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Utrecht Work Engagement Scale (UWES): Psychometric parameters in Brazil

Gabriel Lins de Holanda Coelho [a,*], Renan P. Monteiro [b,*], Layrtthon Carlos de Oliveira Santos [c], Luis Augusto de Carvalho Mendes [d], Valdiney Veloso Gouveia [b], Patrícia Nunes da Fonsêca [b]

[a] *University College Cork, Ireland*
[b] *Federal University of Paraíba, Brazil*
[c] *Faculdades Integradas de Patos, Brazil*
[d] *Faculdade Maurício de Nassau, Brazil*

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KEYWORDS
Work engagement, psychometrics, validation, measure

Abstract Introduction: The study of work engagement is key for better understanding the underlying mechanisms that lead people to feel more motivated at work. The construct has gained prominence over recent decades, and the Utrecht Work Engagement Scale (UWES) has emerged as the most popular tool to assess the construct. Though widely known and used, more psychometric evidence is needed for the UWES, especially its item parameters. **Method:** This study (*N* = 525) aimed to provide psychometric evidence for the UWES and its shortened versions in Brazil, using a range of robust statistical analyses (e.g., Confirmatory Factor Analysis, Item Response Theory). **Results:** Results reveal good model fit and high internal consistency for both unidimensional and three-dimensional UWES structures. UWES items also showed high discrimination, difficulty, and information levels. Finally, significant correlations between UWES and workaholism and job satisfaction provided evidence of the convergent validity of the UWES in Brazil. **Conclusion:** This study's findings broaden the understanding of work engagement and underscore the utility of the UWES as an efficacious tool for measuring work engagement in Brazil, paving the way for effective interventions and policies in diverse workplace environments.

Escala Utrecht de Engajamento Laboral (UWES): Parâmetros Psicométricos no Brasil

PALAVRAS-CHAVE
Engajamento no trabalho, psicometria, validação, a medida

Resumo Introdução: O estudo do engajamento laboral é fundamental para uma melhor compreensão dos mecanismos subjacentes que levam as pessoas a terem maior motivação no trabalho. O constructo ganhou destaque nas últimas décadas, e a Escala Utrecht de Engajamento Laboral (UWES) emergiu como a ferramenta mais utilizada para avaliar o constructo. Embora seja amplamente conhecida e utilizada, são necessárias mais evidências psicométricas, especialmente considerando seus parâmetros de item. **Método**: A presente pesquisa (*N* = 525) teve como

* Corresponding authors.
Gabriel Coelho and Renan Monteiro made equal contributions to this manuscript, and therefore share first authorship
E-mails. linshc@gmail.com, renanpmonteiro@gmail.com

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objetivo fornecer evidências psicométricas para a UWES e suas versões abreviadas no Brasil, utilizando uma série de análises estatísticas robustas (por exemplo, Análise fatorial confirmatória, Teoria de Resposta ao Item). **Resultados**: Os resultados revelam bom ajuste de modelo e alta consistência interna para ambas as estruturas UWES unidimensional e tridimensional. Os itens da UWES também mostraram ótimos níveis de discriminação, dificuldade e informação. Finalmente, correlações significativas entre a UWES e o trabalho compulsivo e a satisfação no trabalho forneceram evidências de validade convergente para a UWES no Brasil. **Conclusão**: Os achados deste estudo ampliam nossa compreensão do envolvimento no trabalho e destacam a utilidade da UWES como uma ferramenta eficaz para medir o envolvimento no trabalho no Brasil, abrindo caminho para intervenções e políticas eficazes em ambientes de trabalho diversos.

Work, as an integral part of people's lives, can have physical (e.g., Basso, 2020; Oakman et al., 2020) and psychological ramifications (e.g., Hammedi et al., 2021; Miranda et al., 2020), especially when individuals are subject to daily pressures at work. Understanding the underlying mechanisms that motivate employees, both as individuals or as a group, and how these factors can help promote quality of life and work satisfaction is one of the biggest challenges in organizational psychology (Zanelli et al., 2014). One construct has gained prominence in research of recent decades: work engagement (Schaufeli & Bakker, 2010). This construct denotes "*a positive, fulfilling, work-related state of mind, characterized by vigor, dedication, and absorption*" (Schaufeli et al., 2002, p. 74). It is closely associated with several variables related both to work and personal life, such as emotional commitment to the organization (Orgambídez & Almeida, 2020), workaholism (Tóth-Király et al., 2021), and well-being (Rusu & Colomeischi, 2020). Due to the relevance that work engagement and its associated variables have in gaining a better understanding of the underlying mechanisms that lead people to feel more motivated at work, we have undertaken a study aimed at providing psychometric evidence for the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002) in Brazil.

