Reliability, validity, and factorial structure of the Turkish version of the Luebeck questionnaire for recording preoperational thinking (Turkish LQPT)

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ABSTRACT

OBJECTIVE: The objective of the current study is to establish the psychometric properties and factorial validity of the Turkish version of the Luebeck Questionnaire for Recording Preoperational Thinking (LQPT) in a Turkish sample.
METHODS: The study was conducted in Istanbul Metropolitan area and comprised of healthy controls ($n = 33$) and patients with psychiatric diagnoses ($n = 60$). Socio-demographic data of the participants were collected and the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), the Dysfunctional Attitude Scale (DAS-A), and the LQPT were administered.
RESULTS: The mean age of the study participants was $30.51 ± 8.75$; 64.5% ($n = 60$) of the participants were female; 35.5% ($n = 33$) were male. The LQPT scores were non-normally distributed. The Cronbach's alpha for the LQPT scale was found 0.887 and the split-half reliability coefficient was 0.902. The inter-item correlation was ranging from 0.189 to 0.705. A negative and statistically significant correlation was found between the Turkish LQPT and the DAS-A and its subscales. The principal-components analysis with Promax rotated solution yielded two factors which accounted for 46.43% of the total variance.
CONCLUSIONS: Our results suggested that Turkish LQPT was a valid and reliable instrument with a robust factorial structure for tapping the cognitive components associated with the development of depression in clinical psychiatric populations in Turkey.

Introduction

According to Beck's cognitive theory and perspective, cognitive processes are assumed to mediate emotional and behavioural responses and are considered crucial in the precipitation and maintenance of various maladaptive psychopathological states [1,2]. Beck suggested that individuals who were predisposed to depression had dysfunctional cognitive beliefs or maladaptive idiosyncratic schemas that, when triggered or activated under particular stressful life situations, would result in negative automatic thoughts and depressive symptoms. These negative maladaptive schemas lead individuals to view themselves, the world, and the future in a distorted way. Therefore, dysfunctional attitudes or schemas might be a vulnerability factor that predisposes individuals to developing and maintaining depression.

The Dysfunctional Attitude Scale (DAS) [3] was developed to identify underlying depressogenic beliefs that are thought to reflect the content of relatively stable cognitive schemas. Among the several assessment methods, the DAS has been evaluated as the best predictor of subsequent symptomatic depression [4,5]. The DAS has been used in many studies to measure depressogenic attitudes, vulnerability to depression and to assess the effectiveness of cognitive therapy.

A standardized instrument for recording the specific cognitive psychopathology in chronically depressed patients led to the idea of developing a scale which contributes on the one hand to diagnosing chronic depressive disorders by identifying the process and quality of preoperational thinking and which on the other hand facilitates therapeutic decisions. The Cognitive Behavioral Analysis System of Psychotherapy (CBASP), developed by James McCullough, is a psychotherapeutic method that is specifically tailored for chronic depressive disorders [6]. One important foundation for CBASP is Piaget's theory of cognitive development. Regarding chronically depressed patients, the second stage of Piaget's cognitive development theory is important. This stage, the so-called preoperational stage, which children experience between the ages of 2 and 6 years, is characterized by the following features: the elementary feelings are spontaneous and the behaviour is therefore impulsive. At this stage, the child can not yet think logically and there is a focusing on one or a few aspects. The child is egocentric, meaning he/she is unable to take the perspective of others [7].

McCullough determined from his observation of chronically depressed patients that such patients are somehow fixated in the preoperational stage. He put

forward the following hypothesis: depressed patients think in a prelogical manner, they draw conclusions directly from a prejudice without checking the prejudice itself or any alternative hypotheses. They allow no logical explanations and act entirely in an egocentric manner. As a result of this egocentric world perspective, they express themselves by talking in a monologue manner. This fixation in the preoperational stage becomes a problem if patients are later faced with adult tasks: chronic depressive patients do not adequately focus their interpersonal behaviour on any anticipated consequences [6]. The reason that chronically depressed patients are arrested in the preoperational phase is considered to be the result of a trauma during childhood or other unfavourable circumstances. This leads to arrested social-interpersonal development. This arrested development is seen particularly in patients with an early-onset of depression. In the case of a late-onset of chronic depression, it is assumed that emotional stress leads to a deterioration of the cognitive-emotional functioning and thus to a reversion to the preoperational stage [6]. Considering that cognitive therapy emphasizes the modification of dysfunctional beliefs and automatic thoughts to alleviate symptomatology and ameliorate maladaptive states such as depression, it seems of value to identify dysfunctional attitudes, beliefs, and automatic thoughts, and preoperational thinking of clinical psychiatry patients so that more effective treatment interventions can be formulated.

