Psychometric Properties of the Traditional Chinese Version of the Child and Adolescent Needs and Strengths-Trauma Comprehensive

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Abstract

Objective: To determine the internal consistency, construct validity, and scaling properties of the traditional Chinese version of the Child and Adolescent Needs and Strengths-Trauma Comprehensive (TC-CANS-Trauma).

Methods: 66 male and 62 female children, adolescents, and young adults aged 3 to 22 years who were referred to trauma treatment service were selected by convenience sampling. The original English version of the CANS-Trauma was translated to traditional Chinese by a medical professional, back-translated to English by a clinical psychologist, and then cross-checked by another psychologist to ensure consistency. Chinese wordings were adjusted to maintain the conceptual rather than literal meaning. Participants were assessed using the TC-CANS-Trauma as well as the traditional Chinese version of the Life Events Checklist (LEC), the Children's Impact of Event Scale-Revised (CHIES-R), the Strengths and Difficulties Questionnaire-Impact Component (SDQ-Impact), and the Parenting Sense of Competence (PSOC). Internal consistency of eight primary domains of the TC-CANS-Trauma was evaluated by Cronbach's alpha. Construct (convergent and divergent) validity of five of these domains with the LEC, the CHIES-R, the SDQ-Impact, and the PSOC was assessed. Rasch modelling was used to evaluate the scaling properties of the eight primary domains of the TC-CANS-Trauma.

Results: Internal consistency of the eight primary domains of the TC-CANS-Trauma was satisfactory, with Cronbach's alpha ranging from 0.63 to 0.90. Construct (convergent and divergent) validity of five of these domains with the LEC, the CHIES-R, the SDQ-Impact, and the PSOC was good. In Rasch modelling, most TC-CANS-Trauma domains showed good item separation values. Infit and outfit statistics of most domain items were <2 indicating good item fitness in their respective domains. For person separation, all domains of the TC-CANS-Trauma did not have a sufficient discriminability to identify high and low performers.

Conclusions: The TC-CANS-Trauma is valid for comprehensive assessment of trauma-related domains among Hong Kong children and adolescents. Its ratings can be used to guide the levels of clinical intervention required. Clinicians are recommended to implement the TC-CANS-Trauma to facilitate trauma-informed practice in Hong Kong.

Key words: Adolescent; Child; Child, preschool; Psychological trauma; Psychometrics; Young adult

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Introduction

Trauma-informed practice involves (1) practitioners' sensitivity towards the effects of trauma, (2) clients' physiological and psychological safety, and (3) service users' strengths and resources.[1] Service providers should ensure that professional and administrative staff have a comprehensive understanding of the impacts of trauma and the ability to carry out trauma-informed assessment and formulate responsive interventions.[2,3] Traumatised children tend to have more self-regulation problems, poorer responses to consequences of aggressive behaviours, and more deficient of optimism.[4] Complex trauma (ie, prolonged exposure to adverse interpersonal events such as abuse) can be detrimental to children's development[5] and may result in developmental difficulties such as insecure attachment, affect dysregulation, and cognitive dysfunction.[6] The array of needs of traumatised children necessitates the trauma-informed practice among frontline healthcare service providers.

From 2001 to 2010, the incidence of child abuse in Hong Kong had increased by 87%. The rate of admission to hospital secondary to child maltreatment has increased since 2001.[7] Hong Kong children with experiences of complex trauma are associated with a higher degree of

attachment insecurity and posttraumatic stress disorder reactions.[8] A Hong Kong commissioned report concluded an association between child abuse and mental illness among victims.[7] Indeed, exposure to abuse affects both victims and perpetrators. 66% of perpetrators of child abuse have a history of child maltreatment themselves; this suggests an intergenerational transmission of trauma.[7] The prevalence of depressive and anxiety disorders among Hong Kong adults is 13.3%, which is comparable to that in other developed regions,[9] whereas the prevalence of common mental disorders among Hong Kong adolescents is 16.4%.[10] In Hong Kong, the number of patients seeking public hospitals' psychiatric services increased from 187 000 in 2011-12 to >220 000 in 2015-16.[11] Thus, service providers need to equip their frontline staff with higher sensitivity to trauma among children and adolescents, as well as caregivers. However, trauma-informed practice is not yet a mainstream practice in Hong Kong.[12] Validation studies in Hong Kong mainly focus on tools for screening and identifying trauma events or symptoms,[13-15] rather than comprehensive trauma-informed assessment. Therefore, the aim of the present study was to determine the internal consistency, construct validity, and scaling properties of the traditional Chinese version of the Child and Adolescent Needs and Strengths-Trauma Comprehensive (TC-CANS-Trauma).

