Global Perspectives in Communication, 2026, **1**(**1**), wpaf002
https://doi.org/10.1093/gpcomm/wpaf002
Research Report

The dimensionality and cross-cultural invariance of narrative transportability: evidence from 50 countries and 21 languages

W. P. Malecki[1,*], Melanie C. Green[2], Marta Kowal[3], Michał Misiak[3,4], S. Craig Roberts[3,5], Agnieszka Sorokowska[6], Piotr Sorokowski[6]

[1]Institute of Polish Philology, University of Wrocław, Wrocław, Poland
[2]Department of Communication, University of Buffalo, Buffalo, New York, United States
[3]IDN Being Human—Institute of Psychology, University of Wrocław, Wrocław, Poland
[4]School of Anthropology & Museum Ethnography, University of Oxford, Oxford, United Kingdom
[5]Division of Psychology, University of Stirling, Stirling, United Kingdom
[6]Institute of Psychology, University of Wrocław, Wrocław, Poland
*Corresponding author: Email: wojciech.malecki@uwr.edu.pl

Abstract

Narrative transportability (an individual difference in the extent to which a person becomes immersed in stories) is an important construct in communication science and related fields. However, the dimensionality and cross-cultural invariance of transportability are underexplored. To address this gap, we conducted a study with a widely used narrative transportability scale and 8,814 participants from 50 countries and 21 languages. An exploratory factor analysis (EFA; $n = 2{,}644$) indicated a four-dimensional structure: Cognitive Involvement, Cognitive-Emotional Imagination, Sensory Imagination, and Personal Involvement. A confirmatory factor analysis ($n = 6{,}170$) and configural, metric, and scalar invariance testing supported this structure and its cross-cultural stability. These results have critical implications for the understanding of narrative transportability and highlight the value of cross-cultural research on narrative experience. To support such future research, professionally translated versions of the validated scale in 20 languages, along with the English original, are made publicly available on the project's OSF page.

Keywords narrative transportability, stories, measurement invariance, scale validation, cross-cultural methods

Narrative transportability refers to an individual's tendency to become transported or immersed into narratives (Dal Cin et al., 2004; Mazzocco et al., 2010), or to have all one's "mental systems and capacities […] focused on events occurring in the narrative" (Appel & Richter, 2010; Green & Brock, 2000, p. 701). The experience of immersion into narratives has also been described with other terms, such as narrative engagement and absorption. These concepts are strongly overlapping, and empirically, their measures are highly correlated (see Green & Appel, 2024).

Narrative transportation is a key mechanism of narrative influence; individuals who are more transported into narratives are more likely to change their attitudes, beliefs, or behaviors in a story-consistent way (see van Laer et al., 2014, 2019 for meta-analyses). These persuasive effects have been demonstrated in health communication, marketing, environmental communication, and other topic areas (see Green & Appel, 2024 for a review).

Narrative transportation can be influenced by textual factors such as story quality, but there are also individual differences in the tendency to become transported (Gnambs et al., 2014). Whereas narrative transportation is a psychological state that occurs in response to a specific narrative, transportability is an individual difference in the tendency to experience transportation. Highly transportable individuals can easily imagine themselves in stories, become emotionally involved in them, and form mental images of story events. Some individuals are highly transportable and easily become engaged in a variety of narratives, whereas other individuals are less transportable (e.g., Busselle & Bilandzic, 2009; Dal Cin et al., 2004). Individuals lower in transportability can still become immersed in stories, but are less dispositionally motivated to do so, and therefore may be less influenced by narrative messages (e.g., Mazzocco et al., 2010). Because narratives have been a central form of communication for centuries and across cultures, examining potential variations in transportability across cultures can provide useful insights.

Given the range of important persuasive outcomes that can be influenced by narrative transportation, the goal of the current research is to provide stronger psychometric information about a widely used measure of transportability and to assess the cross-cultural stability of the measure. We collected data from over 8,000 people across 50 countries, in 21 different languages. These data provide insight into

Received: June 30, 2025; **Revised:** October 13, 2025; **Accepted:** October 19, 2025

the important elements or subcomponents of transportability and also provides initial evidence about the similarities and differences in transportability across cultures.

Because narrative transportation involves multiple mental systems, transportability may also be related to several underlying tendencies or abilities. For example, Mazzocco et al. (2010) note that narrative transportation involves narrative comprehension, emotional responses, mental imagery production, and the ability to connect with characters. Thus, individuals who are willing or able to exert cognitive effort may be more transportable, as may individuals who can more easily create mental images. Research has found that transportability is positively correlated with need for affect (individuals' tendency to seek out and enjoy emotional experiences; Maio & Esses, 2001) and need for cognition (individuals' tendency to enjoy effortful cognitive activity; Cacioppo & Petty, 1982; Thompson & Haddock, 2012; see also Bilandzic et al., 2019).

Transportability is also positively correlated with empathy as measured by the Interpersonal Reactivity Index (IRI; Davis, 1980), including a low but positive correlation with the personal distress subscale and moderate positive correlations with the empathic concern and perspective-taking subscales (Ministero et al., 2022). Not surprisingly, transportability has a strong correlation with the fantasy subscale of the IRI, which is specifically focused on involvement with stories and fictional characters (Ministero et al., 2022) and is likely measuring a very similar concept. While some abilities that contribute to transportability may be innate (e.g., mental imagery tendencies), others may potentially be affected by environments or learning over time (e.g., exposure to books or reading at a young age; practice or training in emotion recognition).

Studies of transportability have found that it relates to a variety of important outcomes. In the marketing context, highly transportable individuals have been shown to be more receptive to advertising and show higher ad recall (Brechman & Purvis, 2015). Additionally, transportability has been shown to predict children's likelihood of leisure reading (Jensen et al., 2016). Indeed, Jensen and colleagues suggest that concept of transportability may be important in helping to understand and combat the gap that occurs between good readers and poor readers over time; children who are more transportable may be more intrinsically motivated to read and thus may improve their reading more quickly. Transportability predicted video game players' identification with their avatar in story-based games (Christy & Fox, 2016), and enjoyment of film clips indirectly through increasing transportation (Busselle & Bilandzic, 2011). Transportability is also correlated with retrospective imaginative involvement, individuals' tendency to continue to think about a narrative world after they have finished a story (Sethi et al., 2022), and their tendency to reread books that they have read before (Ministero et al., 2022).

In addition to the outcomes described above, Bilandzic et al. (2019) highlighted three important ways that this type of individual difference measure can contribute to research. First, if research is using multiple narrative stimuli and repeated measurement of state transportation is not possible due to study length or participant fatigue, transportability can serve as a proxy for state transportation. Second, transportability measurements can be useful in areas such as cultivation research, which examine habitual media exposure rather than engagement in a particular narrative. Finally, examining trait-level transportation or narrative engagement can help identify groups that may be more receptive to narrative messages, which can be useful for campaign development for health communicators or consumer researchers.

Because of its relevance to persuasion through stories, narrative transportation, and by extension, narrative transportability, has accordingly become central to communication science and related fields such as media psychology and marketing. This is clearly demonstrated by the many studies that utilize it. However, two major gaps remain.

First, the existing evidence on its dimensionality is limited and inconsistent. To the best of our knowledge, only three empirically driven studies have addressed the dimensionality of transportability. Two of these indicated a unidimensional structure (Jensen et al., 2016; Slater et al., 2018), and one a three-dimensional structure with "Cognitive," "Emotional," and "Imagery" components (Green, 1996). Furthermore, all three studies were conducted with culturally homogenous and demographically specific samples: a convenience sample of 136 American children aged 9–13 (Jensen et al., 2016), a convenience quota sample of 1,039 American citizens, approximating "national norms in terms of sex and race" (Slater et al., 2018); and 317 American undergraduate students (Green, 1996). These conflicting findings make the dimensionality of transportability unclear, hindering our understanding of both the construct and the underlying mechanisms of transportability.

Additionally, because there is no clear guidance on which items belong to particular subdimensions, individual researchers may select different sets of items based on their own intuitions rather than on a firm evidence base. Using inconsistent subsets of items across studies makes it difficult to build a cumulative body of research. This has even led to the development of related constructs such as narrative engageability, which were designed to have clear, theoretically-driven and empirically confirmed, dimensionality (Bilandzic et al., 2019). Notably, while Green (1996) originally conceptualized transportability as having three subcomponents/factors, the narrative engageability construct includes four dimensions: Suspense/Curiosity Propensity, Emotional Engageability, Presence Propensity, and Ease of Accepting Unrealism. According to Bilandzic et al. (2019), "Suspense/Curiosity Propensity refers to the processing of the representation of events, suggesting that the viewer not only understands events but also has the impression of being in the middle of the events, and is keen on learning how the plot is resolved. Emotional Engageability is connected to the construction of character models and indicative of a successful deictic shift, which enables perspective taking and emoting with the characters. Presence Propensity is associated with the construction of a story world model and, again, a successful deictic shift into it. In all three mental models, unrealism may present a problem, and tolerating to a certain extent such violations supports the comprehension process and is expressed in the subdimension of 'Ease of Accepting Unrealism'" (p. 826).