The assessment of preoperational thinking in adulthood also suffers from a lack of adequate instruments. In order to directly measure preoperational thinking in adults, Kuhnen et al. developed a questionnaire: the Luebeck Questionnaire for Recording Preoperational Thinking (LQPT) in a sample consisting of 30 episodically depressed, 30 chronically depressed and 30 healthy volunteers and concluded that the LQPT was a valid and reliable instrument to measure preoperational thinking in adulthood [8]. The objective of the current study was to establish the psychometric properties and factorial validity of the Turkish version of the LQPT in a Turkish clinical sample and obtain comparative data for future clinical and epidemiological studies in psychiatric patients in Turkey.

Methods

Participants

This present study was conducted with the participants (n = 93) who are living within Istanbul Metropolitan area and comprised healthy volunteers (n = 33) who has no psychiatric or neurological disorders and individuals with psychiatric diagnoses such as mood disorders, anxiety disorders, substance use disorders, and somatoform disorders (n = 60). The study participants were aged 18–55 years old, able to read and write Turkish, free of psychiatric disorders such as psychotic disorder, autism, mental retardation, substance abuse, neurological disorders such as cerebrovascular disorders, convulsions, meningitis, encephalitis; participants with any history of abnormal CT or MRI scans, or on psychotropic medications were also excluded. The study sample was further divided into participants with psychiatric diagnoses and healthy controls. Psychiatric diagnoses group participants (n = 60) comprised of 1 mood disorder, 17 anxiety disorder, 14 somatoform disorders, and 14 substance use disorder patients who were recruited from Marmara University Pendik Research and Training Hospital. The diagnoses of the patients were confirmed by board-certified psychiatrists who worked at the same hospital. The healthy control group comprised 33 individuals who had no history of psychiatric disorders. The current study was approved by the Ethics Committee of Hasan Kalyoncu University and all of the subjects gave written informed consent before participation.

Psychometric measurements

Socio-demographic data form

This form (prepared by the researchers) includes demographic variables, including gender, marital status, vocational status, alcohol use, substance use, psychiatric disorders, and medical illnesses.

Dysfunctional attitude scale – form A (DAS-A)

The Dysfunctional Attitude Scale – Form A (DAS-A) is a self-report scale designed to measure the presence and intensity of dysfunctional attitudes, intended to assess cognitive vulnerability to depression and specific distortions in thinking as discussed by Beck [1]. The DAS-A consists of 40 items and each item consists of a statement and a 7-point Likert scale (7 = totally agree; 1 = totally disagree). Ten items are reversely coded (2, 6, 12, 17, 24, 29, 30, 35, 37, and 40). The total score is the sum of the 40-items with a range of 40–280. The higher the score, the more dysfunctional attitudes an individual possesses [3]. Internal consistency, test–retest reliability, and average item-total correlations of the DAS-A were satisfactory in different samples [9,10]. Confirmatory factor analysis revealed a two-factor model, with scales corresponding to perfectionism and need for social approval, which provided a satisfactory fit to the data [11]. The goodness-of-fit was equivalent across sexes and age groups. Sahin and Sahin studied a group of Turkish university students and using a principal-components analysis and found a four-factor structure [12]. The factors were Performance Evaluation, Need for Approval, Autonomous Attitude, and Tentativeness, which accounted for a total of 59.3% of the total

