The Thai Version of Effort-Reward Imbalance Questionnaire (Thai ERIQ): A Study of Psychometric Properties in Garment Workers

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Abstract: The Thai Version of Effort-Reward Imbalance Questionnaire (Thai ERIQ): A Study of Psychometric Properties in Garment Workers: Aporntip Buapetch, *et al*. Department of Public Health Nursing, Faculty of Public Health, Mahidol University, Thailand—This study aimed to test the psychometric properties of the Thai version of the Effort-Reward Imbalance Questionnaire (T-ERIQ). The English version of the 23-item ERIQ was translated and back-translated. Content validity was examined by five experts and face validity was examined by twelve key informants before being tested for construct validity with 828 workers from six garment factories. Predictive validity was assessed through the relationship between the ERI constructs and psychological health outcomes including psychosomatic symptoms, state of anxiety, depression, and job satisfaction. The internal consistency of the Thai ERIQ was tested using the first survey (n=828), and test-retest stability was examined 2 to 4 wk later with a subsample (n=408). The results show that 2% of workers reported effort-reward imbalance (ERI ratio≥1). The Thai ERIQ has good content validity with a Content Validity Index of 0.95. Cronbach's alpha coefficients for the effort, reward, and overcommitment scales were 0.77, 0.81, and 0.66, respectively. The 2–4 wk stability of these three constructs was moderate (r=0.496–0.576, *p*<0.001). Overall, the factorial validity was demonstrated as the best model fit, with high values of the goodness-of-fit indices, using confirmatory factor analysis, indicating accordance with the theoretical constructs of the ERI model. Logistic regression analyses supported significant associations of reward with all psychological health outcomes (*p*<0.05). The findings suggest that the Thai ERIQ has adequate reliability and validity to investigate the psychosocial work environment. The Thai ERIQ can be applied to the Thai working population, particularly industrial manufacturing workers.
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Key words: Effort-Reward Imbalance Questionnaire (ERIQ), Psychometric properties, Thai garment workers

Psychosocial factors in the work environment are among the most important predictors of employee well-being and are considered to be among the most important work environment issues in contemporary society[1]. Over the last few decades, the impact of the psychosocial work environment on employee health, performance of workers, and the organization has been acknowledged[2]. Psychosocial elements also increasingly need to be incorporated into the design of workplace interventions to improve both workers' health and the overall quality of working life[3]. Eventually, this will affect organizational productivity. Studies in Thailand reveal a lack of unified knowledge of the psychosocial work environment and the specific instruments needed to measure this phenomenon. The need for research on these issues, therefore, is important[4].

The Effort-Reward Imbalance Model (ERI) was introduced by Siegrist *et al*. in 1986 and is one of the most important models for guiding occupational stress and health research[5–7]. It focuses on specific situational and personal characteristics that elicit or enhance the stressful work experience[8, 9]. The ERI postulates that a lack of reciprocity between costs (effort) and gains (rewards) defines a state of emotional distress that can lead to the arousal of the autonomic nervous system and associated strain reactions[9]. The ERI comprises three components: extrinsic effort (the demands and obligations put on the working person), extrinsic rewards (offered or promised as part of social exchange in terms of money, esteem, and job security/career opportunities), and intrinsic overcommitment (personal coping with demands and reward expectancies)[7, 9]. Overcommitment is seen

as a personality characteristic based on the cognitive, emotional, and motivational elements of Type A behavior. It reflects excessive ambition in combination with a need for approval and esteem[7] and can be described as the person-specific dimension of the ERI Model, whereas effort and rewards comprise the situation-specific dimension of the model. Over the past decades, numerous studies have utilized the ERI model and the Effort-Reward Imbalance Questionnaire (ERIQ), mostly in European research, and in some countries in Asia, such as Japan, China, and Korea. Most of these studies showed strong support for an association with various adverse health effects. However, there is no evidence of ERI research on employees' health and well-being in Thailand.

A validated instrument is needed to measure the characteristics of the psychosocial work environment for Thai workers because the existing tools that are well-established in western countries may not be appropriate for Thais. This study was an initial test of a translated ERI questionnaire and its relationships to the psychosocial work environment. The objective was to examine whether the Thai version of the ERIQ has adequate psychometric properties in terms of both reliability and validity.

Methods

The present study was conducted in the period from December 2006 to July 2007 in two phases, instrument development and testing of psychometric properties. Samples were Thai female and male garment workers who were randomly selected from medium- and large-sized factories located in the three main areas where textile and garment factories are situated (i.e., Bangkok, Samut Prakan, and Samut Sakhon provinces). Because the present study was specifically conducted within the garment industry, which has predominantly female workers, the proportion of female and male participants was 9:1 in the pilot study and the cross-sectional study. Some potential confounders were considered and identified as selection criteria, such as employment status, job position, experiences at work, and history of psychiatric disorders. Stressful life events were also involved and identified as an exclusion criterion when the score obtained was higher than 230.