Methods

66 male and 62 female children, adolescents, and young adults aged 3 to 22 (mean, 10.75±4.89) years who were referred to trauma treatment service by a non-governmental organisation were selected by convenience sampling. Informed consent was obtained from each participant; participants were free to withdraw from the study at any time. Caregivers of the participants were most commonly mothers (80.5%), followed by fathers (12.5%) and others (7%) such as grandparents, aunts, and foster care parents.

The original English version of CANS-Trauma was developed by Northwestern University and the National Child Traumatic Stress Network, with its copyrights held by the Praed Foundation for free usage.[16] It is used to assist in planning and evaluating trauma cases.[16] It also guides the degree of corresponding interventions required in trauma-informed practice.[16] It is a 110-item, clinician-rated tool that covers eight primary domains: trauma exposure, traumatic stress symptoms, child strengths, life functioning, acculturation, child emotional/behavioural needs (ie, child mental health), child risk behaviours, and caregiver needs and strengths. In addition, there are two optional domains. Each item is rated on a 4-point scale from 0 (no evidence of trauma, no evidence of need, or centrepiece strength), 1 (single incident, mild need, or useful strength), 2 (multiple incidents, moderate need, or identified strength but must be built) to 3 (repeated incidents, severe need, or no strength). Higher scores indicate greater needs and less strength. The ratings for the scale guide the levels of action: 0 (no need for action), 1 (prevention), 2 (action needed), and 3 (immediate action); ratings of 2 and 3 require clinical interventions.[16] The original CANS-Trauma has acceptable internal consistency and good inter-rater reliability, convergent validity, and scaling properties.[17] With reference to previous studies,[18-20] the TC-CANS-Trauma is expected to demonstrate at least acceptable internal consistency and convergent validity.

The original English version was translated to traditional Chinese by a medical professional, back-translated to English by a clinical psychologist, and then cross-checked by another psychologist to ensure consistency. Chinese wordings were adjusted to maintain the conceptual rather than literal meaning. The TC-CANS-Trauma was then used by trained clinicians for clients and caregivers. The TC-CANS-Trauma was completed by clinicians who had been trained through the tool's training website. Trainees needed to rate a clinical vignette to pass a test with a reliability score of ≥0.70.

Other tools used included the traditional Chinese version of the Life Events Checklist (LEC), Children's Impact of Event Scale-Revised (CHIES-R), Strengths and Difficulties Questionnaire-Impact Component (SDQ-Impact), and Parenting Sense of Competence (PSOC).

The LEC is a 17-item clinician-administered structured interview to assess respondent's exposure to traumatic events, with ratings from 0 (does not apply), 1 (not sure), 2 (learned about it), 3 (witnessed it) to 4 (happened to me).[21,22] The original LEC has optimal convergent validity.[23] The Traditional Chinese version of the clinician-administered posttraumatic stress disorder scale for DSM-IV has been validated against the Impact of Event Scale-Revised and the Posttraumatic Stress Disorder Checklist.[24]

The CHIES-R is a 15-item, self-report scale that measures three areas of psychological impacts of trauma (hyperarousal, avoidance, and intrusion) in children. The level of distress for each item is rated on a 5-point scale from 0 (no influence) to 3 (moderate influence) to 5 (greatest influence).[25,26] The Chinese versions of the CHIES-R have good reliability and construct validity and have a stable three-factor structure.[26,27]

The SDQ comprises 25 behavioural questions rated by a parent or teacher to assess the child's total difficulties (ie, SDQ-Difficulties), SDQ-Impact (social impact in areas of family life, leisure activities, academic learning, and social relationships), and pro-social behaviours.[28] Ratings range from 0 (none or minimal), 1 (somewhat) to 2 (definite). The Chinese version of SDQ-Difficulties and SDQ-Impact have optimal internal consistency, test-retest reliability, and validity.[29,30] Compared with the SDQ-Difficulties, the SDQ-Impact is more sensitive in predicting clinical caseness in the local context.[30] Thus, the SDQ-Impact was used.

