Back-Translation Practices in Organizational Research: Avoiding Loss in Translation

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Abstract

As organizational research continues to globalize, scholars increasingly must translate established scales into languages other than those in which the scales were originally developed. In organizational psychology research, back-translation is the dominant procedure for translating scales. Back-translation has notable strengths in maintaining the psychometric properties of an established scale in a translated version. However, cross-cultural methodologists have argued that in its most basic form, back-translation often does not result in translations with acceptable levels of equivalence between original and translated research materials. Fortunately, there are complementary procedures to back-translation that can evaluate and strengthen the extent to which scale translations have achieved equivalence between original and translated versions of scales. But how often organizational research uses and reports these procedures in tandem with back-translation is unclear. This paper aims to address this lack of clarity by evaluating the state of the use of back-translation in organizational psychology research by reviewing every study in *Journal of Applied Psychology* that has employed translation over the past nearly 25 years (k = 333). Our findings suggest that the majority of the time that researchers engage in translation procedures, they report having done so. At the same time, the details of these procedures are commonly underreported, making it unclear whether additional techniques beyond back-translation have been used to examine and demonstrate equivalence between original and translated versions of scales. Based on the results of our review, we develop a set of recommendations for conducting and reporting scale translations in organizational research.

Keywords: Back-translation; Research Methods; International Psychology; Transparency and Openness; Scale Development

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When the American Psychological Association created a new division dedicated to International Psychology in 1997 (APA Division 52), it represented formal recognition that the scientific study of psychology was an inherently global endeavor. Every branch of psychology was recognized as having international implications, including organizational psychology, where scholars were studying employees and organizations whose activities were increasingly spanning national borders and cultures (Salas et al., 2017). Today, the internationalization of organizational psychology is reflected not only in the continued expansion of research focused on cross-cultural organizational phenomena but also in the growth of all forms of organizational research taking place outside of the English-speaking world (Gelfand et al., 2017). Indeed, a literature search of almost any established construct in human resources or organizational behavior will return examinations of the construct in different countries around the globe (Oh et al., 2014; Salgado et al., 2003). At the same time, developing a global perspective in organizational psychology has not been without growing pains, including in the area of measurement consistency across languages (Sanchez et al., 2006; Schaffer & Riordan, 2003).

Many research designs used by organizational researchers involve measures that reliably and accurately represent the construct when assessed across time and individuals (Hinkin, 1995; Nunnally, 1978). These measures often take the form of scales, or a collection of closed-response items to measure respondents on a given construct (Johnson & Morgan, 2016). Given that the development of valid and reliable scales typically accompanies the introduction of new constructs (e.g., Ferris et al., 2008; Lewis, 2003), researchers building on prior work are often able to employ existing scales to measure their constructs of interest (Bono & McNamara, 2011).

This practice is straightforward when studying phenomena in the cultural contexts where the scales were created. However, when a scale's source language differs from the language spoken in the location where a researcher plans to use it, the researcher must translate the scale from the source language into a "target" language. Because many scales used in organizational research were developed in English-speaking contexts and published in English-language journals, scholars seeking to use established scales in countries or cultures with languages other than English often bear the extra burden of conducting a translation process (Chu-Chen et al., 2014), even when culture or location has nothing to do with their research question.

Relative to language translation in general, translating existing measures is intricate because organizational researchers must ensure the outcome of the translation process is a scale in the target language that is *equivalent* to the source language scale (Hulin, 1987; Spector et al., 2015). Equivalence in scale translation is achieved (1) when the meaning of each item in a translated scale represents the definition and content of the construct as well as it did in the source scale (i.e., semantic equivalence; Flaherty et al., 1988) and (2) when a translated scale is empirically equivalent to the source scale, such that individuals with the same level of an underlying construct would have the same likelihood of choosing a given response (i.e., measurement equivalence; Mallinckrodt & Wang, 2004; Schaffer & Riordan, 2003). Achieving equivalence has long been recognized as a critical step in the research process for cross-cultural psychologists (Farh et al., 2006; Spector et al., 2015), partly because failing to achieve equivalence has serious consequences. For instance, when examining cross-cultural differences in a given construct, a translated scale that is not equivalent to its source scale could lead to erroneous conclusions that there are significant cultural differences when in reality none exist or could cause meaningful differences between cultures to go undetected. In addition, when testing theoretical models or previously established interrelationships with participants who speak a different language than those in the original studies, nonequivalent scales represent a source of measurement error that threatens the validity of study findings (e.g., Tsai & Huang, 2002). In fact, nonequivalent scale translations have recently been identified as a crucial challenge to replication research in psychology (Flake et al., in press). These problems can cause further issues by contaminating meta-analytic results, where the inclusion of studies that contain nonequivalent translated scales reduces the precision of effect-size estimates and generalizability inferences (Carpenter et al., 2019; North & Fiske, 2015). Conducting thorough and transparent scale translation procedures is essential to avoid these problems associated with nonequivalence.

While several procedures to adapt measures in ways that maintain equivalence across languages and cultures have been put forth (e.g., Brislin, 1970, 1986; Triandis, 1983; Vallerand, 1989), back-translation has emerged as the dominant method of scale translation in the organizational sciences (Schaffer & Riordan, 2003; Spector et al., 2015). In its simplest form, back-translation involves having one bilingual individual translate a scale from its source language to a target language, then having another bilingual person translate it back to the source language. The translators and researchers then examine the correspondence between source items and those that have been translated to another language and back; if there are meaningful differences, the translated items are adjusted accordingly and the process is repeated (Brislin, 1970). Although back-translation in its simplest form may seem straightforward, the way it is used often creates questions regarding whether the procedure results in a translated scale that is equivalent to the source scale. Chiefly, as observed by Brislin (1970) and reiterated numerous times since (e.g., Maneesriwongul & Dixon, 2004), articles in psychology often do not report translation processes in detail, if at all. Inconsistencies in the reporting of translation procedures are problematic because they create uncertainty regarding whether equivalence was achieved and, correspondingly, whether the newly translated scales are viable for future use.

Beyond inconsistent reporting of translation processes, scholars often report using a single round of back-translation, an approach that has shortcomings. Due to language complexities, a single round of back-translation is often insufficient to achieve equivalence, and multiple rounds are typically warranted (Brislin, 1986). In addition, because back-translation is dependent on (as few as) two bilingual translators, biases or idiosyncrasies possessed by these individuals can lead to a translated scale being viewed as equivalent by the translators, but not by those to whom the scale will be administered (Colina et al., 2017). To ameliorate the shortcomings of single-round back-translations, Brislin and other researchers have emphasized that it should be combined with other translation techniques and that translated scales should be pretested to more rigorously assess the extent to which equivalence has been achieved (Brislin, 1970; Spector, 2013). Yet, studies in organizational psychology that describe their translation procedures often do not report more than one round of back-translation or other translation techniques, or pretesting, to establish equivalence (Spector et al., 2015).

These inconsistencies in performing and reporting translation procedures create questions about whether back-translation efforts result in equivalent source and translated scale versions. Therefore, the goal of this paper is to answer these questions by reviewing the use of back-translation in organizational psychology research relative to best practices for conducting and reporting this process. To do this, we first develop research questions regarding the use of back-translation in organizational research. We then systematically review the past nearly 25 years of articles in this domain (i.e., since the formal recognition of international psychology) to examine how researchers conduct and report back-translation as well as if they have changed doing so over time. Based on the findings of this review, we revisit and update recommendations for conducting, assessing, and reporting back-translation procedures in a way that places equivalence between the source and translated scale versions in a more prominent position as the outcome of this process. Finally, we describe how additional stakeholders in our field (i.e., editors, reviewers, publishers) can facilitate the adoption of these recommendations as well as how technological advancements in the publication process can increase the transparency and availability of translated scales.

