SA Journal of Industrial Psychology
ISSN: (Online) 2071-0763, (Print) 0258-5200

Psychometric properties of an adapted work-family boundary management tactics scale

Author:
Marthinus Delport[1,2]

Affiliations:
[1]Department of Industrial Psychology, Faculty of Economic and Management Sciences, Stellenbosch University, Stellenbosch, South Africa

[2]Department of Industrial Psychology, Faculty of Economic and Management Sciences, University of the Free State, Bloemfontein, South Africa

Corresponding author:
Marthinus Delport,
delportm@ufs.ac.za

Dates:
Received: 31 Jan. 2025
Accepted: 28 Mar. 2025
Published: 21 June 2025

How to cite this article:
Delport, M. (2025). Psychometric properties of an adapted work-family boundary management tactics scale. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde, 51*(0), a2291. https://doi.org/10.4102/sajip.v51i0.2291

Orientation: Current workplace trends are characterised by the continuous integration of technology and the seamless traversal between work and home domains. This has complicated the work–life interface, resulting in boundary management challenges.

Research purpose: The purpose of this article was to validate the 12-item work–family boundary management tactics scale (WFBMT) within the South African context.

Motivation for the study: Owing to the increased interest in boundary management behaviours, there is a critical need to validate measurement scales that can be used to operationalise such behaviours. Very few scales currently exist in this regard, with limited empirical evidence.

Research approach/design and method: The study used a quantitative cross-sectional research design. A non-probability sample ($N = 521$) was drawn from five higher education institutions representing typical knowledge workers. Confirmatory factor analysis was used to investigate the psychometric properties of the scale.

Main findings: The results demonstrated acceptable goodness-of-fit for the proposed factor structure. Adequate convergent and discriminant validity were achieved. A moderately dominant general factor emerged, although more than half (51.27%) of the explained common variance was attributed to the first-order factors. Scalar invariance was obtained between male and female respondents and between designated and non-designated group employees.

Practical/managerial implications: The WFBMT represents a reliable and valid measurement to operationalise boundary enactment behaviours in the South African context.

Contribution/value-add: As far as could be ascertained, the study provides the first empirical evidence of the validity and measurement invariance of the WFBMT scale on a South African sample.

Keywords: boundary management tactics; work–life integration; workplace tethering; psychometric properties; measurement invariance.

Introduction

As the fourth industrial revolution continues to unfold, there has been an unprecedented surge in the reliance on information and communication technology (ICT), as companies strive to remain competitive in an ever-expanding global arena (Verhoef et al., 2021). The 21st-century world of work stands at a transformative crossroads as traditional workplace boundaries are starting to give way to a much more dynamic, interconnected and often virtual work environment, driven from work and home offices alike (Davis et al., 2021). This ICT has enabled seamless traversal between work and home domains (Tennakoon, 2018), allowing employees to accommodate both professional and personal pursuits with flexibility and ease (Menezes & Kelliher, 2017).

Notwithstanding the array of benefits such technologies have realised, it has also altered the way in which employees integrate their work and personal lives (Jacukowicz & Merecz-Kot, 2020), indicative of workplace tethering (Nevin & Schieman, 2021). As a result, the delineation between personal and professional spheres has become increasingly difficult to navigate (Fetherston et al., 2020), which traditionally determined distinct moments of engagement and disengagement with work activities (Harrison & Lucassen, 2018). According to Allen et al. (2014), there is a growing interest among scholars in how individuals navigate the work–life interface in ways that are conducive to their well-being.

The boundary management literature concerns how individuals create, maintain and manage boundaries around work and home domains (Ashforth et al., 2000; Clark, 2000). Yet despite the surge in research interest, very few scales are available to adequately operationalise boundary management behaviours and often rely on the use of proxy measurements such as segmentation preferences (Kreiner, 2006), boundary permeability (Clark, 2002) and boundary control (Kossek et al., 2012). Although such psychological constructs are helpful in clarifying broader work–life tendencies and outcomes, they fail to give adequate insight into the exact behaviours that individuals enact when erecting work–home boundaries. Inferences drawn towards boundary management behaviour when using such proxy measures might, therefore, be misleading and incomplete.

A notable exception is the Work-to-Family Boundary Management Tactics scale (WFBMT) developed by Carlson et al. (2016). The scale operationalises four boundary management tactics (temporal, physical, behavioural and communicative) individuals use to keep work and home domains separate. The scale is based on the theoretical foundations proposed by Kreiner et al. (2009), who originally conceptualised the four different boundary management tactics. The WFBMT has enabled researchers to operationalise boundary management behaviour more precisely and paved the way for further explanatory studies in the work–life literature. However, very little empirical evidence is currently available on the scale's psychometric properties and whether it generalises across different population groups.

Research purpose and objectives

Research on boundary management remains vastly unexplored as a relatively new strand within the work–life literature (Allen & Eby, 2016). Part of the slow progress can be attributed to construct proliferation (Cobb et al., 2022) and the lack of adequate measurement instruments to operationalise boundary enactment behaviour. The WFBMT is a step in the right direction, yet limited validation studies on the scale exist. The main aim of this study is, therefore, to provide empirical evidence of the psychometric properties of the WFBMT.

More specifically, the following will be evaluated, based on a South African sample of typical knowledge workers:

- The reliability, validity and goodness-of-fit associated with the measurement model.
- The degree to which the WFBMT consists of a dominant general factor (boundary management), as opposed to the specific first-order factors (temporal, physical, behavioural and communicative).
- The degree to which the measurement model generalises across population groups (males vs. females; non-designated group vs. designated group).

Literature review

Background of the boundary management literature

Over the past few decades, considerable effort has been put into understanding the work–life interface from various perspectives (see Allen & Eby, 2016; Major & Burke, 2013). Among some seminal work, various psychological constructs have emerged, such as work–life conflict (e.g. Greenhaus & Beutell, 1985), work–life enrichment (e.g. Greenhaus & Powell, 2006), work–life balance (e.g. Kalliath & Brough, 2008) and work–life integration (e.g. Kossek & Lambert, 2005). Yet despite the growing interests, two key challenges remained. Firstly, the work–family interface has become increasingly complex because of evolving technologies and the changing nature of work (Vyas, 2022). Secondly, more research is needed to understand how individuals navigate and manage work and life domains in ways that are conducive to their well-being (Allen & Eby, 2016). As a result, boundary management, one of the latest strands in the work–life literature, has gained significant traction.

