DIAGNOSTIC UTILITY OF THE PTSD CHECKLIST IN DETECTING
PTSD IN CHINESE EARTHQUAKE VICTIMS 1,2

HUANHUAN LI
Department of Psychology
Renmin University of China

LI WANG, ZHANBIAO SHI
Key Laboratory of Mental Health
Institute of Psychology
Chinese Academy of Sciences, Beijing

YUQING ZHANG, KANKAN WU
Center for Social and Economic Behaviour
Institute of Psychology
Chinese Academy of Sciences, Beijing

PING LIU
People’s Hospital of Deyang City, Deyang, China

Summary.—By using the posttraumatic stress disorder (PTSD) module of the
Mini International Neuropsychiatric Interview (MINI) as the gold standard to
identify PTSD, the current study investigated the diagnostic efficiency of the PTSD
Checklist (PCL) as a screening questionnaire in a sample of 152 Chinese victims of
the Wenchuan earthquake. The results showed that the area under the receiver operat-
ating characteristic (ROC) curve was .96 (SE = .02), and the optimally efficient cut-
off score was 44. The findings provide preliminary support of the PCL as a screening
questionnaire among Chinese earthquake victims. The present study may contrib-
ute to further PTSD-related research and practices in Chinese disaster settings.

The Asia-Pacific region has been strongly hit by natural disasters in
the recent past (Ofrin & Salunke, 2006). As the largest country in this re-
region, China also often experiences natural disasters which not only lead
to economic losses, physical injuries, and deaths, but also cause serious
mental health problems. Previous studies, especially studies following
the Wenchuan earthquake, have shown that posttraumatic stress disorder
(PTSD) is also a common mental health problem among victims of natu-
ral disasters in China. For example, Wang, Zhang, Wang, Shi, Shen, Li,
et al. (2009) reported that the prevalence of probable PTSD was 37.8 and
13.0%, respectively, in two communities affected differently by the earth-
quake. Kun, Chen, Han, Gong, Chen, Zhang, et al. (2009) also reported
that the prevalence of suspected PTSD after the earthquake was 45.5% in
a heavily damaged county and 9.4% in a moderately damaged county. Al-
though several PTSD-related assessments have been introduced in China
(see Tang, 2007), few of them have been validated against clinical diagnos-
in populations exposed to natural disasters.

1 Address correspondence to Li Wang, Institute of Psychology, Chinese Academy of Sciences,
4A Datun Road, Beijing 100101, China or e-mail (wangli1@psych.ac.cn).
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The PTSD Checklist (PCL) developed by Weathers and his colleagues (Weathers, Litz, Herman, Huska, & Keane, 1993) is one of the most widely used measures in PTSD-related research and practices around the world (Elhai, Gray, Kashdan, & Franklin, 2005). The reliability and validity of the Chinese version of the PCL have been well documented in various populations including college students (Yang, Yang, Liu, & Yang, 2007) and survivors of road traffic accidents (Wu, Chan, & Yiu, 2008). However, the diagnostic utility of the PCL as a screening questionnaire has never been thoroughly examined among Chinese people, especially in natural disaster settings.

The goal was to evaluate the diagnostic efficiency of the PCL as a screen in Chinese victims following a destructive earthquake, and to identify the optimal cut score for the population. Given inadequate knowledge and practices concerning the mental health of disaster victims in China, the data provided by this study could help to establish effective PTSD screening practices. This article also would help Chinese researchers to compare PTSD-related research results to the international scientific literature.

**Method**

**Participants**

On May 12, 2008, a very destructive earthquake measuring 8.0 on the Richter scale occurred in Sichuan province of southwest China. During the earthquake, 69,227 people were killed, 374,643 injured, 17,923 listed as missing, and about 4.8 million left homeless. The sample of this study was collected by a psychological relief workstation established by the Institute of Psychology, Chinese Academy of Sciences, and a local general hospital in Deyan district which was severely affected by the earthquake. The sample consisted of 102 (67.1%) women and 50 (32.9%) men with ages ranging from 16 to 82 years ($M = 47.6$, $SD = 12.3$). Of the participants, 99 (65.1%) were married, and 53 (34.9%) were unmarried (never married, divorced, separated, widowed). In terms of educational levels, 14 (9.2%) did not complete high school, 125 (82.2%) completed high school, and 13 (8.6%) completed college. All the participants experienced the earthquake locally.

**Measures**

PTSD symptoms were assessed using the PTSD Checklist (PCL; Weathers, et al., 1993). The PCL is an easily administered self-report scale based on the Diagnostic and Statistical Manual of Mental Disorders [DSM-IV; American Psychiatric Association (APA), 1994] criteria for PTSD. The PCL includes 17 items: five for Re-experiencing/intrusion symptoms, seven for Avoidance/numbing symptoms, and five for Hyperarousal symptoms. Each item is rated on a 5-point Likert-type scale with anchors 1:

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Not at all and 5: Extremely, reflecting the extent to which the particular symptom was a problem for the respondent during the past month. The PCL now is one of the most widely used measures of PTSD in trauma-related research and practices (Elhai, et al., 2005), and has been demonstrated to have sound psychometric properties in various trauma populations (see Orsillo, 2001; Norris & Hamblen, 2004). For the Chinese version, high internal consistencies (Cronbach’s α above .77) for the total scale and three subscales have been previously reported (Yang, et al., 2007; Wu, et al., 2008). The test-retest reliability (3-wk. internal) was .84 for the total scale, and ranged from .76 to .82 for the three subscales (Wu, et al., 2008). Convergent and discriminant validities of the Chinese version of the PCL have been demonstrated through associations with other PTSD measures (Impact of Event Scale–Revised and Clinician-administered Posttraumatic Stress Disorder Scale) and the General Health Questionnaire–20 (Wu, et al., 2008). In this study, the PCL adapted by Yang, et al. (2007) was used, and items were completed with respect to the Wenchuan earthquake.

