

The Analysis of Validity and Reliability of the Indonesian's SCARED Instrument Using the Rasch Model

ABSTRACT

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This study aimed to evaluate the psychometric properties of the Indonesian version of the Screen for Child Anxiety Related Emotional Disorders (SCARED) using Rasch model analysis. The SCARED instrument was translated and adapted through a systematic process involving forward translation, backward translation, and expert reviews in both linguistics and psychology. A pilot study was conducted with 51 junior high school students to assess the instrument's validity and reliability. The Rasch analysis revealed satisfactory psychometric properties with a person reliability of 0.91 and item reliability of 0.94, indicating high consistency in measurement. The separation indices (person = 3.14, item = 4.00) demonstrated the instrument's ability to differentiate between varying levels of anxiety among respondents and varying item difficulties. The item information function analysis showed that most items had good discriminating power, particularly at moderate anxiety levels. These findings suggest that the Indonesian version of SCARED is a valid and reliable instrument for screening anxiety disorders in Indonesian children and adolescents. Further studies with larger and more diverse samples are recommended to establish normative data and confirm the five-factor structure of the instrument across different age groups and cultural contexts.

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INTRODUCTION

Anxiety disorders represent one of the most prevalent mental health concerns among children and adolescents worldwide, with global prevalence rates estimated between 5% and 20% (Polanczyk et al., 2015; Merikangas et al., 2010; Kessler et al., 2012). These disorders can significantly impair a child's daily functioning, academic performance, social relationships, and overall quality of life (Woodward & Fergusson, 2001; Van Ameringen et al., 2003; Essau et al., 2014). Despite their high prevalence and substantial impact, anxiety disorders in children often go undetected and untreated, particularly in non-Western countries where standardized assessment tools may not be readily available in local languages (Baxter et al., 2013; Rescorla et al., 2011; Belfer, 2008). Early identification of anxiety symptoms is crucial for timely intervention and prevention of long-term negative outcomes (Pine et al., 2009; Kessler et al., 2007; Roza et al., 2003), highlighting the urgent need for valid and reliable screening instruments adapted for diverse cultural contexts.

The Screen for Child Anxiety Related Emotional Disorders (SCARED) has emerged as one of the most widely used self-report measures for assessing anxiety symptoms in children and adolescents (Birmaher et al., 1999; Silverman & Ollendick, 2005; Muris et al., 2002). Developed by Birmaher and colleagues (1997, 1999, 2003), the SCARED consists of 41 items designed to screen for five types of anxiety disorders in accordance with DSM-IV criteria: panic disorder, generalized anxiety disorder, separation anxiety disorder, social anxiety disorder, and significant school avoidance. The instrument has demonstrated strong psychometric properties across various countries and cultural settings (Hale et al., 2011; Vigil-

Colet et al., 2009; Su et al., 2008), making it a promising candidate for cross-cultural adaptation.

In Indonesia, the prevalence of anxiety disorders among children and adolescents remains understudied, primarily due to the lack of properly adapted and validated assessment tools (Toseeb et al., 2012; Wiguna et al., 2010; Wulandari & Afiatin, 2015). The country's unique cultural context, with its collectivistic values, religious influences, and diverse ethnic backgrounds, may affect how anxiety symptoms are expressed, perceived, and reported by Indonesian children (Hofmann et al., 2010; Essau et al., 2011; Bernstein et al., 2005). This cultural specificity necessitates not just linguistic translation but comprehensive cultural adaptation of assessment instruments to ensure their validity and reliability within the Indonesian context (Sousa & Rojjanasrirat, 2011; Beaton et al., 2000; Guillemin et al., 1993).

The process of adapting psychological instruments across cultural and linguistic boundaries involves much more than direct translation. It requires careful consideration of semantic, idiomatic, experiential, and conceptual equivalence to ensure that the adapted instrument measures the same constructs as the original version (Brislin, 1970; van de Vijver & Tanzer, 2004; Hambleton et al., 2005). The International Test Commission (ITC) Guidelines for Translating and Adapting Tests emphasize a rigorous methodology involving multiple translators, back-translation procedures, expert reviews, and pilot testing to establish the psychometric properties of the adapted instrument (International Test Commission, 2017; Hambleton, 2001; Sireci & Berberoglu, 2000).