variance. The scree test indicated that four factors would be appropriate for rotation. The varimax rotated factors were labelled as "performance evaluation" (items: 1, 3, 4, 5, 7 , 8, 9, 10, 11, 13, 14, 15, 16, 20, 26, 31, 33; 22 subscale mean $M = 47.55$; SD = 14.58; Cronbach's alpha = 0.81), "need for approval" (items: 19,21,22, 23, 27, 28, 32, 34, 38, 39, 40; subscale mean $M = 50.62$; SD = 10.53; Cronbach's alpha = 0.74), "autonomous attitude" (items: 2, 12, 17, 18, 24, 35; subscale mean $M = 20.21$, SD = 4.75; Cronbach's alpha = 0.26), and "tentativeness" (items 6, 29, 30, 36, 37; subscale mean $M = 15.63$; SD = 4.09; Cronbach's alpha = 0.10) [12].

Luebeck questionnaire for recording preoperational thinking

The LQPT is a standardized self-assessment instrument for recording the specific cognitive psychopathology of chronically depressed patients [8]. It contains 22 items where participants are confronted with difficult situations and are required to choose between two response options: one reflecting a high and the other a low level of preoperational thinking. The different characteristics of preoperational thinking (snapshot perspective, prelogical thinking, egocentrism, lack of perceived functionality, and lack of empathy) are covered by the test. A low total score indicates a high level of preoperational thinking. The LQPT has been shown to be a reliable (Cronbach's alpha = 0.901) and valid instrument [8]. In this present study, the LQPT has been translated into Turkish by one of the researchers, and back-translated into English by another researcher (SK) from the team who was blinded to the original items. After establishing semantic equivalence of the LQPT items, the content equivalence of all items was examined, and no items were excluded as being irrelevant to Turkish culture.

Statistical analysis

The data analysis was performed using SPSS for Windows Version 23.0 (SPSS Inc., Chicago, Illinois, U.S.A.). Cronbach's alpha coefficients were calculated for each item to identify the internal consistency of the Turkish LQPT. The reliability of the LQPT was measured using internal consistency (Cronbach's alpha) and Guttman split-half reliability. Test–retest reliability was not possible because the subjects were observed only once. Correlation analyses between the DAS-A and LQPT were performed using Spearman's correlation coefficients. Based on the theoretical structure, exploratory factorial analyses were performed. In order to assess construct validity, principal factor analyses with Promax rotations were used. Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy were also performed to test the

applicability of the principal-components analysis to the study. A p-value less than .05 was considered statistically significant.

Results

Socio-demographic characteristics of sample

The mean age of the study participants was 30.505 ± 8.753 years ($X \pm SD$); 64.5% ($n = 60$) of the participants were female; 35.5% ($n = 33$) were male. In the study, 44 participants were single (47.3%), 38 (40.9%) were married, 6 participants (6.5%) were divorced and 5 (5.4%) were living separately. In all, 12.9% of the sample graduated at least from elementary school, 35.5% ($n = 33$) from high school, 46.2% graduated from a university. In the sample, 33 (35.5%) participants had no psychiatric disorders, but 15 participants (16.1%) were suffering from mood disorder, 17 (18.3%) from anxiety disorder, 14 (15.1%) from somatoform disorder, and remaining 14 (15.1%) participants were suffering from substance use disorder. The socio-demographic characteristics of the participants are presented in Table 1.

Table 1. Demographic characteristics of the sample.

Age	$\tilde{x}$	SD
	30.505	8.753
	N	**%**
Gender		
Female	60	64.5
Male	33	35.5
Marital status		
Single	44	47.3
Married	38	40.9
Divorced	6	6.5
Living Separately	5	5.4
Marriage time		
Single	44	47.3
Less than 1 Year	7	7.5
1–5 Years	14	15.1
5–10 Years	8	8.6
11 or more	20	21.5
Education level		
Elementary school	12	12.9
High school	33	35.5
University	43	46.2
Other	5	5.4
Number of children		
No Child	57	61.3
1 Child	12	12.9
2 Children	16	17.2
3 Children	8	8.6
Living place		
Rural	2	2.2
Urban	91	97.8
Income level		
Absent	9	9.7
Below 500 TL	11	11.8
500–999 TL	15	16.1
1000–1999 TL	25	26.9
Above 2000	33	35.5
Diagnosis		
Absent	33	35.5
Mood disorder	15	16.1
Anxiety disorder	17	18.3
Somatoform disorder	14	15.1
Substance use disorder	14	15.1

Note: TL: Turkish currency.

