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SIX- AND TEN-ITEM INDEXES OF PSYCHOLOGICAL DISTRESS BASED ON THE SYMPTOM CHECKLIST-90

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Clinicians, provider organizations, and researchers need simple and valid measures to monitor mental health treatment outcomes. This article describes development of 6- and 10-item indexes of psychological distress based on the Symptom Checklist-90 (SCL-90). A review of eight factor-analytic studies identified SCL-90 items most indicative of overall distress. Convergent validity of two new indexes and the previously developed SCL-10 were compared in an archival sample of posttraumatic stress disorder patients (n = 323). One index, the SCL-6, was further validated with archival data on substance abuse patients (n = 3,014 and n = 316) and hospital staff (n = 542). The three brief indexes had similar convergent validity, correlating .87 to .97 with the SCL-90 and Brief Symptom Inventory, .49 to .76 with other symptom scales, and .46 to .73 with changes in other symptom measures over time. These results indicate the concise, easily administered indexes are valid indicators of psychological distress.

Keywords: Symptom checklists, test validity, psychiatric patients, psychological distress, treatment outcomes

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As mental health clinicians and provider organizations face increasing demands to routinely monitor treatment effectiveness, they need simple and valid indicators of treatment outcome. Brief measures of psychological distress are also useful in health services and epidemiological studies that need to minimize respondent burden. Existing concise symptom measures, such as the Beck Depression Inventory (Beck, Steer, & Brown 1996), tend to be disorder-specific, limiting their utility in clinical settings that serve patients with a variety of diagnoses. There are brief measures of functioning intended for use with heterogeneous populations, such as the SF-12 (Ware, Kosinski, & Keller, 1996). However, functioning often remits more slowly than distress and is strongly influenced by life context factors outside of treatment (Howard, Leuger, Maling, & Martinovich, 1993). Thus, there remains a need for brief measures of psychological distress that can be used with heterogeneous clinical populations.

The Symptom Checklist 90 (SCL-90; Derogatis, Lipman, & Covi, 1973) and its offspring, the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1983) and Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983), are well-validated measures of general psychological distress. However, the length of these measures makes them impractical for routine use in many applied settings. This paper describes the development and validation of 6-item and 10-item indexes based on the SCL-90 that provide data on distress that are comparable to the SCL-90 General Severity Index (GSI) or overall average score.

Several studies have concluded that the SCL-90, SCL-90-R, and BSI, although originally intended to profile nine symptom domains, are best used as unidimensional measures of overall psychological distress (Cyr, McKenna-Foley, & Peacock, 1985; Piersma, Boes, & Reaume, 1994). Nguyen, Attkisson, and Stegner (1983) developed the SCL-10, a concise unidimensional measure, using data from Hoffman and Overall's (1978) factor analysis of the SCL-90. However, data on the SCL-10's validity have not been published. The present study expands on Nguyen et al.'s (1983) approach by using several factor-analytic studies to inform scale development, and by validating and comparing alternative scales with data from three different populations.

SCL-90 Items Associated With Overall Distress

To inform scale development, we reviewed 12 factor analyses of the SCL-90, SCL-90-R, and BSI (Benishek, Hayes, Bieschke, & Stoffelmayer, 1998; Bonynge, 1993; Brophy, Norvell, & Kiluk, 1988; Carpenter & Hittner, 1995; Clark & Friedman, 1983; Evenson, Holland, Mehta, & Yasin, 1980; Hoffman & Overall, 1978; Piersma et al., 1994; Rauter, Leonard, & Swett, 1996; Schwarzwald, Weisenberg, & Solomon, 1991; Steer, Clark, & Ranieri, 1994; Zack, Toneatto, & Streiner, 1998). These studies included data from psychiatric and substance abuse patients seen in both outpatient and inpatient settings, as well as Israeli soldiers with acute combat stress. In nine studies, the primary factor accounted for 27% to 42% (mean = 35%) of the item variance, 5 to 11 times the variance explained by any subsequent factor. Three studies were even more unidimensional, with the primary factor accounting for 60% to 71% of the overall variance. The amount of variance explained by the first factor was not systematically related to inpatient versus outpatient setting, or psychiatric versus substance abuse diagnoses.

