

# Measuring Employment Precariousness in the European Working Conditions Survey: The Social Distribution in Europe

Vanessa Puig-Barrachina<sup>1,2</sup>, Christophe Vanroelen<sup>1,2,4</sup>, Alejandra Vives<sup>2,7</sup>, José Miguel Martínez<sup>2,3,5</sup>, Carles Muntaner<sup>2,8</sup>, Katia Levecque<sup>4,6</sup>, Joan Benach<sup>2</sup>, Fred Louckx<sup>1</sup>

- <sup>1</sup> Interface Demography – Department of Sociology – Vrije Universiteit – Brussels, Belgium
- <sup>2</sup> Health Inequalities Research Group. Employment Conditions Knowledge Network (GREDS\Emconet) Universitat Pompeu Fabra - Barcelona, Spain
- <sup>3</sup> CIBER Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain
- <sup>4</sup> Research Foundation Flanders, Belgium
- <sup>5</sup> Center for research in occupational health (CISAL), Universitat Pompeu Fabra- Barcelona, Spain
- <sup>6</sup> Department of Sociology – Ghent University – Belgium
- <sup>7</sup> Departamento de Salud Pública, Escuela de Medicina, Pontificia Universidad Católica de Chile.
- <sup>8</sup> Bloomberg Faculty of Nursing and Dalla Lana School of Public Health, Division of Social and Behavioural Health Sciences, University of Toronto - Canada

## **Published on:**

Work 49 (2014) 143–161

DOI 10.3233/WOR-131645

IOS Press

<http://content.iospress.com/articles/work/wor01645>

Corresponding author:  
Vanessa Puig-Barrachina  
vanessa.puig@upf.edu  
Passeig de Circumval·lació, 8  
08003 Barcelona  
Tel.:0034 93 542 28 48  
Fax: 0034 93 542 24 51

## **Abstract**

*Background:* Precarious employment is becoming an increasingly important social determinant of health inequalities among workers. The way in which contemporary employment arrangements and their health consequences are addressed in empirical research is mostly based on the contract-related or employment instability dimension. A broader conceptual approach including various important characteristics of the degrading of employment conditions and relations is needed.

*Objective:* The general objective of this paper is to empirically test a new multidimensional construct for measuring precarious employment in an existing database. Special focus is on the social distribution of precarious employment.

*Methods:* A subsample of 21,415 participants in the EU-27 from the Fourth European Working Conditions Survey-2005 was analysed. A cross-sectional study of the social distribution of precarious employment was conducted through the analysis of proportional differences according to gender, social class and credentials for the European Union as a whole and within each country. The 8 dimensions of the Employment Precariousness Construct were represented by 11 indicators.

*Results:* In general, women, workers without supervisory authority, those with fewer credentials, and those living in Eastern and Southern European countries suffer the highest levels of precarious employment. Exceptionally, men, workers with supervisory authority and those with the highest credentials suffer the highest levels of long working hours, schedule unpredictability and uncompensated flexible working times.

*Conclusions:* This article offers the first validation for an innovative multidimensional conceptualisation of employment precariousness applied to the analysis of existing survey data, showing the unequal distribution of precarious employment across the European labour force. This set of indicators can be useful for exposure surveillance of precarious employment.

**Keywords** Precarious employment · Health inequalities · Monitoring · Gender · Social class

## 1. Introduction

There has been a steady de-standardisation of employment conditions in western countries since the end of the “Golden Age” of industrial mass production (1945-1975) [1]. During these years, the Fordist Standard Employment Relationship (SER) model, i.e., full-time -approximately 40 hours per week-, full-year and permanent employment, for the male breadwinner prevailed [2]. The economic, political and ideological conflicts of the 1970s led to the emergence of a new employment paradigm. This new paradigm favours non-standard or flexible employment arrangements<sup>1</sup> [2], and the deregulation of the SER [3]. Consequently, employment conditions in some segments of the labour market have degraded and can be considered as forms of “precarious employment” [4].

*Precairous employment* can be considered as a major dimension of a much broader phenomenon of social precariousness. The latter refers to the social factors that erode people’s resources and capacities and raise their risk of marginalization [5]. Precarious employment, in turn, is considered a key determinant of social health inequalities [6]. Social health inequalities refer to those health differences which are unnecessary and avoidable but, in addition, are also considered unfair and unjust [7]. The major factors responsible for social health inequalities are the political, economic, cultural and environmental conditions within societies, which determine the risk of people getting ill, their ability to prevent sickness, or opportunities to have access to the right treatment. These conditions are called the social determinants of health [8]. Work plays a major role in most people’s lives [9]; employment and working conditions are prominent social determinants which have been repeatedly shown to be health-related. Finally, because most of work and employment conditions are unequally distributed by social class, gender, education, ethnicity, etc., these conditions also make a substantial contribution to social health inequalities [10].

It is the general objective of this paper to empirically test a new multidimensional construct for measuring employment precariousness in Europe via an existing database, the European Working Conditions Survey (EWCS) and to assess and discuss the social distribution of its constituting indicators.

---

<sup>1</sup> We use “employment arrangements” to point at both employment conditions and social relations, and their mutual interplay in specific job situations.

### *1.1. Conceptualizing and measuring precarious employment*

The quality of work can be represented in four separate domains: *job content*, i.e., worker's degree of autonomy and control over their jobs; *working conditions*, i.e., physical and psychosocial demands of work; *employment conditions*, i.e., the mutual agreement between employees and their employer over the terms of their contracts, rewards and expectations; and finally, *employment relations*, i.e., the mutual relations between employers and employees [11]. Employment relations are in essence an asymmetrical power relationship, intrinsically related to the Marxist concept of social class [12]. In this paper, precarious employment is approached from a *power resources* perspective [13]: it refers to (asymmetrical) employment relations and related employment conditions. Given that the SER model was conceived as a fairly balanced employment relationship [14] it serves as a point of reference, from which to assess diverging characteristics of employment.

The way in which contemporary employment arrangements and their health consequences has been addressed in empirical research varies greatly. Most of the approaches are focused on one single dimension of precarious employment: the instability of employment. This instability is often measured by focusing on the health consequences of *types of employment* situations that differ from the permanent type of employment contract, which was typical for the SER model [15]. Also a *perceptual approach* has been adopted, focussing on the workers perception of job insecurity [16,17]. A third approach focuses on *downsizing* and addresses the imminent threats of job loss due to restructuring processes in organizations [18]. In contrast, other approaches to precarious employment go beyond the contract-related or employment instability dimensions, including other important (objective) characteristics of the degrading of SER-employment, like low social protection, unsustainable wages, or low worker representation [6,19].

Several authors have proposed multidimensional approaches to precarious employment. Rodgers [4] identifies four dimensions of precarious employment: (1) uncertainty of continuing work, (2) limited control over work, (3) limited legal and social protection, (4) income inadequacy. Standing [3] referred to seven forms of employment security which characterize SER-employment in the Fordist labour market: (1) labour market security, i.e., adequate employment opportunities, (2) employment security, i.e., protection against arbitrary dismissal, (3) job security, i.e., opportunities

for employability, (4) work security, i.e., workplace rights, (5) skill reproduction security, i.e., training and skill development, (6) income security and (7) representation security, i.e., protection of collective voice. Other authors have taken into consideration both approaches in building their own concepts of precarious employment [20-22]. However in some cases these conceptualizations also incorporate aspects of working conditions and the content of work, which may be considered undesirable from a conceptual point of view.

It is our purpose to focus on a multidimensional concept based only on employment conditions and relations inspired by the Employment Precariousness Construct developed by Amable and other scholars from Pompeu Fabra University in Barcelona, Spain [19,23,24] and the Employment Conditions Network (EMCONET) –a knowledge network for the Commission on Social Determinants of Health of the World Health Organization [6]. This multidimensional construct of precarious employment has its roots in Rodgers' original framework [4] and is primarily designed for epidemiological studies. Amable [23] defined precarious employment as *the weakening of the wage relation as a consequence of labour flexibility and the resulting asymmetry in power relations* (p. 126). According to this author, accounting for multiple dimensions of the transformations in salaried society identifies precarious employment as a social process that undermines one of the foundations of the post-war societies: the SER-model [23]. The Employment Precariousness Construct [19, 23] encompasses six dimensions: instability of employment or temporariness, low income, lack of workplace rights and social protection, the incapacity to actually exercise the rights and benefits workers are entitled to, the absence of collective bargaining over employment and working conditions and vulnerability.