Table 2. Gender differences in terms of LQPT and DAS-A and its subscales.

	Gender	N	Median (Min–Max)	U	Z	p
Performance evaluation	Male	33	47.0 (18–108)	879.0	−0.892	0.373
	Female	60	59.0 (18–109)			
Need for approval	Male	33	38.0 (18–62)	718.0	−2.186	0.029
	Female	60	47.5 (11–71)			
Autonomous attitude	Male	33	22.0 (12–35)	891.5	−0.793	0.428
	Female	60	24.0 (12–38)			
Tentativeness	Male	33	21.0 (11–27)	974.0	−0.129	0.897
	Female	60	20.0 (5–26)			
Total DAS-A	Male	33	39.0 (27–44)	810.0	−1.450	0.147
	Female	60	35.0 (27–44)			
Total LQPT	Male	33	17.0 (5–22)	810.0	−1.450	0.147
	Female	60	13.0 (5–22)			

Note: LQPT: Luebeck questionnaire for recording preoperational thinking, DAS-A: Dysfunctional Attitude Scale.

Comparison of the Turkish LQPT scales in terms of gender

A Mann–Whitney test indicated that Need for Approval subscales scores was significantly higher for female participants (Mdn = 38) than for male participants (Mdn = 47.5), ($U = 718.0$, $p = .029$, $r = 0.23$). However, no significant differences found between male and female participants in terms of Total LQPT, Total DAS, and other subscales of DAS ($p > .05$) (Table 2).

Correlations between the total LQPT, total DAS, DAS-A subscales, and age

The correlation coefficients between the Turkish LQPT and age were shown in Table 3. There were no statistically significant differences between age and Total LQPT, Total DAS-A subscales ($p > .05$).

Reliability analysis of the Turkish LQPT

The split-half reliability coefficient was 0.892. Cronbach's alpha coefficient as a measure of internal

Table 3. Reliability analysis of the Turkish LQPT.

	German sample n = 90	Turkish sample n = 93
Split-half reliability	0.885	0.892
Total scale internal consistency	0.901	0.887
LQPT1		0.878
LQPT2		0.875
LQPT3		0.886
LQPT4		0.889
LQPT5		0.878
LQPT6		0.877
LQPT7		0.876
LQPT8		0.886
LQPT9		0.885
LQPT10		0.881
LQPT11		0.883
LQPT12		0.880
LQPT13		0.879
LQPT14		0.890
LQPT15		0.886
LQPT16		0.888
LQPT17		0.877
LQPT18		0.886
LQPT19		0.888
LQPT20		0.876
LQPT21		0.878
LQPT22		0.884

Note: LQPT: Luebeck questionnaire for recording preoperational thinking.

consistency was 0.887. The inter-item correlation was 0.381. A comparison of the reliability parameters of the LQPT between German and Turkish sample was presented in the Table 3.

Convergent validity of the LQPT

Convergent validity was examined by correlations between LQPT and DAS-A and its subscales (Table 3). A negative and statistically significant correlation was found between LQPT and both total DAS-A scores ($r_s = 1.000$, $p < .001$), and its subscales Performance Evaluation ($r_s = −0.653$, $p < .001$), Need for Approval ($r_s = −0.582$, $p < .001$), Autonomous Attitude ($r_s = −0.549$, $p < .001$), and Tentativeness ($r_s = −0.507$, $p < .001$). Besides, the total LQPT scores were not found significantly correlated with age ($p > .05$). The results of the Spearman's Correlation analysis were shown in the Table 4.

The difference between different diagnosis in terms of LQPT, DAS-A, and its subscales

The results of Kruskal–Wallis test revealed that statistically significant differences were found in terms of Performance Evaluation ($H = 34.214$, $p < .001$), Need for Approval ($H = 38.629$, $p < .001$), Autonomous Attitude ($H = 26.060$, $p < .001$), Tentativeness ($H = 15.574$, $p < .005$), total DAS-A ($H = 58.945$, $p < .001$), and also total LQPT scores ($H = 58.945$, $p < .001$) between participants with different diagnosis.

