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Research Article

A review of translation processes in scale adaptation studies: A guide for scale translation

Artür Yetvart Mumcu¹ **ABSTRACT**


Ensuring the validity and reliability of translated scales is essential in cross-cultural research, particularly in the social sciences where abstract constructs must be measured across diverse cultural contexts. Although several guidelines exist for scale translation, little is known about which methodological sources are most frequently cited in practice. This study addresses that gap through a citation-based bibliographic analysis of peer-reviewed articles indexed in the Web of Science (WoS). A total of 257 articles published between 1995 and 2024 were identified, yielding 2,239 references. After merging duplicates and filtering out irrelevant or statistical sources, 22 key references cited in at least three articles were selected. A thematic synthesis of these references revealed three central domains: Scale Translation Process, Considerations for the Translation Team, and Key Considerations in Translation. This study provides an evidence-based roadmap that reflects the actual methodological preferences of researchers rather than expert opinion alone. By translating citation behavior into practical guidance, the study contributes to standardizing translation practices and promoting greater transparency and rigor in cross-cultural research. The results demonstrate a strong methodological consensus in the field and highlight three core areas that can guide future translation practices with empirical grounding.

Keywords: Scale translation, Cross-cultural adaptation, Scale adaptation, Methodology

1. Introduction

Disseminating scientific knowledge in different cultures and languages is vital for the progress of global research. The exchange of research between different cultures facilitates the comparison and integration of research results from different cultural settings, and this will enhance both the scientific dialogues and, ultimately, the development of universally accepted theories and practices. A main difficulty in this respect is keeping the research equipment and instruments used, like scales, reliable, and valid when transposed into another language, and culturally adapted to various contexts. For example, in the social sciences scales are often the instruments used to measure these complicated variables like thoughts, reactions, and behaviors which make the accurate representation of these scales to the language the researcher is using very important (Breckler, 1984; Wilson, 2023).

The differences of language and culture are major barriers in the effective transfer of scientific knowledge. This is particularly true in the bilingual adjustment studies that deal with the adaptation of a measurement device from a different language or culture to another. Scale translation, which is at the core of the process of scale adaptation, is much more complex than just exchanging words from one language into another. The translation process should be both linguistically precise and culturally appropriate so that the scale is still meaningful and valid in the new context (Sousa & Rojjanasrirat, 2011). The significance of the cultural and linguistic context in the translation process is irreplaceable. Research in the sciences requires exact and accurate measurements, and the deviation from the scale items' original meaning can result in erroneous results. Hence, the adaptation of scales goes beyond the mere linguistic translation; it involves a careful process of cultural and semantic adaptation, which keeps the original

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Academic Editor: Assoc. Prof. Gökhan AKEL

Received: 05.04.2025

Acceptance: 28.07.2025

Published: 31.07.2025

Citation: Mumcu, A. Y. (2025). A review of translation processes in scale adaptation studies: A guide for scale translation. *Business, Economics and Management Research Journal*, 8(2), 119-136. <https://doi.org/10.58308/bemarej.1670402>



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items' intent and meaning, while making them comprehensible and relevant in the target culture. This process involves the close cooperation of linguists, cultural experts, and subject matter specialists who should work hand in hand in order for the adapted scale to be valid and reliable (Gjersing, Caplehorn & Clausen, 2010).

Moving beyond a one-to-one translation of words, the translation of scales is a complex task. It is particularly true in the field of social sciences, where the scales are utilized for different purposes like measuring the intensity of abstract concepts such as personal attitudes, emotional states, and skills through numerical values. Thus, the translated items need to precisely convey what the source items mean. In addition, they should be simple for the reader to grasp and fit in well with the context in the target language and culture. The negative result from a misguided translation might be a misleading or invalid outcome, which in turn would adversely affect the entire research (Van der Deijl, 2017).

One of the most effective strategies to overcome the mentioned challenges is to follow some important rules during the translation process. The first one is the need to assure that the translation is not only correctly structured but also culturally appropriate. What may have good sense in one language may lose its sense or significance when translated into another language without the help of cultural reference points. Therefore, it becomes essential for the translators to comprehend both the source and target cultures as deeply as possible. Linguistic knowledge is just one aspect of that which entails cultural sensibility and familiarity with the norms of the social and behavioral population (Resnicow, Soler, Braithwaite, Ahluwalia & Butler, 2000). After a complete rethinking of the primary version of the translation, it is important to assess the comprehensibility, validity, and reliability of the modified scale in the target language and culture. Different methods, for instance, pilot studies, focus groups, and cognitive interviews can be used to carry this out. The tools help diagnose the potential localization errors like whether the items are appropriately described and easily grasped by the audience (Amro, et al., 2019; Pillet, Carillo, Vitari & Pigni, 2023).

The need for scales translation and adaptation is also visible in the larger purpose of scale adaptation. Scale adaptation is the act of transporting a research tool from one cultural or linguistic context to another. This process is inherent in the social sciences, where the goal is usually to teach specific knowledge to larger groups. Nevertheless, this is only possible if the scales used are valid and reliable in all cultures of application. Thus, adaptation studies must consider the language, culture, and social aspects of the populations participating in the research in order to guarantee that the findings are relevant and applicable (Bell & Orozco, 2023).

Cultural and linguistic variations may bring about differences in the interpretation of a scale or measuring instrument by respondents. A clear example requesting collaboration of the operations is formed by asking new immigrants what they think is good or bad about society. It is worth noting the fact that when someone speaks in a language they are not fluent in, they might not feel like the meanings of the words are related. Such a situation compels the translator to have an adjustment in language that acts at the level of the sentence and is circular in nature. The alteration is not to add new things but correction of linguistic elements and syntax (Çapık, Gözüm & Aksayan, 2018).

On the other hand, scales should accurately measure the concepts they are intended to measure and produce standardized results across different contexts. Achieving this requires a thorough examination of the scale's content, layout, and measurement properties, and this occurs during the adaptation stage. The aim of these studies is to improve the consistency and reliability of research findings by addressing potential validity and reliability challenges that may arise from the scale (Stover, de la Iglesia, Boubeta & Liporace, 2012).

At the level of writing the target expression of which languages is the translation only a matter of finding word-for-word translation of an expression? Or, is it about getting the most precise meaning possible out of each language? In that case, the translation process ought to be every bit as careful as the procedures described by the science are. Other than the necessity for these processes to be adapted to the requirements of a specific piece of research, the methods used in the process are also important in raising the overall quality and credibility of scales on an international scale. Reasonably adapted scales lead to international comparisons becoming more accurate and to general conclusions being formulated more widely, and to broader, more general conclusions being drawn (Beaton, Bombardier, Guillemin & Ferraz, 2007).

