

Measuring work engagement in Thailand: development and validation testing of the Utrecht Work Engagement Scale-Thai version (UWES-TH)

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Abstract: This study aimed to develop and test the psychometric properties of a Thai-language version of the Utrecht Work Engagement Scale (UWES). The 17-item version of UWES was translated into Thai and a survey was conducted with 507 registered nurses at a public regional hospital in Thailand. Results showed that the alpha and omega total coefficients for the vigor, dedication, and absorption subscales were acceptable. Exploratory Structural Equation Modeling (ESEM) indicated that the three-factor model performed the best for both versions of UWES-17-TH and UWES-9-TH. Both versions correlated positively with job resources and negatively with cognitive, emotional, and physical job demands, and with emotional exhaustion and physical symptoms. They were found to have acceptable reliability and validity and can be used to study work engagement in Thai contexts. For practical reasons, UWES-9-TH might be preferred since it is shorter than the full version. Further studies should include different occupational groups and more male participants.

Key words: Work engagement, Utrecht Work Engagement Scale, Validation, Emotional exhaustion, Physical symptoms

Introduction

In the 21st century, the call of positive psychology to focus on strength and virtue rather than on pathology, weakness, and damage¹⁾ has turned many researchers' attention to finding ways to help people become happier

and stronger as they live to their full potential. Currently, there is a similar shift in the study of job stress and work motivation, from research focusing on psychological distress and its consequences (e.g., burnout) to a more positive psychological construct, i.e. work engagement²⁾. The latter seems to be a key factor in promoting workers' health in today's changing organizations³⁾. Work engagement is defined as "... a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption"⁴⁾. "Vigor is characterized by high levels of

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energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. Dedication refers to being strongly involved in one's work, and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly, and one has difficulties with detaching oneself from work⁵). Work engagement is the conceptual opposite of burnout⁶). Engaged workers have high levels of energy and they strongly identify with their work, while workers with burnout seem to have low levels of energy and poor identification with their work⁷). Previous studies found that work engagement is linked to individuals' positive health outcomes and organizational performance outcomes⁸⁻¹¹). A meta-analysis that included 74 unique samples and 45,683 participants confirmed the presence of a positive relationship between job resources and work engagement, and negative relationship between job demands and work engagement¹²). As for outcomes relevant to health and well-being, high levels of work engagement were associated with low levels of psychological distress and physical symptoms in Japanese employees¹³) and low levels of burnout and of job dissatisfaction in Finnish dentists¹⁴). Work engagement can be measured by using the Utrecht Work Engagement Scale (UWES), which was developed by Schaufeli and his colleagues¹⁵). It has subscales to measure the three domains of work engagement: vigor, dedication, and absorption. The UWES is available in more than 30 languages, and it is being used in research on health, well-being, and performance in various occupational groups worldwide¹⁶). The concept of work engagement across different cultures can be influenced by individualist and collectivist attitudes towards work which might affect work engagement levels differently in Asian and Western countries¹⁷). Currently, there are three versions of the UWES: the original version with 17 items, a short version with 9 items, and an ultra-short version with 3 items¹⁸).

In Thailand as in many countries, nursing is one of the most demanding and thus stressful occupations. Moreover, Thailand's national health policy changed in 2001 with the introduction of the Universal Coverage Scheme, and as the Thai population ages, healthcare services have become more competitive. The increased demands for healthcare services and long-term care in the society contributed to even higher job demands for nurses, all of which must be managed with limited resources. This has posed significant challenges for healthcare providers in maintaining quality care while managing the strain on their workforce and

resources. Many nurses experience high job demands because nurses are on the front lines of healthcare, providing essential care and support to patients. These circumstances have placed higher work demands on registered nurses when working with limited resources and in the environment with higher nurse-patient ratio. Burnout and decreased work performance are common¹⁹⁻²¹). As registered nurses play a crucial role in the health and well-being of the Thai people, research is needed to promote health and well-being among Thai registered nurses, to maintain high-quality healthcare.

Work engagement appears to have a positive impact on workers' health and well-being and it can be distinguished from various other organizational outcomes²²). Therefore, evaluating work engagement among Thai registered nurses is worthwhile. However, the concept of work engagement is unfamiliar in Thailand and an official UWES did not exist in the Thai language, so this work began with translation, focusing on the academic use of UWES, therefore the study of an ultra-short version with 3 items (UWES-3) which is not advised for academic research use but for company use was not included in this work.

Based on a previous study of work engagement²³), the Job Demands-Resources (JD-R) model²⁴) was used as a conceptual framework for this validation study of the Thai language version of the UWES (the UWES-TH). The associations of cognitive, emotional, and physical job demands, as well as job resources, with work engagement were assessed. It is hypothesized that job demands (cognitive, emotional, and physical) are expected to be negatively associated with work engagement (H1), while job resources (cognitive, emotional, and physical) are expected to be positively associated with work engagement (H2). Additionally, work engagement is expected to be negatively related to burnout. Since emotional exhaustion is one of the signs of burnout²), it is hypothesized that emotional exhaustion is expected to be negatively correlated with work engagement (H3). Finally, regarding a potential health outcome as high work engagement often results in increased energy levels, it is hypothesized that work engagement is negatively associated with physical symptoms (H4).