Second, to date, no study has systematically tested the cross-cultural invariance of transportability, despite theoretical reasons to suspect that the construct may be conceptualized or expressed differently across languages and cultures. Storytelling appears in all cultures, but its forms and practices differ. For instance, due to their unique grammatical features, varying inclinations toward metaphor (Underhill, 2011), and different storytelling traditions (Finnegan, 2012; Minami, 2002; Reynolds, 1995), some languages may foster different ways of experiencing and understanding transportability. Cultural values may also shape how transportability is construed. Specifically, higher levels of collectivism in non-Western cultures (Henrich, 2020) may encourage people to see it more as a communal activity than as an individual pursuit (Henrich, 2020; Markus & Kitayama, 1991). The more

holistic cognitive styles observed in non-Western cultures may additionally lead people to construe transportability as a process of attending to a story's overall mood or vision rather than to its detailed elements (Nisbett et al., 2001). Clearly, the cross-cultural and cross-linguistic invariance of transportability cannot simply be assumed.

Rather than assuming the cultural universality of transportability, the core motivation of this study is to subject it to empirical scrutiny. By systematically testing invariance, we aim to explore whether transportability—as currently theorized and measured—retains comparable meaning across diverse linguistic and cultural contexts, or whether its conceptualization and expression are themselves culture-bound. This approach aligns with recent trends in cultural psychology that question universalist assumptions and instead prioritize empirical investigation into the cultural specificity of psychological phenomena (Henrich, 2020; Schimmelpfennig et al., 2024).

To address these gaps, we conducted a study with 8,814 participants from 21 languages, 50 countries, and one territory (Hong Kong), using the widely employed narrative transportability scale developed by Dal Cin et al. (2004). Our aim was to examine the factor structure of the scale by using exploratory and confirmatory factor analysis (CFA), and to test its configural, metric, and scalar invariance. Measurement invariance "assesses the (psychometric) equivalence of a construct across groups or measurement occasions and demonstrates that a construct has the same meaning to those groups or across repeated measurements" (Putnick & Bornstein, 2016, p. 27). Configural invariance refers to the invariance of the model form and tests the basic organization of constructs and items across groups. The next level, metric invariance, tests the equivalence of the loadings on the factors across groups (e.g., that each item contributes to the latent construct to a similar degree across groups). Scalar invariance tests whether both the factor loadings and item intercepts are equivalent across groups, which is necessary for valid comparisons of latent means.

Method

Sample and data

The data in this study come from an online survey that included numerous other measures beyond those analyzed here. It was administered and collected by Syno International, a company established in Lithuania specializing in market research and data management. To ensure broad cultural representativeness, we aimed to include as many countries as possible from all inhabited continents. The final selection of countries was determined by this goal, balanced against practical considerations such as budget constraints and the availability of high-quality online panels through our data collection provider. The result ($N = 10,482$) is a geographically diverse sample of 50 countries and one territory (Hong Kong), spanning six continents (North and South America, Europe, Africa, Asia, and Oceania) and 21 languages.

The sample was prestratified to approximate nationally representative distributions of gender, age, and residential area in each country. The mean age was 39.4 ($SD = 14.1$, range = 18-73). A total of 5,243 (50.0%) participants identified as men, 5,212 (49.7%) as women, 14 (0.1%) as "other," with 13 (0.1%) participants preferring not to disclose their gender identity. There were 2,774 participants from rural areas (26.5%), while the remaining 7,708 participants resided in urban areas. The average number of participants per country/territory was 205.5 (range = 200–261) and 499.1 participants per language. Most languages were represented by 201 to 217 participants, apart from three larger groups: Arabic ($n = 644$), Spanish ($n = 2,826$), and English ($n = 3,319$). Each participant was compensated in line with the company's standard practices.

Initial data cleaning and preparation

We subjected the data to multiple cleaning procedures. First, we removed participants who spent less than 10 minutes completing the survey ($n = 59$). The threshold was chosen based on internal pilot tests of the questionnaire, which indicated that, with its over 150 items total, including three video clips, it was not possible to complete the survey carefully. To identify inattentive or careless responding, we used a well-established indicator, the Longstring Index, which detects unusually long runs of identical responses (Huang et al., 2012; Kowal et al., 2025). Following prior research, we applied a conservative threshold at the 95th percentile (top 5% of the distribution), resulting in the exclusion of 1,112 participants. This approach has been empirically shown to improve psychometric quality while minimizing the risk of over-exclusion (Huang et al., 2012). Consistent with previous studies (Dunn et al., 2018; Meade & Craig, 2012), we also excluded respondents ($n = 466$) who showed excessive intra-individual response variability above the 95th percentile, suggesting erratic responding patterns (e.g., alternating between extreme response options). We additionally identified six multivariate outliers using Mahalanobis distance. Finally, our analyses focused on participants who identified as male or female ($n = 8,814$; >99% of the sample). The small number of respondents who selected 'other' or 'prefer not to answer' ($n = 25$) were not included. We note this as a limitation and encourage future work to recruit larger samples of gender minority participants to examine potential differences in transportability.

After these exclusions, the cleaned dataset consisted of 8,814 participants. The global distribution of participants per country is shown in Figure 1.

All data processing was conducted in R (ver. 4.4.2) using dplyr (Wickham et al., 2020) and ggplot2 (Wickham, 2009). Subsequent analyses were likewise conducted in R, using the lavaan package (Rosseel, 2012) for factor analysis and measurement invariance testing.

To rigorously validate the Transportability scale, we used separate samples for EFA and CFA. We randomly allocated 30% of the data to the EFA sample ($n = 2,644$) and 70% to the CFA sample ($n = 6,170$), with both subsets retaining representation from all 21 language groups and 51 countries and territories. While splitting a dataset into separate subsamples for EFA and CFA is a standard practice in scale development (Mondo et al., 2021; Ng, 2013; Revicki et al., 2014), there are no universally accepted rules regarding the exact proportions. Some studies use equal halves; however, both statistical theory and simulation-based evidence suggest that to ensure the stability of parameter estimates and the reliability of model fit indices, CFA typically requires a larger sample than EFA (Costello & Osborne, 2005). This motivates the

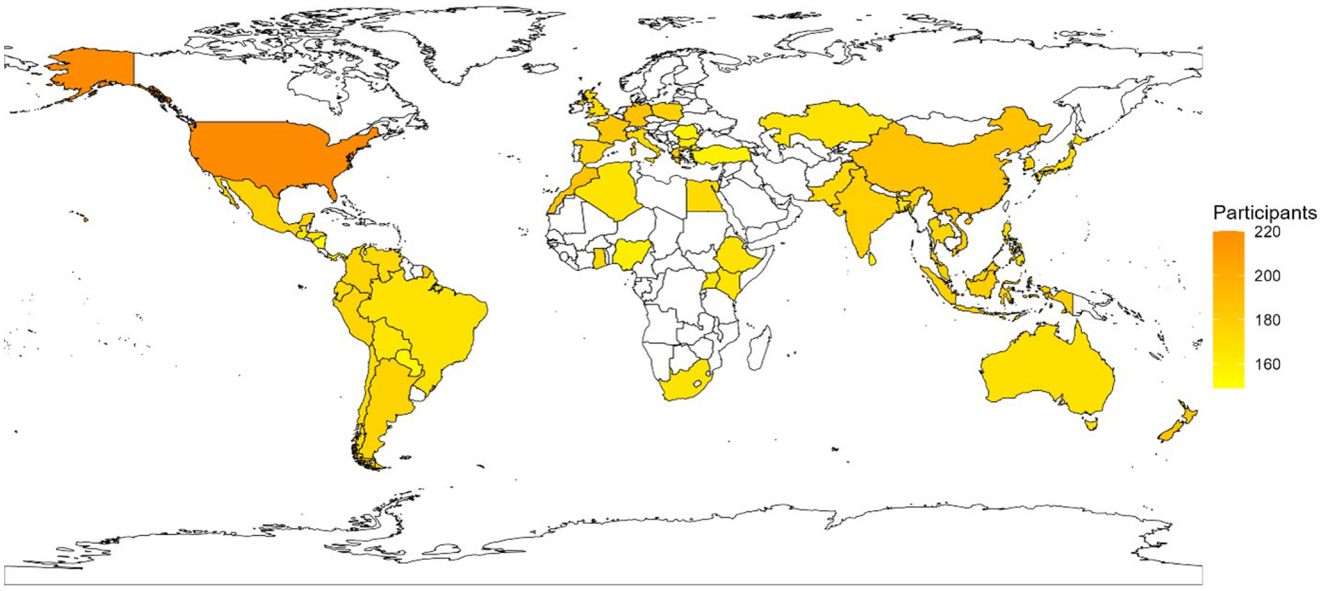

Figure 1 Number of participants for country or territory.