Paradoxically, while the presence of a multitude of rules and reviews on scale translation and cultural adaptation is a bane, the lack of empirical-grounded studies that research which methodological sources are actually being used and cited across disciplines is more essential. Almost all existing studies are solely based on the expert consensus or theoretical models which, despite being beneficial, do not encapsulate the broader scholarly practices observable in

the published research. Thus, the field lacks a data-driven synthesis demonstrating which sources and strategies have gained the most traction in actual academic use. These gaps have impeded researchers who wish to benchmark their methodologies against well-established sources and hindered the goal of a standardized translation process.

To address this gap, the present study adopts a citation-based approach to systematically identify and analyze the most frequently referenced methodological sources in scale translation literature. By extracting and analyzing 2,239 references from 257 peer-reviewed articles indexed in the Web of Science, the study identifies the 22 most-cited works and organizes them into a thematic framework consisting of three major domains: Scale Translation Process, Considerations for the Translation Team, and Key Considerations in Translation. This framework, rooted in observed citation behavior, offers researchers a more objective foundation for designing and justifying their translation methodologies. By transforming citation data into practical guidance, the study contributes to enhancing methodological rigor and promoting consistency in future scale adaptation efforts.

2. Conceptual Framework

Survey and interview methods are frequently used in social sciences research and are also used in exploratory research as well as testing hypotheses. These methods are applied to the sample group with questionnaires prepared using literature-based references. In other words, a significant majority of social science research is based on the use of scales. Therefore, the determination and use of appropriate scales for the research emerges as one of the most basic criteria for the reliability and validity of the research.

A significant number of the scales used in research are developed in English in the international literature and translated and tested for reliability and validity to be used in different languages. The first peer-reviewed journal-level study on scale translation in Türkiye was conducted in 1974 (Cüceloğlu, 1974). In this pioneering study, which involved the translation of emotional meaning scales into Turkish, the main focus was on the challenges of finding suitable Turkish equivalents for Likert-type responses, particularly in determining whether ordinal or interval scales were more appropriate. The adjectives "a little, rather, very" were evaluated for their statistical distances to determine their usability.

Since that early effort, there has been a lack of comprehensive bibliographic studies evaluating the methodological standards and citation practices related to scale translation. Addressing this gap, the present study aims to contribute to the field by identifying the most commonly cited methodological sources in the literature and synthesizing them into a structured guide for future translation practices. In doing so, it offers a contemporary and evidence-based framework that builds on and significantly advances the limited earlier contributions in this area.

Although the practice of scale adaptation has long been established in the scientific literature, debates remain regarding the rigor and standardization of its methodological implementation. A bibliometric review conducted by Öztürk, Şahin, and Kelecioğlu (2015) found that among 108 articles on scale adaptation published between 2005 and 2014 and indexed in SSCI and ULAKBİM (the Turkish Academic Network and Information Center), 33 studies reported using a one-way translation approach, while only 75 followed the more rigorous two-way translation procedure involving both translation and back-translation. This suggests that even within peer-reviewed literature, inconsistencies persist regarding the implementation of established translation guidelines.

Among the 29 scale development and 21 scale adaptation studies conducted in the field of educational sciences and psychology in Türkiye between 2005 and 2013, which were scanned in the Ulakbim index, there is no information about ensuring linguistic and cultural structural equivalence in the translation of the scale. The selection of qualified translators in the translation process was emphasized in only 9.52% of the studies and partially mentioned in 71.43% of the studies. In addition, general principles related to translation were complied with at an average rate of 30.95%. Moreover, only 14.29% of the studies included an expert on measurement and evaluation in the translation process. The authors who conducted the research generally stated that translators do not have the necessary qualifications (Çüm & Koç, 2013).

In only thirty of the 59 articles on scale development and adaptation studies in educational sciences journals indexed in SSCI between 2006 and 2014, at least two or more translators fluent in both languages were used for translation. In addition, back translation was applied in only 24 studies. Only 19 studies checked for equality between the original and final versions of the scale in semantic, experiential, conceptual, and idiomatic dimensions (Güvendir & Özkan, 2015). Again, among the 18 scale adaptation studies published in peer-reviewed journals related to mathematics

education in educational sciences, only one of them made an effort to ensure structural equivalence in terms of linguistic and cultural aspects. In 11 studies, experts familiar with the subject and foreign language of the scale to be adapted were identified (Delice & Ergene, 2015).

Based on these criticisms about scale adaptation, the necessity of taking the translation processes of the scales to be adapted meticulously comes to the fore. As mentioned above, it is seen that the translation processes in adaptation studies often do not include references, or have limited references and limited scientific background (Çüm & Koç, 2013; Öztürk et al., 2015). It is observed that the qualities that translators should possess are not questioned, and there is even no information about translators who have a very critical task. There are also limited efforts to address cultural differences in translations. In addition to language proficiency, a good understanding of the cultural contexts of both the source and target languages is considered essential. When these aspects are overlooked, the validity and objectivity of the scale may be compromised. In some cases, researchers may become aware of translation issues either during or after data collection (Çapık et al., 2018). In line with the importance of translation processes and the correct selection of translators, the ability of researchers to reach the right results with the right measurements is at risk in the first step of adapting the scale. As a result of this situation, the researcher may lose time and effort, and in the worst-case scenario, the researcher may not realize this negativity at all.

In addition to the quantitative aspects of translation, qualitative aspects such as the cultural differences mentioned above are of critical importance in translation processes and should be treated with the necessary sensitivity. As in all scientific research processes, the empirical and logical adequacy of translation is the sole responsibility of the researcher (Frey, 2018). Even though the main criticisms of translation processes have been made in the studies of the past years, many recent studies have attempted to address the shortcomings of the subject in more detail (Heggstad et al., 2019). Based on the necessity that the original and adaptation forms of the scales should produce comparable results, the necessity of applying certain procedures in adaptation processes is an issue that is addressed internationally in social sciences (Coster & Mancini, 2015; Frey, 2018).

Another important issue that is overlooked in scale adaptation studies is that it cannot be foreseen that the author may not have followed the rules that should be followed while determining the items during the development process of the scale. In other words, it is necessary to determine whether the quality and quantity of the items of the scale in the foreign language comply with the generally accepted rules originating from the literature, to design the process by taking into account the possible errors in the original scale during the translation process, and to carry out the translation with appropriate corrections.

In many adaptation studies in the literature, it was concluded that there was no bibliography in the translation process, or there was limited bibliography and limited scientific background (Cha, Kim & Erlen, 2007; Çüm & Koç, 2013; Delice & Ergene, 2015). There are very few theoretical bases for the qualifications of translators and translation processes. Many studies suggest that translation is completed by a single person in a single step, while some studies do not mention the translation process at all. This gap in scale adaptation studies formed the basis of our study. In this direction, the scientific basis of this study is to reveal the basic elements that should be considered in scale translations.