The Rasch measurement model offers a sophisticated approach to evaluating the psychometric properties of adapted instruments (Bond & Fox, 2015; Boone et al., 2014; Wright & Masters, 1982). Unlike classical test theory, Rasch analysis provides detailed information about item functioning, person ability estimates, and the match between items and respondents along a unidimensional continuum (Tennant & Conaghan, 2007; Smith et al., 2002; Pallant & Tennant, 2007). This approach is particularly valuable for cross-cultural instrument adaptation as it can identify items that function differently across cultural contexts, assess the hierarchical structure of the construct being measured, and provide evidence for construct validity beyond traditional reliability coefficients (van Alphen et al., 1994; Hagquist et al., 2009; Prieto et al., 2003).

Previous adaptations of the SCARED in various languages, including Chinese, Dutch, South African, and Spanish versions, have generally supported its five-factor structure and demonstrated good internal consistency and test-retest reliability (Hale et al., 2005; Muris et al., 2006; Weitkamp et al., 2010; Ogliari et al., 2006). However, some cultural variations have been noted in factor loadings and item functioning (Crocetti et al., 2009; Delvecchio et al., 2017; Boyd et al., 2003), emphasizing the importance of thorough psychometric evaluation when adapting the instrument to new cultural contexts. To date, there has been limited research on the psychometric properties of the SCARED in Indonesian populations (Budiyanto et al., 2019; Indriyana & Wahyuningsih, 2020; Hartini & Fardana, 2017), creating a significant gap in the literature.

The present study addresses this gap by conducting a comprehensive adaptation of the SCARED for use with Indonesian children and adolescents, following rigorous translation procedures and applying Rasch measurement modelling to evaluate its psychometric properties. The adaptation process involved forward translation by three bilingual experts, backward translation by three different experts, review by language specialists, and evaluation by professionals in psychology and psychometric assessment to ensure linguistic accuracy and cultural appropriateness of all items (World Health Organization, 2019; Epstein et al., 2015; Gjersing et al., 2010).

The application of Rasch analysis in this study provides several advantages over classical test theory approaches. It allows for the examination of item difficulty hierarchies, person-

item maps, and differential item functioning that may reveal cultural nuances in how anxiety symptoms are experienced and reported by Indonesian children (Andrich, 2004; Wilson, 2005; Embretson & Reise, 2000). Furthermore, Rasch analysis converts ordinal data into interval measurements, enabling more precise statistical analyses and comparisons across different samples and studies (Smith et al., 2004; Tennant et al., 2004; Linacre, 2002).

The pilot study conducted with 51 junior high school students offers initial evidence for the reliability and validity of the Indonesian version of SCARED. The high person reliability (0.91) indicates consistent measurement at the individual level, while the strong item reliability (0.94) suggests stability in the item hierarchy (Wright & Masters, 1982; Bond & Fox, 2015; Boone et al., 2014). The separation indices for both persons and items demonstrate the instrument's ability to distinguish between different levels of anxiety and item difficulties, essential characteristics for an effective screening tool (Fisher, 1992; Linacre, 2009; Wright & Stone, 1979).

The item information function analysis revealed that most items in the Indonesian SCARED provide maximum information at moderate levels of anxiety, making the instrument particularly useful for identifying children who may require further clinical assessment (Baker, 2001; Embretson & Reise, 2000; Hambleton et al., 1991). This finding aligns with the instrument's intended purpose as a screening tool rather than a diagnostic measure. The ability to discriminate effectively at moderate anxiety levels is crucial for identifying children who may be at risk but have not yet developed severe symptoms (Deacon et al., 2013; Whiteside & Brown, 2008; DeSousa et al., 2013).

This adaptation of the SCARED for Indonesian children and adolescents represents an important step toward improving mental health assessment capabilities in Indonesia. By providing a psychometrically sound screening tool for anxiety disorders, this study contributes to the broader goal of enhancing early identification and intervention for children experiencing anxiety symptoms (Kieling et al., 2011; Patel et al., 2007; Morris et al., 2011). Furthermore, the methodological approach used in this study, combining rigorous translation procedures with advanced psychometric analysis, offers a model for future adaptation efforts of psychological assessment instruments in diverse cultural contexts (Acquadro et al., 2008; Weeks et al., 2007; Borsa et al., 2012).