Phase I: Instrument development
The first phase was implemented with the purpose of developing an instrument, examining content and face validity, and testing initial internal consistency of the Thai ERIQ. Processes of instrument development included translation and back-translation, experts reviewing for content validity, interviewing key informants for face validity, and preliminary item try out.
Sample: Subjects in this phase consisted of twelve representatives of workers who were invited to be key

informants. Thirty-five workers were randomly recruited from medium- and large-sized factories in the areas of the target provinces to be the sample for the pilot study.
Data collection: Five experts reviewed the items to examine content validity and provide the Content Validity Index (CVI). Key informants were then interviewed individually to satisfy face validity through reviewing the comprehension and usability of the developed instrument. A pilot study was also conducted with 35 garment workers through self-administered questionnaire for testing of initial internal consistency.

Phase II: A psychometric properties testing
The second phase tested the psychometric properties of the Thai version of the ERIQ, including construct validity, criterion-related validity, Cronbach's alpha coefficients, and stability. The Thai ERIQ was revised based on the results of Phase I. A cross-sectional survey was then conducted with female and male garment workers in the target provinces.
Sample: Subjects were 900 workers (female:male=9:1) who worked in the production sector. Using a simple random sampling technique, they were recruited from three medium- and three large-sized factories in the target provinces. A subsample of 408 subjects was randomly selected in a retest study to determine the stability.
Data collection: The revised 23-item Thai ERIQ was distributed to each factory. The questionnaire was left with participants for 1–2 wk to complete. A retest was conducted with a subsample in the same six factories 2–4 wk after the first survey.

Ethical consideration
This study received approval from the Institutional Review Board of Mahidol University and permission from the authorized personnel at each factory (i.e., the managing director and the manager of the department of human resource development). Subjects were informed about their rights through verbal and written briefs, as well about the study objectives and procedures, potential risks/discomforts, possible benefits, and data confidentiality. Subjects were also informed that participation was voluntary, that they had the right to not answer any individual question and could withdraw from the study at any stage without disadvantaging themselves in any way. After that, their signed consent to participation in the study was obtained.

Measurement development
1) Validity
Content validity: The English version of the ERIQ was translated and back-translated into Thai with the permission of its authors. The recommended version is a 23-item questionnaire, which has demonstrated satisfactory reliability and validity in several countries[10, 11]. Responses

range along a five-point Likert scale (disagree/agee and 4 levels of being distressed) for the effort and reward subscales, and a four-point Likert scale (strongly disagree, disagree, agree, and strongly agree) for the overcommitment subscale.

The English version of ERIQ was first translated into Thai by two bilingual experts working independently. The translations were then compared and discussed with the translators to check the similarity with the original version. The translated Thai version, which was most similar to the original English, was given preference. The consensual version was then sent to two other bilingual experts for separate back-translation into English. The back-translated version was compared to the original version. Items that differed were identified and revised through consulting with the bilingual experts before it was forwarded to the authors of the ERIQ for their approval. Their suggestions were mostly about the usage of tenses. After rechecking the meaningful concepts, the Thai ERIQ was confirmed for use in this study. To establish the content validity, the Thai ERIQ was reviewed by five experts in the field of occupational health, nursing, and mental health. They were asked to rate each item for its representativeness or relevance to the psychosocial work environment. A Content Validity Index (CVI) was performed to identify the extent of agreement. The Thai ERIQ was also refined by a professional editor to improve its readability before a trial with a group of key informants.

Face-to-face interviews were conducted to ask about wording, clarity, and comprehension of the items. Survey administration took 1.5–2 h for the individual interview. The developed instrument was reviewed and revised based on respondents comments and suggestions before being distributed to the study subjects.

Construct validity: The Thai ERIQ was administered to female and male workers (N=900). Eight hundred thirty respondents returned the questionnaire, response rate of 92.2%. After excluding those with incomplete data, a final sample of 828 questionnaires provided data for the analyses. Second-order confirmatory factor analysis (CFA) was conducted (n=828) to determine construct validity. It was performed to replicate the theoretically postulated factorial structure of the ERIQ, specifically effort, reward, and overcommitment. Using LISREL 8.5, indices for model fit testing included the Goodness of Fit Index (GFI), the adjusted GFI (AGFI), the Root Mean Square Error of Approximation (RMSEA), the Root Mean Square Residual (RMR), and Chi-square.

Criterion validity: Predictive validity was assessed by computing correlations between the constructs of the ERI and psychological health problems and psychological well-being (i.e., psychosomatic symptoms, anxiety, depression, and job satisfaction) using a subsample

(n=408). Using SPSS 11.5, logistic regression analysis (LRA) was used to test the probable contributions of effort, reward, and overcommitment subscales. The Effort-Reward ratio was computed between the effort and reward scales, using an algorithm[12]. However, because of the low prevalence of at risk scores for the ERI ratio, the scores of effort, reward, and overcommitment were grouped into tertiles for analysis. Furthermore, because the developed instrument is intended to be used as a tool for prevention, risk was interpreted broadly. Thus, based on tertile score distribution, subjects scoring moderate or high on the effort scale or low or moderate on the reward scale were considered to be at risk groups.