Work engagement and the UWES

Work engagement research started with a pioneering study by William Kahn in 1990. Kahn (1990) defined the concept as the effort workers put into their jobs, the extent to which they are physically, cognitively, and emotionally engaged during their workday, and how connected they feel to the job and other employees. However, in this study, Kahn did not propose a method of assessment for the concept (Schaufeli et al., 2002). As a result, studies started to be undertaken to operationalize work engagement, from which two alternative approaches to the construct have been proposed (Schaufeli & Bakker, 2010). The first approach characterizes work engagement by studying energy, involvement, and efficacy levels. These dimensions are the opposite of those studied in Maslach's Burnout Inventory (Maslach & Leiter, 1997). This opposition between the constructs is logical, as engagement represents a positive pole for well-being in the workplace, and burnout is the negative pole, each at either extreme of the same continuum. The second approach, however, does not consider the two constructs as opposites, with the justification being that an employee who is not in a burnout state might not necessarily be engaged in their work either (Schaufeli & Bakker, 2010). Instead, these constructs are understood as distinct phenomena, that is, as two psychological states that must be assessed independently. This analysis method enables researchers to observe them simultaneously rather than reducing them to a paradox. While these approaches understand the engagement and burnout constructs as independent of each other, they expect them to be negatively correlated. Using this second approach, Schaufeli et al. (2002) propose the Utrecht Work Engagement Scale (UWES) as a concrete assessment method for work engagement.

The UWES initially consisted of 17 items representing three dimensions of work engagement: (1) *Vigor*, characterized by high levels of energy and mental resilience while in the workplace, with the worker showing a willingness to invest effort in activities, even at times of difficulty; (2) *Dedication*, referring to a sense of significance, enthusiasm, inspiration, pride and challenge; and (3) *Absorption*, characterizing a deep concentration and involvement with work, where the individual has difficulty detaching from it. Then, a 15-item version (Schaufeli & Bakker, 2004), a nine-item version (Schaufeli et al., 2006), and an ultra-short three-item version (Schaufeli et al., 2019) were proposed. The 15 and nine-item versions of the UWES split their items equally among the three factors, whereas the ultra-short version comprises one item per factor.

The UWES has become the most widely used measure of work engagement, available in over 20 languages (Schaufeli & Bakker, 2010). It has been shown to have factorial validity and reliability in different contexts, such as Norway, Germany, and South Africa (Schaufeli, 2012; Schaufeli & Bakker, 2010), and with different professions, such as physicists, farmers, and the military (Schaufeli et al., 2002; Simbula et al., 2013). These studies also highlight the possibility of using the UWES as a unidimensional measure of work engagement, providing an alternative application to the scale. The UWES is most notably associated with the Maslach Burnout Inventory dimensions, presenting negative and statistically significant correlations, as the results of Schaufeli et al. (2002) show.

While the UWES has become globally recognized, it is crucial to consider the broader socio-cultural contexts in which it is applied. Beyond these theoretical understandings of engagement, the impact of cultural and socioeconomic factors, as well as working conditions on work engagement

must also be considered. Schaufeli (2018) identified differences among 35 European countries, noting that those in the northwest (e.g., the Netherlands, Belgium, Norway) had higher values than those in the east (e.g., Lithuania, Hungary, Albania) in terms of work engagement. Engagement is lower in countries where workers have longer working hours, and in countries with less active and productive economies, higher corruption indicators, and gender inequality.

Considering striking differences between countries on the same continent, exploring the parameters of the Utrecht Work Engagement Scale (UWES) in contexts like Brazil is crucial. The country ranks 94th in corruption perception (Transparency International, 2022), and has significant gender inequalities (men earn 30% more than women; CNN Brasil, 2020). Brazil also has the tenth-highest weekly workload in the world (OECD Better Life Index, n.d.), while the minimum wage is only 51st in a global purchasing power ranking (Zanatta, 2023). For these reasons, it is challenging to stay engaged at work in a country like Brazil, which we think is important to explore in greater depth using the different parameters of the various UWES versions.

UWES in Brazil

Psychologists have only recently initiated the psychometric validation process for the UWES in Brazil. Vazquez et al. (2015) tested whether the 17-item structure of the UWES would be suitable for the Brazilian context, using a sample of 1167 workers. Their results showed a good model fit and good internal consistency levels (Cronbach's alpha > .70; Kline, 2013), with a preference for their unifactorial solution. Despite the importance of the findings of this study, it has some limitations. The criteria for factor retention applied by Vazquez et al. (2015) were not as precise as they could have been. Similarly, the authors used the same sample for the confirmatory factor analysis that they used for the exploratory one, did not specify the estimator used, and evaluated the precision of the measure solely through the alpha coefficient (which considers the items as having the same weight in the evaluation of the construct). Moreover, the authors did not test the measure's validity based on correlations with external variables.