The Practice and Reporting of Back-Translation in Organizational Research Methods

When researchers use scales with respondents who speak a language other than the language in which the scale was developed, they must translate the scale. Ideally, translated scales in organizational research are so similar that "two individuals with the same amount or level of the construct being measured have equal probabilities of making the same response to the different language versions of the same item" (Mallinckrodt & Wang, 2004, p. 368). This means that achieving equivalence between source and translated items requires not just correspondence between source and translated words, but also matching the words' meaning to the items they comprise in both versions (Riordan & Vandenberg, 1994). Achieving this degree of sameness often necessitates modifying existing items (Brislin, 1986; Heggestad et al., 2019). While these adaptations are typically minor, they may also include substantive changes like switching out culture-specific activities in items (e.g., a household activity like mowing a lawn) with an equivalent activity in a target culture (e.g., taking out the garbage). Because of this complexity, 'forward-only' forms of translation—involving the researcher using their own (bilingual) knowledge or employing a bilingual person to translate a scale—routinely result in translated items that do not retain the meaning of the original items (Hulin, 1987; Maneesriwongul & Dixon, 2004)

Due to the threats to achieving equivalence associated with forward-only translations, methodologists have proposed more complex procedures to mitigate these concerns. The foundational work by Brislin (1970) offered a multi-step iterative process involving an initial round of translation and back-translation, followed by raters examining the three resulting versions of the items (source, initial translation, and back-translation) to identify errors in meaning. Once the translated materials are judged to be error-free, Brislin (1970, 1980) suggested that the scales be pretested. Pretests typically involve administering the translated scale to respondents similar to those who will be used in the study for which the scale is being translated (Brislin, 1986). Pretests can be simple, such as having a set of individuals in the target culture rate the translated items for clarity (e.g., Griffith et al., 2000; Vallerand, 1989). They can also be quite involved such as having groups of bilingual individuals complete the translated and source versions of the scale (or even combinations of the two), and then compare the aggregate responses between each group for nonequivalence (Brislin, 1970).

The comparison between forward-only translation and more rigorous, multi-step processes highlights the multiple decisions researchers must make regarding what additional procedures they might use and how they evaluate each step. In this way, translation is akin to other methodological techniques in which researchers must make a series of decisions that can, if not reported in the manuscript, create vagueness for those seeking to understand or replicate the research (e.g., exploratory factor analysis; Conway & Huffcutt, 2003). Articles that transparently and thoroughly report methodological decisions have improved perceptions of credibility and trustworthiness of their findings, and they can serve as exemplars for methodological reporting in future studies (Aguinis et al., 2018). Additionally, any scale translation that occurs, regardless of the number and types of procedures involved, represents a somewhat extreme form of scale adaptation. Editors and reviewers typically demand detailed descriptions of any modifications to existing scales. Indeed, Zhang and Shaw (2012, p. 9) shared that in their editorial experience, "it is imperative to provide a justification for the modifications and, ideally, to provide additional, empirical validation of the altered measures." And regarding scale translation, in particular, Eby et al. (2020, p. 80) stated that when a survey is translated "the details and rationale for the modification should be clearly explained" by authors. Despite editorial advocacy for complete reporting of scale adaptations, there is evidence that widely recommended reporting practices are often not followed (Heggestad et al., 2019). The absence of detailed reporting is likely due to practical publication constraints, such as reviewer preferences and article length limits (Jackson et al., 2009). Yet, the ultimate result is variance in the details provided regarding translation procedures in published organizational research.

In sum, translation procedures represent major scale adaptations involving multiple steps and decisions by researchers. Given the importance of back-translation for achieving equivalence between established scales and their translated versions, and the cascading effects such (non)equivalence has on the validity of a study's findings, researchers would ideally report all steps involved in their translation efforts. However, prior studies in adjacent disciplines suggest that many articles underreported back-translation procedures. Indeed, the motivation for Brislin's (1970) pioneering work stemmed from criticisms of the back-translation approach (Phillips, 1959) as well as an informal review of major cross-cultural publications that uncovered only sparing evidence of translation processes and scale equivalence. More recently, Maneesriwongul and Dixon (2004) reviewed translation practices in cross-cultural nursing research and found little consistency in the amount of detail publications provided regarding back-translation use. And in their review of organizational studies that used back-translation, Schaffer and Riordan (2003) reported that although researchers often state that they performed back-translation, articles rarely mention anything concerning equivalence. Combined, as organizational research expands its geographic borders of inquiry, whether the reporting of scale translations is meeting the standard for methodological transparency in our field is an open question.

Research Question 1: How frequently does organizational psychology research include reports of the characteristics of back-translation procedures?

Pretesting for Equivalence between Source and Translated Scale Versions

Both researchers who advocate for back-translation and those who critique it agree that pretesting identifies weaknesses or threats to the validity of translated scales (Geisinger, 1994; Guthery & Lowe, 1992). For instance, Schaffer and Riordan (2003) advocated for back-translation combined with pilot testing of translated materials and using a committee of bilingual and monolingual speakers of the target language to discuss the quality of the translated materials. This is for good reason, as even the most generic survey items can cause unexpected translations; pretesting helps to ensure that respondents in the focal study will comprehend all translated items in the same manner as respondents have interpreted the source items in prior work (Brislin, 1973; Vallerand, 1989). Of course, the question arises of how to determine the extent to which the translated scale is equivalent to the source scale.

One answer is qualitative methods, such as the random-probe technique, in which the translated scale is given to a small group of target language speakers who are then asked to explain why they responded as they did (Brislin et al., 1973; Guthery & Lowe, 1992; Schuman, 1966). In another example, the committee approach involves having a group of bilingual individuals collectively translate materials until members agree on the quality of the translation (Douglas & Craig, 2007). The committee approach is effective, in part, because members can identify and correct any mistakes made or biases held by any single translator (Epstein et al., 2015). Such qualitative approaches can yield results in the form of how many issues respondents encountered for each item or the percentage of items that elicited questions among respondents (e.g., Kim et al., 2005). These subjective assessments are useful because they identify problematic items that researchers can then revise to produce more equivalent interpretations. But as some scholars have noted, qualitative approaches primarily surface translation issues that are observable to those involved in the procedures, and as such, are limited in their ability to fully establish the equivalence of translated scales (Mallinckrodt & Wang, 2004).

Quantitative pretesting represents an alternative or complement to qualitative techniques. In quantitative pretesting, the translated version of the scale is administered to a sample that is representative of the eventual research population. The resulting data are then compared to data generated from a (ideally similar) sample who were administered the source version of the scale. Quantitative techniques for assessing equivalence have long been used in cross-cultural psychology research, even if early recommendations involved what would now be considered rudimentary tests (e.g., comparing means across groups; Brislin, 1970). Importantly, contemporary approaches offer greater precision in quantifying equivalence in that they allow for statistical inferences, and they reveal deficiencies or problems with items that may not be apparent to researchers during translation or qualitative evaluation. There are two prominent statistical techniques for quantitatively assessing equivalence (Spector, 2013). Tests of invariance using confirmatory factor analyses (CFA) are the most commonly used approach because they assess the equivalence of both multidimensional scales and multiple different scales. This is advantageous given the prevalence of multidimensional constructs in the organizational sciences and the common need in survey research to translate more than one source scale at a time. A second approach based on an item response theory (IRT) framework can also be effective, especially when examining the equivalence of a single unidimensional scale's source and translated versions.

Examining Equivalence via CFA Invariance

Methodologists have pointed out that the equivalence sought when translating scales across languages corresponds with the broader concept of invariance used in structural equation modeling (van de Vijver & Leung, 2011). Measurement invariance refers to the extent to which items used in survey scales mean the same things to different groups of respondents (Cheung & Rensvold, 2002). To conduct invariance-based pretesting as part of a larger translation process, researchers would administer the translated version of the scale to a sample similar to that which will be used in the focal study, and then they would compare CFA-based findings from these data to the same findings from a similar sample of individuals in the source culture who completed the source-language scale. The comparison source data could be previously collected or collected explicitly for testing invariance of the translation. To test for measurement invariance using CFAs, both the translated and source data are examined simultaneously using a series of nested, increasingly constrained measurement models (Meade & Lautenschlager, 2004).

The first, baseline test for invariance is configural invariance, which exists when the underlying factor patterns (e.g., the number of factors, the items within each factor) are the same across two groups (Zickar et al., 2010). For example, if two, three-item scales have been translated, CFA results which indicate that the same items load onto the same two factors in the source and translated data support configural invariance between the two versions. As is the case for all invariance tests of equivalence, evidence of (non)equivalence is based on chi-squared difference tests or benchmark cutoff values for CFA fit indices (e.g., comparative fit index [CFI], root mean square error of approximation [RMSEA], standardized root mean square residual [SRMR]; Nye et al., 2019). The next step is testing metric invariance, a stricter form of invariance which reflects whether people in different groups respond to items similarly (Vandenberg & Lance, 2000). Tests of metric invariance involve constraining the factor loading to be equal across the two groups to test whether the relationship between item scores and their latent factors are similar (Spector et al., 2015). Therefore, continuing the example above, a test for metric equivalence would require researchers to re-run the CFAs with factor loadings for each item-factor pairing constrained to be equal between the two groups. If the model fit is reasonable for this more restricted model, metric invariance is supported for the translated scale, and researchers can proceed.

