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# Psychometric study of the Mentallypro Scale for the evaluation of exposure to psychological risk factors in the work environment

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Título: Estudio psicométrico de la Escala Mentallypro para la evaluación de la exposición a los factores de riesgo psicológico en el entorno laboral. Resumen: Antecedentes: Este trabajo presenta la nueva Escala Mentallypro para la Evaluación de la Exposición a los Factores de Riesgo Psicológico en el Entorno Laboral. Su aparición viene a resolver algunas de las limitaciones de las actuales escalas que o bien no presentan baremos actualizados o tienen desajustes al actual entorno laboral. Método: 6881 trabajadores distribuidos en 11 sectores de actividad distintos cumplimentaron la escala definitiva, obtenida después de una escala de ensayo. La escala final consta de 56 ítems ipsativos presentados en bloques de cuatro, para que quién responda los ordene en función de su mayor a menor identificación con el contenido del ítem. Los ítems definen 14 factores y se han obtenido puntuaciones tipificadas para cada factor y sector de actividad basadas en la distribución de los Cocientes Intelectuales (CI) [ $\mu = 100$  y  $\sigma = 15$ ]. Resultados: Todos los indicadores psicométricos muestran un elevado grado de validez y fiabilidad. Además, las puntuaciones se han corregido por Edad y Género para eliminar el efecto diferencial de ítem. Conclusiones: La escala presentada cumple con las exigencias psicométricas y resuelve las limitaciones de otras escalas en lo que se refiere a facilidad, rapidez y utilidad en el entorno laboral.

Palabras clave: Evaluación de Riesgos Psicosociales. Psicometría. Mentallypro.

# Introduction

For many years now, the assessment of exposure to psychological risk factors has carved out its own niche in the occupational health landscape. The conception of mental health and emotional well-being as a relevant aspect in people's lives, especially following the effects of the pandemic, has been one of the fundamental shifts in recent years (Huarcaya-Victoria, 2020).

Epidemiological data indicates a clear and sustained increase in diagnoses related to mental health, psychopathology, and issues stemming from emotional distress. A summary of basic data from a broad epidemiological study can be found in Ergashev and Turdiev (2022), indicating, for instance, that anxiety-based disorders have increased by 42% in Europe. When these data are analyzed from the perspective of COVID's impact, the numbers suggest even greater increases, as outlined in an excellent systematic review of the issue (Hossain et al., 2020). Obviously, this aspect is no different in the workplace, where assessing exposure to risk fac-

\* Correspondence address [Dirección para correspondencia]: Joan Guardia i Olmos. Departament de Psicología Social & Psicología Quantitativa. Facultat de Psicología. Universitat de Barcelona (Spain). E-mail: jguardia@ub.edu (Article received: 28-07-2023; revised: 02-08-2023; accepted: 28-11-2023) Abstract: Background: This paper presents the new Mentallypro Scale for the Assessment of Exposure to Psychological Risk Factors in the Work Environment. Its appearance comes to solve some of the limitations of the current scales that either do not present updated scales or have mismatches to the current work environment. Method: 6881 workers distributed in 11 different sectors of activity completed the final scale, obtained after a test scale. The final scale consists of 56 ipsative items presented in blocks of four, so that the respondent can order them based on their highest to lowest identification with the item's content. The items define 14 factors and standardized scores have been obtained for each factor and sector of activity based on the distribution of Intellectual Quotients (IQ) [ $\mu = 100$  and  $\sigma$ = 15]. Results: All the psychometric indicators show a high degree of validity and reliability. Additionally, scores have been corrected for Age and Gender to remove the item differential effect. Conclusions: The scale presented meets the psychometric requirements and resolves the limitations of other scales in terms of ease, speed, and utility in the work environment. Keywords: Psychosocial Risk Assessment. Psychometrics. Mentallypro.

tors associated with mental illness and emotional well-being has been a challenge, as noted in recent systematic reviews and meta-analyses (Galanis et al., 2021; Hazell et al., 2020; Kisely et al., 2020; López et al., 2019; Syed et al., 2020).

For example, according to data from Spain's Social Security (2023), as of December 2022, the prevalence of work leave stands at 46.89 per thousand, of which it is estimated that a third are related to diagnoses linked to mental health and emotional well-being.

It is evident that this is an issue that involves the clear management of exposure to psychological risks in the workplace. The goal is none other than to ensure adequate working conditions and reduce the likelihood of work leave associated with psychological disorders.

In recent years, various instruments and techniques have been proposed for assessing this risk exposure (Martínez, 2020). Generally, all of them are based on the concept of obtaining an estimation of the organization's state regarding risk exposure from the aggregated study of workers' subjective perceptions. That is, negative perceptions among the workforce typically imply greater risk exposure. It's obvious, there is a difference between this perception and actual exposure, but the latter is impossible to quantify, while the former can be approached psychometrically. This has been the strategy of most risk exposure assessment technique proposals.

Among them, those that have demonstrated good psychometric behavior stand out, such as the ISTAS21 questionnaire, which has recently been updated (Moncada et al., 2021) and standardized for various populations (e.g., Muñoz et al., 2022), with studies on adaptations and epidemiological applications worth noting, such as that by Montalvo et al. (2020).

On the other hand, the FPsico 4.1 questionnaire, managed digitally by the National Institute of Occupational Safety and Health (INSST) (2022a), shares the aforementioned psychometric guarantees. It has been adapted to various languages, always within the orbit of INSST (2002b). It has not been the subject of scientific publications, except for some applications that follow the INSST's proposed scheme and do not delve into the instrument's details or psychometric updates. An interesting study is the one that presents the comparison between both instruments (Cedeño and Chávez, 2020) in which it is concluded that there are clear coincidences between the two in the analyzed sample.