Measures of psychological health outcomes consist of: 1) Psychosomatic symptoms outcome—The Common Symptoms in the General Population of Women (CSGP Scale) was modified to evaluate only psychosomatic health complaints. Although the CSGP Scale includes physical and psychological symptoms most frequently reported by women, it has shown the strongest correlations with the standardized instrument as utilized among the general population[13–15]. The modified scale consisted of fifteen items with four-point Likert response scale (almost never/never, and every month=0, every week=1, and almost everyday=2). As recommended, a score of five or more points was defined as a high level of symptoms[14]. Cronbach's alpha coefficient was satisfactory (0.9249). *2) State of anxiety and depression*—The Thai Hospital Anxiety and Depression Scale (Thai HADS) was utilized to assess anxiety and depressive symptoms among the subjects. The Thai HADS has shown good reliability and validity for both anxiety and depression subscales[16]. It includes fourteen items related to moods occurring during the last week, seven items for an anxiety subscale and seven for depression rated on a four-point response scale. CronbachÅfs alpha coefficients were 0.8883–0.8505 for the subscales of anxiety and 0.7892 for depression. As recommended for Thai HADS, the best cut-off point is 11, with scores of 11 to 21 indicating cases of anxiety or depression while potential cases have scores of 8–1016). To support a perspective of prevention of this study, subjects with scores greater than 8 points were identified as at risk cases. *3) Job satisfaction*—Job satisfaction is considered to be one indicator of psychological well-being in organizations[17]. The short-form version of the Minnesota Satisfaction Questionnaire (MSQ) was modified to assess the subjects' satisfaction with their present job. It is frequently used in job satisfaction research[18]. It has twenty statements designed to assess a person's satisfaction with the possible reinforcers of one's job, including three subscales: intrinsic, extrinsic, and general satisfaction[19]. Responses to items are measured by a five-point scale, ranging from very dissatisfied (1)

to very satisfied (5). General satisfaction is the arithmetical sum of the scores for intrinsic and extrinsic satisfaction. Cronbach's alpha coefficient was satisfactory (0.8562). The tertile scores of job satisfaction were grouped for analysis. Based on tertile score distribution, job satisfaction at low and moderate levels was assumed to indicate at risk status, in line with the stated preventive purpose of the study.

2) Reliability

Basic estimates of reliability, internal consistency and correlations between test and retest, were evaluated. Cronbach's alpha coefficients were tested for initial internal consistency in the pilot study and in the cross-sectional survey. Two to four weeks following the first survey, a test-retest study was undertaken to estimate stability, using Pearson's correlation coefficients with a subsample. Homogeneity testing between the sample and the subsample revealed no significant differences (p>0.05) in terms of age, marital status, education, current job position and years in job position, paid working hours/week, having shift-work, and personal and family monthly income.

Results

Demographic characteristics

Demographic data are shown in Tables 1 and 2. Subjects tended to be female (83.5%), full-time workers (80.2%), and blue-collar workers (92.4%). Most of them were married or living together (60.4%) and had at least an elementary school education (40.2%). Nearly half of subjects worked in the sewing section of their factories (41.6%). The majority was employed to work during the day (i.e., no shift-work) and had no second job. Many reported working overtime at least sometimes in the evening (89.7%). Workers' personal (58.0%) and family (46.8%) monthly incomes were mostly sufficient, but left little room for savings.

Scores on the effort, reward, and overcommitment scales and ERI ratio

Means and standard deviations of the ERI scales are shown in Table 2. The mean of the ERI ratio was found to be low (mean=0.46, SD=0.21) compared to the results of studies conducted in Korea[20] and China[21]. In this study, only 2% of workers (n=16) reported an ERI ratio≥1 (median=0.40), indicating little effort-reward imbalance in this sample of industrial manufacturing workers.

Validity

Content validity: The Thai ERIQ was reviewed and revised based on an experts' rating and interviews with key informants. Using a 4-point scale, most items were rated as highly relevant by the five experts, with a few items rated as slightly relevant (item 'I have experienced

an unwanted change in my work') by three experts and somewhat relevant (item 'I am constantly interrupted while working' by two experts. A Content Validity Index (CVI) showed a score of 0.95 for the entire questionnaire (ranging from 0.75 to 1.00 on the items), indicating good content validity[22].

Construct validity: Results of confirmatory factor analysis revealed that it was the best model fit for the theoretically postulated structure of effort, reward, and overcommitment (Table 3). Considering the values of GFI, AGFI, RMSEA, RMR, and Chi-square (p-value), the model test validation achieved the best fit. Effort showed values of the model fit of 1.00, 0.99, 0.011, 0.010, and p=0.36, respectively. Reward demonstrated values of the model fit of 0.99, 0.98, 0.0098, 0.017, and p=0.36, respectively. Overcommitment displayed values of the model fit of 1.00, 0.99, 0.016, 0.016, and p=0.30, respectively. Overall, all ERI components achieved an acceptable model fit (Fig. 1), with values of 0.99, 0.98, 0.0, 0.02, and p=0.98, respectively. In summary, the high values of the goodness-of-fit indices demonstrate factorial validity for all three scales, indicating accordance with the theoretical constructs of the ERI model.