A three-factor structure of UWES was confirmed in a study by the original developers¹⁵), however the study of psychometric properties of the Utrecht Work Engagement provides different results specifically on factor structure measurement model (one general factor, three specific factors, or a bifactor model) in different languages, to address these analytical challenges and get a more comprehensive

view of the psychometric properties of Utrecht Work Engagement Scale-Thai version (UWES-TH), the Confirmatory Factor Analysis (CFA), Bifactor Model in CFA, and the Exploratory Structural Equation Modeling (ESEM) were conducted as more innovative and robust approaches toward the validation and evaluation of UWES-TH.

We investigated the psychometric properties of UWES-TH and sought to collect empirical evidence regarding work engagement in Thailand. This study should pave the way for future research on work engagement in Thai society and should help international collaboration in work-engagement research.

The objective of this study was to develop a Thai version of the UWES and to evaluate its psychometric properties: (1) to evaluate factorial validity by comparing the fit of a one-factor model (all items loading on a single underlying dimension of work engagement) to the fit of a three-factor model (work engagement consisting of three dimensions: vigor, dedication, and absorption) and to the fit of a bifactor model (all items loading on one general factor and three specific factors), using CFA and ESEM (cross-loadings allowed on three dimensions: vigor, dedication, and absorption), (2) to examine the reliability of scale scores, using coefficient alpha and omega, and (3) to examine construct validity by investigating the relationship of work engagement with job demands (cognitive, emotional, and physical) (H1), with job resources (cognitive, emotional, and physical) (H2), with emotional exhaustion (a sign of burnout, which is antipodal to work engagement) (H3), and with a potential health outcome (physical symptoms) (H4).

Subjects and Methods

The participants were registered nurses in Thailand. Data were collected in August 2019 at Uttaradit Hospital, a tertiary-level public regional hospital under the Thai Ministry of Public Health and located in the northern part of Thailand. The public health officers in charge of the academic research unit in the hospital distributed the self-administered questionnaires in paper-and-pencil format to all nursing departments. All nurses working in the hospital during that period were encouraged to take part in the survey. Participation was voluntary. All participants were assured of confidentiality and anonymity. They were given written information regarding the objectives of the study. Those who agreed to participate in the study signed a written informed-consent agreement. The completed questionnaires were returned in sealed envelopes to ensure

privacy. In total, 589 nurses received the study materials and 510 completed the questionnaires, yielding an 86% response rate. Due to occasional missing values, data from 3 nurses were not analyzed. As a result, data from 507 nurses were included in the final analysis, and the final response rate was 86% (507 out of 589). The mean age of the respondents was 38.94 yr (SD=10.71). The mean working experience as a registered nurse was 15.15 yr (SD=10.21). The research ethics committees of the Graduate School of Medicine at The University of Tokyo in Japan and of Uttaradit Hospital in Thailand approved the research procedures before the study began.

Measures

Thai version of the UWES

An official version of UWES did not exist before our study began, so the first step was to translate the UWES from English into the Thai language. The UWES, consisting of 17 items, uses a Likert-type response format with scores ranging from 0 (Never) to 6 (Always; Everyday). Three subscales are included: vigor (6 items) e.g., “At my work, I feel bursting with energy”; dedication (5 items) e.g., “I am enthusiastic about my job”; and absorption (6 items) e.g., “Time flies when I’m working”. The original developers reported alpha coefficients ranging from 0.82 to 0.89¹⁵. With permission from the first author of the UWES (WS), the translation procedure was based on established guidelines and procedures^{25–29}. First, two qualified translators who worked independently each provided a forward translation from English to Thai. The translators were a Thai psychiatrist with a master’s degree in linguistics and a medical-English lecturer with a master’s degree in teaching English as a foreign language. Second, those two translations were reconciled by the first author of this study (OT), to prepare a preliminary Thai version (version A). Then this was shared with the two forward translators for discussion and to produce a pre-final forward translation (version B). Third, version B was back-translated from Thai to English. The back-translator had a master’s degree in linguistics and experience translating psychological questionnaires. Next, OT compared the back-translation with the original English and gave it to the original author of the UWES (WS) for final review. With WS’s approval, OT conducted cognitive interviews³⁰ with 5 registered nurses working in Thailand, in which they confirmed that they understood the questionnaire. Then a pilot study was done among 20 registered nurses in a Thai hospital. The internal consistency was checked based on the COSMIN checklist²⁹. For the pilot study, coefficient

alpha of the scales ranged from 0.84 to 0.93, and alpha of the 9-item short version ranged from 0.76 to 0.90. As a result, no revisions were made. The final version is referred to as the UWES-TH. For the 17-item and 9-item versions of the total UWES-TH, and also for each subscale, responses to the items were summed and averaged.