Boundary management emphasises the boundaries and borders between domains (Ashforth et al., 2000; Clark, 2000; Nippert-Eng, 1996) and how individuals go about constructing and actively managing such boundaries as active agents (Basile & Beauregard, 2020; Kreiner et al., 2009). Individuals create and maintain boundaries as a means of simplifying and organising their environment. As a result, various domains (e.g. work and home) are created, which hold specific relevance and meaning to the individual. A boundary is what defines the perimeter and scope of these domains (Kreiner et al., 2009). Although domains are socially constructed, they are more or less institutionalised and, therefore, tend to share the same meaning, which most people understand (Nippert-Eng, 1996).

Boundaries have various characteristics that dictate their flexibility and permeability and determine the extent to which they can be integrated or segmented based on individual preferences (Kreiner, 2006) and organisational conditions (Gadeyne et al., 2018). According to the original work of Clark (2000), these borderlands (i.e. places where boundaries start to blend or blur) require individuals to navigate conflicting demands, which can cause confusion about their identity and purpose. Research has shown that when boundaries are permeable, it can hinder an individual's perception of domain roles, which can lead to adverse outcomes, such as work–life conflict (Gadeyne et al., 2018), reduced work engagement and lower levels of job satisfaction (Carlson et al., 2016).

Current challenges in operationalising boundary enactment

Despite the increased attention to boundary management behaviours, progress in the field has been stifled by construct proliferation. A recent meta-analysis by Cobb et al. (2022) has identified over 91 different scales, often with overlapping or conflicting conceptualisations. Although fairly established instruments exist to operationalise individual boundary management preferences (e.g. Kreiner, 2006), very few validated scales are available to measure the actual enactment of such preferences. In the boundary management literature, it is important to differentiate between boundary preferences and the actual enactment of such preferences. This is because various situational factors, such as access to flexible work arrangements or strong organisational integration norms (Derks et al., 2015; Kossek et al., 2023; Yang et al., 2019), might prevent individuals from enacting their boundary preferences. In the absence of validated boundary enactment scales, researchers might opt to use scales that measure individual preferences without considering the enactment of such preferences, which might lead to incomplete findings.

The first seminal study to really make progress in conceptualising the idea of specific boundary management behaviours (enactment of boundary preferences) was a qualitative study by Kreiner et al. (2009). The author conceptualised four distinct boundary management tactics (temporal, physical, behavioural and communicative) that individuals use to separate home and work domains. *Temporal tactics* describe how individuals manage blocks of their time to reduce boundary violations, such as deciding on a specific cut-off time for work tasks. *Physical tactics* utilise spatial boundaries to indicate which domain is currently active. For example, having a designated office space when working from home can help create a mental fence that clarifies role expectations. *Behavioural tactics* are social practices individuals use to negotiate the work–family interface. This is often done through the mindful usage of ICT to promote work–home segmentation (Carlson et al., 2018). Finally, *communicative tactics* focus on managing availability expectations to prevent boundary violations. Unlike the previous three tactics, communication tactics are externally focused and involve signalling one's personal boundaries to others (Kreiner et al., 2009).

Carlson et al. (2016) developed a four-factor measurement scale, based on the theoretical descriptions proposed by Kreiner et al. (2009), to operationalise boundary enactment behaviours. The scale has allowed researchers to conduct further explanatory studies (Eastgate et al., 2023; Kashive et al., 2021; Xu et al., 2025), but it has not been adequately validated across diverse contexts. Moreover, some of the scale items do not fully accommodate individuals who work from home, as the phrase 'while at home' is often used to describe non-work time. This necessitates further refinements, especially when used to study individuals who work in hybrid work settings.

The need to rule out group-related measurement bias

Although measurement instruments are typically developed to fit a wide range of assessment contexts (Sekercioglu, 2018), these measures cannot be assumed to work equally well across sociocultural groups. One particularly important consideration when investigating group differences across any psychological construct is the possibility of measurement bias. A measurement is said to be biased if some of its items do not measure the underlying constructs similarly across groups (Brown, 2015). This can lead to inaccurate inferences being drawn, especially when any form of group comparison is of interest to researchers (Rutkowski & Svetina, 2014).

Measurement bias manifests in various ways, which can be evaluated through statistical fit differences between nested models (Vandenberg & Lance, 2000). These models help test various levels of measurement invariance (configural, metric, scalar and strict) based on the hypothesised equality constraints. *Configural invariance* (equal form) tests whether the basic factor structure is invariant across groups (i.e. the pattern of item loadings onto their associated latent constructs). *Metric invariance* (equal loadings) tests whether the factor loadings (i.e. the magnitude of the associations between the items and their latent factors) are invariant across groups. This form of invariance allows researchers to evaluate non-uniform bias. *Scalar invariance* (equal intercepts) tests whether the intercepts of the items (i.e. participant starting positions) are invariant across groups. This form of invariance helps detect the presence of uniform bias. *Strict invariance* (equal residuals) tests whether the residual variance (i.e. the unexplained variance in each item after accounting for the latent factor) is equal across groups. This study set out to test all four of these levels of measurement invariance between both gender (male and female) and racial (designated and non-designated) groups.

Ongoing interest in the work–life interface has resulted in the investigation of gender differences in boundary management behaviour. Some research suggests that women prefer work–home segmentation more strongly than men (Allen et al., 2024; Shockley et al., 2017), yet often have to rely on integration strategies to accommodate caregiving roles (Mellner et al., 2014; Shanine et al., 2019). Furthermore, women are often described as experiencing higher levels of work–life conflict compared to men (Martinengo et al., 2010; McCutcheon & Morrison, 2018).

However, other studies have not found similar support for gender-related differences in boundary management behaviour (Eddleston & Mulki, 2017; Powell & Greenhaus, 2010). Future research efforts will likely be aimed at clarifying some of these contradictions, which require the availability of a boundary management measurement instrument free of gender-related measurement bias. It is important to notice that very few studies go through the trouble of investigating measurement invariance before drawing inferences on gender differences, which require external validation studies, like the current one, to assess group-related measurement bias empirically.

Similarly, given South Africa's culture-diverse business landscape and 11 official languages, it was essential to investigate whether the measurement model of the WFBMT can generalise across racial groups. Measurement bias can stem from cultural, linguistic and socioeconomic disparities that influence how individuals interpret and respond to questionnaire items (Ferreira, 2016). This can introduce uniform or non-uniform bias, where responses vary systematically across racial lines, undermining inferences drawn on real differences in boundary behaviour. This is especially important given the increased scrutiny on using measurement instruments that are free of group-related bias (Ferreira, 2016). Limitations in the sample size, however, did not allow for testing each racial category individually. However, broad differences between designated and non-designated group employees were investigated. The *Employment Equity Act (1998)* defines designated group employees as African, mixed race, Indian and Asian, while non-designated group employees as white. Such employment laws aim to democratise and equalise the labour context and safeguard against any unfair discrimination against protected group employees. This study, therefore, also set out to assess the measurement invariance of the WFBMT scale between designated and non-designated group employees.