In line with the importance of scale studies, this research was conducted to prevent errors in use. To ensure that the scales retain their original expression, the translation processes were examined in detail. This research aims to contribute to the validity of the scales, which are an important instrument of research, especially in the field of social sciences, with a qualified translation before verifying them with numerical data to use them most accurately in different national languages. With the process steps obtained as a result of the research, translation processes will be tried to be determined in the widest scope. There is no intention to use all these processes in every research. Researchers will be able to use the most appropriate steps for their research pattern within these processes. This will contribute to the validity and reliability of scale adaptation studies.

3. Methodology

3.1. Sample

The methodology section consists of the bibliographic review and aims to present a systematic examination of research data obtained from a thorough literature search (White, Marsh, Marsh & White, 2006). Bibliographic reviews

are generally considered the most effective tool for synthesizing knowledge, finding existing themes, predicting prospective research directions, and revealing the lack of certain studies in the literature (Tranfield, Denyer & Smart, 2003).

The primary focus of this study is the research on scale translation and its various fields, in this signaling articles for instance those that have the words scale adaptation, translation, and cross-cultural validation in the titles, abstracts, or keywords. As a step for ensuring the robustness and credibility of the dataset, only English-language articles published in peer-reviewed scientific journals were included in the analysis (Zhu & Liu, 2020). The sample used was from the WOS database, regarded as the strictest and most trustworthy source of bibliometric studies because of its extensive index of major journals (Visser, Van-Eck & Waltman, 2021). Despite other databases like Scopus and Google Scholar providing some benefits in transparency and connectivity, some drawbacks are as well attached. For instance, Scopus has an increased rate of regional and smaller journals cited compared to Google Scholar that also shows non-scientific sources of information and may present indexed materials that are not reliable (Falagas, Pitsouni, Malietzis & Pappas, 2008). In the quest for academic honesty and consistent methodology, WOS was chosen as the only data source.

Although the case, most of the 257 articles encountered these previously mentioned obstacles. Together, these articles represent the center of the present study and collectively cover all the discussed period from the first references of the scale translation in the scholarly literature to the present day.

Although earlier studies had addressed the topic, the year 1995 was chosen as the starting point for analysis, as it marks the period when systematic scholarly interest in scale translation began to take shape across various disciplines (Cheng & Hamid, 1995). The research has an upper limit of 2024 which helps in recording the most recent developments in the field. The span of time allows the project to exhibit both the development of the past and the condition of the present which in turn gives a richer picture of the academic path. Thus, the time frame arrangement is not only a temporal extension of the research but also promotes its methodological consistency, the sample that Arnold covers both the classical literature and the most recent ones on scale translation.

3.2. Procedure

The study was conducted in multiple structured phases, combining both bibliographic mapping and content analysis techniques to identify and synthesize key references related to scale translation processes. First, a systematic list of articles was compiled from the WOS database using a targeted set of keywords: “scale adaptation,” “scale translation,” “cross-cultural adaptation,” “instrument translation,” “translation and validation,” and “back-translation.” These terms were searched within article titles, abstracts, and keywords to ensure that only studies explicitly addressing translation and adaptation processes were included. As a result of the search and screening based on predefined inclusion criteria (language, access type, publication type, time frame), a total of 257 articles were identified.

In the second phase, the full reference lists of all selected articles were extracted, generating a pool of 2239 cited references. These references were cleaned and merged to combine duplicate citations into single entries.

Following the cleaning process, a frequency analysis was conducted to identify the most commonly cited works. References that appeared in at least three different articles were retained, yielding a preliminary list of 29 works.

Each of these 29 references was then manually verified for relevance and consistency. During this validation step, references that primarily focused on statistical or psychometric methods—such as structural equation modeling or factor analysis—were excluded, as they did not directly contribute to scale translation methodology.

After this refinement, a final set of 22 core references was established. These works were then subjected to an in-depth qualitative content analysis. During this process, sections related to translation frameworks, procedures, team roles, and key considerations were carefully extracted and compared.

To ensure methodological consistency and thematic coherence, only elements that were repeated in at least two of the core references were included in the synthesis. As a result, the study developed a structured set of recommendations organized under three central thematic categories. This multi-step procedure ensures that the final framework is grounded in both the frequency and thematic recurrence of best practices found in the academic literature on scale translation.

3.3. Data Collection Instruments (Web of Science)

Web of Science is an omnipresent database that is funded by Clarivate Analytics and is a very reliable database that affects the academic world extremely. It consists of high-quality, peer-reviewed scholarly outputs from different disciplines, such as social sciences, natural sciences, and humanities, therefore, it is a source of trusted and comprehensive materials for data collection and analysis (Pranckutė, 2021). Web of Science is known for its selective journal policy which is strictly applied to add only those journals which are reliable and significant. The database currently contains over 21,000 titles and millions of records with different subjects and hence is listed among the most comprehensive databases worldwide. An exhaustive range of sources in WOS library enables a student to access modern research literature that in turn helps in a detailed data collection (Testa, 2009). One of the features of the WOS system is that it provides a convenient way to search. The researchers can do targeted searches by using keywords, titles, abstracts, and citations which help them to select a dataset with a particular theme or bibliometric studies. Furthermore, citation tools in WOS facilitate citation editing, highlighting significant works, and tracking the effect of the research (Mongeon & Paul-Hus, 2016). WOS is a monitoring tool for the comparative study that can also be used in data collection. It provides researchers globally with the chance to identify problems, topics, and shortages in various domains and zones, thus, they can conduct transdisciplinary studies, for example, discussing organizational theories in a global versus local context. As a result, WOS can be considered one of the most all-round and single-minded resources that can be currently used for academic research. The platform is supported by a comprehensive database, advanced research technologies, and bibliometric tools, making it one of the most reliable sources for conducting detailed literature analysis. These features collectively establish it as the most complete and widely used resource for scholarly data collection and bibliometric research.

3.4. Data Analysis

A qualitative thematic content analysis method was adopted for the examination of the 22 key references obtained from bibliographic screening, which comprised the basis for this analysis. The purpose of this phase was to derive systematic insights into the ways, principles, and methodological recommendations outlined in the scale translation most cited articles. All 22 research papers were thoroughly read in full-text formats. The sections of the relevant content scrutinized included translation frameworks, equivalence strategies, team structure, and quality assurance mechanisms; these were all analyzed line by line. This work further involved focusing on repetitive expressions, methodological procedures, and procedural rules; and then, initial open codes were created. The codes were taken to signify separate ideas or tactics that are affiliated with scale translation/updating.

After this coding, the codes were organized into conceptual categories according to either their similarity, overlap, or shared aspect. The axial coding phase illustrated the patterns and relations between the categories, which, in turn, resulted in the discovery of the higher structural framework. The classification underwent the process of perfection realized through a multitude of iterations to ensure its internal consistency. For the sake of methodological soundness, only the ideas that appeared in at least two different references were kept. This step not only led to eliminating any anecdotal or specific-source suggestions but also assured that the final themes were based on a consensus across sources.