More recently, Martins and Machado (2022) tested the parameters of the 17-item version of the UWES with a sample of 1,934 Brazilians, reporting satisfactory results for the uni and trifactorial models. This study also had certain limitations, however, namely in the calculation of the Confirmatory Factor Analysis, as they used the Maximum Likelihood estimator, which is only suitable for data with normal distribution and scalar measures. Using inappropriate estimation methods can also result in inadequate model fit (Fong & Ho, 2015).

In another Brazilian study, this time with the 9-item version of the UWES, Ferreira et al. (2016) verified the unidimensionality of the measure (confirmatory factor analysis for ordinal data). They also gathered validity evidence from relationships with external variables (e.g., positive feelings about work) and found the UWES-9 invariant concerning gender and the work sector. Sinval et al. (2018) also analyzed the UWES-9 for Brazil, noting a better fit of the three-factor and hierarchical models, with dedication, vigor, and absorption as first-order factors, and work engagement as the general factor.

The 15- and 3-item versions of the UWES remain untested for Brazil, and no studies have explored the parameters of any version of the UWES using Item Response Theory (IRT). IRT allows researchers to check specific item parameters, such as discrimination; the required amount of latent trait for the endorsement of each item; as well as the portion of the construct that each item covers (Pasquali & Primi, 2003). It is also important to note that previous studies do not simultaneously test the parameters of the long, short, and ultra-short versions of the UWES. A direct comparison of these different versions is key as there is an increasing need for short, effective instruments in psychological research (e.g., Coelho et al., 2020; Monteiro et al., 2021). Finally, the results obtained in Brazil support using different structures (i.e., unifactorial, three-factor, hierarchical model), which indicates that new studies on different structures of the UWES in Brazil would be pertinent.

Despite the limitations in these Brazilian studies, assessing the psychometrical properties of measures such as the UWES in this context could potentially advance understanding of the role of work engagement in Brazilian organizations. For instance, Dalanhol et al. (2017) evaluated the associations between work engagement with mental health and personality, in a sample of 82 judiciary workers. They found that mental health issues were significant predictors of engagement and that the construct was also associated with minor psychiatric disorders. In another study, Oliveira and Rocha (2017) found that individuals' specific cases (e.g., core self-evaluations, human resources practices, leader-member relationship quality) significantly influence work engagement. Some work strategies can empower employees to be more positive and engaged.

The present research

Despite the increasing interest in studying work engagement in Brazil over recent decades, research in this area is still scarce, particularly given the emphasis on Positive Psychology in psychological science. Furthermore, studies suggest that work engagement may vary across cultures (Hu et al., 2014; Shimazu et al., 2010). Brazil's unique workplace conditions in both the private and public sectors could influence work engagement. Public organizations often grapple with structural deficits, scarce resources, and outsourcing of services (Antunes & Druck, 2015; Druck, 2016). In contrast, the private sector contends with instability, primarily driven by legislative changes, resulting in lower wages and high employee turnover (da Silva et al., 2020). Thus, validating the robustness and psychometric soundness of the UWES in Brazil could ensure its applicability for measuring work engagement in the country and contribute significantly to psychological literature. Additionally, as psychological findings can vary within and across nations (e.g., Hanel et al., 2018; Henrich et al., 2010), replication studies are crucial for validating the psychometric properties of the UWES in non-Western countries, such as Brazil.

In light of this, our study aims to provide robust psychometric evidence for the UWES in a sample of 525 Brazilian workers, utilizing robust methods such as Confirmatory Factor Analysis and Item Response Theory. Specifically, we assessed the parameters for the full 17-item version of the UWES and its shorter versions: UWES-15, UWES-9, and

UWES-3. We also examine convergent validity by assessing the associations between work engagement, workaholism, and job satisfaction. Workaholism—often associated with work engagement—refers to the tendency to work excessively, beyond what is reasonably expected (Mazzetti et al., 2018). Job satisfaction, reflecting the sense of fulfillment an employee derives from their role, is also typically associated with work engagement (Rai & Maheshwari, 2020). Consequently, we hypothesize that the UWES dimensions will be significantly associated with the compulsive work dimension of workaholism, characterized by an inner compulsion to work harder. Conversely, we anticipate no significant correlation with the excessive work dimension, which reflects the tendency to work long hours. We also predict that job satisfaction will positively correlate with the UWES dimensions.

Method

Participants and procedure

When planning the study, we aimed to reach the minimum recommended sample size to perform factorial analysis for a questionnaire like the UWES, which contains 17 items in three dimensions. Accordingly, we followed the recommendation of at least 100 participants per factor (Pasquali, 1999). Thus, we needed at least 300 participants. As this recommended sample size is considered high (> 30 participants; Field, 2013; Ghasemi & Zahediasl, 2012), there is no need to perform normality tests, and it allows us to perform parametric statistics such as Pearson's correlations.

