

The Employment Precariousness Scale (EPRES): Psychometric properties of a new tool for epidemiological studies among waged and salaried workers.

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ABSTRACT:

Background: Despite the fact that labour market flexibility has resulted in an expansion of precarious employment in industrialized countries, to date there is limited empirical evidence about its health consequences. The Employment Precariousness Scale (EPRES) is a newly developed, theory-based, multidimensional questionnaire specifically devised for epidemiological studies among waged and salaried workers.

Objective: To assess acceptability, reliability and construct validity of EPRES in a sample of waged and salaried workers in Spain.

Methods: Cross-sectional study, using a sub-sample of 6.968 temporary and permanent workers from a population-based survey carried out in 2004-2005. The survey questionnaire was interviewer administered and included the six EPRES subscales, measures of the psychosocial work environment (COPSOQ ISTAS21), and perceived general and mental health (SF-36).

Results: A high response rate to all EPRES items indicated good acceptability; Cronbach's alpha coefficients, over 0.70 for all subscales and the global score, demonstrated good internal consistency reliability; exploratory factor analysis using principal axis analysis and varimax rotation confirmed the six-subscale structure and the theoretical allocation of all items. Patterns across known groups and correlation coefficients with psychosocial work environment measures and perceived health demonstrated the expected relations, providing evidence of construct validity.

Conclusions: Our results provide evidence in support of the psychometric properties of EPRES, which appears to be a promising tool for the measurement of employment precariousness in public health research.

INTRODUCTION

Employment conditions, such as precarious employment, are major social determinants of health and health inequalities.[1] However, empirical evidence of the health consequences of precarious employment is limited, in part due to the absence of a measurement instrument. The Employment Precariousness Scale (EPRES) is a new, theory-based questionnaire, developed to measure precarious employment in epidemiological research.

Employment relations in industrialised countries have significantly changed over the past three decades. As part of the process of globalisation, the shift from statutory to market regulation of labour markets has led to increased employment flexibility.[2] Under increased global competition, a flexible workforce allows firms to rapidly adapt their size or composition to ever-changing economic conditions and demands.

One of the most visible consequences of labour market flexibility has been the proliferation of flexible employment forms and decline of “standard” full-time, permanent employment. Today, flexible employment is widespread in developing economies[3] and growing in developed countries.[4] In Spain, temporary employment alone represents around 30% of salaried employment since 1990.[5]

Labour market flexibility has also expanded through reductions in employment protection provisions,[6] benefits, and entitlements.[2] In addition, the individualisation of labour relations and increasing challenges put on collective interests representation[2,6,7] are limiting workers’ control over employment and working conditions. Accordingly, there is rising concern about the expansion and health consequences[8] of precarious employment, a sociological construct encompassing

employment instability, reduced social protection, reduced worker control over the labour process, and low wages.[6,9]

Various pathways can link precarious employment and adverse health outcomes, including economic and social deprivation, hazardous work environments,[8] and poor occupational health and safety standards.[10] However, empirical evidence is limited. To date, most research on the association between flexible employment and health has focused on major organisational change or downsizing[11,12]; perceived job insecurity[12,13]; and temporary employment.[14-18] Despite some mixed findings, this body of research provides evidence suggesting that unstable employment conditions have negative health consequences.

To assess the health-related impact of precarious employment, “standard” full-time, permanent workers have been compared to workers in flexible employment arrangements (e.g., part-time, temporary, self-employment).[19,20] While such research has yielded informative results, conceptual and measurement alternatives, that go beyond the standard / non standard dichotomy and more broadly encompass the various features of precarious employment, are needed.[8] One approach has been to create typologies of mutually exclusive employment forms (e.g. permanent full-time; permanent part-time; temporary full-time, etc) that differ in relation to the dimensions of precarious employment (e.g., control, regulatory protection, income),[21] or to job characteristics (e.g., multiple job holding).[22] These typologies allow for empirical analysis of the evolution over time and social distribution of the employment forms that give rise to precariousness.

Another approach has been to develop measures of precarious employment. Based on the job strain model, Lewchuk et al[23] developed the model and

questionnaire of employment strain, which focuses on the uncertainties caused by non-permanent employment, the effort expended in securing future employment, and the availability of social support. The employment strain model offers an insight into the pathways linking non-permanent employment to poor health.