Although there was a predominant first factor in all the studies, the items loading on this factor varied somewhat across different populations (Schwarzwald et al., 1991). Eight studies specified how items loaded on the primary factor (Benishek et al., 1998; Brophy et al., 1988; Carpenter & Hittner, 1995; Clark & Friedman, 1983; Evenson et al., 1980; Schwarzwald et al., 1991; Steer et al., 1994; Zack et al., 1998). To identify items that would be signal indicators of distress across a variety of patient populations, we determined which items most consistently loaded highly on the primary factor across these eight studies.

Fifteen items common to both the SCL-90 and BSI loaded on the primary factor in at least six of eight studies. Six items were from the original SCL-90 and BSI depression subscales: suicidal ideation, loneliness, feeling blue, lack of interest,

hopelessness, and feeling worthless. The other nine items included the following: feeling tense, feeling fearful (anxiety subscale); feeling lonely/alone with others, feeling something is wrong with one's mind (psychoticism subscale); feelings easily hurt, feeling inferior (interpersonal sensitivity); feeling blocked doing things, difficulty making decisions (OCD subscale); and guilt (additional item). It appears that psychoticism subscale items associated with overall distress reflect alienation and cognitive difficulty rather than psychosis per se.

Notably, no item from the somatization, phobic avoidance, hostility, or paranoid ideation subscales consistently loaded on the primary factor. These domains often emerged as secondary factors in studies that produced a multiple-factor solution. In sum, the literature suggests the SCL-90 and BSI have a strong unidimensional component, yet in some samples, somatization, avoidance, hostility, and paranoia are somewhat independent of the general factor.

The next section discusses development of two brief alternative indexes and their validation among posttraumatic stress disorder (PTSD) patients. Later sections further assess the validity of a 6-item index (SCL-6) among substance abuse patients and validity of both 6-item and 10-item indexes among VA hospital staff following the 1989 Loma Prieta earthquake.

Index Development and Initial Validation

Method

Index Construction

We constructed two indexes of psychological distress based on items common to both the SCL-90 and BSI. The first index, the Symptom Checklist 6 (SCL-6), represented the primary distress factor. Two items each from the SCL-90 depression, anxiety, and psychoticism subscales were selected based on (a) the number of studies (at least six of eight) in which they loaded on the primary factor, and (b) their average factor loading on the primary factor (see Table 1).

The second index, the Symptom Checklist 10-Revised (SCL-10R), used items from all nine of the original SCL-90 subscales to more broadly represent both primary and secondary factors of the SCL-90. This index is similar to the SCL-10 of Nguyen et al. (1983) which has six items representing the primary factor and four items tapping somatization and phobic avoidance. For our SCL-10R, six primary factor items were chosen based on two criteria: (a) items loaded on the primary factor in at least six of eight studies with a high average loading (> .40), and (b) they represented as many of the original SCL-90 subscales as possible (see Table 1). Four additional items were included to tap secondary factors of somatization, phobic avoidance, hostility, and paranoia. These were selected based on two criteria: (a) each item loaded on the secondary factor in at least five of six studies, and (b) the item came from the original corresponding SCL-90 subscale (see Table 1). Items and factor loadings for the SCL-10 developed by Nguyen et al. (1983) are also shown in Table 1.

Validation Procedure

The two new SCL-90 indexes and the previously developed SCL-10 (Nguyen et al., 1983) were validated initially with data from patients treated in a residential rehabilitation program at the National Center for Posttraumatic Stress Disorder at the VA Palo Alto Health Care System between October, 1992, and March, 1998. The sample included 323 veterans (236 males and 87 females) at intake, with discharge data available for 169 patients. Patients with posttraumatic stress disorder (PTSD) are a good population for testing a measure of overall psychiatric distress, because *DSM-IV* criteria for PTSD span eight of the nine SCL-90 subscales (APA, 1994; Derogatis et al., 1973). PTSD symptoms include physiological reactivity, cognitive intrusions, interpersonal sensitivity, anxiety, phobic avoidance of trauma cues, anger outbursts, paranoid ideation, and estrangement from others. Depressive symptoms, assessed by the remaining SCL-90 subscale, are commonly comorbid with PTSD (Deering, Glover, Ready, Eddleman, & Alarcon, 1996).

