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Psychometric properties and gender invariance of the Work-related Acceptance and Action Questionnaire (WAAQ) in the Italian context

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Abstract

Introduction: This research paper aims to validate the Work-related Acceptance and Action Questionnaire (WAAQ, Bond et al., 2013) in the Italian context, demonstrating gender invariance. This measure was developed to address the need for a brief contextual measure of psychological flexibility in professional domains.

Methods: Five studies were conducted. In Study 1, the scale was culturally adapted; parallel analysis and Exploratory Factor Analysis were conducted. Study 2 tested the structure, and the model fit of the 7-item scale through confirmatory factor analysis and internal consistency indices. Study 3 examined concurrent validity. Study 4 verified the temporal reliability using the test-retest method. Study 5 analyzed gender invariance.

Results: In Study 1, the scale confirmed its one-factorial structure, accounting for 59.73% of the variance. Study 2 demonstrated a good model fit of the 7-item scale in the Italian context. Study 3 showed negative correlations with psychological inflexibility and positive correlations with life satisfaction, flourishing, and work engagement. Study 4 verified the temporal stability of the scale. Study 5 confirmed configural, metric, scalar, and residual invariance regarding gender.

Discussion: Overall, the results support the WAAQ's validity and reliability for assessing work-related psychological flexibility, making it a valuable tool for researchers and practitioners.

Take-home message: The research presents the Italian validation of the Work-related Acceptance and Action Questionnaire (WAAQ), providing a reliable and valid measure for researchers and practitioners in clinical and organizational contexts.

Key words: psychological flexibility; work-related psychological flexibility; assessment; ACT; WAAQ

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INTRODUCTION

The world of work requires preventing numerous psychosocial risks [1] addressing numerous challenges, including those related to work-life balance [2], and preserving and maintaining mental health [3]. These challenges require an approach that integrates protection from work-related safety and health hazards with workplace health promotion programs to advance worker well-being [4].

Psychological flexibility – a fundamental aspect of personal and social well-being and mental health [5] – can help people to live mindfully in our uncertain and unpredictable world of work, where sudden and continuous change is the norm rather than the exception.

Psychological flexibility is the core process of Acceptance and Commitment Therapy (ACT [6]), a variant of third-generation cognitive behavioral therapy, and according to Hayes et al. [7] it refers to “the ability to contact the present moment more fully as a conscious human being and to change or persist in behavior when doing so serves valued ends” (p. 7). In other words, psychological flexibility is the multidimensional ability to behave according to whatever the situation requires to go toward what is meaningful, even in the presence of challenging or unwanted private experiences like thoughts, emotions, or physiological sensations [7].

There is good empirical evidence that the psychological flexibility model relates to several dimensions of mental health [8], quality of life [9,10], and work-related quality of life (for a meta-analysis, see [11]). Regarding hedonic well-being, Lucas and Moore [12] demonstrated that psychological flexibility positively and directly affected life satisfaction. Regarding eudaimonic well-being, psychological flexibility was highly correlated with flourishing [13] and predictive of flourishing [14]. Recently, Russo et al. [15] suggested that psychological flexibility, as a positive resource, fosters well-being (hedonic and eudaimonic) by the mediation of career adaptability, enabling individuals to adapt to personal and situational changes.

Deepening work-related context, psychological flexibility has been largely demonstrated as a robust and complex set of skills that can improve well-being and performance in work settings [16-27]. In general, interventions based on psychological flexibility help workers carefully contact the present moment, accept troublesome emotions, avoid being absorbed by distracting thoughts, notice more or less useful self-descriptions, and engage in meaningful and effective actions [17]. Broadly speaking, recent studies show that ACT interventions based on psychological flexibility are associated with a wide range of work-related outcomes, from improved well-being [24] and work-related stress and burnout reduction [21,22,26,27] to new skills development and job performance enhancement [18,19]. For example, psychological flexibility has been positively associated with work engagement [25] and, in a longitudinal study, was found to predict work engagement [26], suggesting that having good levels of psychological flexibility promotes a state of affective-motivational fulfillment related to work. Moreover, mindfulness, an essential component of psychological flexibility, is associated with work-related stress management and job satisfaction [28] (for a meta-analysis on the effects of mindfulness in the workplace context, see [29]).