Research design

Research approach

The study employed a quantitative, cross-sectional research design from a positivistic research paradigm. The study's main aim was to assess the psychometric properties of the 12-item WFBMT on a South African sample and to establish whether the instrument demonstrated measurement invariance across gender and racial groups.

Research participants

A non-probability sample of 521 participants was drawn from five higher education institutions in South Africa. The sample was chosen to represent typical knowledge workers, with variability in their control over the work–life interface (49.2% worked normal office hours, 39.3% had access to some form of flexible work arrangements, while 11.5% worked from home most of the time). All participants were full-time employees in the capacity of either academic (40.2%) or support staff (59.8%). The majority of the participants identified as white (61.2%) and female (72.9%). Because of sample size limitations for each racial category, measurement invariance was investigated between designated (38.8%) and non-designated group (61.2%) employees. Roughly half (51%) of the employees in the sample were married, and 52.8% had dependents.The mean age was 45.2 years (standard deviation [SD] = 10.73). Most participants indicated Afrikaans (47.4%) as their home language and English (61.1%) as their second language. The average tenure of the participants was 11 years (SD = 8.91).

Research procedure

The data were collected through an online survey platform (RedCap), which was distributed through each university's official internal communication channels. Participants were informed about the background and purpose of the study and had to provide written informed consent before being allowed to complete the survey. Data entries were anonymous and no identifiable information was recorded.

Measurement instrument

For the purposes of the study, the 12-item WFBMT (Carlson et al., 2016) was used. The instrument reflects various tactics (i.e. boundary enactment behaviour) that individuals use in an attempt to keep work and family domains separate. It contains four sub-scales: *temporal* (items 1–3), *physical* (items 4–6), *behavioural* (items 7–9) and *communicative* (items 10–12). Items are rated on a 5-point Likert scale ranging from 'almost never' (1) to 'almost always' (5). Participants were asked to indicate how often they make use of these boundary management tactics.

Some adaptations to the item wording were made to accommodate the possibility of participants working from home most of the time (Table 1). More specifically, the phrase 'while at home' was substituted with 'after work' for some of the items. An exception was made for the *physical boundaries* subscale, as these items emphasised the location of work instead of the time of work. Participants were, however, prompted to think about their workspace (even if it is at their home) as separate from their home domain.

The original work of Carlson et al. (2016) revealed support for the multidimensional factor structure of the scale as well as acceptable internal consistency (Cronbach's alpha) for the sub-scales: behavioural (0.92), temporal (0.74), physical (0.88) and communicative (0.91).

Statistical analysis

The data were analysed using jamovi (Love et al., 2022), an open-source statistical software program capable of advanced structural equation analyses. The results suggested that

TABLE 1: Work-to-family boundary management tactics scale.

Item	Question
1	After work, I try to manage blocks of time so that I can keep family separate from work.
2	After work, I try to manage my time such that family time is family time, not work time.
3	After work, I manage my time to keep work demands out of family.
4	When I'm at home, I try not to address work-related issues so I can focus on my family.
5	When I'm at home or with family, I leave work matters at work so that I can focus on my family.
6	When I return from work, I put away work-related thoughts and turn my focus to family.
7	After work, I use technology to help facilitate keeping family responsibilities separate from work responsibilities.
8	After work, I use technology to help keep work demands out of my family life.
9	After work, I use technology to help limit dealing with work during family time.
10	I communicate clearly to my coworkers/supervisor that I prefer not to be distracted by work demands after working hours.
11	I have indicated to my boss that I cannot work past the end of my normal workday unless it is a rare circumstance.
12	I set expectations with my coworkers/supervisor to not contact me after working hours unless it's an emergency.

Source: Adapted from Carlson, D.S., Thompson, M., & Kacmar, K. (2016). Boundary management tactics: An examination of the alignment with preferences in the work and family domains. *Journal of Behavioral and Applied Management, 16*(2), 51–70

TABLE 2: Descriptive statistics for the items of the boundary management scale.

Item	Mean	SD	Skewness		Kurtosis		Shapiro–Wilk	
			Value	SE	Value	SE	W	*p*
1	3.437	1.028	-0.260	0.107	-0.378	0.214	0.903	< 0.001
2	3.528	1.068	-0.330	0.107	-0.490	0.214	0.899	< 0.001
3	3.363	1.087	-0.181	0.107	-0.604	0.214	0.908	< 0.001
4	3.159	1.121	-0.147	0.107	-0.627	0.214	0.915	< 0.001
5	3.135	1.152	-0.053	0.107	-0.715	0.214	0.915	< 0.001
6	2.982	1.155	0.032	0.107	-0.668	0.214	0.915	< 0.001
7	2.647	1.099	0.256	0.107	-0.626	0.214	0.910	< 0.001
8	2.548	1.072	0.271	0.107	-0.564	0.214	0.906	< 0.001
9	2.533	1.070	0.317	0.107	-0.500	0.214	0.905	< 0.001
10	2.497	1.346	0.462	0.107	-0.995	0.214	0.869	< 0.001
11	2.201	1.355	0.800	0.107	-0.668	0.214	0.806	< 0.001
12	2.380	1.402	0.596	0.107	-0.972	0.214	0.835	< 0.001

SD, standard deviation; SE, standard error.

the data deviated from normality with regard to both skewness and kurtosis (Table 2). As a result, robust maximum likelihood was used as the preferred estimation technique (Brown, 2015) for confirmatory factor analysis (CFA). Various goodness-of-fit statistics were investigated, including the Satorra–Bentler scaled Chi-square (S-Dχ^2), root mean square error of approximation (RMSEA), standardised root mean square residual (SRMR), comparative fit index (CFI) and the Tucker–Lewis index (TLI). According to Hair et al. (2018), both sample size and model complexity should be taken into consideration when determining appropriate cut-off values for these indices. For the current measurement model (N = 521; 12 indicator variables), the following values are indicative of a good model fit (RMSEA < 0.07 in the presence of CFI > 0.96 and TLI > 0.96). The SRMR is likely to be biased upwards for models with 12 or fewer indicators; therefore, less emphasis was placed on this fit statistic. The Schmid–Leiman transformation (Schmid & Leiman, 1957) was also applied to distinguish the percentage of variance that is shared by a common underlying factor (general factor) from variance unique to each of the first-order factors.

