty	0.606**	0.669**	0.719**	0.688**	0.713**
Shyness	0.722**	0.752**	0.783**	0.789**	0.776**
Fatigability	0.694**	0.779**	0.756**	0.713**	0.781**
SELF-DIRECTEDNESS	-0.665**	-0.726**	-0.668**	-0.641**	-0.689**
Responsibility	-0.620**	-0.653**	-0.597**	-0.593**	-0.608**
Purposefulness	-0.511**	-0.520**	-0.475**	-0.418**	-0.537**
Resourcefulness	-0.669**	-0.712**	-0.689**	-0.728**	-0.692**
Congruent Second Nature	-0.588**	-0.532**	-0.506**	-0.445**	-0.494**

**Correlation is significant at the 0.01 level (2-tailed).

Table 4: The results of the Hierarchical Multiple Regression

Model 1	B	SE	β
(Constant)	10.071	4.311	
Age	0.055	0.087	0.071
Gender	-2.831	1.790	-0.178
Model 2			
(Constant)	-2.021	6.476	
Age	-0.026	0.046	-0.033
Gender	1.122	0.942	0.070
NOVELTY SEEKING	-0.135	0.106	-0.078
HARM AVOIDANCE	0.613	0.078	0.739**
REWARD DEPENDENCE	-0.086	0.148	-0.035
PERSISTENCE	-0.728	0.302	-0.167*
SELF-DIRECTEDNESS	-0.133	0.090	-0.127
COOPERATIVENESS	0.152	0.108	0.087
SELF-TRANSCENDENCE	0.201	0.094	0.130*
R ²		0.796	
F		16.16**	

* $p < 0.01$, ** $p < 0.05$, Dependent variable: Generalized Anxiety Disorder Scale (GAD-7)

the hierarchical regression analyses. The results indicated that Harm Avoidance, Persistence, and Self-Transcendence were significantly predictive of GAD-7 scores ($R^2=0.796$, $F(2,77)=30.292$, $p=0.000$). The results of the hierarchical multiple regression analysis are presented in Table 4.

Moreover, the relationship between GAD-7 and TCI subscales were also tested, and the demographic variables (age, gender) were entered in the first step, and TCI subscales were entered in the second step of the hierarchical regression analyses. The results indicated that just shyness subscale of Harm Avoidance was significantly predictive of GAD-7 scores.

DISCUSSION

The principal findings of the present study were that GAD patients exhibit higher HA and lower RD and SD scores compared to healthy controls. These results were consistent with a number of previous reports linking high HA (8-11), low SD (9,12,13) and low RD (9,11) with GAD. However, the relationship between personality and GAD seems to be more complex. Personality features may not only predispose an individual to the onset of anxiety, but may also affect the expression of anxiety, or a separate process is responsible for both personality factors and anxiety.

The risk of comorbidity with another psychiatric disorder in GAD patients is estimated to be between 78% and 90.4% (23,24). In a similar study conducted in the USA,

it has been reported that 66% of the GAD patients have another concurrent psychiatric disorder such as major depressive disorder, dysthymic disorder, alcohol use disorder, simple phobia, and panic disorder (23). A study conducted in Turkey has shown that major depression comorbidity rate in GAD patients was 83.7%. In this present study, this rate was found to be 85% which is consistent with the literature.

Cloninger et al. reported that the three personality traits of Harm Avoidance, Self-Directedness, and Persistence accounted for 23% of the variability in lifetime risk for mood and anxiety disorders (25). In the present study, the HA dimension with all the subscales found statistically and significantly high compared to control group. In many studies the correlation between HA and anxiety disorders was shown and also the higher scores of HA has been found to be related to the severity of the disorder (25-27). In previous studies, anxiety disorder patients have been considered as individuals with a temperament profiles with high HA, pessimism, shyness, and fearfulness. Even though this situation can be considered as an inherited pattern in behavior, high levels of HA is not a pre-condition in diagnosis, since it is also seen in major depressive disorder (25). However, in this present study, when we analyze the GAD patients' BDI scores whether they meet comorbid depression criteria (based on Hisli's BDI score of 17 and above, which predicted depression in a Turkish university student sample), we only had 6 patients who also had comorbid depression and when we compare HA scores in GAD patients compared to the GAD comorbid with depression group, no significant differences were found. The result is not consistent with the previous reports (25-27), most probably due to small sample size in GAD comorbid depression group.

