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Alexithymia and personality in relation to social anxiety among university students

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ABSTRACT

The aims of the present study were to investigate the relationship of social anxiety symptoms with alexithymia and personality dimensions in university students and to control the effects of depression and anxiety on this relationship. A total of 319 university students (85 males and 234 females) from two different universities in Ankara were investigated with the Liebowitz Social Anxiety Scale (LSAS), the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), the Toronto Alexithymia Scale (TAS-20) and the Temperament and Character Inventory (TCI). We found that subscales of the LSAS (fear or anxiety and avoidance) were positively correlated with depression and alexithymia and “difficulty in identifying feelings” (DIF) and “difficulty in describing feelings” (DDF) subscales of the TAS-20. Harm avoidance (HA) showed positive correlations with subscales of the LSAS, whereas self-directedness (SD) showed negative correlations with these subscales. High TAS-20 DDF and HA and low SD predicted fear or anxiety LSAS subscale scores, whereas high TAS-20 DDF, HA and depression scores were predictors for LSAS avoidance subscale scores. Although our sample is not representative of the whole Turkish university student population, we conclude that both fear or anxiety and avoidance were mainly interrelated with DDF and HA, although the causal relationship is not clear.

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1. Introduction

Social anxiety is characterized by the fear of negative evaluation by others. If it is severe enough to cause significant distress or functional impairment, then a clinical diagnosis as social anxiety disorder (SAD; social phobia) is appropriate. SAD is defined as excessive fear in social situations in which one believes that she/he will do something embarrassing or have anxiety symptoms (e.g., blushing or sweating) that will be humiliating (DSM-IV-TR; American Psychiatric Association, 1994). Social anxiety is a prevalent condition, can be disabling and usually runs a chronic course (Bruce et al., 2005). Several studies on SAD report high comorbidity of anxiety disorders, depression, alcohol dependence and personality disorders, particularly avoidant personality disorder (APD) (Gokalp et al., 2001; Lydiard, 2001).

Social anxiety that is severe enough to diagnose as SAD was suggested to be the most common disorder for school refusal in adolescence (Heyne et al., 2011). The severity of social anxiety, at least for the avoidance component, may be rather less for those who continue on with their education, and also little is known about people with social anxiety who are not behaviorally inhibited. Thus, it is important to evaluate determinants of social anxiety in university students. The studies conducted among college students in Turkey reported that the prevalence of SAD is between 9.8% and 22.0% (Kirpinar et al., 1997; Izcic et al., 2000; Dilbaz, 2002; Gultekin and Dereboy, 2011). SAD was found in 12.3% of the student sample in the Middle East, according to the Liebowitz Social Anxiety Scale (LSAS) cutoff score of more than 60 (Iancu et al., 2011). Nevertheless, social anxiety symptoms may be inhibiting and burdensome for university students; i.e. among Turkish university students with SAD, lifetime suicidal ideation was more prevalent and they had lower quality of life (Gultekin and Dereboy, 2011).

The Temperament and Character Inventory (TCI) is constructed to assess the normal and abnormal variations in seven basic dimensions of personality (Cloninger et al., 1993). The four temperament dimensions are assumed to be highly heritable and underlined

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by specific neurotransmission systems (Gourion et al., 2003). Three character dimensions may also be determined by genetic and biological factors, but since they are also more prone to environmental factors than temperament, they may be less stable over time (Basiaux et al., 2001). According to Cloninger and Svrakic (1997), the presence and severity of personality disorders can reliably be assessed by the interview or questionnaire versions of the TCI. Consistent findings of the previous studies using the TCI and the Tridimensional Personality Questionnaire (TPQ), which is a previous version of the TCI, indicate that patients with SAD have significantly elevated levels of harm avoidance (HA) (Kim and Hoover, 1996; Chatterjee et al., 1997; Pelissolo et al., 2002; Marteinsdottir et al., 2003; Hofmann and Loh, 2006; Evren et al., 2008), decreased levels of self-directedness (SD) and cooperativeness (C) (Kim and Hoover, 1996; Chatterjee et al., 1997; Pelissolo et al., 2002; Evren et al., 2008) and decreased levels of persistence (P) and self-transcendence (ST) (Marteinsdottir et al., 2003), compared to controls.