The PTSD Module of the Mini International Neuropsychiatric Interview (MINI; Sheehan, Lecrubier, Sheehan, Amorim, Janavs, Weiller, et al., 1998) was administered to the participants to obtain current PTSD diagnosis. The MINI is a short, easily administered structured psychiatric interview compatible with DSM–IV criteria, and questions formulations and algorithms used in it are similar to those of the Composite International Diagnostic Interview. Psychometric properties of the MINI are supported (e.g., Lecrubier, Sheehan, Weiller, Amorim, Bonora, Sheehan, et al., 1997; Sheehan, et al., 1998), and the PTSD Module of the MINI now is commonly used in trauma-related research and practices (Elhai, et al., 2005). The PTSD Module of the MINI also has been demonstrated to be a valid tool in diagnosing PTSD in Chinese populations (Liao, Lee, Liu, Wang, Chen, Cheng, 2000; Chou, Su, Chou, Ou-Yang, Lu, & Chien, 2005).

Procedure

The data were collected from 20 June to 30 June, 2009, via mobile clinic. The PTSD Module of the MINI was first administered to the participants by well-trained clinical psychologists and psychiatrists to obtain current PTSD diagnosis. Subsequently, participants were asked to complete the PCL independently to obtain symptom severity for PTSD. This study and the procedure were approved by the ethics committee of the Institute of Psychology, Chinese Academy of Sciences.

Data Analysis

All statistical analyses were conducted with SPSS (Version 11.5 for Windows). Receiver operating characteristic (ROC) analysis was used to assess the diagnostic efficiency of the PCL against the MINI diagnosis of current PTSD, and to identify the optimal cutoff.
Results

Forty participants (26.3%) met the diagnostic criteria for PTSD on the MINI. The mean score for the total sample on the PCL was 34.5 ($SD = 12.0$, range = 17–73).

Mean scores on the PCL were 52.2 ($SD = 10.4$, range = 36–73) for PTSD cases and 32.2 ($SD = 7.1$, range = 17–52) for the non-PTSD cases. There was a significant difference between the two groups in terms of the PCL scores ($F_{1,151} = 177.97$, $p < .001$). In the current sample, Cronbach’s $\alpha$ was .93 for the Total PCL scale, .83 for the Re-experiencing subscale, .85 for the Avoidance subscale, and .90 for the Hyperarousal subscale.

The area under the ROC curve for the PCL compared to MINI diagnosis of current PTSD, which is a measure of overall diagnostic efficiency, was .96 ($SE = .02$, $p < .001$). The PCL cutoff scores in the range of 30–50 were examined using the MINI PTSD diagnosis as the criterion measure (Table 1). An optimal cutoff of 44 was identified in this study with sensitivity of

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Note. — PCL = PTSD Checklist; MINI = Mini International Neuropsychiatric Interview; Sensitivity = true positives/(true positives + false negatives); Specificity = true negatives/(true negatives + false positives); PPV = positive predictive value = true positives/(true positives + false positives); NPV = negative predictive value = true negatives/(true negatives + false negatives); ODE = overall diagnosis efficiency = (true positives + true negatives)/(true positives + true negatives + false positives + false negatives).
.83, specificity of .97, positive predictive value (PPV) of .92, negative predictive value (NPV) of .94, and overall diagnosis efficiency (ODE) of .93.

**Discussion**

By using the PTSD Module of the MINI as the gold standard to identify PTSD, the current study investigated the diagnostic efficiency of the PCL as a screen in Chinese earthquake victims. The results showed that the area under the ROC curve was .96, and the optimally efficient cutoff score was 44. These findings indicate the PCL has adequate diagnostic efficiency in this sample, and provide preliminary support for use of the PCL in Chinese earthquake victims.

Weathers, *et al.* (1993) first recommended an optimal PCL cutoff score of 50 for differentiating male veterans with and without PTSD. However, by using samples of male and/or female veterans or civilians exposed to various types of trauma, the majority of subsequent studies have recommended different cutoff scores, ranging from 28 to 60 (e.g., Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Andrykowski, Cordova, Studts, & Miller, 1998; Grubaugh, Elhai, Cusack, & Wells, 2007; Bollinger, Cuevas, Vielhauer, Morgan, & Keane, 2008; Keen, Kutter, Niles, & Krinsley, 2008). The optimal cutoff identified in this study was 44, similar to Blanchard, *et al.* (1996), but different from most previous reports. These discrepancies may be due to characteristics of the sample, and type and severity of trauma exposure (Blanchard, *et al.*, 1996; Dobie, Kivlahan, Maynard, Bush, McFall, Epler, *et al.*, 2002; Cook, Thompson, Coyne, & Sheikh, 2003). Therefore, it is important to establish population-specific cutoff scores when the PCL is used as a screen in new populations, highlighting the necessity of this study.

This study has several limitations. First, the generalizability of the findings is limited by the utilization of a small sample diagnosed from mobile clinics. Furthermore, the majority of the sample was female, and all participants came from a district which was severely affected by the earthquake. In light of previous reports which suggest that demographic variables (e.g., sex) and severity of trauma exposure may have important influences on the diagnostic utility of the PCL (Blanchard, *et al.*, 1996; Dobie, *et al.*, 2002; Cook, *et al.*, 2003), the generalizability of findings may be also somewhat limited. Therefore, these findings need to be further tested using a more representative sample.

Notwithstanding these limitations, the results of this study provide preliminary support for the PCL as a PTSD screen in Chinese earthquake victims and suggest an optimal cutoff score of 44. The present study may contribute to further PTSD-related research and practices in Chinese disaster settings.
REFERENCES


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