The ACT framework [6, 7] suggests that the process of psychological flexibility is contextually controlled, as it can fluctuate across different contexts due to variations in levels of awareness, the relevance of one's values in a given context, and the interaction between the two. Therefore, assessing psychological flexibility with a specific measure for the work context can help to evaluate the work-related psychological flexibility processes more accurately, reducing potential measurement errors.

Moving from these premises, Bond et al. [25] created the Work-related Acceptance and Action Questionnaire (WAAQ) to measure psychological flexibility in work-related contexts. Other translations and cultural validations - such as the one in the Spanish language [30] and the one in the Chinese language [31] - confirmed that a specific measure of psychological flexibility in the work context is needed because it is shown to be stronger related with work-related variables than a general measure of psychological flexibility (i.e., AAQ-II; [32]). To the author's knowledge, no prior study has demonstrated the gender invariance of the Work-related Acceptance and Action

Questionnaire (WAAQ) at the international level. Furthermore, it should be noted that no existing scale currently evaluates work-related psychological flexibility in the Italian context.

The present study fills the mentioned literature gap by providing the Italian validation of a measure of the Work Acceptance and Action Questionnaire (WAAQ, [25]), as a measure of psychological flexibility in Italian work contexts, and also offering unique insights into its gender invariance.

METHODS

To test the psychometric proprieties of the Italian WAAQ, we conduct five studies with the following research objectives:

- Study 1: culturally adapt and test the construct validity of the WAAQ.
- Study 2: verify the factorial structure of the scale.
- Study 3: test the concurrent validity through the analysis of correlations with other well-being and work-related variables.
- Study 4: test the temporal stability or reliability of the WAAQ.
- Study 5: test the gender invariance of the scale.

Study 1: Cultural adaptation and exploratory factor analysis

The purpose of the Study 1 was to test the construct validity of the WAAQ.

The cultural adaptation of WAAQ was carried out following the procedures indicated by Beaton and colleagues [33]. Considering the cultural differences between the countries where the WAAQ was developed, the United Kingdom, and Italy, concerning employment conditions and labor force participation [34], it is essential to understand whether the scale can work the same way in Italy. In the first stage, we proceeded with a forward translation: two independent psychologists - with experience in test validation and different backgrounds - translated the test's items. One of the translators was aware of the concept being examined in the questionnaire, and the other was a naive translator who did not have a clinical background. The translations were compared, and the best wording choices were identified in a discussion between the translators.

In the following stage, we proceed with a back translation procedure. A native English speaker translated the Italian version back into English. There were no gross inconsistencies or conceptual errors between the forward and the back translations.

Afterwards, a committee of three experts reviewed all translations of the original version of the test to ensure the Italian version retained its equivalence with the original version, defining the prefinal version. The prefinal version was administered during a pre-test phase to 30 adults. After completing the test, they were interviewed to probe the understandability of the items. All participants answered affirmatively. This final version was used in the following studies.

Methods

Participants and Procedure

The participants were 336 Italian workers, aged between 19 and 64 ($M = 38.44$, $SD = 11.67$). Fifty-six percent were women. The educational level of the participants was as follows: .6% primary studies, 22.3% mid-level study graduates, 39.6% college graduates, 13.1% bachelor graduates, 18.2% master graduates, 6.3% people with post-graduate specialization or PhD. The mean number of working hours per week was 29,77 ($Min = 2$; $Max = 60$; $SD = 11.90$). Regarding their working positions, 43.2% of participants were line-level employees in a public company, 33% were line-level employees in a private company, 13.4% were self-employed or freelance workers, 5.4% were entrepreneurs or managers of a company, and 5.1% were company partners. Moreover, 18.2% of participants defined their work as consistent with their interests, 19,6% as consistent with their abilities, 53.6% as consistent with their interests and skills, and, finally, 8.6% indicated that their work was not consistent with their interests or skills.

Participants were recruited through an online survey, voluntarily, through convenience sampling from the general population. Participants who decided to participate in the research filled out the Italian version of the WAAQ [original version: 25] with the following instructions: "Below you will find a list of statements. Evaluate the truth of each statement as it relates to you and select

one of the numbers, using the scale below to make your choices: 1 = Never true; 2 = Very rarely true; 3 = Rarely true; 4 = Sometimes true; 5 = Frequently true; 6 = Almost always true; 7 = Always true”.