Note. Darker colors indicate more participants. White indicates non-participating countries. Exact participant counts per country are indicated in the supplementary table S24.1.

use of uneven splits. The 30/70 division has been used and explicitly justified in prior validation studies (e.g., Roncal-Belzunce et al., 2025), and ensures sufficient power and estimation stability, particularly in confirmatory modeling.

Instrument

To establish the dimensionality and cultural invariance of narrative transportability we used the Transportability Scale by Dal Cin et al. (2004). The scale is arguably the most popular measure of the construct and was chosen for its wide use across different fields. It consists of 20 items measuring different aspects of the tendency to become transported into written narratives, "generaliz[ing] across stories and contexts" (Dal Cin et al., 2004, p. 183), including emotional aspects (e.g., "I am often emotionally affected by what I've read"), cognitive aspects (e.g., "I get mentally involved in the story"), and others. To ensure that linguistically and culturally appropriate versions were used in each language group, the scale was translated from English into all study languages or linguistic variants by professional local translators hired for this purpose by the company responsible for data collection. The languages included: Arabic, Bahasa Indonesia (Indonesian Malay), Bahasa Malaysia (Malaysian Malay), Bulgarian, Chinese (Simplified),[1] English, French, German, Greek, Italian, Japanese, Korean, Polish, Portuguese (Brazil), Romanian, Russian, Spanish, Tagalog (Filipino), Thai, Turkish, and Vietnamese. All translations, along with the English original, are included in the Supplementary Material (S1-S21).

Preliminary analyses showed the scale's suitability for EFA. The overall Kaiser-Meyer-Olkin (KMO) value was 0.95, or "marvelous," according to the guidelines by Kaiser & Rice (1974). Item-specific KMO values (0.65 to 0.97) indicated high sampling adequacy for all but one item (Transportability_6: "I can easily put stories out of my mind after I've finished reading them," $KMO = 0.65$). Bartlett's test of sphericity was significant, $\chi^2(190) = 22{,}897.09$, $p < .001$, which supported the factorability of the correlation matrix.

Descriptive statistics were calculated for each item. The means ranged from 3.62 to 5.43 with standard deviations from 1.38 to 1.67. These values indicated that the variability in responses was moderate, and therefore appropriate for EFA. The skew, while negative, was within acceptable boundaries (e.g., Transportability_1: "I can easily envision the events in the story"; $skew = -0.84$), as were the excess kurtosis values ($k = -3.71$ to -2.57), indicating a distribution that was flatter than normal. Inter-item correlations were sufficient for factor analysis.

Exploratory factor analysis

To explore the underlying structure of our construct, we conducted an EFA using the minimum residual (MinRes) extraction method. MinRes was selected for its lack of distributional assumptions, robustness with skewed data, and strong empirical performance in simulation studies (Kaçak & Kılıç, 2025; Knol & Berger, 1991; Revelle, 2024). Recent Monte Carlo simulations demonstrate that MinRes (and PAF) yield more accurate and unbiased estimates than PCA even under challenging conditions, including low factor loadings, non-normal distributions, and multidimensional structures (Kaçak & Kılıç, 2025).

Given our large cross-cultural sample, a purely inductive EFA risked overfactoring due to random covariance fluctuations (Hayton et al., 2004; MacCallum et al., 1999). We therefore adopted a theory-driven EFA approach, testing 1–5 factor solutions based on prior research on transportability and related constructs (Bilandzic et al., 2019; Green, 1996). In line with theoretical expectations that the factors may be interrelated, we applied Direct Oblimin rotation.

Because the χ^2 statistic is overly sensitive in large samples (Bentler & Bonett, 1980; Kline, 2011), we prioritized ap-

[1] While Traditional Chinese is more standard in Hong Kong, we used Simplified Chinese in both Hong Kong and mainland China due to practical constraints and widespread familiarity with Simplified characters.

Table 1. Model fit indices for factor solutions in the initial exploratory factor analysis.

Number of factors	Variance explained (%)	RMSR	TLI	RMSEA (90% CI)	BIC
1	37	0.06	0.81	0.09 (0.09, 0.09)	2545.61
2	42	0.04	0.90	0.07 (0.07, 0.07)	833.19
3	45	0.03	0.90	0.07 (0.06, 0.07)	581.12
4	47	0.02	0.93	0.06 (0.05, 0.06)	153.08
5	49	0.02	0.95	0.05 (0.04, 0.05)	−127.2

Note. Model fit indices are presented for solutions ranging from one to five factors. RMSR, root mean square of residuals; TLI, Tucker–Lewis Index; RMSEA, root mean square error of approximation; BIC, Bayesian information criterion. RMSEA confidence intervals (90% CI) are reported in parentheses.

Table 2 Model fit indices for factor solutions in the revised exploratory factor analysis.

Number of factors	Explained variance (%)	RMSR	TLI	RMSEA (90% CI)	BIC
1	43	0.06	0.83	0.11 (0.11, 0.11)	2210.36
2	49	0.03	0.91	0.08 (0.07, 0.08)	674.02
3	52	0.02	0.95	0.06 (0.06, 0.06)	164.65
4	55	0.02	0.97	0.05 (0.04, 0.05)	−72.97
5	56	0.01	0.98	0.04 (0.04, 0.05)	−95.08

Note. Model fit indices are presented for solutions ranging from one to five factors. RMSR, root mean square residual; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation; BIC, Bayesian information criterion. RMSEA 90% confidence intervals (CI) are reported in parentheses.

proximate fit indices (RMSEA, TLI). While they are typically associated with Structural Equation Modeling (SEM), they have been recommended for EFA, and used accordingly in research, as providing more objective guidance than eigenvalues or scree plots, especially when factor retention is ambiguous (Bowman & Goodboy, 2020; Costello & Osborne, 2005; Fabrigar et al., 1999; Preacher et al., 2013). Our hybrid approach thus merges empirical discovery with theory, avoiding the pitfalls of both unrestricted EFA (noise-driven overfactoring) and premature CFA (forced a priori structures).

Results

The analysis showed that fit indices and explained variance improved with each added factor. While the one-factor solution emerged as clearly insufficient, the four- and five-factor solutions provided the best fit (Table 1). The four-factor solution was selected as optimal due to its balance of parsimony and interpretability, further supported by a scree plot analysis, showing an elbow after Component 4 (see Supplement S22).

However, upon inspecting the factor loadings of the four-factor solution, three items (Transportability_6: "I can easily put stories out of my mind after I've finished reading them"; 10: "I am often emotionally affected by what I've read"; and 14: "I find myself thinking of other ways the story could have ended") had maximum loadings below 0.30, which is commonly considered to indicate insufficient contribution to the factor structure. Items 3 and 15, originally reverse-scored, showed substantial negative loadings, unlike other items with smaller negative values. This was unexpected, as they had been recoded for the analysis, suggesting that respondents might have misinterpreted them. Unfortunately, such issues are common with reverse-worded items, which are increasingly criticized for being cognitively confusing and thereby compromising the validity of scales (Zhang et al., 2016). As there were no strong theoretical reasons to retain the five problematic items, we decided to exclude them from the scale and rerun the EFA.

The revised EFA again used the MinRes method and Direct Oblimin rotation and evaluated factor solutions from one to five. The results revealed generally improved fit indices for all solutions compared to the first EFA, further supporting the decision to exclude the problematic items. The four- and five-factor solutions again emerged as the best options, with some differences between them (Table 2).