The Demand-Induced Compensation Questionnaire

Job demands and job resources (cognitive, emotional, and physical) were quantified by using the Demand-Induced Compensation Questionnaire (DIS-Q), which has 19 items³¹. Likert-type response options were used, with scores ranging from 1 (Never or Very Rarely) to 5 (Very Often or Always). The job demands scale included 9 items: cognitive (3 items), emotional (3 items), and physical (3 items). The job resources scale had 10 items: cognitive (4 items), emotional (3 items), and physical (3 items). Alpha coefficients of the DIS-Q were 0.81 (cognitive demands), 0.83 (emotional demands), 0.80 (physical demands), 0.67 (cognitive resources), 0.77 (emotional resources), and 0.77 (physical resources)³². Responses to each item were summed and averaged for each subscale.

Emotional exhaustion subscale of the Maslach Burnout Inventory

Emotional Exhaustion was quantified by using the emotional exhaustion subscale of the well-validated Thai version of the Maslach Burnout Inventory (MBI)^{33, 34}, which has 9 items, e.g., “I feel emotionally drained from my work” and “I feel used up at the end of the workday”. Likert-type response options were used, with scores ranging from 0 (Never) to 6 (Always; Everyday). Coefficient alpha was 0.92³³. Responses to the 9 items were summed and averaged.

Physical symptoms

Physical symptoms were quantified by using the well-validated Thai version of the PHQ-15³⁵, which has 15 items, e.g., “Stomach pain”, “Back pain”, and “Trouble sleeping”. Likert-type response options were used, with scores ranging from 0 (Not bothered at all) to 2 (Bothered a lot). Coefficient alpha was 0.80³⁶. Responses for the 15 items were summed and averaged.

Demographic characteristics

The socio-demographic information collected included 1. Gender, 2. Marital status, 3. Educational level, 4. Current work position (position and department), 5. Work unit, and 6. Work experience, the latter comprising years

of service as a registered nurse and years of service as a registered nurse in the current position or unit.

Statistical analysis

To evaluate factorial validity by comparing the fit of a one-factor model to the fit of a three-factor model, and to the fit of a bifactor model, the Confirmatory Factor Analysis (CFA), Bifactor Model in CFA, and the Exploratory Structural Equation Modeling (ESEM) were conducted to evaluate the factorial validity of UWES-TH, using Maximum likelihood (ML) for CFA and Diagonally Weighted Least Squares (DWLS) for ESEM, with Nonlinear Optimization with a Bounded Box (NLMINB) as a robust optimization method to address non-normality. NLMINB improves the standard ML approach by introducing bounded estimation to prevent non-convergence, which is useful when dealing with non-normally distributed data, a common occurrence in CFA. Fit was judged to be good if the TLI was more than 0.95, the CFI was more than 0.97, the RMSEA was less than 0.80, and the SRMR was less than 0.08³⁷⁻³⁹. We also examined factor loadings for information about the relationship between the latent factor (s) and the items.

The estimation of the internal consistency reliability of the overall work engagement and each of its three subscales (absorption, dedication, vigor) were assessed by computing coefficient alpha and coefficient omega total. The inter-item correlations were also computed⁴⁰.

For construct validation testing, the hypotheses mentioned in the Introduction (above) were tested by assessing the Spearman's rank correlation coefficient (r) for the associations of the UWES-TH (both the 17-item and the 9-item versions), and of its subscales, with other relevant scales. To assess the scale equivalence or measurement invariance and reliability in measuring the same construct, the two versions of UWES-9 and UWES-17 were compared to determine whether they are equivalent or measure the same underlying construct by calculating the correlations between factor scores of UWES-9 and UWES-17. A high correlation suggests that the two versions are capturing the same underlying construct similarly. The Fisher's test was assessed to determine if the difference between two correlation coefficients was statistically significant different in how they measure the construct.

Finally, for the study of between-group invariance, distributions of scores on the UWES-TH and on its subscales were examined among groups defined by gender, age, position level (staff/management), and working experience (years), and differences were tested using independent-

samples *t*-tests or using one-way ANOVA with Bonferroni post-hoc tests for pairwise multiple comparisons (for more than two groups) to assess measurement invariance and explore group differences in scores. Values of *p* less than 0.05 were taken as indicators of statistically significant differences.

All statistical analyses were performed using R, a free software environment for statistical computing and graphics, version 4.3.1 (Beagle Scouts) (<https://www.r-project.org>) except for the Demographic characteristics were computed using the IBM Statistical Package for Social Sciences (SPSS) version 22.

Results

Demographic characteristics

As shown in Table 1, most participants were women, with a mean age of 38.9 and were in staff positions. The average of their total working experience as registered nurses was 15 yr.