The PSOC is a 17-item, self-rated measure to assess the parents' perception of their abilities to handle parenting in terms of satisfaction and efficacy on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree).[31-33] The subscale of parenting efficacy was used owing to its higher degree of relevance to the caregiver needs and to the strengths

domain of the CANS-Trauma. The traditional Chinese version of PSOC has good internal consistency, test-retest reliability, and construct validity, as well as a stable two-factor structure.[34]

Internal consistency of the eight primary domains of the TC-CANS-Trauma was evaluated using Cronbach's alpha. A reliability score of >0.7 indicates good internal consistency. A previous psychometric study of the CANS-Trauma assessed the convergent and divergent validity of only four domains (trauma exposure, traumatic stress symptoms, child emotional/behavioural needs, and child risk behaviours) based on their expected correlations with other validated tools.[17] The present study thus assessed convergent and divergent validity of these domains plus the caregiver needs and strengths domain with the LEC, the CHIES-R, the SDQ-Impact, and the PSOC. A Pearson correlation coefficient of ≥0.3 with p < 0.05 was considered moderate to strong validity. Rasch modelling was used to evaluate the scaling properties of the eight primary domains of the TC-CANS-Trauma.[35] An item separation value of ≥2, corresponding to an item reliability of ≥0.8, indicates a large enough sample size and wide enough difficulty coverage of the items within the domain. Infit and outfit statistics of <2 indicates a good fitness of the items within a domain. A person separation value of ≥2, corresponding to a person reliability of ≥0.8, indicates a good-enough discriminability of the domains to identify high and low scorers.[35]

Results

Internal consistency of the eight primary domains of the TC-CANS-Trauma was satisfactory, with Cronbach's alpha of 0.90 for child strengths (11 items), 0.77 for acculturation (4 items), 0.77 for caregiver needs and strengths (13 items), 0.72 for traumatic stress symptoms (8 items), 0.71 for life functioning (13 items), 0.65 for child emotional/behavioural

needs (13 items), 0.64 for child risk behaviours (11 items), and 0.63 for trauma exposure (14 items).

The trauma exposure domain was strongly correlated with the LEC ($r = 0.66$, p < 0.001) and weakly correlated with the SDQ-Impact ($r = 0.24$, p = 0.024) but was not correlated with the CHIES-R or the PSOC (Table 1). The traumatic stress symptoms domain was moderately correlated with the LEC ($r = 0.35$, p = 0.023) and the CHIES-R ($r = 0.30$, p = 0.037) and weakly correlated with the SDQ-Impact ($r = 0.23$, p = 0.035) but not correlated with the PSOC. The association between trauma exposure and traumatic stress symptoms leads to the adoption of the posttraumatic stress disorder diagnosis, in which theoretical formulation can be traced back to the stress response syndromes.[36] The child emotional/behavioural needs domain was moderately associated with the SDQ-Impact ($r = 0.39$, p < 0.001) but was not associated with the LEC, the CHIES-R, or the PSOC. The child risk behaviours domain was moderately associated with the LEC ($r = 0.34$, p = 0.030) and the SDQ-Impact ($r = 0.30$, p = 0.007) but was not correlated with the CHIES-R or the PSOC. The association between trauma exposure and child risk behaviours has been reported.[37,38] The caregiver needs and strengths domain was moderately and negatively correlated with the PSOC ($r = -0.31$, p = 0.003) but was not correlated with the LEC, the CHIES-R, or the SDQ-Impact.

