Precarious employment and mental health in Europe

Development, validation, and association with mental health of a novel cross-national measure

Eva Padrosa Sayeras

_____

DOCTORAL THESIS UPF / 2021

THESIS SUPERVISORS:

Dr. Joan Benach de Rovira (Department of Political and Social Sciences)

Dra. Mireia Julià Pérez (Department of Political and Social Sciences)

DEPARTMENT OF EXPERIMENTAL AND HEALTH SCIENCES

upf. Universitat Pompeu Fabra Barcelona

A en Xavi, per la confiança,

a la meva mare, l'Anna, per l'energia,

al meu pare, en Pere, per la perseverança,

als meus germans, en Pere i la Blanca, pel recolzament

incondicional.

Agraïments

Lluny de ser una formalitat, aquestes pàgines d'agraïments són les més significatives de tota la tesi doctoral. Sense elles, sense les persones a qui fan referència, ja sigui explícita o implícitament, el procés de tirar endavant el projecte de tesi i culminar-lo amb aquest llibre hauria estat molt més complex, feixuc i, segurament, inacabat. De fet, sempre havia sentit a dir que aquest procés era solitari, introspectiu. I és així, en gran mesura. Ara bé, no hagués arribat enlloc sense les llargues discussions conceptuals i empíriques, debats sobre la interpretació dels resultats, i converses sobre el disseny, l'estructura i el desenvolupament de cada un dels articles i de la tesi en general. Per sobre de tot, no hagués arribat enlloc sense l'acompanyament, suport, i energia implícita en aquestes converses i fora d'aquestes, tant en l'àmbit acadèmic com fora d'aquest. Fer una tesi doctoral és una tasca majoritàriament individual, sí. Però són els petits espais de col·lectivitat els que en marquen el desenvolupament, ja no només de la tesi en sí mateixa, sinó també el personal.

Per tot això m'agradaria deixar per escrit (o intentar-ho) totes aquelles persones que m'han acompanyat al llarg d'aquest camí, que han alleugerit el pes de la motxilla, i totes aquelles altres metàfores tan repetides però tan útils per representar l'essència compartida d'aquest procés.

En primer lloc, agrair a les meves directores de tesi, en Joan i la Mireia, el suport conceptual, empíric i logístic que m'han ofert. Al llarg d'aquests anys el projecte ha viscut moltes anades i vingudes, canvis

de rumb, i eventualitats (com una pandèmia!) que, si no fos per la vostra adaptabilitat i tenacitat, probablement s'hauria esvaït. Estenc aquest agraïment a la resta del col·lectiu del GREDS i, especialment, a la Mireia Bolíbar. El teu suport ha anat molt més enllà de l'acadèmic (que no ha estat poc). T'asseguro que si no hagués estat per la teva energia no hauria sobreviscut al món acadèmic. A la Irene, companya de despatx i de tantes xerrades que relativitzaven qualsevol problema. Espero que trobis en aquesta nova etapa tot el que necessites i que et mereixes. La Marisol, per tenir sempre una mirada o un comentari dolç, tant infreqüents al món acadèmic. En Fabrizio, un cop d'aire fresc. La Mariana, el salvavides del grup. En Paco, la veu de la realitat. En Pere, en Christos, en Jordi i el grup de pensament crític, que em permetien desconnectar connectant. L'Astrid, gràcies per tant. La Carolina, l'Oriol, en Manuel, l'Arielle, l'Iris (cuantas veces he pensado en tu "no hagas como yo" a lo largo de estos meses), i totes aquelles persones que d'una manera o altra han deixat la seva marca en aquest projecte personal i acadèmic.

This project is also not without Brussels. What a corona-tainted yet delightful experience it was! Christophe, I wish everyone in academia had the opportunity to encounter a supervisor like you, professionally and personally. The precarious team, Jessie, Julie, Mattias, Kim, Karen, Rebeka, Deborah, Kelly, Elief, virtuäl lunches were all one could ever ask for during lockdown. Lucía, Bruselas no es sin ti. Undeniably, my Marlow squad. Ana, Sam, Aylene, Joanna, Jeff, Antoine, Katharine, Roxanne (you were truly an example), Louis, Clément, Fanny, Miquel, Inge, as a very wise woman once

said: hapiness made me gain weight (and lots of Belgian chocolate and Masterchef contests, of course).

And the PWR team. Academia is not always a savage competition for publications and grants. There is also kindness, empathy, and partnership if you are lucky enough to find it.

Les coses es poden fer d'una altra manera, més justa, més horitzontal i més humana. I vosaltres ho feu. Esther, Ariadna, i totes les persones d'ESIMar. Gràcies per deixar-me formar part d'aquest engranatge.

Evidentment, a tots els grups que em doneu tant, que hi sou tant, i que m'hi voleu tant. Capos i azus i el millor pis de la història, poris i penyasurvivals, ànecs i ànegues, durfortotes, how are you i las colgadas del cable i figuis, grill for everybody, CEOs d'una multinacional de pagès, i totes les persones que m'alegreu els dies, les nits, i el que faci falta.

A la meva família! No sabeu amb l'orgull que parlo dels dinars dels dissabtes (i el parte de cada divendres), els Nadals i Sant Peres, els viatges i sortides i excursions (sempre acompanyades de menjar, com no!). I no sabeu tampoc l'energia que em donen i com m'ajuden a tirar endavant. I els dinars de can Padro, que sempre acaben amb algú mullat, unes trampes al trivial, o amb alguna trena de la Cèlia sense gaires estirades. Sens dubte, Dumingus i Romeus. Que bé que s'hi està al sud, i quina grandíssima (si no tota) part de culpa que teniu que m'agradi tant baixar al sud. Gràcies per deixar-me ser una més. Mama, papa, Blanca, Pere, Flipi, Sara, Jou, i Zerini. Sou incansables, gràcies.

Xavi, tinc poc a dir. Gràcies per ser-hi i per deixar-m'hi ser.

I a les meves muntanyes, els meus rius i els meus petits plaers que m'ho donen tot.

Abstract

This dissertation aims to advance knowledge on the contours of precarious employment (PE) as a social determinant of health by developing, validating, and evaluating the association with mental health of a novel measure of PE in Europe. A multidimensional summative scale conceptually grounded on the Employment Precariousness Scale (EPRES) was built drawing on the European Working Conditions Survey-2015. Such scale, (namely, EPRES-E) consists of 13 items sorted into six dimensions (temporariness, vulnerability, disempowerment, exercise of rights, wages, and unpredictability of working times). The proposed structure proved to be valid first in Spain and, thereafter, in Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden, Switzerland and the UK. Accordingly, the role of welfare states in the relationship between EPRES-E and poor mental health was tested in these countries, both among women and men. Consistent associations were found in all genders and welfare states analyzed. Besides, Central-Eastern welfare states were found to aggravate the abovementioned relationship among women, compared to their counterparts in continental welfare states. No differences were found among men, though.

Resum

Aquesta tesi té com a objectiu avançar en el coneixement sobre la configuració de la precarietat laboral (PL) com a determinant social de la salut desenvolupant, validant i avaluant l'associació amb salut mental d'una nova mesura de PL a Europa. Es va construir una escala sumativa multidimensional basada conceptualment en l'Escala de Precarietat Laboral (EPRES) a partir de l'Enquesta Europea de Condicions de Treball-2015. Aquesta escala, (és a dir, EPRES-E) consta de 13 ítems ordenats en sis dimensions (temporalitat, vulnerabilitat, desapoderament, exercici de drets, salaris, i imprevisibilitat dels temps de treball). L'estructura proposada va demostrar ser vàlida primer a Espanya i, després, a Àustria, Bèlgica, Croàcia, Dinamarca, Finlàndia, França, Alemanya, Grècia, Irlanda, Itàlia, Lituània, Luxemburg, Països Baixos, Noruega, Polònia, Portugal, Eslovàquia, Eslovènia, Suècia, Suïssa i el Regne Unit. En conseqüència, es va analitzar el paper dels estats del benestar en la relació entre la EPRES-E i la mala salut mental en aquests països, tant en dones com homes. Es van trobar associacions consistents en tots els gèneres i estats del benestar analitzats. A més, es va trobar que els estats del benestar del centre-est accentuaven la relació esmentada entre les dones, en comparació amb les seves homòlogues dels estats del benestar continentals. No es van trobar diferències entre els homes, però.

Preface

The focus of this dissertation falls within the intersection of two research lines of the Research Group on Health Inequalities, Environment, Employment Conditions Network (GREDS-EMCONET), of the Department of Political and Social Sciences, Universitat Pompeu Fabra. These are "Precariousness, Employment Conditions, and Work" and "Social Determinants of Health and Intersectionality". Accordingly, it is embedded in an interdisciplinary research field devoted at understanding the role of the configuration of employment relationships in the production of social inequalities in health.

Interest in adverse employment relationships in general, and in precarious employment in particular, as social determinants of health and health inequalities has grown rapidly in the last decades among academics, public health institutions and politicians. Recurring economic crises, globalization processes, and outstanding technological innovations, which had far-reaching implications in the configuration of labor markets, deepened such interest, accentuating already compelling demands for more comprehensive labor policies that promote the health and well-being of workers. However, theory-based measures of precarious employment that allow the monitoring of the phenomenon and assessment of current policies at a cross-national level are scarce and exert limited influence on policy practice.

Building on the experience of GREDS-EMCONET in conceptualizing and operationalizing precarious employment from an occupational and public health perspective, this dissertation aims to add to

this strand of research by developing and empirically validating a theoretically sound measure that can be used for comparative analysis in multiple European countries. That being so, it attempts to provide analysts, policymakers and other active agents in the design, implementation, and evaluation of employment and health policies with tools to advance towards more equitable and healthy labor markets.

*"If we fail to understand precarization, then
we understand neither the politics nor the
economy of the present"*
Isabell Lorey, New York, 2015

"No es depresión, es capitalismo"
Estallido social, Santiago de Chile, 2019

*"Hoy, vale la pena advertir que no hay en el
mundo nada más inseguro que el trabajo.
Cada vez son más y más los trabajadores que
despiertan cada día preguntando: ¿cuántos
sobraremos? ¿quién me comprará?
Muchos pierden el trabajo, y muchos pierden
trabajando, también la vida"*
Eduardo Galeano, Ciudad de México, 2012

Index

1

INTRODUCTION

In recent decades, European countries underwent a set of interlocked political, cultural, economic, social, and ecological processes that had far-reaching consequences on the configuration of people's living and working conditions (Chang, 2003; Harvey, 2007; Milanovic, 2016). Among these processes are the globalization of economies, the rise in neoliberal policies, and the so-called fourth industrial revolution. The outbreak of the COVID-19 pandemic added to this fast-changing landscape by triggering rapid-response policies and interventions, including massive lockdown restrictions and workplace closures, mandatory vaccination of workers and service consumers, and exhaustive surveillance structures, whose consequences will last well beyond the eventualities of the pandemic (Benach, 2021).

Employment relationships, as one of the pillars of post-industrial societies (Beck, 1992), are among the aspects that suffered the most profound transformations. By way of illustration, the globalization of labor markets within a neoliberal framework blurred the boundaries of national employment regulations, collective bargaining coverage and social protection schemes (Frege & Kelly, 2013; Harvey, 2007); innovations in information and communications technology (ICT) paved the way for the development of platform-mediated forms of employment, which diluted the historically clear-cut distinctions between employers, employees and consumers (Drahokoupil & Piasna, 2017; Valenduc & Vendramin, 2016); and the rise in remote work, particularly after the implementation of COVID-19-related lockdown restrictions and workplace closures, restructured the socio-spatial and temporal dimensions of employment (Aroles et al., 2019; Brocklehurst, 2001).

2

Beyond employment, however, other factors have been transformed, such as family models, the standards of social interaction, trade and consumption patterns, and even leisure (Giddens, 2007). Consequently, employment relationships that were once deemed "ideal" (i.e., full-time permanent contracts, with fixed schedules, bound to a specific workplace, with opportunities for career progression, benefits, and social protection (Bosch, 2004)), may no longer accommodate the necessities of an increasingly diverse workforce (Vosko et al., 2009). For instance, full-time contracts, when combined with reproductive responsibilities, leave little or no room for social commitments, recreation activities, or non-productive alternatives of contributing to society (e.g., community action) (Dahl, 2012; Gorz, 1982).

Against this background, it is necessary to disentangle whether the reconfiguration of employment relationships is beneficial or detrimental to contemporary workers. Certainly, remote work or (worker-led) flexible working times can aid in easing work-family tensions. However, these can also be strategies unidirectionally led by employers to adapt to potential externalities, minimizing the sense of control of workers over their private lives (Arlinghaus et al., 2019; Porthé et al., 2010). The key point therefore is the asymmetry in power relations between capital and labor (Amable, 2006; Korpi, 2016). And, noteworthy, the abovementioned macro-level changes in labor markets are likely to deepen the weakening of trade unions and individualization of employment. In other words, to shift old and new labor market risks from corporations and governments to workers. That being so, the recent transformation of employment relationships is tightly related to the precarization of employment relationships.

This process of precarization raised social, political, and academic concern about the negative side effects of precarious employment, broadly understood as the accumulation of unfavorable employment conditions and relations (e.g., employment instability, low wages, poor social rights and benefits (Kreshpaj et al., 2020)), particularly in terms of health and well-being (Benach et al., 2014). As a matter of fact, employment constitutes the main source of income and activity for the majority of the population. By extension, it contributes to socialization and has a clear influence on the positioning of individuals in the social hierarchy (Kunst & Mackenbach, 2000). For these reasons, it has a key weight in shaping the health and well-being of the population (Marmot & Wilkinson, 2005).

Indeed, a growing body of research reports the association between precarious employment and a variety of poor health outcomes, ranging from occupational injuries and accidents (Koranyi et al., 2018) to poor mental health (Rönnblad et al., 2019; Utzet et al., 2020). Nevertheless, knowledge gaps remain. Among these gaps is the achievement of an internationally consensual conceptualization and, by extension, operationalization of precarious employment devised for epidemiologic research (Bodin et al., 2020). This impedes the cross-national comparability of findings, which is greatly needed in a globalizing context. Another gap in research is the understanding of how and why contextual factors such as welfare states and family models interact with precarious employment in the production of health inequalities (Muntaner, 2016). In the same way, the adoption of gender-sensitive perspectives that properly acknowledge the unequal experi-

ence of men and women both inside and outside the labor market are scarce (Menéndez et al., 2007).

Advancing knowledge on all these aspects is imperative to identify effective policy entry points to counteract the adversities of precarious employment and promote the health of well-being of the working population. The work performed within the framework of this dissertation thus aims to add to this strand of research by proposing a novel cross-national measure of precarious employment for the European context and exploring its relationship with mental health across genders and welfare states.

That being said, the dissertation is organized as follows. Chapter 2 provides a chronicled overview of the configuration of employment relationships in Europe, departing from the so-called golden era of capitalism and the blooming of the Standard Employment Relationship (SER). Additionally, it emphasizes the divergences in the evolution of employment relationships both across genders and territorial realities. Chapter 3 introduces the concept of precarious employment and offers a brief overview of the ongoing theoretical and methodological debates that hinder the achievement of an internationally consensual definition of the phenomenon. In the absence of such agreement, the conceptualization of precarious employment used in this dissertation is presented. Chapter 4 outlines current evidence and knowledge gaps on the role of precarious employment as a social determinant of health. This leads to the justification, objectives, and hypotheses that drove this dissertation, portrayed in chapter 5. Chapter 6 presents general aspects of the methodology employed in the

research studies carried out to respond to the aforementioned objectives. Chapter 7 compiles these research studies, formally structured as original research articles. As such, they all consist of a brief introduction, a detailed explanation of the methods employed, a section depicting the findings, and a concise discussion. Chapter 8 discusses the overall research findings, its contribution to existing knowledge, limitations and strengths, and implications for policy and practice. Ultimately, chapter 9 summarizes the main conclusions drawn from the findings.

2

EMPLOYMENT RELATIONSHIPS IN EUROPE: A HISTORICAL PERSPECTIVE

2.1 The golden era of capitalism

In the aftermath of the second world war (WWII), a unique scenario was assembled in most European[1] countries to build up a new socio-economic order. On the one hand, there was an urgent need to reconstruct war-torn infrastructures and focus industrial production back to non-military goods. On the other, the recent experience of the Great Depression forged a strong public opinion against the capitalist laissez-faire strategy that was used after the WWI (Appelbaum, 2012; Harvey, 1990; Shutt, 1998). In this occasion, recovery had to preclude going back to economic stagnation, large-scale unemployment, and social inequality (Judt, 2005). Equilibrium between economic and social development was claimed for, and great expectations were placed on nation states to find it.

Governments therefore built new institutional powers and adopted new roles in the economy. Following the Keynesian doctrine, public investment was enhanced, mechanisms of economic redistribution were implemented, and fiscal and monetary policies were applied to stabilize the markets (Jones, 1972; Marglin & Schor, 1991; Shutt, 1998). However, the costs of state interventionism would have been

---

[1]This section describes the historical trajectory of employment relationships in almost all Western European countries. As such, references to "Europe" or "European countries" should be understood from this narrower viewpoint. Central-Eastern European countries, in contrast, experienced a whole different sequence of events, which are detailed in chapter 2.4.

too burdensome for the economy in the potential absence of effective demand and economic growth. For this new economic system to be successful, it was crucial to stimulate the demand. In other words, industrially produced goods that, in the traditional paradigm of craft production, were restricted to the wealthiest social classes, had to be made available to a larger part of the population. This set up the optimal environment for the definitive shift to mass production under the principles of Fordism (Hudson, 2009; Rubery & Grimshaw, 2003). Broadly, in the heart of Europe, the model was based on the standardization of the industrial process and the perpetual introduction of technological innovations, allowing the reduction of production costs, the increase of surplus value and, ultimately, higher salaries for workers (Gramsci, 1971, pp. 291). Therefore, the extension of the Fordist mode of production simultaneously increased the affordability of luxury goods (e.g., cars, consumer electrical products) and the purchasing power of the industrial working class, setting in motion virtuous cycles between mass production and mass consumption (Boyer, 1993; Castel, 2002). Additionally, governments smoothed these cycles through the Keynesian fiscal and monetary policies mentioned above, giving rise to an unprecedented period of sustained economic growth.