Despite the popularity of Cronbach's alpha (α) being used in most reliability studies, it has received increased criticism with regard to the appropriateness of its application in the field (e.g. Hayes & Coutts, 2020). Unidimensionality and tau-equivalence assumptions of α are often violated (Flora, 2020) and rarely checked in advance. As a result, the coefficient omega (ω), as proposed by McDonald (1999), is often recommended as a better alternative for investigating model-based reliability. Both α and ω coefficients are reported. Reliability estimates of 0.7 and above are generally considered acceptable (Hair et al., 2018).

Convergent validity was evaluated by calculating the average variance extracted (AVE). The AVE represents the average percentage of variance that can be explained (i.e. communality) among items of a construct. Recommended values are above 0.5 (Hair et al., 2018). Discriminant validity was assessed through the heterotrait–monotrait (HTMT) ratio of correlations. Although HTMT was initially developed for variance-based approaches to structural equation modelling (Henseler et al., 2015), it readily translates to covariance-based approaches as well (Afthanorhan et al., 2021). A critical cut-off value below 0.85 has been suggested to indicate sufficient evidence for discriminant validity (Hair et al. 2018).

Finally, measurement invariance was tested to assess whether the measurement model generalised across groups (i.e. the absence of group-related measurement bias). Despite different terminologies often being used in the literature, most authors seem to agree that the process involves a series of empirical comparisons of nested models, which have increasingly restrictive constraints placed upon them (see Putnick & Bornstein, 2016; Vandenberg & Lance, 2000). For the purposes of this study, four types of measurement invariance were tested (configural, metric, scalar and strict), as proposed by Brown (2015). Mean structures were modelled to allow investigation into potential intercept differences, and the latent variables were scaled by fixing the first factor loading to unity.

An important consideration in determining whether a particular level of invariance has been attained is the extent to which model fit deteriorates. A significant deterioration would imply that the parameters that were constrained to be equal do not generalise across the groups. Although statistically significant differences in Chi-square ($\Delta\chi^2$) are frequently recommended to evaluate such deterioration (Brown, 2015; Hoyle, 2023), the χ^2 statistic remains sensitive to model complexity and sample size and has garnered some criticism when used as the sole determinant of invariance (see Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). Some authors have suggested that in addition to Chi-square, changes in other fit indices should also be considered (Chen, 2007; Cheung & Rensvold, 2002; Little, 2013; Meade et al., 2008). For example, based on a large Monte Carlo simulation study, Cheung and Rensvold (2002) demonstrated that a critical cut-off of ΔCFI < 0.01 and ΔTLI < 0.05 is suitable to imply that the models are practically equivalent. Similarly, Meade et al. (2008) recommend ΔCFI < 0.02, while Chen (2007) suggests ΔRMSEA < 0.015, ΔSRMR < 0.015 and $\Delta\chi^2$/degrees of freedom (*df*) < 1. In this study, the deterioration in model fit was evaluated based on a combination of these fit indices.

TABLE 3: Goodness-of-fit statistics for the competing measurement models.

	Model					
Goodness-of-fit statistics	**First-order**	**95% CI**	**Second-order**	**95% CI**	**Bifactor**	**95% CI**
S-B χ^2	87.276	-	89.552	-	68.829	-
df	48	-	50	-	42	-
RMSEA	0.040	0.028, 0.052	0.039	0.027, 0.050	0.035	0.021, 0.048
SRMR	0.024	-	0.028	-	0.022	-
CFI	0.990	-	0.990	-	0.995	-
TLI	0.986	-	0.986	-	0.992	-

df, degrees of freedom; RMSEA, root mean square error of approximation; CI, confidence interval; SRMR, standardised root mean residual; CFI, comparative fit index; TLI, Tucker–Lewis index.

Ethical considerations

Ethical approval to conduct this study was obtained from the Stellenbosch University, Social, Behavioural and Education Research Ethics Committee with REF. (SBE-2022-26298). Further ethical clearance and institutional permission were also obtained from each participating institution.

Results

Descriptive statistics for the items are presented in Table 2. Mean scores ranged between 2.20 and 3.55, with the standard deviation between 1.03 and 1.40. The variability in item responses is considered adequate for further analyses. Univariate normality assumptions were violated, as per the Shapiro–Wilk test (Shapiro & Wilk, 1965). Similarly, multivariate normality assumptions (Mardia, 1980) were violated in both skewness (15.328, $p < 0.001$) and kurtosis (230.179, $p < 0.001$). Robust maximum likelihood was, therefore, used as the preferred CFA estimation method (Brown, 2015).

Factor structure and goodness-of-fit

The goodness-of-fit statistics, derived with jamovi (Love et al., 2022) for the different factor structures of the measurement model (first-order, second-order and bifactor), are depicted in Table 3. The fit indices for all three model configurations are indicative of good model fit (i.e. RMSEA < 0.07; in the presence of CFI > 0.96 and TLI > 0.96) when model complexity and sample size are taken into consideration (see Hair et al., 2018). The bifactor model demonstrated the best fit out of the three proposed structures, as it also accounts for the variance shared by an underlying general factor (boundary management tactics) over and above the four first-order factors (temporal, physical, behavioural and communicative).

First-order measurement model

Correlations between the sub-scales for the first-order measurement model ranged between 0.228 and 0.801. Physical and temporal tactics had the strongest association (0.801), while behavioural and communicative tactics had the weakest (0.228). The remaining four magnitudes all ranged between 0.367 and 0.389, suggesting a moderate association between the subdimensions, with distinct subthemes being present. This is in line with the conceptual definition of boundary management tactics, which suggests that individuals make use of various distinct forms of boundary enactment efforts to keep work from spilling into the home domain (Carlson et al., 2016).

TABLE 4: Reliability indices for the sub-scales.

Subscale	Number of items	α	ω	AVE
Temporal boundaries	3	0.938	0.942	0.840
Physical boundaries	3	0.927	0.930	0.813
Behavioural boundaries	3	0.963	0.964	0.898
Communicative boundaries	3	0.914	0.914	0.780

α, Cronbach's alpha; ω, McDonald's omega; AVE, average variance extracted.

TABLE 5: Heterotrait–monotrait ratio of correlations.

