

Developing the Persian version of the Anticipated Turnover Scale (P-ATS) and measuring its psychometric properties among Iranian industrial workers

Hamidreza Mokarami¹, Elahe Dortaj¹, Rosanna Cousins², Tayebe Rahimi Pordanjani^{3*}

1. Department of Ergonomics, School of Health, Shiraz University of Medical Sciences, Iran.

2. Department of Psychology, Liverpool Hope University, Liverpool, UK.

3. Department of Psychology, Faculty of Humanities, University of Bojnord, Iran.

Corresponding Author: Tayebe Rahimi Pordanjani, Department of Psychology, Faculty of Humanities, University of Bojnord, Esfrayen Road 4th km, Bojnord, North Khorasan, Iran. Email: t.rahimi@ub.ac.ir

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Abstract

The aim of this cross-sectional study was to measure the psychometric properties of the Persian version of Anticipated Turnover Scale (P-ATS) using a large sample of workers in the oil industry in Iran (N=443). The psychometric properties of the scale were assessed using face, content, convergent, and construct validity, internal consistency, and test-retest reliability methods. A two-factor solution emerged from exploratory then confirmatory factor analyses. Content validity index and ratio were .93 and .98, respectively. There were high significant correlations between P-ATS and both perceived stress and workability. The Cronbach's alpha was .90 and test-retest correlation coefficient was .87. The P-ATS exhibited very good psychometric properties and can be applied as a useful tool to predict job turnover among Iranian employees.

Keywords: Turnover intention; Employees turnover; Validity; Reliability; Iranian employees

Introduction

Efficient human resources are currently considered as one of the most important assets of any organization and paying attention to these resources is an effective step towards achieving organizational goals (Khalatbari et al., 2013; Shamim et al., 2019; Stovel & Bontis, 2002). One of the fundamental problems faced by organizations is staff turnover due to the imposition of added costs on the organization and a reduction of productivity in the interim (Hur & Hawley, 2019; SamGnanakkan, 2010). Employee turnover has direct and indirect effects on the organization (Hayes et al., 2012). High turnover among highly skilled employees is a critical challenge for many managers (Hong & Chao, 2007; SamGnanakkan, 2010), but even voluntary turnover can undermine the effectiveness of the organization (Dess & Shaw, 2001). Turnover may incur training, social investment, and personnel replacement costs as well as indirect costs, and this can have a negative effect on the morale and performance of the remaining employees in the organization (Hinkin & Tracey, 2000; Maertz Jr. et al., 2007; Patterson et al., 2010). Therefore, given the significant costs of employee turnover for organizations, anticipating turnover before actual turnover occurs is good management practice (Barlow & Zangaro, 2010).

Turnover intention, as a thoughtful, planned and voluntary process (Mobley, et al., 1979), is one of the most important predictors and immediate precursors of actual turnover (Barlow & Zangaro, 2010; SamGnanakkan, 2010; Takase, 2010). It has been defined as an individual's estimate of the probability of leaving their current organization in the near future (Chen et al., 2011), and as “the willingness or attempts to leave the current workplace voluntarily” by Takase (2010, p. 4). Takase also suggests that turnover is a multi-step process and psychological, cognitive, and behavioral in nature. Therefore, given the high cost of employee turnover, especially the skilled and knowledgeable

employees, it is reasonable for managers to want to anticipate turnover intentions of their employees before they take the form of turnover behaviors, and they leave the organization permanently.

Different tools and methods can be used to measure turnover intention. Questionnaires are used in many studies because of the relatively low cost and easy analysis of large volumes of employee data (Barlow & Zangaro, 2010). To measure the turnover intention, a questionnaire with appropriate psychometric properties is required. The extant literature shows that many studies have employed a one-item approach to assess job turnover intentions, and there is a dearth of studies that use a comprehensive and valid questionnaire to measure this construct. An exception in the healthcare literature is the Anticipated Turnover Scale (ATS) (Hinshaw et al., 1985) that has been widely used to predict nurses' turnover intentions. Barlow and Zangaro (2010), in a meta-analysis of studies conducted among nurses, confirmed that the ATS has good psychometric properties for this type of employee. However, there is a need to extend the literature and investigate the usefulness of the ATS to predict turnover in other sectors. The oil industry, in particular, is known to experience high levels of expensive turnover (Suliman & Al-Junaibi, 2010). The evidence from Iran remains anecdotal; nevertheless there is a keen interest in providing a robust scale to help managers in this important economic sector for the Iranian economy. It is reasonable to assume that the ATS will be suitable to use in other work sectors, nevertheless, the question of whether this is so begged an evidence-based answer. Furthermore, to the best of our knowledge, no studies have been conducted using a Persian version of the Anticipated Turnover Scale (P-ATS), which would allow use of the scale in Iran. For these reasons, we sought to address the following question: to what extent can all items of the ATS, translated in Persian, operate like the original English version to measure the turnover intention among Iranian industrial workers? It