Based on the sociological construct of precarious employment,[6,9] Amable and colleagues[24] conceptualised and operationalized the employment precariousness construct. They defined employment precariousness as a multidimensional construct encompassing contractual features of precarious employment (employment instability; individual-level bargaining over employment conditions; low wages and economic deprivation; limited workplace rights and social protection); and workplace social dimensions of precarious employment relationships, i.e., workplace power relations (defencelessness to workplace authoritarianism; powerlessness to exercise workplace rights).[24] Employment precariousness is thus embedded in a power relations framework,[3,25] according to which employment relationships are key determinants of working conditions, and worker well-being and health.[3]

The construct was operationalised as the Employment Precariousness Scale (EPRES), which was devised for epidemiological research among waged and salaried workers.[26] The purpose of this study is to assess acceptability, reliability and construct validity of the EPRES among waged and salaried workers in Spain.

MATERIALS AND METHODS

Development of the Employment Precariousness Scale (EPRES)

The EPRES is product of a long-term, interdisciplinary research project. The development process to identify the dimensions and obtain the initial pool of items has been thoroughly described elsewhere.[24,26] Briefly, a qualitative study was undertaken to identify the main dimensions of “employment precariousness”. The study involved an extensive literature review; interviews with 12 key informants (experts in sociology, labour economics, and public health, among others); and six focus group discussions with temporary workers, permanent workers, and trade union representatives (four to eight participants per group). During focus group analysis the four dimensions drawn from the aforementioned framework[6,9] (temporariness, disempowerment, wages and rights) were confirmed; and two new, social dimensions of precarious employment, highly relevant for workers’ well-being, emerged (vulnerability and capability to exercise rights).

After content analysis of the initial pool of items, 36 items were selected and pretested through cognitive debriefing to assess understanding of the questions and appropriateness of the wording. Content validity was assessed by expert consensus. Pilot testing and preliminary psychometrics were performed on a sample of 100 temporary workers selected by snowball procedure; the number of items was reduced to 26.[26]

The EPRES questionnaire is structured, worker-reported, and can be self- or interviewer-administered. It comprises six subscales: ‘temporariness’ (contract duration) (2 items); ‘disempowerment’ (level of negotiation of employment conditions) (3 items); ‘vulnerability’ (defencelessness to authoritarian treatment) (6 items); ‘wages’ (low or insufficient; possible economic deprivation) (3 items); ‘rights’ (entitlement to workplace rights and social security benefits) (7 items); and ‘exercise rights’

(powerlessness, in practice, to exercise workplace rights) (5 items). (See online supplement).

Response scales consist of a 5-point frequency scale in the ‘vulnerability’ and ‘exercise rights’ subscales; 5-point ordinal scales in ‘wages’ and ‘temporariness’; and 3-point categorical scales in the ‘disempowerment’ and ‘exercise rights’ subscales. Subscale scores are computed as simple averages and transformed into a 0-4 scale, with high values representing high levels of precariousness. The overall EPRES score, ranging from 0 (not precarious) to 4 (most precarious), is the arithmetic mean of the six subscale scores. Computed this way, each subscale contributes equally to the total score, regardless of its number of items.[27]

Subjects and Study Design

Data come from the Union Institute of Work, Environment and Health (ISTAS) Psychosocial Work Environment Survey (PWES), a cross-sectional study carried out between October 2004 and July 2005 on a representative sample of the wage-earning population aged 16 to 65 living in Spain (n=7650).[28] It assessed their psychosocial work environment, employment precariousness, and health-related quality of life. Subjects were eligible to participate if they had worked in a paid employment job for at least one hour during the week preceding the survey. Sample selection followed a multistage, stratified, random-route sampling procedure. Non-respondents were substituted on the field, following the same sampling procedures and inclusion criteria. Fieldwork was conducted during autumn, winter and spring, with an overall response rate of 60%. The survey was voluntary and confidential, and the dataset was completely

deidentified before analysis. Prior to its initiation, the PWES protocol was reviewed and approved by ISTAS institutional review board (IRB).

For this study, we analysed the sub-sample of waged and salaried workers with temporary and permanent employment contracts (n=6968). We excluded the self-employed (n=296); workers without a contract (n=348); graduate students (n=12); workers with unknown employment status (n=7); and subjects with unknown or non-eligible ages (n=19).

Measurement instruments:

Questionnaires, administered at home by trained interviewers, included demographic information, the middle-length Spanish version of the Copenhagen Psychosocial Questionnaire (COPSOQ ISTAS21),[29] three Short Form-36 (SF-36) Health Survey scales, and the EPRES.

