Reliability and Validity of the Persian Version of Distress Tolerance Scale

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Objectives: This study aims to assess the validity and reliability of the Persian version of Simons and Gaher `s Distress Tolerance scale(DTS) by administering it to nicotine dependent students of Tehran University.
Method: In a descriptive cross-sectional study, 317 nicotine dependent students of Tehran University who were selected ,using available sampling method, completed DTS, Coping with Stress- Revised(CS-R), Positive and Negative Affect Scales(PANAS) and Fagerstrom Test for Nicotine Dependence(FTND). Data were analyzed using descriptive statistic methods and correlation coefficient.
Results: The alpha coefficients for Tolerance, Absorption, Appraisal and Regulation subscales were 0.75, 0.77, 0.70 and 0.75, respectively. The test-retest correlation coefficients with two months interval for Tolerance, Absorption, Appraisal and Regulation subscales and the total scale were 0.71, 0.69, 0.77, 0,73 and 0.79, respectively; all of which were statistically significant ($p < 0.001$). The correlation coefficient of DTS with problem-focused, emotional-focused, less useful and insufficient coping with stress were found to be: 0.213, -0.278, -0.337 and -0.196. In addition, the correlation coefficient of DTS with positive emotion, negative emotion and smoking-dependency were 0.543, -0.224 and -0.653 which were also significant($p < 0.05$).
Conclusion: the DTS is valid and reliable and suitable to use for assessing distress tolerance.

Keywords: *Psychological tests, Psychometrics, Reproducability*

Distress Tolerance refers to individual's ability to withstand and experience negative psychological states(1). Distress may be the result of physical and cognitive processes, but its representation is often emotional, and characterized by tendency to relieve this state. Distress tolerance is considered a meta-emotional construct with respect to tolerability and aversiveness; appraisal and acceptability; tendency to absorb attention and disrupt functioning; and regulation of emotions (1). People with low distress tolerance descript confusion as an intolerable construct and can not manage their confusion. These individuals have a negative perspective in connection with confusion, they do not seem to accept its existence; and therefore, underestimate their coping abilities. Most of these people try to avoid negative emotions and use different ways to find immediate relief for their confusion. Furthermore, because these individuals do not have the capability to deal with their emotions, all their attention is focused on the existence of the turbulent emotions ; and therefore, their performance will become significantly impaired (1).

Distress tolerance construct is also associated with substance abuse (1,2). Substance and drug use are emotion-based coping strategies. Emotion-based coping strategies are characterized by fast emotional change, while problem-based coping strategies involve the use of more cognitive resources, resulting in more gradual emotional change(2). Thus, substance use is an emotion-based coping strategy , which can result in the rapid relief of extreme emotions, especially for those who have low distress tolerance(1). Some researches suggest that low distress tolerance is associated with relapse cigarette consumption (3). Brown and colleagues reported that smokers who had sustained previous quitting attempts for at least 3 months, persisted longer in mental arithmetic tasks, breath holding, and CO_2 inhalation relative to smokers who had never sustained a quit attempt(3). College students represent a population at risk for the development of substance-related problems (4,5).
In addition, Linehan, emphasize on distress tolerance and places this construct among the four main skills of her group therapy. According to linehan`s Dialectical Behavioral Therapy(DBT), people with borderline

personality disorder have lower distress tolerance compared to others(6). In linehan`s biopsychosocial theory, Distress tolerance is a result of interaction between the individual`s social environment and bio-behavioral system. It seems that all problems of individual`s with borderline personality disorder can be justified with this construct. Low distress tolerance is led to impulsive behaviors and, in turn, these behaviors are led to people`s relieving. In other words, emotional regulation styles are influenced by distress tolerance skills. Distress tolerance causes individual`s difference in the assessment of confusion and this, in turn, causes a person to feel a certain amount of stress stronger than others and, also, has a more negative view about confusion. Hence, the main component of treatment in DBT is to increase the individual distress tolerance (6). This construct plays a major role in the treatment of suicidal behaviors (7-10), substance abuse(11), bulimia(12) and eating disorder(13)

Some other researches have indicated that the ability to withstand temporary psychological confusion and lack of avoiding difficult emotions is particularly valuable, especially when experiencing such emotions can lead to healthy and positive behavioral change (14) . Accordingly, treatment based on commitment and acceptance believed to negative effects of avoiding or suppressing the emotional experience and benefits of accepting and experiencing negative emotions (15).

Yet, different methods have been used for measuring this construct .

Experimental measures of distress tolerance have focused on persistence in stressful tasks. Some researches have used such methods as the following to evaluate distress tolerance: persistence in arithmetic tasks, breath holding, and CO2 inhalation and holding hand in cold water (1). Despite considerable amount of research and theory invoking the construct of distress tolerance, no self-report measures have been designed to measure distress tolerance in Iran .