Within the final dataset of 22 key articles, the most frequently repeated terms and concepts related to translation processes were identified. Semantically similar terms were merged, and the three most recurrent conceptual clusters were selected. These clusters served as the foundation for the thematic structure of the study, resulting in the construction of three overarching themes representing core considerations in scale translation.

The aforementioned process resulted in the uncovering of three major thematic areas:

Scale Translation Process: focused on procedural steps such as forward translation, back-translation, reconciliation, expert panel review, and pilot testing.

Considerations for the Translation Team: addressed the qualifications, composition, and roles of the individuals involved in the translation process.

Key Considerations in Translation: encompassed issues such as cultural and linguistic equivalence, conceptual clarity, and contextual relevance.

In addition to the thematic analysis, a descriptive statistical analysis was carried out on the sample of 257 articles for a deeper understanding of the scale translation research's evolution and disciplinary distribution. The articles were sorted by publication year in order to determine the longitudinal trends, which facilitated the tracking of the peaks and gaps in scholarly interest through the time. Furthermore, each article's WOS subject category was noted and totalled to illustrate the primary disciplines where scale translation research is mostly referred to. This analysis implications were the pre-conditions for the demonstration of the interdisciplinarity of the topic and served as the evidence of its relevance in the fields of psychology, education, health sciences, and multifarious research.

4. Findings

This section is intended to present the key findings of the current study which are derived from the content analysis of 22 core methodological references that were identified through citation frequency in the sample of 257 articles. The thematic structure was formed by synthesizing the conceptual frameworks and methodological practices was most frequently cited in these studies.

It is pertinent to specify that the references mentioned in this section, such as Brislin (1970), Beaton et al. (2007), Terwee et al. (2018) and Bartram et al. (2018) which are not subjected to a direct scrutiny of primary sources in this study. Rather, they are shown repeatedly within the selected articles hence they are included in the findings as the most frequently cited foundational works on scale translation. The analysis, therefore, mirrors the collective usage and interpretation of these sources by the respective academic community, rather than individual evaluations by the authors of this study.

4.1. Descriptive Distribution of the Sample

In order to provide the necessary contextual understanding of the dataset, a descriptive analysis was done on the 257 articles included in the sample. The distribution was analyzed both chronologically and by disciplinary field, providing insight into how scale translation has evolved through time and academic disciplines.

4.1.1. Distribution by Year

The figure below shows the number of articles published per year from 1995 to 2024. The picture shows that there has been a continuous rise in research interest related to scale translation, especially since the mid-2010s. The growth in the number of articles for publication might symbolize a wider understanding of the requirement for a stringent methodology as well as the consideration of the difference in culture in psychological and educational measurements.

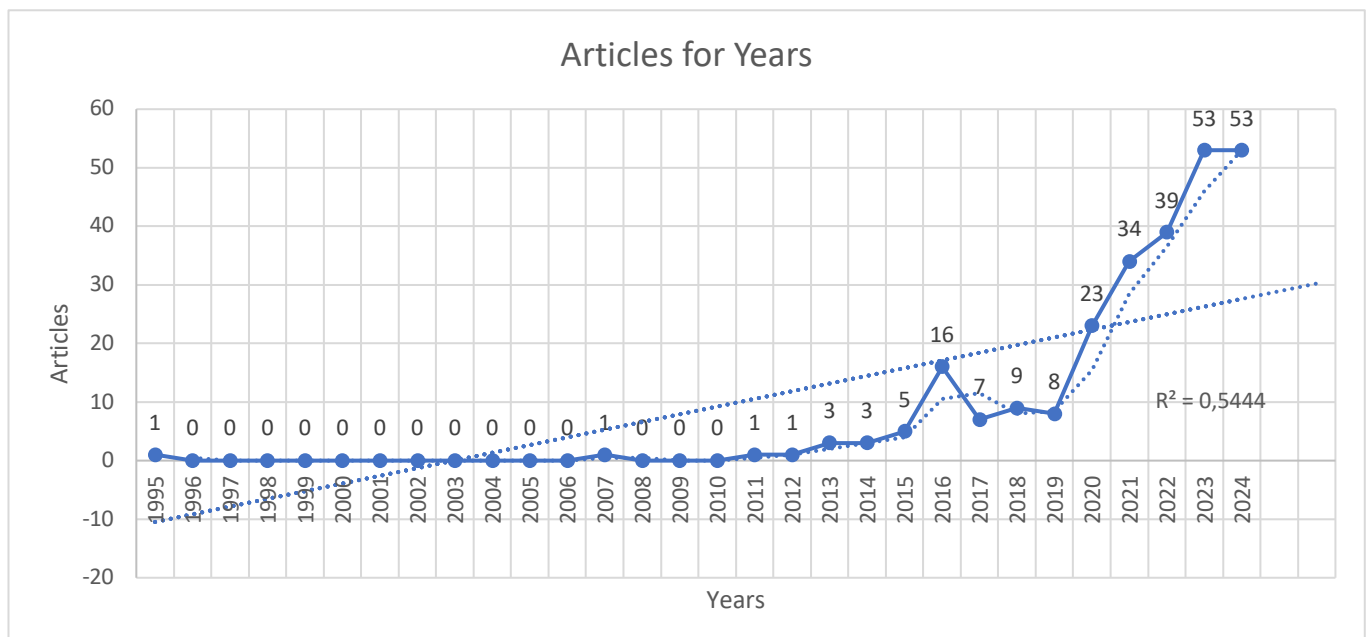


Figure 1. Articles for Years

The publication trend on the subject of scale translation in the articles published from 1995 to 2024 is shown in Figure 1. The data point to the fact that before the year 2010, the topic has got little attention from the scientists with almost no articles as a result. What was noticeable, however, was a constant increase in the number of publications, starting with a very sharp rise after 2020, which is the main point of 2015. The years of 2022 and 2023 are known as the high points with both of them having 53 articles representing the peak years in this topic.

This particular trend portrays the developing understanding of the role of the careful translation processes in the cross-cultural scale development, especially as the response to psychometric instruments being used more frequently in various populations. The increment of the time linear positive corresponds with the phenomena observed ($R^2 = 0.5444$); this speaks about the academic expansion and the emergence of the separation of scale translation from the general method of research into a specific methodological concern within the scope of measurement studies.

4.1.2. Distribution by Scientific Field

An analysis of the assignments of the WOS category to the articles 257. This data reveals that the primary location of investigations in scale translation is within the disciplines of Psychology, Education & Educational Research, and Multidisciplinary Sciences. This exempts the translation from the clutches of distinct fields as it is multidisciplinary and is recognized in both areas of research theoretical and applied.