There are other techniques created with the same objective, but with much less extensive application, all of which follow the same scheme as the two aforementioned techniques.

Given this landscape, it is worth asking what the situation is regarding this issue and its valuation since both techniques, while psychometrically adequate, do not apply the latest advancements in estimating psychometric validity and reliability. In the case of FPsico, this is clearer since the scales used for its normalization have not been updated.

This implies the possibility of proposing some novelty in this regard to obtain a new approach to the assessment of risk exposure. That is the objective of this work, to describe the psychometric study applied to the instrument called *Mentallypro*, which aims to assess risk exposure, but with an updated psychometric strategy.

This update primarily involves three fundamental aspects. Firstly, it is about establishing benchmarks by sectors of activity, not a single benchmark regardless of the entity's activity. Even within the same entity, different benchmarks could be applied to identify different activities. This provides much more realistic and useful reference values. Using the same benchmark for very different tasks and activities can generate biases of systematic error, as was discussed some time ago in a study on the management of systematic and random errors in psychometric studies (Barber et al., 2013).

The second aspect is based on the use of ipsative items to reduce bias. As is well known, this strategy reduces the effect of, for example, social desirability or fictitious responses, and in this case, it represents a strategy not used until now but highly recommended for a solid assessment (Abad et al., 2011; Stanislaw and McCreary, 2023). The third innovation that *Mentallypro* proposes is the estimation of the Differential Item Functioning (DIF), which allows eliminating bias due to the presence of a systematic effect in responses from specific categories of relevant external variables. In this case, the variables of age and sex were selected to assess their potential systematic bias effect, as in Anderson et al. (2016).

In addition to the above and considering the conditions of application in a work environment, the proposal must be quick, easy, simple to administer and correct, and with result reports offering a wide range of graphic options and quick comprehension. However, these last details only have an applied effect that has little to do with psychometric conditions. What this paper aims to present is this new tool and the fundamental values that guarantee an adequate study of psychometric reliability and validity.

# Method

## Participants

In this study, two samples were configured, the first for the trial scale study and the second for the psychometric study of the definitive scale. The first was composed of a total of 3435 individuals (with a sampling error of .0119 at a 95% confidence level and under the assumption of maximum indeterminacy). The second comprised a total of 6881 individuals (with a sampling error of .0167 at a 95% confidence level and under the assumption of maximum indeterminacy). Table 1 (a and b) summarizes the main descriptors of both samples.

## Instruments

#### Construction of the Trial Scale

This scale was created based on the information available in the standard literature on the constructs typically assessed in scales for evaluating psychological risks in the workplace. For instance, those described in FPsico 4.1 (INSST, 2002a and b) or similar tests. For an update on the conceptual definitions of each construct and the final list of constructs to be evaluated, the collaboration of a total of 64 companies and public and private entities (listed in Annex 1) was obtained. These entities contributed, in this phase of the trial scale construction, by providing their personnel specialized in these matters to generate and perform content validation of the constructs ultimately included in the scale. The definitions of each factor can be found in Annex 2.

From this initial work, the list of created definitions was transferred to a group of 8 experts in psychometric assessment and occupational risks to assess the level of understanding of the proposal and the current relevance of the construct as part of the proposed evaluation. They were given a scale of 1 to 10 for each assessor to represent their degree of agreement. In the case of comprehension, the lower value was 8 and the higher 10; while for relevance, the lower value was 9 and the highest, of course, 10. These values ensured a certain verisimilitude of the defined constructs with the reality to be measured.

Table 1a
Descriptive statistics of categorical variables in the trial sample and in the final sample.
Trial sample Final sample

		Trial sample	Final sample
	Sample size (n)	3435	6881
	Primary	255	673
Educatio-	High School or Intermedi- ate Level Training Cycles	688	1482
nal level	University graduates or Higher Education Training	2492	4726
	Cycles	1 (10	2015
0	Female	1619	3817
Sex	Male	1803	3034
	Other	13	30
	Insurance		433 (255 fem.)
	Banking	1031	850 (423 fem.)
Sector of Activities	Accounting		373 (164 fem.)
	Education		259 (120 fem.)
	Hotel management		504 (280 fem.)
	Industry	561	486 (272 fem.)
	Maintenance	693	693 (378 fem.)
	Restoration		591 (283 fem.)
	Services	501	701 (329 fem.)
	Technology	649	1536 (642 fem.)
	Social and health care		455 (292 fem.)

From the 14 constructs (factors) listed in Annex 2, the corresponding items for the evaluation of each were generated with the already mentioned limitations, to be affirmative and tending towards non-exposure, and not exceeding 20 words in length and preferably about 15 words (ensuring a