Variable	Temporal boundaries	Physical boundaries	Behavioural boundaries	Communicative boundaries
Temporal boundaries	1.000	0.816	0.377	0.357
Physical boundaries	0.816	1.000	0.399	0.380
Behavioural boundaries	0.377	0.399	1.000	0.221
Communicative boundaries	0.357	0.380	0.221	1.000

The reliability indices for the four sub-scales are presented in Table 4. Both coefficients α and ω revealed highly reliable sub-scales for the instrument. The high AVE is also a testament to the instrument's ability to accurately capture all four types of boundary enactment with relatively little measurement error. As such, convergent validity is confirmed for the four different types of boundary management tactics.

To investigate the discriminant validity between the subdimensions, the HTMT ratio of correlations was calculated (Table 5). All four first-order factors had stronger relationships with their own indicator variables (monotrait) as opposed to indicator variables of other subdimension (heterotrait). Trends were observed that the temporal and physical tactics sub-scales seemed to share slightly more communality compared to any other combination of factors. These values are, however, considered well within the acceptable range (Henseler et al., 2015) and discriminant validity for each of the subdimensions was therefore confirmed.

Second-order measurement model

For the second-order measurement model, the R-squared (R^2) values were calculated for each of the four subdimensions: temporal (0.776), physical (0.839), behavioural (0.175) and communicative (0.172). Although behavioural tactics and communicative tactics seemed to play a slightly less prominent role in comparison to temporal and physical tactics, they remained discernible subdimensions in the scale. Lower R^2 values in the presence of high AVE values (refer to Table 4)

TABLE 6: Standardised factor loadings for the empirical bifactor model.

Item	General factor	Temporal boundaries	Physical boundaries	Behavioural boundaries	Communicative boundaries	Item residuals
1	0.749	0.439	-	-	-	0.247
2	0.813	0.532	-	-	-	0.057
3	0.837	0.366	-	-	-	0.166
4	0.826	-	0.329	-	-	0.210
5	0.868	-	0.416	-	-	0.073
6	0.822	-	0.241	-	-	0.267
7	0.406	-	-	0.818	-	0.165
8	0.417	-	-	0.894	-	0.027
9	0.405	-	-	0.851	-	0.112
10	0.352	-	-	-	0.818	0.206
11	0.361	-	-	-	0.783	0.257
12	0.374	-	-	-	0.814	0.197

are not necessarily considered problematic (Hoyle, 2023) and might simply indicate that the behavioural and communicative tactics sub-scales are more distinct from the rest of the factors, further supporting the multidimensional nature of boundary management behaviour as proposed by Carlson et al. (2016).

Bifactor measurement model

Table 6 presents the standardised factor loadings for the 12 items, as estimated in the bifactor model. All factor loadings were statistically significant. In bifactor models, the factor loadings are typically lower than in first- or second-order models (Hoyle, 2023), as the variance explained in each indicator variable is separated into both an underlying common factor (general factor) and a specific first-order factor. For the first six items, the general factor was able to account for more of the variance in each item compared to the first-order factors. In contrast, for the remaining six items, the first-order factors were able to account for more variance compared to the general factor, indicating that the first-order factors of the behavioural and communicative tactics subdimensions shared less common variance with the rest of the scale. Item residuals were relatively small across all 12 items, suggesting low levels of measurement error.

Next, the Schmid–Leiman transformation procedure was applied (Schmid & Leiman, 1957) to investigate the percentage of common variance explained by each factor. The results revealed a moderately dominant general factor (48.73%), with significant portions of unique variance explained by the behavioural (22.30%) and communicative (19.40%) tactics sub-scales. In contrast, the temporal (5.61%) and physical (3.96%) tactics sub-scales explained only a tiny proportion of the unique variance over and above what has already been accounted for by the general factor. This suggests a high level of commonality between the general factor and the temporal and physical sub-scales. In contrast, behavioural and communicative tactics seem to be conceptually distinct, with larger proportions of unique variance explained.

Multidimensional omega was also calculated for both the hierarchical and bifactor models (ω–t = 0.94 and ω–h = 0.75, respectively). Given the distinct difference between the total and hierarchical omega values, it is clear that the four sub-scales do seem to add value to the overall internal consistency of the instrument. Although a relatively dominant general factor is present, there is support for the multidimensional nature of boundary management behaviours.

Measurement invariance

Following the confirmation of the reliability and factor structure of the WFBMT, measurement invariance was tested between male and female employees, as well as between designated and non-designated group employees. The bifactor measurement model was selected for this purpose, as it recognises the underlying general factor (boundary management tactics) in addition to the four first-order factors (temporal, physical, behavioural and communicative). Single group CFAs were verified before proceeding with the multigroup measurement model, as recommended by Hair et al. (2018). Model deterioration across the four hierarchical forms of measurement invariance (configural, metric, scalar and strict) is depicted in Table 7 for both gender and designated group status.

The results revealed minimal deterioration in model fit over the entire series of nested models for both gender and designated group status. Changes for most of the fit indices were within the acceptable limits ($\Delta\chi^2/df$ < 1, ΔRMSEA < 0.015, ΔCFI < 0.01 and ΔTLI < 0.05). A notable exception was the SRMR values, which frequently exceeded the recommended cut-off (ΔSRMR < 0.015). Hair et al. (2018), however, caution against the reliance on SRMR for structural models with 12 or fewer indicators, given the index's tendency to be biased upwards. Based on these recommendations, less emphasis was placed on changes in SRMR values. As a result, the full basket of evidence suggests that strict invariance was established both between gender groups (male and female employees) and between designated group statuses (designated vs non-designated group employees).

Practical implications

Previous research has highlighted the importance of using measurement instruments that are valid and reliable and that do not fall victim to measurement bias (Rutkowski & Svetina, 2014). The current findings have demonstrated

TABLE 7: Measurement invariance for the bifactor boundary management tactics measurement model.