Thereupon, a new reality came into being for the working class. As mass consumers, they had become active agents in the economy. Consequently, their economic and social well-being turned into an essential parameter to maintain economic growth. Moreover, a key lesson from the Great Depression was that extensive unemployment and deep social inequalities triggered exclusionist attitudes and,

fundamentally, fascism (Harvey, 1990; Judt, 2005). Hence, guaranteeing an all-embracing social protection network to workers, those who were unable to work, and their extended families in a landscape of economic recovery became one of the most compelling challenges of nation states (Castel, 2003; Muntaner, et al., 2010; Palier, 2015). By that time, the few welfare policies that existed in most European countries consisted of unlinked amendments to specific social problems, with strict eligibility criteria, and restricted benefits (Castel, 2003; Judt, 2005). Therefore, publicly funded, or subsidized social services, including healthcare, education, housing, public transport, and other indirect benefits, were deployed. Compounding that, economic insurance against unemployment, illness or accident, and old age was extensively provided (Esping-Andersen, 1990). Although the scope and conditions of these services and protections varied across countries, a general commitment of European welfare states was to weave a more comprehensive and holistic social protection system, regardless of people's attachment to the Fordist labor market (Castel, 2002).

Welfare states, however, could only be financed in a landscape of virtually full employment, where levies could be extracted from wage packets, and taxations could be applied proportionally to the working population. Furthermore, the conditions under which work was performed needed to be revised (e.g., low wages, long working hours, absence of safety measures and workplace rights), to minimize injuries and illnesses on the one hand, and to ensure the capacity and willingness of workers to actively consume goods and services on the other (Castel, 2002; Judt, 2005). Accordingly, governments took up

an active role in the negotiation of wage agreements and the entitlement of workers to benefits and rights such as paid vacations (Castel, 2002; Harvey, 1990). Trade unions, in turn, gained significant influence both in large-scale industries and in the institutional sphere, where they exerted important political power over social policy decision-making (Benach, Muntaner, et al., 2013; Marglin & Schor, 1991; Silver, 2003).

Within this framework of relatively balanced power relations between organized labor, nation states and corporate capital, the SER was coined. Briefly, it related to full-time (i.e., 40h working weeks) employment relationships, with opportunities for career progression and bound to social rights and benefits (Bosch, 2004). That being so, the SER offered a greater sense of security to employees, both within and outside the workplace, which translated into greater commitment to their employers. Therefore, the golden era of capitalism in general, and the popularization of the SER in particular, represented an unprecedented accomplishment for the industrial working class, who saw their employment as well as their living conditions vastly improved.

Notwithstanding, in more operational terms, the situation was far from ideal for workers. The Fordist mode of production was based on a strong division of labor and highly centralized management structures, whereby de-skilled workers repetitively performed single tasks under tight managerial control (Rubery & Grimshaw, 2003; Watson, 1996). Beyond being physically demanding and excruciatingly boring, this model of organizing labor was deeply hierarchical.

As such, tensions between employees and supervisors grew, which translated into radical labor movements in the immediate post-war period (Armstrong et al., 1984). Nevertheless, the grassroots of working-class radicalism were either counteracted with wage gains and social benefits or fiercely repressed (Braverman, 1974; Burawoy, 1979). Even trade union leaders were increasingly correlated to cooperate with corporate capital in disciplining revolutionary workers in exchange for higher wages (Armstrong et al., 1984; Harvey, 1990). Therefore, the Fordist-Keynesian model did not overcome the perpetual problem of antagonistic class relations despite rising the standards of living for most of the working class (Braverman, 1974; Gramsci, 1971). Rather, it crystallized the subordinated position of workers in the division of social labor and in societies at large (Castel, 2002; Lorey, 2015); not to mention that it suppressed all modes of subsistence alternative to wage spending, including self-supply (Gorz, 1982). As a result, those workers that were left out of the Fordist labor market (e.g., non-manufacturing workers, self-employed contractors, shift-workers), mostly women and workers with a migrant background, received lower wages and fewer social benefits, and were thus positioned in a more disadvantaged situation (Vosko et al., 2009).

Yet, the golden era of capitalism set a historical benchmark in terms of social consensus and welfare, wherein employment relationships reached a degree of security and social rights that contemporary societies still idealize (Standing, 1997).

2.2 The rise of neoliberalism and flexibilization of employment relationships

This period of social consensus, near-full employment and extensive growth came to a symbolic end in the 1970s, but the first signs of destabilization showed up in the mid-1960s. By then, the reconstruction of war-torn infrastructures (e.g., housing, electricity and sewage, industrial equipment, transportation) had already concluded. That being so, traditionally proliferating industries, including coal mining and steel production, weakened and, with them, the jobs of multiple workers (Judt, 2005). Additionally, the demand for industrially manufactured goods (e.g., cars, electronic devices) had stalled, since they were already widespread, and their durability constrained the need for replacement. Likewise, the demand for less durable goods (e.g., food, cleaning products) had stabilized. Therefore, new consumers could only grow in line with population growth –a much slower pace compared to that of the immediate post-war period (Boyer & Durand, 1993; Eichengreen, 2007; Shutt, 1998). In brief, internal markets saturated, productivity slowed down, and the competition among corporations for market share intensified.

Against this background, the flaws, and "rigidities" of the Fordist model came to the fore. Within factories, employers saw themselves compelled to diversify their economic activity towards the fabrication of more innovative products or the provision of new services, the demand of which had not yet been exhausted, or to reduce production costs (Shutt, 1998). However, the strong standardization on which the Fordist model was based thwarted both approaches (Boyer, 1993;

Rubery & Grimshaw, 2003). For instance, the equipment used in the industrial process was optimized to produce a certain volume of a certain product. Scaling down assembly lines thus led to the underutilization of machinery, which inevitably raised production costs. Modifying the equipment for new purposes, such as the fabrication of other products, was not a feasible option either, in that it required too great of an investment, both in terms of capital and time. Regarding the workforce, the relatively protective labor market regulation ruled out layoffs and pay cuts, and the reassignment of de-skilled surplus workers to other assembly lines or non-manufacturing activities was not only a slow process, but also physically and psychosocially demanding for them (Boyer, 1993). All in all, what had hitherto been strengths of the Fordist system were now weaknesses (Rubery & Grimshaw, 2003).

On top of that, two decades of working under rather adverse conditions (e.g., tight managerial control, strict division of tasks, physical strain, low job satisfaction) were starting to weigh on the physical, mental, and social well-being of workers (Boyer, 1993; Castel, 2002; Judt, 2005; Rubery & Grimshaw, 2003). The levels of absenteeism and employee turnover were growing compared to the 1950s, and disaffection with the intensification of work was spreading, particularly among a younger, more educated, and more skilled generation of employees, the unmet aspirations of whom could not be disheartened with the benefits of the Fordist labor market (Boyer, 1993; Judt, 2005). Hence, trade unions kept pressing their case for wage gains and other non-monetary compensations, regardless of the productivity downturn, to the point where wage growth exceeded productivity

growth and profit margins squeezed further. Corporations sought to counteract rising production and labor costs by raising prices. But, far from regaining profitability, this only reinforced the demands of the workforce for higher wages (Shutt, 1998). As a direct consequence, inflation escalated. Besides, the interests of the working class and corporate capital diverged again, reviving the traditional conflict between them (Braverman, 1974; Castel, 2002; Eichengreen, 2007; Gramsci, 1971).

Therefore, the late 1960s and early 1970s were characterized by the acceleration of inflation, the reduction in opportunities for private investment, and the rupture of social consensus, as illustrated by the wave of strikes of that period. The threat of a new economic recession loomed large, and political action was called for.

In view of the situation, nation states extended the benefits of welfare states and tax-subsidized private consumption, all while devaluating their currencies to keep the economy of the country stable (Eichengreen, 2007; Harvey, 1990). Under the umbrella of the international monetary system set after the Bretton Woods agreement (1944), in which exchange rates were fixed among the currencies of partner countries (e.g., European countries, United States, Japan), these policies were fiscally sound (Bordo & Eichengreen, 2007). However, artificially enlarging public funds at the national level could either drive the restoration of the country's economy or, on the contrary, set off an inflationary wave; and there was a fine line between the two landscapes. That being so, when the international monetary system collapsed, in 1971, and the currencies of European countries fell

dramatically, inflation skyrocketed (Eichengreen, 2007; Judt, 2005; Kuttner, 2018).

The oil shocks of the 1970s were the last straw for the decay of the synergy between Fordism and Keynesianism. That is, the consumer boom of the immediate post-war period, along with the vast amount of energy required by Fordist industries, had forged Europe's dependence on imported oil (Boyer, 1993; Judt, 2005). For that reason, the fourfold increase in oil prices shattered the already wounded socioeconomic model of the post-war era. Thereupon, the transition to a new epoch of capitalism initiated.

Mounting public indebtedness and inflationary trends served as the perfect pretext for advocates of neoliberalism (mainly, corporations and class elites) to question the sustainability of welfare states and state interventionism (Judt, 2005). Building on the pervasive idea of individual freedom[2], this current of thought held each person responsible of his or her own economic and social well-being. As such, trade unionism and other forms of social solidarity, nationalized industries, and strongly regulated markets were conceived as obstacles to competitiveness, entrepreneurial initiatives, and opportunities for nation-

---

[2]Dissatisfaction with parental, educational, corporate, bureaucratic, and state constraints grew among young people throughout the 1960s, setting in motion a set of political movements demanding greater individual freedom. However, these movements were grounded on values of social justice, as opposed to neoliberal theory (Harvey, 2007).

al and international private investment. Unemployment, in turn, was perceived as a personal choice rather than a consequence of market deficiencies (Harvey, 2007; Navarro, 1998). Quite the opposite, one of the most forceful convictions of neoliberal theory was that restoring market freedoms would provide individuals with the opportunity to work in accordance with the exact amount of goods and services they desired to purchase, as well as with their own ambitions (De-Martino, 2000). On that account, if unemployment was to be minimized, the only role of the state should be to secure an institutional framework in which free markets could function smoothly (Harvey, 2007).

The political strategy of the 1980s thus shifted away from Keynesian orthodoxy to the benefit of anti-inflation and flexibilization policies. Tax and budget cuts, free trade, the privatization of public sectors and industries, the deregulation of financial markets, and the dismantling of welfare states and social protection structures ensued, first in Britain and then in the rest of Europe (Harvey, 2007; Judt, 2005; Navarro, 1998). From the perspective of employment relationships, the neoliberal agenda included easing the processes of firing and hiring, repealing wage agreements, limiting social security benefits (e.g., unemployment benefits), and constraining the regulatory position of trade unions (Arnold & Bongiovi, 2013; Boyer, 1993; Boyer & Durand, 1993). All these measures eroded the hegemony of the SER and reopened the door to old and new forms of "non-standard" employment relationships (e.g., fixed-term contracts, part-time employment, self-employment).

To the neoliberal political turn were added fundamental changes in the industrial process. New patterns of consumption (i.e., quality rather than quantity) required new production systems and, by extension, new forms of labor organization (Rubery & Grimshaw, 2003). In pursuit of product differentiation and quality performance, a homogeneous de-skilled workforce was no longer effective. On the contrary, providing extensive and continuous training to some employees was essential for them to master the ever-changing technological processes applied in production. Likewise, more integrated and cooperative forms of organization optimized the competences acquired by these workers, as opposed to the Fordist hierarchical model. Ultimately, they also benefited from performance-related monetary incentives, as to enhance their productivity on the one hand and minimize employee turnover on the other. As such, the role of a privileged set of employees went well beyond repetitively performing single tasks: they became active agents in the overall industrial process. (Boyer & Durand, 1993; Harvey, 2007).

Yet, whereas empowering and ensuring the continuity of high-skilled and functionally flexible workers was an asset for corporations, from a neoliberal perspective, a disposable bottom-line workforce that could easily be hired, replaced, or laid off in line with consumer demand was also essential. Therefore, these "core" or "primary" employees were backed up by a reserve of "peripheral" or "secondary" less-skilled workers (Castel, 2002; Sabel, 1982; Silver, 2003; Standing, 1997). In contrast with their core counterparts, peripheral employees performed non-specialized activities and were thus low paid, insecure and did not receive on-the-job training. Accordingly, their

opportunities for upward mobility were negligible. Besides, most of them were self-contractors or hired through temporary employment agencies, which excluded them from collective bargaining schemes, blurred the responsibilities of corporations for worker safety or grievance procedures, among others, and put them ruthlessly in competition with each other (Boyer, 1993; Rubery & Grimshaw, 2003).

Further aggravating the situation of peripheral workers, the geographical mobility of capital allowed employers to offshore entire production plants or specialized non-core activities to countries where labor standards were lower or absent and the workforce was cheaper (Castel, 2002; Harvey, 2007; Sabel, 1982; Shutt, 1998; Silver, 2003). This process favored the de-industrialization of European countries and the shift from a manufacturing to a service economy (Judt, 2005). Eventually, unionized and relatively protected jobs gave way to low paid and poor-quality jobs.

All in all, the situation became critical for multiple workers (i.e., peripheral workers). First, the fragmentation of the workforce, both within and outside national boundaries, created new barriers to already weakened trade unions, the strength of which was based on a determined and united membership (Atkinson, 1987; Silver, 2003). Second, the globalization of employment reduced the already meager employment opportunities of low-skilled workers, intensifying the competition between them. Third, the retrenchment of welfare states left the unemployed and those who were unable to work at mercy of their individual capacity to subsist, let alone to achieve a sustainable standard of living (Esping-Andersen, 1990). Altogether, these

processes not only favored the individualization and recommodification of labor, but also lowered the conditions under which individuals accepted to work, including the reservation wage, the duration of contracts and the rights and benefits to which they were (not) entitled (Boyer, 1993; Esping-Andersen, 1990; Harvey, 2007).

Therefore, the erosion of the SER in European countries was not the product of a single process. Rather, multiple micro- and macro-economic, political, and social transformations mutually reinforced the restructuring of power relations between governments, corporate capital, and the working class. As a result of this power displacement, market risks shifted from employers and nation states to workers, the collectivity of the workforce faded away, and the social protection fabric, arduously built in the post-war era, was ripped up. Against this hostile background, the flexibilization of employment relationships spread and labor markets polarized. That is to say that, despite some flexible forms of employment may be favorable to workers (Vosko et al., 2009), insofar as the SER materialized the subordinated position of the working class in the social organization of labor (Castel, 2002, 2003), they stemmed from the asymmetry between capital and labor (Benach, Muntaner, et al., 2013). Their purpose was to provide credit to employers to respond to externalities, to the detriment of the interests of workers (Amable, 2006; Boyer & Durand, 1993). As such, it is not by chance that flexibility is often related to adverse employment and working conditions; and when it's not, it frequently relates to workers with higher educational attainment or coming from wealthy or socially more advantaged family backgrounds (Vanroelen et al., 2010).

20

As displayed in the beginning of this chapter, political, economic, and social transformations have not ceased. Employment relationships are being constantly reshaped. However, flexibility remained or even intensified, taking new forms such as employer-led schedule flexibility (Arlinghaus et al., 2019; Porthé et al., 2010), performance-based wages, or zero-hour contracts (Farina et al., 2020; Ryan et al., 2019).

2.3 Gender inequalities in the evolution of employment relationships

The previous section provided a brief overview of the evolution of employment relationships in Europe. Nonetheless, such evolution did not affect all workers equally. While some of them benefited from the emergence of the SER and, afterwards, from the flexibilization of employment relationships (e.g., functionally flexible workers whilst protected, with benefits and control over the labor process), others remained in the shadow of these progresses (Boyer & Durand, 1993; Harvey, 2007). No matter the improvements achieved by the working class at large (e.g., 8h journeys, permanent contracts, entitlement to social benefits), the employment and working conditions of the latter group remained unaltered or even deteriorated. For instance, most self-employed contractors continued to be unprotected in the event of an occupational injury despite the popularization of the SER and the development of welfare states. On top of that, these workers were alienated from the configuration of labor movements and the collective construction of a better framework for workers (Castel, 2002; Silver, 2003). Remarkably, these differences were not randomly distributed across the workforce. People that were in a socially more disadvantaged position, particularly women and people with a migrant background, bore (and still bear) the brunt of labor market inequalities (Silver, 2003; Vosko et al., 2009).

Therefore, evoking the golden era of capitalism as the paradigm of employment stability and workers' rights neglects the insecure and low-paid jobs held by women and immigrant workers during that

period, and reflects the patriarchal and colonial hegemony on which the foundations of the SER were laid (Betti, 2016).

Focusing on a (binary) gender perspective, employment inequalities between men and women precede the emergence of the SER. Ever since the origins of industrial societies and wage labor, the distribution of productive and non-productive activities in society was articulated around the so-called "gender contract" (Rubery, 1998). On that account, men were assumed to engage in productive activities to economically sustain themselves as well as their families, whereas women were held accountable for non-productive activities. Therefore, the gender contract pivoted on the institution of the family, wherein men adopted the instrumental role of breadwinners and were thus exempted from domestic or caregiving obligations, while women were responsible for the social reproduction[3] of male workers (Lewis, 1992). That being the normative case, women only participated in the labor market either when they were young and unmarried, or as secondary or temporary earners in case of economic need (Duncan & Pfau-Effinger, 2000; Vosko, 2010).

This trend partially shifted during the WWII, insofar as men mobilized and women undertook their role in factories and other

---

[3]According to Picchio (1981), the social reproduction determines the position of individuals within the labor market, provides the basis for standards of living, and structures inter- and intra-class relations and the distribution of the product.

traditionally male economic sectors (Acemoglu et al., 2004). By way of illustration, in the early 1900s, US census estimates of white women's engagement in paid employment were of about 3%, which compares with percentages close to 50% in the post-war period (Goldin, 1991). A similar, albeit less sharp, turning point was experienced during the war by European countries (Humphries & Sarasúa, 2012). When the WWII concluded, and men got back to their occupations, most female workers lost their wartime jobs. Still, the growing demand for workers in the service sector from the late 1940s onwards, which was deemed "more suitable"[4] to women than the industrial sector, as well as other long-run changes in the global economy (e.g., higher educational attainment of women due to the development of welfare states), preserved the rise in female labor supply (Goldin, 1991; Humphries & Sarasúa, 2012).