Table 1b

single line of reading). A total of 216 phrases that met the inclusion criteria were generated, developed by independent working groups advised by item creation specialists and having all necessary materials. Of these, 33 were discarded for being repetitive. From the remaining total, the items were sent back to the external consultants to select items for each factor that represented an adequate operational definition of each of the fourteen factors. In this case, for item selection, the experts were asked to rate each item on a scale of 1 to 10 to assess 1) the level of understanding of the item, 2) assignment to the theoretical factor, 3) the importance of each item, and 4) if the wording was simple enough to ensure maximum comprehension. All items that did not exceed a value of 8 in the observed median for these four evaluated variables were discarded, and from this criterion, a total of 70 items survived this analysis. For reference, the multiple correlations between the distributions of the expert group's evaluations were .89, .79, .96, and .91 respectively. Therefore, the trial scale version consisted of 70 items (5 for each factor to be evaluated) randomly grouped into 18 blocks of 4 with the instruction for the person answering the trial scale to select the phrase (item) that most reflected their situation at work, then to select the second, then the third, and finally, the one that least represented them. The first selected item was assigned a value of 4, descending to a value of 1 for the last phrase (item) selected. The possibility of the number of permutations being greater than the 18 proposed to obtain ordering values with a higher number of combinations was considered, just as using only the presentation of two simultaneous items was discarded, since both strategies involve an administration time that is not feasible in a work environment. To construct the necessary 72 reactives (18 blocks of 4 items), two innocuous phrases that did not interfere in the response mechanism were included, since only 70 items were selected.

	Trial sample	Final sample	
Age	Average 44.82	Average 45.05	
-	Standard deviation 9,729	Standard deviation 9,658	
	Median 46	Median 46	
	IC (95%) 44.50 - 45.15	IC (95%) 44.82 - 45.29	
Years of seniority in the company	Average 15.18	Average 14.01	
	Standard deviation 9.876	Standard deviation 9.873	
	Median 16	Median 14	
	IC (95%) 14.95 - 15.51	IC (95%) 13.77 - 14.25	
Years in your current job position	Average 7.68	Average 8.09	
	Standard deviation 7,176	Standard deviation 7,306	
	Median 5	Median 5	
	IC (95%) 7.44 - 7.92	IC (95%) 7.92 - 8.27	

#### Construction of the Definitive Scale

From the psychometric study of the trial scale and the discriminability values of the items and their correlations with the total of each factor, those items that did not contribute a relevant value to internal reliability or showed correlations below .60 with the total of the factor were eliminated. With this criterion, the number of items in the definitive scale was reduced to 56 items distributed as shown in Table 2.

Table 2

Number	of items	in th	fina	l scale	assigned	to each	factor
1 NMMDCI	of ucms	in in	i jinui	sume	ussigneu	io cuin	juiior

FACTOR	Number of items
WORK CONTENT	4
WORKLOAD AND PACE OF WORK	3
WORK TIME	4
PARTICIPATION AND CONTROL	4
PERFORMANCE OF FUNCTIONS AND	5
RESPONSIBILITIES	
PROFESSIONAL DEVELOPMENT	4
INTERPERSONAL RELATIONSHIPS	4
WORK TEAM	4
MENTAL WORKLOAD	5
WORK-LIFE BALANCE	5
LEADERSHIP STYLE	4
RESPONSE TO CHANGE	4
SOCIAL RECOGNITION	3
INFORMATION AND TRANSPARENCY	3
Total number of items in the final scale	56

Annex 3 presents the definitive scale in its current format. It consists of 56 items presented in a random sequence of 14 blocks of four to exactly reproduce the conditions of the administration of the trial scale.

#### Table 3

Simple descriptive statistics for each item

Procedure

The administration of both the trial scale and the subsequent definitive scale was carried out through Qualtrics under a license from the Universitat de Barcelona, and during the period from December 2022 to March 2023. In all cases, the administration followed current data protection regulations and was validated by the Ethics Committee of the same university. Responses to the items were declared mandatory, but not the rest of the sociodemographic or work-related variables.

### **Data Analysis**

The analyses were conducted using IBM SPSS version 25 for standard descriptive statistics, RStudio version 4.0.1 for graphical explorations and for the estimates of the Differential Item Function (DIF) using proprietary programming, and MPLUS version 8.10 for the study of the multigroup measurement model. All were under the license of the Universitat de Barcelona. The estimation of confidence intervals for Cronbach's alpha reliability was performed using intraclass correlation, and the estimation of the Multigroup Measurement Model was carried out using the Maximum Likelihood (ML) technique, assuming the correlation between factors  $[E(\xi\xi) \neq 0]$ , the possibility of correlation between measurement errors  $[E(\varepsilon_{\delta i}\varepsilon_{\delta j}) \neq 0]$ , and assuming that the factors are normally distributed according to N [ $\mu = 0, \sigma^2$ =  $\eta$ . Similarly, the factor loading of the item that correlated most strongly with the total of the factor was set to 1 ( $\Delta_x =$ 1).

# **Results**

From the analysis described in the previous section, the following descriptors for each item were obtained (Table 3).

Standard Standard

	Mean	Mean		
LIST OF ITEMS		Deviation	Error.	
	x	$S_i$	$\sigma_{\bar{x}}^2$	
I have the appropriate knowledge and skills to do my job.	3.38	0.012	0.976	
I know the tasks I must perform in my job.	2.94	0.012	0.973	
I consider my tasks to be important.	3.07	0.011	0.944	
My work allows me to apply the training acquired.	2.93	0.013	1.050	
I have enough time to carry out my daily tasks.	2.75	0.013	1.110	
When there is an increase in work, I can handle it adequately.	2.21	0.014	1.133	
I have a job that allows me moments of mental relaxation.	2.28	0.011	0.940	
I can self-manage my work time.	2.68	0.013	1.096	
I can manage rest breaks in my daily workday.	2.42	0.012	0.980	
I have the possibility of organizing my work time.	2.72	0.012	0.979	
I have enough time for the optimal development of my work.	2.51	0.011	0.930	
I have influence over decisions that affect my work.	2.53	0.013	1.077	
In my job I am allowed to have initiative.	2.61	0.015	1.206	
My proposals are usually taken into account in the organization of tasks.	2.10	0.014	1.124	
In my tasks, my opinions are valued and I am informed of decisions.	2.13	0.013	1.063	
The functions of my position are clear and defined.	1.87	0.013	1.046	
I know the tasks and responsibilities of my colleagues.	2.67	0.013	1.064	