Factorial validity

Results of CFA, Bifactor CFA, and ESEM comparing a one-factor model with a bifactor model and a three-factor model for both the UWES-17-TH and the UWES-9-TH

Table 1. Demographic characteristics of participants (n=507)

Variable	Mean	SD	N (%)
Age (yr)	38.94	10.71	
Gender			
Male			22 (4.34)
Female			485 (95.66)
Marital status			
Single			252 (49.70)
Married			222 (43.79)
Widowed/Divorced			33 (6.51)
Education			
Bachelor's			439 (86.59)
Master's			68 (13.41)
Position			
Staff (Operation, Technical, etc.)			418 (82.45)
Management			89 (17.55)
Department			
Anesthesia			26 (5.13)
Ears, nose, and throat			11 (2.17)
Emergency			20 (3.94)
Gynecology			37 (7.30)
Medical			201 (39.64)
Neurology			9 (1.78)
Orthopedic			30 (5.92)
Pediatric			40 (7.89)
Surgery			133 (26.23)
Working experience as a registered nurse			
Total years of working as a registered nurse	15.15	10.21	
1 month–10 yr			206 (40.63)
11–20 yr			145 (28.6)
21–30 yr			114 (22.49)
31–42 yr			42 (8.28)
Years of working in the current unit	10.52	8.71	
1 month–10 yr			312 (61.54)
11–20 yr			122 (24.06)
21–30 yr			64 (12.62)
31–40 yr			9 (1.78)

SD: standard deviation.

are shown in Table 2. On all of the indices of fit that we used, and for both the 17-item and the 9-item versions, the three-factor model performed better than the one-factor model. Furthermore, the ESEM three-factor model of the 9-item short version fit better than did the ESEM three-factor model of the 17-item long version. The correlation between the item and the factor to examine factor loadings for information about the relationship between the latent factor(s) and the items was displayed in Table 3.

The results indicated that the observed variables were well-represented by the latent factors. The result of factor loadings for both versions of UWES-9-TH and UWES-17-TH reported the high factor loadings, suggesting that the latent factors explain a substantial portion of the variance in the observed variables, with the small standard errors, high Z-scores, and low *p*-values confirming the reliability and statistical significance of these factor loadings. The narrow confidence intervals indicate that the factor loading estimates are precise.

Internal consistency reliability

For both the 17-item version and the 9-item version of the UWES-TH, internal-consistency reliability was high (Table 4). Not surprisingly, coefficients alpha and omega total for the longer version were higher than those for the shorter version. Nonetheless, the values of coefficients alpha and omega total for both versions of the UWES-TH and for all of their subscales indicated good internal-consistency reliability. As shown in Table 5, more than

two thirds of the inter-item correlations were greater than 0.4, and all were statistically significant. For the 17-item UWES-TH the inter-item correlations ranged from 0.10 to 0.74 and for the 9-item version they ranged from 0.13 to 0.74.

Construct validity

As shown in Table 6, UWES-TH scores correlated weakly and negatively with emotional and physical job demands, and the correlation with cognitive job demands was extremely weak. In contrast, UWES-TH scores correlated positively and somewhat more strongly with job resources (cognitive, emotional, and physical). Scores on both the 17-item and the 9-item versions of the UWES-TH correlated negatively with emotional exhaustion and physical symptoms. The result of Inter-factor correlations is also reported in Table 6. A high correlation between factors of UWES-9 and UWES-17 (overall work engagement, absorption, dedication, vigor) were observed, suggesting that the two versions are capturing the same underlying construct similarly. Finally, the Fisher’s test between two correlation coefficients of the Spearman’s rank correlation coefficient (*r*) has shown that there was no difference between the two version of UWES-TH-9 and UWES-TH-17.

Distribution of work engagement among groups

In terms of the study of between-group invariance, the result of work engagement across socio-demographic groups was presented in Table 7. In summary, the study

Table 2. Fitting results for the Thai version of the Utrecht Work Engagement Scale (UWES-TH, n=507)

Model	TLI	CFI	RMSEA	SRMR	χ^2	df	<i>p</i>
UWES-TH Short Version (9 items)							
CFA One-Factor ^{a)}	0.893	0.919	0.133	0.044	277.012	27	<0.01
CFA Three-Factor ^{b)}	0.89	0.927	0.134	0.042	249.842	24	<0.01
CFA Bifactor Three-Factor ^{c)}	0.886	0.934	0.136	0.041	226.312	21	<0.01
ESEM Three-Factor ^{d)}	0.94	0.975	0.109	0.028	36.356	15	<0.01
UWES-TH Long Version (17 items)							
CFA One-Factor ^{a)}	0.848	0.867	0.108	0.061	856.957	119	<0.01
CFA Three-Factor ^{b)}	0.85	0.872	0.107	0.06	825.489	116	<0.01
CFA Bifactor Three-Factor ^{c)}	0.857	0.89	0.104	0.058	716.264	105	<0.01
ESEM Three-Factor ^{d)}	0.915	0.943	0.089	0.031	159.346	91	<0.01

Results indicating better fit of the model to the data are denoted by bold letters.
^{a)} CFA One-factor model (all items loading on a single underlying dimension of work engagement)
^{b)} CFA Three-factor model (work engagement consisting of three dimensions: vigor, dedication, and absorption)
^{c)} CFA Bifactor model (all items loading on one general factor and three specific factors)
^{d)} ESEM Three-factor model (work engagement consisting of three dimensions: vigor, dedication, and absorption, where cross-loadings between items are allowed)
 TLI: Tucker Lewis Index; CFI: Confirmatory Fit Index; RMSEA: Root Mean Square Error of Approximation; χ^2 : Chi-squared; df: degree of freedom.