However, the increasing participation of women in paid employment was not accompanied by a redistribution of non-productive responsibilities within households. Consequently, the burden of domestic duties that were still socially attributed to them ruled out their chance

---

[4]The social construction of gender roles and stereotypes determined what was socially acceptable for women to do in the public sphere. Women were perceived physically weaker than men, and thus less able to occupy industrial jobs. Contrastingly, they were perceived to be more docile, honest, and manually dexterous, which were essential features to perform clerical occupations. These gender stereotypes contributed to the emergence of feminized and masculinized economic sectors and jobs (Anker, 1997).

to pursue a professional career, as opposed to their male counterparts with no housework or caregiving obligations. On the one hand, family requirements forced women to take on jobs that allowed a better balance between the public and private spheres, such as part-time jobs or industrial homework (e.g., sewing), and these jobs were lower paid and with fewer social benefits than the full-time permanent jobs offered within the Fordist labor market (Anxo et al., 2007; Vosko et al., 2009). To this should be added that feminized jobs (e.g., clerical occupations, paid domestic work, industrial homework) were already low paid, insecure, and not safeguarded by trade unions or other forms of collective representation, contrasting with industrial occupations (Judt, 2005). On the other hand, both employers and institutions perpetrated gender-discriminatory practices, including dismissal due to childbearing, regardless of the strength of employment protection legislation (Betti, 2016; Vosko, 2010). Hence, the gender contract and socially constructed gender roles and stereotypes mutually reinforced to produce unequal labor markets in an era of presumed equality, stability, and social protection (Anker, 1997; Castel, 2003; Duncan & Pfau-Effinger, 2000).

The flexibilization of employment relationships that characterized European labor markets from the late 1970s onwards emphasized the already unfavorable landscape for female workers. For instance, the removal of controls on hiring and firing consolidated pregnancy-related layoffs. Because of the same life-cycle reason, women were offered permanent positions less frequently than men (Lewis, 1992). By extension, they received less on-the-job training, fewer opportunities for career promotion, and had fewer chances to participate in

decision-making processes (Crompton, 2006; Rubery et al., 1999). All these features combined resulted in the over-representation of women in the peripheral workforce (Vosko et al., 2009). That being so, in the closing decades of the twentieth century, European labor markets polarized not only in terms of working and employment conditions (i.e., core versus peripheral workers), but also in terms of gender.

In the past decades, political, economic, cultural, and social changes triggered the reconfiguration of work, employment, and families (Crompton, 2006). Additionally, second- and third-wave feminist movements have achieved substantial goals for the economic and social lives of women. As a consequence of these interwoven processes, the male breadwinner model is eroding to the benefit of other models whose centrality is no longer a clear-cut division between employment and the family, such as dual-earner models (Crompton, 1999); the fight against gender-related labor market inequalities is gradually being added to European employment policy (Rubery et al., 1999); and women are more and more often taking part in decision-making, implementation and monitoring processes within organizations.

Nevertheless, structural sources of gender inequality remain, and women still face more difficulties than men to enter, endure and succeed professionally in European labor markets (Crompton, 2006; Duncan & Pfau-Effinger, 2000). By way of illustration, equal pay between men and women, even when they hold the same job title, has not yet been reached (International Labour Organization, 2018); mechanisms of gender segregation in the labor market, both

horizontal and vertical[5], are still systematic (Christofides et al., 2013); and working women still report discrimination and harassment as a barrier to their career development, way more frequently than men (Wajcman, 1996).

Therefore, the patriarchal and androcentric framework in which European labor markets developed determined the persistence and pervasiveness of employment inequalities between women and men. Neglecting such framework in the analysis of contemporary employment relationships not only oversights a large share of the labor force (i.e., women), but also a key driving force in the redefinition of work and (flexible) employment relationships throughout history (Crompton, 2006; Valero et al., 2020).

---

[5]Horizontal gender segregation refers to the mechanisms through which women are channeled into feminized occupations, while men are more frequently occupied in masculinized economic sectors or jobs. Contrastingly, vertical gender segregation relates to the under-representation of women in managerial positions of the occupational structure and their over-representation in lower-level positions (Rubery & Fagan, 1995).

2.4 The evolution of employment relationships in Central-Eastern Europe

Just as the cultural, political, economic, and social framework in which jobs take place shaped gender inequalities in the evolution of employment relationships, it also shaped territorial inequalities.

This is the case of Central and Eastern European countries, which experienced a whole different storyline after the WWII. Strongly influenced (if not absorbed) by the Soviet Union, totalitarian communist regimes, rather than capitalist democracies, took on the lead in Central-Eastern Europe (Havel & Keane, 1985). The economic and social strategy of these regimes was thus to centralize all means of production, as opposed to balancing the power relations between states, corporations, and organized labor. On that account, workers as well as traditionally inactive population (i.e., women) were provided with stable jobs. This was in return for low wages, regardless of the tasks performed, building on the communist grounds that increasing wages would inherently entail the commodification of labor. Nevertheless, food and housing were subsidized, healthcare and educational services were universally guaranteed, and reproductive activities were socialized so that working women were not burdened doubly[6] (Razzu, 2016; Standing, 1996). Therefore, the social

---

[6]Note that these policies were aimed at enhancing women's participation in the labor market, rather than at emancipating them from reproductive responsibilities. Indeed, women performed in the public sphere all the domestic and caring activities

benefits, transfers, and services provided by communist regimes went far beyond those provided by European welfare states.

Yet, targeting the well-being of the community obscured the specific necessities of individuals. Consequently, the centrally planned redistribution of resources and assets was somewhat inefficient and even inequitable (Standing, 1996). Besides, both capital and labor were massively mobilized to the heavy industry (e.g., coal, iron, steel), which had become the economic engine of Central-Eastern Europe (Eichengreen, 2007; Judt, 2005). On the one hand, this led to a shortage of raw materials and personnel in other key economic sectors (e.g., agriculture, light industry) that resulted in deficient electrical and heating infrastructures, urban transport, etc. On the other hand, it compelled laborers to work multiple shifts and, sometimes, with obsolete machinery, in order to reach the production quotas set by central governments and necessary to economically sustain the social structure. To this should be added that collective bargaining was outlawed, and worker radicalism or non-conformism was frustrated by means of force and oppression (Judt, 2005; Standing, 1996). Hence, the living standards of the population were limited despite the vast array of social policies and subsidies deployed by the states; the landscape of near-full employment was imposed to workers, rather than

from which they had been relieved in the private sphere. Besides, the gendered division of work persisted within households, and women took on the tasks that were not covered by the states (Pollert, 2003; Razzu, 2016).

proffered; and any source of dissent was fiercely repressed (Havel & Keane, 1985).

When communist totalitarian regimes collapsed in 1989, and Central-Eastern European countries transitioned to a market economy, the situation hardly improved. Eventually, a non-competitive industrial system was plunged into the global economy and confronted with much more mature economic systems (Standing, 1996). Socialized enterprises were sold to private investors, who sought to enhance the levels of productivity by applying massive layoffs and flexibilizing the workforce (Judt, 2005; Mrak et al., 2004). The communist social safety net was ripped up. As such, unemployment grew at the same time as unemployment benefits were removed. Workers who kept their jobs saw their employment stability severely affected, and their insufficient wages were no longer coupled with subsidies (Eichengreen, 2007; Judt, 2005; Standing, 1996). The public provision of domestic and caring services was suspended, overloading women with both productive and reproductive activities (Pascall & Manning, 2000; Pollert, 2003; Razzu, 2016).

The reinforcement of the welfare state, regulation of employment and reinstatement of family-friendly policies were added back to the political agenda once the most urgent adjustments of the transition were completed. Still, hitherto these welfare policies mainly apply to workers in the formal sector and, particularly, to public workers, leaving informal workers (who represent a large share of the labor force) completely unprotected from market risks (Woolfson, 2010).

Certainly, there were national variations in the approach and extent to which transitional social and employment policies were implemented, and some labor markets and welfare states in Central-Eastern Europe resemble or are even better off than some of their homologues in Western Europe (Mrak et al., 2004; Orosz, 2019). Yet, the historical path through which these countries reached the current degree of employment stability and social protection bear no relation and, as a consequence, the implications that similar forms of employment have for the economic and social well-being of workers in each territory cannot be equated.

At this point, it should be stressed that, even though the historical trajectories of Western European countries were quite similar compared to those of Central-Eastern Europe, dissimilarities between them were still discernible. For instance, countries experienced different industrialization processes in the post-war period, which in turn entailed divergences in the ensuing shift to a service economy. Other inequalities include the relative power position accomplished by trade unions, the development and subsequent retrenchment of welfare states, or the (re)configuration of family models (Esping-Andersen, 1990; Hall & Soskice, 2001; Judt, 2011; Korpi, 2006). All these factors combined determined the unequal evolution of labor markets and employment relationships, crystallizing distinct paradigms of employment in each country.

3

PRECARIOUS EMPLOYMENT RELATIONSHIPS: CONCEPTUALIZATION AND OPERATIONALIZATION IN COMPARATIVE RESEARCH

3.1 The concept of precarious employment

The flexibilization of employment relationships, deregulation of labor markets, and subsequent shift of market risks from corporations and states to workers propelled the incorporation of the term "precarious employment relationships" or "precarious employment" into the academic, social, and political discourse.

At first, such terms were used to designate the temporariness or employment instability of seasonal workers (Barbier, 2005). However, it was soon recognized that many other characteristics of employment relationships can entail a precarious employment situation, that is, an employment situation that is unfavorable for workers both within the workplace and in their broader life (Burgess & Campbell, 1998; Cano, 2000). Therefore, since the introduction of these terms in the public outlook, researchers have been devoted to putting forth more precise conceptualizations; a cornerstone to understand the full range of consequences precarious employment can trigger, as well as to identify policy entry points to counteract such consequences (Benach & Muntaner, 2007).

Rodgers (1989) was the first to explicitly conceptualize precarious employment. In a groundbreaking publication, he outlined the following four dimensions: a) employment instability or threats to the continuation of employment, either due to high risk of job loss or short-time contracts; b) employment insecurity or limited control (collective or individual) over working conditions, wages and pace of work; c) erosion of worker protection, including social security

and protection against discrimination, unfair dismissal, or unacceptable working practices; and d) low material rewards associated with poverty and social exclusion.

By taking various dimensions into account, Rodgers emphasized the multidimensionality of precarious employment. In other words, that multiple features shape this unfavorable employment situation. Still, these do not need to occur simultaneously for a job to be precarious. As such, precarious employment should be understood less as a clear-cut binary division and more as a continuum, whereby employment relationships showing none of these dimensions lie on one end, and those showing most or all of them lie on the other. Therefore, rather than speaking of precarious versus non-precarious workers, we should speak of degrees of precariousness. On these grounds, a significant novelty of the approach was the appreciation that not all flexible or non-standard forms of employment are necessarily precarious (Julià, Vives, et al., 2017).

The publication became a landmark, and most of the ensuing conceptualizations built on these grounds. Indeed, a recent systematic review of definitions and operationalizations of the concept found that employment insecurity, low or inadequate wages, and reduced social protection and workplace rights were the most commonly used dimensions (Kreshpaj et al., 2020); three of the four dimensions defined by Rodgers.

Nevertheless, some of the existing approaches extend the scope of the conceptualization further by discrediting the SER as an ideal-type

employment relationship, in the sense that even full-time permanent contracts with benefits, social protection and opportunities for worker representation can be subject to precariousness (Julià, Vives, et al., 2017). Cano (2000), for instance, highlighted the social component of precarious employment, stressing that it is "a work trajectory that does not allow consolidating a level of income, a profession, and a stability of employment that can permit workers to plan for their future and become fully integrated in social life". Lewchuk (2017) described PE as the combination of a) the uncertainty of low control over work schedules and the continuity, terms, and conditions of future employment, b) the effort in finding and maintaining employment or balancing the demands of multiple jobs, and c) the lack of support either from formal organizations (e.g., trade unions), coworkers, or family and friends. Similarly, Tucker (2002) proposed the following five indicators: a) certainty of on-going employment, b) degree of employee control, c) level of income, d) level of benefits, and e) degree of regulatory and union protection. Standing (2011), in turn, characterized seven forms of employment security that precarious workers lack: adequate employment opportunities, protection against arbitrary dismissal, opportunities for employability, workplace rights, training and skill development, income security, and protection of the collective voice. Ultimately, Amable (2006) emphasized the asymmetry in power relationships between employers and precarious employees, both at a formal (e.g., absence of worker representation schemes) and an informal level (e.g., interpersonal power relations between precarious employees and their colleagues, supervisors, or direct employers). This asymmetry was theorized to

materialize in six dimensions: temporariness (i.e., type and length of contract), low wages, lack of rights, incapacity to exercise these rights, disempowerment (i.e., extent to which workers can bargain, collectively or individually, over their employment conditions), and vulnerability (i.e., defenselessness against authoritarianism in the workplace).

To date, however, no agreement has yet been reached on a gold-standard conceptualization. On a first account, as this brief overview of multidimensional conceptualizations suggests, there is no consensus on the features that define the precariousness of employment relationships. At this point, it should be clear that jobs can undermine the living conditions of workers in many ways, but not all of them relate to the precariousness of employment relationships (Benach, Muntaner, et al., 2013). Unfavorable working conditions, which are mainly defined by the nature of the tasks performed in an occupation, can certainly be adverse for workers. Working night shifts, for instance, reduces the opportunities of workers to socialize with their families or broader communities and disrupts biological rhythms (Arlinghaus et al., 2019; Fagan et al., 2012). Nevertheless, this will occur regardless of the conditions under which workers agree to sell their labor power (e.g., wage, non-wage benefits, entitlement to rights), namely, the employment conditions. Therefore, despite the lack of agreement on the dimensions that shape precarious employment, these should at least be confined to characteristics related to the employment conditions, as well as to the (unbalanced) power relations at work (Benach, Muntaner, et al., 2013; Bodin et al., 2020; Kreshpaj et al., 2020).

On a second account, and related to the previous point, there are differences in what is deemed precarious between countries and over time (Muñoz-Bustillo et al., 2009). As illustrated in the previous chapter, employment relationships are contoured by the legal and regulatory framework in which they take place, which in turn springs from broader political, cultural, economic, and social trends (Duell, 2004; Muntaner et al., 2010). The same happens with the precariousness of employment relationships (Duell, 2004). Accordingly, an employment relationship that is considered precarious and is thus unfavorable for workers in a specific country, may not be so in another country. The SER is an insightful example. In contexts where employment responsibilities are dissociated from reproductive tasks it might be an ideal-type employment relationship (Vosko et al., 2009). However, in contexts where the double breadwinner model predominates, or heterogeneous family realities coexist (Crompton, 2006), the SER can even be detrimental for the well-being of workers, and employment relationships that allow a better work-life balance (e.g., part-time employment, remote work, employee-led schedule flexibility) are potentially preferred (Fleming, 2014; Weeks, 2011). For this reason, almost all the available conceptualizations of precarious employment focus on a single country or, at the most, on a group of countries with fairly homogeneous labor market trajectories (Kreshpaj et al., 2020).

All said, laying out an accurate conceptualization that applies to multiple territorial realities is a complex endeavor. Finding the balance between broadness, to encapsulate the particularities of distinct labor markets, and detail, to avoid the oversimplification of the phenome-

non, can only be achieved if such conceptualization is rooted on a deep understanding of employment relationships and the social organization of work beyond national or historical specificities. The power relations theory offers an auspicious framework for such understanding (Korpi, 2006). Building on this framework, the various sources or dimensions of employment precariousness are the manifestation of the asymmetric power relations between capital and labor (Amable, 2006; Benach et al., 2013; Muntaner, et al., 2010; Vives, 2010). On that account, the materialization of this asymmetry may vary according to socioeconomic, political, and cultural patterns. As such, the framework allows the inclusion or removal of dimensions in line with the specificities of each labor market structure.

For this reason, the current dissertation is based on this all-embracing framework. More precisely, on the abovementioned conceptualization put forth by Amable (2006), which is composed of six dimensions theorized to epitomize such asymmetry.

Temporariness or employment instability concerns the type and length of the employment contract. The pervasiveness of this dimension lies in the incapacity of temporary workers to plan for their future. By way of illustration, they cannot secure an income, as opposed to their permanent counterparts, which constrains life-changing decisions (e.g., family formation, homeownership) (Artazcoz et al., 2005; van Wijk et al., 2021). Besides, employment instability impedes the acquisition of work experience, minimizing the opportunities for upward mobility; prevents workers from establishing solid interpersonal relationships in their workplaces, narrowing the scope of social

support; and jeopardizes their participation in trade unions or worker representation schemes (Benavides et al., 2006; Heery & Abbott, 2000).

Disempowerment refers to the incapacity of employees to negotiate their working and employment conditions. As depicted in the previous chapter, the individualization of employment relationships through the weakening of trade unions and the flexibilization of labor contracts, drove the de-standardization (and precarization) of employment relationships (Kalleberg, 2018). Individually, workers have fewer resources to bargain with employers. As a consequence, they are more vulnerable to unilateral decisions regarding wages or working times, for instance (Silver, 2003). The dimension also encompasses situations in which workers are unaware of the protection network offered by trade unions and collective agreements and, therefore, these are partially or not applied (Vives, 2010).

Vulnerability is directly related to the unbalanced power relations at work. Workers in a vulnerable situation lack resources to offset authoritarian or discriminatory practices, both exerted by employers (e.g., threats of being fired) and coworkers (e.g., bullying), or to ask for better employment and working conditions (Pollert & Charlwood, 2009). Among these resources are the absence of formal or informal social support in the workplace, or security over the continuation of employment (Cano, 2000).

The *rights* to which workers are entitled are designed to protect workers against market risks and decommodify labor (Esping-Andersen,

1990). These may include monetary compensations during non-work periods (e.g., sick leave, unemployment benefits, retirement), or non-wage benefits (e.g., paid vacations, compulsory breaks during the journey). Therefore, the absence of these rights inherently entails the dependence of workers on their capacity to sell their labor power, which leaves them unprotected from adverse externalities and, by extension, in an unfavorable bargaining position (Esping-Andersen, 1990; Standing, 2011). Poor knowledge of these rights is also a sign of precariousness (Vosko, 2006).

The *capacity to exercise rights* adds to the previous dimension by differentiating what is established in labor legislation from actual practices in the workplace. Implicit or explicit threats of dismissal, wage cuts, or other reprisals may prevent workers from exercising their legal rights (Porthé et al., 2010). Therefore, even when comprehensive social protection nets are deployed, workers in a precarious employment situation potentially remain subordinated to their jobs and employers (Lorey, 2015).

To end with, in capitalist societies, *wages* are the main incentive for workers to engage in employment relationships (Bowles & Edwards, 1985). As such, inadequate wages that do not allow the achievement of a sustainable standard of living crystallizes the vulnerable position of precarious workers in the unequal distribution of power resources, both in the workplace and in societies at large (Castel, 2002).