The participants were 525 workers (e.g., teachers, civil servants, physiotherapists, psychologists) with a mean age of 36.62 (*SD* = 10.91), who were mostly women (69.3%) and from public organizations (55%). To collect the data, we used two approaches. For in-person data collection, we first contacted different organizations, presented our study, and asked whether it would be possible to administer the questionnaires in their work environment. If consent were granted, trained researchers would go to the organizations at an agreed time and day, administering the questionnaires to multiple workers. The researchers would also present participants with the ethical aspects of the study. The second approach we used was through the internet, advertising the study on social media networks like Facebook and Instagram. We included the study link in the postings, along with the goals of our research and its ethical principles. In both approaches, participants had to be over 18 years old and be currently working. All questionnaires used are self-administerable, with instructions on how to respond. This research was approved by the Ethics Committee of the Federal University of Paraíba (CAAE. 20284713.6.0000.5188).

Measure

Utrecht Work Engagement Scale (Schaufeli et al., 2002). We used the Brazilian-Portuguese version of the questionnaire developed by Vazquez et al. (2015). The UWES is composed of 17 items and can either be used as a single-factor scale, representing a general component of engagement, or across three dimensions: Vigor (6 items; e.g., *At my work, I feel bursting with energy*), Dedication (5 items; e.g., *My job inspires me*), and Absorption (6 items; e.g., *time flies when I'm working*). Workers answer how often they experience different situations using a 7-point scale (0 = *Never*; 6 = *Every day*).

Dutch Workaholism Scale (Schaufeli et al., 2009). Adapted to Brazilian-Portuguese by Carlotto and Miralles (2010), the measure comprises ten items equally divided into two factors: working excessively (e.g., *I seem to be in a hurry and racing against the clock*) and working compulsively (e.g., *I often feel that there's something inside me that drives me to work hard*). Workers answer how often they experience these situations using a 4-point scale (1 = *[Almost] Never*; 4 = *[Almost] Always*).

Finally, we asked participants to evaluate their satisfaction with their current work using an answer scale from zero to ten.

Data analysis

We used R (R Development Core Team, 2022) and JASP (https://jasp-stats.org/) to analyze the data. In R, we performed multiple Confirmatory Factor Analyses (CFA) using the *lavaan* package (Rosseel et al., 2023) and the *weighted least square mean* (WLSMV) estimator. This estimator is recommended for nonnormal ordinal data (Li, 2016). We applied the following indices to assess model fit (Hair et al., 2022; Tabachnick & Fidell, 2019): *Comparative fit index* (CFI) and *Tucker-Lewis index* (TLI), which need to present values of between .90 and .95 to qualify for acceptable model fit, whereas values over .95 indicate a good fit. We also used *Standardized Root Mean Squared Residual (SRMR)*, which should preferably present values lower than .08. Additionally, in R, using the *MIRT* package (Chalmers et al., 2022), we assessed the individual parameters of the items (i.e., discrimination, difficulty, information). As the answer scale of the UWES has more than two answer categories, we used the graded response model in the Item Response Theory analysis (Samejima, 1968). Finally, we used the free, open-source software JASP (https://jasp-stats.org/) to assess the reliability (Cronbach's alpha and McDonald's omega) and convergent validity.

Results

Confirmatory factor analysis and reliabilities

First, we performed CFAs to assess the model fit for the three-factor and unidimensional structures of the full UWES and the shortened versions. As can be seen in Table 1, all models presented a good fit (e.g., CFI & TLI > .90), with all factorial weights differing statistically from zero ($\lambda \neq 0$, z > 1.96, $p < .05$). Due to the low number of items, we were not able to assess the model fit of the UWES-3. We also used McDonald's omega and Cronbach's alpha to assess the reliabilities of the UWES for all versions (Table 2). Results were good for both the three-dimensional and unidimensional structures ($\omega >$ and $\alpha >$ .70; Kline, 2013).