Based on the Employment Precariousness Construct, an Employment Precariousness Scale (EPRES) has been developed and tested empirically on a sample of Spanish employees [25]. Results of the first empirical studies relating the EPRES scale to outcome measures of worker's health and well-being have shown some clear associations with poor mental health [26]. Adverse mental health is shown to increase in a gradient-wise manner in relation with rising employment precariousness [23].

For this study, we have adopted the Employment Precariousness Construct with some adaptations because of conceptual considerations. Because precarious employment should consider the degrading of the different characteristics of employment that are typically manifested in the SER model, we adopted two additional

dimensions from Standing's model [3]: lack of training possibilities and skill development and low control over working times. Working time was already proposed as a new dimension for the Employment Precariousness Construct in a previous review among migrant workers [24].

### *1.2. Social class, credentials and gender as social mechanisms of health inequalities*

The assumption that precarious employment is related to axes of social inequalities makes it a determinant of social health inequalities. In social epidemiology, health inequalities are traditionally explained through two main pathways: socially differential exposure to health-related risks and protective factors (mainly social determinants of health) and differential vulnerability to these factors (effect modification) [27]. The axes of social inequalities determine people's social position, which is related to the availability of their economic, cultural, and social standing and determine their access to valuable health-related social resources, privileges and opportunities [28]. Social class and credentials are clear examples of axes of social inequalities that are affecting health [29]. However, "ascribed social positions" such as gender, sexual orientation or ethnicity are also related to health inequalities to the extent that these positions are related to fewer opportunities. Specifically gender remains an important element of social stratification [30] with regard to flexible and non-standard employment conditions [31].

In this paper we specifically address *the differential exposure to precarious employment* according to social class, credentials and gender. Social class is considered here from a relational, rather than a stratification perspective which is most often adopted in social epidemiology [28]. The relational approach focuses on the dynamic character of social inequalities as constantly (re)produced during human action, while a stratification approach focuses on the social differences in a given community at a given time [12]. Credentials are understood as socially valued skills and knowledge that are certified through education and experience, and may serve as a major mechanism of social resource allocation [29].

A final key point is the interaction between mechanisms of health inequalities. It has been shown that social class, credentials and gender are intertwined [32]. As a consequence, different gender-related class patterns in health can be expected. Therefore in this study, an intersectional approach [32-34] is applied through

investigating the social distribution of precarious employment by social class and credentials stratified by gender.

### *Aim and hypothesis*

The central focus of this study is the social distribution, in the European workforce, of 11 indicators which together make up a multidimensional measure of employment precariousness. The 11 indicators are the result of the adaptation of the Employment Precariousness Construct to the 2005 European Working Conditions Survey. As a first step, the distribution of employment precariousness according to social class, credentials and gender is analyzed. Then, gender-stratified results of the social class and credentials distributions are shown. Finally, the geographic distribution of employment precariousness is assessed.

Our main hypothesis was that employment precariousness is unequally distributed among the European labour force according to gender, social class and credentials. More concretely, it is expected that a higher proportion of respondents in a socially disadvantaged position, i.e., women, workers without authority, and unskilled employees, will predominate in the most precarious category of each indicator. Moreover, different gender patterns for employment precariousness can be expected by social class as well as by credentials. Regarding specific country distributions, higher levels of precarious employment are expected to be found in southern and eastern European countries.

## **2. Methodology**

### *2.1. Survey design*

The Fourth European Working Conditions Survey (EWCS), conducted in 2005 was the basis for this study. The EWCS contains information on working conditions, demographics, household characteristics, socioeconomic indicators and work-related health. The EWCS 2005 was conducted to obtain a representative sample of people in paid work aged 15 and over (employees and self-employed) through multi-stage, stratified, random sampling [35]. Almost 30,000 European workers were interviewed in 31 countries (all EU-27 Member States plus Croatia, Norway, Turkey and Switzerland). In our analyses however, only wage-earners from the EU-27 member states have been

included (N= 21,415 participants). Note that response rates varied considerably between participating countries [35].

## 2.2. Measures

Based on the information available in the EWCS, 11 indicators were constructed representing the dimensions of employment precariousness that have been described above. A brief definition of the dimensions and the construction of precariousness indicators are available in Table 1.

The *social class* indicator is based on a Neo-Marxist theoretical framework [28]. On theoretical grounds, three possible class positions can be defined among wage-earners: *managers*, those who make strategic decisions over the means of production; *supervisors*, those who have a certain authority over the work of others or the policy of their organization; and *workers*, those without authority over the work of others. The social class indicator is constructed from two variables: “people supervising the work of others” and the International Standard Classification of Occupations (ISCO). Legislators and senior officials, corporate managers, managers of small enterprises, with or without supervising functions were classified as *managers*; other occupations with supervising functions were classified as *supervisors*; and the remaining respondents were classified as *workers*.

The *credentials* indicator was constructed from two variables: educational attainment based on the International Standard Classification of Education (ISCED) and the ISCO. Employees with low education, e.g., primary education or lower secondary education (except for workers in precision, handicraft, craft printing and related trades) and those who combine higher secondary education with un/semi-schooled manual, non-manual routine, educational or healthcare occupations are classified as unskilled employees. Schooled manual employees, professionals and managerial employees with higher educational attainment, as well as manual, non-manual routine, educational and healthcare workers with a higher non-university educational attainment are in the semi-skilled category. Finally, professionals and managerial employees with non-university higher education and all respondents with a university degree are classified as experts. In this way, the indicator of credentials also takes into account credentials achieved through experience during an occupational career [29].

## 2.3. Statistical Analysis



The social distribution of precarious employment was obtained through the analysis of the proportions of employees within the 11 precarious employment indicators according to social class, credentials and gender (Table 2). The distribution of precarious employment indicators according to social class and credentials was also stratified by gender (Tables 3 and 4). In addition, the proportion of employees in each precariousness indicator was computed for each individual country separately (Table 5). The most precarious category of each indicator is described in Table 5 - except for the contract indicator where the least precarious category “indefinite contract” is shown. Countries are ordered according to a modified Esping-Andersen typology of welfare states [36,37]: social democratic, conservative-corporatist, southern, liberal, former-USSR, post-communist European and developing welfare state. The last three categories correspond to the eastern countries according to Fenger’s classification [37]. In Table 5, countries in the highest quartile of the distribution for each indicator are highlighted. Finally, the distribution of employees according to social class, gender and credentials was computed for each individual country (data available on request). Due to the unequal selection probabilities and differential non-response rates across the various socio-demographic segments of the labour force, case weighting was required within each country. In addition, cross-country weights were used to obtain a reliable distribution for the whole sample [35]. Statistical analyses were conducted using Stata 11.0 [38].

### **3. Results**

The overall (EU-27) social distribution of employment precariousness indicators by gender, social class and credentials is shown in Table 2. Table 3 and 4 show the overall distribution of the employment precariousness indicators according to social class and credentials stratified by gender. Table 5 shows the distribution of the employment precariousness indicators by country, ordered according to the above cited typology.

#### *3.1. Employment instability*

For the *type of contract* indicator in the overall sample, women showed a lower percentage of indefinite contracts (77%) than men (80.7%). Considerable differences were found in the social class distribution of this indicator. A lower proportion of

workers (77%) had indefinite contracts when compared to supervisors and managers (87.5 and 87.8% respectively). The proportion of unstable contracts was lower among expert employees (2.7%) than among semi-skilled (7.7%) and unskilled employees (8.7%).

For social class stratified by gender (Table 3), we found several differences. While the proportion of indefinite contracts was similar among male and female workers and supervisors, a notable difference was found between male (90.4%) and female managers (81.8%) ( $p < 0.001$ ). In particular, female managers were more likely to have temporary contracts lasting one year or more (11.2%) when compared to male managers (3.6%). For credentials, the greatest difference between men and women was found in the expert-category, followed by unskilled workers, with male experts having a highest percentage of indefinite contracts in both cases (See Table 4).

Country-specific analyses showed that Cyprus, Greece, Ireland, Malta, Poland, Spain and the United Kingdom had the lowest percentages of indefinite contracts (Table 5). Moreover, Spain, Greece and Italy were the countries exhibiting the largest gender differences. For instance, the proportion of indefinite contracts among Spanish men was 74.3%, while only 56.3% among women. Again, the largest differences according to social class (comparing workers to managers) were found in Spain, Malta, Greece and Italy. Also for credentials, Cyprus, Spain, Greece and Ireland were exhibiting the greatest level of inequality between the highest and the lowest categories.