As stressed above, the power relations perspective within which this conceptualization is framed (Korpi, 2006) allows the introduction or

extraction of dimensions according to the ever-changing contextual characteristics that embed precarious employment relationships, provided that they stem from the asymmetry in the power relations between capitalists and laborers.

In that regard, ever since Amable's approach was published (2006), European labor markets have undergone profound changes, including far-reaching globalization processes and technological innovations (see chapter 1). The service sector now circumscribes a large share of the workforce. As a result, demand fluctuations are much more volatile and require new forms of employment flexibility for employers to adapt to market irregularities, that is, new sources of employment precariousness. Among them is the *unpredictability of working times*, which constitutes the seventh dimension of precarious employment as understood in this dissertation. The dimension relates to the absence of control of workers over the time spent at work. Certainly, it stems from the unequal distribution of resources between employers and employees, in the sense that employers can rearrange the working schedules of employees at will while the latter have few resources to oppose. (Arlinghaus et al., 2019; Porthé et al., 2010). As such, they cannot establish daily routines or participate in social life to the point of being reduced to mere wage-earners (Castel, 2002).

3.2 From the conceptualization to the operation-alization of precarious employment

If agreement on a gold-standard conceptualization is yet to be achieved, let alone a standardized operationalization to measure the concept regionally, nationally, and internationally.

Beyond the absence of a consensual conceptual framework on which to build an operationalization, information systems that assess the quality of employment relationships periodically and with sufficient detail are scarce (Benach et al., 2012, 2016). National institutes of statistics retrieve data on unemployment, wages and, in some countries, the type and length of contracts, but not on more intricate features such as worker bargaining power.

Against this background, over the years most scholars focused on one-dimensional proxy indicators of precarious employment, such as temporary employment, low wages, or perceived job insecurity (Benach et al., 2014; Ferrie et al., 2002; Virtanen et al., 2005). While these approaches did advance knowledge on topics such as the trends and the social distribution of the phenomenon, they can still lead to the misclassification of non-precarious workers as precarious and vice-versa (Julià, Vives, et al., 2017; Vives, González-López, et al., 2020). Moreover, one-dimensional approaches oversimplify the contrasting experiences of workers in each territorial reality. By way of illustration, temporary jobs in countries with flexicurity systems (e.g., Denmark, the Netherlands) have different implications for the working and living conditions of employees compared to countries

where these contractual forms of employment are used by corporations to reduce labor costs and transfer market risks to workers (e.g., Spain, Greece) (Grimshaw et al., 2016; Vosko et al., 2009).

That being so, attempts to operationalize precarious employment multidimensionally spread progressively (Kreshpaj et al., 2020; Vanroelen et al., 2021). However, only a handful of the existing proposals were empirically validated (Lewchuk, 2017; Vercruyssen & Van Gyes, 2017). Among them is the Employment Precariousness Scale (EPRES) (Vives et al., 2010), which is grounded on the conceptual framework put forth by Amable (2006). It consists of a summative scale composed of 22 items that are sorted into the six dimensions listed above (i.e., temporariness, wages, rights, exercise of rights, disempowerment, and vulnerability). As mentioned above, EPRES was empirically validated in Spain (Vives et al., 2010, 2015) and Catalonia (Benach et al., 2015). Later on, it was translated, adapted, and empirically validated in Chile (Vives et al., 2017), Sweden (Jonsson et al., 2019) and Belgium (Vandevenne, 2020), and is currently being tested in Finland. As such, EPRES stands out as a promising proposal to solve the puzzle of applying the same approach to different labor market realities (Ervasti & Virtanen, 2019; Peckham & Seixas, 2021).

However, a key challenge of most multidimensional approaches, including EPRES, is the availability of data on a periodic basis, which is crucial to analyze time trends and evaluate public policies (Benach et al., 2016). Because of the lack of high-quality register-based or

administrative data on employment relationships[7], these operational-izations mostly rely on primary data sources, which are both expensive and time-consuming.

For this reason, researchers sought to adapt multidimensional theory-based approaches such as EPRES to the information available in large-scale surveys (Matilla-Santander et al., 2020; Puig-Barrachina et al., 2014). Certainly, a great disadvantage of this strategy is the lack of control of the research team over the topics explored. However, multiple advantages outweigh this drawback: large-scale surveys are conducted periodically on a representative sample of their target population, follow standardized sampling designs, and harmonize their data so that comparative analyses can be performed. Moreover, most of these surveys are open to suggestions as regards the items to be included in following waves. That being so, researchers worldwide are increasingly embracing this procedure (Matilla-Santander et al., 2020; Oddo et al., 2021; Puig-Barrachina et al., 2014).

The strategy has an essential requirement, though. By adapting a conceptualization or a theory-based operationalization to a secondary dataset, the resulting measure is basically composed of proxy-indicators. Accordingly, it is imperative to perform conceptual and empirical validity tests to make sure that the nature of the original construct is safeguarded. Likewise, if measures are to be applied in the different

[7]An exception is the Swedish case, where a multidimensional measure of PE was recently proposed by Jonsson and colleagues (2021).

countries or population groups covered in large-scale surveys, measurement invariance techniques should also be checked (Davidov et al., 2014). However, few proposals undergo these tests (Vercruyssen & Van Gyes, 2017).

All in all, there is still a long way to go in the research field of precarious employment (Benach et al., 2016; Bodin et al., 2020). Yet, reaching international consensus on a conceptualization and operationalization of precarious employment or, at least, empirically validating an existing multidimensional proposal in a cross-national setting, is a steppingstone to advance current knowledge on the broader implications of the phenomenon. Therefore, future research needs to be geared towards this direction.

4

PRECARIOUS EMPLOYMENT AS A SOCIAL DETERMINANT OF HEALTH

4.1 The social determinants of health

As it happened with precarious employment, health is a complex concept to define. The understanding of what establishes "good health" evolved substantially over time. Early definitions focused solely on the biological or genetic characteristics of individuals. In a groundbreaking shift, the World Health Organization (WHO) defined health as a "state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity" (World Health Organization, 1946)[8]. Despite being widely criticized (McCartney et al., 2019), this definition acknowledged for the first time the social dimension of health.

Thereupon, the scope of epidemiologic and public health research broadened to incorporate the social determinants of health, namely, the "circumstances in which people are born, grow up, live, work, and age" (WHO Commission on Social Determinants of Health, 2008). These circumstances are in fact shaped by a set of cultural, political, economic, and social dynamics that stem from the uneven distribution of power, resources, and prestige across population groups (Marmot & Wilkinson, 2005; Solar & Irwin, 2010). As a

---

[8]The Constitution of the WHO also argues that the enjoyment of the highest attainable standard of health is a fundamental right of every human being, as well as a mechanism to achieve other objectives in life, pointing out the responsibility of governments to secure the health of their inhabitants (World Health Organization, 1946).

result, the social determinants of health produce gradient-wise health inequalities globally, nationally, and regionally, wherein the most socially disadvantaged population groups accumulate poorer health outcomes compared to increasingly more advantaged groups (Marmot, 2015).

Social inequalities in health are thus systematic, avoidable and, above all, unfair. Indeed, they can be potentially minimized through reasonable action, social interventions, and interdisciplinary policies (Whitehead, 2007). That is, improving the living conditions of the population as a whole; balancing the unequal distribution of power, income, services, and goods; and monitoring the abovementioned phenomena to design and evaluate tailored action (WHO Commission on Social Determinants of Health, 2008).

On that account, fully understanding the causal mechanisms underpinning the relationship between the social determinants of health and health inequalities is imperative to layout compelling policies and interventions, as well as to establish comprehensive surveillance systems of the social determinants of health at a macro-, meso-, and micro-level. As such, a number of scholars embraced the task of developing conceptual frameworks that can aid in shedding light on this relationship.

Cassel (1976) hypothesized that psychosocial factors (i.e., dominance hierarchies, social disorganization and rapid social change, marginal status in society, bereavement, and social support or psychosocial assets) determine the social environment of individuals,

which in turn molds people's resistance to pathogenic agents. Contrastingly, the ecosocial theory put forth by Krieger (1994, 2001) outlines that the unequal exposure to damaging experiences between dominant and dominated groups is configured by the interaction of social and ecological features that occur at multiple levels (i.e., national, regional, area, household, and individual). These experiences are embodied (i.e., incorporated biologically) by population groups, producing health inequalities. Link and Phelan (1995), in turn, argued that social factors are likely "fundamental causes" of individual exposure to risks and diseases, in the sense that these determine access to important resources and affect multiple other mechanisms that have a bearing upon the contraction of diseases. Beyond that, they also stressed that the association between social factors and diseases is maintained even when intervening mechanisms change. Dahlgren and Whitehead (1992, 2021) conceptualized the upstream-downstream "rainbow model", currently the most influential of its kind. The model pictured the interconnectedness of distal (i.e., general socioeconomic, cultural, and environmental conditions) and proximal (i.e., biological factors) determinants of health inequalities, streamlined by intermediate determinants (i.e., living and working conditions, including education, the work environment, access to healthcare services, etc.). Lastly, the Commission to Reduce Social Inequalities in Health in Spain (Comisión para reducir las desigualdades sociales en salud en España, 2015), drawing on the work of Solar and Irwin (2010) and Navarro (2004), proposed a framework that also differentiated structural (i.e., distal) and intermediate determinants of health inequalities, but incorporated the axes of

social inequalities (e.g., gender, age, ethnicity, social class) as a centralizing force (Figure 1).
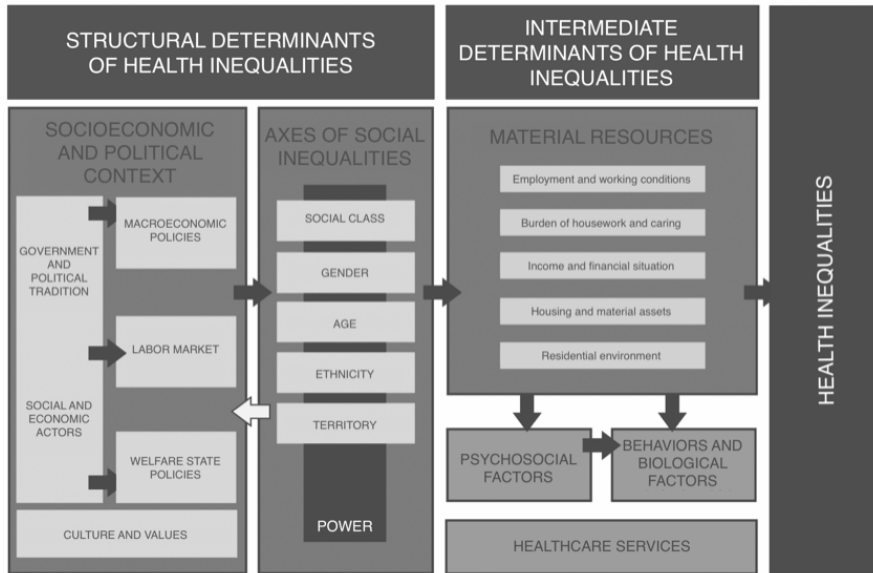

Figure 1. Conceptual framework of the social determinants of health inequalities. (Comisión para reducir las desigualdades sociales en salud en España, 2015).

In this framework, the authors theorized the structural determinants of health inequalities as the interplay between political, socioeconomic, and cultural processes that shape the legal and regulatory framework (i.e., macroeconomic policies, labor markets, welfare states) in which people's living conditions develop. These therefore define the unequal distribution of intermediate determinants of health inequalities, both directly, through the unequal access to material resources or services, and indirectly, through the configuration of the social environment of individuals that engenders distinct psychosocial factors and, ultimately, health-related behaviors and biological factors.

The interrelation between the structural and intermediate determinants of health is centralized by the axes of social inequalities, as briefly mentioned above. More precisely, the axes of social inequalities systematize the uneven distribution of power across population groups through the uneven representation of these groups in the main social and economic actors in societies (e.g., governments, corporations, civil organizations), for instance. Correspondingly, people are socially placed in more or less favorable positions within the social structure, which results in unequal opportunities and assets to prosper in all life domains, including education, employment, and housing. All these processes combined produce social inequalities in health.

That being said, this framework is of particular interest for the purposes of the current dissertation. Firstly, it explicitly highlights employment as an intermediate determinant of health. Secondly, it emphasizes the embeddedness of employment relationships in the broader socioeconomic, political, and cultural context in which these occur. Thirdly, it points out the central role that the axes of social inequalities in general, and gender in particular, play in the production of employment-related health inequalities. Hence, the following sections will be grounded on this all-embracing perspective.

4.2 Precarious employment as a social determinant of health

The acknowledgement of the social determinants of health gave birth to multiple research disciplines, including occupational health. Historically, this discipline was focused on the adverse health effects of unemployment (Dooley et al., 1996). However, as the main source of income and activity for the majority of the population, at least in capitalist societies, the characteristics of employment contribute greatly to the configuration of people's daily experiences and determine the position of individuals in the social structure (Kunst & Mackenbach, 2000), which has a key weight in shaping the health and well-being of the working population (Comisión para reducir las desigualdades sociales en salud en España, 2015; Dahlgren & Whitehead, 1992, 2021). As such, employment, and not only the lack of it, was also recognized as a crucial social determinant of health and health inequalities that affects workers, their families, and broader communities (Benach, Muntaner, et al., 2013).

Indeed, there are several features of jobs that have a bearing upon health. Certainly, lifting heavy loads on a daily basis, that is, during the working journey, can result in musculoskeletal pain (Engels et al., 1996). Likewise, being exposed to toxics such as asbestos at work enhances the risk of cancer (Doll, 1955). On another instance, adverse psychosocial work environments (e.g., poor social support, high emotional demands, low control over the tasks performed) can have long-standing consequences on the mental health of workers (Stansfeld & Candy, 2006). All these features, which monopolized

occupational and public health research for years, relate to the nature or content of the tasks performed (e.g., whether jobs are physically demanding, repetitive, require particular skills) and the associated working conditions (e.g., physical, environmental, ergonomic, psychosocial).

Beyond that, however, the circumstances under which workers are engaged in a job or occupation (i.e., employment conditions), as well as the materialization of power relations between employers and employees (i.e., employment relations) also have the potential to impact the health and well-being of workers (Benach, Muntaner, et al., 2013; Vanroelen, 2019). For instance, earning low wages has extensively been acknowledged to damage health (Deaton, 2008; Stronks et al., 1997). Therefore, precarious employment, understood as the accumulation of unfavorable employment conditions and relations (see chapter 3), should also be conceived as a social determinant of health and health inequalities (Benach & Muntaner, 2007).

Against this background, precarious employment was incorporated into the occupational and public health research agenda. At first, given the absence of a standardized conceptualization and operationalization of the term, and the scarcity of detailed sources of information, researchers relied on one-dimensional proxy-indicators (see chapter 3). This body of research definitely helped to empirically unravel the health-damaging effects of precarious employment. Temporary employment, for instance, showed consistent associations with presenteeism, work accidents, and all-cause as well as cause-specific mortality (Balogh et al., 2021; Benavides et al., 2006;

Virtanen et al., 2005). Perceived job insecurity was reported to cause both poor psychological well-being and somatic ill-health (De Witte et al., 2016; Ferrie et al., 2002). Part-time employment and irregular working hours were also linked to poor health outcomes (Arlinghaus et al., 2019; De Moortel et al., 2014; Fagan et al., 2014).

Nevertheless, ambiguous findings and theoretical inconsistencies of these approaches should not be overlooked. On a first account, a review of the relationship between temporary employment and health found inconclusive results regarding physical and mental health outcomes (Virtanen et al., 2005). This was argued to relate to the great heterogeneity of employment situations falling under the term "temporary employment", ranging from seasonal agricultural work to professional project-based contracts (Peckham & Seixas, 2021). As for job insecurity, it stems from the individual perception of potential job loss or dismissal. Therefore, it may derive from circumstances other than the employment conditions and relations, including economic crises or personal feelings and expectations. Finally, studies that considered variables related to personal choices suggested that involuntary full-time employment may be worse for the health and well-being of the working population than part-time employment or irregular working times (De Moortel et al., 2020). In sum, one-dimensional indicators oversimplify the multiple dimensions of precarious employment that have a bearing upon the health of workers (Benach et al., 2014; Bodin et al., 2020; Peckham & Seixas, 2021). Moreover, these individual dimensions (e.g., temporary contracts, part-time employment, irregular working times) translate into different impairments to achieve a sustainable standard of living and, by extension,

they have a different potential to affect health and well-being (Bosmans, 2016, pp. 69–74). That being so, the findings derived from each one-dimensional indicator cannot be equated.

These drawbacks called for the adoption of multidimensional approaches (Vives, Benmarhnia, et al., 2020). Thereupon, various efforts to operationalize precarious employment from a public health perspective emerged. Among others, EPRES (see chapter 3) gained strong appeal (Ervasti & Virtanen, 2019; Peckham & Seixas, 2021), showing consistent associations with both physical and mental health outcomes in multiple countries (Jonsson, Matilla-Santander, Kreshpaj, Johansson, et al., 2021; Julià, Vanroelen, et al., 2017; Vandevenne, 2020; Vives, Benmarhnia, et al., 2020). Other multidimensional measures were also associated with poor health outcomes, including occupational injuries (Koranyi et al., 2018; Peckham et al., 2019), functional limitations (Scott-Marshall & Tompa, 2011) and, above all, poor mental health (Rönnblad et al., 2019; Utzet et al., 2020).

Yet, multidimensional approaches are not without their hindrances either. From a conceptual perspective, the use of these approaches precedes the achievement of international agreement on, at least, the dimensions that shape precarious employment. Hence, there is great heterogeneity in the dimensions included in each measure (Utzet et al., 2020). While employment instability (or the type and length of contracts) wages, and poor social benefits and rights are rather ubiquitous (Kreshpaj et al., 2020), other dimensions are as diverse as previous spells of unemployment (Canivet et al., 2016), subjective

perceptions of wage adequacy (Macmillan & Shanahan, 2021), or training opportunities (Vandevenne, 2020; Vanroelen et al., 2021). Therefore, and as it happened with distinct one-dimensional indicators, the comparability of the findings is questionable. On top of that, few existing multidimensional measures were validated empirically (Jonsson et al., 2019; Vandevenne, 2020; Vives et al., 2010, 2017). Non-validated measures may thus combine dimensions that affect health in a completely different manner (e.g., long working hours and involuntary part-time employment), leading to uninterpretable results.