was also important to know whether this scale has favorable psychometric properties in Iranian society. Thus, the aim of this study was to prepare a translation of the ATS in Persian and measure the psychometric properties of the P-ATS among employees of an oil company in Iran.

Materials and Methods

Design and Study Population

The study protocol was reviewed and approved by the Research Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1399.S923). The research population included all employees of an oil company in southern Iran. The inclusion criterion was having at least one year of full-time work experience as an employee of the company. There was no exclusion criterion related to department, type of job, ethnicity, or sex to encourage a scale that could be applied to all employees. Seven hundred eighty employees met the requirement for participation. Instructions on how to answer the items in the scale and the ethical obligations of the researchers regarding confidentiality and anonymity for the completed questionnaires were provided to the employees. Five hundred and one employees provided written consent to join the study. All 501 participants submitted a questionnaire. Fifty-eight questionnaires were subsequently excluded for being incomplete, leaving a sample of 443 questionnaires for the final data analysis. The data were analyzed by IBM® SPSS® Amos™ 23 (USA, SPSS Inc.).

Anticipated Turnover Scale (ATS)

The ATS was developed by Hinshaw and Atwood to predict turnover intentions in nurses (Hinshaw et al., 1985). The ATS is a norm-referenced attitudinal measure of the

anticipated turnover and turnover intention concepts. The items in the scale measure employees' intention to leave a current position (Barlow & Zangaro, 2010). The ATS is a 12-item, Likert type scale with a range of responses from 1 (strongly disagree) to 7 (strongly agree). Scores range from 12 to 84. The higher the score, the higher will be the intention to leave (Hinshaw et al., 1985). There are equal numbers of positively and negatively worded items. Items 1, 3, 6, 8, 9, and 10 are reversely scored. It takes about five minutes to complete the ATS, and results are easy to interpret (Barlow & Zangaro, 2010). The 12-item English version of the ATS has no 'official' cut-offs to indicate active turnover intention. In their doctoral studies, Armstrong (2004) suggested the scale score should be divided by the number of items on the scale, and 'responses' / groups or departments with means higher than 3.5 should raise concern in terms of turnover intention. This cut-off has subsequently been cited in nine other studies – all investigating turnover-intention in nurses.

Translation of the Scale

To maintain the intellectual property rights of the scale, the researchers corresponded with the developers and then translated the scale from English into Persian with receipt of the developers' permission. First, the scale items were translated from English to Persian by three experienced translators, each translating the scales on their own. The translators were asked to avoid literal translation while being faithful to the English text when translating it into Persian (forward translation stage). Second, members of the research team, together with the three translators, contrasted and combined the three Persian versions of the scale, and reviewed the items for ambiguity, inconsistency, and common understanding of the items. Finally, a single Persian provisional version of the ATS was developed at this step. In the third step, the provisional Persian version was sent to two Iranian professors living in the United States who were unaware of the English

content of the scale and were asked to translate it back into English (backward translation stage). At the end of this step, two English questionnaires obtained from each scale were re-reviewed and merged into a provisional English version of the scale. Finally, this English version was sent to the developers of the scales, and after applying their proposed modifications, final versions were prepared to check their psychometric properties. The Persian version of ATS is available upon request from authors.

