



Research report

An examination of resilience cross-culturally in child and adolescent survivors of the 2008 China earthquake using the Connor–Davidson Resilience Scale (CD-RISC)

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ABSTRACT

Background: The 2008 Sichuan earthquake in China destroyed towns and village, displaced over a million people and caused thousands of deaths. There is a need to understand how children and adolescents are able to bounce back after this distressing event. This study conducts a psychometric assessment of the Connor–Davidson Resilience Scale (CD-RISC) and the measure's validity among children and adolescent survivors in order to identify the factors associated with resilience in this socio-cultural setting.

Methods: Translated and culturally verified versions of the CD-RISC, UCLA-PTSD Index and Birmaher Self-rating Depression Scale were used to collect data from 2132 children and adolescents located in post-disaster areas 1 year after the event.

Results: Through exploratory factor analysis, a 2-factor model was found and defined by Chinese scholars as Rational Thinking and Self-Awareness. Internal consistency of total CD-RISC was 0.86, 0.91 for Rational Thinking and 0.74 for Self-Awareness. Convergent validity between items ranged from 0.17–0.69 and 0.12–0.20 to the total score. Items related to post-traumatic stress disorder loaded separately than CD-RISC items, demonstrating discriminant validity.

Conclusions: Our findings demonstrate that resilience may be understood and manifested dissimilarly in different socio-cultural settings. This study confirms the applicability of the CD-RISC scale to Chinese children and adolescent earthquake survivors, and adds to the richness of resilience research cross-culturally.

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1. Introduction

Previous studies have shown that post-traumatic stress disorder (PTSD) is a common mental health problem in victims of disasters in Western (Acierno et al., 2007; Altindag et al., 2005) and Asian countries (Kumar et al., 2007; Shinfuku, 2002). A study of children one and a half years after the 1988 earthquake in Armenia found high rates of chronic, severe post-traumatic stress reactions, suggesting that such negative psychological outcomes can remain high for extended periods, and may jeopardize the well-being of children (Pynoos et al., 1993). However, many children endure a traumatic event without negative consequences on their psychological or behavioral functioning (Elbedour et al., 1993). This capacity to sustain functioning and achieve adaptive outcomes in the face of great adversity has been termed “resilience” (Masten, 2007).

Many researchers have contributed to the theoretical literature on resilience (Garmezy and Masten, 1994; Luthar et al., 2000; Rutter, 1979; Werner and Smith, 1982). Child and youth resilience in adverse conditions is viewed as an accumulation and interplay of genetics and “dynamic processes” (Luthar et al., 2000) involving transactions between the individual, family and environment (Egeland et al., 1993). Researchers agree that resilience is specific to the context, population, risk exposure, promotive/protective factors and the outcome (Fergus and Zimmerman, 2005).

1.1. Current gaps in cross-cultural resilience research

International perspectives on resilience are lacking and it would be beneficial to investigate types of risk and protective factors that appear across dissimilar cultural contexts as well as those specific to certain locales (Masten and Hubbard, 2002). This study conducts a psychometric assessment of the Connor–Davidson Resilience Scale (CD-RISC) (Connor and Davidson, 2003) and the measure's validity among children and adolescent survivors in order to identify the factors associated with resilience in this socio-cultural setting.

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The CD-RISC is a promising measure that has been widely used in various cultural settings, including the U.S., India (Singh and Yu, 2010), South Africa (Jorgensen and Seedat, 2008), South Korea (Baek et al., 2010), Turkey (Karairmak, 2010) and China (Wang et al., 2010; Yu and Zhang, 2007) among the general population (Connor and Davidson, 2003; Yu and Zhang, 2007), Generalized Anxiety Disorder patients, university students (Campbell-Sills and Stein, 2007), and adult survivors of an earthquake (Karairmak, 2010; Wang et al., 2010). The scale has demonstrated robust internal consistency with Cronbach's alpha ranging between 0.89 and 0.93 (Baek et al., 2010; Connor and Davidson, 2003; Karairmak, 2010; Singh and Yu, 2010; Yu and Zhang, 2007), test-retest reliability of 0.87 (Connor and Davidson, 2003), and convergent validity by being positively correlated with the Kobasa hardiness measure in psychiatric outpatients (Pearson $r=0.83$, $p\text{-value} < 0.0001$) (Connor and Davidson, 2003).

Connor and Davidson (2003) performed exploratory factor analysis (EFA) with data from a general population of 577 adults in the U.S. and found a 5-factor model that included, self-efficacy and persistence in overcoming challenges, coping ability, adaptability, ability to obtain goals and perceived access to social support, and faith in God or fate. However, subsequent studies were not able to replicate the 5-factor structure originally reported. Research in the U.S. by Campbell-Sills and Stein (2007) reported that the original scale had an unstable factor structure across two demographically equivalent samples. These results were similar to a Chinese study of the scale that reported a 3-factor structure in a sample of 560 Chinese adults (Yu and Zhang, 2007).