Table 3. Factor loadings for Confirmatory Factor Analysis Three-Factor Model of Thai version of the Utrecht Work Engagement Scale (UWES-TH, n=507)

Variable	Factor loading	SE	Z	p-value	95% CI Lower	95% CI Upper
UWES-TH short version (9 items)						
V11WE1	0.62	0.04	13.97	<0.01	0.53	0.70
V12WE4	0.37	0.03	12.27	<0.01	0.31	0.43
V13WE8	0.68	0.05	14.19	<0.01	0.59	0.77
DE2WE5	0.45	0.03	13.70	<0.01	0.38	0.51
DE3WE7	0.46	0.04	12.79	<0.01	0.39	0.53
DE4WE10	0.58	0.04	13.74	<0.01	0.50	0.66
AB3WE9	0.34	0.04	9.30	<0.01	0.27	0.42
AB4WE11	0.43	0.04	11.98	<0.01	0.36	0.50
AB5WE14	1.46	0.09	15.73	<0.01	1.27	1.64
UWES-TH long version (17 items)						
V11WE1	0.65	0.04	15.07	<0.01	0.57	0.74
V12WE4	0.42	0.03	14.43	<0.01	0.36	0.48
V13WE8	0.70	0.05	15.13	<0.01	0.61	0.79
V14WE12	0.91	0.06	15.36	<0.01	0.79	1.03
V15WE15	0.89	0.06	15.71	<0.01	0.78	1.00
V16WE17	0.77	0.05	15.65	<0.01	0.67	0.86
DE1WE2	0.67	0.05	14.99	<0.01	0.58	0.76
DE2WE5	0.42	0.03	14.12	<0.01	0.36	0.48
DE3WE7	0.51	0.04	14.02	<0.01	0.44	0.58
DE4WE10	0.56	0.04	14.24	<0.01	0.48	0.64
DE5WE13	0.63	0.05	14.04	<0.01	0.54	0.72
AB1WE3	0.79	0.05	15.08	<0.01	0.68	0.89
AB2WE6	1.07	0.07	15.31	<0.01	0.93	1.20
AB3WE9	0.44	0.04	12.42	<0.01	0.37	0.51
AB4WE11	0.45	0.03	13.22	<0.01	0.39	0.52
AB5WE14	1.42	0.09	15.75	<0.01	1.24	1.59
AB6WE16	1.32	0.08	15.80	<0.01	1.16	1.48

SE: standard error; 95% CI: 95% confidence interval.

Table 4. Means, standard deviations, numbers of items, alpha coefficients, and omega total coefficients of the Thai version of the Utrecht Work Engagement Scale (UWES-TH, n=507)

Variables	Number of items	Mean	SD	α	ω_t
UWES-TH short version (9 items)					
Overall work engagement	9	3.72	0.92	0.91	0.94
Subscale					
Absorption	3	3.37	0.99	0.72	0.80
Dedication	3	4.12	0.99	0.83	0.83
Vigor	3	3.66	1.02	0.82	0.83
UWES-TH long version (17 items)					
Overall work engagement	17	3.77	0.84	0.93	0.95
Subscale					
Absorption	6	3.45	0.86	0.79	0.88
Dedication	5	4.15	0.97	0.88	0.90
Vigor	6	3.78	0.88	0.84	0.90

SD: standard deviation.