Alexithymia is characterized by the inability to identify and describe feelings and by externally oriented thinking (Bagby et al., 1994a, 1994b). The rate of alexithymia was 58% (Solmaz et al., 2000) among Turkish patients with SAD, whereas this rate was 28.3% (Cox et al., 1995) and 58% (Fukunishi et al., 1997) in previous studies. Fukunishi et al. (1997) found that scores on the alexithymia constructs of “difficulty identifying feelings” (DIF) and “difficulty describing feelings” (DDF) significantly decreased after the treatment of patients with SAD. In this study, authors suggested that secondary alexithymia related to anxiety exists as a state reaction in patients with SAD. In contrast, alexithymia was a prevalent personality trait in Turkish patients with SAD, independent of depression and anxiety, suggesting that alexithymia could not be seen as a consequence of these conditions (Solmaz et al., 2000).

Since alexithymic personality features are only partially captured by Cloninger's psychobiological model (Grabe et al., 2001), it is important to evaluate the contribution of alexithymia, in combination with features captured by the TCI, to psychopathology in different populations such as depression (Conrad et al., 2009), post-traumatic stress disorder (Evren et al., 2010) and SAD (Evren et al., 2008). Recent findings suggest that anxiety and depression may mediate the relationship between alexithymia and the TCI (Lee et al., 2010). Also, anxiety and depression may be related to both alexithymia (Motan and Gencoz, 2007) and the TCI (Corruble et al., 2002). Thus, anxiety and depression are either potential confounding variables or potential moderating variables that must be taken into account when the relationship between alexithymia, temperament, character and social anxiety is examined.

Although the relationship between alexithymia and social anxiety symptoms was evaluated among Turkish university students in a previous study (Aslan et al., 1997), to our knowledge, this is the first study to investigate the relationship of social anxiety symptoms with alexithymia in combination with personality dimensions, and to control the effects of depression and anxiety on this relationship, also among a relatively large number of subjects. Initial evidence suggests that social anxiety may be related to different cultural norms across countries (Heinrichs et al., 2006). Thus, although instruments used in the present study are known to be culturally stable and Turkish versions are validated, alexithymia and personality dimensions that predict social anxiety symptoms may differ in different cultures.

2. Methods

2.1. Participants

The present study was conducted in two universities in Ankara between December 2011 and May 2012. The Ethical Committee of the Fatih University

Faculty of Medicine approved the present study. Student's written informed consent was obtained after the study protocol was thoroughly explained.

Five hundred university students were considered as candidates for the present study, as this was the approximate number given by directors of the two universities. Sixty-four of the students refused to participate in the present study. Eighty-two students who volunteered to participate withdrew because they thought that forms were too long. Thirty-five students were excluded because they failed to complete some parts of the scales or did not give the forms back. Thus, a total of 319 university students (85 males and 234 females) participated in the present study. All students were assessed by using a semi-structured socio-demographic form and scales. The questionnaires were completed by students in a classroom setting via paper-and-pencil format.

2.2. Measures

2.2.1. Liebowitz Social Anxiety Scale

The Liebowitz Social Anxiety Scale (LSAS) contains 24 situations, selected on the basis of clinical experience, which are rated by the assessor on separate 4-point scales for fear/anxiety and avoidance (Liebowitz, 1987). A self-rated Turkish version, which has been validated in the Turkish population, was used in the present study (Soykan et al., 2003). The scales range from no fear or anxiety (0) to severe fear or anxiety (3) and never avoids (0) to usually avoids (3). Students were asked to provide ratings based on this scale. Cronbach's alpha coefficient for fear or anxiety was 0.90, whereas it was 0.89 for avoidance. In research on the self-report version of the LSAS, cutoffs of 30 and 60 on the scale provided the best balance of sensitivity and specificity for classifying participants with social anxiety and generalized SAD, respectively (Rytwinski et al., 2009).

2.2.2. Beck Depression and Beck Anxiety Inventories

Symptoms and severity of depression were evaluated by using the Beck Depression Inventory (BDI) (Beck et al., 1961), Turkish version (Hisli, 1989), and symptoms and severity of anxiety were evaluated by the Beck Anxiety Inventory (BAI) (Beck et al., 1988), Turkish version (Ulusoy et al., 1998). Both scales have been validated on Turkish populations. Cronbach's alphas were 0.89 for the BDI and 0.90 for the BAI in the present study.