In addition to anxiety disorders, high levels of harm avoidance behavior might be observed in adjustment disorders. We already know that the serotonergic mechanism of action which is important in pathophysiology of the disorder is also related to harm avoidance. It is also known that following pharmacotherapy of general anxiety disorder and depressed patients with serotonergic agents, a considerable decrease of HA scores in patients have been documented. Abrams et al. reported that depressed subjects, both before and after treatment, had significantly higher HA scores compared to healthy controls and suggested that HA was trait-dependent in depression, and

could be considered as a personality risk factor for depression, which might also be valid for GAD patients (28).

In terms of Novelty Seeking; Exploratory Excitability subscale was statistically significantly lower and impulsiveness subscale was statistically significantly higher compared to the controls. This findings were in line with previous studies. Piero et al. have suggested that higher NS scores especially together with lower SD and RD scores, might be associated with impulsiveness and might highlight the relationship between impulsiveness and anxiety (9). In terms of Reward Dependence scores; we found considerably low RD scores compared to the control group. This result is consistent with several previous studies (9,11,12). Also, there are some studies showing higher RD scores (29) or similar scores (30) in anxiety disorders patients compared to the controls. Although no significant differences were found for Sentimentality and Dependence scores, Attachment, and total Reward Dependence scores were significantly lower compared to controls. Persistence scores were also significantly lower compared to the controls. Cloninger's view is that individuals with lower RD are having difficulties such as social withdrawal, separation and coldness in social interactions. Individuals with low Persistence are lazy, motionless, undecided and untidy; they rarely work for success and can quit very easily. In previous studies Persistence used to be seen as a hereditary disposition of the continuity of act even suppressed, related to diligence, determination and has no relation with anxiety.

In terms of character dimensions; it was reported that GAD patients had lower Self-directedness scores in previous studies (12,13). Due to fact that there was a positive correlation between age and Self-Directedness and Cooperativeness, we might conclude that character dimensions evolve with age. No significant differences were found in the Self Acceptance subscale scores, but the Responsibility, Purposefulness, Resourcefulness, Congruent Second Nature subscales, and total Self-Directedness scores were significantly lower in GAD patients compared to the controls. These results were consistent with the literature (12,13,26,31).

In previous studies, neuroticism was mentioned as a pre-morbid personality trait, high HA and low SD were mentioned as risk factors for depressive episodes and HA might have been as a sub-dimension of temperament

starting from the early stage interacting and affecting the evolution of SD in a negative manner (32).

Some studies have shown minor negative correlations between Cooperativeness and anxiety (3,33). In our study, there were no significant differences between total Cooperativeness, Empathy, Helpfulness, Compassion, Pure-Heartedness subscale scores. Only Social Acceptance subscale scores were significantly lower than the control group. Individuals with low Social Acceptance scores are impatient and they have a tendency to criticize other people with different lifestyles and values.

In this present study, we found statistically significant and strong positive correlations between Harm Avoidance scale and all subscales with BDI, BAI, GAD-7, and State Anxiety and Trait Anxiety scores. This is consistent with the current data and we might speculate that high levels of harm avoidance might be a core feature of both anxiety and depression. Similarly, individuals with poor emotional regulation skills could be impaired at more moderate levels of harm avoidance. Replication of these results using large sample size and other clinical patient groups would be critical to assess the generality of these findings.

On the other hand, Self-Directedness scale (including all of its subscales except for Self-acceptance) were statistically significantly and negatively correlated with BDI, BAI, STAI-I / STAI-II, and GAD-7 scores. This finding was consistent with previous reports that Self-Directedness was inversely correlated to anxiety (5,25). Individuals who are low in SD feel that their attitudes, behavior, and choices are determined by influences outside their control or against their will and so can be anxious about each event.

The hypothesized relationship between GAD-7 scores and TCI scales were tested in hierarchical multiple regression. When demographic variables such as age and gender were controlled Harm Avoidance, Persistence, and Self-Transcendence and only shyness subscale of Harm Avoidance were significantly predictive of GAD-7 scores. Our findings support the notion that TCI can be instrumental in both clinical and research purposes while evaluating GAD patients and can be a predictor of the anxiety disorders and its symptoms.

The present study has certain limitations. First, temperament and character traits can also be affected by personality disorders. We did not exclude patients who had comorbid personality disorders. Second, it should be noted that the study was carried out with a relatively small sample

due to our hospital's outpatient clinics inherent limitations. Therefore, the conclusions should not be considered definitive and further studies should be conducted in larger patient samples. Despite these limitations, our findings, especially predictive value of temperament and character dimensions for generalized anxiety disorder would help shape future discussions concerning the degree to which

temperamental traits are necessary or sufficient conditions for anxiety disorder psychopathology.

In conclusion, our data suggest that enhanced understanding of temperament–psychopathology relations will have important implications for both assessment and prevention of significant psychiatric symptoms in patients with generalized anxiety disorder.

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