Table 1. Model fit of the UWES-17, UWES-15 and UWES-9

Models	CFI	TLI	SRMR	Factorial Loadings (Range)
UWES-17				
One Factor	.94	.94	.055	.39 (Item 16) - .87 (Item 11)
Three Factors	.95	.94	.053	.39 (Item 16) - .87 (Item 11)
UWES-15				
One Factor	.95	.94	.53	.43 (Item 15) - .87 (Item 11)
Three Factors	.95	.94	.50	.44 (Item 15) - .87 (Item 11)
UWES-9				
One Factor	.96	.94	.46	.68 (Item 14) - .87 (Item 11)
Three Factors	.97	.95	.40	.69 (Item 14) - .87 (Item 11)

Table 2. Reliability levels of the UWES

	ω	α
UWES-17	.92	.92
Vigor	.81	.80
Dedication	.84	.84
Absorption	.76	.75
UWES-15	.92	.92
Vigor	.79	.79
Dedication	.84	.84
Absorption	.78	.78
UWES-9	.92	.92
Vigor	.82	.82
Dedication	.84	.83
Absorption	.76	.76
UWES-3	.73	.73

Note: ω = McDonald's omega, α = Cronbach's alpha

Item response theory

Then, using Item Response Theory, we assessed the items' discrimination, difficulty, and information levels for all three model versions of the UWES. Table 3 shows the parameters for the UWES-17 and UWES-15, and Table 4 shows the parameters for the UWES-9 and the (unidimensional) UWES-3. We followed Baker's (2001) discrimination classification to interpret our findings. Discrimination represents how well an item can differentiate individuals with various latent trait levels. In other words, whether these items help distinguish between people with different engagement levels. For the UWES-17, ten items were "very highly" discriminative ($a > 1.7$), two "highly" discriminative (a between 1.35 and 1.69), and five "moderately" discriminative (a between 0.65 and 1.34). For the UWES-15, ten items were "very highly" discriminative, three were "highly" discriminative, and only two were "moderately" discriminative. For the UWES-9 and UWES-3, all items were "very highly" discriminative.

Regarding the questionnaire design, it is essential to think about the difficulty level, so that an individual's level of work engagement corresponds to the category in the answer scale that they select. In other words, difficulty level indicates whether an item is too easy or difficult for the

Table 3. Item Parameters of the UWES-17 and UWES-15

	UWES-17									UWES-15								
	a	*b1*	*b2*	*b3*	*b4*	*b5*	*b6*	*b*(*m*)	Θ	*a*	*b1*	*b2*	*b3*	*b4*	*b5*	*b6*	*b*(*m*)	Θ
Vigor																		
Item 01	2.75	-2.91	-2.47	-1.58	-1.01	-.45	.84	-1.26	10.61	2.86	-2.88	-2.45	-1.56	-1.00	-.44	.83	-1.25	11.22
Item 04	2.83	-2.80	-2.13	-1.58	-.98	-.47	.80	-1.20	10.90	3.00	-2.76	-2.10	-1.55	-.96	-.46	.78	-1.18	11.83
Item 08	2.35	-2.06	-1.72	-1.20	-.74	-.18	.76	-.86	7.15	2.24	-2.09	-1.74	-1.22	-.75	-.18	.77	-.87	6.70
Item 12	1.63	-2.46	-2.03	-1.58	-1.04	-.32	.98	-1.07	4.49	1.60	-2.48	-2.04	-1.59	-1.04	-.32	.99	-1.08	4.37
Item 15	.84	-4.78	-3.38	-2.24	-1.35	-.43	1.34	-1.81	2.20	.80	-4.98	-3.51	-2.31	-1.39	-.44	1.39	-1.87	2.08
Item 17	1.28	-4.99	-3.31	-2.63	-1.74	-.90	.45	-2.18	4.03									
Dedication																		
Item 02	1.79	-3.90	-2.87	-2.29	-1.73	-1.15	-.15	-2.01	5.52	1.79	-3.90	-2.87	-2.29	-1.73	-1.15	-.15	-2.01	5.52
Item 05	2.31	-2.77	-2.04	-1.43	-.96	-.50	.65	-1.18	7.77	2.31	-2.77	-2.04	-1.43	-.96	-.50	.65	-1.18	7.77
Item 07	3.38	-2.20	-1.87	-1.47	-1.05	-.62	.33	-1.15	11.78	3.38	-2.20	-1.87	-1.47	-1.05	-.62	.33	-1.15	11.78
Item 10	2.18	-3.13	-2.44	-1.84	-1.42	-.84	.09	-1.60	6.93	2.18	-3.13	-2.44	-1.84	-1.42	-.84	.09	-1.60	6.93
Item 13	1.35	-3.51	-2.85	-2.31	-1.77	-1.17	-.30	-1.99	3.23	1.35	-3.51	-2.85	-2.31	-1.77	-1.17	-.30	-1.99	3.23
Absorption																		
Item 03	1.34	-3.63	-2.94	-2.09	-1.52	-.73	.79	-1.69	3.79	1.38	-3.55	-2.88	-2.05	-1.49	-.72	.78	-1.65	3.95
Item 06	1.19	-3.34	-2.72	-1.97	-1.27	-.50	1.10	-1.45	3.17	1.20	-3.31	-2.70	-1.96	-1.27	-.50	1.09	-1.44	3.21
Item 09	1.85	-3.15	-2.30	-1.71	-1.16	-.53	.62	-1.37	5.85	1.86	-3.15	-2.30	-1.71	-1.16	-.53	.62	-1.37	5.89
Item 11	2.60	-2.82	-2.41	-1.86	-1.38	-.80	.13	-1.52	8.66	2.64	-2.81	-2.40	-1.87	-1.38	-.80	.13	-1.52	8.82
Item 14	2.05	-2.72	-2.09	-1.52	-.96	-.23	.91	-1.10	6.72	1.93	-2.79	-2.15	-1.56	-.99	-.24	.94	-1.13	6.20
Item 16	.78	-3.70	-2.47	-1.37	-.50	.29	1.92	-.97	1.89									