Criterion validity: In univariate analyses, effort showed modest but statistically significant associations with all measures of psychological health problems (r=0.151–0.169, p<0.01) and a negative association with job satisfaction (r =–0.104, p<0.05). To test the core constructs of the ERI model, LRA was performed with the theoretical subscales of the Thai ERIQ, rather than the factor analyzed component (Table 4). This analysis revealed that both effort and reward were associated with psychosomatic symptoms and anxiety with statistically significant odds ratios. Only reward was associated with depression with statistically significant odds ratios. Both reward and overcommitment were associated with job satisfaction with statistically significant odds ratios. The reward component demonstrated statistically significant odds ratios with all psychological health and well-being outcomes.

Using the tertile divisions and adjusting for gender, age, employment status, shift work, monthly income, and stressful life events in LRA, the results revealed that the risk of psychosomatic symptoms for subjects reporting high effort was 1.67 times (95%CI 1.10 to 2.53) greater than for those reporting low effort. The risk of psychosomatic symptoms for subjects with low reward was 2.34 times (95%CI 1.57 to 3.49) greater than for those with high reward. The risk of anxiety for subjects reporting high effort was 2.13 times (95%CI 1.38 to 3.28) greater than for those reporting low effort, while the risk of anxiety for subjects with low reward was 1.67 times (95% CI 1.12 to 2.50) greater than for those with high reward. The risk of depression for subjects reporting low reward was 2.06 times (95% CI 1.35 to 3.15)

Table 1. Demographic characteristics of the subjects (N=828)

Characteristics	N	(%)
Factory size (n=828)	413	(49.9)
- Medium		
- Large	415	(50.1)
Gender (n=828)		
- Female	691	(83.5)
- Male	137	(16.5)
Marital status (n=805)		
- Married/living together/cohabiting	486	(60.4)
- Single	259	(32.2)
- Divorced/separated	46	(5.7)
- Widowed	14	(1.7)
Educational level (n=819)		
- Elementary school	329	(40.2)
- Junior high school	263	(32.1)
- Senior high school/ Certificate in Vocational	174	(21.2)
- Diploma/college (1–2 yr.)/ Certificate in Higher Education	137	(4.5)
- Bachelor's degree	16	(2.0)
Current employment status (n=807)		
- Full-time	647	(80.2)
- Others (i.e., daily and weekly)	160	(19.8)
Current job position (n=827)		
- Blue-collar workers	764	(92.4)
- Supervisors	63	(7.6)
Work sector (n=828)		
- Sewing	345	(41.6)
- Cutting	86	(10.4)
- Packing	62	(7.5)
- Quality Control (QC)	52	(6.3)
- Embroidering	22	(2.7)
- Others	169	(20.3)
- Not specified	92	(11.2)
Having shift-work (n=806)		
- No, but working overtime sometimes in the evening	723	(89.7)
- No, and do not work overtime in the evening	66	(8.2)
- Yes, working with a night shift	14	(1.7)
- Yes, but working without any night shifts	3	(0.4)
Personal monthly income (n=805)		
- Not enough, incurring debt	126	(15.7)
- Barely sufficient, adequate (without debt)	76	(9.4)
- Enough without saving	467	(58.0)
- Enough with some saving	136	(16.9)
Family monthly income (n=733)		
- Not enough, incurring debt	110	(15.0)
- Barely sufficient, adequate (without debt)	53	(7.2)
- Enough without saving	343	(46.8)
- Enough with some saving	227	(31.0)

Table 2. Demographic characteristics and the effort, reward, and overcommitment scales (mean, standard deviation, median, and minimum and maximum) (N=828)

Variables	Mean ± SD	Median	Min–Max
Age (yr) (N=810)	31.02 ± 7.15	30.20	17–60
Current employment status (yr) (N=807)	6 ± 6.10	4.01	0.25–30.00
Current job position (yr) (N=827)	3 ± 5.02	1.02	0.25–35.00
Paid working h/wk (N=828)	48 ± 21.76	50	42–98
Effort (N=823)	11.53 ± 3.808	10.83	6–28
Reward (N=822)	48.41 ± 5.458	49.86	24–55
Overcommitment (N=825)	14.15 ± 2.479	14.27	7–24
ERI Ratio (N=816)	0.46 ± 0.209	0.40	0.20–1.83

Table 3. Confirmatory factor analysis of the 23-item ERIQ using the second-order confirmatory factor analysis (N=828)

	ERIQ (23 items)	Effort (6 items)	Reward (11 items)	Overcommitment (6 items)
χ^2	73.23	5.49	24.84	6.09
df	99	5	23	5
p	0.98	0.36	0.36	0.30
χ^2/df	0.74	1.098	1.08	1.218
GFI	0.99	1.00	0.99	1.00
AGFI	0.98	0.99	0.98	0.99
RMSEA	0.0	0.011	0.0098	0.016
RMR	0.020	0.010	0.017	0.016
Loading	0.42–1.00	0.60–1.00	0.50–1.00	0.29–1.00

compared to those reporting high reward. The risk of low job satisfaction for subjects reporting low reward was 2.04 times (95% CI 1.46 to 2.84) greater than for those with high reward. Finally, the risk of low job satisfaction for subjects who reported high overcommitment was 1.60 times (95% CI 1.15 to 2.24) greater than for those with lower overcommitment.