2.2.3. Toronto Alexithymia Scale

The prevalence of alexithymia was screened using the 20-item version of the Toronto Alexithymia Scale (TAS-20) (Bagby et al., 1994a, 1994b), Turkish version (Gulec et al., 2009). The Turkish version of the TAS-20 has been validated on Turkish populations. Each TAS-20 item was rated on a five-point (1–5) Likert Scale, with total scores ranging from 20 to 100. The three dimensions of the TAS-20 are as follows: (1) difficulty in identifying feelings (DIF); (2) difficulty in describing feelings (DDF); and (3) externally oriented thinking (EOT). The total scores of the TAS-20 were categorized according to the recommendations of Gulec et al. (2009); thus a score ≥ 61 indicated alexithymia and < 61 no alexithymia. The Cronbach alpha for the total TAS-20 scale was 0.77, and those for the three subscales (factors DIF, DDF, and EOT) were 0.80, 0.57, and 0.63, respectively.

2.2.4. Temperament and Character Inventory

To evaluate temperament and character traits, the TCI (Cloninger et al., 1993), Turkish version (Kose et al., 2004) in the form of a 240-item, forced-choice, self-report scale, was used. Dimensions of temperament were (1) harm avoidance (HA); (2) novelty seeking (NS); (3) reward dependence (RD), and (4) persistence (P). Dimensions of character were (1) self-directedness (SD); (2) cooperativeness (C), and (3) self-transcendence (ST). The reliability and validity of the Turkish version of the TCI were supported by its psychometric properties and construct validity (Kose et al., 2004). Cronbach's alpha coefficients ranged between 0.60 and 0.85 for temperament dimensions and ranged between 0.82 and 0.83 for character dimensions.

2.3. Statistical methods

The Statistical Package for the Social Sciences (SPSS) 17.0 for Windows was used for all the analyses. Frequency and percentages were used for sociodemographic variables. Categorical variables were compared by means of the χ^2 statistics. Student *t* test was used to compare the groups on continuously distributed variables. Correlation analyses (Pearson, bivariate) between LSAS scores and other scale scores were performed. Predictors of fear or anxiety and avoidance subscale scores of the LSAS were evaluated using two hierarchical linear regression analyses. In the hierarchical linear regression models for fear or anxiety and avoidance, depression and anxiety scores were entered as independent variables in the first step (Enter), whereas in the second step the TCI dimensions (Stepwise), and in the third step (Enter) DIF and DDF of the TAS-20 were entered as independent variables. For all statistical analyses, the level of significance was set at $p=0.05$.

3. Results

The mean age of the participants was 21.29 (S.D.=1.83, range=17–27). The mean score of the fear or anxiety subscale of the LSAS was 23.54 (S.D.=12.48, range=0–67), whereas the mean score of the avoidance subscale of the LSAS was 20.20 (S.D.=11.41, range=0–60). Mean scores on the fear or anxiety subscale (22.34 ± 13.29 for males and 23.97 ± 12.17 for females) and the avoidance subscale (19.49 ± 11.08 for males and 20.46 ± 11.54 for females) did not differ between males ($n=85$) and females ($n=234$) ($t=-1.03$, $p=0.30$ and $t=-0.67$, $p=0.50$ respectively). Also, mean scores of alexithymia did not differ between males and females. Among personality dimensions HA, RD and C scores were higher in the female group than in the male group. NS, P, S.D. and ST scores did not show any significant differences between groups (a comparison of the scale scores between males and females may be found in the Supplementary Materials).

Sixty-two (19.4%) students were considered as having SAD, whereas 257 (80.6%) did not, according to the LSAS cutoff score of more than 60 (Rytwinski et al., 2009). The mean scores of the DIF (16.94 ± 5.07), DDF (14.52 ± 4.00) and total TAS-20 score (52.82 ± 10.07) were higher in those with SAD, whereas the mean score of the EOT (21.37 ± 4.06) did not differ between groups (14.29 ± 4.74 , 12.21 ± 3.74 , 47.25 ± 9.01 and 20.75 ± 3.49 respectively) ($t=-3.89$, $p<0.001$; $t=-4.30$, $p<0.001$; $t=-4.27$, $p<0.001$; and $t=-1.22$, $p=0.23$ respectively). Among personality dimensions, the HA score was higher, whereas the SD score was lower in the group with SAD than in the group without SAD. NS, RD, P, C and ST scores did not show any significant differences between groups (Table 1).