The Copenhagen Psychosocial Questionnaire (COPSOQ) is a generic tool designed to assess the psychosocial work environment and well-being of employees.[30] COPSOQ ISTAS21 is a validated adaptation of COPSOQ, encompassing 21 scales. Scores range from 0 to 100, with high values representing a high level of the concept being measured. For this study we analyzed ‘job satisfaction’ (4 items); ‘insecurity at work’ (4 items, assessing perceived employability and worries about involuntary changes to job features); and ‘employment insecurity’, measured with a single item asking “Currently, are you worried you might be fired or your contract not be renewed?” with 5 response categories ranging from ‘not at all’ to ‘very worried’.

We used four COPSOQ ISTAS21 scales which assess the components of the demand-control-support model. Demands was measured with the ‘quantitative psychological demands’ scale (4 items). Job control was measured as the decision latitude construct, encompassing two scales: ‘influence at work’ (decision authority) (4 items) and ‘possibilities for development’ (skill discretion) (4 items). Support, from both co-workers and superiors, was measured with the ‘social support’ scale (4 items).[31]

The SF-36 is an 8-scale, generic, short-form health survey. COPSOQ ISTAS21 includes 3 scales of the Spanish version of SF-36,[32] which was developed within the International Quality of Life Assessment project, wherein assessment of the

psychometric properties and conceptual equivalence of the adapted questionnaire was performed. SF-36 scores range from 0 (worst) to 100 (best possible health state). For this study we analyzed data on general health (5 items) and mental health (5 items).

Demographic variables used were sex, age, country of birth (Spain or other, mostly Latin America), occupational social class, and type of contract (permanent or temporary). Occupational social class was created by grouping occupations into five categories according to the Spanish Epidemiology Society proposal[33] which uses the 1994 National Classification of Occupations.[34] The economic activity of the company in which interviewees worked was classified according to the Statistical Classification of Economic Activities in the European Community (NACE Rev. 1.1), as implemented by the Spanish 1993 National Classification of Economic Activities.[35] (See Table 2)

Analysis

Scale acceptability was evaluated separately for temporary and permanent workers (measured by the proportion of subjects with at least one missing item), as were subscale means (standard deviation), observed score range, and proportion of subjects with lowest and highest possible scores (floor and ceiling effects). Internal consistency reliability, a measure of the homogeneity of the items in a scale, was evaluated with Cronbach's alpha coefficient.

We assessed structural validity using principal axis exploratory factor analysis with varimax rotation. This examines whether the placement of items into subscales follows the questionnaire's conceptual model. Factors were selected for the maximum cumulative variance explained, with an eigenvalue greater than 1.

Validity is the degree to which an instrument measures what it purports to measure.[38] To assess construct-related validity, we first evaluated whether EPRES demonstrated expected logical relations with related variables and constructs. First, we explored patterns of EPRES scores (mean and 95% confidence interval) for groups defined by sex, age, country of birth, type of contract, and occupational social class. We expected higher scores among those at greater disadvantage in the labour market[3,8,9,21]: women, younger workers, foreign-born workers, and temporary workers. Independent sample T-tests were performed to compare group means. Similarly, we expected an inverse occupational social class gradient, which we tested with the Anova test for linear trends, weighted for unequal sample sizes.

Secondly, inter-scale correlations and correlations between EPRES and the SF-36 and COPSOQ ISTAS21 scales were evaluated with a multitrait-multimethod matrix of comparisons using Spearman's correlation coefficients. Validation hypotheses were

based on the prediction of the expected direction and gradient of these correlations (defined as low: <0.3; moderate: 0.3–0.45; substantial: 0.45–0.6; and high: >0.6),[36] which we expected to be, at the most, moderate (see Table 1). These hypotheses were based on the micro-theoretical framework developed by the Employment Conditions (EMCONET) Knowledge Network of the WHO Commission on Social Determinants of Health, which depicts the complex links between employment relations, employment conditions and the health of workers[3]; and on evidence collected during the qualitative phase of the employment precariousness project.[24]

Table 1: Hypotheses concerning the expected logical relations between employment precariousness and other related constructs.

Related constructs:	Construct validity hypotheses		
	Direction of correlation	Gradient of correlations	Correlation strongest with:
General health	Negative	+	
Mental health	Negative	++	'vulnerability'; 'exercise rights'
Job satisfaction	Negative	++	'vulnerability'; 'exercise rights'
Quantitative psychological demands	Positive	+	'vulnerability'; 'exercise rights'
Influence at work	Negative	+	
Possibilities for development	Negative	+	
Social support	Negative	++	'vulnerability'; 'exercise rights'
Insecurity at work	Positive	+	'vulnerability'; 'exercise rights'
Employment insecurity	Positive	++	'vulnerability'; 'exercise rights'; 'temporariness'