### 3.2. *Low income level*

Large inequalities were found in the gender, social class, and credentials distribution of *country-specific relative income*. Women, workers without supervisory responsibilities, and less-educated employees presented the lowest percentages of well paid jobs. For instance, only 13% of male employees declare working in a very low paid job, compared to 36.7% of female employees, and only 4.9% of managers, compared to 27.9% of workers. A similar pattern can be seen for credentials.

We found strong associations between *country-specific relative income*, social class and credentials for both women and men. Absolute differences in the proportion of “very low paid jobs” between female workers and managers (40% - 10.1%) and unskilled and expert women (48.1% - 9.2 %) were more pronounced than between male workers and managers (15.6% - 2.7%) and unskilled and expert male employees (16.8%- 3.4%).

Cyprus, Ireland, Lithuania, Luxembourg, the Netherlands, Portugal and the United Kingdom had the largest proportions of very low paid jobs ( $\geq 27\%$ ). The general European pattern of income by gender, social class, and credentials was reproduced in all countries individually. It is remarkable that in most of European countries, more than 50% of semi-skilled employees and more than 60% of unskilled employees were in low-paid or very low-paid jobs.

Slight differences were found in the gender distribution of *non-wage benefits*. In the overall figures, women were less likely to receive benefits (9.9%) than men (12.2%). However, greater differences were found by social class and credentials: supervisors, managers, and employees with higher credentials had a higher probability of receiving benefits. Regarding social class for instance, 24.4% of managers received benefits, compared to 14.2% of supervisors and 9.8% of workers.

Gender-stratified analyses showed some important differences between men and women. While the difference in the overall proportion of women and men receiving *non-wage benefits* was small, this difference increased when comparing male managers to female managers (27.3% vs. 18%). Within genders, small credentials-related differences were found among women (8% unskilled; 10% semi-skilled; 12.1% experts) and unskilled and semi-skilled male employees (10.8% vs. 10.7%), while expert employees had a clearly higher chance of receiving benefits (19%).

Generally, a low proportion of workers reported receiving such benefits, the lowest being in Estonia, Lithuania, Poland, Portugal, Slovenia, Spain and the UK. Regarding gender, in those countries where differences were statistically significant, women had less chances of receiving benefits than men. This was the case in France, Greece, Ireland, Italy, Luxembourg, Malta and the UK. Differences by social class and credentials were statistically significant in half of the countries. For those with significant differences, the overall EU-27 pattern was largely replicated.

### 3.3. *Lack of rights and social protection*

Small differences were found in the overall gender, social class and credentials distribution of the *health and safety information* indicator. According to social class, workers were less informed (84.1%) than supervisors (90.7%) and managers (91%). Regarding credentials, unskilled (84.5%) and semi-skilled employees (84.7%) were less informed than experts (88.4%).

Luxembourg, Malta, France, Belgium, the Netherlands and Spain were the countries with the highest percentage of employees (>5%) who were not at all informed about health and safety risks related to the performance of their job. A significant gender difference was seen in France, where women were less informed than men (77.1% men vs. 71.3% women were well or very well informed). Regarding social class, managers were the best informed in nearly all countries, but these differences were statistically significant in only a few countries. The same pattern holds for credentials. (See Tables 2 and 4).

### 3.4. Incapacity to exercise rights

From a gender point of view, a higher percentage of men compared to women declared working *uncompensated flexible working times*. By social class, managers had the highest probability of working uncompensated flexible working times (42.4%), followed by supervisors (30%) and workers (20.9%). Looking at credentials, those who declared a higher percentage of uncompensated flexible working times were experts (29.8%), compared to semi-skilled and skilled employees (21.7% both).

From the analysis stratified by gender, it can be seen that percentages of uncompensated working flexible times increased gradually among both male and female employees according to social class, the increase being slightly steeper for men. Regarding credentials, almost no differences were found between unskilled and semi-skilled employees among men or women. No statistically significant differences were found between female semi-skilled and expert employees (19.6% vs. 21.7%), while there was a significant difference between the same categories for men (23.3% vs. 37.7%). Thus, credentials showed stronger associations for men than for women.

This gender pattern is maintained in the majority of the countries, however most country-specific associations were not statistically significant. Regarding the social class distribution by countries, three different patterns were seen. First, a pro-high pattern: meaning that in these countries managers more often worked uncompensated flexible working times. This was the case in Denmark (80% of managers, 39% of supervisors, 20.6% of workers), Finland (50% of managers, 45.5% of supervisors, 14.6% of workers), but also in Belgium, Germany, France, the Netherlands, Sweden, Malta, and Poland. Second, in some countries the supervisors were those with the highest proportion of uncompensated, flexible working times: i.e., Italy and Luxembourg. Third, there were countries where these differences were not statistically

significant for social class (Spain, Greece, Estonia, Romania, Slovenia, Portugal, Bulgaria, Cyprus, Latvia and Lithuania). For credentials a double pattern was found. There were countries where having more credentials was related to a higher probability of working uncompensated flexible times, i.e., Belgium, Germany, Denmark, Finland, France, Ireland, the Netherlands and Sweden. In other countries having fewer credentials was associated with a higher probability of working uncompensated flexible times. This was the case in the Czech Republic, Spain, Greece, Latvia, Malta, Portugal, Bulgaria and Romania.

### 3.5. *Absence of collective bargaining*

No significant gender differences were seen for *self-determination over the work schedule*. However, this indicator followed a clear social class pattern in which only 30% of workers had certain freedom to set their working time, compared to 44% of supervisors and 62% of managers. For credentials, slight differences were found between unskilled and semi-skilled employees (30.7% vs. 29.5%), while experts had a higher percentage (49.5%).

Gender-stratified analyses showed significant gender differences in the social class pattern. While a slightly higher proportion of female than male workers and supervisors indicated having some freedom to determine their work schedule, male managers showed clearly higher percentages than female managers (65.6% vs. 54.4%). A similar pattern existed for the distribution of credentials stratified by gender.

The countries with a higher percentage of employees without any freedom to determine their work schedules were Bulgaria, Cyprus, Greece, Hungary, Malta, Portugal and Romania. It was noted that this indicator fluctuated over a very wide range: Bulgaria was the country with the highest percentage of employees without freedom to determine their work schedules and Sweden the lowest (92.1% vs. 35.9%). The gradient of social class was maintained in all countries, except for Germany, France, Hungary and Bulgaria.

### 3.6. *Imbalanced interpersonal power relations*

Only small gender differences were seen for the indicator *communication and participation with superiors*. Women were slightly overrepresented in jobs with low participation. Analyzed by social class, workers were overrepresented in the category with the least participation (26.8% - supervisors 11.4% - and managers 9.8%). The same

pattern existed for credentials: 29.4% among unskilled, compared to 24.6% among semi-skilled and 14.1% among experts. No significant differences were found when the results of social class and credentials were stratified by gender.

France, Germany, Italy, Luxembourg, Poland, Portugal and Spain were the countries with higher scores in the most precarious category. Gender differences were only statistically significant in Greece, Malta, Ireland, the Netherlands, Portugal and Italy, where women were more exposed, especially in the latter two countries. The country-specific distribution by credentials is similar to the overall pattern.

### *3.7. Lack of training opportunities*

*Training opportunities* did not show any gender differences. According to social class, a clear gradient appeared in the overall analyses: managers received more training opportunities than supervisors and supervisors more of these opportunities than workers (66.6%, 57.5% and 43.3% successively). The same pattern was seen for credentials: 65.4% of the experts declared having received some kind of training, compared to only 43.7% of the semi-skilled employees and 38.7% of the unskilled employees.

When analyzing results for social class and credentials stratified by gender, the same patterns existed. Female supervisors had slightly more training opportunities than male supervisors, and male managers had slightly more opportunities than female managers. A similar pattern was seen with credentials.

The analyses by country showed that Bulgaria, Greece, Hungary, Italy, Portugal, Romania and Spain were countries where, in general, the least training opportunities were offered. Higher percentages of training opportunities were found among women in Denmark, Estonia and Lithuania. According to social class, in some countries supervisors were receiving more training than managers, e.g., Belgium, Germany, and Hungary. In other countries no statistically significant differences existed (e.g. Austria, Finland and Greece). The distribution of training opportunities by credentials showed the same pattern in each country, being statistically significant ( $p \leq 0.001$ ) throughout. The biggest differences in the percentage of training opportunities between experts and semi-skilled employees were seen in Austria, Cyprus, the Czech Republic, Germany, Lithuania, Latvia and Slovenia.