2. Methods

2.1. Procedure

The 2008 Sichuan earthquake that measured a magnitude 7.9 on the Richter scale (Chan et al., 2010) affected 45.6 million people (Bhatia et al., 2010), lead to over 69,000 deaths and left almost 5 million people homeless and displaced (Wang et al., 2009).

This study utilized cross-sectional survey data collected from Chinese children and adolescent participants of a psychosocial intervention that was implemented by Mercy Corps, an international humanitarian aid organization, in Sichuan, China. The intervention was implemented from July 2008 to July 2009 to reduce risk for PTSD and improve resilience in children and adolescents in the earthquake disaster areas.

Data was collected by the Department of Psychology West China University Medical School. West China researchers selected intervention and control schools located within the same geographic region. Student respondents were then selected randomly by participating grade levels. For the control group, four schools that were found comparable in terms of geographic location, damage suffered from the earthquake, student demographics and socio-economic conditions were selected. The only inclusion criteria for both groups was the respondent had to be 6 years of age or older and attend public school in designated severely affected disaster areas. The age criterion helped minimize comprehension problems younger children may have faced with the self-report survey.

The CD-RISC was translated into Mandarin Chinese by two West China psychologists. A panel of Chinese psychologists reviewed the translated instrument before it was back-translated by a third-party researcher into English. Differences in the back-translation were shared with the Chinese panelists for revision. Survey data was collected between May and November 2009.

Children and adolescents completed the self-report questionnaire in their homeroom classroom under the supervision of their teacher. Respondents were informed about the purposes of the program evaluation at the beginning of the survey and completion of the survey was taken as assent from the child or adolescent. Teacher consent was collected in place of parental consent. A total of 2132, ranging from 6 to 16 years-old were sampled. Half of were female ($SD=0.50$) with a mean age of 11.7 years ($SD=2.18$) and mean grade level of 5.86 ($SD=2.13$). The Institutional Review Board of the Johns Hopkins Bloomberg School of Public Health approved all aspects of this study.

2.2. Measures

The CD-RISC is a 25-item scale, using a 5-point range of responses that includes not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4) (Connor and Davidson, 2003). Responses are based on how the respondent felt over the past month. Total scores on the CD-RISC range from 0 to 100, with higher scores corresponding to greater resilience (Connor and Davidson, 2003).

Risk for PTSD symptoms was measured using the UCLA-PTSD Index for DSM-IV (Rodriguez et al., 1999). The UCLA-PTSD Index is a 22-item self-report measure, assessing trauma exposure and post-traumatic stress symptoms among children and adolescents (Steinberg et al., 2004). Items are rated on a five point frequency scale and scores can either be summed up to form a severity score or scored categorically to determine a likely diagnostic grouping.

Risk for depression was measured using the Birlenson Depression Self-rating scale (DSRS) developed by Birlenson (1981). The DSRS is an 18-item self-report questionnaire that asks the child respondent to rate his own situation during the past week on a 3-point scale of “most of the time”, “sometimes” or “never”.

2.3. Statistical analysis

Analysis was performed using Stata 11 (StataCorp., 2007) statistical package and Mplus 6.11, a latent variable software program (Muthén and Muthén, 1998–2007). The first procedure was to perform exploratory data analysis and tabulations. Histograms and stem and leaf plots were used to assess frequency distributions, normality, outliers and missing data. Descriptive statistics was conducted to examine the means and standard deviations of social demographics and resilience scores. Statistical significance required a two-sided $p\text{-value}$ of < 0.05 .

Internal consistency, a type of reliability was assessed, using the Cronbach alpha scores (Cronbach, 1951) that were adjusted using polychoric correlations instead of Pearsons. The CD-RISC is based on a Likert scale from 0 to 4, thus, violating the Pearson correlation's assumption of interval measurement scales, which underestimates the degree of association between observed variables and standard errors (DiStefano, 2002; Saris et al., 1998). The following equation based on the polychoric correlation matrix was used to calculate the coefficient alpha:

$$\alpha = \frac{p[f^-]^2 - f^{-2}}{p - 1[p(f^-)^2 + u^{-2}]}$$

where f^- is the average of the p factor loadings, f^{-2} is the average of the squares of the p factor loadings, and u^{-2} is the average of the squared p uniquenesses (McDonald, 1985; Zumbo et al., 2007).

Convergent validity was measured through polychoric correlations between indicators measuring resilience. Discriminant validity was examined by testing whether indicators of theoretically dissimilar factors loaded on different factors or not. External

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