On the one hand, the five-factor solution showed minimal improvements in fit (TLI = 0.98 vs. 0.97, RMSEA = 0.04 vs. 0.05) and explained variance (1%) as well as a slightly lower BIC. On the other, the overall pattern of factor loadings in the four-factor solution was cleaner and more interpretable than in the five-factor model, which exhibited weaker dominant loadings and increased cross-loadings (e.g., Transportability_7: "I sometimes feel as if I am part of the story" loaded on three factors). This supported the four-factor model's superior parsimony and conceptual clarity (see Supplement S23 for the scree plot analysis). Finally, the dimensions of the four-factor solution were far more theoretically interpretable, clearly falling into the categories of Cognitive Involvement, Cognitive-Emotional Imagination, Sensory Imagination, and Personal Involvement.[2] Accordingly, we settled on the four-factor solution (Table 3) and propose the following conceptualization of its structure:

1. Cognitive Involvement (MR1) reflects the capacity to intensely focus one's cognitive processes on the story, as exemplified by putting oneself in the perspective of characters, envisioning oneself in the story's events, and becoming "lost" in it. The dimension partially overlaps with such dimensions of related constructs (narrative transportation, narrative engagement, and engageability) as "Narrative Presence" (Busselle & Bilandzic, 2009), "projection in the narrative universe" (Jarrier et al., 2017), and the "Cognitive" aspect of transportation (Appel et al., 2015; Green & Brock, 2000).

[2] Although items T_7 and T_16 showed modest cross-loadings across related dimensions, both were retained due to their theoretical alignment with their primary factors and their acceptable communalities. Such overlap is to be expected in multidimensional constructs involving affective and cognitive integration, such as narrative transportability (Mazzocco et al., 2010).

Table 3 Factor loadings, communalities, and correlations among factors.

	Factor				
Item	Cognitive Involvement	C-E Imagination	Sensory Imagination	Personal Involvement	h^2
T_1: I can easily envision the events in the story.	**0.7**	0	0.14	−0.16	0.56
T_2: I find I can easily lose myself in the story.	**0.33**	0.15	0.07	−0.09	0.20
T_4: I can easily envision myself in the events described in a story.	**0.83**	−0.03	−0.05	0.06	0.64
T_5: I get mentally involved in the story.	**0.75**	0.04	0	0.05	0.64
T_7: I sometimes feel as if I am part of the story.	**0.43**	0.11	−0.04	0.35	0.50
T_8: I am often impatient to find out how the story ends.	**0.34**	0.07	0.06	0.02	0.20
T_9: I find that I can easily take the perspective of the character(s) in the story.	**0.37**	0.18	0.19	0.11	0.52
T_12: I find myself accepting events that I might have otherwise considered unrealistic.	0.06	**0.53**	0.10	0.01	0.43
T_13: I find myself thinking what the characters may be thinking.	0	**0.85**	0	0.01	0.73
T_16: I find myself feeling what the characters may feel.	0.07	**0.41**	0.11	0.33	0.62
T_20: I have vivid images of the events in the story.	0	−0.01	**0.81**	0.12	0.76
T_11: I have vivid images of the characters.	0.11	0.17	**0.64**	−0.11	0.64
T_17: I find that events in the story are relevant to my everyday life.	−0.02	0.15	0.01	**0.67**	0.58
T_18: I often find that reading stories has an impact on the way I see things.	0.11	0.01	0.14	**0.60**	0.56
T_19: I easily identify with characters in the story.	0.10	0.04	0.31	**0.49**	0.62
Correlation with Cognitive Involvement	1				
Correlation with Cog-Emo Imagination	0.6	1			
Correlation with Sensory Imagination	0.66	0.70	1		
Correlation with Personal Involvement	0.41	0.59	0.49	1	

Note. Factor loadings are from the pattern matrix using the Minimum Residuals (MinRes) extraction method with direct Oblimin rotation. Highest loadings on a factor are marked in boldface. "T_[number]" indicates the position of the item in the full, 20-item, Transportability Scale.

2. Cognitive-Emotional Imagination (MR2) refers to the capacity to creatively imagine story-relevant concepts and emotions that may not be directly portrayed in the story but are key for achieving full immersion. This includes the realities that make possible the events in the story (e.g., the principles governing a fantasy world) or the emotional states of characters. This factor is conceptually related to elements of the "Cognitive" aspect of narrative transportation (Green & Brock, 2000) and to the "Ease of Accepting Unrealism" dimension of Narrative Engageability (Bilandzic et al., 2019) (see supplement S26 for the exact wording of all Engageability scale items and their factor assignments).
3. Sensory Imagination (MR3) is analogous to Cognitive-Emotional Imagination but concerns sensory qualities rather than concepts and emotions. To be sensory imaginative is to be capable of creatively imagining sensory qualities that may not be directly or extensively portrayed in the story but which facilitate immersion nonetheless. This trait is related to the process reflected in the "Mental Imagery/Sensory Imagination" component of narrative transportation (Green & Appel, 2024).[3]
4. Personal Involvement (MR4) captures how likely the readers are to become affected by the story's events on a personal and emotional level, including after exposure. It overlaps with the "Emotional Engagement" dimension of narrative engagement (Busselle & Bilandzic, 2009) and is related to the process reflected in the "emotional-affective" dimension of narrative transportation (Green & Brock, 2000).

Confirmatory factor analysis

To validate the four-factor structure of the resulting transportability scale, we conducted a CFA on the dedicated sample described above (n = 6,170), after submitting the data to a battery of preliminary tests.

Results

The results of a Kaiser–Meyer–Olkin test (overall measure of sampling adequacy = 0.95, with individual MSA values ranging from 0.93 to 0.97) and Bartlett's Test of Sphericity ($\chi^2(105)$ =

[3] Interestingly, even though item T1 explicitly mentions envisioning the events in the story, it did not load on Sensory Imagination. One potential explanation is that this factor was primarily driven by the explicit mention of vividness in items T20 and T11. In contrast, T1 focuses on the ease of envisioning events, which corresponds more closely with Cognitive Involvement. Additionally, three other Cognitive Involvement items (T4, T5, T7) explicitly mention ease, likely drawing T1 into that cluster. Thus, it appears that the Cognitive Involvement factor captures the ease and fluency of mental engagement, while Sensory Imagination centers on the vividness of sensory detail.

45,595.90, $p < .001$) indicated the suitability of the data for CFA. The moderate to strong inter-item correlations revealed by the correlation matrix were consistent with the assumption that the scale measured cohesive constructs. We found evidence for neither multicollinearity nor extremely weak relationships. Mean scores ranged from 4.28 ($SD = 1.56$) to 5.44 ($SD = 1.41$). The values for skewness (from −0.87 to −0.21) and kurtosis (−0.54 to 0.61) were within conventional thresholds for normality. The reliability of the four hypothesized factors measured with Cronbach's alpha was good: Cognitive Involvement (α = 0.84), Cognitive-Emotional Imagination (α = 0.79), Sensory Imagination (α = 0.81), Personal Involvement (α = 0.80). Overall, the data were suitable for CFA.

The results of CFA showed that the model demonstrated acceptable to good fit to the data: $\chi^2(84) = 2{,}477.95$, $p < .001$; Comparative Fit Index (CFI) = 0.95; Tucker–Lewis Index (TLI) = 0.93; root mean square error of approximation (RMSEA) = 0.07, 90% CI [0.07, 0.07]; and standardized root mean square residual (SRMR) = 0.04. The standardized factor loadings (from 0.47 to 0.86) were statistically significant (Table 4 and Figure 2). The correlations between factors were moderate to strong (Table 5). These findings suggested that the factor structure was both cohesive and distinct, corroborating the results of EFA, which indicated an analogous factor structure.

To further investigate whether the four factors represented distinct constructs, we examined discriminant validity. Specifically, we used Heterotrait–Monotrait Ratio (HTMT) method, which assesses whether constructs are empirically distinguishable from one another by comparing the average correlations between items measuring different constructs (heterotrait) to the average correlations between items measuring the same construct (monotrait). Therefore, lower values indicate greater discriminant validity, meaning the constructs are more distinct. A growing number of scholars have adopted HTMT as a more reliable alternative to the previously dominant Fornell-Larcker criterion (Henseler et al., 2015).

While it is conventionally assumed that values below 0.85 indicate strong discriminant validity, in the case of conceptually related constructs, such as those measured by the Transportability Scale, values up to 0.90 are considered acceptable (Henseler et al., 2015). Apart from values for cognitive-emotional imagination & personal involvement (HTMT = 0.87) and cognitive-emotional imagination & sensory imagination (HTMT = 0.86), all HTMT values were below 0.85. These results provide sufficient evidence for the scale's discriminant validity.