### *3.8. Low control over working times*

Differences were found in the gender distribution of *schedule unpredictability*, with men being overrepresented in the most precarious response group. Social class and credential-related differences were also seen for this item. It must be noted that supervisors were those with the highest (most precarious) score for “schedule changes known on the same day”. The same held for semi-skilled employees in the distribution of credentials.

When analyzing the results of social class stratified by gender, we found that female workers and supervisors had lower percentages in comparison to male workers and supervisors for “schedule changes known on the same day”. This percentage was however equivalent among female and male managers. For credentials, percentages of “schedule changes known on the same day” were lower for all female categories, compared to male.

Slovakia, Romania, Portugal, Luxembourg, Finland, Denmark and Cyprus had the highest proportion of respondents in the most precarious category. Few countries showed statistically significant differences by gender (e.g., Belgium, Germany, and Finland), social class (e.g., Austria, Belgium and Germany) and credentials (e.g., Austria, Denmark and Finland).

The indicator of *part-time employment* showed that women had a higher frequency of voluntary and involuntary part-time employment than men. Regarding social class, more workers (6.9%) than supervisors (3.2%) and managers (0.8%) declared that they had to work (involuntary) part-time. Also, according to credentials, a higher percentage of semi-skilled and unskilled employees reported having to work part-time, compared to experts.

Looking to the gender-stratified analyses, the highest percentages of voluntary and involuntary part-time work were concentrated among male and female workers. Regarding credentials, no significant differences were found in the distribution of part-time work among male employees. In contrast, credentials had a high impact on the distribution of part-time employment among women: 13% of expert employees, compared to 20.5% and 18.8% of the semi-skilled and unskilled employees, respectively, reported being voluntarily in part-time employment. Also involuntary part-time employment was seen in 5.8% of the experts, compared to 11% and 10.8% among semi-skilled and unskilled female employees.

The same gender pattern for involuntary-part time employment was evident in all European countries, except Finland, Bulgaria and Romania. The countries with the

highest inequalities for this item were Germany, Spain, Greece, Italy, the Netherlands, Malta and Sweden. However, regarding social class, only Ireland, the Netherlands, Poland, the United Kingdom and Bulgaria followed this pattern of statistically significant over-representation of workers ( $p \leq 0.05$ ). The pattern of credentials was significantly reproduced in 10 of the 27 countries.

*Long working hours* were performed in a higher percentage of men than women (20.3% vs. 9.6%), and by managers as opposed to supervisors and workers (30.3% vs. 16.7% and 11.1%, respectively). No statistically significant differences were found in relation to credentials. When analyzing the results of social class stratified by gender, the social class gradation was apparent among both men and women, however women always had lower scores in each category.

When analyzing the results by country, two different patterns were evident. Among Nordic and central European countries such as Germany, Denmark, the Netherlands, Sweden and the United Kingdom, experts were overrepresented in the category “working more than 45 hours”. Among southern and eastern European countries, this was also the case for unskilled, followed by semi-skilled employees. However, these results must be interpreted with caution as these differences were not statistically significant for 12 of the 27 participating countries. Regarding social class, these two patterns were not so clear. However, in those countries where differences were statistically significant, managers tended to work longer hours.

#### **4. Discussion**

In this paper the Employment Precariousness Construct was applied to the data of the Fourth European Working Conditions Survey (2005). Applying this construct to existing databases is promising for labour market monitoring purposes. Results of the analyses confirm our main hypothesis. Employment precariousness was clearly unequally distributed across the European labour force according to gender, social class and credentials. Women, workers without supervisory authority, supervisors, and less-skilled employees showed the highest prevalence of the most precarious response category for the majority of the indicators. The only exceptions were long working hours, uncompensated flexible working times and schedule unpredictability. Different social class and the patterns of credentials patterns were found by gender. Several



indicators, although not all, showed a clear country pattern, with Southern and Eastern European countries exhibiting the least favourable scores.

The higher accumulation of disadvantages in women and lower socioeconomic categories regarding work and employment characteristics is in line with other published studies [20,26,29,39]. In Standing's recent work [40], employees with generally unfavourable employment characteristics were described as a "new social class", the "*precariat*", characterized by their lack of seven forms of labour-related security [3,40].

#### *4.1 Gender distribution of employment precariousness*

Precairous employment was deeply gendered [31]. Women were especially overrepresented in the most precarious income category and work more in part-time employment. Part-time work, both voluntary and involuntary is related to other disadvantages relative to the employment situation: (1) most frequently, part-time employment fails to provide sufficient earnings to meet subsistence needs, thereby reinforcing the dependence of women on the earnings of their partners [2]; (2) entitlement to social protection and benefits, such as unemployment benefits, is sometimes restricted to people working more than a minimum number of hours, as at present, eligibility levels for benefits are often framed within the context of the male-breadwinner SER-Model potentially leading to insufficient coverage for other types of employees [2,31]; (3) part-time employees are more likely than full-time employees to experience more limited opportunities for training and promotion within the organization [2]; (4) they are more often treated as "more disposable" and are more affected by temporal flexibility arrangements aimed at meeting employers' preferences [2]. Consequently, all these factors reinforce gender inequalities inside and outside labour markets.

#### *4.2 Socioeconomic distribution of employment precariousness*

Social class followed a clear gradient in which workers scored worse in nearly all aspects of precarious employment, followed by supervisors. Also expert employees score better than semi-skilled and unskilled employees for all aspects of precarious employment. Specific attention should be paid to the intermediate position of supervisors. In contrast with the indicator for credentials, the social class indicator cannot be considered as ordinal: workers, supervisors and managers have distinct

positions in the labour process. Frequently, the position of supervisors combines the negative aspects of both workers and owners. Among some precarious employment indicators that are most frequent in workers, supervisors fared more poorly than managers; and among some indicators that were most frequently seen in managers, supervisors fared more poorly than workers. The latter is clearly the case of schedule unpredictability, where supervisors had the worst scores. According to the E.O. Wright's [41] thesis of "contradictory class position" supervisors hold a squeezed position, combining the limited decision-making authority of workers and the responsibilities typically beard by managers. In other words, supervisory positions may turn into responsible jobs with low autonomy, leading to an unclear status and limited resources to meet the expectations attached to their jobs. This may be contributing to poor physical and mental health outcomes previously reported for supervisors, compared to non-supervisory workers [28,29,42].

#### *4.3 Exceptions to the general pattern of distribution*

Three indicators of employment precariousness were more concentrated among men, managers and highly skilled employees: uncompensated flexible working times, long working hours and schedule unpredictability. These features of employment appear to be characteristic of high status jobs that often are associated with high monetary and non-monetary rewards, such as career advancement [43]. However, regarding their job content, experts, managers and supervisors are often found to have more quantitative and emotional demands, overtime work and sudden schedule changes than lower skilled employees and workers without authority [29]. Working time insecurity may have grown for managers and experts, who are expected to work long hours and during their leisure time, often to remain competitive and to advance in their careers [3]. Such an employment pattern may be related to the notion of "over commitment" which – in turn – may pose increased risks to their health and well-being [44]. As a result, there is a need to question whether the over-commitment faced by employees in high-status jobs should not also be seen as a "contextual" element of (precarious) employment.

#### *4.4. Country distribution of employment precariousness*

As hypothesised, Eastern and Southern European countries were those with the highest level of employment precariousness according to most of the dimensions. In addition, they were the countries with the highest inequalities by gender, social class

and credentials. Both regions are characterized by an underdeveloped welfare regime with limited unionization and worker protection. In the Southern case, this is the consequence of preceding authoritarian right-wing regimes, and in Eastern Europe, of the transition from Soviet communism to liberal capitalism. However, also important gender inequalities were found in the Netherlands, Germany, Luxembourg, Sweden, France and the UK for involuntary part-time employment and very low income, which are probably related to each other.

More interesting is the double pattern in Europe found for long working hours and uncompensated flexible working times. In countries with the lowest percentages of uncompensated flexible working hours, i.e. Nordic and Central European countries, managers and expert employees were those reporting working the longest hours and not being monetarily rewarded for their overwork. In contrast, in the countries with the highest percentages of long working hours and uncompensated flexible working times, i.e., Eastern and some Southern European countries, those with fewer credentials were the employees reporting the longest hours and the highest percentages of uncompensated working times. Consequently, in Southern and Eastern European countries all of the characteristics of employment precariousness predominantly affect employees with fewer credentials and those without authority over other workers. In contrast, in Nordic and Central European countries there appears to be a type of employment configuration where employees with high credentials and authority have jobs characterized by overall beneficial employment conditions and relations in combination with intensive working hours and uncompensated flexible working times. These jobs resemble the category of highly flexible, high skilled and independent workers which Standing [40] describes as “proficians”.