With regards to health-related constructs, we hypothesized that correlations between EPRES scores and perceived health and job satisfaction are negative; that correlations are stronger with mental health[24] and job satisfaction[19] than with general health[24]; and that perceived health and job satisfaction correlate strongest with ‘vulnerability’ and ‘exercise rights’.[24]

With regards to the components of the demand-control-support model, we hypothesized that EPRES scores correlate positively with ‘quantitative psychological demands’ and negatively with ‘influence at work’, ‘possibilities of development’, and specially, ‘social support’[3,37]; and that ‘quantitative demands’ and ‘social support’ correlate highest with ‘vulnerability’ and ‘exercise rights’.[24]

With regards to perceived insecurity, we tested the hypotheses that correlations between EPRES and both ‘insecurity at work’ and ‘employment insecurity’ are positive, and that correlations are stronger with the latter, which specifically addresses concerns about employment continuity. We expected ‘insecurity at work’ to correlate highest with ‘vulnerability’ and ‘exercise rights’, which limit workers’ capacity to resist involuntary changes at work. We expected ‘employment insecurity’, a measure of perceived job insecurity, to correlate highest with ‘temporariness’, a measure of objective employment instability; and with ‘vulnerability’, and ‘exercise rights’.[24]

Analyses were performed using SPSS, version 15.0 for Windows (SPSS Inc, Chicago, Illinois, USA).

RESULTS

Characteristics of the study participants are presented in Table 2. All mean scores were significantly ($p < 0.001$) higher in temporary than in permanent workers (Table 3). Almost 90% of the sample completed all the items in the questionnaire; the proportion of subjects with missing items was below 1% for most subscales. All observed score ranges coincided with the theoretical range (0-4), except for that of the ‘temporariness’ subscale and the global score in both sub-samples, and that of the ‘wages’ subscale among temporary workers. Percentages of ceiling effects were low, but substantially high floor effects were observed in several subscales: ‘temporariness’ (95%), ‘rights’ (47.1%) and ‘exercise rights’ (40.3%) among permanent workers; and ‘vulnerability’ in both sub-samples (58.4% and 40.2%). Floor and ceiling effects for the global score were negligible among both sub-samples ($\leq 0.1\%$). All Cronbach’s alpha coefficients were above 0.70.

Loading weights produced by the factor analysis are shown in Table 4. All items presented the highest loading within their theoretical subscale; all item loadings were above 0.35. The model explained 66.7% of cumulative variance.

Table 2. Demographic and occupational characteristics of the study population (frequency and percentages). Spain, 2004-2005.

	n	%
Sex		
Women	3377	48.6
Men	3573	51.4
Age (years)		
16 – 30	2354	33.8
31 – 65	4614	66.2
Country of birth		
Spain	6395	91.8
Other	573	8.2
Type of contract		
Permanent	5147	73.9
Temporary	1821	26.1
Occupational social class		
SCI: higher managerial and professional	612	8.9
SCII: lower managerial and professional	524	7.6
SCIII: administrative personnel and supervisors	1540	22.4
SCIV: skilled and semi-skilled manual	3254	47.4
SCV: unskilled manual	931	13.6
Economic activity		
(A) Agriculture, hunting and forestry	1	0.0
(C) Mining and quarrying	171	2.6
(D) Manufacturing	992	15.1
(E) Electricity, gas and water supply	44	0.7
(F) Construction	565	8.6
(G) Wholesale, repair of motor vehicles, etc.	1527	23.3
(H) Hotels and restaurants	653	10.0
(I) Transport, storage and communication	382	5.8
(J) Financial intermediation	177	2.7
(K) Real estate, renting and business activities	639	9.7
(L) Public administration, defence; social security	335	5.1
(M) Education	399	6.1
(N) Health and social work	354	5.4
(O) Other community, social and personal services	314	4.8
(P) Activities of households	1	0.0

Table 3. Distribution and reliability of EPRES in a population sample of permanent (P) (n=5147) and temporary (T) (n=1821) workers. Spain, 2004-2005.

	Mean		SD		Missing items [§] (%)		Observed range		Floor * (%)		Ceiling * (%)		Cronbach's alpha
	P	T	P	T	P	T	P	T	P	T	P	T	
Temporariness	0.1	2.7	0.3	0.8	0.4	0.9	0-2	0.5-4	95.3	0	0	5.2	0.82
Disempowerment	1.4	1.7	1.1	1.1	0.1	0.1	0-4	0-4	29.3	22.1	5.1	9.3	0.95
Vulnerability	0.4	0.7	0.7	0.8	0.3	0.3	0-4	0-4	58.4	40.2	0.02	0.6	0.90
Wages	2.1	2.4	0.7	0.7	10.5	7.3	0-4	0.4-4	0.5	0	0.3	1.9	0.70
Rights	0.5	1.1	0.7	1.0	0.3	0.2	0-4	0-4	47.1	21.1	0.5	3.6	0.80
Exercise rights	0.8	1.3	1.0	1.1	0.9	2.1	0-4	0-4	40.3	25.4	1.2	2.4	0.87
EPRES score	0.9	1.7	0.4	0.5	12.2	10.5	0-2.7	0.3-3.5	0.1	0	0	0.1	0.86

Abbreviation: SD, standard deviation.