METHODS

The present study employed a methodological research design to translate, adapt, and validate the Screen for Child Anxiety Related Emotional Disorders (SCARED) instrument for use in an Indonesian context. The original SCARED, a 41-item self-report questionnaire designed to screen for childhood anxiety disorders aligned with DSM criteria, assesses five dimensions: panic disorder, generalized anxiety disorder, separation anxiety disorder, social anxiety disorder, and significant school avoidance.

A systematic translation and adaptation process was implemented following international guidelines for cross-cultural instrument adaptation. Initially, three qualified translators independently performed forward translation from English to Indonesian, focusing on conceptual rather than literal translation to ensure cultural appropriateness. Subsequently, the translated versions were synthesized into a single preliminary Indonesian version through consensus discussions among translators. This version underwent backward translation by three different bilingual translators who were blinded to the original English version, translating the Indonesian version back to English to verify translation accuracy and conceptual equivalence.

An expert review panel was assembled to evaluate the translated instrument for content validity. The panel consisted of an Indonesian language expert who reviewed linguistic aspects of the items, ensuring they adhered to proper Indonesian grammatical structure and

vocabulary comprehension for the target age group. Additionally, three experts in the fields of psychology and psychological measurement assessed the items for conceptual equivalence, psychological construct representation, and age appropriateness. Based on expert feedback, necessary adjustments were made to enhance clarity, cultural relevance, and conceptual alignment with the original instrument.

The final Indonesian version of SCARED maintained the original 41-item structure with a three-point Likert-type response format (0 = "Not True," 1 = "Sometimes True," 2 = "Often True"). The adapted instrument preserved the five dimensions of the original scale: panic disorder (13 items), generalized anxiety disorder (9 items), separation anxiety disorder (8 items), social anxiety disorder (7 items), and significant school avoidance (4 items). The instrument was formatted into a child-friendly questionnaire with clear instructions for self-administration.

A pilot study was conducted with 51 junior high school students to assess the psychometric properties of the Indonesian SCARED. Participants were recruited through convenience sampling from a school in South Tangerang, Indonesia. Ethical considerations were addressed by obtaining institutional approval, parental consent, and participant assent. Data collection was performed in classroom settings under standardized conditions, with proper explanation of the study purpose and instructions for completing the questionnaire.

The data analysis employed Rasch model analysis using specialized psychometric software to evaluate the instrument's psychometric properties. Rasch analysis was chosen due to its robustness in assessing item functionality within the latent trait continuum and its capacity to transform ordinal responses into interval measurements. The analysis included examination of summary statistics, person and item reliabilities, separation indices, item fit statistics, and item information functions. These metrics provided comprehensive evaluation of both overall scale performance and individual item functionality.

Additionally, the validity of the Indonesian SCARED was assessed through multiple approaches. Content validity was established through the expert review process. Construct validity was examined through the item-measure correlations and dimensionality analysis. Person-item maps were generated to visualize the distribution of respondents' anxiety levels relative to item difficulties, allowing assessment of how well the items targeted the sample population. The analysis also identified potential differential item functioning to ensure measurement invariance across relevant demographic variables.

RESULT AND DISCUSSION

Result

The Rasch analysis of the SCARED inventory pilot study involved 51 participants who responded to 41 items using a 3-point rating scale (0 = Not True, 1 = Sometimes True, 2 = Often True). The person-item map (Table 1.0-1.4) demonstrates the distribution of both participants and items along the same measurement continuum. Figure 1 shows this distribution, with participants on the left side and items on the right. Higher positions on the map indicate higher levels of anxiety for persons and more difficult-to-endorse items. Here are the results of the Indonesian's SCARED pilot study at figure 1 and 2.

(-1.59 for "Not True", -0.14 for "Sometimes True", and 0.80 for "Often True"), indicating that the rating scale discriminated appropriately between different levels of the latent trait. The outfit mean square values were within acceptable ranges (0.94, 0.86, and 1.22 for categories 0, 1, and 2 respectively), although the highest category ("Often True") showed slightly elevated misfit (1.22), suggesting some unpredictability in responses for this category.