Methodologists have suggested that configural and metric equivalence are typically sufficient to provide researchers with confidence that a translated scale is psychometrically operating similarly to its source scale (Haggestad et al., 2019). However, demonstrating that source and translated scales have configural and metric invariance does not mean that the two scales are fully equivalent. Scalar invariance represents an even stricter test, and indicates whether the respondents in the culture in which the translated scale is to be used have a different response style than those in the source culture (Meredith, 1993; Spector et al., 2015). Tests of scalar equivalence involve once again comparing the two groups via CFA, but in addition to constraining factor patterns and loadings, they also constrain item intercepts to be equal across the two groups. In this way, scalar invariance tests can show whether the target group responds systematically higher or lower than the source group (Somaraju et al., 2021).

Through this stepwise process, tests of invariance can provide researchers with information regarding not just *whether* translated scales are equivalent to their source scales, but more precisely, the *degree* to which they are equivalent. When fit indices suggest nonequivalence between the translated and source versions of scales, especially in terms of configural and metric invariance, it signals that more translation work is needed before the translated scale is used. In particular, researchers can examine the resulting modification indices that can identify problematic items causing poor fit in invariance tests (Jorgensen et al., 2018).

Examining Equivalence via IRT

Researchers can also use an IRT framework to examine equivalence in translated scales (Spector et al., 2015). IRT approaches are seen as more suitable than CFA-based approaches when testing the equivalence of source and translated versions of single scales that are theorized or known to be unidimensional latent constructs (Foster et al., 2017). A critical advantage of IRT is its flexibility; the approach can accommodate different response formats (e.g., dichotomous, polytomous, fixed-choice items) and allow item responses to covary non-linearly with construct scores (Raju et al., 2002; Stark et al., 2006). IRT analyses are also robust when testing for equivalence using a sample for the source scale that is dissimilar to the pretest sample for the translated scale (e.g., assessing absence norms in Canadian utility workers versus Chinese state-owned manufacturing workers; Johns & Xie, 1998; Prince, 2016). IRT models retain their accuracy and can isolate the extent of equivalence between source and translated scale versions even when differences in sample characteristics cause differences in means and variance between the two samples of scale respondents.

IRT results consist of several item-specific parameters estimating the probability of a response choice on each item based on the latent trait scores for the scale (e.g., parameters for item difficulty, discrimination; Carlson, 2020). Researchers can use these parameters to determine equivalence by estimating the differential item functioning (DIF) score for each item. DIF scores indicate the likelihood of individuals from different groups choosing different response options for each item even though the individuals have the same level of the given construct (Bauer, 2017). The significance tests associated with DIF scores are at the item-level and identify which, if any, items exhibit nonequivalence across respondents in different groups (Tay et al., 2015). When establishing the effectiveness of a back-translation process, significant DIF scores for scale items computed by comparing data from one language to another indicate that the translated items are less than equivalent across the two versions (e.g., English versus non-English coworking satisfaction scale; Drasgow & Probst, 2004). Although originally developed to examine item-level differences across groups, IRT approaches also offer a scale-level composite of DIFs, referred to as differential test functioning, which indicates whether the scale's scores and, by extension, the scale itself is equivalent and comparable across groups (Meade, 2010; Robert et al., 2000). Collectively, IRT-based tests of equivalence can indicate the extent to which individual items or whole scales function similarly across groups and offer insights into revisions, replacements, or corrections needed to reduce item- or scale-level differences when they occur (Meade, 2010).

Between the above-described qualitative and quantitative approaches, cross-cultural methodologists have provided "a smorgasbord for researchers" in terms of pretesting procedures they can use for achieving and providing evidence of equivalence (Brislin, 1976, p. 226). Yet, the emergence of back-translation as the dominant translation technique in organizational research raises the question of whether researchers are pretesting their translations' effectiveness and provide empirical evidence of the translations' equivalence. If not, there is currently a missed opportunity to use back-translation in tandem with complementary techniques that can strengthen, and provide evidence for, equivalence between source and target scale versions.

Research Question 2: How frequently does organizational psychology research that uses back-translation (a) report the use of some form of pretest and (b) report empirical findings of translated scale equivalence?

Back-Translation Use in Organizational Psychology Research Over Time

Although useful and informative to researchers and potential readers alike, some methodological processes are not necessary for every empirical study and are left to the authors' discretion to perform them. For example, the use of outlier analysis is not consistently reported in manuscripts in which it may have been used (Aguinis et al., 2013). When these discretionary processes are not disclosed in a manuscript, it is reasonable to assume that they did not occur. However, regardless of whether it was reported, a translation process almost certainly occurred in any study using a scale developed in a different language than that of the study's participants. While it was once common for authors not to report scale translation procedures (Brislin, 1970), many articles have been written about the importance of scale translation procedures, and the standards for transparency in fully reporting methodological processes have increased dramatically in recent decades (Aguinis et al., 2021). As the expectations of methodological rigor and reporting transparency have increased, it is widely believed that "incomplete analyses do not survive the review process" in our field (Cortina et al., 2017, p. 283). Regarding the reporting of scale-related procedures, in particular, methodologists and journal editors agree that authors must provide details regarding changes or modifications to existing published scales (Aguinis et al., 2018; Zhang & Shaw, 2012). Thus, there are compelling reasons that the reporting of scale translation practices should have become *more common* over time.

On the other hand, there are also reasons to predict that scholars may be providing increasingly fewer specifics about translation practices over time. First, since back-translation has become the standard scale translation procedure in organizational research (Spector et al., 2015), authors may tacitly assume that reviewers and readers will know how the translation was conducted while reviewers similarly assume that authors have followed the procedure. Second, authors may choose to focus on or dedicate more effort to novel elements of their product (i.e., research study) while giving limited attention to elements that conform to industry expectations (i.e., translation process) to maximize their paper's overall novelty (Deephouse, 1999). Third, external forces (e.g., reviewer guidance, manuscript length requirements) may influence researchers' ability to provide comprehensive detail when reporting methodological practices that are believed to be widely understood (Heggestad et al., 2019; Simsek et al., 2021). Thus, while authors likely recognize the importance of translation procedures, their ability and perceived need to detail them exhaustively may have decreased over time.

Overall, there are competing reasons to predict that scholars have become either more comprehensive or more cursory in reporting scale translation procedures since the founding of the International Division of the APA. Alternatively, it is possible that as the field has become increasingly familiar with the process, reporting some aspects of back-translation procedures has become more frequent while other aspects have become less likely to be detailed. Determining the trajectory of back-translation reporting practices, if any, is necessary to assess the extent to which the increase in organizational psychology studies across different cultures is being reflected in the Method sections of the field's publications.

Research Question 3: How, if at all, have back-translation reporting practices changed over time in organizational psychology research?

Method

Transparency and Openness

Our study follows the *Journal of Applied Psychology (JAP)* methodological checklist. Processed data on which study conclusions are based and the syntax needed to reproduce the results are available from the first author upon request. Analyses were conducted using SPSS 27 (IBM Corp., 2020). The study design and analyses were not preregistered.

Literature Search and Criteria for Inclusion

Our initial sample included every article published in *JAP* from 1997 (issue 1) to 2021 (issue 2). We chose 1997 as the starting point given it was the founding year for APA's International Psychology Division 52. We focused on *JAP* because it is the preeminent organizational psychology journal and is expected to be emblematic of the best practices and reporting trends in broader organizational research (Cortina et al., 2020). These selection criteria resulted in 2,159 articles. Based on PRISMA guidelines (Page et al., 2021), Table 1 summarizes how we moved from 2,159 articles to our final sample, as we describe below.

To identify all articles in which a scale had been translated from English to a non-English language, we manually reviewed every article for potential inclusion based on the following criteria. First, articles needed to feature at least one psychometric scale containing at least two closed-response items to be considered for inclusion (e.g., Likert-type, multiitem scales; Cortina et al., 2020; Johnson & Morgan, 2016). Second, articles stating that the items were administered in a language other than English were retained for inclusion. Additionally, if an article did not explicitly state the language but reported that a sample was from a country where English was not an official language, we retained the article for possible inclusion. Finally, articles were retained for potential coding if they did not mention the language or sample location but did have a coauthor affiliated with an institution in a non-English-speaking country. The unit of analysis for this review was the article, such that we included articles with multiple samples if any of the samples used translated scales. These criteria yielded 408 studies for possible inclusion.[1]

Coding Procedures and Scheme

We manually coded the content of each retained article for characteristics of the article itself, the sample in which translation occurred, the scales that were translated, and the corresponding translation procedures. Regarding the *article*, we coded (1) the year of the article's publication, (2) whether the article was an abbreviated research report, and (3) any listed author affiliations in non-English-speaking locations (Shen et al., 2011). Regarding the *sample*, we coded characteristics of any samples that were drawn from non-English speaking locations. Here, we recorded (1) the study number(s) within the article, (2) the country (or countries) where the sample(s) were collected, and (3) the languages used or likely used by the respondents based on the sample locations stated in the text. Regarding *scales,* we coded whether the article had scales that were (1) originally published in English outlets and therefore in need of translation, (2) originally published in non-English outlets and therefore not in need of translation, and (3) self-developed by the authors to use in the study, likely in the non-English language of the sample, that were then reported in English in *JAP*.