Participants expressed their informed consent after being made aware that the data would be collected for scientific research and that their processing would take place in complete anonymity, as required by EU GDPR 679/2016 on protecting personal data. The research followed the ethical guidelines of the Italian Psychological Association.

Data analysis

Exploratory factorial analysis was used to verify construct validity. We used principal axis factoring with Promax rotation for seven items in IBM SPSS Statistics Version 25.0. We first checked the Kaiser – Mayer – Olkin (KMO) test to verify if the data were suitable for factor analysis, and Bartlett's sphericity test to evaluate the correlations between the variables. A KMO value $> .7$ and a significant Bartlett's test (χ^2) indicate adequacy to conduct EFA [35,36]. The number of factors to be extracted was determined by considering: (1) parallel analysis (PA) [37] using 100 random datasets [38], which is one of the most accurate methods for determining the number of factors to retain [39,40]; (2) the scree plot criterion, for which it is suggested to select all components just before the line flattens out (“elbow” in the curve); and (3) the Kaiser's rule, which suggests selecting the number of factors with an eigenvalue greater than 1 [35,36].

Reliability was evaluated with Cronbach's alphas and with McDonald's Omega values. Cronbach's alpha values are excellent if they exceed a value of .90, good above .80, and acceptable if they exceed .70 [41]. McDonald's Omega values, which is a more sensible and appropriate index of internal consistency compared to Cronbach's alphas [42], must be greater than .70; if they are greater than .8, they indicate good internal reliability.

Furthermore, we estimated gender differences through a t-test for independent samples, calculating the effect size through Cohen's *d*.

Study 2: Confirmatory Factor Analysis (CFA)

In Study 2, we tested the fit of the one-factor WAAQ [original version: 25] using CFA.

Methods

Participants and Procedure

The same procedure as in Study 1 was used to collect the data. In this second study, the participants were 301 Italian adults aged between 19 and 78 ($M = 35.76$, $SD = 11.71$). Sixty-two percent were women. The percentage of education level was thus distributed: .7% primary studies, 16.3% mid-level study graduates, 43.9% college graduates, 7.0% bachelor graduates, 26.9% master graduates, 5.3% people with post-graduate specialization or PhD. Regarding their working positions, 42.5% of participants were line-level employees in a public company, 27.6% were line-level employees in a private company, 16.3% were interns, 9.0% were self-employed or freelance workers, 2.3% were entrepreneurs or managers of a company, 2.3% partners of a company. Moreover, 16.9% of participants defined their work as consistent with their interests, 15.3% as consistent with their abilities, 56.5% as consistent with their interests and skills, and 11.3% indicated that their work was inconsistent with their interests or abilities.

Data analysis

We conducted CFA using IBM SPSS Amos, version 25.0. The model fit was measured through the following indices: ratio of the Chi-Square to degrees of freedom (χ^2/df); Comparative Fit Index (CFI) [43], which can take values from the 0 to 1 range; values of .90 or greater indicate of a good-fitting model [43,44]; Root Mean Square Error of Approximation (RMSEA) [45], whose values .05 or lower indicate excellent model fit, values .08 are acceptable, and values greater than .10 show an unacceptable model [46, 45]; Standardized Root Mean Square Residual (SRMR) [47], that has to be less than .08 [47]; Goodness of Fit Index and Adjusted Goodness of Fit Index (GFI and AGFI), whose values are acceptable if up to .90 [47].

For convergent validity, we examined two good indicators of the quality of measurement [48]: the average variance extracted (AVE) [49], which needs to be .50 and higher to indicate a sufficient

degree of convergent validity, and composite reliability coefficient (CR) [50], whose acceptable values are greater than .70.

The Cronbach's Alpha and McDonald's Omega reliability indices were calculated to determine the internal consistency.

Study 3: Concurrent validity of the scale

In Study 3, we examined the concurrent validity of WAAQ.