Measurement Invariance Tests

While narratives are a culturally universal phenomenon, the universality of narrative transportability cannot simply be assumed given its potential dependence on various factors that differ across cultures and languages, including styles of thinking and storytelling conventions. This is a particularly important consideration in the case of any scale emerging from a culturally specific environment rather than from a cross-cultural inquiry, such as the Narrative Transportability Scale. However, to the best of our knowledge, no large-scale cross-cultural measurement invariance testing has been conducted on this or any other scale measuring narrative transportability. To address this gap, we conducted a sequence of configural, metric, and scalar tests, with language as a grouping variable. The group sizes varied, with the largest group being English speakers ($n = 1{,}987$, 32.2%) and the smallest being Bulgarian speakers ($n = 103$, 1.67%). The results of the tests are reported in detail in Table 6.

Results

Configural and metric invariance were supported, indicating, respectively, that across all 21 languages, the hypothesized four-factor structure was stable and that factor loadings were equivalent. The scalar model indicated suboptimal fit, as the covariance matrix of latent variables was not positive for four languages (Bahasa Indonesia, Bahasa Malaysia, Korean, and Thai). While the scalar model with the four languages excluded showed improved fit indices, suggesting that the flagged groups contributed to misfit in the full scalar invariance model, these indices were still insufficient to support full scalar invar-

Table 4 Standardized factor loadings for the confirmatory factor analysis of the transportability scale.

Factor	Item	Loading
Cognitive Involvement	I can easily envision the events in the story.	0.67
Cognitive Involvement	I find I can easily lose myself in the story.	0.47
Cognitive Involvement	I can easily envision myself in the events described in a story.	0.75
Cognitive Involvement	I get mentally involved in the story.	0.78
Cognitive Involvement	I sometimes feel as if I am part of the story.	0.70
Cognitive Involvement	I am often impatient to find out how the story ends.	0.47
Cognitive Involvement	I find that I can easily take the perspective of the character(s) in the story.	0.74
Cognitive-Emotional Imagination	I find myself accepting events that I might have otherwise considered unrealistic.	0.64
Cognitive-Emotional Imagination	I find myself thinking what the characters may be thinking.	0.78
Cognitive-Emotional Imagination	I find myself feeling what the characters may feel.	0.81
Sensory Imagination	I have vivid images of the events in the story.	0.85
Sensory Imagination	I have vivid images of the characters.	0.79
Personal Involvement	I find that events in the story are relevant to my everyday life.	0.70
Personal Involvement	I often find that reading stories has an impact on the way I see things.	0.74
Personal Involvement	I easily identify with characters in the story.	0.82

Note. Standardized factor loadings from confirmatory factor analysis (CFA). Each item loads on only one latent factor. All factor loadings are statistically significant at $p < .001$.

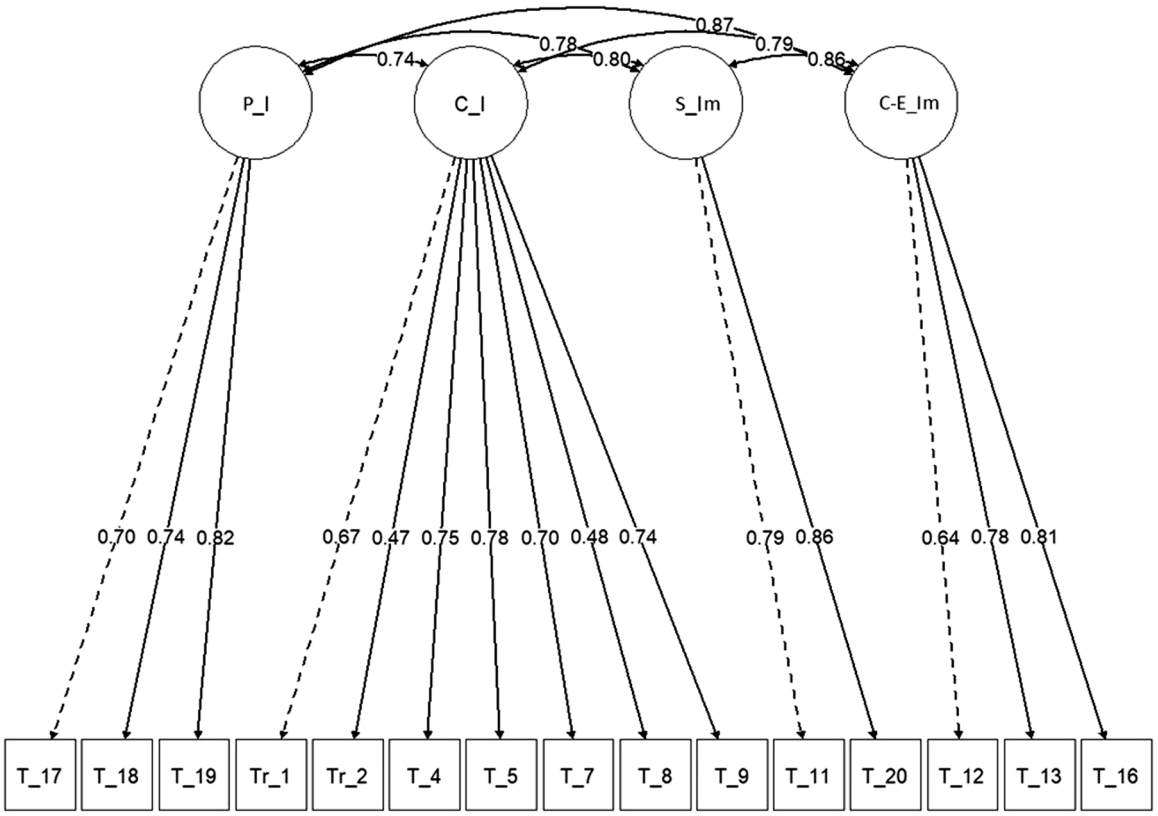

Figure 2 Confirmatory factor analysis of the transportability scale.

Note. C_I = Cognitive Involvement, S_Im = Sensory Imagination, C-E_Im = Cognitive-Emotional Imagination, P_I = Personal Involvement. T_17, T_18, etc, refer to item numbers from the Transportability Scale. Standardized estimates are reported. Residual variances are not shown for clarity.

Table 5 Factor correlations among latent constructs in the transportability scale.

	Cognitive Involvement	Cog—Emo Imagination	Sensory Imagination	Personal Involvement
Cognitive involvement	1			
Cognitive-emotional Imagination	0.79	1		
Sensory imagination	0.80	0.86	1	
Personal involvement	0.74	0.87	0.78	1

Note. Correlations between latent factors in the CFA model. All correlations are statistically significant at $p < .001$.

Table 6 *M*odel fit indices for configural, metric, scalar, and partial scalar invariance models.

Model	$\chi^2(df)$	*RMSEA [90% CI]*	*CFI*	*TLI*	*SRMR*	$\Delta\chi^2(df)$	$p\ (\Delta\chi^2)$
Configural invariance	5374.21 (1764)	0.08 [0.08, 0.09]	0.92	0.90	0.05	N/A	N/A
Metric invariance	5971.62 (1984)	0.08 [0.08, 0.09]	0.91	0.90	0.07	597.41 (220)	<.001
Scalar invariance (full)	8044.01 (2204)	0.10 [0.09, 0.10]	0.90	0.90	0.08	2072.39 (220)	<.001
Scalar invariance (reduced)	6943.81 (1780)	0.09 [0.09, 0.10]	0.90	0.90	0.08	1100.20 (424)	<.001
Partial scalar invariance	5204.80 (1604)	0.08 [0.08, 0.08]	0.92	0.91	0.07	1739.01 (176)	<.001

Note. $\Delta\chi^2$ values represent chi-square difference tests between nested models. RMSEA, root mean square error of approximation; CFI, comparative fit index; TLI, Tucker–Lewis Index; SRMR, standardized root mean square residual. The partial scalar invariance model relaxed constraints for Transportability_2 ("I find I can easily lose myself in the story"), Transportability_4 ("I can easily envision myself in the events described in a story"), and Transportability_9 ("I find that I can easily take the perspective of the character(s) in the story") to account for noninvariance. All chi-square difference tests were statistically significant ($p < .001$).

iance. Therefore, we proceeded with partial scalar invariance testing, again omitting the flagged groups. We identified the three most statistically significant violations of intercept equality constraints ($p < .001$) and mapped them onto their respective items: Transportability_2 ("I find I can easily lose myself in the story"), Transportability_4 ("I can easily envision myself in the events described in a story"), and Transportability_9 ("I find that I can easily take the perspective of the character(s) in the story"). A partial scalar invariance model was refitted with intercept constraints relaxed for these items, allowing

for cross-group differences in the intercepts for these specific items while retaining constraints for all other items. The resulting partial scalar invariance model demonstrated sufficiently improved fit for achieving partial scalar invariance (Putnick & Bornstein, 2016; Rutkowski & Svetina, 2017).