Table 1
SCL-90/BSI Items Included on Brief Indexes and Their Factor Loadings

Item (SCL-90 subscale)	Item in index			Loading on primary factor		
Primary factor	SCL-6	SCL-10R	SCL-10	# of studies[a]	M[b]	Range[b]
Hopeless about future (dep)	X	X	–	8/8	.70	.68 - .75
Feeling blue (dep)	X	X	X	8/8	.69	.55 - .77
Lonely (dep)	–	–	X	8/8	.69	.64 - .77
No interest in things (dep)	–	–	X	8/8	.63	.51 - .70
Feel worthless (dep)	–	–	X	7/8	.65	.51 - .79
Feel alone with others (psy)	X	–	X	7/8	.64	.53 - .72
Something wrong with mind (psy)	X	X	–	7/8	.61	.49 - .70
Feelings easily hurt (int)	–	X	–	7/8	.57	.46 - .70
Tense or keyed up (anx)	X	X	X	7/8	.55	.44 - .66
Fearful (anx)	X	–	–	6/8	.57	.57 - .70
Difficulty with decisions (OC)	–	X	–	6/8	.57	.48 - .70
Secondary factors				# of studies loading on a secondary factor[c]		
Trouble getting breath (som)	–	X	–	5/6		
Feel weak (som)	–	–	X	5/6		
Heaviness in limbs (som)	–	–	X	4/6		
Afraid of open spaces (phob)	–	X	X	5/6		
Afraid to go out alone (phob)	–	–	X	3/6		
Temper outbursts (host)	–	X	–	5/6		
Talked about/watched (par)	–	X	–	6/6		

Note. SCL-90 = Symptom Checklist-90; BSI = Brief Symptom Inventory; SCL-6 = 6-item index of primary SCL-90 factor; SCL-10R = 10-item index of the SCL-90 primary factor plus somatization, phobic anxiety, hostility, and paranoid ideation; SCL-10 = 10-item index developed by Nguyen et al. (1983). SCL-90 subscales: dep = depression, anx = anxiety, psy = psychoticism, int = interpersonal sensitivity, OC = obsessive-compulsive, som = somatic, phob = phobic avoidance, host = hostility, par = paranoia.
[a]Studies in which item loaded > .40 on factor. [b]Based on 5 studies that reported exact loadings. [c]Studies in which item loaded > .40 on a secondary factor. Exact loadings (not shown) reported in only 2 studies.

The male veterans in this sample averaged 48.3 years of age (SD = 4.8 years) and all had experienced combat trauma, mostly in Vietnam. Sixty percent of the men were White, 18% African American, 15% Hispanic, 2% Native American, 1% Asian American, and 4% from other groups. One-third (33%) of the men were married or living with a partner, 18% separated, 40% divorced, and 9% never married. The female veterans averaged 41.3 years of age (SD = 8.4 years). They experienced either sexual trauma (58%), war-zone trauma (27%), both sexual and war-zone trauma (8%) or other traumatic events (6%). The women were predominantly White (79%) with 13% African American, 2% Hispanic, 2% Asian American, and 3% from other groups. Almost one quarter (24%) of the women were married, 6% separated, 38% divorced, 1% widowed, and 31% never married.

Convergent validity was assessed by correlating intake scores on each of the three brief indexes with the SCL-90 GSI (overall average score), and with scores on the Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988), state anger subscale of the State Anger Inventory (Spielberger,

1983), and Mississippi PTSD Scale (Keane, Cadell, & Taylor, 1988). Sensitivity to change was assessed by correlating change scores on the brief indexes with change scores on the SCL-90 GSI, BDI, BAI, Mississippi PTSD Scale, and State Anger Inventory. Preliminary analyses suggested correlations between measures were similar among males and females, so the data from both genders were analyzed together.

Results

Internal Consistency

Cronbach's alphas for the three brief indices were all better than .80 (see Table 2). Alphas for the 10-item indexes were not much higher than for the SCL-6 because their items tapped more diverse domains of distress. Corrected item-total correlations ranged from .49 to .65 on the SCL-6, .46 to .68 on the SCL-10R, and .52 to .67 on the SCL-10 (Nguyen et al., 1983). Mean squared correlations between each item and all the other items on the scale ranged from .30 to .46 on the SCL-6, .24 to .51 on the SCL-10R, and .38 to .60 on the SCL-10. These results indicate all three indexes had adequate internal consistency without excessive item redundancy.

