

TRANSLATION AND RELIABILITY EVALUATION OF THE THAI VERSION OF THE EXERCISE ADDICTION INVENTORY-3 (T-EAI-3)*

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Abstract

Exercise addiction is a behavioral condition characterized by compulsive engagement in physical activity despite physical, psychological, and social consequences. Accurate and culturally appropriate assessment tools are essential for screening and research; however, a validated Thai version of the Exercise Addiction Inventory-3 (EAI-3) has not yet been available. This study aimed to translate and examine the translation validity of the EAI-3 into the Thai language to support exercise addiction research in Thailand. The translation process followed Brislin's translation framework. Forward translation was conducted by professors with expertise in languages, while back-translation was performed independently by professors specializing in psychology. The Thai Exercise Addiction Inventory-3 (T-EAI-3) demonstrated strong cross-language

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agreement with the original English version, with Pearson's correlation coefficients ranging from .732 to .918. Mean differences were minimal, indicating negligible language-related bias. In addition, the T-EAI-3 demonstrated acceptable internal consistency reliability, with Cronbach's alpha coefficient of .784. The T-EAI-3 appears linguistically comparable to the original English version and suitable for use in future research.

Keywords: Exercise addiction, Exercise Addiction Inventory, reliability, Thai version

Introduction

Exercise addiction is a maladaptive behavioral pattern characterized by a compulsive and uncontrollable urge to engage in physical activity despite experiencing physical harm, psychological distress, or negative social and occupational consequences (Wang et al., 2026). Although regular exercise is widely promoted for its physical and psychological health benefits, excessive exercise may develop into a pathological behavior resembling behavioral addictions (Griffiths & Szabo, 2022). Individuals at risk of exercise addiction frequently report feelings of guilt when unable to exercise, continue exercising despite illness or injury, and prioritize exercise over personal, social, and professional responsibilities (Lichtenstein et al., 2021).

Accurate assessment of exercise addiction is essential for both clinical and research purposes. Early identification enables health professionals to distinguish between healthy exercise commitment and maladaptive exercise behavior, which is critical for preventing long-term physical injury, psychological distress, and comorbid mental health conditions such as anxiety, depression, and eating disorders (Di Lodovico et al., 2023; Marques et al., 2021). In research contexts, valid and reliable measurement instruments are necessary to estimate prevalence, identify high-risk groups, and examine associations between exercise

addiction and psychosocial variables, including motivation, emotional regulation, stress, and personality traits (Sicilia et al., 2020; Villeda et al., 2022).

Despite the growing recognition of exercise addiction, the availability of culturally appropriate assessment tools remains limited in some regions, including Thailand. Therefore, this study aimed to translate and psychometrically validate the Thai version of the Exercise Addiction Inventory-3 (T-EAI-3) to support both research and clinical practice within Thai populations.

Objectives

1. Translate the Exercise Addiction Inventory-3 (EAI-3) from the original English version into the Thai language using a standardized cross-cultural translation procedure.
2. Evaluate the content validity of the translated Thai version through expert review to ensure semantic and conceptual appropriateness.
3. Assess translation equivalence between the original English version and the Thai version to determine cross-language consistency.
4. Examine the internal consistency reliability of the T-EAI-3 to confirm its psychometric stability.

Literature Review

The Exercise Addiction Inventory has been developed to assess exercise addiction risk (EAI; Griffiths et al., 2005). However, this instrument has identified conceptual limitations that it does not sufficiently capture key pathological indicators such as guilt related to missed exercise sessions, continued exercise despite illness or injury, and perceived negative consequences—features now considered central to maladaptive exercise behavior within contemporary addiction frameworks (Lichtenstein et al., 2021; Szabo, 2021). These limitations

may reduce the instrument's ability to differentiate between high yet healthy exercise involvement and genuinely problematic exercise patterns.

To cover these limitations, the Exercise Addiction Inventory-3 (EAI-3) was developed as an expanded version of the original instrument (Granziol et al., 2023). The EAI-3 retained the six core components of behavioral addiction while initially incorporating three additional items assessing guilt, exercise despite illness or injury, and negative consequences arising from excessive exercise. However, cross-cultural psychometric evaluation demonstrated that one newly added item assessing negative consequences produced model misfit and violations of measurement invariance (Granziol et al., 2023). Consequently, this item was removed from the final version. The validated EAI-3 now consists of eight items, including two additional items from the original which assess guilt and exercise despite illness or injury. This refinement enhances conceptual clarity and improves sensitivity in identifying maladaptive exercise behavior across diverse populations (Granziol et al., 2021, 2023). Recent empirical studies have further supported the psychometric robustness and applicability of the EAI-3 for both screening and research purposes (Villella et al., 2022).

Despite the increasing international adoption of the EAI-3, including validated versions in Hungarian, Chinese, German, Italian, Japanese, and Turkish populations (Granziol et al., 2021; Szabo et al., 2024), a culturally adapted and psychometrically validated Thai version is not yet available. Cultural and linguistic differences may influence how individuals interpret concepts such as guilt, self-discipline, and social expectations related to exercise. Therefore, direct application of the original English version may not accurately reflect the experiences of Thai individuals. The absence of a validated Thai version limits both epidemiological research and clinical screening efforts within Thailand.

Methodology

This study employed a cross-sectional methodological design to translate and evaluate the Thai version of the Exercise Addiction Inventory-3 (EAI-3). The study consisted of two phases: (1) translation and cultural adaptation of the instrument and (2) assessment of translation validity and internal consistency reliability.