In more methodological terms, several approaches to the multidimensionality of precarious employment have been harnessed, the most popular ones being typological proposals and summative scales (Vanroelen et al., 2021). Briefly, the former procedure supports that the unequal combination of dimensions results in distinct employment typologies with distinct health-damaging effects (van Aerden et al., 2016). On the negative side, however, there is the subjective interpretation of the typologies by the research team. The latter approach rules out such subjectiveness by relying on the accumulation, rather than the combination, of dimensions. But, in this case, the approach overlooks the unequal burden that each dimension poses on the health of workers. Certainly, weighting the dimensions could potentially overcome this issue, but it requires a deep (and still immature) understanding of the mechanisms through which precarious employment affects health (Benach, Vanroelen, et al., 2013; Muñoz-Bustillo et al., 2009). All said, the two procedures provide dissimilar information and, again, can entail contrasting results.

Resolving these conceptual and methodological inquiries is a complex endeavor that requires the cooperative work of interdisciplinary researchers, public institutions, and social actors. Yet, some key points and recommendations can definitely be drawn from them. First, future empirical research on precarious employment and health should be based on multidimensional approaches to better encapsulate the full scope of the concept, as well as the multiple ways in which it negatively affects health. Second, these approaches should be theoretically sound, that is, based on well-established and comprehensive conceptual frameworks. Finally, they should be empirically validated, to safeguard the meaningfulness of the findings (Benach et al., 2016).

4.3 Precarious employment and health: a gender perspective

Despite the conceptual and methodological shortcomings mentioned in the previous section, occupational and public health research tackling the adverse effects of precarious employment grew significantly in the last decades, showing consistent associations with an increasing number of health outcomes (Benach et al., 2014; Bodin et al., 2020). Yet, knowledge gaps remain. Among these gaps are the understanding of gender inequalities in these associations.

As detailed in the foregoing, the axes of social inequalities play a key role in the distribution of power and resources across population groups, resulting in uneven opportunities to achieve a sustainable standard of living and, by extension, in health inequalities (Comisión para reducir las desigualdades sociales en salud en España, 2015). Gender, as one of the axes of social inequalities, strongly influences the way men and women develop within societies according to a set of socially constructed norms, values, and roles (Marmot & Wilkinson, 2005; Ridgeway & Correll, 2004). By dint of these norms, values, and roles, women are placed in a socially more disadvantaged position than men, which is made manifest in multiple levels of the social structure (Krieger, 2001). Women thus face multiple sources of adversity that reinforce each other in the production of health inequalities between them and their male counterparts. Precarious employment is only one of these sources of adversity. As such, its effects on the health of men and women should be understood in

conjunction with the social organization of work and life (Weber & Parra-Medina, 2003).

For instance, the gendered division of labor that traditionally attributed to women the brunt of reproductive activities, as well as productive activities in double breadwinner models (Crompton, 1999), determined the unequal implications that the evolution of employment relationships had for men and women, both in Western and Central-Eastern European countries (see chapter 2). On a first account, by being historically relegated to the private sphere, the interests of women were underrepresented in social and labor movements (Silver, 2003). Therefore, their incorporation into the labor market was more a response to an economic need rather than an emancipation process actively driven by women. On a second account, the role of women as primary caregivers and secondary wage-earners narrowed both their opportunities and expectations within labor markets (Pollert, 2003; Rubery et al., 1999). On a third account, socially constructed gender roles and stereotypes translated into horizontal and vertical sources of segregation, confining women to a restricted range of "feminized" occupations with low prospects for career progression (Christofides et al., 2013; Rubery & Fagan, 1995). All these factors combined channeled women into part-time and other types of flexible employment relationships that apparently ease the work-life balance, in low unionized economic sectors, and with few promotion opportunities. That is to say that women are far more frequently exposed to precarious employment than men and, when their jobs are not precarious, they still encounter multiple other difficulties to stay and progress in the labor market (Menéndez et al., 2007).

To this should be added that the socially disadvantaged position of women is also made manifest outside the boundaries of labor markets (Ridgeway & Correll, 2004). As an example, women's lower rate of participation in high-level politics results in the absence of a gender-sensitive perspective in official policy (A. C. Weeks, 2017). Accordingly, the all-embracing male power structure challenges women's access to resources that would prevent or offset the negative consequences of precarious employment (Menéndez et al., 2007). But, beyond that, it also entails other harmful life events or circumstances (e.g., structural violence against women) that intersect with precarious employment in damaging the health and well-being of women further (Weber & Parra-Medina, 2003).

All said, the proper incorporation of gender in occupational and public health in general (Messing et al., 2003), and in the research field of precarious employment in particular (Menéndez et al., 2007; Valero et al., 2020), is imperative. To date, however, only a handful of studies applied a gender lens in their analyses, and those that showed stratified results by women and men retrieved contrasting findings: while some studies report greater associations among men, others do so among women, and a third set of studies suggests that precarious employment affects men and women alike in terms of ill-health (Gray et al., 2021; Valero et al., 2020).

In any case, most authors relate their findings to the abovementioned gendered division of labor. On the one hand, a number of commentators argue that the socially constructed role of men as breadwinners triggers a greater toll on their health in the event of an adverse labor

market outcome, including precarious employment, insofar as they are more strongly compelled to succeed professionally than women (Siaroff, 1994). On the other hand, by being overloaded with both productive and reproductive activities, precarious employment among women is theorized to add to an already detrimental experience and, ultimately, entail poorer health outcomes (Menéndez et al., 2007). Recently, a more comprehensive study confirmed both theories by framing their analyses within welfare states and family regimes (Fujishiro et al., 2021). More precisely, the authors suggested that men are indeed worse affected by precarious employment in traditional male breadwinner family models, whereas this is the case of women in double breadwinner models that provide few family-friendly services and resources.

Therefore, it is not yet clear whether precarious employment affects the health of men and women alike. What is evident, however, is the great need for holistic approaches that incorporate contextual factors into the analysis to truly disentangle the gendered distribution of precarious-employment-related health outcomes.

4.4 The role of welfare states

Beyond emphasizing the need to adopt a gender-sensitive perspective in the analysis of the relationship between precarious employment and health, the previous section stressed that contextual factors such as the gendered division of labor have a bearing upon people's exposure to and embodiment of precarious employment (Krieger, 2001; Weber & Parra-Medina, 2003). Indeed, the conceptual framework of the social determinants of health on which this dissertation is based (Comisión para reducir las desigualdades sociales en salud en España, 2015) points out the interconnectedness of structural and intermediate determinants of health inequalities, centralized by the axes of social inequalities, in the production of health inequalities. That being so, if precarious employment is to be conceived as a social determinant of health, its relationship with health should be framed within the broader context in which it takes place.

To shed light on this complex puzzle, Muntaner and colleagues (2010) proposed a macro-level conceptual model of the configuration of precarious employment relationships and health inequalities (Figure 2). At the core of the model is the particular distribution of power between the main economic (e.g., institutions, trade unions, and corporations) and social (e.g., governments and civil organizations) actors in societies, which in turn is integrated in the historical and ecological context of each society. This realm of political power relations is made manifest in two crucial sets of policies: labor market regulations and welfare state policies and interventions.
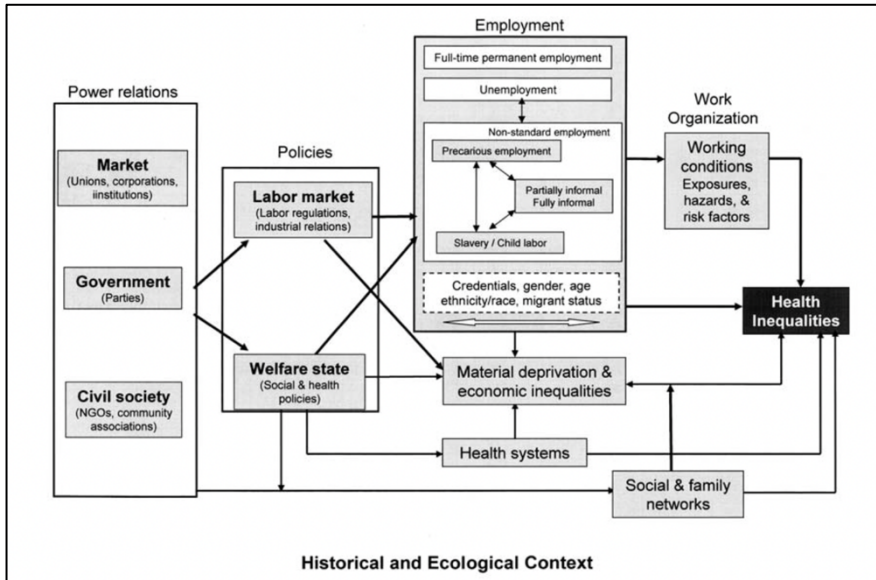
Figure 2. Macro-level conceptual framework of employment relationships and health inequalities (Muntaner et al., 2010).

By way of illustration, the most significant achievements of the working class, at least in Western European countries, were accomplished during the golden era of capitalism, when power relations between trade unions, corporate capital, and governments were relatively balanced (see chapter 2). These achievements were definitely related to the expansion of employment protection legislation and social protection rights and benefits bound to the Fordist labor market, which gave birth to the Standard Employment Relationship, but also to the development of welfare states. As a consequence, the standards of living of the overall working class, and not only of industrial workers, ameliorated, insofar as welfare states safeguarded the working and non-working population from the risks and exigencies of the labor market. Contrastingly, when the distribution of power became unbalanced again to the detriment of trade unions and civil organizations,

in the late 1970s, both the flexibilization of employment relationships and retrenchment of welfare states arose.

Labor markets and welfare states are thus deeply intertwined. Accordingly, the next part of the model depicts how the configuration of (precarious) employment relationships springs from the interactions between the two institutions, rather than from the labor market structure alone (Kolberg & Esping-Andersen, 1991).

Lastly, by shaping the evolution of employment relationships, labor markets and welfare states indirectly determine the health and well-being of the population (Comisión para reducir las desigualdades sociales en salud en España, 2015; Dahlgren & Whitehead, 1992). Beyond that, however, welfare states are also directly related to health. As briefly mentioned above, the main aim of welfare states is to detach the living conditions of individuals from their capacity to sell their labor power (Esping-Andersen, 1990). In more practical terms, to redistribute resources and assets among all population groups in order to blur social stratification and promote the universal achievement of a sustainable standard of living (Briggs, 1961; Marshall, 1961). On that account, welfare states are committed to warranting equal access to healthcare, education, or housing, for instance, acting as buffers against the health-damaging effects of adverse life events and circumstances, including precarious employment (Eikemo & Bambra, 2008; Muntaner et al., 2011). Therefore, welfare states both intersect and interact with precarious employment in defining health and well-being.

Certainly, this conceptual model is not exempted from weaknesses, such as the marginal role attributed to family models or to the axes of social inequalities, neglecting their transversality in the overall production of employment-related health inequalities (Comisión para reducir las desigualdades sociales en salud en España, 2015; Weber & Parra-Medina, 2003). Nevertheless, it was instrumental in highlighting welfare states as crucial factors in the relationship between precarious employment and health.

In addition to that, by emphasizing the embeddedness of welfare states in the context in which they are shaped, the model pointed out that welfare policies and interventions cannot be understood independently from one another (Kolberg & Esping-Andersen, 1991). Rather, these are all part of an integrated strategy or blueprint that aligns with the socioeconomic, political, and cultural structure of each society. This is of particular interest in view of the diverse approaches to welfare states that have been used so far in public health research (Bergqvist et al., 2013; E. Dahl & Van der Wel, 2013). The institutional approach, for instance, focuses on specific social policies, programs, and interventions (e.g., unemployment benefits, pensions, family-friendly policies). Similarly, the expenditure approach addresses the share of public spending devoted to social protection schemes. Although these approaches are definitely useful to identify the scope and redistribution strategies of welfare states in each territorial reality (Bergqvist et al., 2013), they fail to grasp the all-embracing picture of how and why welfare states have a bearing upon the relationship between precarious employment and health. By contrast, the regime approach clusters national welfare states into a

number of rather homogeneous categories according to a set of institutional, cultural, and political criteria. For this reason, it is the most commonly used approach among occupational and public health scholars (Bambra et al., 2014; Bambra & Eikemo, 2009; De Moortel et al., 2014; Fujishiro et al., 2021; Mensah & Adjei, 2020; Shahidi, De Moortel, et al., 2016).

In that regard, and focusing on the European context, five distinct welfare state regimes are commonly identified (Eikemo & Bambra, 2008). First, Scandinavian welfare states (Nordic, social-democratic) stand out for their principles of universalism and strong interventionism. As such, these regimes integrate a wide set of social services, transfers, and benefits that maximize the capacities for individual independence of the family and broader community and minimize social inequalities. These welfare states also endorse family support policies in order to empower men and women alike in their chances to pursue a professional career (Chung & Muntaner, 2007; Esping-Andersen, 1990; Fritzell et al., 2005; Korpi et al., 2013). On the contrary, in Anglo-Saxon welfare states (liberal, residual) decommodification policies are scant, employment is weakly regulated, and the state provision of welfare, including family policies and interventions, is usually means-tested or subject to strict entitlement criteria. Consequently, families and other informal social protection networks bear the responsibility for key social benefits and services (Esping-Andersen, 1990; Korpi et al., 2013; Lewis, 1992; Muntaner et al., 2011). Continental welfare states (Christian-democratic, Bismarckian, conservative, corporativist, coordinated) are strongly interventionist and labor markets are soundly regulated, but welfare is

provided according to occupational criteria, which reinforces social inequalities. Additionally, these welfare states support the traditional male breadwinner model, relegating women to the role of homemakers or secondary wage-earners (Daly, 2001; Esping-Andersen, 1990; Korpi et al., 2013; Lewis, 1992). Southern welfare states (Mediterranean, post-fascist) are rather underdeveloped and provide few social benefits and transfers. Accordingly, individuals depend on their families and the voluntary sector. Mirroring continental welfare states, they also enforce the traditional male breadwinner model, but fewer policies are dedicated to families, children, and dependent individuals, hindering the incorporation of women into the labor market further (Ferrera, 1999; Naldini, 2004; Navarro & Shi, 2001). To end with, Central-Eastern welfare states (transitional, post-communist, contradictory) are the result of the recent shift from communist welfare regimes to a market economy (Cerami & Vanhuysse, 2009). As a consequence, the social protection structures on which the population strongly relied were privatized, and labor market regulations were eased, shifting new market risks to an unshielded workforce. From a gender perspective, in these regimes women are sharply encouraged to participate in the labor market, echoing their communist past. Yet, the gendered division of labor in the private sphere persists, overloading women with a double burden of work (Fenger, 2007; Standing, 1996).

Against this background, in occupational and public health research it is frequently hypothesized that Scandinavian welfare states attenuate the health-damaging effects of unfavorable labor market outcomes, including precarious employment, for both men and women

(Muntaner et al., 2011). On the contrary, Southern, Anglo-Saxon, and Central-Eastern welfare states are theorized to aggravate this relationship among women in particular. The empirical evidence supporting these hypotheses is not yet conclusive, though. In a systematic review, Scandinavian welfare states were found to protect the health of flexible and permanent workers alike, as opposed to the other welfare state regimes (Kim et al., 2012). However, when a gender-sensitive perspective is adopted, the results are less consistent (Bambra & Eikemo, 2009; De Moortel et al., 2014; Fujishiro et al., 2021; Mensah & Adjei, 2020).

All said, further research is needed to fully understand the extent to which welfare states and family models mold the relationship between precarious employment and health. Therefore, adopting this intersectional view of welfare states, family models, and employment relationships could make a stride towards more integrated labor and social policies that aid in minimizing the adversities of precarious employment.

5

JUSTIFICATION AND OBJECTIVES

Precarious employment is an on-the-rise phenomenon (Lorey, 2015). Undeniably, adverse employment situations have rather been the norm throughout the history of wage-earning societies (Castel, 2002; Muntaner, 2016). Even in the so-called golden era of capitalism, wherein the working class achieved an unprecedented power position in the realm of political power relations, multiple workers were excluded from social protection and collective bargaining structures (L. Vosko et al., 2009). Nevertheless, in recent decades the combination of multiple economic crises and ensuing neoliberal and austerity policies, globalization processes, and far-reaching technological innovations opened the door to old and new forms of employment precariousness (Kalleberg, 2018). Compounding that, the evident challenges of properly regulating this ever-changing landscape left an increasing share of the labor force at mercy of their individual or familiar capacity to overcome mounting labor market risks (Armano et al., 2017; Lorey, 2015).

This scenario raised social, political, and academic concern about the detrimental consequences of precarious employment aggravated by the retrenchment of welfare states and collective bargaining schemes, particularly in terms of health and well-being (Benach et al., 2014; Bodin et al., 2020). Indeed, a growing body of research supports the association between precarious employment and a wide range of poor health outcomes (Benach et al., 2014; Gray et al., 2021; Koranyi et al., 2018; Rönnblad et al., 2019; Utzet et al., 2020). However, the previous chapters pointed out multiple gaps in current knowledge that hinder the identification of policy entry points to fight against the

health-damaging effects of precarious employment regionally, nationally, and internationally.

First and foremost, the absence of international agreement on a conceptualization and, by extension, operationalization of precarious employment poses a major challenge for comparative occupational and public health research. (Kreshpaj et al., 2020). Certainly, coming up with a comprehensive measure of such a complex phenomenon that is pervasive in multiple countries and over time is an intricate endeavor, insofar as the evolution of employment relationships according to the socioeconomic, political, and cultural framework in which they are embedded results in the expansion of distinct forms of employment in each society (Bodin et al., 2020; Muntaner, 2016). For instance, in countries where neoliberal theory gained strong appeal and the subsequent deployment of liberal policies relaxed labor market regulations, extremely flexible employment relationships (e.g., zero-hour contracts) spread far more than in countries where trade unions and civil organizations retained a relative influence in the public sphere (Farina et al., 2020). That being so, measures of precarious employment that capture the full scope of the phenomenon in one context may not do so in another context (Muñoz-Bustillo et al., 2009; Muntaner, 2016).

This is particularly conspicuous in Central-Eastern European countries. Due to the fact that this group of countries has, in general terms, fewer research capacities and high-quality information structures than their Western European counterparts (Santoro et al., 2016), studies examining the configuration of (precarious) employment relation-

ships in Central-Eastern Europe are scarce. Yet, their socio-historical labor market trajectories cannot be equated with those of Western European labor markets (see chapter 2). On that account, it is reasonable to think that the triggers of precarious employment in Central-Eastern and in Western European countries diverge substantially. Using the same measure in the two groups of countries may therefore lead to misleading conclusions about how precarious employment is arranged and distributed in Europe (Orfao et al., 2021).