We also coded features of the *translation process* descriptions, including whether the authors mentioned the translation process at all, specified that back-translation occurred, cited a published back-translation process and the citations if so, and whether additional translation details were available to readers outside of the manuscript text (e.g., appendix, online

[1] An additional 24 meta-analytic studies that mentioned how they handled the coding or exclusion of non-English articles were reviewed. Recommendations stemming from this subsample are provided in the Discussion section.

supplement). In addition, we coded details of who was involved in the translation process, if provided. Specifically, we coded whether the authors reported who translated the scales (e.g., a given author, graduate student), described the qualifications of the translators (e.g., bilingual scholar, employees of a professional translation service), and stated if separate translators were used for the initial translation and subsequent back-translation. We also coded whether the authors described any translation procedures or pretests they used in addition to back-translation and whether any data on equivalence were provided. Finally, we collected a word count for the entire passage in the article describing the translation process.

Two authors discussed inclusion criteria and formalized the coding scheme prior to coding. After identifying the 408 studies for possible inclusion, these authors independently coded the same 30 randomly chosen articles. They then discussed the infrequent disagreements (96.5% agreement level) until agreement was achieved. The coding scheme was revised accordingly. The remaining 378 articles were then divided among the two authors for coding.

Of the initial 408 articles retained for possible inclusion, 75 were excluded following the coding process. There were several reasons why initially retained articles were subsequently determined not to meet the inclusion criteria. We excluded 26 articles because not enough information was provided to identify what languages were used and/or where studies were conducted (e.g., Van Kleef et al., 2013; Zohar & Polachek, 2014). We excluded 22 articles because the studies were conducted in locations with several official languages, both English and non-English languages, but the specific language used was not specified by the authors (e.g., Foo et al., 2009; Ng et al., 2011). Another 20 articles were excluded because even though they used scales and were conducted in non-English contexts, they did not require any scale translations from English to non-English. In these cases, authors used scales that were sourced from archival data, were originally developed in the non-English language of the study, or were previously translated in prior published studies (Demerouti et al., 2001; Gross et al., 2011; Meinecke et al., 2017). Finally, we excluded seven articles after closer examination revealed the studies were conducted entirely in English. In total, 333 articles were retained for analysis.[2]

Analyses

We dummy coded (1 = *reported in article*, 0 = *absent from article*) basic article characteristics (e.g., *Article*, *Sample*, *Scale* features) as well as information related to translation procedures (e.g., mention back-translation, cite process followed, provide data on equivalence) so that we could assess each characteristic's frequency across the 333 articles. For our analyses focused on how back-translation practices have changed over time (i.e., Research Question 3), we used the independent variable of *time* to predict the likelihood that information related to translation procedures appeared in articles. We created the variable for *time* by subtracting 1997, the first year included in the literature review, from the year an article was published such that larger values indicate more recently published articles (i.e., 1997, 1998, 1999… 2021 were coded as 0, 1, 2… 24). Additionally, we used *article type* (1 = research report, 0 = traditional article) as a control variable given that page length limitations in research reports constrain authors' ability to detail all study elements, including back-translation. We used logistic regression to estimate the likelihood that specific information regarding scale translations was (versus was not)

[2] At the suggestion of a reviewer, we coded every translated construct and keyword in the 333 retained articles. We compared the frequencies of translated constructs and article keywords in the 333 articles to construct and keyword frequencies present in *JAP* more broadly, as reported in Bosco et al. (2015) and Kozlowski et al. (2017), respectively. Although those two articles were not exactly comparable to our focus (e.g., constructs versus effect sizes) or timeframe, we did find that the constructs and topics from the 333 studies using translated scales were generally similar to those from all *JAP* articles in a similar time period. A full description of this coding process, its results, and these comparisons are provided in Supplement 1. These results provide insight into the degree to which constructs and topic areas featured in *JAP* have (or have not) been examined in non-English speaking contexts.

included in articles. We used negative binomial regression in analyses predicting word count given overdispersion found in our count data (Cohen et al., 2003).

Following coding, it became evident that back-translation practices may differ depending on the study location, in terms of the country of the sample. Thus, we decided to conduct supplementary analyses examining back-translation reporting differences based on sample locations. To do so, we created dummy variables for the countries that appeared in at least 5% of the retained articles: China (k = 115; 34.5% of retained articles), the Netherlands (k = 44; 13.2%), Germany (k = 28; 8.4%), and Israel (k = 19; 5.7%). This cutoff was made to facilitate meaningful interpretations based on relatively common sample locations and concerns about low-base rates, or sampling zeros, on certain outcome variables (e.g., quantitative tests of scale equivalence; Agresti, 2003). Again, we ran independent logistic regression and negative binomial regression models to estimate the likelihood that authors reported (versus did not report) scale translation information and word counts (respectively) when using samples from each of the four countries compared to all other locations.

Results

Table 2 reports frequencies and percentages of article characteristics and author reporting of translation practices included in our analyses. Of the 333 articles, the majority (k = 254; 76.3%) had at least one author affiliated with an institution in a non-English-speaking country. Although every article featured translated multiitem scales, 90 (27.0%) did not explicitly state the language into which scales were translated; those articles only reported the country where the study was conducted. As expected, most of the articles used scales originally published in English outlets (k = 315; 94.6%), then translated to target languages. In addition to translating at least one scale, some of these articles also used scales originally published in non-English outlets

(k = 60; 18.0%) or included at least one self-developed non-English scale that was subsequently reported in English for *JAP* (k = 143; 42.9%).

Research Question 1 focused on the frequency with which organizational research articles report back-translation procedures characteristics. To start, 196 of the 333 articles (58.9%) mentioned that a translation process occurred even though every article used at least one scale in a language other than its source language. Of the 196 articles that reported that translation occurred, 179 used back-translation (91.3%). A total of 142 articles (42.6%) provided at least one reference for the translation guidelines they used. Of these, all but five (k = 137) cited Brislin’s work (1970, 1973, 1980, 1986), with Brislin (1980) being the most frequently cited (k = 77). The reporting of back-translation details in the 196 articles was inconsistent. Fewer than a quarter of all retained articles described who the translator was (k = 54; 16.2%) or what translation qualifications they held (k = 76; 22.8%). Additionally, authors infrequently mentioned whether independent translators were used for the initial translation and subsequent back-translation (k = 60; 18.0%).

Research Question 2a focused on the frequency with which researchers used translation procedures in addition to back-translation. As reported in Table 2, our findings indicate that 52 articles (15.6%) reported that translated scales were pretested or reviewed by multiple raters. Furthermore, Research Question 2b inquired about the frequency with which empirical tests of equivalence follow back-translations. Analyses revealed that providing quantitative results from empirical tests of translated scale equivalence was rare (k = 13; 3.9%)[3]. These results suggest that researchers either do not consistently conduct or do not report details of checks for

[3] A list of each of the 13 studies reporting empirical tests of translated scale equivalence as well as the verbatim passages are presented in Supplement 2.

equivalence in translated measures. Overall, the results of analyses examining Research Questions 1, 2a, and 2b indicate that translation processes are not always reported, back-translation is the dominant translation process, evidence of translation techniques beyond back-translation is uncommon, and the reporting of results of empirical tests of equivalence is rare.