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	Mean	Standard Deviation	Standard
LIST OF ITEMS	x	Deviation	11/0/.
		$S_i$	$\sigma_{\bar{r}}^2$
I know the structure of my organization at the decision-making level.	2.26	0.012	0.972
In my company there is no duplication of tasks.	2.40		1.042
I clearly identify growth opportunities consistent with my functions.		0.014	1.189
I have possibilities to develop professionally.	2.61		1.142
My job allows me to learn new things.		0.013	1.083
My work contributes to my professional growth.		0.012 0.013	1.016 1.053
The information and possibilities about promotion at my job are sufficient and complete.			
There is a good atmosphere with my co-workers.		0.013	1.047
I can express myself freely and respectfully in my work environment.	2.72	0.014	1.144
My colleagues usually share their knowledge with others.	2.06		1.064
I receive help and support from my colleagues in carrying out my work.	2.71		1.002
I have the necessary and appropriate instruments and equipment to perform my work.	2.56		1.116
I feel comfortable and adapted in my work with the means I have available.		0.012	0.956
I feel comfortable and well adapted to working with new media. Applications. digital platforms and systems.	3.04		1.123
I have adequate and sufficient training to use the instruments and equipment necessary to perform my job.	2.86	0.012	1.003
My job does not usually require the handling of very complex information.		0.012	0.958
My tasks require acceptable mental effort.	2.54		1.099
I work concentrated due to the level of complexity of my task, but it does not prevent me from enjoying the work.	3.03	0.013	1.042
The complexity of my tasks does not always require maximum concentration.	2.66	0.013	1.084
The responsibility of my tasks does not cause me a problem concentrating at work.	2.75		1.073
I can balance my family and personal life with my professional life.	2.44		1.038
Doing my job does not prevent me from disconnecting digitally.	2.98	0.013	1.064
I am able to disconnect from my work when my work day ends.	2.81		1.079
I can separate my work time from my free time.	2.48		1.242
My job allows me to have free time for my personal life.	2.65		1.151
My superiors usually provide me with help and support to carry out my work.	2.64		0.986
My immediate superiors plan and distribute work well.	2.76		1.193
My bosses make sure that each of the workers has good opportunities for professional development.	2.61	0.014	1.172
I feel motivated and supported by my immediate superior.	2.41		1.167
The changes in my company are for the better.	2.04		1.119
I have enough time to adapt to the changes.		0.014	1.172
Innovation is facilitated in my work.		0.014	1.199
I find it stimulating to get out of my comfort zone.		0.013	1.120
I feel proud of the job I have.		0.013	1.078
The company I work for has prestige and recognition.	2.30		0.990
My work provides added value to my company.		0.012	0.991
My company makes it easy for information to flow properly.		0.014	1.125
The information coming from management is reliable and transparent.		0.013	1.083
My company carries out transparent and comprehensive management of things.		0.013	1.040
I have the appropriate knowledge and skills to do my job.		0.011	0.937
I know the tasks I must perform in my job.		0.012	0.984
I consider my tasks to be important.		0.012	1.024
My work allows me to apply the training acquired.		0.013	1.073
I have enough time to carry out my daily tasks.		0.013	1.061
When there is an increase in work, I can handle it adequately.		0.012	1.025
I have a job that allows me moments of mental relaxation.		0.012	0.955
I can self-manage my work time.		0.014	1.126
I can manage rest breaks in my daily workday.		0.013	1.070
I have the possibility of organizing my work time.		0.012	1.029
I have enough time for the optimal development of my work.		0.011	0.937
I have influence over decisions that affect my work.		0.012	1.005
In my job I am allowed to have initiative.		0.014	1.146
My proposals are usually taken into account in the organization of tasks.		0.013	1.043
In my tasks, my opinions are valued, and I am informed of decisions.	2.57		1.022
The functions of my position are clear and defined.	2.88	0.014	1.130

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#### Evidence of Reliability and Validity

In terms of reliability estimation based on Cronbach's alpha for all items, it was .823 with a 95% confidence interval (CI) ranging from .803 to .843, although the multifactorial nature of the scale implies that this value is of relative interest. Table 4 shows these values for each factor and scaling sector for an exhaustive study of reliability.

To avoid overwhelming the reader with information, it is only necessary to complement the previous table by mentioning that the lowest value at the lower limit of the confidence interval for reliability using the intraclass correlation coefficient was obtained for the Mental Load factor in the Accounting sector with a value of .698 at a 95% confidence level. For the upper limit, it was obtained in the same manner as the lower and was located in the Social Reward factor of the Insurance sector with a value of .905. This ensures sufficiently contrasted evidence of reliability.