Reliability

Internal consistency: Cronbach's alpha coefficients showed satisfactory reliability for all three scales: 0.8809 for the 6 items of effort, 0.8927 for the 11 items of reward, and 0.6720 for the 6 items of overcommitment. Item-total correlation and alpha coefficients for unique scales are given in Table 5 (n=828). All item-total correlations were higher than 0.30, with the exception of two items of the overcommitment scale (as noted above), 'relax and switch off work (0.2062)' and 'sacrifice too much for job (0.2995)' suggesting weak relationships. Cronbach's alpha coefficients were satisfactory for the scales of effort (α=0.7736) and reward (α=0.8060), whereas the overcommitment scale displayed a marginal value (α=0.6581).

Stability: Correlation coefficients between constructs for the first and the follow up surveys displayed statistically significant relationships at moderate levels (r=0.496–0.576, p<0.001) between the two surveys.

Discussion

In comparison with other Asian populations, the subjects in this study reported a lower mean score of effort than Chinese and Korean employees[20, 21], but higher than that of Japanese employees[23]. Reward showed the highest mean score for all four countries, whereas the mean score of Thai overcommitment was higher than that for Korean employees and lower those for Japanese and Chinese employees.

The findings of this study indicate that the content validity of the Thai ERIQ was supported by the expert panel, although these components might be affected by socio-cultural and linguistic differences. Both specific occupation and the nature of job characteristics might also have had an impact on workers' perception of the context at work, as well. The effort, reward, and overcommitment constructs of the Thai ERIQ were consistent with previous studies conducted in European countries[10, 11], which have shown strong evidence for supporting in tests of the ERI model. Overall, the factor
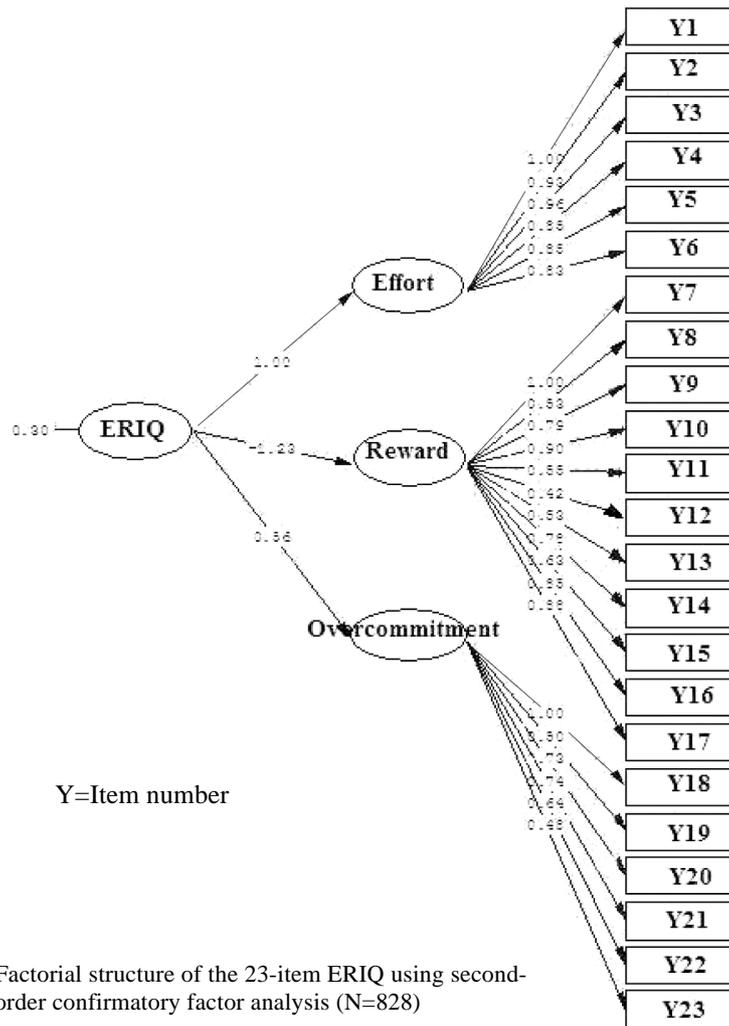
Fig. 1. Factorial structure of the 23-item ERIQ using second-order confirmatory factor analysis (N=828)

Table 4. Associations of ERI subscales with psychological health outcomes¶ (N=828)

	Psychosomatic symptoms			Anxiety			Depression			Low job satisfaction		
	OR	95% CI	*p*-value	OR	95% CI	*p*-value	OR	95% CI	*p*-value	OR	95% CI	*p*-value
Effort												
Low level	1.00			1.00								
High level	1.67	1.10, 2.53	0.015	2.13	1.38, 3.28	0.001						
Reward												
Low level	2.34	1.57, 3.49	<.001	1.67	1.12, 2.50	0.013	2.06	1.35, 3.15	0.001	2.04	1.46, 2.84	<0.001
High level	1.00			1.00			1.00			1.00		
Overcommitment												
Low level										1.00		
High level										1.60	1.15, 2.24	0.013