Research Question 3 asked how the reporting of back-translation procedures has changed over time. As shown in Table 3, the findings in Models 1, 2, and 3 indicate that since 1997, researchers have become more likely to mention their translation process (b = .03; p = .09) and provide at least one citation supporting justifying their process (b = .10; $p < .01$). This evidence supports the notion that organizational psychologists increasingly report that translations occurred. However, the results from Models 4 through 8 in Table 3 tell a more nuanced story. These findings indicate that providing details about who was involved in the translation process (b = -.04; p = .06), what their qualifications were (b = -.04; p = .04), and whether independent translators/back-translators were used (b = -.04; p = .07) has become less common over time. Beyond the reporting of back-translation, results further showed that reporting whether translated scales were pretested or reviewed (b = -.04; p = .05) and providing data indicating the equivalence of the scale translation (b = -.11; p = .01) have also decreased in prevalence. Finally, the results from the negative binomial regression using *time* to predict the word count used to describe translation processes are reported in Table 4. Results indicate a significant negative relationship between time and the number of words used to describe translation processes (b = -.03; $p < .01$), such that the number of words used to describe how scales were translated is decreasing. In total, our findings indicate that since 1997, organizational research articles are increasingly including descriptions and citations for translation processes but are providing less detail and using fewer words to do so.

Supplementary Analyses

Table 5 includes the results from supplementary analyses examining whether reporting of translation practices varied by sample location. Collectively, the results indicate studies conducted in China were more likely to mention the translation process (b = 2.37; p < .01), specify that back-translation occurred (b = 2.49; p < .01), cite the translation process that was followed (b = 2.60; p < .01), and discuss pretesting of translated scales (b = .79; p < .01) compared to articles that featured translations but in non-China-based studies. Studies based in Germany, Israel, and the Netherlands were less likely to include details of translation processes compared to studies from other countries that used translations. Several of these analyses were unable to be run given the presence of empty cells, or sampling zeros (e.g., none of the 19 Israel-based studies report translation details; Agresti, 2003). Of the analyses that converged, German, Israeli, and Dutch studies were significantly less likely to mention the translation process, specify that back-translation occurred, and cite the translation process they followed (i.e., all associated dummy variables were negative and significant at p < .01 when they could be estimated). Studies based in the Netherlands were significantly less likely than non-Dutch studies to report who translated the scales (b = -1.53; p = .04), what qualifications translators possessed (b = -1.98; p < .01), whether independent translators/back-translators were used (b = -1.21; p = .05), and if translations were quantitatively tested for equivalence (b = -1.48; p = .05). German-based studies were less likely than non-German-based studies to mention translator qualifications (b = -2.22; p = .03) and whether independent translators were used (b = -1.94; p = .06). Finally, as reported in Table 6, German (b = -2.72; p < .01), Israeli (b = -1.90; p < .01), and Dutch (b = -1.41; p < .01) studies used significant fewer words when describing their translation processes compared to other non-English studies, whereas significantly more words were used to describe translations in studies conducted in China ($b = .33$; $p < .01$).

Discussion

This paper began with the well-established observation that organizational psychology research is becoming increasingly global and raised the question of whether one aspect of the field's methodological practices is keeping pace with this internationalization. The ever-expanding study of organizational phenomena in diverse locations, countries, and populations (Feitosa & Sim, 2020) necessitates the increased translation of scales validated in one language for use in another. However, despite our field's growing emphasis on rigorous measurement (Cortina et al., 2020), and although researchers have recognized for more than a half-century that translations pose a threat to the psychometric soundness of measures via nonequivalence of translated scales, the extent to which rigor has been maintained with regard to scale translation is unclear. Thus, the goal of this paper was to systematically examine translation practices in organizational psychology over the last quarter-century.

The findings of this paper suggest that back-translation is the dominant method of scale translation, but that its use often goes unreported or underreported. Given the potential for translation procedures to impact the validity and generalizability of a study's findings and the important decisions required by even the most basic form of back-translation (e.g., who translated the scales, how discrepancies were resolved, what item adaptations occurred; Brislin, 1986; Schaffer & Riordan, 2003), such minimal reporting is incongruent with the field's standards of methodological transparency (Eby et al., 2020; Zhang & Shaw, 2012). In addition, our results indicated that back-translation is seldom used in tandem with a pretest, and that results of tests to quantify the effectiveness and identify problems with back-translation procedures are rarely reported. Finally, we found that over the past 25 years, authors are increasingly reporting that translation processes occurred, indicating that authors and review teams clearly acknowledge the importance of scale translations as noteworthy methodological procedures. Yet, the number of words used to describe translations has decreased over that same period, as have the use of additional translation procedures and tests evidence of equivalence.

Overall, these results provide evidence of a potentially suboptimal current state of translation processes and reporting practices in organizational psychology. However, the responsibility for these findings does not rest solely with researchers, as reporting efforts and methodological practices are influenced by pressures to conform to institutional norms or practical constraints (Zucker, 1987; Simsek et al., 2021). Moreover, optimism is warranted, not only because the gradual improvements in reporting that translations occurred over the last quarter century signal a recognition of the importance of these procedures, but also because the supplementary steps to strengthen the rigor of back-translation are becoming more accessible. Indeed, some qualitative methods can be executed quickly and at minimal cost (e.g., random-probe technique; Schuman, 1966) and advances in accessing online subject pools (e.g., MTurk, Prolific) and statistical software make quantitative tests easier to conduct (Foster et al., 2017; Somaraju et al., in press).

Methodological Implications and Recommendations

While the findings of our paper paint a mixed picture of the current state of back-translation in the organizational sciences, there is ample reason for hope because many of the concerns identified in this paper are readily addressable. In Table 7, we summarize our recommendations for conducting and reporting scale translations via back-translation in organizational research. First, one of our primary findings—that articles do not always report whether translations occurred—is simple to address. Little progress can be made until this reporting norm is firmly in place and consistently followed. Therefore, our first recommendation is that in all studies, authors state the country where the study took place and the primary language of participants. We recommend this norm should be followed for studies conducted in English-speaking countries that do not involve translation as well, as we observed that studies conducted in English-speaking countries often did not report this essential detail. If organizational psychology is truly an international field, there should not be a default language. Moreover, in studies with scales that were initially developed in a different language than the language of the current participants, details on how translations were completed should be reported.

We also found that basic aspects of back-translation procedures were often not reported, making it difficult for readers to determine the rigor of these procedures. Thus, our second recommendation is that when back-translation is used, authors report the number, roles, and qualifications of translators as well as how many rounds of translation took place. Our third recommendation is that authors report any discrepancies or problems encountered during back-translation. It is common for problems, disagreements, or errors to arise during back-translation (Brislin, 1970; Epstein et al., 2015; Philips, 1959), but our findings indicate that occurrences of these issues are seldom reported, which creates opacity in terms of if and how scales were adapted during translations. This murkiness is not only out of alignment with current standards for transparency and openness in organizational research (Nosek et al., 2015), but future scholars would benefit from understanding how and why scales were adapted during this process.

As repeated throughout this paper, the goal of back-translation is equivalence, such that the translated scale is as semantically and psychometrically similar to the source scale as possible

(Mallinckrodt & Wang, 2004; Spector et al., 2015). Yet, even thorough back-translation does not guarantee a high degree of equivalence (Brislin et al., 1973; Epstein et al., 2015; Schaffer & Riordan, 2003). Pretesting, however, can provide authors with a sense of the extent to which translated scales have achieved equivalence. Therefore, our fourth recommendation is that translated scales are pretested. At a minimum, pretests would involve having a single (i.e., third) bilingual person qualitatively review the source and translated scale versions. Ideally, pretests would go further, given that subjective evaluations of translations have limited effectiveness (Sanchez et al., 2006). Thus, our fifth recommendation is that formal quantitative tests (e.g., CFA invariance tests, IRT analyses) are used to determine the degree of (non)equivalence between source and translated versions of scales. Of course, it may not be feasible or practical in all cases to administer the source and translated scales to two new samples prior to using the translating scale in a focal study. In cases where such a pretest is not conducted, we suggest researchers report the results of empirical tests of equivalence comparing data of the translated scales used in the focal study to previously collected data using the source scales. Still, the decision to forego pretesting in favor of assuming translated scales used in the focal study will be equivalent to the source scales is not without risk. If tests reveal nonequivalence, it may necessitate further scale revisions and the collection of a new dataset reflecting these revisions.

Our sixth and final recommendation is that both source and translated scale versions be included in all submissions, either in appendices or online supplements. Providing both scale versions would give bilingual reviewers and editors the ability to examine the equivalence of the two scales subjectively and, upon publication, would give readers from source and target cultures easy access to the measures. Moreover, translated versions of scales should be uploaded to existing scale databases, such as the PsycTests database administered by the APA and the

"Measure Chest" administered by the Research Methods Division of the Academy of Management. By making translated scales widely available through these repositories, the challenge of finding valid scales to use in non-English research contexts will be greatly reduced.