Two linear regression (Enter) models were conducted in which the LSAS Fear or Anxiety and Avoidance scores were taken as the dependent variable and dimensions of the TCI were taken as independent variables. Among seven personality dimensions HA, P and SD predicted fear/anxiety, whereas HA and SD predicted avoidance (linear regression analyses may be found in the Supplementary Materials).

Thirty-eight (11.9%) students had alexithymia and 281 (88.1%) students had no alexithymia according to the cut-off point suggested by Gulec et al. (2009) previously. The mean score of the fear or anxiety subscale (32.37 ± 12.43) and the mean score of the avoidance subscale (28.68 ± 12.31) were higher in alexithymic university students than non-alexithymic university students (22.35 ± 12.02 and 19.06 ± 10.80 respectively) ($t=-4.81$, $p<0.001$; and $t=-5.07$, $p<0.001$ respectively) (not shown).

Table 1

A comparison of the scale scores between the group with social anxiety disorder and the group without social anxiety disorder.

Scale scores	The group without SAD ($n=257$)		The group with SAD ($n=62$)		<i>t</i>	<i>p</i>
	Mean	S.D.	Mean	S.D.		
DIF	14.29	4.74	16.94	5.07	-3.89	<0.001
DDF	12.21	3.74	14.52	4.00	-4.30	<0.001
EOT	20.75	3.49	21.37	4.06	-1.22	0.23
TAS-20	47.25	9.01	52.82	10.07	-4.27	<0.001
Novelty seeking	19.44	4.65	18.77	5.77	0.96	0.34
Harm avoidance	16.76	5.11	19.76	5.90	-3.69	<0.001
Reward dependency	13.54	3.21	13.61	3.16	-0.16	0.87
Persistence	4.54	2.01	4.39	1.68	0.64	0.53
Self-directedness	27.72	6.60	24.57	5.99	3.44	0.001
Cooperativeness	27.86	6.43	26.58	5.82	1.43	0.15
Self-transcendence	19.79	5.31	19.89	5.46	-0.13	0.89

SAD: Social anxiety disorder.

Table 2

Correlations between subscales of Liebowitz Social Anxiety Scale and other scales.

Liebowitz Social Anxiety Scale	Fear or anxiety		Avoidance	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Beck Anxiety Inventory	0.20	<0.001	0.22	<0.001
Beck Depression Inventory	0.29*	<0.001	0.34*	<0.001
Toronto Alexithymia Scale (TAS-20)	0.34*	<0.001	0.39*	<0.001
Difficulty in identifying feelings	0.30*	<0.001	0.33*	<0.001
Difficulty in describing feelings	0.34*	<0.001	0.41*	<0.001
Externally oriented thinking	0.12	0.033	0.11	0.048
Temperament				
Novelty seeking (NS)	-0.07	0.193	-0.11	0.057
Harm avoidance (HA)	0.35*	<0.001	0.44*	<0.001
Reward dependency (RD)	0.10	0.067	0.01	0.796
Persistence (P)	-0.14	0.014	-0.10	0.076
Character				
Self-directedness (SD)	-0.33*	<0.001	-0.28*	<0.001
Cooperativeness (C)	-0.10	0.080	-0.06	0.821
Self-transcendence (ST)	0.12	0.039	0.09	0.113

* Correlation coefficients equal to or above 0.25.

Among those with SAD, 15 (24.2%) were alexithymic, as compared with 23 (8.9%) among those without SAD ($\chi^2=11.06$, d.f.=1, $p=0.001$). Alexithymia was 3.25 times higher in those with SAD (95% C.I.=1.58–6.68). Presence of alexithymia and SAD did not differ between genders (not shown).

Correlations between dimensions of TCI, BDI, BAI, and TAS-20 were evaluated. HA was positively correlated with alexithymia ($r=0.29$), anxiety ($r=0.28$) and depression ($r=0.27$), whereas SD was negatively correlated with alexithymia ($r=-0.44$), anxiety ($r=-0.34$) and depression ($r=-0.38$). Also alexithymia was positively correlated with anxiety ($r=0.32$) and depression ($r=0.50$) (Correlations between dimensions of TCI, BDI, BAI, and TAS-20 may be found in the Supplementary Materials.) Correlations between subscales of the LSAS and other scales were also evaluated. Subscales of the LSAS were correlated with the BDI, TAS-20 and DIF and DDF subscales of the TAS-20. Among dimensions of the TCI, HA showed a positive correlation with LSAS subscales, self-directedness (SD) showed a negative correlation with these subscales (Table 2).