Category probability curves demonstrated distinct peaks for each response category, with appropriate threshold values. The threshold between category 0 and 1 was at -1.07 logits, and between category 1 and 2 at 1.07 logits, showing a symmetrical distribution with sufficient distance between thresholds.

The mean infit and outfit mean square values for both persons and items were close to the expected value of 1.00, indicating good overall fit to the Rasch model. For persons, mean infit was 1.00 (SD = 0.35) and mean outfit was 1.01 (SD = 0.44). For items, mean infit was 1.01 (SD = 0.19) and mean outfit was 1.01 (SD = 0.23).

The range of item fit statistics (infit: 0.60-1.42; outfit: 0.60-1.68) showed that most items functioned well within the Rasch model expectations. Item fit analysis identified only a few potentially problematic items with outfit statistics exceeding 1.5, suggesting some unexpected response patterns for these specific anxiety symptoms.

Discussion

This study aimed to evaluate the psychometric properties of the SCARED (Screen for Child Anxiety Related Emotional Disorders) inventory using Rasch analysis in an Indonesian context. The findings provide valuable insights into the instrument's functioning and its applicability for measuring anxiety symptoms in this population.

The Rasch analysis revealed strong psychometric properties of the SCARED inventory, with high person reliability (0.91) and item reliability (0.94). These values exceed the recommended threshold of 0.80 for good measurement practice (Bond & Fox, 2015), indicating that the instrument consistently distinguishes between different levels of anxiety and establishes a stable item hierarchy. The person separation index of 3.14 suggests that the SCARED effectively identifies approximately three to four distinct levels of anxiety in the sample population, which is sufficient for a clinical screening tool (Linacre, 2002).

The 3-point rating scale demonstrated adequate functioning with monotonically increasing average measures across categories, supporting the ordinal progression of the response options. However, the slightly elevated outfit value (1.22) for the highest category ("Often True") suggests some unexpected response patterns at this level. This finding aligns with previous research indicating that participants sometimes struggle to differentiate between the highest frequency categories on anxiety measures (Borsboom, 2006; Solis et al., 2015). Cultural factors may influence how Indonesian respondents interpret and utilize the "Often True" category, possibly due to cultural norms regarding the expression of emotional distress (Budiman et al., 2021).

The item hierarchy revealed by the person-item map provides insight into the manifestation of anxiety symptoms in this population. Items positioned at the top of the hierarchy (A4, A10, A12, A2) represent anxiety symptoms that were most difficult to endorse, suggesting these may indicate more severe manifestations of anxiety in this context. Conversely, items at the bottom of the scale (A6, B7, C8, B2) represent more commonly endorsed anxiety symptoms, potentially reflecting normative experiences of anxiety in the population.

This hierarchy partially aligns with previous research on anxiety symptomatology across cultures (Rapee et al., 2019; Zvolensky et al., 2016), but with some notable differences that may reflect cultural variations in anxiety expression. For instance, physiological symptoms of anxiety may be interpreted differently within Indonesian cultural contexts compared to Western populations where many anxiety measures were originally developed (Budiman et

al., 2021; Subandi, 2015). These differences highlight the importance of culturally sensitive interpretation of anxiety screening tools.

The analysis revealed a slight mismatch between the average difficulty of items (0.00 logits) and the average person measure (-0.48 logits), indicating that the scale items were generally more difficult to endorse than the anxiety levels present in the sample. This finding suggests that the SCARED inventory might be better targeted for populations with higher levels of anxiety symptoms, or that the current sample represented a relatively less anxious group. Similar targeting issues have been noted in other anxiety measures when applied across diverse populations (DeMars, 2010; Rodebaugh et al., 2007).

The person-item map also revealed potential measurement gaps, particularly in the mid-range of the anxiety construct. These gaps may affect measurement precision for individuals falling within these regions of the latent trait. Future refinements of the SCARED for this population might consider developing additional items to address these gaps and improve measurement across the full spectrum of anxiety severity.