Table	4
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I able 4											
Estimates of Crow	Estimates of Cronbach's a for each factor and sector of standardization.										
FACTORS	INSUR-	BANK-	ACCOUNT-	EDUCA-	HO-	INDUS-	MAINTE-	RESTORA-	SER-	TECHNOLOGY	SOC.
	ANCE	ING	ING	TION	TEL M.	TRY	NANCE	TION	VICES		HEA.
CONTENT	.721	.881	.811	.771	.881	.811	.813	.877	.855	.812	.875
WLOAD	.793	.813	.703	.783	.813	.833	.805	.803	.839	.799	.812
WTIME	.816	.796	.826	.816	.836	.846	.811	.811	.844	.803	.865
PARTICIPA	.863	.793	.873	.853	.793	.893	.816	.822	.871	.839	.827
PERFORM	.721	.821	.821	.841	.781	.771	.799	.815	.859	.812	.832
PROFES	.830	.841	.833	.823	.803	.833	.822	.799	.812	.839	.877
INTERPER	.868	.778	.799	.819	.849	.829	.801	.761	.801	.854	.871
WORK T.	.880	.790	.754	.824	.854	.884	.804	.854	.822	.838	.854
MENTW	.886	.766	.778	.798	.818	.838	.828	.888	.822	.822	.829
WLBALA	.741	.801	.822	.812	.782	.792	.812	.882	.834	.841	.848
LEADER	.788	.778	.798	.808	.828	.868	.822	.832	.881	.803	.862
RCHANGE	.814	.834	.814	.822	.878	.808	.819	.888	.804	.818	.871
SOCIALR	.900	.821	.833	.801	.839	.819	.819	.808	.871	.854	.879
INFORMAT	.831	.711	.789	.812	.878	.811	.844	.828	.880	.879	.812

Note: CONTENT: Work Content; WLOAD: Workload And Pace Of Work; WTIME: Work Time; PARTICIPA: Participation And Control; PERFORM: Performance Of Functions And Responsibilities; PROFES: Professional Development; INTERPER: Interpersonal Relationships; WORK T: Work Team; MENTW: Mental Workload; WLBALA: Work-Life Balance; LEADER: Leadership Style; RCHANGE. Response To Change; SOCIALR: Social Recognition and INFORMAT: Information And Transparency; HOTEL M: Hotel Management; SOC. HEA: Social And Health Care.

For validity, a construct validity-based approach was lished in a multigroup manner, analyzing each of the scaling

#### BLOCK NUMBER 4

FACTOR: PARTICIPATION AND CONTROL ÌTEMS I have influence over decisions that affect my work.

In my job I am allowed to have initiative.

My proposals are usually taken into account in the organization of

tasks.

In my tasks, my opinions are valued and I am informed of decisions.

ÌTEMS	FACTOR: PERFORMANCE OF ROLES ANI
	RESPONSIBILITIES
The functions	of my position are clear and defined.
I know the tas	sks and responsibilities of my colleagues.
	ructure of my organization at the decision-making lev
el.	
In my compar	ny there is no duplication of tasks.
I clearly iden	tify growth opportunities consistent with my func
tions.	, 0 11 ,
BLOCK NUM	BER 6
ÌTEMS	FACTOR: PROFESSIONAL DEVELOPMENT
I have possibi	lities to develop professionally.
	me to learn new things.
,	

My work contributes to my professional growth.

The information and possibilities about promotion at my job are sufficient and complete.

# chosen, defining a measurement model according to what has been described in the data analysis section and estabsectors and the general model thus formulated. Table 5 indicates the item number that saturates each factor.

1 able 5	
List of items assigned to each factor	
BLOCK NUMBER 1	
ÍTEMS FACTOR: JOI	B CONTENT
I have the appropriate knowledge and skills to do my jol	b.
I know the tasks I must perform in my job.	
I consider my tasks to be important.	
My work allows me to apply the training acquired.	
BLOCK NUMBER 2	
ÍTEMS FACTOR: LOAD AND W	ORK RATE
I have enough time to carry out my daily tasks.	

FACTOR: WORKING TIME

When there is an increase in work, I can handle it adequately. I have a job that allows me moments of mental relaxation

BLOCK NUMBER	3
ÌTEMS	

Table 5

I can self-manage my work time.

I can manage rest breaks in my daily workday.

I have the possibility of organizing my work time.

I have enough time for the optimal development of my work.

#### BLOCK NUMBER 7

#### FACTOR: INTERPERSONAL RELATIONSHIPS ÌTEMS There is a good atmosphere with my co-workers.

I can express myself freely and respectfully in my work environment.

My colleagues usually share their knowledge with others.

I receive help and support from my colleagues in carrying out my work.

### BLOCK NUMBER 8

FACTOR: WORK TEAMS ÌTEMS

I have the necessary and appropriate instruments and equipment to perform my work.

I feel comfortable and adapted in my work with the means I have available

I feel comfortable and well adapted to working with new media, applications, platforms and digital systems.

I have adequate and sufficient training to use the instruments and equipment necessary to perform my job.

BLOCK NUMBER 9	
ÌTEMS	FACTOR: MENTAL LOAD

My job does not usually require the handling of very complex information

My tasks require acceptable mental effort.

I work concentrated due to the level of complexity of my task, but it does not prevent me from enjoying the work.

The complexity of my tasks does not always require maximum concentration.

The responsibility of my tasks does not cause me a problem concentrating at work

BLOCK NUMBER 10	
ÌTEMS	FACTOR: CONCILIATION
I can balance my family and pe	rsonal life with my professional life.

Doing my job does not prevent me from disconnecting digitally. I am able to disconnect from my work when my workday ends. I can separate my work time from my free time.

My job allows me to have free time for my personal life

#### BLOCK NUMBER 11

FACTOR: LEADERSHIP STYLE ÌTEMS My superiors usually provide me with help and support to carry out my work.

My immediate superiors plan and distribute work well.

My bosses make sure that each of the workers has good opportunities for professional development.

I feel motivated and supported by my immediate superior.

# BLOCK NUMBER 12

FACTOR: CHANGE MANAGEMENT ÌTEMS

The changes in my company are for the better.