In the hierarchical linear regression models for fear or anxiety and avoidance, depression and anxiety scores were entered as independent variables in the first step, whereas in the second step the TCI dimensions, and in the third step DIF and DDF of the TAS-20 were entered as independent variables. In the first step of both models, depression was the only predictor. In the second step, additional to depression, high HA predicted both fear or anxiety and avoidance, whereas low SD only predicted fear or anxiety. In the final third step the results identified that the DDF factor of the TAS-20, HA and SD subscales were the determinants for the fear or anxiety subscale of the LSAS, whereas DDF, HA and depression were the determinants for the avoidance subscale of the LSAS (Table 3).

4. Discussion

The rate of SAD among college students (19.4%) (Kirpinar et al., 1997; Izgic et al., 2000; Dilbaz, 2002; Gultekin and Dereboy, 2011; Iancu et al., 2011) and the rate of alexithymia among those with SAD (24.2%) (Cox et al., 1995; Fukunishi et al., 1997; Solmaz et al., 2000) found in the present study were consistent with the previous studies. The prevalence of SAD is quite different depending on the measure that is used. The LSAS typically provides much

Table 3
Hierarchical linear regression models when LSAS—fear or anxiety and avoidance scores are taken as dependent variable.

Model	Unstandardized coefficients		Standardized coefficients Beta	<i>t</i>	<i>p</i>
	B	Std error			
Fear or anxiety					
Step 1					
Constant	42.864	1.141		37.570	< 0.001
Anxiety	0.097	0.082	0.074	1.180	0.239
Depression	0.347	0.087	0.248	3.967	< 0.001
Step 2					
Constant	46.104	4.236		10.884	< 0.001
Anxiety	−0.022	0.079	−0.017	−0.279	0.780
Depression	0.202	0.086	0.144	2.358	0.019
Harm avoidance (HA)	0.594	0.126	0.257	4.731	< 0.001
Self-directedness (SD)	−0.393	0.107	−0.208	−3.671	< 0.001
Step 3					
Constant	38.859	4.944		7.860	< 0.001
Anxiety	−0.030	0.079	−0.023	−0.378	0.706
Depression	0.114	0.092	0.081	1.238	0.217
Harm avoidance (HA)	0.528	0.126	0.228	4.195	< 0.001
Self-directedness (SD)	−0.333	0.109	−0.176	−3.058	0.002
Difficulty in identifying feelings (DIF)	0.066	0.180	0.026	0.366	0.715
Difficulty in describing feelings (DDF)	0.534	0.214	0.166	2.498	0.013
Avoidance					
Step 1					
Constant	39.259	1.022		38.396	< 0.001
Anxiety	0.075	0.074	0.062	1.020	0.309
Depression	0.399	0.078	0.311	5.086	< 0.001
Step 2					
Constant	27.355	1.886		14.501	< 0.001
Anxiety	−0.012	0.069	−0.010	−0.179	0.858
Depression	0.315	0.074	0.246	4.281	< 0.001
Harm avoidance (HA)	0.795	0.109	0.376	7.296	< 0.001
Step 3					
Constant	20.746	2.376		8.730	< 0.001
Anxiety	−0.030	0.067	−0.025	−0.447	0.655
Depression	0.189	0.079	0.148	2.395	0.017
Harm avoidance (HA)	0.692	0.108	0.328	6.423	< 0.001
Difficulty in identifying feelings (DIF)	0.062	0.154	0.027	0.400	0.690
Difficulty in describing feelings (DDF)	0.709	0.185	0.242	3.834	< 0.001

Variables entered in first step (Enter): Beck Anxiety Inventory and Beck Depression Inventory; variables entered in second step (Stepwise): dimensions of TCI; variables entered in third step (Enter): DIF and DDF subscales of TAS-20.