Methods

Participants and Procedure

The same procedure as in Study 1 and Study 2 was used to collect the data. In this case, participants were 255 Italian adults (male = 155, 45.1%; female = 140, 54.9%) aged between 19 and 68 ($M = 35.71$; $SD = 13.69$). More than half of the participants were college graduates (135, 52.9%); the other participants were master graduates (44, 17.3%), bachelor graduates (31, 12.2%), mid-level study graduates (25, 9.8%) or post-graduate specialization or PhD (19, 7.5%). Only one had primary studies (.4%). Regarding their working positions, 39.6% were employers in a private company, 25.1% were employers in a public company, 16.1% were self-employed or freelance workers, 4.3% were entrepreneurs or managers of a company, 2.4% were partners of a company, and the others (12.5%) belonged to other types of work.

Measures

Work-related psychological flexibility (WAAQ; [25]). The same scale used in Study 1 and Study 2 was also used in Study 3. In this study, Cronbach's alpha value was .87.

Psychological inflexibility. Acceptance and Action Questionnaire-II (AAQ) [32; 51]. The AAQ-II is a self-report questionnaire composed of 7 items that assess psychological inflexibility on a 7-point Likert scale (1 = not at all true to 7 = completely true). The AAQ-II was chosen for this study as it is the most used measure of psychological inflexibility in the empirical literature and has shown good internal consistency and test-retest reliability in community samples [32]. A sample item from this measure is "My painful experiences and memories make it difficult for me to live a life that I would value". In this study, Cronbach's alpha was .87.

Work engagement. Utrecht Work Engagement Scale (UWES-9) [52; 53]. The UWES-9 is a 9-item scale that evaluates work engagement and contains three subscales: vigor, dedication, and absorption. Participants are asked to respond on a 7-point Likert scale (from 0 = never to 6 = always). Sample items are: "At my job, I feel strong and vigorous" (measure of vigor), "My job inspires me" (measure of dedication), and "I am immersed in my job" (measure of absorption). In addition, the scale makes it possible to calculate a total point of work engagement. In this study, Cronbach's alphas were: .88 for vigor, .91 for dedication, .79 for absorption, and .93 for the total point.

Life Satisfaction. Satisfaction with Life Scale (SWLS) [54,55] comprises five items that ask individuals to rate the extent to which they agree with statements on a 7-point Likert scale (1 = strongly agree, 7 = strongly disagree). A sample item of this measure is "In most ways, my life is close to my ideal". In this study, Cronbach's alpha was .89.

Flourishing. The Flourishing Scale [56; 57] is an 8-item scale evaluating flourishing. Respondents are asked to rate their degree of agreement on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). A sample item of this measure is "I lead a purposeful and meaningful life". In this study, Cronbach's alpha was .88.

Data analysis

SPSS Version 25.0 was used in this study. The convergent validity was assessed by correlating the scores of the WAAQ with the following measures such as to the most widely used measure of psychological inflexibility (AAQ-II) [32], life satisfaction (SWLS) [54], flourishing (FS) [56], and work-engagement (UWES-9) [52], using Pearson's r coefficient.

Study 4: Test-retest reliability

The fourth study aimed to evaluate the stability of WAAQ using the test-retest method.

Methods

Participants and Procedure

Participants in the third study were 56 Italian adults (male = 20, 35.7%; female = 36, 64.3%) aged between 26 and 58 ($M = 40.16$; $SD = 7.08$). One of them was a bachelor's graduate, 42 participants (75%) were master's graduates, and the others (13 participants, 23.2%) had people with post-graduate specialization or PhD. Regarding their working positions, most of them (37, 66.1%) were line-level employees in a public company, 11 of them (19.6%) were partners of a company, 5 (8.9%) were self-employed or freelance workers, and the others (3, 5.4%) were line-level employees in a private company.

Also, in this case, as in previous studies, participants were volunteers and completed an online research protocol. The same procedures as in previous studies were used. The only difference concerned the request to insert a personal code at the beginning of the protocol (formed by the first letter of the name, the first letter of the surname and the day of birth) and an email address to which remote administration of the same protocol should be sent after three weeks. This allowed anonymity. Also, in this case, the research followed the ethical guidelines of the Italian Association of Psychology.

Data analysis

SPSS Version 25.0 was used to conduct the analyses. To determine the internal consistency Cronbach's Alpha and McDonald's Omega values were used; WAAQ's test-retest reliability was calculated using intraclass correlation coefficients after three weeks.

Study 5: Measurement of gender invariance

The purpose of the fifth study was to evaluate the gender invariance of WAAQ [original version: 25], given the significant differences across genders found in Study 1 (see Table 2).