We acknowledge that following the above recommendations could result in more work for researchers in some cases. However, we believe that most scholars would agree that the cumulative benefits of such increased efforts for our field—namely, semantically and psychometrically equivalent translated scales that are widely available—outweigh the costs. Moreover, some scholars are already following these recommendations, and their reporting of back-translation processes can provide a template for those who seek to follow these recommendations. Table 8 displays these exemplars, reproducing passages for each portion of the translation process in which the authors gave a thorough and transparent description of what they did. Collectively, these passages can serve as a resource for researchers, reviewers, and editors seeking to replicate the best practices for conducting and reporting back-translations.

Limitations and Directions for Future Research

Our quantitative review benefitted from design features such as hand-coding all articles, spanning 25 years, and a clearly defined scope centered on back-translation; but it is not without limitations. Many of these limitations point to opportunities for future research. First, our review largely focused on translations related to the items within scales. Although items are the primary component of scale-based measures, response scales are also an integral part of such measures and there is ample evidence that respondents from different cultures may differ systematically in terms of how they respond to the same response scales (Cheung & Rensvold, 2000; Hamamura et al., 2008; Sanchez et al., 2006). For example, Gibson and colleagues found that "respondents in the Philippines and Puerto Rico reported discomfort and confusion with an agree–disagree response format. They explained that a scale ranging from 1 (not accurate) to 7 (very accurate) would be clearer and therefore consistently responded to, given their cultural reluctance" (2009, p. 67). As such, the reporting transparency and translation procedures advocated in this paper also apply to response scales. In examining the passages from the text of the 196 articles that reported translation, we found that in 83 cases (42.3%), authors reported that they translated the entire survey or questionnaire, or that all study materials were translated. In another 71 cases (36.2%), authors reported that all scales or measures were translated. Together, this evidence indicates that most researchers are extending their translation procedures to response scales and other survey elements. At the same time, in 42 cases (21.4%), authors only reported that they translated the items. We assume this is mainly a wording issue, and these researchers used the same translation procedures for the items and the other elements of their surveys. However, it does highlight a need for thorough reporting and for equal care to be taken when translating items, response scales, and other survey elements (e.g., instructions).

Second, our review of translation procedures did not include the translation of experimental protocols, stimuli, vignette descriptions, and other study materials. We chose this focus due to the prevalence and importance of scale use in organizational psychology research. Of course, scales are not the only established study materials that authors use when developing their current research designs. Therefore, we recommend that researchers interested in extending our findings examine the translation processes and reporting used when researchers use non-scale related materials in languages other than the materials' source language. We do not see a reason why scholars would systematically use one type of translation process for scales and an entirely different approach for other study materials, especially considering many Institutional Review Boards require that all study materials are submitted together (Bankert & Amdur, 2006).

However, reporting practices and subsequent recommendations for translating these materials likely differ from those for multiitem scales.

Third, we did not examine the psychometric properties of the source scales, so our findings cannot provide insight into which source scales are the best candidates for translation when multiple seemingly-viable source options exist for a single construct. However, we concur with previous scholars that construct validity is of paramount importance to research (Westen & Rosenthal, 2003) and argue that selecting source language scales with high construct validity is critical for successful, construct-valid (back-) translations. If scholars are faced with the choice between using an already translated scale that was derived from a source scale with low/questionable construct validity or back-translating a source scale with higher construct validity, we recommend the latter. Conducting a new back-translation may be the less convenient option, but the tradeoff of having higher construct validity is almost certainly worth the effort.

Fourth, our research questions and analyses focused on primary studies and excluded meta-analyses. However, we identified 24 meta-analyses that acknowledged their literature search identified non-English primary studies. Most of these articles ($k = 17$) explicitly excluded non-English articles when conducting their meta-analyses. Given the resources currently available to researchers (e.g., Google Translate, professional list serves, etc.), the choice to discard primary studies based on translation issues should be avoided in future quantitative reviews to reduce biased meta-analytic estimates (Schmidt & Hunter, 2015). Practices used by the seven studies that included non-English primary studies varied, such as relying on author translation abilities (e.g., Hülsheger et al., 2009), searching for pre-translated versions of articles (McKee-Ryan et al., 2005), and conducting literature searches in non-English databases (e.g., Jiang et al., 2012). We cannot comment on the efficacy of these practices as extracting effect sizes for meta-analyses from non-English publications is not identical to translation processes for ensuring equivalence. Thus, there is an opportunity to establish best practices for translating primary study results so valuable data are not discarded when conducting quantitative reviews.

Fifth, although our review focused on back-translation, due to the limitations associated with the technique, there are compelling reasons scholars should consider using alternative initial translation procedures. For example, Douglas and Craig (2007) advocated for group-based translations. In one approach, a group reviews and discusses the quality and differences between two independent translations of the same source materials (i.e., committee approach). In another, a set of experts independently reviews the translations before coming together to discuss any issues with them (Douglas & Craig, 2007). We see no reason why researchers should not use approaches such as these when it suits their research team's areas of expertise and needs better than back-translation (Van de Vijver & Tanzer, 2004). In either case, the qualitative review process can be supplemented with the quantitative tests for equivalence described in this paper.

Sixth, it is worth noting that the focus of our review was on scales that were originally published in English-language outlets. Our choice in this regard overlooks two critical elements that represent fruitful areas for examination in future research. First, a great deal of impactful research is published in journals that are not printed in English. We encourage researchers who use scales published initially in non-English outlets to follow the recommendations in this paper regarding translation processes and reporting, even though our study did not directly address this type of translation (for example, see Mueller et al., [2012] and Schaubroeck et al., [2018]). Second, the focus of our study was on the translation of existing scales. However, authors often need to develop new scales to measure their constructs of interest, either due to an absence of existing scales or deficiencies in existing scales. Although translation is not a component of the scale development process (Hinkin, 2005), we encourage authors to consider validating their new scales in more than one language to increase their research's utility.

Conclusion

The translation of scales has long been an essential methodological component of organizational psychology research, one that can affect studies' conclusions and generalizability. The impact of scale translations on the corpus of organizational literature will only increase as the study of work-related topics continues to expand geographically. This paper questions whether the transparency and rigor of back-translation practices used in organizational psychology research have kept pace with this globalization. Our findings suggest reporting practices collectively have fallen below the espoused standards for the field. Stemming from the results of our review, we outlined six recommendations for scale translation to directly improve the extent to which equivalence is achieved in scale translations and is reported in our research. From the psychometric perspective, we encourage researchers to conduct quantitative tests (e.g., CFA invariance tests, IRT analyses) for assessing equivalence. Our findings, and their implications, point out an opportunity for our field to make a meaningful leap forward in the practice and reporting of scale translations.

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Table 1

Summary of inclusion and exclusion criteria and data for review

Records identified from APA Database, retrieved, and assessed for eligibility	2159
Records excluded	
Article did not use a translated scale in initial screening	1751
Not enough info was provided to determine language or country	26
Conducted in country with multiple languages including English and language was not specified by authors	22
Article used non-English instrument but did not use a translated scale	20
Upon further screening, was determined that entire study was conducted in English	7
Records retained for analysis	333

Table 2

Frequencies of article characteristics and author reporting of translation practices

Variable	Articles Reporting (Count)	Articles Reporting (Percent)
Article Characteristics		
Author with non-English affiliation	254	76.3
Explicitly state language used	243	73.0
Scales originally published in English	315	94.6
Scales originally published in non-English	60	18.0
Self-developed scales	143	42.9
Acknowledged Translation Process		
Mention translation process occurred	196	58.9
Specified back-translation	179	53.8
Cited translation process followed	142	42.6
Translation Process Details Provided		
Who translated	54	16.2
Translator qualifications	76	22.8
Independent (back)-translators used	60	18.0
Translated scales pretested/reviewed	52	15.6
Quantitative tests of scale equivalence	13	3.9
Average number of words used =	26.43	

Note: Total k = 333.

Table 3

Logistic regressions predicting likelihood of translation practice reporting

	Model 1			Model 2			Model 3		
	DV = Mention Translation Process			DV = Mention Back Translation			DV = Provide Citation for Back Translation		
Variable	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*
Constant	.01	.28	1.01	-.19	.28	.82	-1.80**	.34	.17
Article Type	-.29	.25	.75	-.23	.25	.79	.07	.25	1.07
Time	0.03†	.02	1.03	.03	.02	1.03	.10**	.02	1.11
-2 Log likelihood		447.16			456.43			426.70	
Nagelkerke R^2		.02			.01			.11	

Note: *N* = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† *p* ≤ .10. * *p* ≤ .05. ** *p* ≤ .01.

