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# The Chinese version of the Tampa Scale for Kinesiophobia was cross-culturally adapted and validated in patients with low back pain

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## Abstract

**Objectives:** The aim of the present study was to obtain a cross-cultural adaptation and evaluation of a Simplified Chinese (SC) version of the Tampa Scale for Kinesiophobia (TSK) for use in patients with low back pain (LBP).

**Study Design and Setting:** The TSK was translated and adapted cross-culturally following international guidelines. It was administered to 150 patients with LBP along with the Fear Avoidance Beliefs Questionnaire, Oswestry Disability Index, Short Form Health Survey, and a pain visual analog scale assessment. Measurement properties, including content validity, construct validity (structural validity and hypotheses testing), internal consistency, and test–retest reliability, were tested.

**Results:** The final analysis included data from 142 patients. Content validity analysis led to the exclusion of four reverse-scored items due to low item–total correlation. Structural validity analysis favored a three-factor structure: somatic focus, activity avoidance, and avoidance belief. Construct validity analysis confirmed 9 of 11 a priori hypotheses. Both the 17-item and 13-item versions of the SC-TSK had excellent internal consistency (Cronbach's $\alpha = 0.74$ and 0.82, all values, respectively) and test–retest reliability (intraclass correlation coefficient = 0.86, 0.90).

**Conclusion:** TSK was adapted successfully into an SC version with excellent internal consistency and test–retest reliability and with acceptable construct validity. A 13-item, three-factored SC-TSK structure was deemed to be a good fit for Chinese patients and appropriate for clinical and research use in mainland China. 

*Keywords:* Tampa Scale for Kinesiophobia; Cross-cultural adaptation; Simplified Chinese; Reliability; Validity; Low back pain

## 1. Introduction

Low back pain (LBP), a common cause of disability, can deteriorate the quality of life of afflicted patients [1,2]. The incidence rate of LBP is high in both developed and developing countries, including China [3]. The prevalence rate of LBP in China's massive populations is not firmly known. Incidence rates have been estimated to be more than 60% for drivers and other high-risk workers in China [4]. It is imperative to get a detailed understanding of how LBP affects the lives of people in terms of the pain they endure, their functional status, and their quality of life [5]. Such information will be useful for the development of preventive and treatment strategies.

The fear-avoidance model, which predicts pain perpetuity and pain-defensive behavior in patients with chronic musculoskeletal pain, is gaining attention [6]. Based on this model, kinesiophobia is conceptualized as an irrational fear of physical movement due to perceived risk of pain [7]. The Tampa Scale for Kinesiophobia (TSK) and Fear Avoidance Beliefs Questionnaire (FABQ) are often used to evaluate fear of movement in patients with LBP [8]. The TSK has been reported to be an excellent predictor of disability in patients with LBP [9,10] and has been shown to have satisfactory reliability and validity in the evaluation of fear of movement [11–27]. Multicenter international research requires cross-culturally adapted instruments and rigorous measurement properties for a target population before use [28]. The TSK, which was originally developed in American English and validated across several English-

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**What is new?**

**Key findings**

- The Tampa Scale for Kinesiophobia (TSK), a questionnaire assessing fear of movement/(re)injury resulting from pain, was translated into Simplified Chinese (SC) and adapted for use in patients with low back pain (LBP) in mainland China.

**What this adds to what was known?**

- Psychometric evaluation of the TSK favored a 13-item, three-factored SC-TSK, which demonstrated good internal consistency, test−retest reliability, and construct validity.

**What is the implication and what should change now?**

- The SC-TSK can be considered a valid instrument for Chinese-speaking LBP patients in clinical practice and research in mainland China.

speaking populations [11−14], has been adapted successfully for use in Dutch [12,16−20], Swedish [18,21−23], Norwegian [24], Spanish [25], Brazilian [26], and Italian [27] populations with solid reliability and sound validity.

Many modified versions of the TSK have been developed from the original TSK that was introduced in 1995 [11,13−19,22,23,25,27,29]. Vlaeyen et al. [16] produced a four-factor Dutch version using principal component analysis (PCA) with oblique rotation. Clark et al. [11] obtained a two-factor solution for a 13-item English version (with the reverse-scored items excluded) via exploratory factor analysis. Lundberg et al. [21] obtained a five-factor solution based on the 17-item Swedish version and then produced a reduced 4-item, single-factor structured version [22]. Recently, an 11-item, two-factor English version was proven to be invariant across Dutch, Swedish, and Canadian samples [18].

A group in Hong Kong cross-culturally adapted the TSK into traditional Chinese and validated the traditional Chinese TSK in a Hong Kong sample [29]. However, there are substantial cultural differences between Hong Kong and mainland China, including distinct official languages. In mainland China, Mandarin (Putonghua) is the dominant dialect spoken and simplified Chinese (SC) is the official written language. Meanwhile, English and Cantonese are the official spoken languages of Hong Kong, and the people of Hong Kong use traditional Chinese characters. Hong Kong is a special administrative region of the People's Republic of China, with its own political and health care systems. Because of the substantive differences between the residents of Hong Kong and the residents of China, the Hong Kong version of the TSK is not appropriate for use in mainland Chinese patients. The aims of this study were to cross-culturally adapt the TSK for use in mainland China and to evaluate the measurement properties of the resultant SC-TSK.

## 2. Materials and methods

### 2.1. Overview of study design

This study was carried out in two stages: (1) linguistic translation and cross-cultural adaptation of SC-TSK and (2) testing of the measurement properties of SC-TSK, including content validity (committee judging, item response trend, and item−total correlation), construct validity (structural validity and priori hypotheses), and reliability (internal consistency and test−retest reliability).

### 2.2. Translation and cross-cultural adaptation

Translation and cross-cultural adaptation of the original English TSK version to SC was performed according to established guidelines for the process of cross-cultural adaptation of self-report measure [28,30]. Two bilingual translators, who spoke Chinese as their first language, each translated the English version to SC independently. One translator was the author of this article (X.W.), who was aware of the translation purpose and the concepts underlying the TSK. The other one was an English teacher without a medical background who was blinded to the study's purpose. An expert committee comprised four translators, two orthopedic surgeons, one physician specializing rehabilitation, one physical therapist, and two patients with LBP was set up to compare the two English-to-SC translations with each other and with the original English version. A single final version was agreed based on the two forward translations, with item translation discrepancies being resolved by consensus.

The step-two backward translation was performed by two independent native English speakers who spoke Chinese as their second language and were blinded to the study purpose. Both translators were without a medical background and were not informed about the prior translation procedures or the original document. The committee reached agreement on the semantic, idiomatic, experiential, and conceptual equivalence between the original and the target versions.

Finally, the penultimate SC-TSK was pilot tested in a cohort of 35 patients with LBP. Each patient completed the SC-TSK and was interviewed subsequently about whether they experienced any difficulties in completing the questionnaire or understanding the purpose and meaning of each question. The expert committee took into account all the findings and then developed the final SC-TSK (Appendix at www.jclinepi.com), which was subjected to further measurement testing.

### 2.3. Participants

A cohort of 150 consecutive patients with a diagnosis of nonspecific LBP was recruited from the outpatient