Distress Tolerance Scale (1) has sixteen items; its items are generated based on theoretical relevance and review of related scales. Based on the conceptual analysis in the introduction, four types of items were developed reflecting perceived ability to tolerate emotional distress (e.g., I can't handle to feel distressed or upset); subjective appraisal of distress (e.g., My feelings of distress or being upset are not acceptable); attention being absorbed by negative emotions (e.g., When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels); and regulation efforts to alleviate distress (e.g., When I feel distressed or upset I must do something about it immediately). Items were rated on a 5-point scale: (5) strongly disagree, (4) mildly disagree (3) agree and disagree equally, (2) mildly agree, (1) strongly agree. High scores represent high distress tolerance (1). This scale has represented good psychometric properties in the USA ;and the 4 factors are represented based on factor analysis.

The current paper presents the translation of Simons and Gaher`s self-report measure of distress tolerance, examining its psychometric properties, and associations with other measures of affect, and criterion validity in respect to substance use variables.

Materials and Method

All the questions of Simons and Gaher`s Distress Tolerance Scale(DTS) were translated and revised. Then, the translated text was back translated, and the two forms was compared. Finally, the translated text was revised and given to two professors holding a PhD in psychology; and their professional suggestions were included in the translations. To identify the face validity and initial survey, the Persian version of DTS was given to 30 students , and they were asked to identify ambiguous items. The unclear items were then revised. Available sampling method was used. The students were provided with explanations about the questionnaires, and then completed Fagerström Test for Nicotine Dependence, Positive Affect Negative Affect Scale ,and Distress Tolerance Scale (DTS). The estimated sample size was 350 students. In this descriptive cross-sectional study, 317 nicotine dependent students of Tehran University who were selected using available sampling method completed these questionnaires.

All the participants were examined using the measures below:

Distress Tolerance Scale (DTS): The DTS is composed of 14 items answered on 5-point Likert-type scales ranging from 1, strongly agree, to 5, strongly disagree ,evaluating participants' ability to experience and endure negative emotional states. Greater scores reflect higher levels of distress tolerance. This scale has good psychometric properties, including high internal consistency (α=.89) and appropriate convergence with other self-report ratings of affective distress and regulation (1). In addition, the DTS has demonstrated adequate 6-month test-retest reliability (r=.61). The scale incorporates items that assess appraisal, tolerance, absorption, and regulation (1).

Positive Affect Negative Affect Scale (16): The PANAS is a mood measure that assesses two global dimensions of affect: negative and positive. Both the negative affectivity and the positive affectivity scales of the PANAS have demonstrated high levels of internal consistency across a range of populations, including cross-national samples (range of alpha coefficients: 0.83–0.90 and 0.85–0.93, respectively) (17). The PANAS has also demonstrated good test-retest reliability (r=0.71) (17). The negative affectivity subscale was used as an index of the disposition to experience negative affective states (e.g., anger, anxiety, depression, guilt).

Fagerström Test for Nicotine Dependence: (18). The FTND is a 6-item scale designed to assess gradations in tobacco dependence (18). The FTND has shown good internal consistency, positive relations with key

smoking variables (e.g., saliva cotinine) (18-19), and high degrees of test-retest reliability (20).

The Coping Scale- Revised (CS-R): The CS-R questionnaire (21) is a 72-item questionnaire addressing different ways of coping with problems. Items are rated on a 4-point scale, ranging from 1 ("I usually don't do this at all") to 4 ("I usually do this a lot").

These items are then summated to provide 18 subscales, such as: active coping, planning, suppression of competing activities, restraint coping, seeking social support for instrumental reasons, seeking social support for emotional reasons, positive interpretation and growth, acceptance, turning to religion, focus on venting of emotions, denial, behavioral disengagement and mental disengagement, etc. These subscales evalue the 4 following dimentions: problem-focused coping, emotional-focused coping, less useful coping and insufficient coping (21). This test has represented good test-retest reliability and content validity (21).**.**

Data analysis

Data were analyzed using SPSS-11. Data were analyzed using descriptive statistic methods and correlation coefficient.

Results

The means and standard deviation of DTS, PANAS, FTND and CS-R have been represented in Table 1(N=317)

Internal consistency and test-retest methods were used to calculate DTS reliability. The alpha coefficient was used to calculate Internal consistency. The alpha coefficients for Tolerance, Absorption, Appraisal and Regulation subscales were 0.75, 0.77, 0.70 and 0.75, respectively. In general, the Cronbach's alpha coefficients were acceptable for all subscales. Test-retest correlation coefficients, with two months interval, for Tolerance, Absorption, Appraisal and Regulation subscales and the total scale were 0.71, 0.69, 0.77, 0,73 and 0.79, respectively. Moreover, correlation coefficients were calculated among scale items and among the total score of the scale. The range of these coefficients was between 0.17 and 0.58, and only 0.17 coefficient wasn't significant. One hundred and four students took the same test again and that was used to measure the test-retest reliability.