Model	χ^2	*df*	χ^2/df	RMSEA	SRMR	CFI	TLI	$\lvert\Delta\rvert$ RMSEA	$\lvert\Delta\rvert$ SRMR	$\lvert\Delta\rvert$ CFI	$\lvert\Delta\rvert$ TLI	$\lvert\Delta\rvert$ χ^2/df
Gender†												
Configural	114	84	1.357	0.038	0.035	0.994	0.991	-	-	-	-	-
Metric	125	103	1.214	0.029	0.040	0.996	0.994	0.009	0.005	0.002	0.003	0.143
Scalar	133	115	1.157	0.028	0.040	0.996	0.995	0.010	0.005	0.002	0.004	0.200
Strict	172	127	1.354	0.037	0.054	0.991	0.991	0.001	0.019	0.003	0.00	0.003
Race‡												
Configural	118	84	1.405	0.040	0.028	0.994	0.990	-	-	-	-	-
Metric	158	103	1.534	0.046	0.079	0.990	0.987	0.004	0.051	0.004	0.003	0.129
Scalar	167	115	1.452	0.045	0.079	0.989	0.087	0.005	0.051	0.005	0.001	0.047
Strict	168	127	1.323	0.038	0.081	0.992	0.991	0.002	0.053	0.002	0.001	0.082

df, degrees of freedom; RMSEA, root mean square error of approximation; SRMR, standardised root mean residual; CFI, comparative fit index; TLI, Tucker–Lewis index.
†, Group 1: Male (n = 134). Group 2: Female (n = 377); ‡, Group 1: Non-designated (n = 316). Group 2: Designated (n = 200).

that the WFBMT scale is a valid and reliable instrument to be used in the South African context, especially among knowledge workers. The scale will aid researchers in operationalising boundary management behaviours, which can be studied in relation to employee segmentation preferences (Kreiner, 2006), as well as other work–life outcomes (Basile & Beauregard, 2020; Kossek et al., 2023). Moreover, researchers would be able to utilise the WFBMT scale to investigate gender differences in boundary behaviour without the fear of measurement bias. There is also preliminary evidence to suggest that the scale can be used on different racial groups. Finally, researchers would have some flexibility in how they decide to operationalise boundary management tactics in relation to other variables. For example, the presence of a moderately dominant general factor will allow boundary management tactics to be operationalised as a single construct within larger nomological networks of variables. Similarly, researchers would also be able to study differences in the types of tactics used, given the fact that they are conceptually distinct and contribute to explaining unique variance in boundary behaviour.

Limitations and future research

Despite the contribution made by the study, several limitations need to be noted. *Firstly*, sample size restrictions made testing invariance between each racial group impossible. Even though no practical differences were observed in the way designated and non-designated group employees interpreted the questionnaire items, the possibility of differences within the designated group itself might exist (e.g. between African and Asian employees). Furthermore, sampling bias was clearly present in both gender and language preferences. Future research should expand the sample size, aiming to include more participants from each designated group and more male participants.

Secondly, boundary enactment was only assessed in one direction (i.e. from work to home). Previous research seems to suggest that directionality matters when it comes to implementing boundary preferences (McCloskey, 2018) and that individuals might accommodate boundary violations in one direction but not the other. Therefore, future validation studies should also evaluate the items from the family-to-work scale.

Thirdly, the wording of the items of the physical tactic's subscale was not adjusted, as it emphasised the location of one's work. The phrases 'When I'm at home' and 'When I return from work' might, therefore, create confusion for individuals who primarily work from home. Future research should aim to further refine and clarify items from this specific subscale.

Finally, the study's cross-sectional nature did not allow for the assessment of the stability and validity of the scale over time. Given the likelihood of longitudinal studies within the boundary management literature, future research could investigate measurement invariance over various timeframes to further bolster confidence in the scale.

Discussion and conclusion

The study set out to verify the psychometric properties of an adapted version of the WFBMT on a South African sample of typical knowledge workers. To the knowledge of the researcher, this is the first study of its kind and makes three important contributions to the field.

Firstly, it provides strong empirical evidence for the reliability and validity of the adapted scale. All items were shown to contribute to the scale's internal consistency, with relatively small portions of measurement error. The items, therefore, accurately capture the four underlying factors. Moreover, the adaptations made to the item wording seem to hold up well in contexts where participants are able to work from home. The current findings also corroborate the reliability figures suggested by Carlson et al. (2016), yet expand on their work by showing support for both the second-order factor structure as well as the bifactor structure. The present study also provided empirical evidence for the discriminant validity of the four factors, suggesting that each of the four types of boundary management tactics, originally conceptualised by Kreiner et al. (2009), are indeed conceptually distinct.

Secondly, it provides support for a moderately dominant general factor with distinct subdimensions present. This suggests that a relatively strong overarching construct influences responses across all boundary management tactics (e.g. a participant's overall willingness or effectiveness to implement boundary management tactics). This might suggest that individuals do not differentiate strongly on the exact type of tactics but merely the preference to use them or not. The temporal and physical subdimensions are most noticeable in this preference and share a lot of common variance with the general factor. In contrast, the behavioural and communicative tactics retain considerable unique variance and represent more distinct aspects of boundary management behaviours. Furthermore, the noticeable drop in composite reliability when moving from omega-total (0.94) to omega-hierarchical (0.75) suggests that the behavioural and communicative tactics contribute to the overall variance explained. Therefore, despite a relatively dominant general factor, there is support for the multidimensional nature of the construct.

Finally, measurement invariance was demonstrated across both gender (male and female) and racial (designated and non-designated) groups. The factor structure was practically equivalent across groups, with no deterioration in model fit. There was no evidence of either uniform or non-uniform bias. Participants, therefore, seem to interpret the questionnaire items in much the same light, irrespective of group membership. This would suggest that participants standing on the latent variables, as predicted by the questionnaire items, are equivalent across groups.

Acknowledgements

This article is partially based on the author, M.D.'s Doctoral thesis entitled, 'The impact of Technostress on Work Exhaustion in Higher Education from a Boundary Management perspective: A multi-phase quantitative study', toward the degree of Doctorate in Philosophy in Industrial Psychology in the Department of Industrial Psychology, Stellenbosch University, South Africa, with supervisor Professor Gina Görgens, received March 2025.

Competing interests

The author declares that no financial or personal relationships inappropriately influenced the writing of this article.

Author's contributions

M.D. is the sole author of this research article.

Funding information

The author received no financial support for the research, authorship and/or publication of this article.

Data availability

The data that support the findings of this article are available from the corresponding author, M.D., upon reasonable request.

Disclaimer

The views and opinions expressed in this article are those of the author and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency, or that of the publisher. The author is responsible for this article's results, findings, and content.