In the era of globalized labor markets, expanding the boundaries of precarious employment research at an international level is imperative. Moreover, achieving a measure of the phenomenon that can be equally applied in multiple countries can aid in drawing lessons from national experiences. It is undeniable that the absence of an internationally consensual conceptualization and operationalization of the phenomenon weighs down this essential strand of research. Yet, empirically validating a multidimensional and theoretically sound approach in a cross-national setting represents an insightful first step towards this goal (Muñoz-Bustillo et al., 2009; Vercruyssen & Van Gyes, 2017).

One of the few extant proposals that has already been validated for epidemiological research in several countries with distinct labor market structures is EPRES. As mentioned in the foregoing, EPRES is a multidimensional measure of precarious employment, conceptually grounded on Amable's (2006) approach, that consists of six dimensions: temporariness, wages, rights, exercise of rights, vulnerability, and disempowerment (Vives, 2010). The scale was designed and

validated in Spain (Vives et al., 2010, 2015) and, subsequently, it was translated and validated in Chile (Vives et al., 2017), Sweden (Jonsson et al., 2019), and Belgium (Vandevenne, 2020). However, so far it has only been included in primary data sources. Accordingly, data are not collected systematically and are not homogenized across countries. That being so, EPRES cannot be used to analyze time trends or cross-national comparisons, which is crucial in view of the chameleonic nature of precarious employment.

This limitation triggered the *first objective* of the current dissertation: to adapt EPRES to the information available in a large-scale survey and to empirically validate the resulting measure in Spain, the country where EPRES was designed.

This objective was thus designed to obtain an instrument conceptually homologue to EPRES but derived from a source of information that is conducted periodically, in order to offer the opportunity to retrieve comprehensive data on the prevalence and distribution of precarious employment on a regular basis. For this purpose, the European Working Conditions Survey (EWCS) stood as a promising data source. Firstly, the EWCS is administered quinquennially. Secondly, it is representative of the population in employment in a wide range of European countries, up to 35 in the last published wave that was fielded in 2015 (Eurofound, 2017). Lastly, it contains an exhaustive set of items related to employment conditions and relations, employment-related health outcomes, and demographic and socioeconomic characteristics of interviewees and the households in which they reside (Eurofound, 2021). Accordingly, EWCS has been chosen by

multiple scholars so far to put forth indicators of precarious employment (Matilla-Santander et al., 2020; Puig-Barrachina et al., 2014), job quality (Vercruyssen & Van Gyes, 2017), and employment quality (Van Aerden et al., 2016). As such, it was considered an appealing dataset to fulfil the current objective.

Beyond that, it is worth mentioning that restricting the validation of the adapted version of EPRES, namely, EPRES-E (i.e., Employment Precariousness Scale for Europe) to Spain responded to a cautionary measure to safeguard the integrity of the original construct. In other words, if the context in which employment is experienced has the potential to shape the various forms precarious employment can take, validating EPRES-E, an adapted measure, in a context where EPRES has not yet proven valid may result in ambiguous findings. Nevertheless, the final goal of this whole endeavor was to obtain a multidimensional measure of precarious employment that could be meaningfully used in cross-country comparative research.

On that account, the *second objective* of the dissertation was to empirically validate EPRES-E in the remaining European countries covered in the EWCS-2015, i.e. the last wave published to date.

Note that the scope of this objective went far beyond the methodological effort to validate an instrument cross-nationally. Exploring whether a structured measure of precarious employment composed of predefined dimensions can be equally applied in multiple countries inherently sheds light on the configuration of precarious employment in each of the countries tested (Rudnev et al., 2018). In countries

where validity is not attained, the proposed dimensions do not fully capture the full span of precariousness that employment relationships can take there. On the contrary, in countries where validity is attained, precarious employment is potentially contoured by the same set of facets. Analyzing these divergences from a critical perspective has the potential to enrich the current understanding of what are or are not the dimensions that sculpt precarious employment across Europe.

Aside from that, the cross-national validation of a comprehensive measure of precarious employment is a fundamental first step before the occupational and public health research agenda can be taken any further. That being so, the other central axis of this dissertation was to explore the role of precarious employment as a social determinant of health. More precisely, as a gendered social determinant of health.

As a matter of fact, women are, in general terms, more exposed to precarious forms of employment than men (Menéndez et al., 2007). Compounding that, the gendered division of labor that frequently results in a double burden of work and other forms of structural discrimination against women, pose a greater toll on their health and well-being (Rosenfield & Mouzon, 2013; Weber & Parra-Medina, 2003). Nevertheless, it is not yet clear whether precarious employment unequally affects the health of women and men (Gray et al., 2021; Valero et al., 2020). What is clear, however, is that the relationship between precarious employment and health across genders cannot be decontextualized from the broader context in which it occurs, especially from welfare states and family models (Fujishiro et

al., 2021), which have the potential to provide precarious working men and, particularly, women with resources and assets to avoid or counteract the adversities of their employment situation (Comisión para reducir las desigualdades sociales en salud en España, 2015; Muntaner et al., 2010). Introducing these contextual factors into the analysis inherently implies performing cross-country comparative research, which brings us back to the need of a valid cross-national measure of precarious employment.

Accordingly, the *third objective* of the dissertation was to examine the relationship between EPRES-E and mental health in the European countries where EPRES-E proved to be valid, both among men and women. Related to it, a sub-objective was to examine the role of European welfare states in this relationship, again across genders.

Among all the health outcomes with which precarious employment has hitherto been associated, mental health was deemed the most suitable to meet this objective. Mental health conditions are increasingly being acknowledged as a key public health issue (World Health Organization, 2021). Therefore, advancing knowledge of its determinants represents a cornerstone for policymakers and other active agents in the design, implementation, and evaluation of public policies. Precarious employment is among these determinants, insofar as mental health is considered "the most acutely responsive and the most sensitive" health indicator of adverse life events and circumstances (Marusic & Bhugra, 2008), and precarious employment is definitely and adverse life circumstance (Lorey, 2015). That being so, both quantitative and qualitative research have described mental

health to be at the core of precarious workers' health complaints (Bosmans et al., 2016; Clarke et al., 2007; Porthé et al., 2010; Rönnblad et al., 2019; Utzet et al., 2020).

On the one hand, this consistency in the literature provides an insightful framework to extend the validation of EPRES-E one step further. Determining the extent to which a measure relates to other indicators in an expected manner provides robustness to the assumption that the theorized measure actually captures the construct that it intends to capture. Accordingly, this procedure is usually performed in the last phase of validating a construct (O'Leary-Kelly & J. Vokurka, 1998). In this case, therefore, EPRES-E should demonstrate consistent associations with poor mental health. On the other hand, although plenty of evidence points out the relationship between precarious employment and mental health, the existence of a gender differential in this relationship is less clear (Gray et al., 2021; Valero et al., 2020). Some studies suggest that welfare states and family models play a key role in explaining this differential (Fujishiro et al., 2021; Menéndez et al., 2007). Hence, the third objective of this thesis was devised to shed light on this intricate.

Summing up, precarious employment is not a uniform phenomenon, nor are its health-damaging effects. Advancing current knowledge on how and why precarious employment produces health inequalities across countries and genders is thus contingent on developing a comprehensive measure of the phenomenon that can be equally applied in a multiplicity of countries. Therefore, this dissertation is aimed at:

1) To adapt EPRES to the information available in the EWCS-2015 and to test the psychometric properties and construct validity of the adapted measure (i.e., EPRES-E) in Spain.

2) To empirically validate EPRES-E in the 35 European countries covered in the EWCS-2015.

3) To explore the relationship between EPRES-E and poor mental health in the European countries where EPRES-E proved valid and the interactions with welfare states, separately by men and women.

6

METHODS

To fulfill the objectives mentioned above, three different studies were carried out. These are presented in the following chapter, which also includes a detailed description of the methods employed in each study. As such, this chapter is mainly devoted to outlining the characteristics of EPRES and the EWCS-2015 dataset, which are central to the development of EPRES-E.

6.1 The Employment Precariousness Scale

The Employment Precariousness Scale or EPRES is the result of a long-term, interdisciplinary, mixed-methods research project.

In a first phase, beyond an extensive literature review, interviews with 12 key informants were performed. These were experts in the research fields of sociology, labor economics, social epidemiology, and public health, among others. Six focus-group discussions with temporary, permanent workers, and trade union representatives ensued (Amable, 2006; Vives, 2010). The starting point of both the interviews and the discussions were the dimensions proposed by Rodgers (1989). That is, employment instability, low wages, poor rights, and disempowerment.

The aims of this qualitative phase of the project were therefore to confirm these four dimensions as key components of the configuration of precarious employment, as well as to identify other potential dimensions. As a result of this process, the four dimensions listed above were verified, and two new dimensions were further added,

i.e., vulnerability, understood as the defenselessness of precarious workers against authoritarianism, and the capacity to exercise the rights to which they are entitled.

Thereafter, the first version of the scale was put forth. This consisted of 26 items sorted into the six specified dimensions[9]. However, EPRES was conceived as a unitary scale in which items added up into a single score. Due to the fact that the dimensions were not composed of the same number of items, the summative score was weighted according to the number of items in each dimension. That is, poor rights and vulnerability were the dimensions that weighed the most in the preliminary version of EPRES, whereas employment instability and wages weighed the least (Amable, 2006; Vives, 2010).

Ultimately, the psychometric properties and construct validity of EPRES were tested (Vives et al., 2010). The results prompted the exclusion of four items in subsequent versions (Vives et al., 2015). Additionally, a new method to calculate the scale was proposed, which consisted of the arithmetic mean of each dimension. By using this new method, equal weights were attributed to every dimension (Vives, 2010; Vives et al., 2015). All these contributions resulted in the final version of EPRES (Table 1).

---

[9]Employment instability 2 items, wages 3 items, rights 7 items, disempowerment 3 items, vulnerability 6 items, exercise of rights 5 items.

	Indicator	Response options
Temporariness	Type and length of contract	0. Permanent 1. Temporary, 1 year or more 2. Temporary, no exact duration 3. Temporary, from 1 year to 6 months 4. Temporary, less than 6 months
	Tenure	0. More than 10 years 1. 5 to 10 years 2. 2 to 5 years 3. 6 months to 2 years 4. Less than 6 months
Wages	Net monthly salary	0. > 2,400 euros 1. 1,500-2,400 euros 2. 750-1,500 euros 3. 450-750 euros 4. < 450 euros
	Your salary covers basic daily needs	0. Always 1. Most of the time
	Your salary covers important unexpected expenses	2. Sometimes 3. Rarely 4. Never
Disempowerment	Setting of working times Setting of salary	0. By collective agreement 1. Agreement within my working team 2. Agreement with my employer 3. By employer 4. Don't know
Vulnerability	You feel afraid to demand better working conditions	
	You feel defenseless against authoritarianism	0. Always
	You would be fired if you didn't do what you are asked to do	1. Most of the time 2. Sometimes 3. Rarely
	You are treated in an authoritarian manner	4. Never
	You are made feel you can be easily replaced	
Rights	Maternity/paternity leave	0. Yes
	Pension	1. No
	Severance pay	2. Don't know
	Unemployment benefits	
Exercise of rights	Weekly holidays	0. Always
	Sick leave	1. Most of the time
	Going to the doctor	2. Sometimes
	Annual holidays	3. Rarely

Day off for family reasons	4. Never
Day off for personal reasons	

Table 1. Structure of the Employment Precariousness Scale (EPRES)

To date, EPRES has been translated, adapted, and empirically validated in other countries. These versions contained additional items or even dimensions, in order to reflect better the contextual reality of each country. For instance, the Chilean version of EPRES (i.e., EPRES-Ch) incorporated an item related to previous spells of unemployment into the "temporariness" dimension and two items related to the provision of insurance and occupational health and safety measures into the "rights" dimension (Vives et al., 2017). As for the Belgian version (i.e., EPRES-Be), the authors included two dimensions: one referring to low employability opportunities and the other to the unpredictability of working times (Vandevenne, 2020; Vanroelen et al., 2021). That is to say that the construct of precarious employment on which EPRES is based (see chapter 3) offers the opportunity to include new items and dimensions to the measure while safeguarding the nature of the construct. As such, EPRES stands out as an insightful approach to be adapted to the EWCS-2015 dataset.

6.2 The European Working Conditions Survey

The European Working Conditions Survey (EWCS) is a cross-sectional survey representative of the population in employment (i.e., having worked for pay or profit at least one hour during the week preceding the interview) living in private households in the countries covered in each wave (Eurofound, 2021). Respondents are thus aged 15 years or older except for respondents living in Bulgaria, Norway, Spain and the UK that are aged 16 years or older due to the minimum legal working age being higher in these countries. Ever since its first wave, fielded in 1990, the EWCS has been conducted quinquennially. In this first wave, 12 countries were covered, i.e., the 12 original European Union (EU) Member States, but this number increased progressively in subsequent waves. The sixth wave, which is the one used in the current thesis and that was fielded in 2015, covered up to 35 countries; namely, the 27 EU Member States, 5 EU-candidate countries (i.e., Albania, Republic of North Macedonia, Montenegro, Servia and Turkey), Norway, Switzerland, and the UK.

The main goal of the EWCS is to provide a comprehensive overview of the working and employment conditions, employment relations and employment-related outcomes of both employees and the self-employed. As such, the questionnaire contains a broad range of items related to these topics, as well as information on demographics, household characteristics and socioeconomic indicators. Although some items change from wave to wave, the survey is homogenized across countries and waves so that cross-national comparisons and time trends can be analyzed meaningfully (Eurofound, 2021).

Focusing on the sixth wave of the EWCS, fielded between February and December 2015, almost 44,000 individuals responded to the survey, the average response rate being of 42.5% (ranging from 10.9% in Sweden to 78% in Albania). To select the sample of this specific wave, a random multi-stage stratified process was followed. In a first stage, country-level samples were stratified by region and degree of urbanization. Primary Sampling Units (PSU) were drawn randomly from the resulting strata with probability proportional to size (PPS). Thereafter, addresses, households or individuals were selected from PSUs using national registers when these were available. In the absence of high-quality registers, addresses were retrieved via enumeration using a random-walk approach. Finally, an eligible individual was drawn from each of the selected households. Unless individual-level registers were available, the selected interviewee was the person in employment whose birthday would be next. The questionnaire was administered face to face at the respondent's home by trained interviewees. In each country, the questionnaire was made available in various languages in order to minimize selection bias (Eurofound, 2017).

7

RESULTS

Paper 1. Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain

Paper 2. Comparing precarious employment across countries: measurement invariance of the Employment Precariousness Scale for Europe (EPRES-E)

Paper 3. Precarious employment and mental health across European welfare states: a gender perspective

Paper 1

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2021). Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain. *Quality & Quantity*, 55 (2), 543-562.

Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain

Abstract

Monitoring precarious employment (PE) is crucial to design and evaluate policies tailored to enhance the quality of employment and to achieve more decent and sustainable labour markets. In that regard, the construction of theory-based multidimensional measurement instruments with data derived from well-established and periodically-conducted surveys stands out as an insightful opportunity to acquire so. Accordingly, this study aims to adapt the Employment Precariousness Scale (EPRES) to the available information in the European Working Conditions Survey VI (EWCS-2015), and to explore the psychometric properties and construct validity of the ensuing instrument, namely EPRES-E, in Spain. 13 items sorted in six dimensions (temporariness, disempowerment, vulnerability, exercise of rights, uncertain working times and wages) shaped the EPRES-E. In a sample of 2442 formal employees residing in Spain, item- and scale-level analyses were performed alongside omega reliability coefficients and confirmatory factor analyses (CFA). The scale exhibited good psychometric properties and reliability ($\omega = 0.80$ for the EPRES-E score and near or above 0.70 for all subscales excepting "exercise of rights"). The factor structure was confirmed by CFA [$\chi2$ (df) $= 530.432$ (58), $p < 0.0001$;

CFI = 0.964; TLI = 0.951; RMSEA (95% CI) = 0.067 (0.062–0.073); all paths statistically significant]. Acceptability, however, was hampered by the large amount of non-response in the "earnings" variables (20.97%). In sum, the EPRES-E constitutes a promising instrument for the measurement of PE over time in Spain. Further studies should explore its comparability in the rest of the countries included in the EWCS as a first step towards the achievement of a European-wide monitoring system of the phenomenon.

1 Introduction

In the midst of the so-called fourth industrial revolution, framed by the perpetual development of neoliberal macroeconomic policies, globalisation processes and ensuing economic recessions, the nature of employment arrangements is changing at an unprecedented pace in post-industrialised societies. In this scenario, precarious employment (PE) is increasingly gaining traction among social, political and academic actors. Because of the central role employment plays in most people's daily life, the potential implications PE might have for crucial aspects such the well being of workers emerge as an issue of concern (Kalleberg 2018). Therefore, the development of monitoring schemes that inform of the prevalence, distribution and evolution of the phenomenon at regional, national and international levels is essential to identify policy entry points that effectively minimise its impact (Benach et al. 2016). To achieve this purpose, three main issues must be attained: first, international agreement on a conceptualisation of PE has to be reached; second, this conceptualisation must derive in a sound operationalisation that allow for collecting reliable and comparable data within and across sites; and third, data must be retrieved systematically to be able to assess the trends at all levels (Benach et al. 2012). These are not straightforward issues, though. On the one hand, the dynamism of labour markets determines the variety of forms PE can take over time, as well as the contexts in which people experience their jobs that are, in turn, shaped by political, socioeconomic, historical and cultural characteristics. Both these aspects influence what is held to be precarious in each territorial reality at a specific time point (Duell

2004; Muñoz-Bustillo et al. 2019). As a consequence, a consensual definition that can be applied for surveillance within and across countries is still absent. On the other hand, harmonized datasets that can be meaningfully compared are not omnipresent (Smits and Van Gyes 2017). Notwithstanding, especially in the European region, there are well-established surveys conducted on a periodic basis and covering a substantial amount of countries that stand out as a unique infrastructure for the monitoring of social phenomena. In the specific case of PE, the European Working Conditions Survey (EWCS) is a great source of information since it gathers data on working and employment conditions, employment relations and employment-related well being outcomes (e.g. job insecurity, job satisfaction, etc.); is fielded every 5 years from its start in 1990; and accounts for a sizeable sample in an increasing number of European countries— up to 37 in the latest wave of 2020 (Eurofound 2020).