Note: *a* = discrimination levels, b1-b6 = difficulty threshold, *b*(*m*) = means between *b*1 – *b6*, Θ = information levels.

Table 4. Item Parameters of the UWES-9 and UWES-3

	UWES-9									UWES-3 (Unidimensional)								
	a	*b1*	*b2*	*b3*	*b4*	*b5*	*b6*	*b*(*m*)	Θ	*a*	*b1*	*b2*	*b3*	*b4*	*b5*	*b6*	*b*(*m*)	Θ
Vigor																		
Item 01	3.10	-2.82	-2.41	-1.54	-.99	-.43	.82	-1.23	12.52	2.38	-3.10	-2.62	-1.68	-1.06	-.45	.88	-1.34	8.52
Item 04	3.02	-2.77	-2.11	-1.54	-.95	-.45	.78	-1.17	12.02									
Item 08	2.10	-2.15	-1.79	-1.24	-.77	-.19	.79	-.89	6.15									
Dedication																		
Item 05	2.63	-2.62	-1.96	-1.38	-.92	-.48	.63	-1.12	9.21	2.75	-2.57	-1.91	-1.35	-.90	-.46	.63	-1.09	9.79
Item 07	3.68	-2.16	-1.84	-1.45	-1.04	-.61	.33	-1.13	13.27									
Item 10	1.98	-3.18	-2.52	-1.91	-1.48	-.87	.10	-1.64	5.97									
Absorption																		
Item 09	1.71	-3.25	-2.38	-1.77	-1.21	-.55	.64	-1.42	5.24									
Item 11	2.93	-2.69	-2.31	-1.80	-1.34	-.78	.12	-1.47	10.17	2.40	-2.89	-2.45	-1.91	-1.40	-.79	.15	-1.55	7.74
Item 14	2.04	-2.71	-2.10	-1.53	-.97	-.23	.92	-1.10	6.64									

Note: *a* = discrimination levels, b1-b6 = difficulty threshold, *b*(*m*) = means between *b*1 – *b6*, Θ = information levels.

participants. A generically written item might be considered too easy, making most participants agree. At the same time, an item that is too specific and with lots of information might only be fully endorsed by participants with a high level of work engagement (e.g., Coelho et al., 2020; Monteiro et al., 2021). With this in mind, it is recommended that items are neither too easy nor too difficult (e.g., the means across the b-parameters should fall between 0 and |1.5|; Rauthmann, 2013). For the UWES-17, seven items slightly exceeded this threshold. Similarly, the UWES-15 had six items over the limit, while the UWES-9 and UWES-3 versions had a single item that exceeded the recommended range.

Finally, we assessed the information levels of the items. Dimensions with more informative items are also more reliable (Cappelleri et al., 2014). For the UWES-17, Item 07 (Dedication) was the most informative, and Item 15 (Vigor) the least. For the UWES-15, Item 04 (Vigor) was the most informative, and once again, Item 15 was the least. For the UWES-9, Item 07 was once again the most informative, and Item 09 (Absorption) was the least. Finally, for the UWES-3, Item 05 (Dedication) was the most informative and Item 11 (Absorption) the least.

Convergent validity

Finally, to assess the convergent validity of the UWES, we correlated it with workaholism and a single item of job satisfaction. The results are presented in Table 5 and show that the unidimensional factor of work engagement and the separate dimensions of the UWES were highly correlated to each other for all versions of the UWES. We also found significant positive associations between the compulsive work factor of workaholism and job satisfaction. Only the vigor dimension of the UWES-9 was negatively related to the excessive work factor of workaholism.