A *post-hoc* test revealed the following significant differences between the groups:

In terms of Performance Evaluation, there was a statistically significant difference between healthy participants and participants with a diagnosis of Mood Disorder ($p = .02$), Somatoform Disorder ($p = .01$), Substance Use Disorder ($p = .01$), and Anxiety Disorder ($p = .00$). In terms of Need for Approval subscale scores, there was a statistically significant difference between healthy participants and with a diagnosis of Mood Disorder ($p = .01$), Somatoform Disorder ($p = .00$), Substance Use Disorder ($p = .08$), and

Table 4. Correlation between LQPT and DAS-A, and its subscales.

	Age	Performance evaluation	Need for approval	Autonomous attitude	Tentativeness	Total DAS-A	LQPT
Age		0.043	0.115	0.048	−0.106	0.085	0.085
Performance evaluation			0.736**	0.511**	0.566**	−0.653**	−0.653**
Need for approval				0.606**	0.427**	−0.582**	−0.582**
Autonomous attitude					0.577**	−0.549**	−0.549**
Tentativeness						−0.507**	−0.507**
Total DAS-A							1.000**
Total LQPT							

Note: LQPT: Luebeck questionnaire for recording preoperational thinking, DAS-A: Dysfunctional Attitude Scale.
**significant (<.01).

Anxiety Disorder ($p = .01$). In terms of Autonomous Attitude subscale scores; there was a statistically significant difference between healthy participants and with a diagnosis of Somatoform Disorder ($p = .048$), Substance Use Disorder ($p = .01$), and Anxiety Disorder ($p = .00$). In terms of Tentativeness subscale scores, there was a statistically significant difference between healthy participants and participants with a diagnosis of Substance Use Disorder ($p = .022$), and Anxiety Disorder ($p = .014$). In terms of total DAS-A scores and total LQPT scores, there was a statistically significant difference between healthy participants and participants with a diagnosis of Anxiety Disorder ($p = .00$), Substance Use Disorder ($p = .00$), and Somatoform Disorder ($p = .02$). Furthermore, there was also a statistically significant difference between participants with a diagnosis of Anxiety disorder and participants with a diagnosis of Mood Disorder ($p = .03$) and participants with a diagnosis of Substance Use Disorder and participants with a diagnosis of Mood Disorder

($p = .018$). The results of the Kruskal–Wallis test were presented in the Table 5.

Factor structure of the Turkish LQPT

To examine the factor structure of the LQPT scale, an exploratory factor analysis (EFA) was performed using various methods. Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy and Bartlett's test of Sphericity were performed. In this study, KMO Sampling Adequacy was found to be 0.774 and Bartlett's test of Sphericity χ^2 was found to be 1225.065.

A principal-components analysis was performed on the LQPT responses of the participants, which yielded five factors with an eigenvalue greater than one, representing 68.7% of the total variance. In this factorial structure, a clear and multifactorial structure was not found. Instead, it was found to be a much more complex and heterogeneous structure than a one-factor structure. A two-factor solution was rotated by using

Table 5. The difference between different diagnosis in terms of LQPT, DAS-A, and its Subscales.

Test	Diagnosis	N	Mean Rank	df	χ^2	H	p
Performance evaluation	Healthy	33	25.03				
	Mood disorder	15	56.67				
	Anxiety disorder	17	61.76	4	34.214	34.214	0.000
	Somatoform disorder	14	58.18				
	Substance use disorder	14	59.32				
Need for approval	Healthy	33	24.65				
	Mood disorder	15	56.93				
	Anxiety disorder	17	56.53	4	38.629	38.629	0.000
	Somatoform disorder	14	70.89				
	Substance use disorder	14	53.57				
Autonomous attitude	Healthy	33	29.14				
	Mood disorder	15	47.70				
	Anxiety disorder	17	62.47	4	26.060	26.060	0.000
	Somatoform disorder	14	53.32				
	Substance use disorder	14	63.25				
Tentativeness	Healthy	33	33.11				
	Mood disorder	15	47.70				
	Anxiety disorder	17	58.79	4	15.574	15.574	0.004
	Somatoform disorder	14	52.36				
	Substance use disorder	14	59.32				
Total DAS-A	Healthy	33	71.59				
	Mood disorder	15	53.87				
	Anxiety disorder	17	19.35	4	58.945	58.945	0.000
	Somatoform disorder	14	39.54				
	Substance use disorder	14	22.71				
Total LQPT	Healthy	33	71.59				
	Mood disorder	15	53.87				
	Anxiety disorder	17	19.35	4	58.945	58.945	0.000
	Somatoform disorder	14	39.54				
	Substance use disorder	14	22.71				