Considering all these standpoints, we aim to advance in this field through the proposal of a new multidimensional and theory-based instrument to monitor PE among formal employees. Concretely, we carry out an adaptation of the Employment Precariousness Scale (EPRES) in the sixth wave of the EWCS, which was conducted in 2015 (Eurofound 2017a). We further assess the psychometric properties and construct validity of the ensuing instrument (hereafter, EPRES-E) in Spain, the country where the EPRES was originally designed and validated. Accordingly, the structure of the article is as follows: first, we draw from the existing literature to expose the main challenges of the available PE definitions and operationalisations, and display the solutions that our approach potentially provides for

the monitoring of the phenomenon; second, the development of the EPRES-E is presented, alongside the data set and the studied sample, which is followed by a detailed commentary on the methods applied in this research; third, the obtained results are depicted and, subsequently, discussed; finally, the implications of our findings for future research and policy-making are argued.

2 Background

As it was mentioned briefly in the section above, there is no internationally shared definition of PE. Indeed, not even the term is consensual since it is frequently used interchangeably with related terms such as employment precarity, job and employment quality or decent work (Van Aerden et al. 2014; Lewchuk 2017; Vercruyssen and Van Gyes 2017; ILO 2020a). Broadly, they all stem from the premise that employment should be a source of fair income, personal development, social integration and security on a number of aspects (Rodgers 1989; Standing 2011; Lewchuk 2017; ILO 2020a). Notwithstanding, ever since it was brought into the public discourse back in the 1980s by French sociologists (Barbier 2005), PE has been the term most extensively endorsed by all actors in society, both academic and non-academic (e.g. trade unions, politicians, civil organisations, etc.) (Campbell and Burgess 2018; Bodin et al. 2019). Accordingly, even in the absence of an agreed conceptualisation, some nuances of the concept are widely acknowledged. First, PE envisages the detrimental characteristics of employment relationships, which shape how workers are immersed in their jobs regardless of its specific content (Bodin et al. 2019). Therefore, the

concept focuses on the employment conditions (i.e. circumstances in which a person is engaged in a job or occupation such as the type of contract, wage, etc.) and employment relations (i.e. power relations between buyers and sellers of labour, both as collective and as individual actors), rather than on the nature of the job tasks and its related working conditions (Benach et al. 2013; Muntaner 2016). Second, it has a multidimensional nature (Rodgers 1989) in the sense that multiple adverse features related to different aspects of the employment relationship configure PE, and these do not need to occur simultaneously for a worker to be precarious (Campbell and Burgess 2018). Consequently, PE is theorised to represent a continuum rather than a clear-cut binary division, with employment arrangements displaying no precarious attributes lying in one end, and the most precarious and de-standardized jobs lying in the other (Julià et al. 2017). Third, it is confined to objective employment characteristics since subjective feelings and expectations might emanate from circumstances other than the employment relationship (Gould 1981; Burgess and Campbell 1998).

Drawing from these ideas, in the last decades several efforts stemming from different research fields and national contexts have been put to define and operationalise PE. As a recent systematic review on the topic portrayed, three main dimensions were almost ubiquitous in the identified definitions and operationalizations: employment insecurity, income inadequacy, and lack of rights and social protection (Kreshpaj et al. 2020). This is an insightful stepping-stone for reaching conceptual agreement on what delineates PE at an international level. However, the authors also stated that, in

practice, most of the identified definitions fail to extend its applicability in other countries and labour market conjunctures, restricting the comparison of findings. Further, it is also a striking restriction for the monitoring of PE the difficulty of gathering primary data of these approaches over time. To overcome these limitations, the construction of measures based on a sound theoretical framework with the available information in on-going international labour surveys arises as an engaging opportunity. As a matter of fact, some studies attempting this strategy have already been carried out using, for example, the EWCS (Puig-Barrachina et al. 2014; Matilla-Santander et al. 2020), but it is still a key gap in the literature the conceptual and empirical validation of these instruments. Since the use of secondary data that was not designed for the specific purpose of measuring PE constrains the way the concept is appre- hended, this is strongly required to ensure the theoretical nature of the instrument prevails.

In this article, we aim to add to this strand of research through adapting an already validated tool to measure PE among formal employees (i.e. the EPRES) to the EWCS data, and to test its psychometric properties and construct validity in Spain. To elaborate, the EPRES is a multidimensional scale that goes beyond the three main dimensions of PE identified in the foregoing (Kreshpaj et al. 2020), taking also into account the asymmetrical power relations underlying precarious employment arrangements (Amable 2006; Vives 2010). It does so through the following six dimensions: temporariness (type and duration of contract), low wages, lack of workplace rights, incapacity to exercise them, disempowerment

(level of negotiation of the employment conditions) and vulnerability (defencelessness to workplace authoritarianism). The process to come up with this structure involved, firstly, an extensive literature review followed by interviews with 12 key informants, i.e. experts in interdisciplinary fields such sociology, labour economy or social epidemiology. Thereafter, six focus groups discussions with temporary and permanent workers, and trade unions representa- tives were held (Amable 2006; Vives 2010). Finally, the scale was empirically validated, both among permanent and temporary formal employees in Spain (Vives et al. 2010) and Catalonia (Benach et al. 2015). To date, the EPRES has also been validated in other labour market contexts such Chile's private sector (Vives et al. 2017) and Sweden (Jonsson et al. 2019) so it stands out as an optimal theoretical basis for the objective of constructing a measure that can be used for the international monitoring of PE. However, some considerations must be born in mind as regards its adaptation to the EWCS-2015. First, the EPRES was last revised in 2010 (Vives et al. 2015), in the bosom of the financial and economic crisis that led to significant changes in European labour markets, particularly in Spain. This ever-changing landscape might have set off sources of precariousness neglected in the EPRES that have to be taken into account. An example would be the increasing prevalence of part-time employment (OECD 2019a), which draws the attention towards the employment conditions and relations underlying this particular form of employment, especially in relation to wages. That is, even if part-time employees earn the same hourly wages as their full-time counterparts, the absolute earnings they receive to live with is

substantially lower, prompting their economic dependence on other family or community members or the state (Kalleberg 2000). Moreover, it has also been reported that this form of employment is frequently related to marginal, low-status and low-paid employment (Owen 1978; Fagan et al. 2014), so the relative amount of money they earn for their labour is potentially lower as well (Glauber 2013; European Parliament 2016; Horemans et al. 2016). Likewise, the on-the-rise irregularity of working times led unilaterally by employers should also be apprehended (Tucker 2002), since it limits the workers' control over their personal time hindering a full integration in social life (Cano 2004; O'Carroll 2015; Arlinghaus et al. 2019). Both aspects align with the EPRES theoretical construct in the sense that they stem from the unbalanced power relations and disadvantaged position of employees along the labour process. The second consideration is that the EPRES was designed in the Spanish context. Even though, as stated before, it has also been validated in other countries facing different labour market experiences, in this article we will cautiously examine the psychometric properties and construct validity of the adapted instrument (EPRES-E) only in this country. The rationale underlying this decision lies in the vast amount of contextual factors that must be taken into account to understand how PE deploys in each territorial reality. That being said, limiting the analyses to Spain inherently implies the reduction of these contextual factors, enabling a more straightforward interpretation of the results. Further research, however, should empirically assess the comparability of the EPRES-E in the rest of the countries covered in the EWCS.

100

3 Methods

3.1 Data and study population

Data were derived from the sixth wave of the EWCS (2015), a quinquennially-conducted cross-sectional survey representative of the population in employment residing in the covered European countries (Eurofound 2017a). It garners information on working and employment conditions, employment relations, work-related health, demographics, household characteristics and socioeconomic indicators. As mentioned in the previous section, because the EPRES was devised in the Spanish context, only the subsample of Spain was selected. The sampling followed a random, multi-stage, stratified design and the response rate of the country was of 31.4% (Eurofound 2017a). A total of 3364 individuals aged 16 or older responded to the questionnaire. For the purposes of this study the analyses were restricted to salaried workers with a formal employment contract, therefore excluding the self-employed (n=814) and informal workers (n=84). Employees working in the armed forces (n=9) and people with unknown or non-eligible ages, i.e. 65 or over (n=15) were also excluded. Hence, the final sample under analysis was composed of 2442 individuals.

3.2 Measures

Demographic, occupational and socioeconomic variables were used to describe the sample. These were sex (women, men), age (15–24, 25–34, 35–44, 45–54, 55–64), place of birth (Spain, other), occupational social class (non-manual, manual), and educational

attainment according to the International Standard Classification of Education 2011 (high, medium, low).

3.3 Development of the EPRES-E

Prior to the actual construction of the EPRES-E, we scrutinized the literature both to obtain information on those concepts that might relate to each dimension of the EPRES but that were not featured in its original version (e.g. Vives 2010, p. 268) and, as explained in Sect. 2, to explore other dimensions to be included in the adapted instrument in a top-down strategy. From this process, a new candidate dimension to be incorporated in the EPRES-E emerged, which consisted in the uncertainty of working times triggered by changes unilat- erally imposed by employers (Tucker 2002; Cano 2004; O'Carroll 2015; Arlinghaus et al. 2019). Thereafter, we selected the available items in the EWCS-2015 questionnaire that were conceptually closest to the 6 (+1) EPRES dimensions and built proxy indicators as follows.

- *Temporariness* The temporariness of employment relationships was approached through the type of the employment contract, distinguishing permanent from temporary contracts and, in the latter case, differentiating the duration of it as well (e.g. long-term, short-term, no exact duration). The length of time that workers had been employed in the current organisation was also accounted for, to add a perspective of trajectory to the dimension.

- *Wages* The rewards (in the form of wages) workers receive for selling their labour establish the basis of any employment relationship and, therefore, are a key source of PE. Besides, low or insufficient wages might lead to economic dependence or material deprivation. Therefore, we incorporated both the relative (hourly) and absolute (monthly) wages to take into account these two facets.

- *Disempowerment* This dimension reflects the degree of say workers have over their employment and working conditions, both as individuals and as a collective. To capture it the capacity of workers to set their working times was included, along with the existence of worker representation schemes at the organisation, either in a more formal (trade unions, work councils or similar committees) or informal manner (regular meet- ings in which employees can express themselves about the organisation).

- *Vulnerability* Asymmetrical power relations between employers and employees leave the latter group vulnerable to and undefended from authoritarian behaviours at the workplace. The items selected to reflect it were whether workers were treated fairly at their workplace and whether their bosses respected them.

- *Rights* No items found.

- *Exercise of rights* The incapability of workers to exercise their workplace rights (to which they are entitled by law) is also a sign of the disadvantaged position of employees in relation to employers. This was apprehended through the

scope of workers to take a break and to arrange an hour or two off for personal or family matters.

- *Uncertain working times* This dimension represents the lack of control workers have over their own time, which is at mercy of their employer requirements. This was measured through the degree of regularity of their working time arrangements (whether workers work the same number of hours every day, the same number of hours every week, the same number of days every week, or if they have fixed starting and finishing times), the existence of and previous information on regular changes to these working time arrangements, and the frequency in which workers were required to come into work at short notice.

More details of these 14 indicators are shown in Table 1. Content analysis of this pro- posed structure was discussed in three focus groups conducted between December 2018 and March 2019, with experts in interdisciplinary fields such as sociology, labour economics, social epidemiology and public health. These confirmed both the suggested dimensions and the placement of the items within them.

In relation to the response scales of the items, they consist of 3, 4 or 5-point frequency or ordinal scales, with scores recoded so that higher ones correspond to more precarious situations and, therefore, can be quantitatively added up in a scale (Table 1). Sticking with the EPRES computation procedure, equal weights were given to every component of the instrument. Accordingly, subscale scores are simple averages of the items transformed into a 0–100 scale, and the

overall score is the arithmetic mean of the six subscale scores, ranging again from 0 to 100.

3.4 Statistical analyses

Item descriptive statistics were analysed, including mean and standard deviations (SD), response frequencies, acceptability (percentage of missing values), and inter-item poly- choric correlations within each dimension. The latter addressed the extent to which items are measuring the same construct (internal consistency) if correlations were equal or above 0.3 and redundancy if they were above 0.7 (Boyle 1991). Additionally, item-subscale polychoric correlations were explored to further test internal consistency and item discriminant validity (whether items are measuring concepts other than the hypothesised ones). These were corrected for overlap, meaning that items were removed from its dimension for correlation. Results emerging from this analytical stage were discussed in a focus group encompassing participants that took part in the three previous ones, which was held in May 2019.

In a second stage, construct validity was evaluated through confirmatory factor analysis (CFA), a highly recommended method for use when the scale to be examined has an already defined structure (Brown 2006). In more operative terms, CFA assesses the fit of a theorised measurement model to the data (Preedy and Watson 2009). The six-dimensional structure with 14 proxy indicators was tested alongside other plausible alternative models, emerged after the exploration of item descriptive statistics and that were discussed in

the last focus group mentioned in the foregoing. Because of the ordinal nature of the variables, the diagonal weighted least squares estimation (DWLS) method with polychoric correlaions was used to estimate the model parameters taking into account every response option (Muthén 1984; Yang-Wallentin et al. 2010). Latent factors were standardised (constrain- ing them to have a mean of 0 and a variance of 1) to allow free estimation of all factor loadings. To evaluate the adequacy of the models, the following standard goodness-of-fit indices were referred to Hooper et al. (2008) and Kline (2010): (a) the $\chi 2$ statistic and the associated degrees of freedom and p value, a measure that tests the absolute discrepancy between the observed and predicted covariance matrices (the smaller the statistic's value the better the fit); (b) the comparative fit index (CFI), an incremental fit index that estimates the differences between the proposed and the independent or null model (a cut-off value above 0.90 was set for acceptance); (c) the Tucker Lewis index (TLI), another incremental fit index that includes penalties for adding freely estimated parameters that do not improve the fit of the model (cut-off value also above 0.90); and (d) the root mean square error approximation (RMSEA) and its 95% confidence interval (CI), a parsimony-adjusted index of the discrepancy of the proposed model from the data per degree of freedom (values below 0.08 were considered indicative of adequate fit). Note that, while the $\chi 2$ statistic was reported for each model (Kline 2010), it was not relied upon to determine the models' fit if it disproved the other indices because of its n-related shortcomings (Goffin and Jackson 1988).

Finally, scale descriptive statistics were performed, exploring the mean and SD, acceptability, observed score range, floor and ceiling effects (more than 15% of the sample achieving, respectively, the minimum or the maximum score) and internal consistency reliability through the omega coefficient (homogeneity of the items taking into account the structure of the scale) (Raykov 2001).

Descriptive statistics were computed for the entire sample, whereas only complete cases were subjected to CFA. All the analyses were conducted using Stata 13.0 (StataCorp 2013) except for CFA and omega coefficients, which were performed using the lavaan and sem-Tools packages in the R version 3.5.3 (R Core Team 2017).

4 Results

Characteristics of the sample are shown in Table 2. As observed, 49.22% of the sample were women, 57.50% were middle-aged (36–55 years old), 89.39% were born in Spain, more than two-thirds had a non-manual job, and a quarter were low educated.

Regarding item descriptive statistics (Supplementary material, Tables 1, 2), there was a small proportion of non-response (<3%) for all items but "net earnings per month" and "net earnings per hour", which were of 20.97%. The "earnings" variable was also problematic in the original and the Chilean version of the EPRES (Amable 2006; Vives et al. 2010, 2015, 2017; Benach et al. 2015) albeit in a lower degree. All response options were used in all items but with varying response distributions. These variations, especially if occurred within dimensions (e.g. vulnerability), contributed to better measure the full

range of the concept, therefore increasing content validity (Ware and Gandek 1998). However, the highly skewed response distribution of "working times setting" suggests that its response options might not adequately capture the country's labour market scenario. Item means and their SD were rather dissimilar, which is not unexpected given that some items measure more extreme situations that should, consequently, be less frequent than others (e.g. "respect of boss" versus "the scope to take a break"). Looking into inter-item correlations within dimensions we observed some redundancy between "type of contract" and "tenure" ($r=0.756$), and low internal consistency between "working times setting" and the other two items of its dimension ($r=0.083$ with "trade unions" and 0.139 with "meetings"). Item-subscale correlations indicated that all items measure the intended concept as they correlated better, and mostly in a substantial degree, with their hypothesised dimen- sion than with the others. An exception was, again, "working times setting" that showed a low correlation with "disempowerment" ($r=0.152$), and "trade unions" that showed a slightly higher correlation with "temporariness" ($r=0.413$) and "wages" ($r=0.395$) than "disempowerment" ($r=0.389$).

Discussion of these results in the focus group encouraged the omission of "working times setting" because of its poor psychometric performance. Further, a suggestion was made to correlate the dimensions "vulnerability" and "exercise of rights", since the two items composing each of them showed similar correlations with each of the two dimensions ($r\sim0.4$) that were, in turn, higher than those with the other dimensions ($r<0.2$). From a methodological point of

view, this relationship was also observed in the original, the Chilean and the Swedish version of the EPRES (Amable 2006; Vives et al. 2010, 2017; Jonsson et al. 2019). As from a conceptual point of view, both dimensions were devised to capture the unbalanced power relations between employers and employees (Amable 2006; Vives 2010), so this was not considered to jeopardize the theoretical nature of the EPRES-E. Accordingly, the following models were subjected to CFA: (A) the original proposed model with 14 items; (B) model A without the item "working times setting"; (C) model A permitting the correlation between "vulnerabil- ity" and "exercise of rights"; and (D) a combination of models B and C. Goodness-of-fit indices of these four models are shown in Table 3. Model D was the best fitting model [$\chi 2$ (df): 530.432 (58), p<0.0001; CFI=0.964; TLI=0.951; RMSEA (95%CI)=0.067(0.062–0.073)], upholding the poor empirical performance of "working times settings". All of the freely estimated parameters in this model, displayed in Fig. 1, were statistically significant (p<0.001). Factor loading estimates revealed that all items were strongly related to their theorised dimensions (R2 ranging from 0.42 to 0.86). In a higher order, "temporariness", "disempowerment" and "wages" were more strongly related to the overarching PE factor than the other dimensions. As for the correlation estimate, it confirmed the substantial relationship between "vulnerability" and "exercise of rights" (r=0.59).