Fear or anxiety: Step 1: $F=14.72$, $d.f.=2, 316$, $p < 0.001$, adjusted $R^2=0.079$; Step 2: $F=19.32$, $d.f.=4, 314$, $p < 0.001$, adjusted $R^2=0.187$, R^2 change=0.112; Step 3: $F=14.83$, $d.f.=6, 312$, $p < 0.001$, adjusted $R^2=0.207$, R^2 change=0.024

Avoidance: Step 1: $F=21.64$, $d.f.=2, 316$, $p < 0.001$, adjusted $R^2=0.115$; Step 2: $F=34.55$, $d.f.=3, 315$, $p < 0.001$, adjusted $R^2=0.240$, R^2 change=0.127; Step 3: $F=26.62$, $d.f.=5, 313$, $p < 0.001$, adjusted $R^2=0.287$, R^2 change=0.051.

higher rates (14.6%) compared with diagnosis rates of clinicians in clinical settings (5.5%) (Wiltink et al., 2010). The main finding in the present study was that the fear or anxiety and avoidance dimensions of social anxiety symptoms were interrelated with DDF and HA. Lower SD was another factor that predicted fear or anxiety, whereas depression was related to the avoidance dimension. As this was a cross-sectional study conducted on a female-dominant sample, gender-specific aspects and stability of these findings in longitudinal course need further inquiry.

Men with high alexithymia scores suggested reduced ability in verbal emotional expression, were more frequently unmarried and had low levels of social contacts and acquaintances, suggesting that alexithymia could be viewed not only as a psychological phenomenon, but also partly as a socially determined one (Kauhanen et al., 1993; Evren et al., 2008). Consistent with this, alexithymic students had higher social anxiety scores in the present study. Nicolo et al. (2011) suggested that a subsample of patients, mostly suffering from avoidant personality disorder (APD), had alexithymic features, particularly DDF. Further analyzing the data, they (Nicolo et al., 2012) also suggested that in contrast with other personality disorders that were related to alexithymia, APD was still correlated with alexithymia after the presence of co-existing depression had been controlled. As APD is known to overlap particularly with generalized type SAD, high rates

of alexithymia can be expected among generalized type SAD (Solmaz et al., 2000). Among Turkish university students, levels of social anxiety symptoms showed a positive relationship with alexithymia, and this association could be due to the high anxiety level and physiological symptoms caused by social anxiety. As the socially anxious person attempts to avoid experiencing these sensations, he may try to suppress emotional experiences in general (Aslan et al., 1997). Alexithymia can be considered as a defense mechanism that patients with social anxiety develop against anxiety, in order to keep anxiety at a level that will not cause disability (Solmaz et al., 2000). Also, since social anxiety symptoms start as early as childhood, it may interfere with social interaction, as avoidance may cause alexithymic characteristics (Kauhanen et al., 1993; Solmaz et al., 2000). Consistent with these speculations, alexithymia was related to social anxiety features among adults with attention-deficit hyperactivity disorder (Edel et al., 2010) and alcohol dependent inpatients (Evren et al., 2008). Supporting these findings, scores on the alexithymia constructs of DIF and DDF significantly decreased after the treatment of patients with SAD in a previous study (Fukunishi et al., 1997).

In a previous study socially anxious undergraduates reported greater use of emotional suppression compared to their non-socially anxious peers. Believing that emotional expression is a sign of weakness and must be kept in control partially mediated the

association between social anxiety and emotional suppression (Spokas et al., 2009). Initial evidence suggests that social anxiety may be related to different cultural norms across countries (Heinrichs et al., 2006). Thus alexithymia may be a way of coping with social anxiety in a non-Western society with a different culture and religion where articulation of feelings is still not highly valued (Sayar et al., 2003). Consistent with this, previous research with clinical and nonclinical populations suggests a strong association between alexithymia and immature or maladaptive defense styles (Parker et al., 1998; Helmes et al., 2008; Evren et al., 2012), including findings in university students (Besharat and Shahidi, 2011). Nevertheless, the main finding in the present study, that is, the relationship between dimensions of social anxiety (fear or anxiety and avoidance) and DDF, may also be an artifact of conceptual and psychometric overlap with cognitive aspects of social anxiety (Cox et al., 1995). Avoidance of communicating with others may be falsely considered as DDF by persons with social anxiety. Also, anxiety or secondary depression, which may be caused by social anxiety, may further elevate alexithymic features as a state reaction in patients with social anxiety (Fukunishi et al., 1997). Nevertheless, the case can be vice versa. Individuals who present a substantial amount of alexithymic features in their adolescence often have difficulties in socializing and thus feel uncomfortable in social situations, which may further predispose them to social anxiety.