Taken together, the measurement invariance results support the use of the revised, 15-item Transportability Scale in multilingual and cross-cultural research. Configural invariance indicated that the conceptual meaning of transportability was shared across the different language groups, metric invariance showed that participants across different languages interpreted the relationships between items and the respective latent constructs similarly, and partial scalar invariance demonstrated that the observed differences in latent means reflected true differences rather than measurement artifacts.

Discussion and conclusion

The purpose of this study was to investigate the dimensionality of narrative transportability, as measured by Dal Cin et al.'s (2004) widely used scale, and to test the measurement invariance of the scale on large, cross-cultural samples. EFA indicated a structure consisting of four dimensions: Cognitive Involvement, Cognitive-Emotional Imagination, Sensory Imagination, and Personal Involvement. Subsequent CFA confirmed this structure in a separate sample.

These findings have important implications for the study of narrative transportability. Perhaps most importantly, the previous evidence on the dimensionality of transportability yielded an ambiguous picture, indicating either a unidimensional (Jensen et al., 2016; Slater et al., 2018) or a three-dimensional structure with "Cognitive," "Emotional," and "Imagery" components (Green, 1996). It was also based on culturally uniform and demographically specific samples. Given that our findings were obtained with a larger, cross-national, and cross-linguistic sample, there is now sound evidence that narrative transportability is a multidimensional construct.

Furthermore, our findings point to a division between at least two kinds of imaginative tendencies in narrative transportability. The first, Cognitive-Emotional Imagination, reflects the process of imagining story-relevant concepts and emotions. The second, Sensory Imagination, reflects the process of imagining story-relevant sensory qualities. This distinction could be partially deduced from previous evidence, which, on the one hand, pointed to a separate sensory dimension of transportability (i.e., "imagery" in Green et al., 1996), and, on the other, identified within Narrative Engageability the dimension of "Unease of Accepting Unrealism," containing some elements of what we call Cognitive-Emotional Imagination. However, our study is most likely the first to bring the distinction between cognitive/emotional and sensory imagination into sharper focus. Notably, it is consistent with theoretical and empirical research on imagination, which points to clear differences between sensory (Kosslyn et al., 2001; Thomas, 1999), cognitive (or conceptual) (Currie & Ravenscroft, 2002; Ward et al., 1997), and emotional (Coplan, 2011; Oatley, 1999) forms of imagination. Given this, and the size and diversity of our sample, the distinction warrants further consideration and more comprehensive research by scholars of transportation and transportability.

Furthermore, the measurement invariance testing provides strong empirical support for the validity of the scale across a variety of languages. It is important to emphasize that this support does not establish narrative transportability as a universal psychological trait. Rather, our results provide an empirical probe into the extent to which the existing Transportability Scale functions similarly across cultures, while also highlighting meaningful exceptions and sources of noninvariance. First, we found that four languages in our sample (Bahasa Indonesia, Bahasa Malaysia, Korean, and Thai) significantly contributed to misfit in the full scalar invariance model, necessitating their exclusion from further scalar testing. Importantly, this misfit could not be attributed to any major flaws in the translation of the scale into these languages. Instead, there are a number of factors that might have contributed to it, from purely linguistic to cultural in nature. The problematic languages belong to distinct linguistic families, Austronesian (Adelaar & Himmelmann, 2005) and Kra-Dai (Enfield & Comrie, 2015), with Korean being an isolated language unrelated to Indo-European, Sino-Tibetan, or Japonic families (Sohn, 1999). Specific features of their grammatical structures and conceptual framing could have led to differential item functioning (Fischer & Karl, 2019). On the other hand, the differential item functioning might have been due to the fact that, in our study, these languages were represented by participants from Southeast and East Asian populations, which have been found to exhibit specific response patterns, including acquiescence and middle-response bias, distorting factor loadings and intercepts in cross-cultural surveys (Harzing, 2006; He & van de Vijver, 2013). Conducting cognitive interviews or focus groups within these cultural groups could help determine whether the observed issues reflect purely translational ambiguities, systematic response biases, or deeper differences in how narrative transportation is conceptually understood and experienced. Regardless of their exact underlying cause, our findings suggest that the linguistic and cultural universality of narrative transportability may be limited.

Furthermore, full scalar invariance was not achieved, and partial scalar invariance demanded relaxing constraints on three items. Granted, this might have been due to the fact that all three items belonged to the Cognitive Involvement factor, which contained the largest number of items in the scale, with larger factors more likely to contain noninvariant items due to greater measurement variance (Putnick & Bornstein, 2016). Additionally, the three items were the only ones in the scale to contain the adverb "easily," which can be interpreted differently in different languages, for instance, as emphasizing subjective effort or as an absolute descriptor of difficulty, or both (Sakamoto, 2001). The fact that the full scalar invariance was not achieved might have been precisely due to such superficial contingencies of semantics (Lewis et al., 2023). However, rather than this, or an artifact of sample statistics, it might have been due to deep linguistic or cultural limitations of the construct of transportability.

It is also worth noting that although our measurement invariance tests and language-based sensitivity analyses addressed whether the factor structure and measurement properties of the scale held across language clusters, we did not explicitly model the nesting of participants within language or country in our EFA or CFA. This decision was based on the study's primary focus on measurement equivalence rather than multilevel variance decomposition. Nevertheless, future studies may benefit from formally modeling such nested structures—particularly when the aim is to quantify cultural variability or explore the contextual effects of language or nation-level characteristics.

An additional limitation is that due to survey length constraints, we relied solely on Dal Cin's (2004) scale, rather than including items from other scales or generating additional new items, which could have resulted in a different dimensional structure. Future research extending the scale in international contexts should also include item generation from different populations to capture potential cultural differences in engagement with narratives.

Comparing this scale to other commonly-used transportability scales shows a high degree of similarity in items, but with some minor differences. For example, the Green (1996) dispositional transportation (transportability) scale does not include an item about accepting unrealistic events, but does have items that explicitly ask about the appeal of reading stories for fun, stories affecting one's mood, the desire to communicate with characters in stories, and the sense that characters in stories feel like friends (see supplement S25 for the exact wording of all scale items and their factor assignments). Thus, Green's scale may have slightly more emphasis on tendencies toward parasocial engagement, which would likely fit with the cognitive-emotional imagination factor identified here. Additionally, in Green's (1996) factor analysis, items that in the current study were categorized as Personal Involvement loaded on the emotion factor. Given that the 1996 factor analysis was based on a much smaller number of participants, we suggest that the current factor structure is likely a more accurate reflection of the transportability concept.

Bilandzic et al.'s (1999) narrative engageability scale includes more items related to suspense and curiosity (similar to "impatient to find out how a story ends") and more items about accepting unrealism, and has more direct questions about feelings of presence (e.g., feeling that one's mind is inside the story world) (see supplement S26 for the exact wording of all scale items and their factor assignments). Examining the factor structure of items from all three scales (and possible new items generated from different populations, as noted above) could be a useful direction for future research.

It is not unlikely that some languages may be more conducive to narrative transportation because of their unique grammatical features or an inclination for figurative discourse (Underhill, 2011). Other languages may facilitate immersion due to their rich storytelling traditions and narrative conventions (Finnegan, 2012; Minami, 2002; Reynolds, 1995). Transportation may also depend on cognitive styles, which likely varied between our language groups. For instance, the more holistic cognitive styles prevalent in non-Western cultures might result in non-Westerners experiencing higher levels of transportability in general, as transportation depends on integrating one's mental systems in a narrative experience (Nisbett et al., 2001). Establishing whether any patterns in our data are consistent with these explanations would require a separate study. Future research should also include a wider array of languages to examine whether narrative transportability and transportation differ between language families or groups, and to implement formal back-translation procedures when adapting transportability instruments. Our study did not use this procedure, relying on translations by local professionals, which unfortunately led to potential semantic shifts in some cases.[4]

However, it is important to note that the sample used in this study is sufficiently large and diverse to conclude that narrative transportability is shared across many cultures and languages, and that the version of the Transportability Scale we used has broad applicability. Ultimately, the value of this study lies not in claiming cultural universality but in drawing attention to the need for comparative, cross-cultural, and cross-linguistic work that interrogates the assumptions built into constructs widely used in communication science. We see our findings as a first step toward mapping both the shared and culturally specific dimensions of narrative transportability. To support future work, the professionally translated versions of the validated scale in 20 languages, along with the English original, are provided in the Supplementary Material.