References

Afthanorhan, A., Ghazali, P.L., & Rashid, N. (2021). Discriminant validity: A comparison of CBSEM and consistent PLS using Fornell & Larcker and HTMT approaches. *Journal of Physics: Conference Series, 1874*(1), 012085. https://doi.org/10.1088/1742-6596/1874/1/012085

Allen, T., Beham, B., Ollier-Malaterre, A., Baierl, A., Alexandrova, M., Artiawati, Beauregard, A., Carvalho, V.S., Chambel, M.J., Cho, E., Coden da Silva, B., Dawkins, S., Escribano, P., Gudeta, K.H., Huang, T., Jaga, A., Kost, D., Kurowska, A., Leon, E., … Waismel-Manor, R. (2024). Boundary management preferences from a gender and cross-cultural perspective. *Journal of Vocational Behavior, 148*, 103943. https://doi.org/10.1016/j.jvb.2023.103943

Allen, T.D., Cho, E., & Meier, L.L. (2014). Work–family boundary dynamics. *Annual Review of Organizational Psychology and Organizational Behavior, 1*(1), 99–121. https://doi.org/10.1146/annurev-orgpsych-031413-091330

Allen, T.D., & Eby, L.T. (2016). *The oxford handbook of work and family*. Oxford University Press.

Ashforth, B.E., Kreiner, G.E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *The Academy of Management Review, 25*(3), 472–491. https://doi.org/10.2307/259305

Basile, K.A., & Beauregard, T.A. (2020). Boundary management: Getting the work-home balance right. In C. Grant & E. Russell (Eds.), *Agile working and well-being in the digital age* (pp. 35–46). Springer International Publishing. https://doi.org/10.1007/978-3-030-60283-3_3

Brown, T.A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford Press.

Carlson, D.S., Thompson, M.J., Crawford, W.S., Boswell, W.R., & Whitten, D. (2018). Your job is messing with mine! The impact of mobile device use for work during family time on the spouse's work life. *Journal of Occupational Health Psychology, 23*(4), 471–482. https://doi.org/10.1037/ocp0000103

Carlson, D.S., Thompson, M., & Kacmar, K. (2016). Boundary management tactics: An examination of the alignment with preferences in the work and family domains. *Journal of Behavioral and Applied Management, 16*(2), 51–70.

Chen, F.F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(3), 464–504. https://doi.org/10.1080/10705510701301834

Cheung, G.W., & Rensvold, R.B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal, 9*(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Clark, S.C. (2000). Work/family border theory: A new theory of work/family balance. *Human Relations, 53*(6), 747–770 https://doi.org/10.1177/0018726700536001

Clark, S.C. (2002). Communicating across the work/home border. *Community, Work & Family, 5*(1), 23–48. https://doi.org/10.1080/13668800020006802

Cobb, H.R., Murphy, L.D., Thomas, C.L., Katz, I.M., & Rudolph, C.W. (2022). Measuring boundaries and borders: A taxonomy of work-nonwork boundary management scales. *Journal of Vocational Behavior, 137*, 103760. https://doi.org/10.1016/j.jvb.2022.103760

Davis, M.A., Ghent, A.C., & Gregory, J.M. (2021). *The work-from-home technology boon and its consequences*. Working Paper 28461. National Bureau of Economic Research.

Derks, D., Van Duin, D., Tims, M., & Bakker, A.B. (2015). Smartphone use and work–home interference: The moderating role of social norms and employee work engagement. *Journal of Occupational and Organizational Psychology, 88*(1), 155–177. https://doi.org/10.1111/joop.12083

Eastgate, L., Creed, P.A., Hood, M., & Bialocerkowski, A. (2023). It takes work: How university students manage role boundaries when the future is calling. *Research in Higher Education, 64*(7), 1071–1088. https://doi.org/10.1007/s11162-023-09736-9

Eddleston, K.A., & Mulki, J. (2017). Toward understanding remote workers' management of work–family boundaries: The complexity of workplace embeddedness. *Group & Organization Management, 42*(3), 346–387. https://doi.org/10.1177/1059601115619548

Employment Equity Act: (No. 55 of 1998). (RSA). Section 8. (RSA).

Ferreira, R. (2016). *Psychological assessment: Thinking innovatively in contexts of diversity.* Juta and Company. Retrieved from https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=1172031

Fetherston, C., Fetherston, A., Batt, S., Sully, M., & Wei, R. (2020). Wellbeing and work-life merge in Australian and UK academics. *Studies in Higher Education, 46*(12), 1–15. https://doi.org/10.1080/03075079.2020.1828326

Flora, D.B. (2020). Your coefficient alpha is probably wrong, but which coefficient omega is right? A tutorial on using R to obtain better reliability estimates. *Advances in Methods and Practices in Psychological Science, 3*(4), 484–501. https://doi.org/10.1177/2515245920951747

Gadeyne, N., Verbruggen, M., Delanoeije, J., & De Cooman, R. (2018). All wired, all tired? Work-related ICT-use outside work hours and work-to-home conflict: The role of integration preference, integration norms and work demands. *Journal of Vocational Behavior, 107*, 86–99. https://doi.org/10.1016/j.jvb.2018.03.008

Greenhaus, J.H., & Beutell, N.J. (1985). Sources of conflict between work and family roles. *The Academy of Management Review, 10*(1), 76–88. https://doi.org/10.2307/258214

Greenhaus, J.H., & Powell, G.N. (2006). When work and family are allies: A theory of work-family enrichment. *The Academy of Management Review, 31*(1), 72–92. https://doi.org/10.5465/amr.2006.19379625

Hair, J., Anderson, R., Babin, B., & Black, W. (2018). *Multivariate data analysis* (8th ed.). Cengage Learning EMEA.

Harrison, G., & Lucassen, M. (2018). *Stress and anxiety in the digital age: The dark side of technology.* OpenLearn.

Hayes, A.F., & Coutts, J.J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But…. *Communication Methods and Measures, 14*(1), 1–24. https://doi.org/10.1080/19312458.2020.1718629

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*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hoyle, R. (2023). *Handbook of structural equation modeling* (2nd ed.). Guilford Press. Retrieved from https://www.routledge.com/Handbook-of-Structural-Equation-Modeling-Second-Edition/Hoyle/p/book/9781462544646

Jacukowicz, A., & Merecz-Kot, D. (2020). Work-related internet use as a threat to work-life balance—A comparison between the emerging on-line professions and traditional office work. *International Journal of Occupational Medicine and Environmental Health, 33*(1), 21–33. https://doi.org/10.13075/ijomeh.1896.01494

Kalliath, T., & Brough, P. (2008). Work–life balance: A review of the meaning of the balance construct. *Journal of Management & Organization, 14*(3), 323–327. https://doi.org/10.5172/jmo.837.14.3.323

Kashive, N., Sharma, B., & Khanna, V.T. (2021). Work from home: Understanding boundary management profiles using boundary-fit perspective. *International Journal of Organizational Analysis, 31*(5), 1776–1801. https://doi.org/10.1108/IJOA-04-2021-2695

Kossek, E.E., & Lambert, S.J. (2005). *Work and life integration: Organizational, cultural, and individual perspectives.* Lawrence Erlbaum Associates Publishers.