Table 1. The means and standard deviation of DTS, PANAS, FTND and CS-R

variable.	Mean (standard deviation).
Coping Scale-Revised (CS-R).	
problem-focused coping	26.44(8.07)
emotional-focused coping	28.89(7.30)
Less useful coping	15.60(4.54)
insufficient coping	17.61(6.10)
Positive Affect Negative Affect Scale (PANAS).	
positive emotion	30.57(3.85)
negative emotion	25.35(4.39)
Fagerström Test for Nicotine Dependence: (FTND).	
smoking-dependency	3.98(1.85)
Distress Tolerance Scale (DTS).	
Tolerance distress	2.62(0.58)
Absorption distress	2.73(0.61)
Appraisal distress	2.78(0.46)
Regulation distress	2.82(0.62)

Table 2. Correlation matrix among DTS, CS-R, PANAS subscales and smoking dependency(n=317)

Variable	problem-focused coping	emotional-focused coping	Less useful coping	insufficient coping	positive emotion	negative emotion	smoking-dependency
tolerance	0.193*	**0.226-	**0.197-	*0.203-	**0.330	**0.289-	**0.610
absorption	**0.323·	*-0.209	0.173-	**0.289-	**0.449	**0.229-	**0.549-
Appraisal	*0.188	0.176-	**0.248	0.087-	**0.423	0.064-	**0.354-
Regulation distress	0.023	*0.203-	**0.346-	0.016-	**0.345	0.118-	**0.434-
DTS	*0.213	**0.278-	**0.337-	*0.196-	**0.543	*0.224-	**0.653-

* P≤0.05, ** P≤0.01

Table 3. correlation matrix distress tolerance subscales

Variable	Tolerance	Absorption	Appraisal	Regulation
Absorption Subscale	**0.563			
Appraisal Subscale	**0.224	**0.221		
Regulation Subscale	**0.379	**0.370	**0.410	
DTS	**0.704	**0.697	**0.738	**0.733

* P≤0.05,   ** P≤0.01

As expected, the DTS is negatively associated with the measures of the emotional-focused coping, less useful coping, insufficient coping , negative emotion and smoking-dependency.

Furthermore, DTS is positively associated with the measures of problem-focused coping, and positive emotion. The results are demonstrated in Table 2.

Internal consistency among subscale scores has been demonstrated in Table 3. The range of correlations is between 0.69 and 0.73. These correlations are statistically significant (P<0.01). There is also a significant association among all sub-scales(P<0.01).

Discussion

The results indicate that this questionnaie can be used as a valid and reliable scale. Findings of this study are relatively harmonious with Simons and Gahr`s study(2005). In the present study, the correlation between the two implementations with two months interval was 0.81, while Simons and Gaher(2005) reported 0.67 for women and 0.78 for men. Further, in this study, Cronbach's alpha for the total scale was obtained to be 0.79, and this level of Cronbach's alpha is slightly lower than what was reported by Simons and Gaher(2005),as they reported 0.86 for the total scale and 0.70-0.82 for the subscales(1).

Construct Validity of this scale is reflected in its positive correlation with problem-based coping strategies and its negative correlation with emotional-based coping strategies. This result is coordinated with findings of Gaher and Simons (2005). They concluded that people with low distress tolerance use alcohol and marijuana to fight their common sense of turmoil, and that substance use is a emotional-based coping style (2).

Positive correlation between positive emotions and distress tolerance , and negative correlation between negative emotions and distress tolerance confirm the constuct validity of this scale. Watson et al(1988) believed that positive emotion means active involvement with the environment, being active and energetic, and tending to have positive emotions in various situations; and , negative emotions means tending to experience repeated intense negative emotions and have difficulty adapting to daily events. The definition of distress tolerance indicates that those with low distress tolerance describe distress as an unbearable construct and this results in increased negative emotions of such people. This finding is consistent with several other researches(1, 16).

In general, the DTS is a valid and reliable scale and is suitable for use to assess distress tolerance.

Implimentation of this scale on students only is one of the most important restrictions of this study . To achive higher reliability and validity and to eliminate research restrictions, administering the scale among the general population with higher sample size is rcommended.

Doing so can provide normative data for the general population. It is also necessary to conduct more research in borderline personality disorder, eating disorder and suicidal population using this scale.

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