Methods

Participants and Procedure

The same procedure as in previous studies was used to collect the data. In this fifth study, the participants were 892 Italian adults aged between 19 and 78 ($M = 35.76$, $SD = 11.71$). Men were 377; women were 515. The percentage of education level was thus distributed: .6% primary studies, 16.7% mid-level study graduates, 44.8% college graduates, 10.8% bachelor graduates, 20.9% master graduates, 6.3% people with post-graduate specialization or PhD. Regarding their working positions, 37.8% of participants were line-level employees in a public company, 33.1% were line-level employees in a private company, 12.7% were self-employed or freelance workers, 9.1% were interns, 4% were entrepreneurs or managers of a company, 3.4% partners of a company.

Data analysis

We test gender invariance using IBM SPSS Amos, version 25.0. Measurement invariance across the gender groups was tested through a series of multiple-group CFAs in which we tested different, progressively more stringent forms of measurement equivalence [58]. We examined four levels of invariance: (1) configural, (2) metric, (3) scalar, and (4) residual invariance. (1) Configural invariance tests at the most basic level if the same factor structure holds for the different groups. (2) Assuming configural invariance is achieved, metric invariance tests if the items have the same relationship to the underlying latent construct across groups (i.e., equivalent factor loadings) [59]. (3) If metric invariance is supported, researchers test scalar invariance to deepen if there is equivalency in item intercepts across the groups. (4) Assuming scalar invariance is met, residual invariance tests for equivalency across the groups for measurement error. If residual invariance is achieved, an instrument may be assumed to be entirely equivalent between groups in measurement function. As the procedure for testing measurement invariance has largely been covered in the literature [60, 61, 62, 63], we will not detail it here. Metric, scalar, and residual invariance are often called weak, strong, and strict invariance, respectively [60]. Nested models were compared for testing invariance, estimating the differences in the approximate fit indices. Specifically, differences regarding the RMSEA of $\geq .015$ and the CFI of $\geq .10$ can be interpreted as a lack of invariance [64, 65]. Moreover, we tested model fit using the Comparative Fit Index (CFI) [43], which values of .90 or greater indicate a good-fitting model [43, 44]; Root Mean Square Error of Approximation (RMSEA) [45], regarding which a value of .05 or less indicate very good model fit, a value of .08 shows acceptable fit and a

value greater than .10 shows an unacceptable model [46, 45]; Standardized Root Mean Square Residual (SRMR), that has to be less than .08 to indicate a good model [47].

RESULTS

Results of the Study 1

Table 1 shows descriptive statistics and gender differences for the items and the total score for the WAAQ. The distribution of the items' scores was normal, according to the skewness and kurtosis values [66]. Results of t-test comparisons showed significant differences in items 1, 4, 5, 6, and 7 (indicating higher values in males); notwithstanding, the effect sizes were small ($\leq .35$).

Table 1. Descriptive statistics and gender differences of the WAAQ's items.

Items	Total (n = 336)				Male (n = 148)		Female (n = 188)		t	p	Cohen's d
	M	SD	Skewness	Kurtosis	M	SD	M	SD			
1.	5.37	1.25	-.64	.32	5.52	1.15	5.25	1.31	1.98	.04	.22
2.	5.49	1.30	-.86	.46	5.53	1.26	5.46	1.34	.48	.63	.05
3.	5.00	1.32	-.37	-.36	5.14	1.30	4.89	1.33	1.75	.08	.19
4.	4.83	1.49	-.36	-.45	5.07	1.38	4.64	1.54	2.65	.01	.29
5.	4.89	1.39	-.47	-.24	5.09	1.34	4.73	1.42	2.36	.02	.26
6.	4.46	1.55	-.24	-.58	4.76	1.48	4.22	1.57	3.22	.01	.35
7.	4.77	1.57	-.45	-.49	5.00	1.48	4.60	1.62	2.36	.02	.26
Total Mean			34.81								
Total SD			7.60								
% Explained Variance			59.73								

Note: WAAQ = work-related acceptance and action questionnaire

The data were suitable for factor analysis because Kaiser–Mayer–Olkin (KMO) test value was .83, and Bartlett's test was significant ($\chi^2 = 1159,01$; $p < .000$). The results of the exploratory factorial analysis show a one-factor solution, with the first eigenvalue of 4.18 (the second was .83), accounting for 59.73% of the variance. Parallel analysis suggested that a unidimensional structure can be investigated (Table 2). All the seven items had adequate commonalities [67]. Table 3 shows factor loadings of all the seven items of the WAAQ in the first study. Moreover, the total Cronbach's alpha was .88 and McDonald's Omega for the over WAAQ was .89, which shows good reliability.