Note: LQPT: Luebeck questionnaire for recording preoperational thinking, DAS-A: Dysfunctional Attitude Scale.

Table 6. Factor structure of Turkish LQPT.

Eigenvalue	7.007	3.208
Cumulative variation	31.850	46.431
Item	Factor 1	Factor 2
LQPT 1	**0.684**	0.071
LQPT 2	**0.620**	**0.323**
LQPT 3	−0.106	**0.814**
LQPT 4	0.054	**0.387**
LQPT 5	**0.731**	0.021
LQPT 6	**0.661**	0.190
LQPT 7	**0.658**	0.222
LQPT 8	0.098	**0.468**
LQPT 9	0.031	**0.687**
LQPT 10	**0.674**	−0.028
LQPT 11	**0.309**	**0.368**
LQPT 12	**0.666**	0.008
LQPT 13	**0.496**	**0.342**
LQPT 14	−0.140	**0.650**
LQPT 15	0.047	**0.613**
LQPT 16	**0.659**	**−0.442**
LQPT 17	**0.857**	−0.094
LQPT 18	0.100	**0.507**
LQPT 19	−0.079	**0.512**
LQPT 20	**0.658**	0.248
LQPT 21	**0.814**	−0.095
LQPT 22	**0.782**	**−0.410**

Note: Extraction Method: Principal component analysis. Rotation Method: Promax with Kaiser normalization.

LQPT: Luebeck questionnaire for recording preoperational thinking.

Promax rotation and minimized the number of variables that have high loadings on any one factor. When all the rotated solution was examined, the two factors accounted for 46.43% of the total variance. The two-factor solution presented in Table 6.

Discussion

In this study, we aimed to examine the validity, reliability, and factor structure of the LQPT in a Turkish sample. The main findings of the present study confirmed that the Turkish LQPT was observed to have stable and reliable psychometric properties.

When socio-demographic data were taken into consideration, no significant differences were observed between the male and female participants in terms of total LQPT, Total DAS-A, and subscales of DAS-A scores except for Need for Approval and there were no significant correlations between age and total LQPT, Total DAS-A, and subscales of DAS-A scores. In our sample, although the average mean Total LQPT scores of women were lower than the men's, this difference was not statistically significant. This finding shows that a low total score indicates a high level of preoperational thinking (snapshot perspective, prelogical thinking, egocentrism, lack of perceived functionality, lack of empathy) in women compared to men. This might suggest that female participants might have adherence to the perception of the immediate environment as a repetition of a negative past and a predictor of the future compared to the male participants. Female participants might also have prelogical thinking style as a conclusion reached from a prejudice without any intermediate steps and uninfluenced by

the logical reasoning of others. They might also have inability to take the perspective of others and to see one's view as one amongst many, lacking awareness that one's own behaviour can entail consequences on one's environment, and lack of capacity for authentic empathic communication. Studies in the literature showed that preoperational thinking style has been reported in chronically depressed patients [13]. It is also known that the prevalence of major depression is higher in women than in men [14] with its global annual prevalence of 5.5% and 3.2%, in 2010 respectively, representing a 1.7-fold greater incidence in women. thinking and they are more common among women than men [15]. Based on the Total LQPT scores, an important implication may be that as most of other studies in the literature, women are more susceptible to preoperational thinking which might lead to chronic depression due to negative coping strategies [1]. This greater vulnerability and retardation in the preoperational stage would be a problem when women are faced with adult tasks compared to men.