[§]Proportion of participants with any item missing on the scale.

*Proportion of participants with lowest (floor) and highest (ceiling) EPRES scores.

Table 4. Exploratory Factor Analysis of the Employment Precariousness Scale (EPRES). Spain, 2004-2005.

	Factor 1 VU	Factor 2 ER	Factor 3 RI	Factor 4 DE	Factor 5 WA	Factor 6 TE
Temporariness (TE)						
Duration of current contract			0.24		0.14	0.79
Months under temporary contracts previous year			0.21		0.10	0.80
Disempowerment (DE)						
How did you settle your workplace schedule?			0.11	0.91		
How did you settle your weekly working hours?				0.92		
How did you settle your wages or salary?			0.10	0.90		
Vulnerability (VU)						
Afraid to demand better working conditions	0.73	0.15	0.10			
Defenceless towards unfair treatment	0.84	0.15				
Afraid of being fired for not doing...	0.73	0.12	0.10			
Treated in a discriminatory and unjust manner	0.83	0.13				
Treated in an authoritarian and violent manner	0.77	0.16				
Made to feel easily replaceable	0.74	0.16				0.10
Wages (WA)						
Cover basic needs?		0.10			0.82	
Allow for unexpected expenses?					0.78	
Monthly take home (net) wage or salary			0.17	0.11	0.39	0.19
Rights (RI)						
Paid holiday	0.13	0.12	0.57			0.14
Pension			0.58			0.12
Severance pay	0.10		0.71			0.12
Maternity / paternity leave		0.12	0.63			
Day off for family or personal reasons		0.21	0.53	0.12	0.12	
Weekly holidays		0.25	0.46	0.11		
Unemployment benefit / compensation			0.66			
Exercise rights (ER)						
Weekly holidays		0.60	0.10			
Sick leave	0.25	0.77	0.13			
Go to the doctor	0.24	0.79	0.13			
Holiday	0.15	0.69	0.19			0.11
Day off for family or personal reasons	0.15	0.82	0.15			

NOTE: Cumulative variance explained by the EPRES model: 66.7%.

Loadings <0.1 are not presented. The loading weights of the factor corresponding to the domain assigned by the EPRES developers are boxed.

Patterns for known groups are shown in Figure 1. The mean EPRES score was higher among women (1.15) than men (1.03) ($p < 0.001$); higher among workers aged 30 years or less (1.32) than older (0.97) ($p < 0.001$); higher among foreign-born (1.47) than Spanish-born workers (1.06) ($p < 0.001$); and higher among temporary (1.65) than permanent (0.89) workers ($p < 0.001$). EPRES and occupational social class showed an inverse linear relationship, with means scores ranging from 0.80 to 1.33 ($p < 0.001$).

The multitrait-multimethod matrix of comparisons is shown in Table 5. Inter-scale correlations were all positive and low (< 0.3), except three which were moderate: ‘temporariness’ and ‘rights’; ‘vulnerability’ and ‘exercise rights’; ‘rights’ and ‘exercise rights’. Correlations between the global score and the six subscales were substantial (0.49-0.63).

EPRES correlations with perceived health and job satisfaction were negative and moderate or low, and stronger with mental health and job satisfaction than with general health. The strongest correlations were observed with ‘vulnerability’ (around 0.3), followed by ‘exercise rights’ and the global score.

The EPRES subscales presented statistically significant, low positive correlations with ‘quantitative psychological demands’ (≤ 0.23); and low negative correlations with ‘influence at work’ (≤ 0.26), ‘possibilities for development’ (≤ 0.26), and ‘social support’ (< 0.29). ‘Quantitative psychological demands’ correlated highest with ‘vulnerability’ (0.23); ‘influence at work’ with ‘temporariness’ (-0.20), ‘wages’ (-0.26), and the global score (-0.24); ‘possibilities for development’ with ‘wages’ (-0.26) and the global score (-0.21); and ‘social support’ with ‘vulnerability’ (-0.29), ‘exercise rights’ (-0.25), and the global score (-0.28).