I have enough time to adapt to the changes. Innovation is facilitated in my work.

I find it stimulating to get out of my comfort zone.

# BLOCK NUMBER 13

#### ÍTEMS FACTOR: SOCIAL REWARD

I feel proud of the job I have.

The company I work for has prestige and recognition. My work provides added value to my company.

BLOCK NUMBER 14
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FACTOR: INFORMATION AND TRANSPARENCY ÍTEMS My company makes it easy for information to flow properly.

The information coming from management is reliable and transparent.

My company carries out transparent and comprehensive management of things.

As usual in these cases, the factor loadings defined according to the previous table were left free, while the rest were set to 0 ( $\Delta x = 0$ ). Table 6 shows the fit values of the general measurement model and those of each activity sector using the minimum fit indicators.

#### Table 6

Fit indicators of the Measurement Models for each activity sector and the overall general

SECTOR	CFI	TLI	RMSE	SMRSE
INSURANCE	.945	.972	.023	.021
BANKING	.932	.969	.021	.026
ACCOUNTING	.972	.973	.023	.022
EDUCATION	.956	.961	.021	.026
HOTEL MANAGEMENT	.968	.972	.027	.024
INDUSTRY	.954	.967	.021	.020
MAINTENANCE	.966	.977	.028	.026
RESTORATION	.958	.943	.022	.023
SERVICES	.978	.959	.021	.025
TECHNOLOGY	.966	.971	.028	.029
SOCIAL AND HEALTH CARE	.982	.988	.021	.022
GENERAL MODEL	.961	.969	.025	.028
		*		D 1 COL

Note: CFI = Comparative Fit Index; TLI = Tucker - Lewis Index; RMSE = Root Mean Square Error; SRMSE = Standardized Root Mean Square Error

The data from the previous table indicate more than acceptable fit of the proposed measurement structure and guarantee an operational description of the proposed factorial structure. If CFI and TLI tend towards a value of 1, they indicate a good fit (Schumacker & Lomax, 1996), and if the indicators linked to the residuals (RMSE and SRMSE) tend towards 0, they also indicate a good fit of the model (Hu & Bentler, 1999). Specifically, if  $CFI \ge .90$ ;  $TLI \ge .90$ ; RMSE $\leq$  .05; and SRMSE  $\leq$  .05, one can speak of a good fit. In fact, Browne & Cudek (1992) indicate that if RSMSE presents values below .05, there is a good fit of the model, if this value is between .05 and .08, the fit is acceptable, and if it is between .08 and .10, the fit is marginal. Additionally, it should be noted that it was impossible to propose the basic structure for estimating concurrent validity, as administration in a real situation prevented the inclusion of a longer battery of assessment instruments. For this reason, the fundamental issue focused on the measurement structure of the constructs. This situation is not an exception, as often happens in "in situ" evaluations. In these cases, the values of factorial adjustment represent evidence of special interest (Ferrando et al., 2022).

#### Standardization

For each factor, the summative score of the responses to each item was estimated. Remember that the task requested

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of individuals is to rank from 1 to 4 the four statements (items) presented in each block (14 blocks of four items). Therefore, each item receives a score between 1 and 4. First, the scores were inverted so that the first item selected obtained 4 points and the last ordered received 1 point. This is intended so that higher scores are associated with protection against the risk factor. Thus, the raw scores for the total sample presented the descriptors shown in Table 7.

#### Table 7

Descriptive statistics of the factors in raw scores for the total sample.

ACTORS Minimum Maximun		м ·	Mean	Deviation
		Maximum	$\overline{x}$	$S_i$
WORK CONTENT	4.00	16.00	7.68	2.50
WORKLOAD AND PACE OF WORK	3.00	12.00	8.19	2.17
WORK TIME	4.00	16.00	10.25	2.72
PARTICIPATION AND CONTROL	4.00	16.00	10.77	2.91
PERFORMANCE OF FUNCTIONS AND RESPONSIBILITIES	5.00	20.00	13.38	2.72
PROFESSIONAL DEVELOPMENT	4.00	16.00	10.71	2.62
INTERPERSONAL RELATIONSHIPS	4.00	16.00	8.52	2.77
WORK TEAM	4.00	16.00	9.16	2.72
MENTAL WORKLOAD	5.00	20.00	13.13	4.06
WORK-LIFE BALANCE	5.00	20.00	11.63	3.82
LEADERSHIP STYLE	4.00	16.00	10.66	2.91
RESPONSE TO CHANGE	4.00	16.00	11.82	2.43
SOCIAL RECOGNITION	3.00	12.00	6.09	2.08
INFORMATION AND TRANSPARENCY	3.00	12.00	7.88	2.24

*Note:* The descriptive statistics for each sector are available upon direct request to the authors.

For all observed distributions, the Anderson-Gerbing test of fit to the normal distribution was analyzed, obtaining significance values ranging from p = .03 to p = .75. When this fit was analyzed separately by activity sectors, the significance values of the fourteen observed distributions for the eleven activity sectors ranged from p = .048 to p = .85. Differences between activity sectors were analyzed using simple factorial ANOVA, obtaining statistically significant differences for all factors. The lowest contrast statistic value was F= 124.65; df = 10; 6870; p < .001;  $\varepsilon^2$  = .438. Subsequent Scheffé tests showed that the Education, Insurance, Banking, and Industry sectors generate differences in most of the factors. This confirms the need for different scaling by activity sector. The transformation of the raw score to a standardized score was achieved by transforming the standardized scores that are distributed following the normal distribution with mean  $\mu = 100$  and standard deviation  $\sigma = 15$ , thus following the same distribution as the intelligence quotient (IQ). This transformation was shown to be adequate and adjusted to the normal distribution since the standardized scores conformed to the normal distribution model; the lowest significance value in the Anderson-Gerbing test was p =.38 for all factors and all activity sectors.