Table 2. Parallel analysis results.

Variable	Real-data eigenvalues	Mean of random eigenvalues	95 th percentile of random eigenvalues
1	4.181	1.1493	1.586862
2	.826	1.403	1.460792
3	.552	1.340	1.392804
4	.455	1.284	1.33143
5	.370	1.237	1.279134
6	.318	1.192	1.231114
7	.298	1.150	1.183893

Table 3. Exploratory factorial analysis results.

Item	Communalities	Factor Loadings
1	.55	.74
2	.20	.45
3	.63	.79
4	.60	.78
5	.64	.89
6	.52	.72
7	.61	.78

Results of the Study 2

The model showed the following fit to the data: $\chi^2/df = 28.21/14 = 2.01$, CFI = .99, RMSEA = .06 (C.I. 90 % .03 – .09), SRMR = .03, GFI = .97, AGFI = .94, AIC = 56.21). The fit statistics for the model are shown in Table 4. Factor loadings are shown in the path diagram (Fig. 1).

Furthermore, we estimated Convergent validity through CR and the AVE. The values for these indices were CR = .88 and AVE = .52. The results confirmed a good convergent validity.

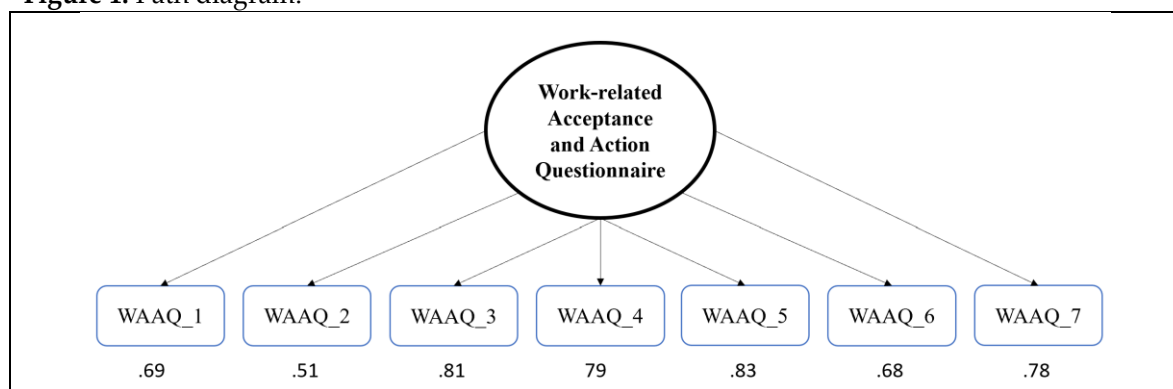
In this study, total Cronbach’s alpha was .89 and McDonald’s Omega was .89.

Table 4. Fit statistics for Confirmatory Factor Analyses of the WAAQ.

χ^2	df	CFI	RMSEA (C.I.)	SRMR	GFI	AGFI	AIC
28.21	14	.99	.06 (.03 - .09)	.03	.97	.94	56.21

Note: WAAQ = work-related acceptance and action questionnaire

Figure 1. Path diagram.



Note: WAAQ = work-related acceptance and action questionnaire

Results of the Study 3

Table 5 reports the correlations between WAAQ and the other scales. As expected, WAAQ is significantly and positively related to Work engagement and its three subscales (vigor, dedication, and absorption), general satisfaction, and flourishing; it is negatively related to psychological inflexibility.

Table 5. Correlations between work-related psychological flexibility, psychological inflexibility, work engagement, meaningful work, life satisfaction, and flourishing (N = 255). Pearson’s r coefficient.