Correlations between EPRES subscales and both measures of insecurity were positive and low (≤ 0.14). 'Disempowerment' showed no correlation (-0.05 & -0.02). Four EPRES subscales and the global score correlated higher with 'employment insecurity' than with 'insecurity at work'. 'Insecurity at work' exhibited the highest correlations with 'vulnerability' (0.14), 'rights' (0.12), and 'exercise rights' (0.12); 'employment insecurity' exhibited the highest correlations with the same three subscales as well as with 'temporariness' (0.12) and the global score (0.14).

Table 5. Spearman correlation coefficients. Multitrait-multimethod matrix of the EPRES and the SF-36 and COPSOQ ISTAS21 dimensions in waged and salaried workers. Spain, 2004-2005

	Temporariness	Disempowerment	Vulnerability	Wages	Rights	Exercise rights	EPRES
Temporariness	(0.82)						
Disempowerment	0.106**	(0.95)					
Vulnerability	0.209**	0.103**	(0.90)				
Wages	0.250**	0.128**	0.185**	(0.70)			
Rights	0.337**	0.167**	0.167**	0.217**	(0.80)		
Exercise rights	0.207**	0.123**	0.357**	0.150**	0.348**	(0.87)	
EPRES [†]	0.629**	0.513**	0.493**	0.497**	0.584**	0.630**	(0.86)
General health	-0.018	-0.030*	-0.271**	-0.029*	-0.005	-0.143**	-0.135**
Mental health	-0.079**	-0.076**	-0.343**	-0.108**	-0.025*	-0.178**	-0.227**
Job satisfaction	-0.178**	-0.131**	-0.316**	-0.220**	-0.183**	-0.249**	-0.348**
Quantitative psychological demands	0.015	0.064**	0.225**	-0.010	-0.010	0.146**	0.130**
Influence at work	-0.202**	-0.080**	-0.150**	-0.267**	-0.134**	-0.062**	-0.242**
Possibilities for development	-0.092**	-0.101**	-0.159**	-0.257**	-0.115**	-0.095**	-0.210**
Social support	-0.114**	-0.113**	-0.291**	-0.177**	-0.125**	-0.248**	-0.285**
Insecurity at work	0.052**	-0.047**	0.142**	0.002	0.118**	0.124**	0.097**
Employment insecurity	0.122**	-0.024*	0.143**	0.034**	0.137**	0.102**	0.135**

Scale internal consistency reliability (Cronbach's alpha coefficient) is presented in the diagonal. [†] EPRES score was obtained as the mean of the six subscales.

**Correlation significant at p=0.01. * Correlation significant at p=0.05

DISCUSSION

The Employment Precariousness Scale is a new, theory-based, multidimensional tool for epidemiological studies. In our knowledge, this is the first measure of precarious employment to address specific dimensions such as worker vulnerability, disempowerment, and the exercise of rights. This first validation study of the EPRES clearly showed its good metric properties (acceptability, reliability, and validity) among permanent and temporary workers in Spain.

The EPRES psychometric properties were examined on a large, nationally representative, and heterogeneous sample, comprising a wide range of occupations and economic activities. The availability of previously validated measures of perceived health and psychosocial risk factors allowed for various relevant construct-related validation hypotheses. However, the study is not without limitations.

Because we used a single measurement at one point in time, sensitivity to change and test-retest reliability, i.e., the degree to which an instrument yields stable scores over time,[38] were not assessed. Although high internal consistency coefficients suggest very good reliability, they should be complemented with test-retest reliability,[38] paying special attention to the stability of the study sample, as employment precariousness describes a job situation characterised by its instability. It was also not feasible to gauge criterion validity (the comparison of a new instrument with a gold standard), due to the lack of a criterion standard of employment precariousness. Hence, construct-related evidence of validity was collected by examining hypotheses based on the theoretical and qualitative empirical background of the questionnaire.

Following the labour force survey definition of employed persons,[5] subjects who had worked for as little as one hour during the preceding week were included in the ERP sample. Including workers with very short job tenure introduces two problems: that their time of exposure to employment precariousness is very short, and that their self-reported workplace relations and working conditions may be unreliable measures given their brief contact with the job. However, over 95% of respondents had been at their jobs for one month or more and only 0.7% (49 subjects) had job tenures shorter than 15 days.

An important restriction of the study sample was the exclusion, despite their precariousness, of workers without a contract and dependent self-employed workers. Employment precariousness was conceptualised as the erosion of the standard employment relationship, and thus, the wording of several EPRES items assumes the existence of a formal employment relationship whose duration and degree of protection are made explicit in an employment contract. This currently limits the use of the questionnaire to temporary and permanent employees with a contract.