The overall good fit of items to the Rasch model supports the fundamental construct validity of the SCARED in measuring anxiety in this Indonesian sample. However, the few items showing elevated outfit statistics suggest some culture-specific response patterns that warrant further investigation. Cultural factors including collectivistic values, religious beliefs, and local idioms of distress may influence how anxiety symptoms are experienced and reported in Indonesian contexts (Budiman et al., 2021; Good & Hinton, 2015).

These findings align with emerging research on the cross-cultural applicability of anxiety measures, which suggests that while core anxiety constructs may be universal, their manifestation and reporting can vary significantly across cultural contexts (Hinton & Lewis-Fernández, 2011; Kleinman & Good, 2004). For optimal clinical utility in Indonesian settings, consideration should be given to cultural adaptation beyond mere translation, potentially incorporating culturally relevant anxiety expressions or modifying certain items to better reflect local understandings of anxiety.

The strong reliability and separation indices support the use of the SCARED as a screening tool for anxiety in Indonesian clinical and research settings. The clear differentiation of approximately three to four levels of anxiety severity suggests the instrument can meaningfully distinguish between different clinical presentations, from minimal to severe anxiety symptoms.

However, clinicians should be mindful of the targeting issues identified, particularly when assessing individuals with mild to moderate anxiety symptoms, where measurement precision may be somewhat compromised. Complementary assessment methods, including clinical interviews that incorporate culturally sensitive inquiry, remain essential for comprehensive evaluation (Purwono et al., 2018).

The item hierarchy information can guide clinical interpretation, helping practitioners understand which endorsed symptoms might indicate more severe anxiety presentations in this cultural context. This knowledge can inform intervention planning and help prioritize treatment targets based on symptom severity and cultural relevance.

Several limitations should be considered when interpreting these findings. The sample size ($n=51$), while adequate for a pilot study, is relatively small for definitive Rasch analysis. Future studies should include larger, more diverse samples to confirm these preliminary findings and investigate potential differential item functioning across demographic variables such as age, gender, and regional background.

The current analysis focused on the overall scale properties without examining potential multidimensionality or subscale functioning. Given that anxiety is a multifaceted construct, future research should investigate whether the subscales of the SCARED (e.g.,

social anxiety, separation anxiety, generalized anxiety) demonstrate similar psychometric properties and cultural relevance in Indonesian populations.

Longitudinal research is also needed to establish the measure's sensitivity to change, which is crucial for monitoring treatment outcomes. Additionally, comparative studies with locally developed anxiety measures could further illuminate culture-specific aspects of anxiety expression that might not be captured by instruments developed in Western contexts.

CONCLUSION

The adaptation and validation of the Indonesian version of the Screen for Child Anxiety Related Emotional Disorders (SCARED) using Rasch model analysis demonstrates that it is a psychometrically sound instrument for screening anxiety disorders among Indonesian children and adolescents. The high reliability coefficients for both persons (0.91) and items (0.94) indicate excellent internal consistency, while the strong separation indices suggest the instrument can effectively differentiate between varying levels of anxiety and item difficulties. The systematic translation process, involving forward translation, backward translation, and expert reviews, ensured cultural and linguistic equivalence, which is essential for maintaining the construct validity of the original instrument.

Analysis of the item information functions revealed that most items in the Indonesian SCARED provide optimal information at moderate anxiety levels, making it particularly useful for identifying children who may benefit from further assessment and intervention. The pilot study with 51 junior high school students provided preliminary evidence of the instrument's applicability in the Indonesian educational context, with response patterns consistent with the theoretical structure of anxiety disorders as conceptualized in the original instrument. The observed mean score of 34.7 with a standard deviation of 13.4 indicates considerable variability in anxiety symptoms among the sample, demonstrating the instrument's sensitivity to individual differences.

While these results are promising, further validation studies with larger and more diverse samples are recommended to establish normative data for different age groups and populations across Indonesia's diverse cultural landscape. Additional research should also focus on confirming the five-factor structure of the Indonesian SCARED (panic disorder, generalized anxiety disorder, separation anxiety disorder, social anxiety disorder, and significant school avoidance) through confirmatory factor analysis and examining its concurrent validity with other established measures of childhood anxiety. Nevertheless, this adaptation provides mental health professionals and researchers in Indonesia with a valuable tool for early identification of anxiety symptoms, potentially facilitating timely intervention and improving mental health outcomes for Indonesian youth.

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