¶Adjusted for gender, age, current employment status, shift work, monthly income, and stressful life events in a multivariate model with stepwise (Likelihood Ratio: LR) elimination procedure at the p=0.05 significance level for entry into the model. OR, Odds ratio; CI, Confidence interval

Table 5. Item-total correlations and Cronbach's alpha coefficients of the effort, reward, and overcommitment scales (N=828)

Scale	Item	Item-total correlation	Cronbach's alpha coefficient
Effort	Time pressure	0.5728	0.7736
	Interruptions	0.5100	
	Responsibility	0.4827	
	Pressure to work overtime	0.5046	
	Physically demanding work	0.4895	
	Increasing demands	0.5584	
Reward	Esteem- Respect from supervisors	0.4401	0.8060
	Esteem- Respect from colleagues	0.4050	
	Esteem- Adequate support	0.4341	
	Esteem- Unfair treatment	0.4996	
	Career opportunities- Job promotion prospects	0.5639	
	Job security- Undesirable change	0.4738	
	Job security- Job insecurity	0.5061	
	Job security- Adequate position	0.3066	
	Esteem- Adequate respect and prestige	0.5471	
	Career opportunities- Adequate promotion prospects	0.5224	
	Monetary gratification- Adequate salary income	0.5110	
Overcommitment	Overwhelmed by time pressure	0.3475	0.6581
	Thinking about work problems	0.4236	
	Relax and switch off work	0.2062	
	Sacrifice too much for job	0.2995	
	Work still on mind	0.5746	
	Trouble sleeping at night	0.4816	

structure was consistent and the results reflected the theoretical constructs of the ERI model quite well when the indices of goodness-of-fit showed the best model fit. The findings presented minor differences from the results of previous research conducted in Korea in which the six-item version of effort gave a value of RMR (0.06) marginally higher than 0.05[20]. The final 23-item Thai ERIQ should be tested further across a variety of occupations and industries.

It is important to note again that the linguistic and cultural differences might create challenges for cross-cultural research, particularly in translating existing questionnaires[24–26]. There are a number of possible issues that might have affected the validity of the instrument translation in this study, including concept interpretation, semantic equivalence, cultural nuances in emotionally toned words across cultures, response style word usage, discrepancy in language, clarity of wording, and word meanings. For instances, the interpretation of 'promotion prospects' in the original English version became 'career advancement' in the back-translated questionnaire, reflecting variations related to future expectations. Other differences, for example, were found in face-to-face interviews with key informants, such as when the English word 'distress' was translated into Thai and then back-translated as 'unhappy'. These two English words are not equivalent in meaning, suggesting that the selection of word alternatives can be very sensitive[27]. Key informants also reported that 'distress' describes a serious situation or life experience. They indicated that if they experienced work-related distress, they would leave their jobs.

In addition, long statements and the use of formal wording in some statements of the Thai ERIQ, might be inappropriate for workers who have received only fundamental education. Key informants also reported that such questions appeared to be cognitive questions so that they took more time to read and understand. Word level, therefore, might have been a significant issue in this study. 'Difficult situations,' for example, was regarded by Thai informants as too broad, indicating problems with word clarification. Similar problems were found in studies conducted in Thailand[16], India[28], and Iran[29] that used the same questionnaire. One study by Ichikawa and Natpratan (2004)[30] for example, confronted differences in expressions and activities for people in the northern part of Thailand, where they are familiar with '1 month' but not the notion of '4 wk.'

The use of response formats may also differ across cultures[24]. Some groups may also be more prone to

respond in a moderate way while others may prefer the extreme ends of a response scale[31]. In this study, some key informants expressed a preference for rating scales rather than multiple-choices answers. Moreover, some were uncomfortable with long statements and some of the literal translations in the questionnaire. To decrease these problems, it may be important in future research to use qualitative methods to explore and clarify cognitive concepts.

Predictive validity was examined based on examination of each of the 3 ERI constructs. Thus, findings from this study differ from western studies, in which almost all have used the ERI ratio to investigate associations with adverse health outcomes. In this study, although all ERI scales were significantly correlated with health outcomes, reward was the only component that was statistically significantly associated with all the health outcomes (psychosomatic symptoms, anxiety, depression, and job satisfaction). These findings were somewhat different from previous studies that supported a strong association between all ERI constructs and psychological outcomes[32, 33]. This difference might also be related to the nature of job characteristics, context of work environment, and cultural sensitivity/differences, as well as specific factors that might be affect psychological health among Thai industrial manufacturing workers.