A high level of data completion indicated good acceptability of the EPRES. 'Wages' had the highest non-response rate overall (9.6%), with missing values concentrated in the 'monthly salary' item, which had a high response rate (90.6%) compared with the income non-reporting of other surveys.[39]

Global EPRES scores were spread widely across the theoretical 0-4 score range, and there were no ceiling and floor effects. Subscale scores distributed all across the theoretical ranges (0-4), except for those of 'temporariness' and 'wages'. The observed ranges of 'temporariness', however, are reflecting the actual full span of possible answers in each subgroup: the score range is limited to 0-2 among permanent workers

(they can only add to the score with one question in the subscale), and to 0.5-4 among temporary workers. For the overall sample, ‘temporariness’ and ‘wages’ scores distribute all across the theoretical range.

Four subscales exhibited high floor effects. The very high floor effect of ‘temporariness’ among permanent employees (95.3%) highlights the need to include items that can capture employment instability among permanent workers, such as previous unemployment, which has been used as a measure of the risk of future unemployment.[40] In the case of ‘rights’ and ‘exercise rights’, floor effects are probably attributable to the universal character of most rights and benefits assessed. This characteristic, nevertheless, allows the questionnaire to be used with general, population-based samples. Despite high floor effects, ranges for both subscales cover the whole theoretical score range (0-4).

The high floor effect of ‘vulnerability’ is possibly limiting its ability to detect differences among workers with mild vulnerability.[27] This floor effect could be reflecting the impact of favourable labour market conditions on worker’s vulnerability: at the time the survey was conducted, unemployment rates in Spain were low, and falling.[5] It could also be a consequence of the use of double-barrelled questions, as when asking about ‘authoritarian and violent treatment’: responders who had experienced authoritarian treatment, but did not perceive it as violent, might not endorse the item. Rewriting these double-barrelled questions is recommended.

Cronbacha’s alpha coefficients of the six subscales and the total questionnaire were all above the standard of 0.7 for comparing groups, indicating good reliability. Factor analysis demonstrated the predicted six-factor solution, confirming EPRES’s theoretical structure and the placement of items within subscales. Inter-scale

correlations were lower than their respective reliability coefficients, providing evidence that each subscale measures a distinct concept.[41] A moderate correlation was observed between ‘exercise rights’ and ‘rights’ (0.35), as workers who are not entitled to certain rights cannot have the power to exercise them. ‘Exercise rights’ and ‘vulnerability’, two subscales assessing interpersonal relations that reflect workplace power imbalances, were also moderately correlated (0.36).

The comparisons among known groups demonstrated all the expected relations between EPRES and the socio-demographic and occupational variables analyzed, providing evidence of construct validity. The higher global score among temporary workers is not due exclusively to higher ‘temporariness’ scores, but to significantly higher scores across all subscales. Additionally, permanent workers’ scores indicate that EPRES is capturing employment precariousness among workers with open-ended contracts, a neglected exposure in studies where temporary employment is the only indicator of precariousness.

Further hypotheses to examine construct validity were tested on the multitrait-multimethod matrix. Our validity hypotheses were based on the expectation that employment precariousness negatively affects workers’ health, and that, among other mechanisms, this occurs through exposure to hazardous psychosocial work environments.[3] Thus, EPRES scores should be correlated to perceived health and psychosocial risk factors. Nevertheless, our overarching hypothesis, supported by the data, was that employment precariousness is a conceptually different construct which would not correlate strongly with any other scale.

The general hypothesis that health should be negatively correlated to employment precariousness was supported by the data. As expected, EPRES scores

correlated stronger with mental health than with general health, consistent with previous research on flexible employment,[16] job insecurity,[13] and the qualitative study about precarious employment and health.[24] Also as predicted, health measures correlated strongest to ‘vulnerability’ and, to a lesser extent, ‘exercise rights’, the social dimensions of employment precariousness. With regards to ‘vulnerability’, it cannot be ruled out that it might appear to be more correlated to perceived health due to self-report bias.[42] Nevertheless, weak correlations with other perceived psychosocial risks at work suggest that personality characteristics and affective states which favour a disposition to answer negatively to questionnaires might not be influencing the endorsement of ‘vulnerability’ items.