The translation followed Brislin's forward-backward translation procedure. Two bilingual experts independently translated the original English version into Thai. The translated versions were reconciled through discussion to ensure semantic and conceptual equivalence. The Thai version was then back-translated into English by independent bilingual psychology experts who were blinded to the original instrument. Discrepancies between the original and back-translated versions were reviewed and resolved to achieve linguistic accuracy. Content validity of the translated items was evaluated using the Index of Item-Objective Congruence (IOC). A pilot test was conducted with bilingual participants to assess clarity and comprehension before finalizing the Thai version (T-EAI-3).

A total of 40 bilingual Thai university students were recruited to evaluate translation equivalence. Eligibility criteria included being at least 18 years old and able to read and understand both English and Thai. Participants first completed the Thai version and, after a one-week interval, completed the original English version to reduce recall bias.

The EAI-3 consists of eight items assessing core components of exercise addiction. Items are rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with total scores ranging from 8 to 40. Higher scores indicate greater risk of exercise addiction. The Thai version followed the same scoring procedure as the original instrument.

Statistical analyses were conducted using IBM SPSS Statistics version 20. Translation validity was examined using item-level descriptive statistics and

Pearson's correlation coefficients between corresponding English and Thai items. Internal consistency reliability of the T-EAI-3 was assessed using Cronbach's alpha coefficient.

Table 1 Original Exercise Addiction Inventory-3 (EAI-3)

Item	Original Statements
Item 1	Exercise is the most important thing in my life
Item 2	Concerns have arisen between me and my family and/or my partner about the amount of exercise I do
Item 3	I use exercise as a way of changing my mood (e.g., to get a buzz, to escape, etc.)
Item 4	Over time I have increased the amount of exercise I do in a day
Item 5	If I have to miss an exercise session, I feel moody and irritable
Item 6	If I cut down the amount of exercise I do and then start again, I always end up exercising as often as I did before
Item 7	I feel guilty if I miss planned training or if my training does not go as well as planned
Item 8	I am inclined to train when (or before completely recovered from) illness or injury

Results

Translation validity of the Thai version of the Exercise Addiction Inventory-3 (T-EAI-3) was examined through item-level comparisons with the original English version. Descriptive analyses indicated highly comparable mean scores across all eight items, with mean differences ranging from -0.25 to 0.20. These minimal differences suggest negligible language-related response variation and support semantic equivalence between versions.

Pearson's correlation analyses demonstrated strong positive associations between corresponding Thai and English items, with coefficients ranging from .761 to .929. All correlations exceeded the recommended threshold of .70, indicating satisfactory cross-language consistency. The highest correlation was observed for Item 3 (.929), whereas the lowest was for Item 4 (.761), both within acceptable ranges for translation validation studies.

Internal consistency reliability of the T-EAI-3 was assessed using Cronbach's alpha. The overall alpha coefficient was .784, with a standardized alpha of .789, indicating acceptable and stable internal consistency across items.

Overall, these findings provide evidence of satisfactory translation validity and internal consistency reliability of the T-EAI-3, supporting its use as a linguistically equivalent and reliable instrument for assessing exercise addiction risk among Thai populations.

Table 2 Item-level comparison between Thai and English versions of the Exercise Addiction Inventory-3 (EAI-3)

Item	Thai mean ±SD	English mean ±SD	Mean Difference (T-E)	Pearson's r
1	3.68±0.97	3.83±1.03	-0.15	.784
2	2.05±1.43	2.30±1.42	-0.25	.788
3	3.85±1.37	3.78±1.40	0.07	.929
4	3.40±1.22	3.48±1.04	-0.08	.761
5	2.53±1.40	2.63±1.53	-0.10	.803
6	2.73±1.28	2.80±1.20	-0.07	.762
7	3.15±1.35	2.95±1.41	0.20	.824
8	2.28±1.36	2.23±1.19	0.05	.835

Table 3 Internal consistency reliability of the Thai Exercise Addiction Inventory-3 (T-EAI-3)

Scale	Number of items	Cronbach's Alpha (α)	Cronbach's Alpha (Standardized Items)
Thai Exercise Addiction Inventory-3 (T-EAI-3)	8	.784	.789

Discussion

The findings provide preliminary evidence that the T-EAI-3 demonstrates satisfactory linguistic equivalence and acceptable psychometric performance when administered to a bilingual Thai sample.

Item-level analyses showed minimal mean differences, indicating that the translation preserved the semantic meaning of the original items. Strong positive correlations support cross-language equivalence, suggesting that participants interpreted and responded to both versions consistently. These findings indicate that the forward-backward translation procedure successfully maintained conceptual clarity and content accuracy.

The internal consistency reliability of the T-EAI-3 ($\alpha = .784$) exceeded the recommended threshold of .70 for psychological research and was comparable to previously validated versions of the EAI. This suggests that the translated items function cohesively as a unified scale while retaining adequate item diversity. Compared with the original 6-item Thai EAI, which reported a Cronbach's alpha of .75 (Mattayakorn, 2019), the T-EAI-3 demonstrates slightly higher internal consistency.

Overall, the results support the use of the T-EAI-3 as a linguistically valid and internally consistent instrument for assessing exercise addiction risk among Thai populations. The instrument may serve as a useful screening and research tool in sport psychology, exercise science, and public health contexts.

Recommendation

Future research should further examine the construct validity and factorial structure of the T-EAI-3 using larger and more diverse Thai samples to strengthen its psychometric evidence. Additional studies are also recommended to evaluate its criterion-related validity and applicability in both clinical and sport settings.

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