	Model 4			Model 5			Model 6			Model 7			Model 8		
	DV = Mention Who Translated			DV = Mentioned Translator Qualifications			DV = Independent Translators Used			DV = Translated Scales Pretested/Reviewed			DV = Quantitative Test of Scale Equivalence		
Variable	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*
Constant	-1.01**	.35	.36	-.55†	.31	.58	-.84*	.33	.43	-.96**	.35	.38	-1.82**	.53	.16
Article Type	-.09	.34	.91	-.26	.31	.77	-.50	.35	.60	-.40	.37	.67	-.09	.69	.92
Time	-.04†	.02	.96	-.04*	.02	.96	-.04†	.02	.96	-.04*	.02	.96	-.11**	.04	.90
-2 Log likelihood		291.49			352.34			308.31			283.22			103.17	
Nagelkerke R^2		.02			.02			.03			.03			.07	

Note: *N* = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† *p* ≤ .10. * *p* ≤ .05. ** *p* ≤ .01.

Table 4

Negative binomial regression predicting word count describing translation process

	DV = Number of Words Used		
Variable	β	SE	*OR*
Constant	3.75**	.14	42.30
Article Type	-.38**	.13	.68
Time	-.03**	.01	.97
Likelihood ratio X^2	20.13		
AIC	2845.04		

Note: *N* = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. AIC = Akaike information criterion

Table 5

Logistic regressions predicting likelihood of translation practice reporting by country of sample

	Model 1 DV = Mention Translation Process			Model 2 DV = Mention Back Translation			Model 3 DV = Provide Citation for Back Translation		
Variable	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*
China									
Constant	-.17	.16	.85	-.47**	.16	.63	-1.22**	.18	.29
Article Type	-.42	.28	.65	-.38	.29	.68	.04	.29	1.04
China Dummy	2.37**	.33	10.69	2.49**	.31	12.08	2.60**	.28	13.42
-2 Log likelihood		376.90			372.70			349.86	
Nagelkerke R^2		.27			.31			.36	
Germany									
Constant	.66**	.14	1.94	.40**	.14	1.50	---	---	---
Article Type	-.38	.26	.68	-.31	.25	.73	---	---	---
Germany Dummy	-2.72**	.63	.07	-2.47**	.62	.08	---	---	---
-2 Log likelihood		417.86			433.10			---	
Nagelkerke R^2		.13			.10			---	
Israel									
Constant	.54**	.14	1.72	.30*	.13	1.35	-.24†	.13	.78
Article Type	-.26	.25	.77	-.20	.25	.82	.14	.25	1.15
Israel Dummy	-2.14**	.64	.12	-1.91**	.64	.15	-2.69**	1.03	.07
-2 Log likelihood		434.17			446.60			439.57	
Nagelkerke R^2		.07			.05			.06	
Netherlands									
Constant	.73**	.15	2.08	.51**	.14	1.66	-.09	.14	.91
Article Type	-.28	.26	.76	-.22	.26	.80	.15	.26	1.16
Netherlands Dummy	-2.50**	.46	.08	-3.06**	.61	.05	-3.72**	1.02	.02
-2 Log likelihood		405.41			407.99			409.69	
Nagelkerke R^2		.17			.19			.17	

Note: N = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. --- indicates sampling zero.

Table 5 (cont.)

Logistic regressions predicting likelihood of translation practice reporting by country of sample

	Model 4			Model 5			Model 6			Model 7		
	DV = Mention Who Translated			DV = Mentioned Translator Qualifications			DV = Independent Translators Used			DV = Quantitative Test of Scale Equivalence		
Variable	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*	β	SE	*OR*
China												
Constant	-1.62**	.20	.20	-1.24**	.18	.29	-1.46**	.19	.23	-1.89**	.22	.15
Article Type	-.14	.34	.87	-.31	.30	.73	-.55	.35	.58	-.49	.37	.62
China Dummy	.04	.31	1.04	.29	.27	1.34	.22	.30	1.25	.79**	.31	2.20
-2 Log likelihood		295.01			355.57			311.00			280.41	
Nagelkerke R^2		.01			.01			.02			.04	
Germany												
Constant	---	---	---	-1.02**	.15	.36	-1.28**	.17	.28	---	---	---
Article Type	---	---	---	-.36	.31	.70	-.59†	.35	.55	---	---	---
Germany Dummy	---	---	---	-2.22*	1.03	.11	-1.94†	1.03	.14	---	---	---
-2 Log likelihood		---			347.44			305.16			---	
Nagelkerke R^2		---			.05			.04			---	
Israel												
Constant	---	---	---	---	---	---	---	---	---	---	---	---
Article Type	---	---	---	---	---	---	---	---	---	---	---	---
Israel Dummy	---	---	---	---	---	---	---	---	---	---	---	---
-2 Log likelihood		---			---			---			---	
Nagelkerke R^2		---			---			---			---	
Netherlands												
Constant	-1.48**	.18	.23	-.99**	.16	.37	-1.27**	.17	.28	-1.45**	.18	.23
Article Type	-.13	.34	.88	-.30	.31	.74	-.54	.35	.58	-.44	.37	.64
Netherlands Dummy	-1.53*	.74	.22	-1.98**	.74	.14	-1.21*	.62	.30	-1.48*	.74	.23
-2 Log likelihood		288.52			344.10			306.36			280.96	
Nagelkerke R^2		.03			.06			.04			.04	

Note: N = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. --- indicates sampling zero.

Table 6

Negative binomial regression predicting word count describing translation process

Variable	DV = Number of Words Used β	SE	*OR*
China			
Constant	3.25**	.08	25.69
Article Type	-.40**	.13	.67
China Dummy	.33**	.12	1.39
Likelihood ratio X^2		17.70	
AIC		2847.47	
Germany			
Constant	3.48**	.07	32.37
Article Type	-.48**	.13	.62
Germany Dummy	-2.72**	.24	.07
Likelihood ratio X^2		96.68	
AIC		2768.49	
Israel			
Constant	3.44**	.07	31.03
Article Type	-.44**	.13	.64
Israel Dummy	-1.90**	.26	.15
Likelihood ratio X^2		45.46	
AIC		2819.71	
Netherlands			
Constant	3.51**	.07	33.53
Article Type	-.52**	.13	.60
Netherlands Dummy	-1.41**	.17	.24
Likelihood ratio X^2		59.55	
AIC		2805.63	

Note: N = 333. β = log odd; *OR* = odds ratio. Article Type was coded *Research Report* = 1 and *Traditional Article* = 0.
† $p \leq .10$. * $p \leq .05$. ** $p \leq .01$. AIC = Akaike information criterion

Table 7

Recommendations for the practice and reporting of back-translation

Recommendations for Conducting and Reporting Back-Translation Procedures
1. In all studies, report the country where the study took place and the primary language of participants.
2. Provide the basic details of the back-translation procedure, including the number, roles, and qualifications of translators, and many rounds of translation took place.
3. Document whether any problems or discrepancies arose during translation and how they were resolved.
4. Pretest translated versions of scales and describe the sample used for the pretest.
5. Report results of pretests (e.g., CFA invariance tests, IRT analyses) detailing the degree of equivalence present in translated scales.
6. Include both the original and translated versions of scales in submissions (e.g., in a table, appendix, or online supplement).

Table 8

Representative passages of best reporting practices

Translation Reporting Practice	Source	Representative Quote
Acknowledged Translation Process		
1. Mention translation process occurred	Liu et al. (2017, p. 1232)	For the scales described in the preceding text, except for self-esteem and leader self-efficacy scales (which were Chinese language scales), all of the other scales were translated and back-translated by psychology researchers.
	Madjar et al. (2011, p. 735)	The items in all questionnaires were first developed in English and then translated into Bulgarian by a certified translator. The Bulgarian version was then translated back (by a different translator) into English to confirm consistency in meaning of the items (Brislin, 1970). The questionnaires were administered in Bulgarian to all participants.
	Antonakis et al. (2017, p. 1007)	The majority of raters completed the questionnaire in English (77.87%), with some responding in French (16.21%) or German (5.92%); we took the appropriate safeguards to ensure translation equivalence by translating the questions to the target language using one translator and then independently back again to the original language using another translator and then reconciling differences to ensure lingual equivalence.
2. Specified back-translation	Bentein et al. (2005, p. 472)	Because this study was conducted in a French-speaking context, all measures were translated from English to French by one translator and then back-translated independently by a second translator (cf., Brislin, 1980).
	Wanberg et al. (2020, p. 214)	The United States survey was administered in English. For Germany and the Netherlands, the surveys were translated into German and Dutch. No items were identified as problematic in translating. German and Dutch items were subsequently and independently back-translated to English by scholars knowledgeable of job search research and fluent in both English and German or Dutch, respectively.
	Salanova et al. (2005, p. 1221)	Scales originally in English were translated into Spanish and from Spanish into English (counter-translation) by native English and Spanish speakers to check for equivalence of meaning in both languages.
3. Cited translation process followed	Liu et al. (2010, p. 474)	Because we were developing a scale that could be used in both America and China, the items were first generated in English, translated into Chinese, back translated between Chinese and English, discussed with regard to semantic discrepancies, and revised until total agreement in meaning equivalency was reached (Brislin, 1970, 1981).
	Kim et al. (2005, p. 235)	Surveys were initially written in English and translated into South Korean using the procedure recommended by Brislin (1986). Specifically, all translators were blind to the study's hypotheses, and two bilingual individuals independently translated the survey from English to South Korean. There was 94% agreement between the translators regarding word choice and expression. A third bilingual individual translated the survey back to English. During this procedure, 13 words or phrases in the South Korean version that were not exactly matched to the English version were back-translated into English, in accordance with the recommendation of Brislin.