The internal consistency of the Thai ERIQ was sufficient for the effort and reward scales. Overcommitment demonstrated a slightly lower alpha coefficient, which may be related to the weak internal associations of 2 of the 6-scale items, and it will need more refinement. This result is in contrast to prior European and Asian studies, which showed Cronbach's alpha coefficients greater than 0.70 for all three scales[11, 20, 21, 23, 34]. The Thai ERIQ had modest correlations for stability ($r<0.5$). This alternative form of reliability is not frequently reported in ERIQ studies[10, 11, 20, 21, 23]. According to Nunnally and Bernstein (1994)[35], trait variation and content differences are assumed to be the major sources of unreliability by the retest method. Stability scores may be less reliable if individuals' traits are temporally unstable: for example, measurements related to mood may produce more change than those related to long term personality traits or attributes. One's reflections about work may vary over time with variations in mood. It is also possible that the Thai ERIQ items ask for the respondent's opinions on work events that call for too much interpretation of the frequency of occurrence. This situation might affect attitudes and judgments that can change, and thus attenuate correlations[36]. It is also possible that the characteristics of the actual psychosocial work environment may change over time, depending upon the context of the job.

Implications

The study findings suggest that the Thai version of ERIQ is an adequately reliable and validated instrument for measuring the psychosocial work characteristics, but one that will require further research and development. Three items need to be refined and the factor structure retested, particularly with regard to the overcommiment scale. Nevertheless, the generalizability of this study needs to be considered since the majority of the participants was women and the study focused only on garment workers. The results are a first report of the psychometric properties of the Thai version of ERIQ, particularly those of garment workers in the central region. Further research should also be conducted across occupational groups and industries. A higher proportion of male employees will also be important to further validate the ERI measure. Longitudinal study designs, using both quantitative and qualitative methods for data collection, and inclusion of a wider array of physical and psychological health problems are also recommended for future investigation. Employees' perceptions about reward should be taken into consideration in the design of workplace interventions to promote their mental health and well-being. Nevertheless, effort and overcommitment should also be considered for the interventions to improve working conditions.

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Appendix: The Back-translated and Thai ERIQ (23 items)

The Back-translated ERIQ	The Thai ERIQ

Instructions: Please kindly tick ☑ to show your opinions with the level of your satisfaction with the following responses.
    ☐ Agree/Disagree
    ☐ Agree/Disagree but I'm absolutely fine.
    ☐ Agree/Disagree and I'm a little distressed
    ☐ Agree/Disagree and I'm distressed
    ☐ Agree/Disagree and I'm totally/very distressed
☺ Highly appreciated your cooperation in advance ☺
	<u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์การ</u>
	<u>ทำงานของคุณในปัจจุบัน</u> กรุณาตอบว่าคุณเห็นด้วยหรือไม่เห็นด้วย
	กับข้อความดังกล่าว <u>โดยทำเครื่องหมาย ☑ หน้าข้อความที่ตรงหรือ</u>
	<u>ใกล้เคียงกับความคิดเห็นของคุณมากที่สุดเพียงคำตอบเดียว</u> และ
	กรุณาบอกระดับความรู้สึกของคุณที่มีต่อสถานการณ์นั้นๆ ดังนี้
	☐ ไม่ใช่/ไม่เห็นด้วย **หรือ** ใช่/เห็นด้วย
	☐ ใช่/เห็นด้วย **หรือ** ไม่ใช่/ไม่เห็นด้วยแต่ฉันไม่ได้รู้สึกทุกข์ใจ
	☐ ใช่/เห็นด้วย **หรือ** ไม่ใช่/ไม่เห็นด้วยและฉันรู้สึกทุกข์ใจบ้าง
	    เล็กน้อย
	☐ ใช่/เห็นด้วย **หรือ** ไม่ใช่/ไม่เห็นด้วย และฉันรู้สึกทุกข์ใจ
	☐ ใช่/เห็นด้วย **หรือ** ไม่ใช่/ไม่เห็นด้วย และฉันรู้สึกทุกข์ใจมาก
	☺*ขอขอบคุณสำหรับการตอบคำถาม*☺