#### *4.5. Health consequences of employment precariousness*

Previous research has shown that precarious employment is associated with poor health [19,23]. A recent study showed how Canadian employees exposed to several dimensions comparable to those in the Employment Precariousness Construct, i.e. low earnings, unpaid overtime hours, and absence of social benefits, are at increased risk of reporting poor health [22]. These studies are a first confirmation that precarious employment, conceptualized as a multidimensional construct, is a social determinant of health. Given the unequal distribution of precarious employment [19,23] our findings also confirm the status of precarious employment as a determinant of social health

inequalities. In that regard, it is also important to consider interactive effects between the social position and the (precarious) employment position of employees. Different health consequences may arise depending on whether people affected by employment precariousness are obliged to take precarious jobs because of the absence of alternatives or whether they can manage the situation of having a precarious job [45]. There is a lack of research regarding the differential vulnerability to employment precariousness. For example, we still do not know whether men and women suffer the same health effects when both are exposed to precarious employment. Menéndez et al. [46] hypothesised a greater effect on women's health due to several reasons, e.g. the gendered division of household work and different layers of labour market discrimination. Furthermore, research on employment conditions has shown a differential health impact of unemployment according to social characteristics such as gender and social class, and an interaction between both [32,34].

#### *4.6 Limitations and recommendations*

This research is the first validation of a set of indicators to measure the Employment Precariousness Construct in the EWCS. Nevertheless, some limitations need to be addressed, and suggestions to improve the monitoring of employment precariousness in surveys are made. An important limitation was the number of missing values for the income indicator (11.6%). The social distribution of these missing values is rather homogeneous by social class, credentials and gender, while relatively heterogeneous by country: Nordic countries being those with the lowest percentages of missing values and the United Kingdom the country with the highest percentage (32.5%), followed by Austria (23.1%). A second limitation is related to the secondary nature of our analysis and the consequent lack of direct questions to construct some of the dimensions of the construct. For example, extra questions providing information about rights and social protection (e.g., having pension rights, maternity or paternity leave, unemployment benefits) and collective representation (e.g., trade union affiliation, coverage of collective bargaining) would be desirable. The “*lack of rights and social protection*” dimension could only be measured by the “information on health and safety” indicator, understanding that the right of receiving information –in this case on health and safety – is the first premise to be able to exercise rights. Final consideration has to be given to the introduction of the *low control over working times* dimension in the Employment Precariousness Construct. It is not completely clear to

what extent this dimension is defining employment conditions and relations or the organization of work tasks. However, as most of the changes related to working time have been accompanied by a change or a weakening of working times regulation, we believe it should be considered an aspect of employment precariousness [47].

#### *4.7 Final remarks*

The adaptation of the Employment Precariousness Construct to the data available in the 2005 European Working Conditions Survey allowed us to measure employment precariousness in Europe in a multidimensional way. The results of this research provide the first validation of a measurement approach for employment precariousness via proxy-indicators available in existing surveys.

This approach is important since it allows for monitoring employment precariousness on a regular basis in the European context. Currently, the expansion of precarious employment in the European Union, in the context of the economic crisis, makes it a serious public health issue, which should be adequately and periodically measured. Repeating these analyses in different editions of periodic data collections such as the EWCS-2010 will allow researchers to document trends in employment precariousness. A further step will be the creation of an overall score based on the indicators reported in this article. Since overall indicators are easier to interpret for stakeholders and easier to incorporate in a monitoring system this will facilitate the task of monitoring. When possible, interactions with social background indicators, such as social class, gender, ethnicity, and migration should be analysed, as such intersectional approaches provide an excellent insight into inequalities [33].

The development of surveillance systems monitoring employment conditions is a priority for reducing work-related health inequalities and working towards more sustainable employment [10]. Some early efforts at monitoring social determinants of health exist; however most of them include few indicators of employment – generally unemployment or employment rates [34]. Further development of employment-health-equity surveillance systems would provide researchers and policy makers with more sensitive information of the impact of employment policies on health and well-being [10].

Acknowledgements – This work was supported by the Research Foundation Flanders, Belgium, project number G.0440.09N, the Spanish Ministry of Science and Innovation and PLAN E. (Financiado por MICINN), project number CSO2009-12536 (GEHES project) and the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 278173 (SOPHIE project). The authors also like to thank Maya Braekman for her important preparatory work on the database.

## References

- [1]Piore MJ. Perspectives on Labour Market Flexibility. *Industrial Relations: A Journal of Economy and Society* 1986;25(2):146-166.
- [2]Rubery J, Grimshaw D. *The Organization of Employment*. 1st ed. Great Britain: Palgrave Macmillan; 2003.
- [3]Standing G. *Global Labour Flexibility. Seeking distributive justice*. 1st ed. London: MacMillan Press Ltd; 1999.
- [4]Rodgers G. Precarious work in Western Europe. In: Rodgers G, Rodgers J, editors. *Precarious jobs in labour market regulation: the growth of atypical employment in Western Europe*. Geneva: International Institute for Labour Studies; 1989. p. 1-16.
- [5]Gallie D, Paugam S. *Social Precarity and Social Integration*. Brussels: Report for the European Commission; 2002.
- [6]Benach J, Muntaner C, Santana V, Chairs Employment Conditions Knowledge Network (EMCONET). *Employment Conditions and Health Inequalities. Final report to the WHO Commission on Social Determinants of Health (CSDH)*. 2007:1-172.
- [7]Whitehead M. The concepts and principles of equity and health. *Int J Health Serv* 1992;22(3):429-445.
- [8]Commission on Social Determinants of Health (CSDH). *Closing the gap in a generation: Health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health*. Geneva: World Health Organization; 2008.
- [9]Siegrist J, Theorell T. Socio-economic position and health: the role of work and employment. In: Siegrist J, Marmot M, editors. *Social Inequalities in Health: New evidence and policy implications* Oxford: Oxford University Press; 2006. p. 73-100.
- [10]Benach J, Puig-Barrachina V, Vives A, Tarafa G, Muntaner C. The challenge of monitoring employment-related health inequalities. *J Epidemiol Community Health* 2012 Jun 15.
- [11]Van Hoof JJ, Huiskamp RJ. 'New Forms of Work Organization in the Netherlands'. In: Grootings P, Gustavsen B, Hethy L, editors. *New Forms of Work Organization in Europe*. New Brunswick, NJ.: Transaction Publishers.; 1989. p. 155-173.

- [12]Crompton R. Class and stratification :an introduction to current debates. 3rd ed. Cambridge: Polity Press; 2008.
- [13]Korpi W. The democratic class struggle London: Routledge and Keagan Paul; 1983.
- [14]Mückenberger U. Non-standard forms of employment in the Federal Republic of Germany: The role and effectiveness of the State. In: Rodgers G, Rodgers J, editors. Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe. Geneva: International Institute for Labour Studies; 1989. p. 267.
- [15]Quinlan M, Mayhew C, Bohle P. The global expansion of precarious employment, work disorganization, and consequences for occupational health: placing the debate in a comparative historical context. *Int J Health Serv* 2001;31(3):507-536.
- [16]Ferrie JE, Shipley MJ, Newman K, Stansfeld SA, Marmot M. Self-reported job insecurity and health in the Whitehall II study: potential explanations of the relationship. *Soc Sci Med* 2005 4;60(7):1593-1602.
- [17]De Cuyper N, De Witte H. Job insecurity in temporary versus permanent workers: Associations with attitudes, well-being, and behaviour. *Work & Stress* 2007;21(1):65-84.
- [18]Vahtera J, Kivimaki M, Pentti J, Linna A, Virtanen M, Virtanen P, et al. Organisational downsizing, sickness absence, and mortality: 10-town prospective cohort study. *BMJ* 2004 March 6;328(7439):555.
- [19]Vives A. A Multidimensional approach to precarious employment. Measurement, association with poor mental health and prevalence in the Spanish workforce. Thesis, Universitat Pompeu Fabra. Barcelona, Spain.
- [20]Vosko LF. Precarious employment: towards and improved understanding of labour market insecurity. In: Vosko LF, editor. Precarious employment: towards and improved understanding of labour market insecurity. 1st ed.: McGill-Queen's University Press; 2006. p. 3-39.
- [21]Hannif Z, Lamm F. When Non-Standard Work Becomes Precarious: Insights from the New Zealand Call Centre Industry. *management revue* 2005;16(3).
- [22]Scott-Marshall H, Tompa E. The health consequences of precarious employment experiences. *Work* 2011;38(4):369-382.
- [23]Marcelo Amable. La precariedad laboral y su impacto sobre la salud. Un estudio en trabajadores asalariados en España. Thesis. Barcelona, España: Departament de Ciències Experimentals y de la Salut, Universitat Pompeu Fabra; 2006.
- [24]Porthe V, Ahonen E, Vazquez ML, Pope C, Agudelo AA, Garcia AM, et al. Extending a model of precarious employment: A qualitative study of immigrant workers in Spain. *Am J Ind Med* 2010 Apr;53(4):417-424.
- [25]Vives A, Amable M, Ferrer M, Moncada S, Llorens C, Muntaner C, et al. The Employment Precariousness Scale (EPRES): psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occup Environ Med* 2010 Aug;67(8):548-555.