Convergent Validity

The three short indexes correlated .89 to .90 with each other, and .87 to .95 with the SCL-90 GSI (see Table 2). The SCL-90 and the three brief indexes all correlated similarly with the BDI and Mississippi PTSD scale. The BAI correlated somewhat more strongly with the SCL-10R and SCL-10 than the SCL-6, probably because the latter did not include items on somatization and phobic avoidance. The SCL-10R, which included two items on hostility and paranoia, correlated slightly more strongly with the State Anger Inventory than did the SCL-6 or SCL-10. Pre-post changes scores on the three brief indexes and SCL-90 all correlated similarly with change scores on the BDI, Mississippi, BAI, and State Anger scales. These findings indicate convergent validity and sensitivity to change of the three brief indexes were comparable to those of the SCL-90 GSI score.

Because depressive symptoms load highly on the primary SCL-90 factor, post hoc analyses considered whether the SCL-6 measured global distress or only depression. With BDI scores partialed out, the SCL-6 correlated significantly at intake and discharge with the SCL-90 GSI (r = .75 and .73), BAI (r = .39 and .41), Mississippi PTSD scale (r = .25 and .33) and State Anger Inventory (r = .25 and .19). These findings suggest the SCL-6 reflects overall psychiatric distress, not purely depression.

Further Validation of the SCL-6 and SCL-10R

Validation of the SCL-6 with Substance Abuse Patients

Method

Given equivalent convergent validity for the SCL-6 and SCL-10R in the PTSD sample, the SCL-6 was selected for further validation because it was brief and was comparable with data from a multisite evaluation of VA substance abuse patients (Moos, Finney, Ouimette, & Suchinsky, 1999; Ouimette, Finney, & Moos, 1997). We first examined how the SCL-6 correlated with a 22-item version of the BSI used in the multisite evaluation that included items from the BSI depression, anxiety, psychoticism, and paranoia subscales. The multisite sample included 3,698 male VA substance abuse patients at intake and 3,014 patients at 1-year follow-up.

We also assessed the convergent validity of the SCL-6 with the psychiatric composite of the Addiction Severity Index (ASI; McLellan et al., 1992), a measure of psychiatric problems that is commonly used with VA substance abuse patients. In all, 316 patients at the VA Palo Alto Health Care System who had substance abuse diagnoses completed both ASI interviews and a self-report questionnaire containing the multisite evaluation version of the BSI and items used to calculate ASI composite scores (Rosen, Henson, Finney, & Moos, 2000). Intake and 6-month change scores (n = 200) on the SCL-6 were correlated with the multisite BSI, self-report based ASI psychiatric composite scores, and interview-based ASI psychiatric

Table 2
Means and Correlations of Distress Indices and Symptom Measures Among Posttraumatic Stress Disorder (PTSD) Patients

Measure	*M*	*SD*	Correlations			
			SCL-90 GSI	SCL-6	SCL-10R	SCL-10
Intake scores (n = 323)						
SCL-90 GSI	1.94	0.73	–	.87	.95	.92
SCL-6	2.62	0.88	–	(.83)	.90	.89
SCL-10R	2.17	0.84	–	–	(.87)	.90
SCL-10 (Nguyen et al., 1983)	2.26	0.85	–	–	–	(.88)
BDI	30.6	10.1	.70	.68	.68	.67
Mississippi PTSD Scale	134.3	17.6	.57	.53	.54	.50
BAI	28.2	12.6	.74	.63	.70	.68
State Anger	18.3	8.0	.60	.49	.57	.51
Change scores (n = 169)						
SCL-90 GSI	-0.16[a]	0.68	–	.87	.92	.90
SCL-6	-0.34	0.95	–	–	.88	.89
SCL-10R	-0.18	0.84	–	–	–	.88
SCL-10 (Nguyen et al., 1983)	-0.24	0.85	–	–	–	–
BDI	-3.52	11.6	.72	.73	.71	.68
Mississippi PTSD Scale	-4.43	17.2	.51	.53	.46	.46
BAI	+0.74	12.5	.69	.66	.66	.64
State Anger	+0.37	9.8	.57	.54	.54	.49