	1	2	3	4	5	6	7
1. Work-related psychological flexibility (WAAQ)	-						
2. Psychological inflexibility (AAQ)	-.13*	-					
3. Vigor (UWES-9)	.32**	-.29**	-				
4. Dedication (UWES-9)	.23**	-.30**	.83**	-			
5. Absorption (UWES-9)	.34**	-.18**	.70**	.68**	-		
6. Work engagement (UWES-9)	.33**	-.29**	.93**	.93**	.87**	-	
7. Life satisfaction (SWLS)	.21**	-.41**	.50**	.49**	.30**	.48**	-
8. Flourishing (FS)	.26**	-.43**	.59**	.61**	.42**	.60**	.69**

Note: * p < .05; ** p < .01

Results of the Study 4

The intraclass correlation coefficient of WAAQ was .78 (95% C.I., .62, .87). Cronbach’s Alpha values were .85 in the first administration and .88 in the second. In the first and the second administration, McDonald’s Omega values were .86 and .88.

Results of the Study 5

The first multiple-group analysis tested a model of configural invariance (Model 1) by simultaneously evaluating its fit on male and female samples. The fit indices ($\chi^2_{(69)} = 238.73$, $p = .00$; CFI = .98; SRMR = .07; RMSEA = .08) all indicated an acceptable fit for this model, supporting an equivalent one-factor solution for the WAAQ for both men and women.

Model 2 tested for metric or weak invariance. All the fit indices were acceptable (Table 6). Moreover, $\Delta\chi^2_{M2-M1} = 11.4$ and $\Delta CFI = .002$ suggested that Model 2 was equivalent to Model 1. Thus, metric invariance was supported.

Model 3 was tested for scalar or strong invariance, and it found an acceptable fit ($\Delta\chi^2_{M3-M2} = 14.8$, $\Delta CFI = .003$).

Finally, we tested the equivalence in measurement errors or residual invariance (Model 4): $\Delta\chi^2_{M4-M3} = 28.3$, $\Delta CFI = .007$. The results were satisfactory as the model fit proved to be invariant across both populations (see Table 6).

Table 6. Measurement invariance across gender for the WAAQ one-factor model.

Model	Model fit					Model comparison		
	χ^2/df	RMSEA (90% C.I.)	CFI	TLI	SRMR	$\Delta\chi^2$	$\Delta RMSEA$	ΔCFI
M1: Configural invariance	148.7/28 ***	.070 (.06, .08)	.960	.940	.040	-	-	-
M2: Metric invariance	160.1/34 ***	.065 (.05, .07)	.958	.948	.042	11.4	.005	.002
M3: Scalar invariance	174.9/40 ***	.062 (.05, .07)	.955	.953	.042	14.8	.003	.003
M4: Residual invariance	203.2/47 ***	.061 (.05, .07)	.948	.954	.046	28.3	.001	.007

Notes. WAAQ = work-related acceptance and action questionnaire; ***p < .001

Table 7 shows the final version of the WAAQ questionnaire in Italian.

Table 7. The Italian version of the Work-Related Action Questionnaire (WAAQ).

Qui sotto troverà una lista di affermazioni. Valuti la verità di ciascuna di esse per quanto la riguarda e selezioni uno dei numeri di seguito riportati. Usi la scala sottostante per fare le Sue scelte: 1 = Non è mai vero 2 = È vero molto raramente 3 = È vero raramente 4 = È vero a volte 5 = È spesso vero 6 = È vero quasi sempre 7 = È sempre vero
1. Sono in grado di lavorare in modo efficace nonostante le preoccupazioni personali che ho
2. Posso ammettere i miei errori sul lavoro e avere comunque successo
3. Posso lavorare in modo molto efficace, anche se sono nervoso per qualcosa
4. Le mie preoccupazioni non mi ostacolano nel riuscire a fare le cose
5. Posso svolgere il lavoro come richiesto, indipendentemente da come mi sento
6. Posso lavorare in modo efficace, anche quando dubito di me stesso
7. I miei pensieri e sentimenti non intralciano il mio lavoro

DISCUSSION

In this research, we aimed to verify the psychometric properties of the WAAQ in the Italian context. The data of these five studies support the validity, reliability, and invariance across genders of the WAAQ as a measure of work-related psychological flexibility in Italy.

The scale shows a high level of construct validity (Study 1), confirming the one-factorial structure (Study 2), and a good concurrent validity, showing correlations with other measures (Study 3); moreover, the scale appears to have good test-retest reliability (Study 4); finally, the scale shows to guarantee the gender invariance (Study 5).