Kossek, E.E., Perrigino, M.B., & Lautsch, B.A. (2023). Work-life flexibility policies from a boundary control and implementation perspective: A review and research framework. *Journal of Management, 49*(6), 2062–2108. https://doi.org/10.1177/01492063221140354

Kossek, E.E., Ruderman, M.N., Braddy, P.W., & Hannum, K.M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior, 81*(1), 112–128. https://doi.org/10.1016/j.jvb.2012.04.003

Kreiner, G.E. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *Journal of Organizational Behavior, 27*(4), 485–507. https://doi.org/10.1002/job.386

Kreiner, G.E., Hollensbe, E.C., & Sheep, M.L. (2009). Balancing borders and bridges: Negotiating the work-home interface via boundary work tactics. *Academy of Management Journal, 52*(4), 704–730. https://doi.org/10.5465/AMJ.2009.43669916

Little, T.D. (2013). *Longitudinal structural equation modeling* (Annotated ed.). The Guilford Press.

Love, J., Dropman, D., & Selker, R. (2022). *The jamovi project.* Retrieved from https://www.jamovi.org/about.html

Major, D.A., & Burke, R.J. (2013). *Handbook of work-life integration among professionals: Challenges and opportunities.* Edward Elgar Publishing.

Mardia, K.V. (1980). 9 Tests of univariate and multivariate normality. In C.R. Rao & S.R. Arni (Eds.), *Handbook of statistics* (Vol. 1, pp. 279–320). Elsevier. https://doi.org/10.1016/S0169-7161(80)01011-5

Martinengo, G., Jacob, J., & Hill, E. (2010). Gender and the work-family interface: Exploring differences across the family life course. *Journal of Family Issues, 31*(10), 1363–1390. https://doi.org/10.1177/0192513X10361709

McCloskey, D.W. (2018). An examination of the boundary between work and home for knowledge workers. *International Journal of Human Capital and Information Technology Professionals, 9*(3), 25–41. https://doi.org/10.4018/IJHCITP.2018070102

McCutcheon, J.M., & Morrison, M.A. (2018). It's "like walking on broken glass": Pan-Canadian reflections on work–family conflict from psychology women faculty and graduate students. *Feminism & Psychology, 28*(2), 231–252. https://doi.org/10.1177/0959353517739641

McDonald, R.P. (1999). *Test theory: A unified treatment* (p. xi, 485). Lawrence Erlbaum Associates Publishers.

Meade, A.W., Johnson, E.C., & Braddy, P.W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *The Journal of Applied Psychology, 93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Mellner, C., Aronsson, G., & Kecklund, G. (2014). Boundary management preferences, boundary control, and work-life balance among full-time employed professionals in knowledge-intensive, flexible work. *Nordic Journal of Working Life Studies, 4*(4), 7–23. https://doi.org/10.19154/njwls.v4i4.4705

Menezes, L.M.D., & Kelliher, C. (2017). Flexible working, individual performance, and employee attitudes: Comparing formal and informal arrangements. *Human Resource Management, 56*(6), 1051–1070. https://doi.org/10.1002/hrm.21822

Nevin, A.D., & Schieman, S. (2021). Technological tethering, digital natives, and challenges in the work–family interface. *The Sociological Quarterly, 62*(1), 60–86. https://doi.org/10.1080/00380253.2019.1711264

Nippert-Eng, C.E. (1996). *Home and work: Negotiating boundaries through everyday life.* University of Chicago Press.

Powell, G.N., & Greenhaus, J.H. (2010). Sex, gender, and decisions at the family → work interface. *Journal of Management, 36*(4), 1011–1039. https://doi.org/10.1177/0149206309350774

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, 41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Rutkowski, L., & Svetina, D. (2014). Assessing the hypothesis of measurement invariance in the context of large-scale international surveys. *Educational and Psychological Measurement, 74*(1), 31–57. https://doi.org/10.1177/0013164413498257

Schmid, J., & Leiman, J.M. (1957). The development of hierarchical factor solutions. *Psychometrika, 22*, 53–61. https://doi.org/10.1007/BF02289209

Sekercioglu, G. (2018). Measurement invariance: Concept and implementation. *International Online Journal of Education and Teaching, 5*(3), 609–634.

Shanine, K.K., Eddleston, K.A., & Combs, J.G. (2019). Same boundary management preference, different outcome: Toward a gendered perspective of boundary theory among entrepreneurs. *Journal of Small Business Management, 57*(1), 185–205. https://doi.org/10.1111/jsbm.12424

Shapiro, S.S., & Wilk, M.B. (1965). An analysis of variance test for normality (complete samples). *Biometrika, 52*(3–4), 591–611. https://doi.org/10.1093/biomet/52.3-4.591

Shockley, K.M., Shen, W., DeNunzio, M.M., Arvan, M.L., & Knudsen, E.A. (2017). Disentangling the relationship between gender and work–family conflict: An integration of theoretical perspectives using meta-analytic methods. *Journal of Applied Psychology, 102*(12), 1601–1635. https://doi.org/10.1037/apl0000246

Tennakoon, U.S. (2018). Crossing the work/life boundary with ICT: Moderating effect of ICT perception on the relationship between cross-domain ICT use and work/life conflict. *South Asian Journal of Human Resources Management, 5*(2), 194–215. https://doi.org/10.1177/2322093718788712

Vandenberg, R.J., & Lance, C.E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods, 3*(1), 4–69. https://doi.org/10.1177/109442810031002

Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research, 122*, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Vyas, L. (2022). "New normal" at work in a post-COVID world: Work–life balance and labor markets. *Policy and Society, 41*(1), 155–167. https://doi.org/10.1093/polsoc/puab011

Xu, N., Zhang, J., Yang, C., & Tang, C. (2025). Research on the configuration of remote workers' boundary management tactics. *Community, Work & Family,* 1–21. https://doi.org/10.1080/13668803.2025.2471600

Yang, J., Zhang, Y., Shen, C., Liu, S., & Zhang, S. (2019). Work-family segmentation preferences and work-family conflict: Mediating effect of work-related ICT use at home and the multilevel moderating effect of group segmentation norms. *Frontiers in Psychology, 10*, 834. https://doi.org/10.3389/fpsyg.2019.00834