Methods Used to Assess Validity

Face Validity and Content Validity

To assess face validity and qualitative content validity, 14 experts in the field of research (occupational health professionals, industrial and organizational psychologists) were asked to check each item in terms of grammar, wording, item allocation, word choice, difficulty level (difficulty of understanding words and expressions), the relevance of the items or dimensions, and ambiguity (probability of misunderstanding the items or vague words), and in the case of any noncompliance with the mentioned points, to provide some suggestions for improving the items. Furthermore, five employees from the research sample were surveyed to resolve possible ambiguities and improve the comprehensibility of the items. After making the changes, the content validity index (CVI) and content validity ratio (CVR) were used to evaluate the content validity of the scale.

To evaluate the CVI and CVR, 16 experts in the field of research (university professors of occupational health, industrial and organizational psychology) were surveyed. For the CVI evaluation, the experts were asked to examine three criteria of relevance, clarity, and simplicity of each item separately (Polit et al., 2007). According to the guidelines, a CVI of greater than 0.79 is appropriate, between 0.7 and 0.79 requires revision, and less than 0.7 is unacceptable and should be removed. To evaluate the CVR,

16 experts were asked to assess the necessity of each item. According to the table developed by Lawshe (1975) based on the number of members in the panel of experts, items with a CVR greater than 0.48 are important and necessary (for 16 experts), at a significance level of $p < .05$ and items with a lower CVR have to be removed.

Construct Validity

The construct validity of the scale was assessed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). To do so, first, the whole dataset ($N = 443$) was randomly split into two subsamples using SPSS software. An independent samples t -test and ANOVA were used to ensure that there were no significant differences between the two subsamples in terms of demographic and work-related characteristics (age, sex, marital status, educational level, job tenure, work schedule, and employment status). It is worth noting that this sample size was suitable and sufficient for factor analysis as the total number of participants was greater than 4 to 10 times the number of variables and more than 100 (Maasoumi et al., 2017).

Before performing the exploratory factor analysis (EFA), the Kaiser-Meyer-Olkin (KMO) test was run to ensure sampling adequacy and Bartlett's Test of Sphericity was used to ensure an appropriate correlation existed between the items. KMO values ranging from 0.7 to 0.8 are appropriate and values from 0.8 to 0.9 are large. EFA was then performed on the first random sample ($n = 244$). The factor analysis was run using the principal component analysis and varimax rotation. To determine that the scale (the set of items) has been saturated and correctly identified significant factors, three main indices; 1) eigenvalue, 2) the ratio of variance explained by each factor, and 3) the rotated curve called the "scree plot" were used. In the scree plot, eigenvalues above 1 indicate

the number of dimensions of the scale. The items having a factor load of higher than 0.4 were considered acceptable (Costello & Osborne, 2005).

The second random subsample was used for the confirmatory factor analysis (CFA) and the maximum likelihood estimation (MLE) method. The model fit was assessed using several indices including the chi-square/degrees of freedom ratio (χ^2/df), the mean square error of approximation (RMSEA), comparative fit index (CFI), adjusted goodness-of-fit index (AGFI), and the goodness-of-fit index (GFI). If the CFI value is 0.95 or higher, RMSEA is less than 0.08, GFI and AGFI values are 0.8 or 0.9, and χ^2/df is less than 3, the model has high goodness of fit (Maasoumi et al., 2017).

Convergent Validity

Convergent validity of the P-ATS was assessed using the Work Ability Index (WAI) and the Perceived Stress Scale (PSS-10). The three questionnaires were completed by the participants in the same session.

The WAI was developed by the Finnish Institute of Occupational Health to assess work ability (Ilmarinen, 2007). This index contains seven dimensions including individuals' physical and psychological dimensions related to work, feeling ill, work impairment due to diseases, sick leave during the past 12 months, the personal prognosis of work ability two years from now, and mental resources. The total score of the scale ranges from 7 to 49 and is classified into four categories: poor (7-27), moderate (28-36), good (37-43), and excellent (44-49) (El Fassi et al., 2013).

The PSS was developed by Cohen et al., 1983) to determine how people perceive their stress in the face of unpredictable and uncontrollable life events. This scale has versions with 4, 10 and 14 items. The 10-item scale (PSS-10) has been replaced by the original version in many studies due to its lower length than the 14-item scale, and its

similar psychometric properties (Taylor, 2015). Higher scores on this scale indicate higher perceived stress levels.

Reliability Assessments

Cronbach's alpha coefficient was used to assess the internal consistency of the scales. A coefficient greater than .70 is considered desirable (Peterson, 1994). To check the test-retest reliability, the questionnaires were completed twice in a four-week interval by a subsample of 30 employees. The correlation between the results of the first and second stages was evaluated using the Pearson correlation test.