Supplementary material

Supplementary material is available at *Global Perspectives in Communication* online.

Data availability

The raw dataset and the R code used in this study are available on the project's OSF page: https://doi.org/10.17605/OSF.IO/AD7V8.

Materials availability

The Supplementary Material for this article is available on the project's Open Science Framework (OSF) page: https://doi.org/10.17605/OSF.IO/AD7V8

Author contributions

W. P. Malecki (Conceptualization-Lead, Data curation [lead], Formal analysis [lead], Formal analysis [lead], Funding acquisition [equal], Funding acquisition [equal], Investigation [lead], Investigation [lead], Methodology [lead], Methodology [lead], Project administration [supporting], Project administration [supporting], Supervision [lead], Supervision [lead], Validation [lead], Validation [lead], Visualization [lead], Visualization [lead], Writing—original draft [lead], Writing—original draft [lead], Writing—review & editing [lead], Writing—review & editing [lead]), Melanie C. Green (Conceptualization [supporting], Methodology [supporting], Writing—original draft [supporting], Writing—review & editing [supporting]), Marta Kowal (Data curation [supporting], Formal analysis [supporting], Investigation [equal], Writing—review & editing [supporting]), Michał Misiak (Investigation [equal], Project administration [supporting], Writing—review & editing [supporting]), S. Craig Roberts (Funding acquisition [equal], Writing—review & editing [supporting]), Agnieszka Sorokowska (Funding acquisition [equal], Writing—review & editing [supporting]), and Piotr Sorokowski (Funding acquisition [equal], Investigation [equal], Project administration [lead], Writing—review & editing [supporting])

[4] As pointed out by a reviewer, in the instruction for the Chinese version, the phrase "when reading for pleasure" was translated as "在阅读愉快时" (literally: "when reading happily"), potentially resulting in a semantic shift from a motivational context to an emotional state. However, while the phrasing is not a literal match, our statistical analyses provide indicative evidence that the measurement properties of the scale were preserved.

Funding

This study was funded by the Research Excellence Incubator Being Human at the University of Wrocław (Uniwersytet Wrocławski).

Conflicts of interest

The authors declare no competing interests.

Human ethics and consent to participate

All procedures involving human participants were conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. The study was approved by the Research Ethics Committee at the Institute of Psychology, University of Wrocław (Approval No. 19.03.2024).

References

Adelaar, K. A., & Himmelmann, N. (2005). *The Austronesian languages of Asia and Madagascar*. Psychology Press.

Appel, M., Gnambs, T., Richter, T., & Green, M. C. (2015). The transportation scale–short form (TS–SF). *Media Psychology*, *18*, 243–266. https://doi.org/10.1080/15213269.2014.987400

Appel, M., & Richter, T. (2010). Transportation and need for affect in narrative persuasion: A mediated moderation model. *Media Psychology*, *13*, 101–135. https://doi.org/10.1080/15213261003799847

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, *88*, 588–606. https://doi.org/10.1037/0033-2909.88.3.588

Bilandzic, H., & Busselle, R. W. (2011). Enjoyment of films as a function of narrative experience, perceived realism and transportability. *Communication*, *36*, 29–50. https://doi.org/10.1515/comm.2011.002

Bilandzic, H., Sukalla, F., Schnell, C., Hastall, M. R., & Busselle, R. W. (2019). The narrative engageability scale: A multidimensional trait measure for the propensity to become engaged in a story. *International Journal of Communication*, *13*, Article 0.

Bowman, N. D., & Goodboy, A. K. (2020). Evolving considerations and empirical approaches to construct validity in communication science. *Annals of the International Communication Association*, *44*, 219–234. https://doi.org/10.1080/23808985.2020.1792791

Brechman, J. M., & Purvis, S. C. (2015). Narrative, transportation and advertising. *International Journal of Advertising: The Review of Marketing Communications*, *34*, 366–381. https://doi.org/10.1080/02650487.2014.994803

Busselle, R., & Bilandzic, H. (2009). Measuring narrative engagement. *Media Psychology*, *12*, 321–347. https://doi.org/10.1080/15213260903287259

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology*, *42*, 116–131. https://doi.org/10.1037/0022-3514.42.1.116

Christy, K. R., & Fox, J. (2016). Transportability and presence as predictors of avatar identification within narrative video games. *Cyberpsychology, Behavior, and Social Networking*, *19*, 283–287. https://doi.org/10.1089/cyber.2015.0474

Coplan, A. (2011). Will the real empathy please stand up? A case for a narrow conceptualization. *Southern Journal of Philosophy*, *49*, 40–65. https://doi.org/10.1111/j.2041-6962.2011.00056.x

Costello, A. B., & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research, and Evaluation*, *10*, Article 1. https://doi.org/10.7275/jyj1-4868

Currie, G., & Ravenscroft, I. (2002). *Recreative minds: Imagination in philosophy and psychology* (C. Hoerl, Ed.). Oxford University Press.

Dal Cin, S., Zanna, M. P., & Fong, G. T. (2004). Narrative persuasion and overcoming resistance. In E. S. Knowles & J. A. Linn (Eds.), *Resistance and persuasion* (pp. 175–191). Lawrence Erlbaum Associates Publishers. https://doi.org/10.4324/9781410609816

Dunn, A. M., Heggestad, E. D., Shanock, L. R., & Theilgard, N. (2018). Intra-individual response variability as an indicator of insufficient effort responding: Comparison to other indicators and relationships with individual differences. *Journal of Business and Psychology*, *33*, 105–121. https://doi.org/10.1007/s10869-016-9479-0

Enfield, N. J., & Comrie, B. (Eds.). (2015). *Languages of mainland southeast Asia: The state of the art*. De Gruyter Mouton.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*, 272–299. https://doi.org/10.1037/1082-989X.4.3.272

Finnegan, R. (2012). *Oral literature in Africa*. Open Book Publishers. https://doi.org/10.11647/obp.0025

Fischer, R., & Karl, J. A. (2019). A primer to (cross-cultural) multi-group invariance testing possibilities in R. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.01507

Gnambs, T., Appel, M., Schreiner, C., Richter, T., & Isberner, M.-B. (2014). Experiencing narrative worlds: A latent state–trait analysis. *Personality and Individual Differences*, *69*, 187–192. https://doi.org/10.1016/j.paid.2014.05.034

Green, M. C. (1996). *Mechanisms of narrative-based belief change*. The Ohio State University. https://etd.ohiolink.edu/acprod/odb_etd/etd/r/1501/10?clear=10&p10_accession_num=osu1235579429

Green, M. C., & Appel, M. (2024). Chapter One—Narrative transportation: How stories shape how we see ourselves and the world. In B. Gawronski (Ed.), *Advances in Experimental Social Psychology* (Vol. *70*, pp. 1–82). Academic Press. https://doi.org/10.1016/bs.aesp.2024.03.002

Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, *79*, 701–721.

Harzing, A.-W. (2006). Response styles in cross-national survey research: A 26-country study. *International Journal of Cross Cultural Management*, *6*, 243–266. https://doi.org/10.1177/1470595806066332

Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods*, *7*, 191–205. https://doi.org/10.1177/1094428104263675

He, J., & van de Vijver, F. J. R. (2013). A general response style factor: Evidence from a multi-ethnic study in the Netherlands.

Personality and Individual Differences, *55*, 794–800. https://doi.org/10.1016/j.paid.2013.06.017

Henrich, J. P. (2020). *The WEIRDest people in the world: How the West became psychologically peculiar and particularly prosperous* (1st ed.). Farrar, Straus and Giroux.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*, 115–135. https://doi.org/10.1007/s11747-014-0403-8

Huang, J. L., Curran, P. G., Keeney, J., Poposki, E. M., & DeShon, R. P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business and Psychology*, *27*, 99–114. https://doi.org/10.1007/s10869-011-9231-8

Jarrier, E., Bourgeon-Renault, D., Derbaix, M., & Petr, C. (2017). Narrative transportation scale: Measure development for transmedia experience. *14th International Conference on Arts and Culture Management, Beijing, China*. https://hal.science/hal-02139849

Jensen, J. D., Christy, K., Krakow, M., John, K., & Martins, N. (2016). Narrative transportability, leisure reading, and genre preference in children 9–13 years old. *The Journal of Educational Research*, *109*, 666–674. https://doi.org/10.1080/00220671.2015.1034351

Kaçak, T., & Kılıç, A. F. (2025). Factor extraction in exploratory factor analysis for ordinal indicators: Is principal component analysis the best option? *International Journal of Assessment Tools in Education*, *12*, Article 1. https://doi.org/10.21449/ijate.1481201

Kaiser, H. F., & Rice, J. (1974). Little Jiffy, Mark Iv. *Educational and Psychological Measurement*, *34*, 111–117. https://doi.org/10.1177/001316447403400115

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. Guilford Publications.