Note. Cronbach's alphas for the brief indexes are shown on the diagonal in parentheses. SCL-90 GSI = Symptom Checklist-90 General Severity Index; SCL-6 = 6-item index of primary SCL-90 factor using items from SCL-90 depression, anxiety, and psychoticism subscales; SCL-10R = 10-item index of the SCL-90 primary factor plus somatization, phobic anxiety, hostility, and paranoid ideation, using items from all nine SCL-90 subscales; SCL-10 = 10-item index (SCL-90 primary factor plus somatization and phobic anxiety) developed by Nguyen et al. (1983); BDI = Beck Depression Inventory; BAI = Beck Anxiety Inventory.
[a]Negative change score indicates reduced symptoms, positive change score indicates increased symptoms.

composite scores (intake only). Patients in this sample were 99% male, with an average age of 47 years (SD = 8.4 years) and 13.3 (SD = 1.8 years) years of education. More than half (57%) were White, 25% African American, 9% Latino, 2% Native American, and 7% from other groups. Fourteen percent were married, 15% separated, 45% divorced, 3% widowed, and 22% single.

Results

Multisite Evaluation Sample. Cronbach's alpha for the SCL-6 was .89 at intake and .92 at follow-up. Corrected item-total correlations at intake ranged from .67 to .75, and item multiple squared correlations ranged from .46 to .57. The SCL-6 and the 22-item multisite BSI scale correlated .95 at intake and .94 for 1-year change scores.

Comparison of the SCL-6 With the ASI Psychiatric Composite Score. For the Palo Alto VA sample, Cronbach's alpha for the SCL-6 was over .90. Corrected item-total correlations at intake ranged from .68 to .78, and item multiple squared correlations ranged from .49 to .65. The SCL-6 and the 22-item multisite BSI scale correlated similarly with intake and 6-month change scores on the self-administered ASI psychiatric composite (see Table 3). Convergent validity of the SCL-6 with the ASI interview psychiatric composite score was comparable to previously reported correlations of .47

Table 3
Means and Correlations of SCL-6 and Other Symptom Measures Among Substance Abuse Patients

Measure	*M*	*SD*	Correlations: 22-Item multisite BSI	Correlations: SCL-6
Intake (n = 316)				
22-Item multisite BSI	1.75	0.94	–	.95
SCL-6	2.04	1.13	–	–
Interview ASI Psychiatric Composite Score	0.28	0.25	.52	.51
Self-Report ASI Psychiatric Composite Score	0.35	0.26	.74	.71
Pre-Post change (n = 200)				
22-Item multisite BSI	-0.19	0.95	–	.94
SCL-6	-0.29	1.17	–	–
Self-Report ASI Psychiatric Composite Score	-0.03	0.28	.68	.69

Note. 22-item Multisite BSI = 22 items from the depression, anxiety, paranoia, and psychoticism subscales of the Brief Symptom Inventory; SCL-6 = 6-item index of primary SCL-90 factor using items from SCL-90 depression, anxiety, and psychoticism subscales; ASI = Addiction Severity Index.
[a]Negative change score indicates reduced symptoms.

and .66 between the SCL-90 and ASI psychiatric composite (McLellan et al., 1985; Zanis, McLellan, Cnaan, & Randall, 1994).

Validation of the SCL-6 and SCL-10R With Hospital Staff

Although the brief indexes showed good convergent validity among veterans with PTSD or substance use problems, it is possible that they might be valid only for highly symptomatic patients. We therefore evaluated the validity of the SCL-6 and SCL-10R in a less symptomatic population, a sample of VA hospital staff assessed following the 1989 Loma Prieta earthquake. Nguyen et al.'s SCL-10 was not evaluated because not all its items are on the BSI.

Method

Following the 1989 earthquake, psychiatric symptom questionnaires were distributed to all staff at the Palo Alto VA Medical Center (roughly 3,000 people). A total of 542 staff members (25% male, 75% female) returned questionnaires which included responses to the BSI and civilian Mississippi PTSD scale regarding the month following the quake. Correlations with the BSI and Mississippi scale assessed convergent validity of the SCL-6 and SCL-10R.