- [26]Vives A, Vanroelen C, Amable M, Ferrer M, Moncada S, Llorens C, et al. Employment precariousness in Spain: prevalence, social distribution, and population-attributable risk percent of poor mental health. *Int J Health Serv* 2011;41(4):625-646.
- [27]Denton M, Prus S, Walters V. Gender differences in health: a Canadian study of the psychosocial, structural and behavioural determinants of health. *Soc Sci Med* 2004 Jun;58(12):2585-2600.
- [28]Muntaner C, Borrell C, Vanroelen C, Chung H, Benach J, Kim IH, et al. Employment relations, social class and health: A review and analysis of conceptual and measurement alternatives. *Soc Sci Med* 2010 Oct 15.
- [29]Vanroelen C, Levecque K, Moors G, Louckx F. Linking credentialed skills, social class, working conditions and self-reported health: a focus on health inequality-generating mechanisms. *Sociol Health Illn* 2010 Sep;32(6):948-964.
- [30]Anthias F. The material and the symbolic in theorizing social stratification: issues of gender, ethnicity and class. *Br J Sociol* 2001 Sep;52(3):367-390.
- [31]Vosko LF, MacDonald M, Campbell I. *Gender and the contours of precarious employment*. London; New York: Routledge; 2009.
- [32]Artazcoz L, Benach J, Borrell C, Cortes I. Unemployment and mental health: understanding the interactions among gender, family roles, and social class. *Am J Public Health* 2004 Jan;94(1):82-88.
- [33]Weber L, Parra-Medina D. Intersectionality and women's health: charting a path to eliminating health disparities. In: Segal MT, Demos V, Kronenfeld JJ, editors. *Gender Perspectives on Health and Medicine: Key Themes* Amsterdam: Elsevier; 2003. p. 181-230.
- [34]Puig-Barrachina V, Malmusi D, Martinez JM, Benach J. Monitoring social determinants of health inequalities: the impact of unemployment among vulnerable groups. *Int J Health Serv* 2011;41(3):459-482.
- [35]Parent-Thirion A, Fernández Macías E, Hurley J, Vermeylen G. *Fourth European Working Conditions Survey, European Foundation for the Improvement of Living and Working Conditions*. 2007.
- [36]Esping-Andersen G. *The Three worlds of welfare capitalism*. Repr ed. Cambridge: Polity; 1991; 1990.
- [37]Fenger HJM. Welfare Regimes in Central and Eastern Europe: Incorporating Post-Communist Countries in a Welfare Regime Typology. *Contemporary Issues and Ideas in Social Sciences* 2007;3(2).
- [38]StataCorp LP. *Stata Statistical Software*. 2009;Release 11.
- [39]Scott-Marshall H. The Social Patterning of Work-Related Insecurity and its Health Consequences. *Social Indicators Research* 2010;96(2):313-337.
- [40]Standing G. *The precariat : the new dangerous class*. London: Bloomsbury Academic; 2011.



- [41]Wright EO. Class, crisis and the state. London: Verso; 1979.
- [42]Muntaner C, Eaton WW, Diala C, Kessler RC, Sorlie PD. Social class, assets, organizational control and the prevalence of common groups of psychiatric disorders. *Soc Sci Med* 1998 Dec;47(12):2043-2053.
- [43]Burchell B, Ladipo D, Wilkinson F. Job insecurity and work intensification. London; New York: Routledge; 2002.
- [44]Siegrist J. Effort-reward imbalance at work and health . In: Perrewe P, Ganster D, editors. *Research in Occupational Stress and Well Being*. New York: JAI Elsevier; 2002. p. 261-291.
- [45]Clarke M, Lewchuk W, de Wolff A, King A. 'This just isn't sustainable': Precarious employment, stress and workers' health. *International Journal of Law and Psychiatry*, 2007 0;30(4-5):311-326.
- [46]Menéndez M, Benach J, Muntaner C, Amable M, O'Campo P. Is precarious employment more damaging to women's health than men's? *Social Science & Medicine*, 2007 2;64(4):776-781.
- [47]Tomba E, Scott-Marshall H, Dolinschi R, Trevithick S, Bhattacharyya S. Precarious employment experiences and their health consequences: Towards a theoretical framework. *Work* 2007;28(3):209-224.
- [48]Doeringer PB, Piore MJ. *Internal Labor Markets and Manpower Analysis*. Lexington, MA: DC Heath; 1971.
- [49]Atkinson J. Manpower strategies for flexible organisations. *Personnel Management* 1984;August:28-31.

Table 1. Construction of indicators for measuring Employment Precariousness in the EWCS-2005.

Dimension	Indicator	Indicator construction	Categories
<b>Employment instability:</b> Type and duration of employment contract, reflecting the degree of certainty of continuing work. Short contracts prevent workers from planning ahead in their personal or professional lives.	Type of employment contract	a- Type of employment contract b- Contract duration for fixed-term contracts.	1) Indefinite contract 2) Fixed-term contract, $\geq 1$ year, or unspecified 3) Fixed-term contract of less than 1 year 4) Temporary employment agency contract 5) No contract.
<b>Low income level:</b> Income from wages is considered to be insufficient when it does not cover regular or unexpected expenses [19].	Country-specific relative income	Income from the main job, disregarding number of hours worked, additional (second) jobs, other redistributive income transfers or the total household income.	1) Well paid job (above the country specific median), 2) Low paid job (in the second lowest quartile, 3) Very low paid job (in the lowest quartile).
	Benefits in nature	“Does your remuneration include advantages of other nature, for instance medical services, access to shops, etc?”.	1) Mentions receiving benefits in nature 2) Does not mention receiving benefits in nature.
<b>Lack of rights and social protection:</b> Workplace rights provide non-wage employment benefits (e.g. holidays, sick leave...).	Information on health and safety	“Regarding the health and safety risks related to the performance of your job, how well informed would you say you are?”	1) Very well and well informed, 2) Not very well informed and 3) Not at all informed.
<b>Incapacity to exercise rights:</b> It complements previous dimension. Workers powerlessness to exercise their rights may be due to lack of knowledge about their rights as well as implicit or explicit threats of job loss or wage cuts [24].	Uncompensated flexible working times	a- Number of usual hours worked per week, in main paid job; b- Working one or more Sundays per month; c- Extra payments for additional hours of work/overtime d- Extra payments compensating for Sunday work.	1) Doing overwork (> 40 hrs a week) and/or on Sunday, but not being compensated for it 2) Not doing overwork and/or Sunday work, or being compensated for it.
<b>Absence of collective bargaining (or formal relations):</b> Focuses on the erosion of the power of organized labour and a shift towards more “individually negotiated employment relations” [19].	Self-determination over work schedule	“How are your working time arrangements set?”	1) Worker can determine working hours with certain freedom: a) can choose between several fixed work schedules; b) can adapt within certain limits; c) working hours entirely determined by himself 2) “Working hours are set by the company with no possibility for changes”.
<b>Imbalanced interpersonal power relations (or vulnerability):</b> Refers to informal power relations of authority and discrimination, reflecting unbalanced workplace relations. [19,23].	Communication and participation with superiors	“Over the past 12 months, have you, or not..?” (yes=0 ; no=1) a- Had a frank discussion with your boss about your work performance?; b- Been consulted about changes in the organization of work and/or your working conditions?; c- Been subjected to regular formal assessment of your work performance?; d- Discussed work-related problems with your boss?	Sum scale ranging from 0-4 is calculated where 0 is the value for all positive aspects of communication and participation and 4 for all negative aspect.
<b>Lack of training:</b> The decline of internalized career structures has increased the need for individuals to acquire the necessary skills on their own [48], which is a potential source of inequality.	Training paid/provided by the employer	“Over the past 12 months, have you undergone any of the following types of training to improve your skills or not?” Training paid for or provided by your employer; On-the-job training (co-workers, supervisors)	1) Having received training: 2) Not having receiving such training.
<b>Low control over working times:</b> Working time flexibility has been imposed as one of the roads towards more flexibility in work organization. Employees working unsocial hours find it often harder to combine work and family and social life and tend to experience more health related problems [24,49].	Schedule unpredictability	a- How are your working time arrangements set? b- “Do changes to your work schedule occur regularly?” (only asked to workers who choose between several fixed work schedules or who have no possibility to change schedule). c- “How long before are you informed about these changes?”.	1) No sudden unpredictable changes (a) worker can adapt the schedule within certain limits or worker can entirely determined the schedule himself, b) They are set by the company with no possibility for changes or worker can choose between several fixed work schedules and employer informs the changes in the schedule several weeks in advance. 2) Changes known from several days in advance; 3) Changes known the day before; 4) Changes known the same day
	(Involuntary) part-time employment	a- “Do you work part-time or full time?” b- “How many hours would you like to work?” (Involuntary= wants to work longer hours).	1) Full-time job, 2) Voluntary part-time job, 3) Involuntary part-time job.
	Long working hours	a- “How many hours do you usually work per week in your main job?” (intensive: $\geq 45$ hours)	1) Non intensive; 2) Intensive.