Knol, D. L., & Berger, M. P. F. (1991). Empirical comparison between factor analysis and multidimensional item response models. *Multivariate Behavioral Research*, *26*, 457–477. https://doi.org/10.1207/s15327906mbr2603_5

Kosslyn, S. M., Ganis, G., & Thompson, W. L. (2001). Neural foundations of imagery. *Nature Reviews Neuroscience*, *2*, 635–642. https://doi.org/10.1038/35090055

Kowal, M., Sorokowski, P., Roberts, S. C., Małecki, W., Misiak, M., Sorokowska, A., Kocur, M., Bode, A., Janssen, S., García, F., Ozer, S., Gjoneska, B., Lidborg, L., Dubrov, D., Varella, M. A., Grigoryev, D., Mebarak, M., Mattiassi, A., Contreras-Garduño, J.Zumárraga-Espinosa, M. (2025). *Higher individualism predicts lower intensity of experienced love: Data from 91 countries*. OSF. https://doi.org/10.31234/osf.io/zvn49_v1

Lewis, M., Cahill, A., Madnani, N., & Evans, J. (2023). Local similarity and global variability characterize the semantic space of human languages. *Proceedings of the National Academy of Sciences*, *120*, e2300986120. https://doi.org/10.1073/pnas.2300986120

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods*, *4*, 84–99. https://doi.org/10.1037/1082-989X.4.1.84

Maio, G. R., & Esses, V. M. (2001). The need for affect: Individual differences in the motivation to approach or avoid emotions. *Journal of Personality*, *69*, 583–615. https://doi.org/10.1111/1467-6494.694156

Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*, 224–253. https://doi.org/10.1037/0033-295X.98.2.224

Mazzocco, P. J., Green, M. C., Sasota, J. A., & Jones, N. W. (2010). This story is not for everyone: Transportability and narrative persuasion. *Social Psychological and Personality Science*, *1*, 361–368. https://doi.org/10.1177/1948550610376600

Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, *17*, 437–455. https://doi.org/10.1037/a0028085

Minami, M. (2002). *Culture-specific language styles: The development of oral narrative and literacy*. Multilingual Matters. https://doi.org/10.21832/9781853595752

Ministero, L. M., Green, M. C., Gabriel, S., & Valenti, J. (2022). Back where I belong: Rereading as a risk-free pathway to social connection. *Psychology of Aesthetics, Creativity, and the Arts*, *16*, 97–109. https://doi.org/10.1037/aca0000375

Mondo, M., Sechi, C., & Cabras, C. (2021). Psychometric evaluation of three versions of the Italian Perceived Stress Scale. *Current Psychology*, *40*, 1884–1892. https://doi.org/10.1007/s12144-019-0132-8

Ng, S. (2013). Validation of the 10-item Chinese perceived stress scale in elderly service workers: One-factor versus two-factor structure. *BMC Psychology*, *1*, 9. https://doi.org/10.1186/2050-7283-1-9

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review*, *108*, 291–310. https://doi.org/10.1037/0033-295X.108.2.291

Oatley, K. (1999). Why fiction may be twice as true as fact: Fiction as cognitive and emotional simulation. *Review of General Psychology*, *3*, 101–117. https://doi.org/10.1037/1089-2680.3.2.101

Preacher, K. J., Zhang, G., Kim, C., & Mels, G. (2013). Choosing the optimal number of factors in exploratory factor analysis: A model selection perspective. *Multivariate Behavioral Research*, *48*, 28–56. https://doi.org/10.1080/00273171.2012.710386

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review: DR*, *41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Revelle, W. (2024). *psych: Procedures for psychological, psychometric, and personality research*. Northwestern University. https://CRAN.R-project.org/package=psych

Revicki, D. A., Cook, K. F., Amtmann, D., Harnam, N., Chen, W.-H., & Keefe, F. J. (2014). Exploratory and confirmatory factor analysis of the PROMIS pain quality item bank. *Quality of Life Research*, *23*, 245–255. https://doi.org/10.1007/s11136-013-0467-9

Reynolds, D. F. (1995). *Heroic poets, poetic heroes: The ethnography of performance in an Arabic oral epic tradition* (Nagy G., Ed.). Cornell University Press. https://www.jstor.org/stable/10.7591/j.ctt207g77s

Roncal-Belzunce, V., Gutiérrez-Valencia, M., Martínez-Velilla, N., & Ramírez-Vélez, R. (2025). System usability scale for gamified e-learning courses: Cross-cultural adaptation and measurement properties of the spanish version. *International Journal of Human–Computer Interaction*, *0*, 1–11. https://doi.org/10.1080/10447318.2025.2499947

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software 48*. https://doi.org/10.18637/jss.v048.i02

Rutkowski, L., & Svetina, D. (2017). Measurement invariance in international surveys: Categorical indicators and fit measure

performance. *Applied Measurement in Education*. https://www.tandfonline.com/doi/abs/10.1080/08957347.2016.1243540

Sakamoto, M. (2001). The middle and related constructions in English. *English Linguistics*, *18*, 86–110. https://doi.org/10.9793/elsj1984.18.86

Schimmelpfennig, R., Spicer, R., White, C. J. M., Gervais, W., Norenzayan, A., Heine, S., Henrich, J., & Muthukrishna, M. (2024). Methodological concerns underlying a lack of evidence for cultural heterogeneity in the replication of psychological effects. *Communications Psychology*, *2*, 93. https://doi.org/10.1038/s44271-024-00135-z

Sethi, N., Grady, Sara M., Ulusoy, Ezgi, Baldwin, Joshua, & Ewoldsen, D. R. (2022). What do we do with narratives after the fact? exploring dimensions of retrospective imaginative involvement. *Communication Reports*, *35*, 106–119. https://doi.org/10.1080/08934215.2022.2040558

Slater, M. D., Ewoldsen, D. R., & Woods, K. W. (2018). Extending conceptualization and measurement of narrative engagement after-the-fact: Parasocial relationship and retrospective imaginative involvement. *Media Psychology*, *21*, 329–351. https://doi.org/10.1080/15213269.2017.1328313

Sohn, H.-M. (1999). *The Korean language*. Cambridge University Press.

Thomas, N. J. T. (1999). Are theories of imagery theories of imagination? An active perception approach to conscious mental content. *Cognitive Science*, *23*, 207–245. https://doi.org/10.1016/S0364-0213(99)00004-X

Thompson, R., & Haddock, G. (2012). Sometimes stories sell: When are narrative appeals most likely to work? *European Journal of Social Psychology*, *42*, 92–102. https://doi.org/10.1002/ejsp.850

Underhill, J. W. (2011). *Creating worldviews: Metaphor, ideology and language*. Edinburgh University Press.

van Laer, T., de Ruyter, K., Visconti, L. M., & Wetzels, M. (2014). The Extended Transportation-Imagery Model: A Meta-Analysis of the Antecedents and Consequences of Consumers' Narrative Transportation. *Journal of Consumer Research*, *40*, 797–817. https://doi.org/10.1086/673383

van Laer, T., Feiereisen, S., & Visconti, L. M. (2019). Storytelling in the digital era: A meta-analysis of relevant moderators of the narrative transportation effect. *Journal of Business Research*, *96*, 135–146. https://doi.org/10.1016/j.jbusres.2018.10.053

Ward, T. B., Smith, S. M., & Vaid, J. (Eds.). (1997). *Creative thought: An investigation of conceptual structures and processes* (pp. xv, 567). American Psychological Association. https://doi.org/10.1037/10227-000

Wickham, H. (2009). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag. https://ggplot2.tidyverse.org

Wickham, H., François, R., Henry, L., & Müller, K. (2020). *dplyr: A Grammar of Data Manipulation*. https://CRAN.R-project.org/package=dplyr

Zhang, X., Noor, R., & Savalei, V. (2016). Examining the effect of reverse worded items on the factor structure of the need for cognition scale. *PLoS ONE*, *11*, e0157795. https://doi.org/10.1371/journal.pone.0157795