Results

Table 1. Participants' socio-demographic and work-related factors (N = 443)

Characteristics	n	%
Gender		
Male	425	95.9
Female	18	4.1
Marital status		
Single	54	12.2
Married	389	87.8
Education level		
Elementary	30	6.8
Diploma	136	30.7
Associate	67	15.1
Bachelor	133	30.0
MSc and above	77	17.4
Work schedule		
Day-work	182	41.1
Three-shift	261	58.9
Employment status		
Permanent	237	53.5
Temporary	206	46.5

Participants' socio-demographic and work-related factors are shown in Table 1. Participants' mean age was 39.88±8.6 years, ranging from 23 to 59 years; mean job tenure was 15.2±9.3 years ranging from 1 to 38 years. Table 2 presents the item means (standard

deviation) and inter-item correlations. There was a high correlation between all items of the P-ATS except for items 3 and 9.

Validity

The results of the content validity of the 12-item scale indicated that the CVI and CVR of the whole scale were 0.93 and 0.98, respectively. These results showed the excellent content validity of all items of the scale from the experts' viewpoint.

Table 2. Inter-item Correlations for Items of the Persian Version of ATS scale

	M (SD)	1	2	3	4	5	6	7	8	9	10	11
1	2.77 (1.50)											
2	2.70 (1.63)	.365**										
3	3.94 (1.72)	.203**	.003									
4	2.46 (1.57)	.306**	.759**	.023								
5	3.50 (1.78)	.322**	.605**	.033	.505**							
6	3.30 (1.76)	.283**	.611**	.125**	.531**	.547**						
7	2.85 (1.58)	.400**	.605**	.047	.519**	.497**	.441**					
8	2.59 (1.33)	.520**	.380**	.127**	.421**	.373**	.428**	.283**				
9	3.29 (1.57)	.188**	.032	.227**	.063	.130	.097	.018	.201**			
10	2.73 (1.42)	.561**	.424**	.136*	.448**	.354**	.407**	.317**	.686**	.229**		
11	2.55 (1.45)	.294**	.502**	.060	.496**	.501**	.481**	.492**	.356**	.117	.320**	
12	2.43 (1.51)	.423**	.794**	.003	.706**	.616**	.590**	.602**	.437**	.071	.484**	.548**

Note: ATS= Anticipated Turnover Scale; *= $p < .05$ (2-tailed); **= $p < .01$ level (2-tailed)

Before running the factor analysis, the corrected item-total correlation of the scale was evaluated. The results showed the corrected item-total correlation of all items in the scale, except items 3 ($r = .09$) and 9 ($r = .11$), was high (see Table 2). In other words, except for items 3 and 9, the other ten items had the necessary discrimination power to measure the construct validity of the scale. Therefore, according to the inter-item correlation and corrected item-total correlation values, a factor analysis was run based on 10 items.

To test the suitability of data for factors analysis, the Kaiser-Meyer-Olkin test was run and the corresponding value was .91, and the value of Bartlett's Test of Sphericity was $\chi^2 = 2322.14$, ($p < .001$). These findings indicate that the data were suitable for performing the exploratory factor analysis (EFA). The scree plot of the eigenvalues of principal components yielded two factors greater than one. The eigenvalues for the first and second factors were 5.16 and 1.38, respectively. The first factor accounted for 41.83% of the variance in the data set (items 2, 4, 5, 6, 7, 11, and 12), and the second factor explained 23.50% of the variance in the data set (items 1, 8, and 10). Taken together, these two factors explained 65.34% of the total variance of the scale. The factor loading calculated for the items presenting the first factor ranged from .68 to .85 and for those of the second factor ranged from .80 to .85, indicating a very strong factor load of the ATS items (Table 3).