Table 5. Inter-item correlations of items on the Thai version of the Utrecht Work Engagement Scale (UWES-TH, n=507)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	1																
2	0.64**	1															
3	0.57**	0.51**	1														
4	0.70**	0.57**	0.60**	1													
5	0.65**	0.62**	0.58**	0.74**	1												
6	0.42**	0.35**	0.48**	0.50**	0.42**	1											
7	0.56**	0.48**	0.44**	0.68**	0.61**	0.48**	1										
8	0.55**	0.42**	0.45**	0.58**	0.48**	0.43**	0.63**	1									
9	0.61**	0.50**	0.48**	0.68**	0.61**	0.45**	0.68**	0.73**	1								
10	0.57**	0.58**	0.47**	0.64**	0.63**	0.37**	0.63**	0.53**	0.65**	1							
11	0.58**	0.48**	0.47**	0.59**	0.52**	0.50**	0.68**	0.68**	0.74**	0.65**	1						
12	0.44**	0.35**	0.41**	0.52**	0.46**	0.45**	0.54**	0.55**	0.62**	0.51**	0.65**	1					
13	0.55**	0.54**	0.47**	0.62**	0.60**	0.45**	0.62**	0.56**	0.65**	0.64**	0.67**	0.65**	1				
14	0.20**	0.13**	0.21**	0.23**	0.20**	0.35**	0.23**	0.23**	0.26**	0.17**	0.39**	0.41**	0.34**	1			
15	0.46**	0.41**	0.43**	0.45**	0.46**	0.21**	0.40**	0.41**	0.46**	0.41**	0.38**	0.34**	0.44**	0.12**	1		
16	0.17**	0.10*	0.21**	0.16**	0.14**	0.30**	0.25**	0.22**	0.23**	0.11*	0.34**	0.25**	0.21**	0.43**	0.11*	1	
17	0.43**	0.49**	0.40**	0.43**	0.51**	0.34**	0.42**	0.38**	0.43**	0.45**	0.44**	0.40**	0.53**	0.25**	0.40**	0.29**	1

***p*<0.01 (two-tailed), **p*<0.05 (two-tailed).

The item numbers (#1, 2, 3 ... 17) refer to item numbers in the questionnaire. The long, full version of the UWES-TH consists of all 17 items. The short version of the UWES-TH consists of 9 items (#1, 4, 5, 7–11, and 14).

Table 6. Associations between scores on the Thai Version of the Utrecht Work Engagement Scale and scores on other scales (UWES-TH, n=507)

Variables	No. of Items	Mean	SD	Spearman's rank correlation coefficients							
				UWES-TH short version (9 items)				UWES-TH long version (17 items)			
				Overall	Absorption	Dedication	Vigor	Overall	Absorption	Dedication	Vigor
Overall work engagement	9/17	33.48/64.12	8.24/14.22	1.00**	0.88**	0.92**	0.93**	1.00**	0.90**	0.93**	0.94**
Absorption	3/5	20.71/10.12	2.98/5.18	0.88**	1.00**	0.70**	0.73**	0.90**	1.00**	0.72**	0.77**
Dedication	3/6	12.36/20.75	2.97/4.85	0.92**	0.70**	1.00**	0.82**	0.93**	0.72**	1.00**	0.86**
Vigor	3/6	10.99/22.66	3.07/5.30	0.93**	0.73**	0.82**	1.00**	0.94**	0.77**	0.86**	1.00**
Job demands - Cognitive	3	3.93	0.75	-0.01	0.02	-0.01	-0.01	0.04	0.07	0.03	0.00
Job demands - Emotional	3	3.16	0.96	-0.11	-0.04	-0.13**	-0.12**	-0.07	0.03	-0.12**	-0.12**
Job demands - Physical	3	3.17	1.01	-0.15**	-0.09	-0.14**	-0.16**	-0.13**	-0.06	-0.13**	-0.16**
Job resources - Cognitive	4	3.36	0.59	0.27**	0.21**	0.25**	0.29**	0.27**	0.18**	0.28**	0.30**
Job resources - Emotional	3	3.19	0.76	0.21**	0.15**	0.20**	0.21**	0.22**	0.18**	0.19**	0.24**
Job resources - Physical	3	3.33	0.76	0.31**	0.22**	0.31**	0.32**	0.30**	0.20**	0.32**	0.34**
Emotional exhaustion	9	2.32	1.26	-0.38**	-0.27**	-0.35**	-0.43**	-0.34**	-0.22**	-0.34**	-0.41**
Physical symptoms	15	0.48	0.31	-0.23**	-0.17**	-0.19**	-0.27**	-0.22**	-0.16**	-0.20**	-0.26**

***p*<0.01 (two-tailed).

SD: standard deviation.

of between-group invariance revealed several interesting findings. Work engagement differed by age and by years of working experience. Both age and work experience are positively correlated with work engagement, with older individuals and those with more work experience reporting higher engagement levels. Nurses aged 51–60 yr had higher mean scores than all of their younger colleagues on overall work engagement and on all three subscales

(vigor, dedication, and absorption). Likewise, nurses with the longest working experience (31–42 yr) had the highest mean scores on overall work engagement and on all three subscales. Management positions exhibited higher work engagement compared to staff positions. Gender differences in work engagement are relatively small, with males tending to have slightly higher scores.