These results are consistent with other studies that examined the validity and reliability of the WAAQ, confirming its one-factor solution also in the Spanish [30], Chinese [31], Swedish [68], and Ecuadorian [69] contexts. The one-factor solution has always been supported in all these contexts.

Regarding concurrent validity, the WAAQ revealed different correlation patterns from those of the AAQ-II. Specifically, the WAAQ showed higher correlations than the AAQ-II with work engagement as measured by the UWES. Consistently, the WAAQ-II showed lower correlations than the AAQ-II with life satisfaction measured by SWLS and flourishing measured by FS. As predicted by ACT theory, these findings show that the general measure of psychological flexibility (i.e., the AAQ-II) was significantly more associated with life satisfaction and flourishing; conversely, the WAAQ showed greater associations with work-related variables, such as vigor and absorption of work engagement. These results are consistent with the literature. For example, Holmberg et al. [26] found that the dimension of psychological flexibility at work assessed through the WAAQ correlated with all dimensions of work engagement assessed through the UWES (vigor, dedication, and absorption) and, also with the total score. Relationships between work-related psychological flexibility and work engagement were already known in the literature thanks to studies by Bond et al. [25], Ruiz- Jiménez and Odriozola-González [30], Holmberg et al. [68] and Xu et al. [31].

Furthermore, in a recent study, Holmberg et al. [26] demonstrated an indirect effect of psychological flexibility on the relationship between distress and work engagement. Given the implications that work engagement has in both job performance [70] and job satisfaction [71,72], including in the context of new forms of work such as smart working [72], future studies could explore the role of psychological flexibility in these relationships.

Studies have focused on the relationship between psychological flexibility at work and work outcomes or stressful events that can occur in the workplace [26,68]. Life satisfaction has been investigated above all concerning the general concept of psychological flexibility. Third-wave therapies such as Acceptance and Commitment Therapy (ACT) [6,7] seek to promote psychological flexibility in individuals as this can allow them to live a life close to their values and ideals. This coincides with the concept of life satisfaction [56]. Other studies have shown that psychological flexibility correlates with life satisfaction [73-75] and flourishing [13,14,15,75]. Similarly, we found that the dimension of psychological flexibility in a work domain also correlates positively with life satisfaction and flourishing, albeit weaker than the general concept of psychological flexibility. Psychological flexibility is vital in managing adversity [76], which can also be valid for the work context [77]. Consequently, psychological flexibility in the workplace is strongly related to individual well-being.

The aim of Study 4 was to measure the temporal stability of the scale using the test-retest reliability method. Test-retest reliability was indicated by the intraclass correlation coefficient, calculated by a second scale administration to the same participants after three weeks. The results of Study 4 suggest that the Italian version of the WAAQ may help assess behavioral change.

Finally, Study 5 shows gender invariance, confirming that the results are comprehensive and applicable in research and practice. This is an innovative element compared to previous studies on the WAAQ, which mainly focused on the measure's reliability and its factor structure. Our results supported configural, metric, scalar, and residual invariance between males and females. This outcome supports the idea that the understanding of the work-related psychological flexibility construct is similar for men and women.

Study limitations and conclusion

Overall, this research shows that the WAAQ scale is a reliable instrument for researchers and practitioners who want to evaluate work-related psychological flexibility in the Italian context.

These results must be considered taking into account the main limitation of the research. The first limit lies in the self-report measure, which could not grasp the numerous and deeper aspects of individual variability that can be better understood with more sensitive tools, such as clinical interviews. Second, we used convenience sampling in all studies; therefore, it is probable that the results are not generalizable to all Italian workers. Third, the cross-sectional nature of the third study did not allow for verification of the predictive validity of the scale.

Future research could broaden this scale to measure the six dimensions of psychological flexibility, as conceptualized by ACT [6], concerning the workplace. A measure that reflects the multidimensionality of this psychological flexibility could evaluate personal functioning in the workplace more sensitively and, consequently, guide interventions even more precisely.

The workplace is not just a site for professional activity but a crucial arena for addressing the challenges of psychosocial risks and promoting psychosocial well-being [78-85]. Contextually measuring psychological processes can be essential in prevention interventions aimed at ensuring healthy and sustainable lives and promoting career development and well-being for all workers.

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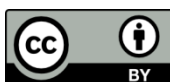
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