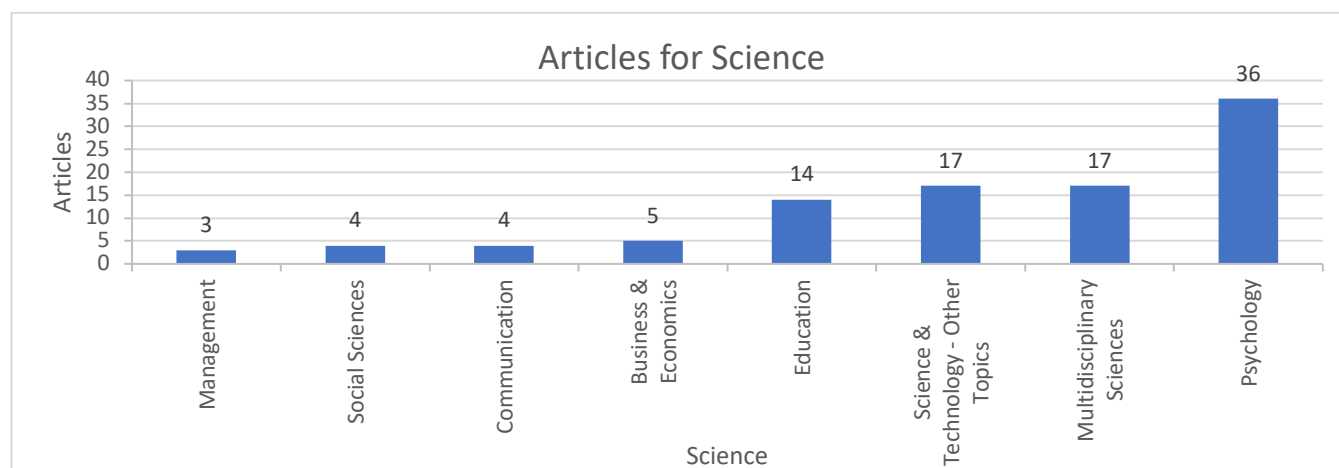


Figure 2. Article for Science

Figure 2 presents the disciplinary distribution of the 257 articles in the dataset, classified according to WOS subject categories. The analysis reveals that Psychology leads prominently with 36 articles, followed by Science & Technology – Other Topics and Multidisciplinary Sciences, each contributing 17 articles. The field of Education also shows significant representation with 14 articles.

Other fields such as Business & Economics, Social Sciences, Communication, and Management are represented to a lesser extent, suggesting that although scale translation has interdisciplinary relevance, it is most frequently applied within the social and behavioral sciences.

This distribution highlights the core relevance of translation practices in human-centered research, where cultural and linguistic equivalence is critical to the validity of psychometric instruments. Moreover, the presence of articles in diverse domains reinforces the idea that scale translation methodology is not discipline-bound, but rather a transversal concern across multiple academic fields.

4.1.3. Distribution by Countries

To understand the global research landscape of scale translation practices, the distribution of the 257 selected articles was examined based on the institutional affiliations of the authors as listed in the Web of Science database. The identified countries represent the geographical origins of research efforts and highlight the prominence of certain regions in advancing methodological discussions around scale adaptation. Figure 3 presents the frequency distribution of these articles across countries, reflecting the extent of contribution by each nation to the literature on cross-cultural scale adaptation.

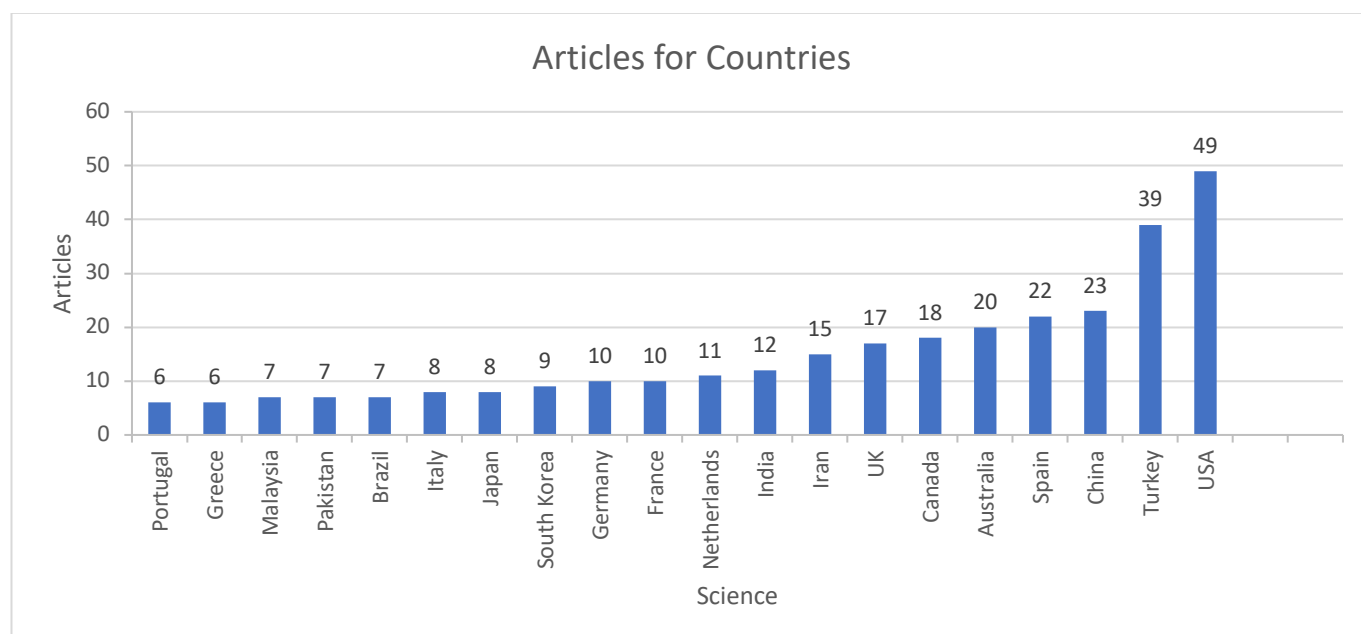


Figure 3. Article for Countries

The data presented in the country-wise distribution table reveals several notable patterns in the global landscape of scale adaptation research. As expected, the United States leads with the highest number of publications, contributing 56 out of 257 articles, which accounts for nearly 22% of the total sample. This finding is consistent with the central role of U.S.-based academic institutions in methodological development and cross-cultural research.

Following the U.S., Turkey stands out with a significant number of studies (39 articles), reflecting the country's increasing attention to cross-cultural validity and its active scholarly engagement with scale adaptation in the national context. This strong representation may also indicate the growing need for validated measurement tools in non-English-speaking contexts where original instruments are predominantly developed in English.