Table 7. Work engagement across socio-demographic groups (n=507)

Variables	Group	N	UWES-9-TH						UWES-17-TH										
			Overall work engagement			Subscale			Overall work engagement			Subscale							
			Mean	SD		Absorption	Dedication	Vigor	Mean	SD		Absorption	Dedication	Vigor					
Gender	Male	22	3.81	0.99		3.27	1.21	4.30	0.94	3.86	1.01	3.82	0.84	3.39	0.90	4.27	0.93	3.87	0.85
	Female	485	3.72	0.91		3.38	0.98	4.11	0.99	3.66	1.02	3.77	0.84	3.45	0.86	4.14	0.97	3.77	0.89
Position level	Staff	418	3.65	0.90		3.30	0.98	4.07	0.99	3.60	1.01	3.72	0.82	3.39	0.85	4.10	0.97	3.72	0.87
	Management	89	4.02	0.93		3.70	1.00	4.39	0.97	3.98	1.02	4.04	0.86	3.74	0.88	4.38	0.97	4.04	0.88
Age (yr)	22–30	151	3.50*	0.85		3.14*	1.01	3.98*	0.91	3.38*	0.95	3.58*	0.76	3.25*	0.85	4.01*	0.88	3.56*	0.79
	31–40	130	3.53	0.90		3.14	0.93	3.93	1.03	3.51	0.99	3.58	0.83	3.23	0.80	3.97	1.01	3.59	0.91
	41–50	137	3.85	0.89		3.55	0.95	4.22	0.96	3.78	1.03	3.90	0.8	3.62	0.81	4.25	0.96	3.88	0.87
	51–60	89	4.17	0.90		3.82	0.92	4.49	1.01	4.21	0.97	4.18	0.83	3.86	0.86	4.49	0.98	4.25	0.82
Work experience (yr)	1 month–10 yr	206	3.49*	0.84		3.15*	0.97	3.95*	0.93	3.36*	0.94	3.56*	0.76	3.24*	0.83	3.98*	0.90	3.54*	0.80
	11–20 yr	145	3.73	0.95		3.35	1.01	4.12	1.04	3.73	1.04	3.78	0.86	3.46	0.83	4.15	1.02	3.79	0.91
	21–30 yr	114	3.89	0.86		3.58	0.93	4.21	0.93	3.88	0.95	3.91	0.81	3.62	0.84	4.25	0.93	3.93	0.86
	31–42 yr	42	4.35	0.93		3.96	0.92	4.72	1.07	4.37	1.04	4.39	0.83	4.03	0.83	4.74	1.01	4.44	0.82

**p*<0.05 (two-tailed).

UWES-TH: Thai version of the Utrecht Work Engagement Scale; SD: standard deviation.

Discussion

We developed the Thai version of the Utrecht Work Engagement Scale and evaluated the psychometric properties its 17-item and the 9-item versions: reliability, content validity, factorial validity, and construct validity, scale equivalence, and how scores varied across different demographic groups.

Confirmatory Factor Analysis (CFA), Bifactor Model in CFA, and Exploratory Structural Equation Modeling (ESEM) were conducted to evaluate the factorial validity of UWES-TH to confirm that the scale measures the concept it proposed. The models tested included a one-factor model, a bifactor model and a three-factor model. The results indicated that the three-factor model performed the best, suggesting that the three-factor structure is the most appropriate representation of the scale. These results are consistent with the earlier work of the original developers⁴). That was true for the 17-item version and also for the 9-item version for CFA three-factor and ESEM three-factor model, while the UWES-9-TH fit the data better than did the UWES-17-TH.

Acknowledging the interplay between three dimensions of work engagement by noting that ESEM three-factor model performed better than CFA three-factor model as ESEM three-factor model recognizes that work engagement may have shared variance between its dimensions and allows for cross-loading of items, which can capture and reflect reality of multidimensional nature of psychological construct. Based on the analysis results of both versions in ESEM three-factor model, there are several cross-loading items, indicating multi-dimensionality, for example in the UWES-9-TH, specifically, items VI1WE1 “At my work, I feel bursting with energy” and VI2WE4 “At my job, I feel strong and vigorous” are influenced by both dimension “Vigor” and “Dedication”, while items DE3WE7 “My job inspires me” and DE4WE10 “I am proud on the work that I do” exhibit cross-loadings on dimension “Vigor” and “Absorption”, and in UWES-17-TH, specifically, item DE1WE2 “I find the work that I do full of meaning and purpose”, AB6WE16 “It is difficult to detach myself from my job” have cross-loadings on dimension “Vigor” and “Dedication”, item VI4WE12 “I can continue working for very long periods at a time” with cross-loadings on dimension “Vigor” and “Absorption”, and item VI1WE1 “At my work, I feel bursting with energy”, VI2WE4 “At my job, I feel strong and vigorous”, VI5WE15 “At my job, I am very resilient, mentally”, VI6WE17 “At my work I always persevere, even when

things do not go well”, AB1WE3 “Time flies when I’m working” have cross-loadings on all three dimensions “Absorption”, “Dedication” and “Vigor”. Therefore, it is possible to conclude that for the Thai version, work engagement is best measured by overall total score of work engagement while we also agree that each dimension of work engagement (absorption, dedication, vigor) can be assessed separately. It is consistent with the previous study that is noted that since the 3 factors (vigor, dedication, and absorption) were very strongly correlated, researchers and occupational-health practitioners may prefer to use the total work engagement score instead of the subscale scores²²).