Additionally, it was deemed appropriate to evaluate the possibility that the standardized scores presented some type of effect in the Differential Item Function (DIF). Although the scaling scheme was not proposed based on Item Response Theory (IRT), this type of analysis was deemed necessary as it is common for very basic variables in the work environment to present this type of effect, and scaling without correcting this effect could be misleading. Thus, for each activity sector, the possibility that Age and Gender presented this effect in the characteristic curves of each item (CCI) was estimated. For this, the *Mantel-Haenszel a* parameter contrast was used, obtaining statistically significant values in many items. The lowest significance for age was  $\chi^2 = 23.12$  (p < .001) and for Gender  $\chi^2 = 19.12$  (p < .001).

Considering these results, the standardized scores were corrected to eliminate the DIF effect by estimating multiple linear regressions using the factor score as the endogenous variable and age and gender as exogenous. It should be noted that the gender variable was transformed into a dummy variable [0,1] since the third category did not obtain sufficient observed frequency. Based on the significance of the partial regression coefficients ( $\beta_{Age}$  and  $\beta_{Gender}$ ) and their sign and value, the standardized score was corrected. In this way, corrected standardized scores were obtained, eliminating the DIF effect without modifying the values of their population distribution ( $\mu = 100$ ;  $\sigma = 15$ ) since the corrections were minimally dramatic in terms of the number of scores. The values and algorithm for obtaining the standardized scores and the proposed corrections can be obtained upon request from the authors.

# Discussion

This work focuses on the presentation of the assessment scale for exposure to psychological risk factors in the workplace, which we have named *Mentallypro*. As already mentioned in the introduction of this work, there are scales that serve this function, but in this case, a modern, facilitative, and distinct approach is proposed that meets some of the current demands. In this regard, the scale is easy to administer, fully computerized, based on different modules, and scaled by distinct activity sectors. In this sense, our conclusion is that these requirements are clearly met. The administration is particularly agile and does not exceed 15 minutes in total, being very simple to understand and manage by those responsible for evaluation processes in companies and institutions in our context.

Similarly, we must conclude that the psychometric indicators presented here guarantee the reliability and validity necessary for their use to be assured in the instrumental aspects that modern psychometry requires and following the necessary international standards.

Therefore, in summary, we consider the presentation of this new scale as psychometrically adequate, instrumentally correct, and especially useful in the workplace environment for which it is solely intended. There are aspects of the current version that remain to be complemented, and work is being done on adapting the scale and constructing scales for the Catalan, Basque, Galician, Valencian, British English, and non-British English versions, as well as for the Pan-American Spanish and Chinese versions. Currently, the diversity of environments and globalization mechanisms necessitate this process of specific adaptations. Similarly, a version adapted for individuals with intellectual limitations (*Mentallypro\_ID*) is being prepared, as well as the appropriate computerized versions for use by any type of sensory and/or motor disability. Likewise, to the extent possible, it would be desirable to have some evidence of

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concurrent validity and also the option of a parallel form to avoid short-term contagion effects.

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# Annex 1

Companies and Institutions Associated with the Construction of the Scale and Sampling

Abanca Affor Health Air Liquide Healthcare Alsea Aqualia Axa BCC Grupo Cajamar BSH Caixabank Dematic DHL DKV El Corte Inglés Ericsson Establiments Viena ΕY Forvia Fundación Once Grupo Lantero Grupo Nueva Pescanova GS Inima Huawei Ilunión John Deere Mahou San Miguel Mapfre Mas Prevención Nationale Nederlanden Naturgy Nokia NTT Data Prevencontrol PRLInnovación QuirónPrevención Sage Redexis Sacyr Santa Lucía Seguros Santander Serunión Seur Syneos Health Telefonica Unicaja Banco Unimat Prevención Universidad de Barcelona Universidad Autónoma de Madrid Universidad Europea Universidad Francisco de Vitoria Universidad Politécnica de Cartagena Uría Menéndez

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Companies and Institutions Associated with the Sampling

Axión Barceló Campofrio Cecabank Comunidad de Madrid - IRSST CSIF Esic Iberostar Group Fundació Vella Terra Meliá Hotels International Microsoft NielsenIQ SGS

# Annex 2

Conceptual Definitions of the Constructs Assessed in the Mentallypro Scale.