Other countries with considerable contributions include China (26 articles), Spain (16 articles), Germany (15 articles), and Canada (14 articles). These countries are known for their established research infrastructures and multilingual populations, which likely contribute to their interest in translation-based studies. Moreover, the representation of countries such as Brazil (13), South Korea (12), Netherlands (11), and Iran (10) suggests that methodological concerns about scale validity are not confined to Western academic hubs, but are widely shared across different regions.

The table also reflects a broader global interest in scale adaptation with moderate contributions from countries like Italy, Australia, India, Japan, and South Africa, each with more than 5 articles. This dispersion demonstrates the increasing relevance of culturally and linguistically appropriate research tools in diverse sociocultural environments. Notably, a number of countries appear with 1 to 3 contributions, highlighting the emergent nature of scale translation research in those regions. These smaller but meaningful contributions may represent early-stage engagement with cross-cultural methodologies or reflect collaborations with more research-intensive countries.

In summary, this distribution not only illustrates the geographic breadth of scale adaptation research but also underscores the asymmetry in research output, with a small number of countries producing the majority of the literature. These findings reinforce the importance of promoting capacity-building efforts and methodological awareness in underrepresented regions to foster more equitable global research practices in the field of scale translation.

4.2. Most Frequently Cited Methodological References in Scale Translation Studies

In this study, the reference sections of 257 articles were analyzed to identify the most frequently cited works in the field of scale translation. A total of 2,239 references were reviewed, and those cited in at least three different articles were included in the final dataset. Table presents the top 22 methodological sources based on their frequency of citation across the selected articles.

Table 1. Most Frequently Cited Articles

	Author	Year	Reference	Count
1	Beaton, D. E., Bombardier, C., Guillemin, F., & Ferraz, M. B.	2000	Guidelines for the process of cross-cultural adaptation of self-report measures.	16
2	Ward, C., & Kennedy, A.	1994	Acculturation strategies, psychological adjustment, and sociocultural competence during cross-cultural transitions.	8
3	Terwee, C. B., Bot, S. D., de Boer, M. R., Van der Windt, D. A., Knol, D. L., Dekker, J., ... & de Vet, H. C.	2007	Quality criteria were proposed for measurement properties of health status questionnaires.	7
4	Ward, C., & Kennedy, A.	1999	The measurement of sociocultural adaptation.	7
5	Epstein, J., Santo, R. M., & Guillemin, F.	2015	A review of guidelines for cross-cultural adaptation of questionnaires could not bring out a consensus.	6
6	Berry, J. W.	1997	Immigration, acculturation, and adaptation.	5
7	Gudykunst, W. B.	2005	Theorizing about intercultural communication.	5
8	Guillemin, F., Bombardier, C., & Beaton, D.	1993	Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines.	5
9	Kim, Y. Y.	2001	Becoming intercultural: An integrative theory of communication and cross-cultural adaptation.	5
10	Nunnally, J. C.	1975	Psychometric theory.	5
11	Bochner, S., McLeod, B. M., & Lin, A.	1977	Friendship patterns of overseas students: A functional model	4
12	Demes, K. A., & Geeraert, N.	2014	Measures matter: Scales for adaptation, cultural distance, and acculturation orientation revisited.	4
13	Gjersing, L., Caplehorn, J. R., & Clausen, T.	2010	Cross-cultural adaptation of research instruments: language, setting, time and statistical considerations.	4
14	Searle, W., & Ward, C.	1990	The prediction of psychological and sociocultural adjustment during cross-cultural transitions.	4
15	Wilson, J., Ward, C., & Fischer, R.	2013	Beyond culture learning theory: What can personality tell us about cultural competence?	4
16	World Health Organization.	2009	Adaptation and translation guide	4
17	Adelman, M. B.	1988	Cross-cultural adjustment: A theoretical perspective on social support.	3
18	Hofstede, G.	1984	Culture's consequences: International differences in work-related values	3
19	Smith, R. A., & Khawaja, N. G.	2011	A review of the acculturation experiences of international students.	3
20	Tsang, S., Royse, C. F., & Terkawi, A. S.	2017	Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine.	3
21	Ward, C., Bochner, S., & Furnham, A.	2020	Psychology culture shock.	3
22	Brislin R. W.	1986	Field methods in cross-cultural research	3

As illustrated in Table 1, the most cited reference was Beaton et al. (2000), with 16 citations across the 257 articles analyzed. This was followed by Ward & Kennedy (1994) with a combined total of 15 citations, and Terwee et al. 2007) with 7 citations. Other prominent sources included Epstein et al. (2015), Berry (2007) and Kim (2001) each cited between 5 to 6 times. Notably, all references listed in Table 1 were cited in at least three separate studies, demonstrating a recurring pattern of reliance on certain core methodological texts within the literature. The frequency of citation was used as an inclusion criterion to ensure that only the most influential and widely recognized sources informed the development of the thematic framework. This frequency analysis not only highlights the methodological convergence in the literature but also reinforces the validity of the themes constructed in the present study. The use of quantitative thresholds (minimum three citations) helped narrow the focus to a set of 22 references that reflect scholarly consensus on best practices in scale translation. Thus, the selection process for the thematic framework was not arbitrary but empirically grounded in citation behavior within the field.

To further ensure the analytical rigor of the thematic framework, an additional frequency-based textual analysis was conducted on the full texts of the 22 most frequently cited methodological articles. Within this dataset, terms and concepts directly related to scale translation practices were extracted and analyzed. The most recurrent keywords and expressions were identified, semantically grouped, and compared across the articles. As a result, three dominant conceptual clusters emerged: procedural stages of translation (e.g., forward/back translation, expert review), qualifications and roles of translators, and linguistic-cultural equivalence considerations. These clusters served as the empirical foundation for constructing the three major themes discussed in this study: **Scale Translation Process**, **Considerations for the Translation Team**, and **Key Considerations in Translation**. By integrating frequency data

with thematic synthesis, this study reinforces the construct validity of the derived framework and ensures that the presented themes are not only theoretically grounded but also reflect the most commonly emphasized components in the existing literature.

4.2.1. Scale Translation Process

This theme focuses on the significance of properly defining every step of the scale translation process. In the literature, forward and backward translation are cited as key stages in the process of cross-cultural adaptation. Beaton et al. (2000) stated that these steps are the prerequisites to linguistic and conceptual equivalence. Gjersing et al. (2010) maintained in turn that translation must not be confined to the linguistic aspect; but, on the other hand, must focus on correctness in the conceptual sense. Brislin (1986) suggested different systematic techniques for the enhancement of trustworthiness of instruments that are translated. As a result of the content analysis, the theme "Scale Translation Process" was divided into three sub-themes: Initial Translation, Back-Translation, and Comparison and Review.