Table 2. Distribution of employment precariousness indicators by gender, social class and credentials for all EU-27 in 2005.

Dimension	Indicator	Category	Gender			Social class				Credentials			
			Male %	Female %	P-value	Workers %	Supervisors %	Managers %	P-value	Unskilled %	Semi-skilled %	Experts %	P-value
Employment instability	Type of employment contract	Indefinite contract	80.7	77.0	<0.001	77.0	87.5	87.8	<0.001	77.4	77.4	85.5	<0.001
		Fixed term ≥ 1 year	7.3	10.1		8.9	6.9	5.9		8.2	8.8	8.6	
		Fixed term <1 year	3.2	4.1		4.3	0.9	0.3		3.8	3.9	2.6	
		Temporary agency	1.9	1.8		2.0	1.4	0.5		1.9	2.3	0.7	
		No contract	7.0	7.0		7.8	3.3	5.5		8.7	7.7	2.7	
Low income level	Country-specific relative income	Well paid jobs	64.6	35.2	<0.001	44.9	75.3	85.4	<0.001	40.6	46.3	78.9	<0.001
		Low paid jobs	22.4	28.1		27.2	16.1	9.7		27.3	27.7	14.8	
		Very low paid jobs	13.0	36.7		27.9	8.7	4.9		32.1	26.0	6.4	
	Benefits in nature	Receiving benefits	12.2	9.9	0.005	9.8	14.2	24.4	<0.001	9.4	10.4	15.7	<0.001
Not receiving benefits		87.8	90.1		90.2	85.8	75.6		90.6	89.6	84.3		
Lack of rights and social protection	Information on health and safety	Very well/well	85.9	84.6	0.015	84.1	90.7	91.0	<0.001	84.5	84.7	88.4	0.016
		Not very well	10.6	10.5		11.3	7.6	7.3		10.9	11.0	8.8	
		Not at all	3.4	4.9		4.6	1.7	1.7		4.7	4.3	2.8	
Incapacity to exercise rights	Uncompensated flexible working times	No flexible times or compensated	73.6	80.1	<0.001	79.1	70.0	57.6	<0.001	78.3	78.3	70.2	<0.001
		Uncompensated	26.4	19.9		20.9	30.0	42.4		21.7	21.7	29.8	
Absence of collective bargaining	Self-determination over schedule	Yes, the worker	33.0	35.0	0.098	30.2	44.1	62.2	<0.001	30.7	29.5	49.5	<0.001
		No, the company	67.0	65.0		69.8	55.9	37.8		69.3	70.5	50.5	
Imbalanced interpersonal power relations	Communication & participation with superiors	0 negative points	19.6	19.4	0.023	17.2	31.0	30.1	<0.001	14.9	19.0	29.1	<0.001
		1 negative points	20.5	18.7		18.3	26.5	26.2		18.9	18.6	23.8	
		2 negative points	21.0	19.1		20.0	19.2	24.1		19.6	19.5	21.8	
		3 negative point	16.1	16.9		17.7	11.9	9.7		17.2	18.3	11.3	
		4 negative points	22.8	25.8		26.8	11.4	9.8		29.4	24.6	14.1	
Lack of training	Paid or provided by the employer	Yes	46.3	46.1	0.867	43.4	57.5	66.6	<0.001	38.7	43.7	65.4	<0.001
		No training	53.7	53.9		56.7	42.5	33.4		61.3	56.3	34.6	
Low control over working times	Schedule unpredictability	No schedule changes	78.6	81.5	<0.001	80.0	77.6	85.5	0.012	78.5	78.6	85.4	<0.001
		Changes several days before	7.4	8.6		8.4	7.2	4.2		8.9	7.9	6.6	
		Changes the day before	6.8	5.7		6.4	6.7	3.7		6.8	7.1	3.6	
		Changes on same day	7.2	4.1		5.3	8.5	6.6		5.8	6.4	4.4	
	Part-time employment	Full-time	94.0	72.0	<0.001	81.8	91.6	93.6	<0.001	82.0	83.2	88.5	<0.001
		Voluntary Part-time	3.2	18.2		11.3	5.2	5.6		11.4	10.2	8.0	
		Involuntary Part-time	2.8	9.8		6.9	3.2	0.8		6.7	6.6	3.5	
Intensive working times	Non intensive	Non intensive	82.6	92.3	<0.001	88.9	83.3	69.7	<0.001	88.1	86.4	87.0	0.260
		Intensive	17.4	7.7		11.1	16.7	30.3		11.9	13.6	13.0	

Table 3. Distribution of employment precariousness indicators by social class and gender for all the EU-27 in 2005.

Dimension	Indicator	Category	Men Social class				Women Social class			
			Workers %	Supervisors %	Managers %	P-value	Workers %	Supervisors %	Managers %	P-value
Employment instability	Type of employment contract	Indefinite contract	78.1	88.1	90.4	<0.001	75.8	86.2	81.8	0.001
		Fixed term ≥ 1year	7.9	6.0	3.6		10.0	8.6	11.2	
		Fixed term <1year	3.9	0.9	0.1		4.7	1.1	0.6	
		Temporary agency	2.2	1.2	0.1		1.9	1.7	1.6	
		No contract	7.9	3.8	5.8		7.7	2.4	4.9	
Low income level	Country-specific relative income	Well paid jobs	58.6	82.9	93.5	<0.001	31.5	60.1	66.7	<0.001
		Low paid jobs	25.8	13.0	3.8		28.5	22.3	23.2	
		Very low paid jobs	15.6	4.2	2.7		40.0	17.6	10.1	
	Benefits in nature	Receiving benefits	10.3	15.0	27.3	<0.001	9.2	12.6	18.0	0.016
		Not receiving benefits	89.7	85.0	72.7		90.8	87.4	90.0	
Lack of rights and social protection	Information on health and safety	Very well/well	84.6	90.4	92.0	0.002	83.6	91.2	88.5	0.026
		Not very well	11.4	7.8	7.0		11.1	7.3	8.2	
		Not at all	3.9	1.8	1.0		5.3	1.6	3.3	
Incapacity to exercise rights	Uncompensated flexible working times	No flexible times or compensated	76.8	67.0	55.2	<0.001	81.4	75.5	63.0	<0.001
		Uncompensated	23.2	33.0	44.8		18.6	24.5	37.0	
Absence of collective bargaining	Self-determination over schedule	Yes, the worker	27.6	43.5	65.6	<0.001	32.9	45.3	54.4	<0.001
		No, the company	72.4	56.5	34.4		67.1	54.7	45.6	
Imbalanced interpersonal power relations	Communication & participation with superiors	0 negative points	17.0	29.8	29.1	<0.001	17.5	33.5	32.6	<0.001
		1 negative points	18.5	27.3	28.4		18.0	25.1	21.0	
		2 negative points	21.1	20.6	21.8		18.9	16.4	29.5	
		3 negative point	17.4	11.9	9.4		17.9	11.9	10.4	
		4 negative points	26.0	10.4	11.3		27.7	13.2	6.5	
Lack of training	Paid or provided by the employer	Yes	42.8	55.8	67.9	<0.001	43.8	60.8	63.5	<0.001
		No training	57.2	44.2	32.1		56.2	39.2	36.5	
Low control over working times	Schedule unpredictability	No schedule changes	78.0	78.5	86.2	0.085	82.1	76.1	83.6	0.152
		Changes several days before	8.0	6.6	3.9		8.8	8.6	5.0	
		Changes the day before	7.3	5.7	3.2		5.5	8.4	4.9	
		Changes on same day	6.8	9.2	6.7		3.7	6.9	6.5	
	Part-time employment	Full-time	93.1	96.5	98.3	0.003	70.2	82.0	82.5	<0.001
		Voluntary Part-time	3.7	1.8	1.5		19.1	11.8	15.2	
		Involuntary Part-time	3.2	1.7	0.2		10.7	6.2	2.3	
Intensive working times	Non intensive	84.7	79.2	66.0	<0.001	93.1	91.1	78.2	<0.001	
	Intensive	15.3	20.8	34.0		6.9	8.9	21.8		

Table 4. Distribution of employment precariousness indicators by credentials and gender for all the EU-27 in 2005.