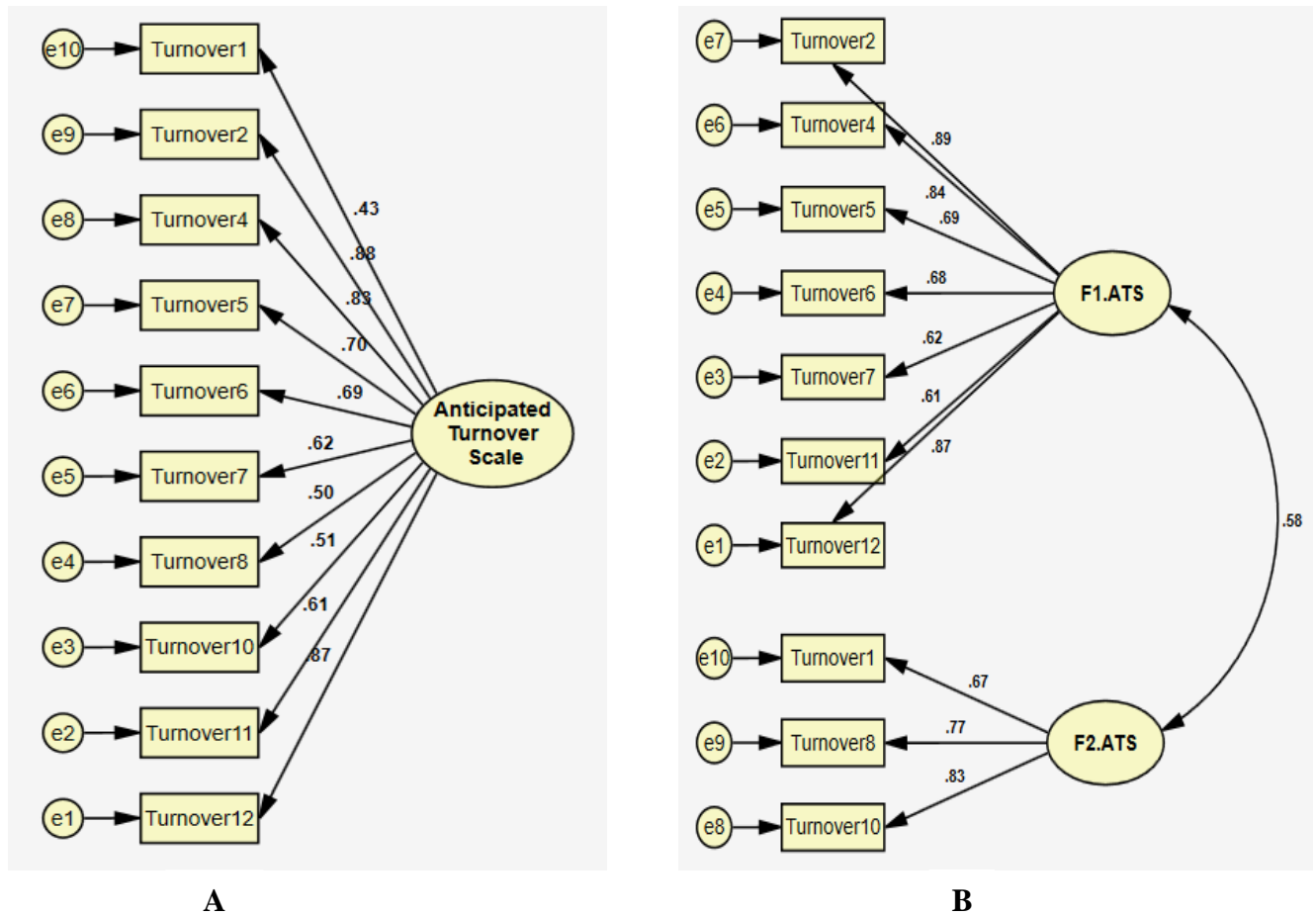
Table 3. Construct validity and internal consistency of P-ATS (N = 443)

Items	Corrected item-total correlations	Cronbach's alpha if item deleted	Communalities	Factor loading	
				F1	F2
1. I intend to stay in my current job for some time.	.54	.85	.66		.80
2. I am almost certain that I will leave my job in the near future.	.75	.84	.78	.85	
3. Deciding whether to stay or leave my job is not an essential issue for me at this time.	.10	-	-		