Initial Translation; Initial translation refers to the first version of a scale from the source to the target language. This is an important process and therefore should be undertaken by a team of experts who are bilingual, culturally competent, and knowledgeable in the subject matter of the scale. Brislin (1970) states that the translators are expected to be skilled in the two languages and also to understand the sociocultural aspects of each the languages to avoid literal, non-functional translations. Furthermore Bartram et al. (2018) point out that the translation should not only be linguistically accurate but also adapted to the cultural context of the target population. Moreover, as noted by experts, two or more translators should independently perform the initial translation at the minimum to ensure a more diverse and dependable initial draft. The independent versions will be combined into one based on consensus (Hall, Wilson & Frankenfield, 2003; Tsang, Royse & Terkawi, 2017).

Back-Translation; Back translation defines one of the assessment methods of the original form's accuracy. It involves the translation of the draft scale from the target language in reverse mode to the language of the source by the outside translators who were not a part of the initial translation stage. Back translation is the key step in the discovery of the differences as well as the conceptual mismatches. Brislin (1970) proposed this method as a standard to show semantic equivalence (J. Epstein, ve diğerleri, 2015). In addition, Beaton et al. (2000) and Terwee et al. (2018) stress that translators must not see the original text to lessen bias and they are the only ones who notice accidental shifts in meaning Guillemin, Bombardier and Beaton (1993). In addition, the study findings showed that using multiple independent back-translations is crucial for the improved quality of the resultant instrument by elucidating contradictory views that would not have been detected otherwise (Edunov, Ott, Auli & Grangier, 2018; M. Epstein & Buhovac, 2014).

Comparison and Review; This is a decision whereby the original version and the back-translated one are compared in order to determine the conceptual equivalence and cultural appropriateness of the two. A multidisciplinary expert ad-hoc is generally formed, that is composed of translators, subject matter experts, and language specialists. Beaton, et al. (2000) proposed gathering of this panel to not only go through the translated items but also to evaluate item scaling and instruction clarity. It is generally agreed that the panel of at least three experts is the one that really enhances the objectivity and depth of the review (Brislin, 1986). Furthermore, the use of structured consensus techniques such as reconciliation meetings along with cognitive debriefings would assist in the further refining of the final version (Gjersing et al., 2010; Tsang et al., 2017).

4.2.2. Considerations for the Translation Team

It should first be mentioned that the translation act is not merely considered a linguistic task but a multidimensional effort, thus the specific attributes of translators engaged in the scale adaptation process will be discussed later. Multidisciplinary work is in the view of many scholars the translation process and therefore competences in not just linguistic mastery, but also cultural norms, field-related knowledge, and ethical standards are paramount for the achievement of a successful translation (Beaton et al., 2000; Gjersing et al., 2010; Tsang et al., 2017). These qualities are often pointed out in scholarly articles as necessary to guarantee the validity of and cultural sensitivity to the adapted instruments. In the period of reviewing the 22 most frequently cited references in scale translation literature, four translator-related criteria came out transversely: language proficiency, cultural knowledge, subject matter

expertise, and motivation and commitment. Again, the subjects mentioned are tackled in further detail in the subsequent sections, being substantiated by the authors of the most popular methodological writings.

Language Proficiency; Translators must be fluent in both the source and target languages and preferably translate into their mother tongue. This native-level proficiency enhances the accuracy and naturalness of the translation. Several sources highlight the importance of translators being bilingual and able to reflect nuances specific to each language context (Beaton et al., 2000; Gjersing et al., 2010; Hambleton & Patsula, 1999)

Cultural Knowledge; Beyond linguistic skills, cultural familiarity is essential. Translators must understand the sociocultural background of both the source and target contexts to preserve the original scale's intent and avoid misinterpretations. This perspective is emphasized in works that stress the significance of cultural equivalence in cross-cultural adaptation processes (Brislin, 1986; J. Epstein et al., 2015; Sousa & Rojjanasrirat, 2011).

Subject Matter Expertise; It is recommended that at least one translator possesses domain-specific knowledge about the construct being measured by the scale. This ensures that technical terms and context-specific items are accurately interpreted. This point is clearly supported in the literature (Beaton et al., 2000; Gjersing et al., 2010; Hambleton & Patsula, 1999)

Motivation and Commitment; Finally, the commitment and professionalism of translators are also critical. A translator must devote adequate time and care to ensure the integrity of the translation. This is especially important given that professional attitude and attentiveness reduce the risk of errors and increase translation reliability. The necessity of translator responsibility and engagement is underlined in various methodological recommendations (Brislin, 1970; Çüm & Koç, 2013; J. Epstein et al., 2015; World Health Organization, 2009).

4.2.3. Key Considerations in Translation

The methodological sources have also brought forth, apart from the procedural and team-based scales of translation, a number of linguistic and cultural conceptual strategies that are undeniably of utmost importance for the semantic clarity and cultural appropriateness of a text. These micro-level factors, often neglected in wide-ranging translation recommendations, are the main premises for the sustainment of the initial validity of translated items (Brislin, 1986; J. Epstein et al., 2015; Gjersing, et al., 2010). During our literature review, we identify the common stance should be put across in the way items are structured, expressed, and examined to prevent misunderstandings and guarantee equivalence in terms of reside communication. Giving a glimpse into the 22 most quoted publications; this section provides a short description of five vital thoughts to be cross-checked—clarity and simplicity, specificity, sentence structure, avoidance of ambiguity, and cultural sensitivity—These terms are the core of the effective outcome of the process of the translation.

Clarity and Simplicity; The correct translation requires the use of a lot of straightforward and clear language which should be done adequately to ensure that people are well informed irregardless of their different cultural and educational backgrounds. The translation literature highlights the lack of idiomatic expressions, metaphors, and cultural references that might not be translatable into culturally approachable languages (J. Epstein et al., 2015; Gudykunst, 2005; World Health Organization, 2014). Sentence structures must be simplified, and words shall be utilized such that the text is easily understood even by individuals with deficient literacy (Gjersing et al., 2010; Searle & Ward, 1990).

Specificity; A version that has specific terms which can be replicated in the original statement must be the one that is translated. Using vague terms that are not precise or terms that cover a broader definition can lead to the possible misinterpretation of the test items and affect their validity (Brislin, 1986; Hofstede, 1980; Tsang et al., 2017). The usage of such terms will conserve items' semantic and conceptual equivalence, which, on the other hand, are achieved by using well-reasoned terms that harmonize with the target culture and subject field (Gudykunst, 2005).

Structure Sentence; The preferred mode of expression is the active voice compared to the passive constructions that are primarily used in translation from English to other languages. The form of the active voice is less complex and hence more understandable, so the overall result is higher user comprehension (Guillemin et al., 1993; Tsang et al., 2017). This is quite pertinent to the instruments in social science that the clarity of response and accuracy rely on (Brislin, 1986).