Construct validity was assessed by examining through the correlations between UWES-TH scores and other relevant scales. As expected, emotional and physical job demands were negatively associated with work engagement, and cognitive, emotional, and physical job resources were positively associated with work engagement. In contrast, the lack of association between cognitive job demands and work engagement was not expected. One possibility is that the relationship between job demands and work engagement depends on the nature of the demands, and, specifically, some nurses might appraise cognitive demands as interesting challenges rather than as hindrances. Nonetheless, overall the results of this study were largely similar to previous results showing a negative relationship between work engagement and job demands⁶), and job resources are positively related to work engagement in the Job Demands-Resources (JD-R) model⁷).

As expected, work engagement was negatively associated with emotional exhaustion and with physical symptoms, which is consistent with previous studies that confirmed the negative relationship between work engagement and ill health, providing support for construct validity of the UWES-TH. For example, in Japan greater work engagement was related to less ill-health⁹), and similar findings were reported from studies of Nepalese and Vietnamese registered nurses: greater work engagement was positively related to health, and it was negatively related to psychological distress, anxiety, and depression^{10, 11}). In terms of scale equivalence, this study also compared if the two versions of UWES-TH measured the same underlying construct similarly. A high correlation between the factors of UWES-TH-9 and UWES-TH-17 suggested that the two versions capture the same underlying construct in a similar way. The Fisher’s test comparing the result of two versions correlation with other relevant scales confirmed that there was no statistically significant difference between the two

versions, indicating their scale equivalence.

We also examined work engagement scores across different socio-demographic groups, including gender, age, position level (staff/management), and years of working experience to examine between-group invariance. Management positions exhibited higher work engagement compared to staff positions, and there were relatively small gender differences, with males having slightly higher scores. With regard to age and years of working experience, the older and more experienced nurses were more engaged with their work than were their younger and less experienced peers, which is similar to a finding among nurses in Nepal¹⁰. It is possible that workers stay in their career longer to the extent that they find it meaningful, rewarding, and enjoyable. This may be similar to the “healthy worker effect”: healthy workers being more likely to stay in their work longer thus being more likely than their unhealthy peers to be included in research.

Coefficient alpha and coefficient omega total were calculated for both the 17-item and 9-item versions of UWES-TH to measure how consistently the items within a scale measure the same construct. Internal-consistency reliability was acceptable for the UWES-17-TH, the UWES-9-TH, and all of their subscales, with coefficient alpha and omega total consistently greater than 0.70. Both versions exhibited high internal-consistency reliability, with the longer version having slightly higher reliability. The inter-item correlations were also computed and showed that most of them were greater than 0.4, indicating strong relationships between items measuring the same construct.

Both the UWES-17-TH and the UWES-9-TH can be used to measure work engagement in a Thai context. While both the 17-item version and the 9-item version performed well on all tests of reliability and validity, in some contexts the 9-item version may be preferred for reasons of practicality. This study should pave the way for future research on work engagement in Thai society. The UWES-TH can also be used in international collaborative research on work engagement.

Notable limitations of this study are inherent in the cross-sectional design, which precludes assessment of test-retest reliability and of causality. In particular, we can make no inferences about causal relations among work engagement, job demands, job resources, emotional exhaustion, and physical symptoms. Longitudinal research is needed to clarify those issues. Criterion or predictive validity should be included for a comprehensive validation study of the future questionnaire to evaluate measurement accuracy. In addition, all of the participants were registered

nurses, most of them were women, and all were working in a government hospital. Therefore, the results should be generalized only with caution. Future research should include more men and different occupational groups.

Conclusion

Both the UWES-17-TH and UWES-9-TH had acceptable internal-consistency reliability, factorial validity, and construct validity. Because it is shorter, the UWES-9-TH might be preferred for practical reasons in some contexts. The UWES-TH can be used to measure work engagement in Thailand. It can also be used in international collaborative research on work engagement.

Authors' Contributions

OT contributed to conceptualization, study design, data collection, statistical analysis, and writing the first draft. KW contributed to statistical analysis and writing the revision with OT. NK and AS contributed to study design and supervised data collection and statistical analysis. NK, AS, and WS reviewed the draft manuscript and made comments to improve it.

Ethics Approval and Consent to Participate

The study protocol was reviewed and approved by the Research Ethics Committee of Graduate School of Medicine/Faculty of Medicine, The University of Tokyo (no. 2018180NI), and the Ethical Review Board of Uttaradit Hospital, Thailand (approved in May 2019) before implementation. All participants signed a written informed consent agreement before joining this study.

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Conflict of Interest

NK reports grants from Fujitsu Japan Ltd., Agile HR, Corp., and BackTech Inc., and personal fees from Japan Dental Association, Junpukai Health Care Center, Occupational Health Foundation, Osaka Chamber of Commerce and Industry, SB AtWork Corp., Fujitsu Japan Ltd., and

Sekisui Chemicals outside the submitted work. This does not alter our adherence to the Journal of Occupational Health (JOH) policies on sharing data and materials. The other authors declare that they have no competing interests.

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