In Rasch modelling, most TC-CANS-Trauma domains showed good item separation values (Table 2), which indicated a sufficient sample size and item difficulty coverage. However, the acculturation domain and the child risk behaviours domain did not have satisfactory item distributions, owing to a narrow item difficulty range in these two domains. With reference to a similar validation study,[17] the category probability curve of the acculturation domain revealed a lack of endorsement of 3 (ie, severe need) by raters, whereas scores of 0, 1, and 2 were clearly

Table 1. Construct validity between five domains of the traditional Chinese version of the Child and Adolescent Needs and Strengths-Trauma Comprehensive (TC-CANS-Trauma) and other tools

Tool	TC-CANS-Trauma domain				
	Trauma exposure	Traumatic stress symptoms	Child emotional/ behavioural needs	Child risk behaviours	Caregiver needs and strengths
Life Events Checklist	$r = 0.66$, p < 0.001	$r = 0.35$, p = 0.023	$r = 0.28$, p = 0.073	$r = 0.34$, p = 0.030	$r = 0.20$, p = 0.234
Children's Impact of Event Scale-Revised	$r = 0.05$, p = 0.717	$r = 0.30$, p = 0.037	$r = 0.11$, p = 0.442	$r = 0.18$, p = 0.201	$r = 0.07$, p = 0.610
Strengths and Difficulties Questionnaire-Impact Component	$r = 0.24$, p = 0.024	$r = 0.23$, p = 0.035	$r = 0.39$, p < 0.001	$r = 0.30$, p = 0.007	$r = 0.01$, p = 0.906
Parenting Sense of Competence	$r = -0.14$, p = 0.186	$r = -0.13$, p = 0.234	$r = -0.08$, p = 0.461	$r = -0.11$, p = 0.312	$r = -0.31$, p = 0.003

Table 2. Person and item distribution scores for the eight primary domains of the traditional Chinese version of the Child and Adolescent Needs and Strengths-Trauma Comprehensive (TC-CANS-Trauma)
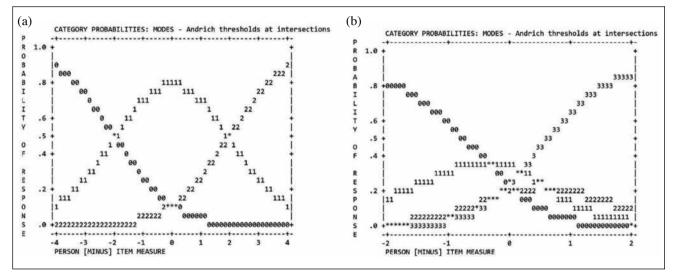
TC-CANS-Trauma domain	Person distribution		Item distribution	
	Separation	**Reliability**	**Separation**	**Reliability**
Trauma exposure	0.42	0.15	2.20	0.83
Traumatic stress symptoms	1.23	0.60	5.22	0.96
Child strengths	1.59	0.72	2.90	0.89
Life functioning	1.17	0.58	2.82	0.89
Acculturation	0.00	0.00	0.73	0.35
Child emotional/behavioural needs	1.01	0.50	2.76	0.88
Child risk behaviours	0.00	0.00	0.32	0.09
Caregiver needs and strengths	1.30	0.63	2.87	0.89

Figure 1. Category probability curves of (a) the acculturation domain and (b) the child risk behaviours domain.

separated (Figure 1a). The category probability curve of the child risk behaviours domain revealed a score of 2 (ie, moderate need), which was not very distinct from other ratings (Figure 1b).

Infit and outfit statistics of most domain items (except for the spiritual/religious item under the child strengths domain, the sexual development item under the life functioning domain, and the marital/partner violence item under the caregiver needs and strengths domain) were <2 indicating good item fitness in their respective domains. Thus, each domain measured a construct with a single underlying dimension.

For person separation, all domains of the TC-CANS-Trauma did not have sufficient discriminability to identify high and low performers. Thus, the TC-CANS-Trauma was not sensitive enough to differentiate children with high

prevalence of symptoms from those with low prevalence of symptoms. The variable maps of all domains consistently showed a low tendency for clinicians to rate a high score (Figure 2).[17]