The highest observed correlation was that between job satisfaction and the global EPRES score. Job satisfaction must be among the most sensitive and responsive indicators to the circumstances of the job, and has been described as the most significantly affected health-related indicator among non-permanent workers in the European Union in 1996[19] and 2000.[43]

Our hypotheses relative to correlations between EPRES and psychosocial risk factors also were also supported. Correlations with quantitative psychological demands were positive and highest with ‘vulnerability’ and, to a lesser extent, ‘exercise rights’. Both dimensions reflect imbalanced power relations, in which workers have limited capability to oppose increasing work demands.[24] The very weak correlation between demands and ‘temporariness’ may be reflecting that speed and pace of work have increased for both temporary and permanent workers[20] and that excess overall fatigue among non-permanent compared to permanent workers has decreased between 1995 and 2000.[43].

Precarious workers are described as lacking autonomy and control over work performed.[6,9] Correspondingly, both components of job control were negatively correlated with EPRES scores. Both scales correlated strongest with ‘wages’, possibly reflecting the relationship between low wages, low-skilled jobs, and low control.[44] ‘Influence at work’ also exhibited a similar correlation with ‘temporariness’, which is compatible with evidence suggesting that temporary workers have little influence over workplace decisions[14] and lack autonomy.[20]

Study results supported the hypotheses that ‘social support’ would be negatively correlated with employment precariousness, and that this correlation would be higher with the subscales tapping social workplace relations: ‘vulnerability’ and ‘exercise rights’. Evidence from temporary workers indicates that they have a greater exposure to intimidation and discrimination,[20] and receive lower support at work from permanent co-workers[14,23] and superiors.[24].

Our results also supported the general hypotheses that ‘employment insecurity’ and ‘insecurity at work’ would exhibit positive correlations with EPRES scores, and that correlations would be weaker with the latter, since it assesses concepts (employability and involuntary changes to job features) that are somewhat distant from the employment precariousness construct. We also found support for the hypothesis that correlations would be strongest with ‘vulnerability’ and ‘exercise rights’. Workers who perceive themselves in a defenceless or powerless position in the workplace are more likely to feel at risk that valued job features might be changed against their will (‘insecurity at work’). Also, it is likely that ‘employment insecurity’ augments employee defencelessness and powerlessness, as a result of the worker’s need to ensure continuity of the current job. However, weak correlations (<0.15) between these EPRES

subscales and perceived insecurity corroborate their conceptual differences. Interestingly, both measures of insecurity were as correlated with ‘rights’ as with ‘exercise rights’, revealing an association between actual lack of rights and perceived job and employment insecurity.

The correlation between ‘employment insecurity’ and ‘temporariness’, although positive, was weaker than originally expected. However, small associations between perceived job insecurity and temporary employment have been previously described[45]; and the importance of distinguishing between perceived and contractual security has been pointed to.[46] On the one hand, temporary workers might not have any expectations of job stability; they may feel secure within the period of their contract, with perceptions of insecurity varying according to the time left before it expires[14]; and some may feel confident that they will remain on the job, either because their temporary jobs are relatively stable,[7] or serve as transition into permanent positions.[40] On the other hand, instability has spread into permanent employment due to the erosion of protective regulations for permanent contracts. [6,40] Permanent workers may perceive their jobs as insecure if, for example, they are afraid of being laid off; or have only recently been granted permanent status, in which case firing costs are low, thus limiting the gains in employment security. Finally, the subjective perception of job insecurity is not necessarily due to instability of the current job. Rather, it may be brought on by a variety of stimuli, including high general unemployment, stagnant economic activity in the company’s business, and, in the case of Spain, a growing share of non-permanent employment.[7]

The results of our study provide evidence of the good metric properties of the Employment Precariousness Scale (EPRES) and its suitability to be used with both

permanent and temporary workers. Some improvements to the scale are suggested. Ongoing assessment of the scale's validity will allow testing such improvements while further exploring the construct. Future research should develop and examine the psychometric properties of EPRES for its use in other contexts, in international comparisons, with workers in other segments of the labour market (e.g. informal, self-employed), and for other public health uses (e.g. surveillance).

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‘What this paper adds’ box:

- 1- Employment precariousness has largely grown with the expansion of labour market flexibility and the erosion of the standard employment relationship.
- 2- Available epidemiological measures do not encompass all its distinctive features; thus, current knowledge of its health-related impact is limited.
- 3- The Employment Precariousness Scale (EPRES) is a theory-based, multidimensional proposal, useful for the assessment of the contractual features and workplace power relations of precarious employment.
- 4- EPRES demonstrated good acceptability, internal consistency reliability and construct validity; it is adequate to be used among both permanent and temporary workers.
- 5- EPRES is a new tool to assess the public health impact of changing employment conditions and growing employment precariousness.

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FIGURES

Figure 1. Mean EPRES scores (95% CI) in waged and salaried workers according to sex, age, country of birth, type of contract, and occupational social class. Spain, 2004-05.