Avoid Ambiguity; In the case of multiple interpretations, the translator should perceive it as a necessary obligation to eliminate them. This requires avoiding pronouns that have no clear referent and negative modal verbs such as "could" or "should" that purport lack of clarity. Instead, they can repeat noun phrases and swap vague phrases with specific items (Beaton et al., 2000; Gjersing et al., 2010; Wilson, Ward & Fischer, 2013).

Cultural Sensitivity; One should consider the demographic, religious, as well as the socio-cultural context the target audience is in. Items that are neutral in one culture can be taken as offensive or meaningless in another culture (Beaton et al., 2007; Çapık et al., 2018; Sousa & Rojjanasrirat, 2011). The question of cultural appropriateness is not just a language affair but also a matter of content familiarity and resonance, particularly for sensitive constructs in psychosocial scales.

5. Discussion

The primary objective of this research was to identify the most cited methodological references related to the process of scale translation and to classify these sources in the form of a thematic framework. The analysis of 257 articles published in peer-reviewed journals and indexed in the WOS database uncovered a total of 22 citations made in at least three publications. Thirteen main themes were thereby generated and three of them were related to Scale Translation Process, Considerations for the Translation Team, and Key Considerations in Translation thereby providing theoretical framework for the understanding of the field best practices. The arrangement consists of the structure that was extracted from this work and is of both conceptual establishment and practical use for the researchers who have commonly practiced the cross-cultural adaptation of measurement tools (Mumcu, Ataman ve Konuk, 2023). Departing from many previous guidelines that were based upon expert recommendations or pitched-case experiences, this research was found to be citation-based patterns that showcase the actual methodological preferences of the scholarly community. The work, therefore, not only employs the recurring practices of translation but also highlights the sources seen as the bedrock across disciplines.

This paper differs in its citation-based methodological approach to the most influential literature in scale translation from earlier methodological reviews such as those by Beaton et al. (2000), Gjersing et al. (2010), Epstein et al. (2015), and Sousa & Rojjanasrirat (2011). Earlier publications merely stated the problem by offering translation guidelines based on expert opinion, disciplinary conventions, or syntheses of selected studies. Although these models have been pivotal in developing the field, they are sometimes not justified empirically through the widespread use of references from other authors. The study's identification of not only the most frequently cited works but also the recurring authors and the broader trends in methodology was made possible by an extensive citation frequency analysis of the 257 peer-reviewed articles indexed in WOS. This methodology is distinctive from narrative or procedural reviews in that it has a foundation built on actual referencing patterns rather than overarching theoretical assumptions. The research does not prioritize a single discipline, as the data set includes health sciences, psychology, education, communication, and management which are all different research fields.

While foundational guidelines such as those proposed by Beaton et al. (2000), Epstein et al. (2015), ITC (2017), and COSMIN (2018) have delineated structured steps for translation—including forward and backward translation, expert committee review, and pretesting—this study reveals that real-world scholarly usage tends to emphasize a broader and sometimes different set of priorities. For instance, although ITC emphasizes team collaboration, the recurring references in our sample highlight translator motivation, conceptual clarity, and cross-disciplinary flexibility as frequently cited concerns—topics that are rarely elaborated in formal protocols. Similarly, while COSMIN focuses on measurement equivalence, citation trends show greater attention to contextual and cultural sensitivity, suggesting a more nuanced application of these standards in practice. This suggests that practitioners often extend beyond guideline-based procedures by integrating lived research experience and field-specific needs, underscoring the value of this study in bridging formal guidance with citation-based scholarly reality.

It is noteworthy that, even though past studies like Epstein et al. (2015) highlighted the lack of uniformity in the adaptation guidelines, this study brings a new perspective: Instead of searching frameworks for agreement, it quantifies the use patterns in the published literature. In this way, it points which ones have been most often referenced and which authors (e.g., Ward, Berry, Brislin, Hambleton) keep on directing the conversation through various inputs over time. This dual-level analysis of publication and author impact updates the scale translation methodology discussion through perspectives non-existent in previous literature.

The comparative perspective provided by the work gives a fresh synthesis of what was thought of as already established models. It transforms the implicit methodological preferences of the academic community into a well-organized and elaborate thematic guide. The explanatory-interpretive character of the guide makes it not only a reference tool but also a representation of the collaborative scholarly practice.

6. Conclusion

This research work represents a synthesis based on evidence of the literature and the scales used for translations which by identifying the most frequently cited within the WOS database, thereon, methodologically, the paper is of listing and reviewing. The reference dataset of 257 peer-reviewed articles from which 2,239 references were extracted and analyzed led to the identification of 22 most-cited articles. The sources categorized into three themes provided a structure: Scale Translation Process, Considerations for the Translation Team, and Key Considerations in Translation. Unlike previous narrative reviews, this study gives a citation-determined structure that reflects the real usage patterns and collective preferences of the academic community across diverse fields.

The thematic areas are consistent with previous frameworks, yet this work additionally introduces a new level of methodological transparency. It gives the name not only to the most referenced works but also to the authors in the blossoming adaptation sector whose cumulative influence has altered the scale. The publication forms a reflection on past studies and at the same time it becomes a guide for newcomers interested in planning translations.

Nevertheless, this analysis is not without its drawbacks. First and foremost, the research is confined to English-language publications listed in the WOS, thus possibly excluding other essential works which may provide insight into the topic in other languages or be found on platforms such as Scopus or Google Scholar. Secondly, it is important to note that the methodology used in the study that is based on citation frequency may not always be equal to the methodological quality or appropriateness. Further, the condition of a minimum of three citations could have precluded the discussion of any emerging but vital contributions in linguistic circles. Finally, the thematic synthesis was based on a selection of 22 references, which while significant do not represent the entire methodological spectrum on the topic of scale translation.

Future research may tackle the limitations by broadening the scope to integrate studies done in non-English languages and gray literature as well as extra bibliometric sources. Contrasting citation analyses across various databases or geographic settings may also uncover divergent trends in methodological preferences. In addition, the combination of expert evaluations or practitioner feedback could help triangulate citation data with experiential insights. Based on the current framework, subsequent studies might delve into specific guidance mechanisms within each discipline or they might analyze the way the listed references are actualized in empirical research. By providing researchers with a structured and citation-based roadmap, this study seeks to ensure successful measurement tools are tested for reliability, validity, and also cultural sensitivity thus contributing to cross-cultural research methodology enhancement indirectly.

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ETHICAL AND SCIENTIFIC PRINCIPLES STATEMENT OF RESPONSIBILITY

The author declares that ethical rules and scientific citation principles were complied with throughout the preparation process of this study.

STATEMENT OF RESEARCHERS' CONTRIBUTION RATE TO THE ARTICLE

1st author contribution rate: 100 %