Respondents' mean age was 42.1 (SD = 10.9 years). Most (76%) were Caucasian, and the rest were African American (9%), Filipino (7%), Asian American (5%), or Hispanic (4%). Relatively few staff members were exposed to earthquake-related trauma: 4% sustained an injury, 1% saw someone else injured, and less than 10% had to leave their homes.

Results

The mean BSI score in this sample was 0.40 (SD = 0.51), consistent with non-patient norms. However 22% of men and 24% of the women had BSI T scores over 60, compared with 16% expected in a normal population. Mean scores on the brief indexes were 0.42 (SD = 0.56) on the SCL-10R and 0.56 (SD = 0.72) on the SCL-6. Cronbach's

alpha was .88 for both brief indexes. Corrected item-total correlations ranged from .34 to .72 on the SCL-10R and from .60 to .78 on the SCL-6. Item multiple squared correlations ranged from .17 to .61 on the SCL-10R and from .39 to .65 on the SCL-6. SCL-10R items with the lowest multiple square correlations with the other items were fear of open spaces (*MSC* = .17) and trouble getting breath (*MSC* = .23).

Correlations with the full BSI were high for both the SCL-10R (r = .97) and SCL-6 (r = .93). Convergent validity with the civilian version of the Mississippi PTSD scale was comparable for the BSI (r = .79), SCL-10R (r = .76), and SCL-6 (r = .73).

Discussion

These findings indicate that a 6-item or 10-item measure can provide data on overall psychiatric distress comparable to average scores on the SCL-90 or BSI. The SCL-10 (Nguyen et al., 1983), SCL-10R, and SCL-6 correlated highly with the SCL-90, BSI, and a 22-item version of the BSI used in a multisite evaluation of VA substance abuse treatment outcomes (Moos et al., 1999; Ouimette et al., 1997). Among PTSD patients, substance abuse patients, and hospital staff, the convergent validity of these brief indexes with other symptom measures was comparable to the convergent validity of the SCL-90, BSI, or 22-item BSI with those measures. Mean changes over time were small in the chronic patient populations studied here, and many patients regressed. Nonetheless, change scores on the brief indexes were highly correlated with changes on other symptom measures.

Validity coefficients were generally equivalent among the three brief indexes we tested. The SCL-6 has the benefit of brevity, whereas the longer indexes include items assessing more symptom domains. Two factors may explain why convergent validity of the 10-item SCL-10R and SCL-10 was not markedly superior to the SCL-6. First, although the 10-item indexes include items from symptom domains that are distinct from overall distress, these domains account for a small proportion of the variance among SCL-90 items. Second, representing each symptom domain with only one or two items may have provided inadequate construct coverage to substantially improve assessment of distress. One advantage of the SCL-6 and SCL-10R over the SCL-10 is that they are comparable with existing BSI data sets, as well as with SCL-90 data.

The present study has two limitations. First, participants responded to the subscale items within the context of the larger parent measures (SCL-90 or BSI). Future research needs to assess the validity of responses to the 6-item or 10-item scales as stand-alone measures. Second, the validation samples were drawn from VA settings. Although these measures proved valid with both highly symptomatic VA patients and generally non-symptomatic VA staff, more research is needed to confirm their validity with non-veterans experiencing moderate psychological distress.

These brief indexes were designed to be tools for monitoring changes in patients' distress and for comparing levels of distress in different patient populations. Although a brief measure of distress might be useful in identifying patients in need of mental health treatment, these indexes were not developed for screening purposes. Further assessment of the indexes' sensitivity and specificity would be needed before using them as screening instruments. The indexes are also not intended to be used for diagnosis, as they intentionally assess symptoms common across many types of psychiatric and substance abuse patients.

In sum, these 6-item and 10-item indexes provide data on psychological distress that are comparable to overall scores on the well-validated and much lengthier SCL-90 and BSI. These concise measures can be easily administered in nonresearch settings to monitor patient progress, evaluate program effectiveness, or compare distress in different patient populations. These indexes are intended to be general measures of psychological distress, and should be supplemented with symptom-specific measures when evaluating treatments that target somatization, phobic avoidance, hostility, paranoid ideation, or psychotic symptoms.

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