4. I have already made the decision to stay with or leave this organization in the short term.	.69	.84	.71	.81	
5. If I were to receive another job offer tomorrow, I would seriously consider it.	.60	.85	.59	.73	
6. I have no intention of leaving my current job.	.66	.84	.55	.68	
7. I have been at this workplace for as long as I want to be.	.61	.85	.50	.70	
8. I am sure I will stay in this job for a while.	.60	.85	.71		.80
9. I have no specific idea how much longer I will stay here.	.11	-	-		
10. I intend to keep my job with this organization for some time.	.62	.85	.77		.85
11. I have major doubts about whether or not to stay in this organization.	.55	.85	.50	.70	
12. I plan to leave this job soon.	.78	.84	.76	.82	

The one-factor model (the whole scale) and the two-factor model of the P-ATS were analyzed using CFA and the maximum likelihood estimation method. The results indicated that the two-factor model had the higher goodness of fit, confirming the results of the EFA. Path diagrams for the CFA of the single-factor and the two-factor models, along with the standardized factor loadings of the items, are displayed in Figure 1. Regarding the goodness of fit indices of both models, only the two-factor solution met the acceptable fit in terms of χ^2/df (2.58; the single-factor solution was 10.17). Similarly, NFI, GFI, AGFI, CFI and RMSEA indices were very good for the two-factor model, and unacceptable for the one-factor model. The standardized regression weight for the first factor items ranged from .61 to .89 ($p < .001$) and for the second factor items ranged from .67 to 0.83 ($p < .001$), indicating the very high values of the standardized coefficients of P-ATS items.

Regarding convergent validity, Pearson's correlation coefficients showed a high positive correlation ($r = .47, p < .001$) between the P-ATS and the PSS-10, and a high negative correlation ($r = -.45, p < .001$) between the P-ATS and the WAI. These results indicated very good convergent validity with workability and stress scales – measures that are relevant to turnover intentions.



Reliability

Our results showed that the ATS and its two factors had very high internal consistency (Table 3). The Cronbach's alpha coefficients for the total scale and the first and second factors were .90, .90, and .81, respectively. The corrected item-total correlation of all items in the scale was significant ($p < .001$), ranging from .544 to .778. Test-retest reliability results showed the excellent reliability of the scale ($r = .87, p < .001$).

Figure 1. The one-factor model (A) and the two-factor model (B) of the Persian version of Anticipated Turnover Scale obtained by Confirmatory Factor Analysis

P-ATS 10 development findings

One hundred and four of the 443 participants (30.67%) that comprised the scale development sample reported turnover intention according to the Armstrong (2004) criteria. The P-ATS 10 scores showed a significant difference in turnover intentions according to the 21 departments in the oil company ($F = 1.86, p = .014$). The mean P-ATS for the departments with the highest and lowest turnover intentions were 40.57 and 18.20 respectively ($Z = -2.86, p < .01$); there was no difference according to size of department.

One-tailed Spearman's Rho correlation analyses of turnover intentions and demographic variables indicated significant negative relationships of turnover intentions and job tenure ($r = -.21, p < .001$), age ($r = -.193, p < .001$), and a positive relationship with level of education ($r = .193, p < .001$). That is, the P-ATS showed higher turnover was found in those with less time in employment with the company, younger employees, and more highly educated employees. Non-parametric comparison of means indicated there was a significant difference in workers who were single and those who were married (Mann-Whitney $U = 7542, Z = -2.785, p < .01$), but no difference according to sex, employment status, hours of work, or type of work.

Discussion

The aim of the present study was to develop a Persian version of the Anticipated Turnover Scale (P-ATS). The objective was to provide a valid tool for predicting turnover intentions among Iranian employees that could be used to enhance employee retention in industries that are important to the Iranian economy. In this study, for the first time, the psychometric properties of the scale were confirmed in a community of industrial workers based on face validity, content validity, convergent validity, construct validity, internal consistency, and test-retest reliability. Results from this developmental study also

indicated that turnover intentions are an important issue for the oil industry, and that the P-ATS could be used to prioritize interventions to support retention of workers.

The face validity assessment asked whether the scale has been properly developed to appear effective in terms of its stated aims. Occupational health professionals, industrial and organizational psychologists, and experienced staff working in an oil refinery were surveyed and their opinions were used to assess the face validity of the scale and make necessary modifications. The quantitative content validity of the scale was assessed using the CVR and CVI indices and the results indicated excellent content validity of scale items.