Table 8 (cont.)

Translation Reporting Practice	Source	Representative Quote
Translation Process Details Provided		
4. Describe who translated	Liao et al. (2009, p. 377)	For measures that were originally in English, we followed an iterative translation procedure. First, Hui Liao worked closely with a Japanese linguist who teaches Japanese at a U.S. university to translate the surveys from English to Japanese. Second, Keiko Toya, who is a Japanese native and proficient in English, teaches marketing at a university in Japan, and has extensive consulting experience with the Japanese banking industry, checked the translation for accuracy, discussed the relevance and appropriateness of the questions in depth with focus groups of managers and employees from the bank, identified areas of concerns, and suggested questions to be deleted, added, and modified. Third, the Japanese linguist, in consultation with Hui Liao and Keiko Toya, worked to resolve these issues. Fourth, Keiko Toya's business partner, who is a Japanese native with a U.S. master's in business administration degree and consults with the Japanese banking industry, improved the readability of the questions through discussions with Keiko Toya.
	Westman et al. (2004, p. 773)	The questionnaires for this study were initially prepared in English, then translated into Russian by personnel from the International Center for Human Values in Moscow, who oversaw the survey research and back-translated by other translators employed by the Center. The Russian version and back-translation were sent to the United States, where a second independent back-translation was prepared.
5. Translator qualifications	Liu et al. (2004, p. 1074)	Translations were done by native speakers in two stages. First, the questionnaire was translated by persons who worked in the company's German headquarter as professional translators whose normal duty was to translate the company's manuals, communication, and training materials. Before the translation, these persons were introduced into the positioning of the employee survey project so that they knew its purpose, goals, and processes. Then the translated questionnaires were sent to the regional survey coordinators in the respective countries. The translated questionnaire was checked with a particular eye to its fit with the local organizational culture. The regional survey coordinators were well informed about the entire employee survey project through intensive training conducted in the company's headquarters. Hence, they were very motivated to avoid any ambiguities that could later hamper effective follow-up processes. Finally, the questionnaires were back-translated into English by translators from outside the company in the respective countries to check for instances of divergence and for a final fine-tuning of items and instructions.
	Takeuchi et al. (2007, p. 1073)	First, the primary researcher, who is fluent in Japanese, created the English version and then translated it into Japanese. This primary researcher and another Japanese faculty member specialized in Japanese human resource management (and who is proficient in English) improved the translation through an iterative process where any concerns about discrepancies between the English and Japanese versions were detected and addressed. To validate the translation, we asked two Japanese employees in no way affiliated with this study to read through the Japanese version to test its readability and ease of comprehension.

Table 8 (cont.)

Translation Reporting Practice	Source	Representative Quote
6. Independent (back)-translators used	Schaubroeck et al. (2017, p. 207)	The second author, who is bilingual in Chinese and English, contributed to and supervised a back-translation procedure (Brislin, Lonner, & Thorndike, 1973). This author translated the items that were originally developed in English to Chinese. Next, a separate bilingual professor of psychology in China, who was blind to the original English language items, translated these Chinese items back to English. A professor of English at the same university in China then checked for differences between the back-translated and the original English language items.
	van Dierendonck et al. (1998, p. 395)	Wilmar B. Schaufeli translated the questionnaire into Dutch, and two Dutch scholars with degrees in English language study independently judged the semantic and syntactic equivalence of the Dutch and English versions. Additionally, a bilingual psychologist checked the adequacy of the Dutch translation.
7. Translated scales pretested/reviewed	Wasti et al. (2000, p. 769)	Two professional translators independently translated into Turkish a questionnaire on sexual harassment that had been administered previously in English. The two translators then met to resolve discrepancies in the Turkish version. The revised Turkish version was subsequently back-translated to English, again by two professional translators working independently. These two translators also discussed the discrepancies in their translations and produced an agreed-upon English version. Finally, the four translators met to finalize the Turkish version of the instrument. Three bilingual academicians further reviewed the final translated version, and minor adjustments were made to increase the clarity of the instrument.
	Liu et al. (2011, p. 299)	A pretest of our measures was conducted in two steps. First, five organizational scholars, bilingual in English and Chinese, examined the Chinese questionnaire and identified items that might be confusing or difficult to answer. Second, we conducted a test of content validity using 30 target respondents from the surveyed company. All participants were able to identify and recognize the measures as familiar and understandable in the target survey context. We made final refinements on the basis of feedback from the pretest participants.
	Gibson et al. (2009, p. 67)	Next, the survey was piloted extensively, including in a bilingual pilot study with 11 teams to further examine the validity of the items across the different translated versions. Bilingual respondents filled out the survey in two different languages at different points in time, and a comparison of their responses on the two versions led to a small number of alterations.

Table 8 (cont.)

Translation Reporting Practice	Source	Representative Quote
8. Data on scale equivalence	Wanberg et al. (2020, pp. 216-217)	Next, we ran multigroup CFAs in Mplus7 to examine the degree of measurement equivalence across the three countries for each of the three parts. ... First, we examined the configural equivalence by testing whether the hypothesized factor structure fit the data well when estimated in each of the three countries. As displayed in Table 2, these models fit the data well, all CFIs > .950, all RMSEAs < .060, all SRMRs < .080 (cf. Hu & Bentler, 1998). We subsequently imposed equality constraints to examine the degree of measurement equivalence. Specifically, we ran multigroup CFAs with the factor loadings set invariant (i.e., metric equivalence), the factor loadings and intercepts invariant (i.e., scalar equivalence), and the factor loading, intercepts, and residuals invariant (i.e., full invariance). Following Cheung and Rensvold (2002), we compared the difference in the CFI between subsequent models to establish the degree of measurement equivalence. For all CFAs, the difference in CFI between the configural invariance and the metric invariance models was not larger than the Cheung and Rensvold (2002) recommended cutoff value of .010 (see Table 2). However, the difference in CFI between the metric and scalar, and between the scalar and full invariance models was larger than .010. These results suggest that the factor structure and the factor loadings can be assumed equivalent across the three countries and support pooling the three countries' data into an overall sample. Overall, our CFA results supported the distinctiveness of our study constructs and measurement equivalence across countries.
	Grandey et al. (2005, pp. 897-898)	It was necessary to statistically demonstrate measurement equivalence (MEQ) before testing our hypotheses, as "it is often difficult to interpret observed group mean differences meaningfully without MEQ" (Raju & Ellis, 2002, p. 173). MEQ shows that the relationship between the construct of interest and the observed measure is similar across groups; if this is not demonstrated, any group differences might be due to measurement issues rather than the proposed mechanisms. The most critical comparison is that the factor loadings for the constructs are invariant across groups (Marsh, 1995). A two-group confirmatory factor analysis was conducted in AMOS 5.0 with a four-factor measurement model of the focal variables (emotion regulation, job autonomy, emotional exhaustion, and job satisfaction). Covariation among the constructs and factor loadings were freely estimated. Constraining the factor loadings to be equal across the two groups did not significantly change the fit $\Delta\chi 2(\Delta 15, N = 194) = 22.91, p > .05$; factor loadings (ramda) for each group were moderate to strong (.55 to .94), and the fit indices were similar for the constrained model ($\Delta\chi 2/df = 1.99$, CFI = 0.85, root-mean-square error of approximation [RMSEA] = .07) and unconstrained model ($\Delta\chi 2/df = 2.01$, CFI = 0.85, RMSEA = .07). Thus, the measurement model was determined to be invariant across the two cultures.