Discussion

TC-CANS-Trauma had satisfactory internal consistency across five primary domains, good construct validity, and acceptable scaling properties. The domains of trauma exposure, child emotional/behavioural needs, and child risk behaviours showed marginally acceptable internal consistency. Although removal of some items may slightly increase the reliability, this may compromise the communication value of the assessment tool,[19,20] because various items in each domain are designed to tap into a
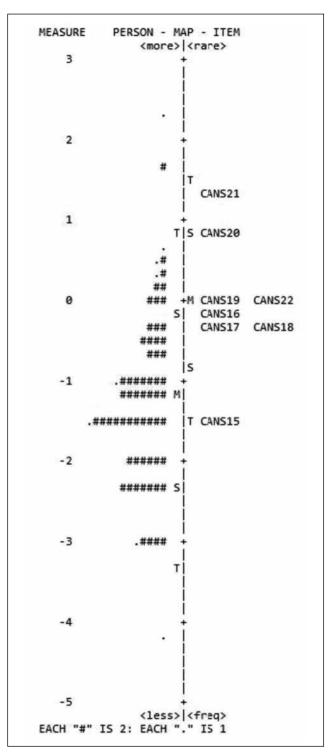
Figure 2. Variable map of the traumatic stress symptoms domain as an example to show a low tendency for clinicians to rate a high score.

wide range of potential needs (eg, suicide risk, sexual aggression, and fire-setting in the child risk behaviours domain). Although a traumatised child or youth is not likely to have elevated scores in all these items, keeping

these items in their respective domains is necessary for a comprehensive trauma-informed assessment. Therefore, this study recommends that the TC-CANS-Trauma retain all domain items, owing to the satisfactory internal reliability in general.

Convergent validity of the TC-CANS-Trauma was good. The domains of trauma exposure, traumatic stress symptoms, and caregiver needs and strength were moderately to strongly correlated with the LEC, the CHIES-R, and the PSOC, respectively, whereas the domains of child emotional/behavioural needs and child risk were moderately correlated with the SDQ-Impact. Divergent validity of the TC-CANS-Trauma was good. The domains of trauma exposure, child emotional/behavioural needs, and caregiver needs and strengths were weakly or not correlated with constructs of other tools that did not correspond to these three domains. The domains of traumatic stress symptoms and child risk behaviours were moderately associated with the LEC (which measures trauma exposure). Trauma experience increases the risk of having traumatic stress symptoms such as avoidance and risk behaviours such as risky sex.[36-38]

The overall scaling properties of the TC-CANS-Trauma were acceptable. The eight primary domains showed sufficient item fitness, and hence they measured constructs with a single underlying dimension. Six of the eight domains demonstrated sufficient difficulty coverage of items. Although the item separation value of the acculturation domain was not satisfactory, this may be due to an absence of such needs in the sample.[17,20] For the inadequate item separation in the child risk behaviour domain, the less distinctiveness of the score of 2 (ie, moderate need) might indicate that a 3-point scale rather than the current 4-point scale is more adequate for this domain. However, to maintain a consistent scoring system for the TC-CANS-Trauma, the 4-point scale is still recommended for the child risk behaviours domain. A larger sample is needed to generate a more satisfactory item reliability result, particularly for the child risk behaviour domain.[35]

All domains of the TC-CANS-Trauma were less able to discriminate children with fewer difficulties related to trauma, consistent with a study.[17] This is not an issue, because the tool was designed to target children with a greater level of needs with regard to trauma.[16] Surprisingly, the child strengths domain of the TC-CANS-Trauma showed an inadequate sensitivity, whereas that of the CANS-Trauma showed a satisfactory sensitivity.[17] The difference might be attributed to cultural differences, as Hong Kong people tend to be critical when appraising positive information.[39] Local clinicians are advised to adopt a more strength-based approach while assessing the competency and resources of Hong Kong traumatised children, adolescents, and young adults.

The current study has limitations. Owing to limited resources, a second assessor was not included and thus inter-rater reliability was not assessed, unlike similar validation studies that emphasise the communication value in the

CANS-Trauma.[18-20] Validation of the two optional domains (ratings for those aged ≤5 years and those transitioning to adulthood) was not included. Inclusion of younger children and older adolescents may enable a more comprehensive evaluation of the characteristics of all ten domains as well as the age effects. Nonetheless, the findings of the study suggest the use of the eight domains of the TC-CANS-Trauma for those aged 3 to 22 years given that the assessors provide the ratings "in the context of what is normative for the child's age/developmental stage", as stated in the guideline.[16]

Conclusion

The TC-CANS-Trauma is valid for the comprehensive assessment of trauma-related domains among Hong Kong children and adolescents. Its ratings can be used to guide the level of clinical intervention required. Clinicians are recommended to implement the TC-CANS-Trauma to facilitate trauma-informed practice in Hong Kong.

Acknowledgements

Declaration

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