Findings of the present study were consistent with previous studies concerning SAD, which found significantly elevated levels of HA (Kim and Hoover, 1996; Chatterjee et al., 1997; Pelissolo et al., 2002; Marteinsdottir et al., 2003; Hofmann and Loh, 2006; Evren et al., 2008), and decreased levels of SD (Chatterjee et al., 1997; Pelissolo et al., 2002; Marteinsdottir et al., 2003; Evren et al., 2008). High levels of HA define individuals who tend to be “cautious, careful, fearful, tense, apprehensive, nervous, timid, doubtful, discouraged, insecure, passive, negativistic, or pessimistic even in situations that do not worry other people” (Kose, 2003). A low level of SD is correlated with personality disorders in general (Svrakic et al., 1993). Personality disorders, particularly APD, are common in patients with SAD (Dyck et al., 2001). Presence of APD in the social anxiety disordered subjects was associated with significantly higher HA, particularly on “the shyness with strangers” subscale (Marteinsdottir et al., 2003). In a previous study conducted among alcohol-dependent inpatients, LSAS subscales showed a positive correlation with HA and a negative correlation with SD, which suggests that APD might well be represented in this population (Evren et al., 2008). Results of the present study, which was conducted within a nonclinical sample of university students, are similar to those of the previous study, at least for the fear or anxiety dimension. Nevertheless, Marteinsdottir et al. (2003) suggested that the observed deviations in TCI dimensions in their study were primarily related to the SAD itself and not to the presence of concurrent personality disorders. Also, as depression (Corruble et al., 2002) or social anxiety (Mörtberg et al., 2007) improves, HA seems to decrease and SD and C seem to increase.

Pelissolo et al. (2002) suggested that higher HA and lower SD scores in patients with social anxiety were independent of their depressive symptomatology, which was supported in alcohol-dependent inpatients (Evren et al., 2008). A similar result was found in the present study for fear or anxiety, whereas depression was interrelated with avoidance instead of low SD, but the levels of both SD and depression were rather low in these models. Studies also showed that after treatment a reduced level of social anxiety symptoms was correlated with a decrease in HA (Hofmann and Loh, 2006; Mörtberg et al., 2007) and an increase in SD (Mörtberg et al., 2007), implying state-dependent changes following treatments. Mörtberg et al. (2007) suggested that patients with SAD show a temperamental vulnerability for developing anxiety and character traits associated with personality disorders. In this study, authors suggested that high HA at baseline might suggest a need for extensive treatment in order to

achieve remission in SAD since it was related to poor treatment outcome in all types of treatments. Overall, elevated HA is not specific to SAD and can be present in other anxiety disorders (Mörtberg et al., 2007) and in depressive states (Kose, 2003). Among patients with SAD, greater fear of negative evaluation and higher scores on HA were associated with greater anxiety at the 6-month follow-up, and HA remained a significant predictor at 24 months (Faytout et al., 2007).

The main limitations of the present study were that students included in the study were from two rather conservative universities in Ankara. Therefore, it is not possible to generalize the findings to students in other universities in Turkey. Also, the predominance of female students may have led to a bias in the present study. The number of male students who dropped out of the present study was higher. Female students may have participated in the survey more willingly and completed the questionnaires more carefully, as suggested in previous studies (Petrie and Gunn, 1998; Ozcan and Sevim, 2005). Females may patients may have a different profile in terms of temperament and character (Miettunen et al., 2007), alexithymia (Mason et al., 2005), and social anxiety (Ozdemir et al., 2005). Relationships between these profiles may also differ according to the gender. Nevertheless, the severity and presence of SAD and alexithymia did not differ between female and male groups. The assessment of SAD was based on a self-report instrument, the LSAS, as opposed to a structured measure and cannot be generalized to patient groups with an actual diagnosis. Finally, the cross-sectional design of the present study does not allow the assessment of causality.

Although our sample is not representative of the whole Turkish student population, we conclude that both fear or anxiety and avoidance were interrelated with DDF and HA. Low SD seems to be related to fear or anxiety, whereas depression seems to be related to avoidance. Evaluation of university students for coexisting social anxiety features is important for improving performance in university and social life. Assertiveness training methods and/or psychodrama techniques, applied in individual or group psychotherapy, may be helpful in this particular group of students with restricted verbalization. Gender-specific aspects and the long-term stability of these relationships need further inquiry.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.psychres.2012.11.027>.

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