The results of the EFA showed that the P-ATS has a two-factor structure. CFA confirmed the two-dimensional structure of the scale, and that the two-factor model had high goodness of fit whereas the single-factor model did not. These results are consistent with the original version of the scale that has a two-factor structure (Hinshaw et al., 1985). The recommendation has been not to use the two subscales separately, but to consider the ATS a single scale (Barlow & Zangaro, 2010). We examined the items in our two factors with the purpose of naming the two factors, but found it was difficult to disentangle the difference other than in terms of positive and negative wording. Thus, following Hinshaw et al. (1985) and Barlow & Zangaro (2010), we suggest that the P-ATS should be used as a whole measure of turnover, especially because the items in the final 10-item P-ATS are significantly correlated.

The findings of the present study indicated that items 3 and 9 of the original English ATS had very weak inter-item correlations with other items in the scale. In addition, these two items had a very poor correlation with the ATS total score. Accordingly, the two items did not have the necessary discriminatory power and were not included in the P-ATS. Interestingly, these items were also found to be insufficient for

inclusion in a recent translation and development of a 6-item ATS scale for use in Korean nurses (Nam et al., 2021), and item 9 was not used in a 10-item Portuguese version of the ATS (de Sur & Lucas, 2020). For this sample, an important factor that may account for the weak correlations is the content of these two items, and their meaning in the labor market conditions in Iran. In fact, people's low confidence in the labor market and the uncertain employment future makes them unable to confidently decide on their career even when they have a serious intention of leaving their job. Accordingly, they cannot provide a decisive response to these two items. Besides, statements such as “not a critical issue” and “any specific idea” have been used in these items, which have neutral connotations in English, and imply having no idea in Persian. These findings indicate that despite the precise procedure taken in this study to translate the scale and evaluate its face and content validity, due to the cultural differences of Iranian society with Western societies, the participants in this study did not have a clear understanding of these two items.

Our findings also indicated that the P-ATS had a high positive correlation with stress, as measured by the PSS-10. In the same vein, Shader et al. reported a significant relationship between job stress and the ATS (Shader et al., 2001). Employee stress arising from various problems and pressures in the workplace and excessive workload can lead to turnover intention and actual job turnover among employees (Bautista et al., 2020). Low levels of stressors are also associated with low levels of job turnover intention (Moscicka-Teske et al., 2019). On the other hand, the result indicated that the P-ATS had a high negative correlation with the WAI. According to the WAI, work ability is the degree to which a worker is physically or mentally fit to meet their job requirements. Work ability estimated by the WAI is very close to the results of clinical assessments (Tuomi et al., 1997) and can predict the early retirement of employees (Bethge et al., 2012;

Jääskeläinen et al., 2016). The high correlation of P-ATS with both PSS-10 and WAI indicates its excellent convergent validity.

The results showed excellent P-ATS consistency and test-retest reliability. Consistent with these results, in their meta-analysis study, Barlow & Zangaro (2010) reported that the overall mean of the coefficient for 2443 participants in 12 studies was .89, which is very close to our result using a 10-item scale ($\alpha = .90$). Cronbach's alpha was calculated as .84 in the original 12-item version of the scale (Hinshaw et al., 1985). In the present study, to examine deeper internal consistency of the items of P-ATS, the correlation between each of the 10 items was assessed with the whole scale. These analyses showed that the P-ATS have excellent internal consistency.

This study, like any other scientific work, was conducted with some limitations. In the present study, due to the time limitation of the respondents, and in line with the main objective of this study, we did not include other variables to study the divergent and concurrent validity of the P-ATS. Also, this project was implemented in an industrial company with a low number of female participants (due to the nature of the job). Therefore, although we found no difference in outcomes according to sex, and the majority of studies using the ATS have been focused on nursing which has a predominantly female workforce, caution should be exercised when interpreting the findings of the study in this respect. Further research is required to replicate our developmental findings and to support effective interventions to reduce turnover intentions and associated impacts on work in those occupations where a significantly high level of turnover intentions is seen.

Conclusion

The results of this study showed that the P-ATS had acceptable reliability and validity, and this 10-item scale can be used as an informative tool to predict job turnover

intentions among Iranian employees. In addition, because the scale items have been developed for general purpose and the scale contains a small number of items, it is easy to use and is applicable in all workplaces.

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