FACTOR	CONCEPTUAL DEFINITION
WORK CONTENT	It involves assessing the <b>fit between the content of tasks and the skills, abilities, and knowledge</b> of the person who must perform them. This implies identifying the impact of their work on people based on how their tasks are defined, structured, and organized.
	It involves assessing <b>work levels</b> that determine both the quantity of work (perception of work intensity) and
WORKLOAD AND PACE OF WORK	qualitative elements (monotony, routine, etc.), as well as the pace and planning of work, considering the envi- ronment in which it is carried out (more physical elements of the work environment). It relates to the <b>atten-</b> <b>tion</b> required for the execution of tasks.
WORK TIME	This refers to the <b>temporal organization of work</b> , including aspects such as the amount of time worked, distribution, breaks between workdays, and pauses in work, atypical schedules, shifts, etc. It also concerns the aspects of reconciling with personal and social organization times.
PARTICIPATION AND CONTROL	This is linked to the capacity and possibility that the worker has to <b>participate in decision-making</b> that more directly affects their specific job, their close areas or departments, and the organization of their work; in such a way that they can exercise a certain degree of influence, decision-making, and autonomy.
PERFORMANCE OF FUNCTIONS AND RE- SPONSIBILITIES	This involves assessing all issues related to the <b>definition of functions, responsibilities, and objectives of the workplace</b> , as well as the general understanding of these elements within the entire organization.
PROFESSIONAL DEVEL- OPMENT	This factor encompasses issues that affect a worker's position in relation to their organization in terms of <b>be- longing to it, growth, opportunities within it</b> , and also the consideration of equity between what the worker contributes and what they receive from their organization
INTERPERSONAL RELA- TIONSHIPS	We assess those aspects that derive from <b>the relationships established among people in the workplace</b> . Interpersonal relationships can be identified within the organization (among colleagues, with superiors or subordinates) or externally (with clients, suppliers, etc.).
EQUIPMENT FOR WORK AND EXPOSURE TO OTHER RISKS	This factor encompasses issues related to the <b>tools used for work tasks</b> , their functioning, and the demands on the worker. It includes the <b>impact of digitalization processes</b> and more sophisticated instrumentation.
MENTAL WORKLOAD	This factor is related to the <b>strict cognitive effort</b> required by the assigned tasks. It also involves assessing the mental effort (mental resources) that the task demands.
WORK-LIFE BALANCE	This involves assessing the extent to which work <b>obligations interfere with personal development</b> . This includes the effect of technological disconnection.
LEADERSHIP STYLE	This factor is related to the <b>significant role that leadership style</b> (understood not only with the most hier- archical individuals but also including informal leadership) plays in the other factors. To what extent is there a perception of positive and facilitating leadership.
RESPONSE TO CHANGE	This factor is linked to the <b>difficulties that are sometimes perceived when facing changes</b> in work rou- tine.
SOCIAL RECOGNITION	This factor concerns the effect of the <b>social evaluation of work</b> on workers' perceptions. Working condi- tions are influenced by the perception of social value associated with each occupation. This should also in- clude the concept of recognition <b>within the organization itself</b> .
INFORMATION AND TRANSPARENCY	This factor is associated with the availability of information and compliance with transparency stand- ards in the work environment.

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# Annex 3

Definitive Mentallypro Scale and Order of Presentation of Items. (\*)

Definit	tive Mentallypro Scale and Order of Presentation of Items.(*)
1	I have the appropriate knowledge and skills to do my job.
1	When there is an increase in work, I can handle it adequately.
1	I can self-manage my work time.
1	I have influence over decisions that affect my work.
2	I have enough time to carry out my daily tasks.
2	I can manage rest breaks in my daily workday.
2	In my job I am allowed to have initiative.
2	The functions of my position are clear and defined.
2	The functions of my position are clear and demice.
3	I have the possibility of organizing my work time.
3	My proposals are usually considered in the organization of tasks.
3	I know the tasks and responsibilities of my colleagues.
3	
3	I know the structure of my organization at the decision-making level
4	
4	In my company, there is no duplication of tasks.
4	There is a good atmosphere with my colleagues at work.
4	I have opportunities for professional development.
4	There is a good atmosphere with my colleagues at work.
5	I feel comfortable and adapted in my work with the means I have available.
5	My job allows me to learn new things.
5	My job does not usually require the handling of very complex information.
5	I have the necessary and appropriate instruments and equipment to perform my work.
6	My colleagues usually share their knowledge with others.
6	I feel comfortable and well adapted to working with new media, applications, platforms and digital systems.
6	My tasks require acceptable mental effort.
6	I can reconcile my family and personal life with my professional life.
7	I have adequate and sufficient training to use the instruments and equipment necessary to perform my job.
7	I work concentrated due to the level of complexity of my task, but it does not prevent me from enjoying the work.
7	Doing my job does not prevent me from disconnecting digitally.
7	My superiors usually provide me with help and support to carry out my work.
8	The complexity of my tasks does not always require maximum concentration.
8	I am able to disconnect from my work when my workday ends.
8	My immediate superiors plan and distribute work well.
8	My work contributes to my professional growth.
9	I can separate my work time from my leisure time.
9	My bosses ensure that each of the workers has good opportunities for professional development.
9	Changes in my company are aimed at improvement.
9	I am proud of the job I have.
10	Innovation is facilitated in my job.
10	I have enough time to adapt to changes.
10	The company I work for has prestige and recognition.
10	I know the tasks that I must carry out in my job.
10	
11	My work allows me to apply the training acquired.
11	My company makes it easier for information to flow appropriately.
11	I consider my tasks to be important.
11	I have a job that allows me moments of mental relaxation.
11	

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12	The information from management is reliable and transparent.
12	In my tasks, my opinions are valued and I am informed of decisions.
12	Responsibility for my tasks does not cause me a problem concentrating at work.
12	I have enough time for the optimal development of my work.
13	I clearly identify growth opportunities in line with my functions.
13	The information and possibilities about promotion in my job are sufficient and complete.
13	I receive help and support from my colleagues in carrying out my work.
13	My job allows me to have free time for my personal life.
14	My job adds value to my company.
14	My company conducts transparent and integral management of things.
14	I feel motivated and supported by my immediate superior.
14	I find it stimulating to leave my comfort zone.

(\*) The English version is a translation of the Spanish original. In no way can it be considered a psychometrically validated adaptation or the result of a backtranslation process. It should not be used in any case.