General discussion

The Utrecht Work Engagement Scale is the most popular measure for assessing work engagement, used worldwide in countries such as the United States (Agarwal et al., 2020), Germany and South Africa (Kotera et al., 2021), and Japan (Odagami et al., 2022). The construct is significantly related to various important personal and work-related variables, such as emotional commitment to the organization (Orgambídez & Almeida, 2020) and well-being (Rusu & Colomeischi, 2020). Understanding its importance and the benefits of providing a more in-depth assessment of the psychometric features of the measure, our research aimed to assess the structure and item parameters of the UWES in the Brazilian context. Our findings corroborate the quality of the questionnaire and its shortened versions, meaning that it can reliably be applied for either research purposes or within an organization. Moreover, it is essential to highlight the need to replicate the analyses in non-WEIRD (western, educated, industrialized, rich, and democratic; Henrich et al., 2010) countries such as Brazil, to assess the continued validity of measure structure and feasibility. Previous research has highlighted that engagement is lower in countries with specific conditions, such as longer work hours and higher corruption indicators (Schaufeli, 2018). These characteristics are also present in the Brazilian context (e.g., Transparency International, 2022). Thus, reinforcing that the UWES is psychometrically suitable for the country is an important step to support further research.

Psychometric properties of the UWES

Cross-cultural research originating from settings such as South Africa and Germany substantiates the applicability of the Utrecht Work Engagement Scale (UWES) either as a single work engagement dimension or as a three-factor model (e.g., Schaufeli 2002; Simbula et al., 2013; Schaufeli & Bakker, 2010). Furthermore, while there is also evidence supporting an alternative bifactorial model, comprising a primary work engagement dimension trailed by three sub-dimensions (Sinval et al., 2018), our study exclusively concentrates on examining independently the one and three-factor structures, as these have previously been tested and validated in the Brazilian context (e.g., Ferreira et

Table 5. Correlations Between UWES and Work Variables

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	Excessive Work	Compulsive Work	Satisfaction with Work
1. UWES-17	4.60	.97	--												.027	.164**	.597**
2. Vigor	4.48	1.06	.925**	--											-.038	.128**	.535**
3. Dedication	4.91	1.10	.910**	.760**	--										.046	.139**	.590**
4. Absorption	4.46	1.02	.927**	.781**	.774**	--									.071	.185**	.527**
5. UWES-15	4.64	1.00	.992**	.917**	.921**	.903**	--								.005	.135**	.609**
6. Vigor	4.41	1.12	.905**	.984**	.741**	.761**	.909**	--							-.050	.117**	.539**
7. Dedication	4.91	1.10	.910**	.760**	1.00**	.774**	.921**	.741**	--						.046	.139**	.590**
8. Absorption	4.61	1.06	.916**	.775**	.796**	.958**	.924**	.757**	.796**	--					.021	.114**	.548**
9. UWES-9	4.63	1.13	.965**	.899**	.907**	.862**	.976**	.895**	.907**	.887**	--				-.014	.118**	.624**
10. Vigor	4.47	1.26	.863**	.909**	.739**	.729**	.876**	.919**	.739**	.749**	.909**	--			-.089*	.074	.537**
11. Dedication	4.76	1.26	.895**	.783**	.946**	.758**	.909**	.777**	.946**	.780**	.934**	.768**	--		.016	.108*	.625**
12. Absorption	4.66	1.17	.904**	.784**	.814**	.899**	.909**	.769**	.814**	.925**	.915**	.732**	.803**	--	.036	.146**	.561**
13. UWES-3	4.70	1.19	.896**	.838**	.867**	.776**	.910**	.839**	.867**	.799**	.940**	.865**	.905**	.819**	-.038	.071	.612**

Note: * = $p < .05$, ** = $p < .01$

al., 2016; Martins & Machado, 2022; Vazquez et al., 2015). This approach provides a versatile and comprehensive framework to assess work engagement.

First, using multiple confirmatory factor analyses, we assessed the model fit for the UWES and its shortened versions in Brazil. Results showed a good model fit, with similar results for both the unidimensional and three-dimensional structures. Moreover, both the isolated factors and the full versions of the UWES presented good reliability levels (ω and α > .70; Kline, 2013), according to two estimators (McDonald's omega, Cronbach's alpha). These findings corroborate the quality of the UWES structure, its flexibility for being used either as a three-factor or unidimensional model, and its good internal consistency. This gives researchers confidence that the UWES can be used effectively in Brazil.

While the CFA focuses on the measure structure, the item response theory focuses on the individual items and how well they perform for the overall measure. Assessing the parameters of the UWES versions in this study using IRT provides valuable insights that can guide future research and application. IRT confers a nuanced understanding of each item's contribution (Pasquali & Primi, 2003), further improving the assessment of work engagement levels. Notably, it provides an advanced approach to psychometric analysis, permitting researchers to examine how individual items relate to the underlying trait they measure, which in this case is work engagement. Our study is the first to perform this assessment in Brazil, and it provides a solid alternative perspective on the measure's psychometric properties.