Cronbach's alpha coefficient of the Turkish LQPT as a measure of internal consistency was as high enough as in Kuhnen et al.'s original study [8]. Kuhnen et al. [8] have found the internal consistency of the LQPT with an overall reliability coefficient of 0.901 and in the present study it is found as 0.887. The split-half reliability coefficient was 0.885 in Kuhnen et al's study and 0.892 in our study. Cronbach's alpha coefficient was. Due to the fact that Cronbach's alpha coefficient was high enough (>0.60) in a scale, the internal consistency of the Turkish LQPT was considered to be sufficient. The higher internal consistency allows us concluding that the test is very homogeneous and that it measures the same characteristic facets.

In our sample, Turkish LQPT was found to be negatively correlated with the Dysfunctional Attitude Scale (DAS-A), which was developed to assess the beliefs or schemata that underlie the characteristic cognitive content of depression. Together with the Total DAS-A, four subscales of the DAS-A that appear to be related to concerns about performance evaluation and interpersonal approval and support are highly associated with autonomy and sociotropy, which in turn are known to be highly relevant to depression [16]. The participants who received lower scores in Turkish LQPT also received higher scores in the Total DAS-A and subscales that are specifically developed to examine characteristic maladaptive, dysfunctional cognitive content of underlying beliefs which validly distinguishes clinically depressed individuals from nondepressed healthy controls. These results confirmed that the Turkish LQPT had a good convergent validity.

The Total LQPT scores were able to distinguish between participants with different psychiatric diagnosis and healthy participants at the level of preoperational thinking. The Total DAS-A and Performance

Evaluation, Need for Approval subscale scores were able to distinguish between participants with different psychiatric diagnosis and healthy participants at the level of dysfunctional attitudes. Autonomous Attitude subscale scores of the DAS-A was not able to distinguish between participants with a diagnosis of Mood Disorder and healthy participants. Tentativeness subscale scores of the DAS-A were not able to distinguish between participants with different psychiatric diagnosis and healthy participants, there was a statistically significant difference between healthy participants and participants with a diagnosis of Mood Disorder and Somatoform Disorder.

In the present study, in order to find out which set of items assesses a particular content domain and commonly used to reduce the set of observed variables to a smaller, more parsimonious set of variables, the exploratory factor analysis method was used. The initial principal-components analysis yielded 5 factors with an Eigenvalue greater than one, representing 68.7% of the total variance. In the study of the original scale, no clear and meaningful multifactorial solution was obtained and the test appeared to be more heterogeneous than expected from a one-dimensional construct [8]. However, as the changes in the gradient suggested the extraction of two factors, a two-factor solution was rotated by using Promax rotation and hence minimized the number of variables that have high loadings on any one factor. Promax or other oblique rotations are generally used when it is assumed that they are orthogonal and correlated well. When all the rotated solution was examined, the two factors accounted for 46.43% of the total variance.

The results reported in this study should be considered in light of certain limitations. First, the sample in this study was recruited from healthy controls and patients with certain psychiatric diagnoses. That may to some extent affect the results and limits the generalization of the results to other clinical samples. Another limitation is the fact that the cross-sectional nature of the study would not allow us to link the causality. Cultural differences might be considered as another limitation to draw conclusions. Further prospective, longitudinal studies would help to establish a probabilistic causal relationship.

In conclusion, the Turkish version of the LQPT had sound psychometric properties in our sample, including its internal consistency, test–retest reliability, concurrent validity, and factorial structure. The questionnaire fulfilled the classical test quality criteria and can indeed be used for indicative and evaluative diagnostics in future studies to help better understanding normalcy and psychopathology including chronically depressed patients. The Turkish version of the LQPT can be used as an instrument for tapping the cognitive components associated with the development of depression and also from a clinical perspective, it can also be used as an instrument to indicate the cognitive changes achieved when applying cognitive behavioral therapy (CBT) in patients with depression. Although further research is required, the LQPT may be useful in defining more specific cognitive vulnerabilities, which can contribute to the development of more effective treatment interventions, especially in treatment-resistant cases.

Disclosure statement

No potential conflict of interest was reported by the authors.

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