1. I always feel pressure while I work due to the work overload and excess quantities of job that need to be done. 2. I am constantly interrupted while working. 3. I have high responsibility in my position. 4. I always feel pressure of working in overtime. 5. My job requires a lot of physical effort/ strength. 6. For the past few years, my work has been increasing.	1. ตลอดช่วงเวลาของการทำงาน ฉันรู้สึกกดดันเรื่องเวลาเนื่องจาก ปริมาณงานที่มีมาก/ลักษณะงานหนัก 2. ฉันมีปัญหาเรื่องการถูกขัดจังหวะหรือถูกรบกวนในการทำงาน บ่อยครั้ง 3. ฉันรู้สึกต้องรับผิดชอบอย่างมากต่อหน้าที่การงาน 4. ฉันรู้สึกถูกกดดันให้ทำงานล่วงเวลาเสมอ 5. งานที่ฉันทำต้องใช้แรงกายมาก 6. ในช่วงหลายปีที่ผ่านมา ปริมาณงานของฉันมีมากขึ้นเรื่อยๆ
7. I have been considerably accepted by my superior/boss. 8. I have been considerably respected by my co-workers. 9. I have experienced enough support in a difficult situation. 10. I have been/am treated unfairly at work. 11. My career advancement is low/ unsatisfactory. 12. I have experienced an unwanted change in my work. 13. My work stability/security is low. 14. My present work position truly reflects my educational and training background. 15. Considering the effort and work achievement, I am as well respected and admired as I should be.	7. ฉันได้รับการยอมรับจากผู้บังคับบัญชา 8. ฉันได้รับการยอมรับจากเพื่อนร่วมงาน 9. ฉันเคยได้รับการช่วยเหลือตามสมควรเมื่อเกิดปัญหา/สถานการณ์ที่ ยุ่งยากในการทำงาน 10. ฉันได้รับการปฏิบัติที่ไม่ยุติธรรมในการทำงาน 11. ฉันคาดว่าหน้าที่การงานของฉันในอนาคตไม่ค่อยมีความก้าวหน้า 12. ฉันเคยมีประสบการณ์ หรือคาดว่าอาจจะต้องเผชิญกับการ เปลี่ยนแปลงที่ฉันไม่ต้องการเกี่ยวกับสถานการณ์ของการทำงาน 13. งานที่ฉันทำมีความมั่นคงในระดับต่ำ/ไม่ดี 14. ตำแหน่งงานในอาชีพปัจจุบันของฉันตรงกับระดับการศึกษาและ การได้รับการฝึกอบรมของฉัน 15. จากการที่ฉันได้ใช้ความพยายามหรือทุ่มเทให้กับงาน รวมถึง ความสำเร็จต่าง ๆ ในหน้าที่การงาน ฉันคิดว่าได้รับการยอมรับและยก ย่องให้เกียรติตามที่ฉันควรได้จากที่ทำงาน

The Back-translated ERIQ	The Thai ERIQ
16. Considering the effort and work achievement, my career advancement is satisfactory. 17. Considering the effort and work achievement, my salary is satisfactory and appropriately.	16. จากการที่ฉันได้ใช้ความพยายามหรือทุ่มเทให้กับงาน รวมถึงความสำเร็จต่าง ๆ ในหน้าที่การงาน ฉันคาดว่าความก้าวหน้าในการทำงานของฉันจะอยู่ในระดับที่น่าพอใจและเหมาะสม 17. จากการที่ฉันได้ใช้ความพยายามหรือทุ่มเทให้กับงาน รวมถึงความสำเร็จต่าง ๆ ในหน้าที่การงาน ฉันคิดว่าเงินเดือน/รายได้ของฉันจัดอยู่ในระดับที่เพียงพอ/เหมาะสมแล้ว

Instructions: Kindly state the level of agreement and disagreement according to your personnel perspectives. Please tick ☑ in the box that reflects your level of agreement by the following responses.
    ☐ Totally disagree
    ☐ Disagree
    ☐ Agree
    ☐ Totally agree
☺ Highly appreciated your cooperation in advance ☺
	2. <u>คำแนะนำ</u> ข้อความต่อไปนี้เป็นข้อความเกี่ยวกับ<u>สถานการณ์</u>
	<u>การทำงานของคุณ**ในปัจจุบัน**</u> กรุณาตอบว่าคุณเห็นด้วยหรือไม่เห็นด้วยกับข้อความดังกล่าว <u>โดยทำเครื่องหมาย ☑ ในช่องว่างที่ตรง</u>
	<u>หรือใกล้เคียงกับความคิดเห็นของคุณมากที่สุด</u>
	    ☐ ไม่เห็นด้วยอย่างยิ่ง
	    ☐ ไม่เห็นด้วย
	    ☐ เห็นด้วย
	    ☐ เห็นด้วยอย่างยิ่ง
	☺*ขอขอบคุณสำหรับการตอบคำถาม*☺

18. I feel easily stressed when there's time limitation in work/ when I have to meet deadlines. 19. When I wake up in the morning, I always think about my work. 20. When I get home, I feel relaxed and can leave my work behind easily. 21. Persons who are close to me say that I have devoted too much of my life to work. 22. I always think about my work even when I go to bed. 23. If I postpone what I have to get done today, I normally have difficulty in getting sleep.	18. ฉันรู้สึกถูกกดดันได้ง่ายมากเมื่อมีเรื่องของเวลาเข้ามาเกี่ยวข้องในการทำงาน 19. ฉันเริ่มคิดเกี่ยวกับปัญหาเรื่องงานในทันทีที่ฉันตื่นนอนตอนเช้า 20. เมื่อกลับถึงบ้าน ฉันสามารถพักผ่อน/ผ่อนคลาย และปล่อยวางทุกอย่างที่เกี่ยวกับงานได้ง่ายดาย 21. คนที่ใกล้ชิดกับฉันพูดว่า ฉันทุ่มเทชีวิตให้กับการทำงานมากเกินไป 22. ฉันยังคงคิดเกี่ยวกับเรื่องงานอยู่เสมอ แม้จะถึงเวลานอนแล้วก็ตาม 23. ถ้าวันนี้ฉันไม่สามารถทำงานที่ได้รับมอบหมายให้เสร็จตามเวลาที่กำหนด คืนนี้ฉันจะมีปัญหาในการนอนหลับ