Specifically, we assessed each item's discrimination, difficulty, and information, which provided an overview of the suitability of items for evaluating the construct, individually and collectively (Pasquali & Primi, 2003). The high discriminative levels of most items in all versions of the UWES underscores their ability to differentiate between individuals with varying levels of work engagement. This aspect is particularly valuable in organizational and research settings where identifying nuanced differences in work engagement can help design interventions, improve work environments, and contribute to understanding the dynamics of work engagement. Furthermore, item difficulty level findings suggest that the UWES items are generally well-calibrated to a range of work engagement levels, and so ensure that the questionnaire is sensitive to various engagement levels and can accurately reflect a wide range of experiences. Finally, all items of the UWES contributed at some level to each of the model's dimensions. However, it should be highlighted that more informative items help to create a more precise and dependable measurement of work engagement. More informative items and measures result in greater reliability for the measure (Cappelleri et al., 2014).

Finally, we assessed the convergent validity of UWES, correlating its factors with workaholism and a single item focused on job satisfaction. First, it is essential to note that all dimensions of the UWES were highly correlated with each other, indicating that the item reduction did not impact their measurement levels. Second, individuals with a higher score in engagement also presented positive scores in compulsive work, suggesting that they are more likely to work harder than other individuals and replicating previous findings (Mazzetti et al., 2018). In contrast, only one significant association (vigor, UWES-9) was found to correlate with the excessive dimension of workaholism, as this dimension focuses on the amount of work that an individual perceives that they have to do (e.g., *I seem to be in a hurry and racing against the clock*), rather than an individual's ability to focus on the job (e.g., *It's important to me to work hard even when I don't enjoy what I'm doing*). We also found significant correlation results between all UWES dimensions and job satisfaction, which is also in line with previous research (Rai & Maheshwari, 2020). Such findings suggest that individuals who are happier with their role are more likely to stay engaged.

Limitations and future studies

Despite the robust findings, we must acknowledge the limitations of our research. First, a convenience sample was used, which is not representative of the Brazilian population, nor the diversity of professions in the country. However, it is important to note that the objective of this research was not to generalize the results. Instead, it was focused on assessing the psychometric parameters of the UWES using a range of techniques. Second, external factors, such as social desirability, might influence individuals when answering questionnaires. Future studies could include a social desirability measure to cover this issue. Third, we only used two constructs to assess convergent validity, and one of them was composed of a single item (job satisfaction), which might raise questions regarding the reliability of the construct. Future studies would benefit from using more established questionnaires, offering more evidence of the convergent validity of the UWES versions. Finally, we did not account for potential variations from answering the questionnaire online or in person, which could impact how participants answered (Perkins & Yuan, 2001). Future studies could control and assess the differences between these two groups regarding their engagement levels.

Final considerations

Our study underscores the pivotal role of the Utrecht Work Engagement Scale (UWES) as a preeminent tool for assessing work engagement across various cultural contexts. Our findings strongly affirm the reliability and robustness of the UWES and its abbreviated versions as a unidimensional and three-factor model. Nuanced analyses using both Classical Test Theory (CTT) and Item Response Theory (IRT), allowed us to delve into the psychometric properties of the UWES. These analyses assessed its overall structure and the individual item parameters (i.e., discrimination, difficulty, and information). This in-depth examination demonstrated the tool's ability to effectively differentiate between varying work engagement levels, rendering the UWES a valuable asset for designing workplace interventions and comprehending the dynamics of work engagement. Additionally, our study correlated the UWES factors with workaholism and job satisfaction, reaffirming the tool's validity.

Furthermore, these results contribute to the advance of UWES research in Brazil. Compared to previous papers focused on psychometric parameters, the most significant advantage of our study is the use of Item Response Theory to assess item parameters, an analysis never previously undertaken for the UWES in the country. The study also benefits from applying an estimator recommended for nonnormal and ordinal data (WLSMV) and using McDonald's omega to assess reliability. Additionally, we tested convergent validity using correlations with external variables, which Vazquez et al. (2015) did not consider in their validation. Finally, we tested multiple versions of the questionnaire (e.g., UWES-17, UWES-15), rather than one single version. Thus, our study provides a substantial psychometrical contribution to work engagement research.

In conclusion, our study supports the psychometric validity of the UWES in a Brazilian context. Given the substantial influence of work engagement on personal and professional life, it is imperative to continue to refine its assessment with robust measures like the UWES. As tools such as this are applied to more diverse contexts, our understanding of work engagement will evolve, paving the way for interventions that promote healthier, more engaging work environments and contribute to organizational growth.

Conflict of Interest

The authors have nothing to disclose.

Informed Consent

Informed consent was obtained from all participants.

Ethical Considerations

This research was approved by the Ethics' Committee of Hospital Lauro Wanderley (Federal University of Paraíba; CAAE. 20284713.6.0000.5188).

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