Dimension	Indicator	Category	Men Credentials				Women Credentials			
			Unskilled %	Semi-skilled %	Experts %	P-value	Unskilled %	Semi-skilled %	Experts %	P-value
Employment instability	Type of employment contract	Indefinite contract	79.4	78.7	88.3	<0.001	75.2	75.8	82.5	<0.001
		Fixed term ≥ 1year	6.7	8.0	6.1		9.9	9.7	11.1	
		Fixed term <1year	3.8	3.3	1.6		3.7	4.6	3.7	
		Temporary agency	1.8	2.4	0.4		2.0	2.1	0.9	
		No contract	8.3	7.6	3.5		9.2	7.8	1.8	
Low income level	Country-specific relative income	Well paid jobs	57.5	60.6	88.9	<0.001	23.0	28.8	69.0	<0.001
		Low paid jobs	25.7	25.4	7.6		28.9	30.5	21.8	
		Very low paid jobs	16.8	14.0	3.4		48.1	40.7	9.2	
	Benefits in nature	Receiving benefits	10.8	10.7	19.0	<0.001	8.0	10.0	12.1	0.014
Not receiving benefits		89.2	89.3	81.0		92.0	90.0	87.9		
Lack of rights and social protection	Information on health and safety	Very well/well	85.5	85.0	89.8	0.020	83.3	84.3	87.0	0.018
		Not very well	10.4	11.9	7.1		11.4	9.9	10.5	
		Not at all	4.1	3.1	3.1		5.3	5.8	2.5	
Incapacity to exercise rights	Uncompensated flexible working times	No flexible times or compensated	75.9	76.7	62.3	<0.001	80.7	80.4	78.3	0.411
		Uncompensated	24.1	23.3	37.7		19.3	19.6	21.7	
Absence of collective bargaining	Self-determination over schedule	Yes, the worker	29.0	26.9	54.5	<0.001	32.5	32.7	44.3	<0.001
		No, the company	71.0	73.1	45.5		67.5	67.3	55.7	
Imbalanced interpersonal power relations	Communication & participation with superiors	0 negative points	14.6	20.4	27.3	<0.001	15.1	17.4	30.9	<0.001
		1 negative points	19.4	19.1	26.2		18.3	18.0	21.2	
		2 negative points	22.2	19.5	21.7		16.9	19.6	21.8	
		3 negative point	15.9	18.5	10.9		18.6	18.0	11.6	
		4 negative points	27.9	22.6	13.9		31.1	27.0	14.4	
Lack of Training	Paid or provided by the employer	Yes	40.2	43.2	66.1	<0.001	37.0	44.4	64.6	<0.001
		No training	59.8	56.8	33.9		63.0	55.6	35.4	
Low control over working times	Schedule unpredictability	No schedule changes	78.6	75.5	85.7	<0.001	78.4	82.6	85.0	0.019
		Changes several days before	7.5	8.0	5.7		10.5	7.7	7.5	
		Changes the day before	6.7	8.4	3.3		6.9	5.4	4.0	
		Changes on same day	7.3	8.1	5.3		4.2	4.2	3.5	
	Part-time employment	Full-time	94.1	93.6	95.5	0.168	68.7	70.2	81.2	<0.001
		Voluntary Part-time	3.0	3.3	3.3		20.5	18.8	13.0	
		Involuntary Part-time	2.9	3.1	1.2		10.8	11.0	5.8	
	Intensive working times	Non intensive	84.0	82.2	81.2	0.367	92.5	91.7	93.2	0.371
Intensive		16.0	17.8	18.8		7.5	8.3	6.8		

Table 5. Percentage of the most precarious category\* of the employment precariousness indicators in each of the EU-27 countries in 2005. Countries are ranked according to their percentage of precariousness in each indicator.

	Employment instability	Low income level		Lack of rights and social protection	Incapacity to exercise rights	Absence of collective bargaining	Imbalanced interpersonal power relations	Lack of training	Low control over working time		
	Indefinite contracts (%)	Income -very low paid jobs (%)	No benefits in nature (%)	Not at all informed (%)	Uncompensated flexible working times (%)	No self-determination over schedule (%)	4 negative points communication (%)	No training opportunities (%)	Changes on schedule on the same day (%)	Involuntary part-time (%)	Long working hours (x> 45)
Denmark	80,67	25,11	79,58	4,43	26,15	43,53	13,33	45,48	8,34	4,86	9,38
Finland	82,57	17,32	76,69	0,66	18,62	49,95	6,69	22,66	7,89	4,25	5,89
Sweden	86,90	19,83	80,37	3,03	23,66	35,92	13,47	28,34	4,66	8,07	8,52
Austria	83,03	23,82	85,08	3,06	11,14	57,40	22,39	43,53	4,38	2,68	6,65
Belgium	90,00	21,33	69,82	6,86	22,08	58,53	16,41	40,00	3,80	5,69	7,73
France	85,95	21,86	78,03	8,67	14,93	60,69	27,79	60,70	6,86	5,59	4,02
Germany	87,60	23,70	90,12	2,60	14,32	61,80	30,11	55,18	5,46	5,49	8,08
Ireland	58,74	27,38	82,15	3,19	22,22	62,96	16,29	42,86	5,43	4,91	10,97
Luxembourg	90,96	27,59	72,36	10,08	15,53	61,86	26,11	46,80	10,25	4,80	7,34
Netherlands	79,67	27,21	88,54	5,81	20,81	40,64	5,59	52,40	1,98	9,49	6,22
United Kingdom	69,22	32,21	94,59	2,25	31,75	60,29	21,63	36,54	6,07	6,98	13,77
Greece	59,17	22,62	90,56	7,12	33,08	85,82	15,46	64,06	6,77	5,71	28,77
Italy	80,55	26,57	90,46	4,39	13,93	68,09	31,13	65,64	1,91	6,60	10,87
Portugal	75,97	28,25	91,72	4,43	23,53	86,27	40,20	68,67	7,42	3,25	12,52
Spain	66,96	22,47	96,24	5,11	27,19	79,33	29,29	69,78	4,83	7,51	15,41
Cyprus	45,92	31,08	79,30	3,83	24,95	88,41	23,70	62,32	8,74	1,02	14,96
Malta	50,39	25,05	82,91	7,45	23,91	83,46	8,71	45,07	1,56	3,87	18,74
Bulgaria	72,50	21,35	88,87	3,71	38,94	92,15	10,12	69,05	4,39	3,77	26,28
Czech Republic	82,75	23,03	81,50	1,78	29,20	73,55	18,69	43,24	6,06	1,10	21,19
Hungary	81,30	23,08	91,44	1,48	29,19	85,14	13,21	67,32	6,02	4,17	20,05
Poland	70,37	20,85	95,32	3,71	37,50	78,75	25,91	45,86	6,78	9,05	24,66
Slovakia	83,77	20,57	88,82	1,56	28,86	78,28	19,59	34,25	9,89	1,94	22,70
Slovenia	76,31	19,66	92,91	3,54	23,87	71,61	13,90	44,16	5,75	1,14	16,57
Estonia	84,73	27,02	92,41	1,30	29,03	69,13	10,89	38,24	6,85	2,39	12,52
Latvia	84,44	26,62	85,77	3,10	40,15	79,06	10,56	44,20	3,12	1,69	23,36
Lithuania	83,11	29,73	97,14	1,40	31,54	81,66	7,12	52,00	4,65	3,79	18,04
Romania	85,88	17,71	87,24	4,07	39,93	84,78	21,83	71,90	16,10	4,91	36,77

\*except for the contract indicator –shown the less precarious category.

25% most precarious			25% less precarious
---------------------	--	--	---------------------