Scale descriptive statistics of model D are displayed in Table 4. Mean scores ranged from 15.38 (uncertain working times) to 56.97 (wages) across dimensions, with an overall mean of 32.48. Further, the hypothesised score range (0–100) was fully covered in all

dimensions, and almost covered in the overall EPRES-E score (0–87.5). The proportion of non-response in the overall score was considerably high (26.62%), mostly due to the large amount of non-response in wages (20.97%). It was rather low for all the other dimensions (<3%). Floor effects were present in "vulnerability" (43.83%), "uncertain working times" (42.72%), "disempowerment" (32.69%) and "temporariness" (32.60%), and no ceiling effects appeared; both effects were negligible in the overall EPRES-E score. Notably, in the case of "vulnerability" and "temporariness", these results reproduce those obtained in the original and the Chilean version of the EPRES (Vives et al. 2010, 2015, 2017). The scale's omega coefficient was of 0.80 (over the 0.70 cut-off value for comparing groups) and the ones for the dimensions were above or very close to this value except for "exercise of rights" ($\omega=0.54$). The latter is consistent with item-subscale correlations, the lowest being found within this dimension ($r=0.373$).

To end with, although it was not the focus of this research, measurement invariance across the two genders was tested by means of multiple-group CFA (Kim and Yoon 2011). Threshold invariance (the highest degree of invariance to be attained in models with ordinal variables) was held in the latter analyses (not shown), meaning that the model is understood and responded to in the same way across genders (Chen 2008). This indicates that EPRES-E scores can be meaningfully compared between women and men.

5 Discussion

In this study we adapted the EPRES, a multidimensional scale to measure PE among formal employees, to the available information in the EWCS-2015. Whereas several other indices addressing the same or similar concepts (such the poor quality of jobs or employment arrangements) have been developed using this data source (e.g. Green and Mostafa 2012; Puig-Barrachina et al. 2014; Vercruyssen and Van Gyes 2017; Eurofound 2017b; Matilla-Santander et al. 2020) this is, to our knowledge, the first one to have its construct validity and psychometric properties examined. Accordingly, the theorised structure of the EPRES-E with 13 items sorted in six dimensions (temporariness, disempowerment, vulnerability, exercise of rights, uncertain working times and wages) demonstrated to be solid both in terms of construct validity and reliability among formal employees in Spain. Acceptability, however, was hampered by the large amount of non-response in the "earnings" item, used to build the proxy indicators "net earnings per month" and "net earnings per hour".

Certainly, differences with the original EPRES turn up. First, the "rights" dimension was omitted. This was not considered to have substantial implications for the content validity of the scale given the following: the dimension was devised to apprehend the protection of employees in the usage of workforce in terms of legislation (Amable 2006; Vives 2010) but, in the Spanish labour market and institutional realm (as in most European countries), the type and length of the employment contract entitle workers to these legal rights and non-wage benefits. Consequently, among workers with an employment

contract, it is the incapability to exercise these rights what reveals the genuine powerlessness of precarious employees over the labour process. For that reason, "temporariness" and "exercise of rights" were deemed sufficient to capture this source of precariousness. In contrast, "uncertain working times", which reflects (the lack of) employee's control over their working schedule, was introduced. As it was asserted above, this dimension relates to the asymmetrical employment power relations also assessed by "disempowerment", "vulnerability" or "exercise of rights". Notwithstanding, unforeseeable working times limit the capacity of workers to plan for their daily lives, thus the dimension covers a social component of PE that was neglected in the EPRES (Porthé et al. 2010; Arlinghaus et al. 2019). Second, the item "working times setting" was excluded because of its poor descriptive statistics and CFA results. This contraposition to the acceptable performance of its homologue in the EPRES might be due to the EWCS' response options, locating the process of setting working times at the individual level (see Table 1). In most European countries, an automatic, generally binding rule compels companies to meet the currently applicable (sectorial) collective agreements, which cover a broad range of issues such operational hours and working times (Anxo and O'Reilly 2000; Köhler and Jiménez-Calleja 2017). Accordingly, the negotiation over this issue mostly occurs beyond the employer-employee sphere, at a collective level that is not represented in the response options. Third, "net earnings per hour" was incorporated in "wages" to complement the information provided by "net earnings per month". The rationale of the decision was that absolute (monthly) earnings determine the

material consequences of precarious employment in terms of economic dependence on employment and risk of material deprivation, a crucial feature to be apprehended in the scale (Rodgers 1989; Amable 2006). Nonetheless, accounting for the num- ber of hours worked reveals the actual pay workers receive for their human capital, which is the basis of the employment relationship (Bowles and Edwards 1985) and profoundly intervenes in determining people's position in the social hierarchy (Clark 2014). Despite these differences from the EPRES, CFA confirmed that both the theorised six-dimensional structure and the placement of items within dimensions fitted the data well, providing an empirical basis for its use to assess PE among the salaried workforce in Spain. Further, it is also remarkable to emphasise the similarities between the EPRES-E and the EPRES (e.g. relationship between "vulnerability" and "exercise of rights", floor effects of "temporariness" and "vulnerability" even though the proxy indicators of the "vulnerability" were substantially different, etc.), which reinforce the construct validity of the EPRES-E.

As regards the psychometric properties of the adapted instrument, they are mostly solid except for two specific issues. First, four dimensions showed meaningful floor effects. In the case of "temporariness", as it happened in the original version of the EPRES, it highlights the need to enlarge the scope of the dimension to employment instability features that apply to permanent workers such previous unemployment (Vives et al. 2010). The items that assemble "vulnerability", on the other hand, do not capture mild vulnerabilities at the workplace but portray rather extreme situations

(disrespectful bosses or unfair treatment). The high floor effect in "uncertain working times" might relate to the aforementioned role of collective agreements in the contention of employer-led working times irregularity. The inclusion of other aspects not considered in the questionnaire such unscheduled extra hours (Peetz et al. 2003) would potentially overcome this point. As for "disempowerment", it could be driven by the wording of the items focusing on the existence of but not on the participation in collective bargaining schemes. This is particularly relevant in the Spanish-specific context of industrial relations, characterised by low union membership despite the high participation in work council elections (Beneyto et al. 2016; Köhler and Jiménez-Calleja 2017). Again, incorporating additional features to the dimen- sion such grievance procedures (Cook 1998) or protection against unacceptable working practices (Tucker 2002), or rewording the response options of "working times setting" so that they better capture collective agreements would be recommended. The second issue relates to the high percentage of missing values in the "earnings" variables, which challenged the good acceptability of the EPRES-E. Income non-response is rather frequent in survey research, and it has been demonstrated that any non-random error associated with socioeconomic variability in this pattern is unlikely to significantly affect the relationship between income and health, for instance (Turrell 2000). However, it is still a cause for concern and future studies harnessing the EPRES-E should carefully explore potential techniques to deal with missing data. Finally, reliability proved to be adequate as the overall omega coefficient was of 0.80 and those of the dimensions were all near or above the 0.70 cut-off

value. Considering the low number of items in each dimension, this is especially supportive of the good psychometric properties of the scale. Notwithstanding, "exercise of rights" would profit from additional items inquiring a broader range of benefits that formal salaried workers are entitled to, e.g. sick leave, vacation... (Porthé et al. 2010).

This study has a number of limitations that need to be acknowledged. First, as it has been depicted throughout the article, the closed nature of the questionnaire constrains both the theoretical concepts approached in the EPRES-E and the way to approach them. That is, some of them are measured through proxy indicators and some of them cannot even be assessed (e.g. the "rights" dimension). Further, the rewording of items showing poor psychometric properties and the incorporation of new items in future editions of the survey can be suggested but not ensured, conferring small room for improvement. Despite these restrictions, the benefits of using a periodically conducted survey (hence enabling the availability of information over time) that covers a large and rising amount of countries compensate them by far. Further, results presented in this article reveal the conceptual and empirical strengths of the EPRES-E, standing out as an unprecedented instrument to measure PE. Second, the scale does not encapsulate other forms of employment lacking a formal contract also deemed precarious, such as informal employment or some forms of self-employment (Gevaert et al. 2018; Julià et al. 2019; ILO 2020b). However, since the main aim of this research was to develop an instrument conceptually homologue to the EPRES, the existence of a formal employment relationship whose

duration and degree of protection are made explicit in an employment contract was inherently assumed (Vives et al. 2010). That is, the representation of these forms of employment exceeds the scope of the article. Third, equally weighting every component in the scale is a choice not exempted of debate. However, CFA results of this study (i.e. "temporariness", "disempowerment" and "wages" presenting a stronger relationship with the higher-order PE factor, see Fig. 1) contrast with the ones obtained in the qualitative phase of the EPRES development, where "vulnerability" and "exercise of rights" were proposed to have the highest weights whereas "temporariness" was suggested to have the lowest (Vives 2010, p. 123). Given this lack of gold standard in the allocation of more specific weights, we cautiously decided to pro- ceed with equal-weighting (Nardo et al. 2008). Future studies should explore the poten- tial implications each dimension has for the experience of PE to establish an alternative weighting procedure. Finally, the target population of the survey was people in employment according to the International Labour Organization definition: if they had worked for pay or profits for at least an hour in the week preceding the interview. Workers with a very short tenure, i.e. <1 month, might produce unreliable measures because of the short exposure to their employment conditions and workplace power relations. This information was not available in the EWCS data since "tenure" is measured in years. Notwithstanding, the mean percentage of workers with <3 months tenure was of 6.29% in Spain that year (INE 2019) so we are confident this does not endanger our results.

Regardless of these shortcomings, the EPRES-E constitutes a promising contribution to the existing strands of research addressing the monitoring of PE with a multidimen- sional approach. On the one hand, it has a sound theoretical basis, validated for its use in highly different labour market realities such Spain, Chile's private sector and Sweden. On the other hand, the use of a European-wide consolidated survey that is conducted quinquennially as data source opens up the possibility to study PE over time and across countries. This is strikingly important as the existing European monitoring schemes that enable cross-national comparisons are based on a few number of indicators such unemployment or temporary employment (Puig-Barrachina et al. 2011), over-simplifying the broader picture of employment conditions and relations. Accordingly, even though the applicability of the EPRES-E is limited to Spain and results cannot be generalized to other European countries yet, it represents a first step towards the achievement of a European-wide surveillance system of PE that provides researchers and policy-makers with sensitive information on the impact of employment policies on well being, a key issue for the reduction of employment-related inequalities and for working towards more decent and sustainable employment (Benach et al. 2012). Future research should therefore address the comparability of the EPRES-E in the other countries covered by the EWCS.

Acknowledgements

References

Amable M (2006) *La precariedad laboral y su impacto sobre la salud. Un estudio en trabajadores asalariados en España*. PhD dissertation. Barcelona: Universitat Pompeu Fabra

Anxo D, & O'Reilly J (2000) Working-time regimes and transitions in comparative perspective. In O'Reilly J Cebrián I & Lallement M (eds) *Working time changes: Social integration through transitional labour markets*. (pp. 61-90). Cheltenham: Edward Elgar, 61-90

Arlinghaus A, Bohle P, Iskra-Golec I, Jansen N, Jay S, & Rotenberg L (2019) Working Time Society consensus statements: Evidence-based effects of shift work and non-standard working hours on workers, family and community. *Industrial health* 57(3): 184-200

Barbier JC (2005) La précarité, una catégorie française à l'épreuve de la comparaison internationale. *Revue Française de Sociologie* 46(2): 351-371

Benach J, Puig-Barrachina V, Vives A, Tarafa G, & Muntaner C (2012) The challenge of monitoring employment-related health inequalities. *Journal of Epidemiology and Community Health* 66(12): 1085-1087

Benach J, Muntaner C, Solar O, Santana V, Quinlan M, & EMCONET (2013) *Employment, Work and Health Inequalities: A Global Perspective.* Barcelona: Icaria.

Benach J, Julià M, Tarafa G, Mir J, Molinero E, & Vives A (2015) [Multidimensional measurement of precarious employment:

social distribution and its association with health in Catalonia (Spain)]. *Gaceta Sanitaria* 29(5): 375-378

Benach J, Vives A, Tarafa G, Delclos C, & Muntaner C (2016) What should we know about precarious employment and health in 2025? Framing the agenda for the next decade of research. *International Journal of Epidemiology* 45(1): 232-238

Beneyto PJ, Alós R, Jódar P, & Vidal S (2016) La afiliación sindical en la crisis. Estructura, evolución y trayectoria. *Sociología del trabajo, nueva época* 87: 25-44

Bodin T, Çağlayan Ç, Garde AH, Gnesi M, Jonsson J, Kiran S, Kreshpaj B, Leinonen T, Mehlum IS, Nena E, Orellana C, Peckham T, Seixas N, Vanroelen C, & Julià M (2019) Precarious employment in occupational health – an OMEGA-NET working group position paper. *Scand J Work Environ Health – online first* doi: 10.5271/sjweh.3860

Bowles S, & Edwards R (1985) *Understanding capitalism. Competition, command and change in the US economy*. New York: Harper and Row Publishers.

Boyle GJ (1991) Does item homogeneity indicate internal consistency or item redundancy in psychometric scales? *Personality & Individual Differences* 12(3): 291-294

Brown C (2006) *Confirmatory Factor Analysis for Applied Research*. New York: Guilford.

Burgess J, & Campbell I (1998) The nature and dimensions of precarious employment in Australia. *Labour & Industry* 8(3): 5-21

Campbell I, & Burgess J (2018) Patchy progress? Two decades of research on precariousness and precarious work in Australia. *Labour & Industry: A Journal of the Social and Economic Relations of Work* 28(1): 48-67

Cano E (2004) Formas, percepciones y consecuencias de la precariedad. *Mientras Tanto* 93: 67-81

Chen FF (2008) What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology* 95(5): 1005

Clark EM (2014) Sociological theories of low-wage work. *Journal of human behavior in the social environment* 24(1): 38-50

Cook J (1998) Flexible employment: Implications for gender and citizenship in the European Union. *New Political Economy* 3(2): 261-277

Duell N (2004) *Defining and assessing precarious employment in Europe: A review of main studies and survey*. Munich: Economic Research & Consulting.

Eurofound (2017a) European Working Conditions Survey 2015 Technical Report. Retrieved 24 June 2019 (https://www.eurofound.europa.eu/sites/default/files/ef_survey/field_ef_documents/6th_ewcs_-_technical_report.pdf).

Eurofound (2017b) *Sixth European Working Conditions Survey – Overview report (2017 update)*. Luxembourg: Publications Office of the European Union.

Eurofound (2020) *European Working Conditions Survey*. Retrieved 27 Feb 2020

(https://www.eurofound.europa.eu/es/surveys/european-working-conditions-surveys-ewcs)

European Parliament (2016) *Precarious employment in Europe. Part 1: Patterns, trends and policy strategy*. Brussels: Policy Department A.

Fagan C, Norman H, Smith M, & González-Menéndez M (2014) *In search of good quality part-time employment*. Geneva: International Labour Organization.

Gevaert J, De Moortel D, & Vanroelen C (2018) Does employment status matter for job quality? Working Paper. In Eiffe F, Parent-Thirion A, & Biletta A (eds) *Employment status and job quality*. Brussels: Publications Office of the European Union.

Glauber RK (2013) *Wanting more but working less: involuntary part-time employment and economic vulnerability*. New Hampshire: The Carsey School of Public Policy Repository, 199-205

Goffin RD, & Jackson DN (1988) The structural validity of the index of organizational reactions. *Multivariate Behavioral Research* 23: 327-347

Gould SJ (1981) *The mismeasure of man*. New York: Norton & Company.

Green F, & Mostafa T (2012) *Trends in Job Quality in Europe: A Report Based on the Fifth European Working Conditions Survey*. Luxembourg: Publications Office of the European Union.

Hooper D, Coughlan J, & Mullen M (2008) Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic*

Journal on Bussiness Research Methods 6: 53-60

Horemans J, Marx I, & Nolan B (2016) Hanging in, but only just: Part-time employment and in-work poverty throughout the crisis. *IZA Journal of European Labor Studies* 5(1): 5-19

Instituto Nacional de Estadística (2019) *Encuesta de Población Activa*. Retrieved 18 June 2019 (http://www.ine.es).

International Labor Organization (2020a) *Decent Work*. Retrieved 4 Mar 2020 (https://www.ilo.org/global/topics/decent-work/lang--en/index.htm).

International Labor Organization (2020b) Employment in the informal economy. *Key Indicators of the Labour Market (KILM).* Retrieved 4 Mar 2020 (http://kilm.ilo.org).

Jonsson J, Vives A, Benach J, Kjellberg K, Selander J, Johansson G & Bodin T (2019) Measuring precarious employment in Sweden: translation, adaptation and psychometric properties of the Employment Precariousness Scale (EPRES). *BMJ Open* 9: e029577

Julià M, Vives A, Tarafa G, & Benach J (2017) Changing the way we understand precarious employment and health: Precarisation affects the entire salaried population. *Safety science* 100: 66-73

Julià M, Belvis F, Vives A, Tarafa G, & Benach J (2019) Informal employees in the European Union: working conditions, employment precariousness and health. *Journal of Public Health* 41(2): 141-151

Kalleberg A (2000) Non-standard Employment Relations: Part-time, Temporary and Contract Work. *Annual Reviews of Sociology*

26: 341-365

Kalleberg A (2018) *Precarious lives: Job insecurity and well-being in rich democracies*. Cambridge: Polity Press.

Kim ES, & Yoon M (2011) Testing measurement invariance: A comparison of multiple-group categorical CFA and IRT. *Structural Equation Modeling* 18: 212-228

Kline RB (2010) *Principles and practice of structural equation modeling*. (3rd Ed). New York: Guildford Press.

Köhler HD, & Jiménez-Calleja JP (2017) Spain: a peripheral economy and a vulnerable trade union movement. In Lehndorff S, Dribbusch H, & Schulten T (eds) *Rough waters – European trade unions in a time of crises*. Brussels: ETUI, 65-83

Kreshpaj B, Orellana C, Burström B, Davis L, Hemmingsson T, Johansson G, Kjellberg K, Jonsson J, Wegman DH, & Bodin T (2020) What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. *Scand J Work Environ Health – online first* doi: 10.5271/sjweh.3875

Lewchuk W (2017) Precarious jobs: Where are they, and how do they affect well-being? *The Economic and Labour Relations Review* 28(3): 402–419

Matilla-Santander N, Martín-Sánchez JC, González-Marrón A, Cartanyà-Hueso A, Lidón-Moyano C, & Martínez-Sánchez JM (2020) Precarious employment, unemployment and their association with health-related outcomes in 35 European countries: a cross-sectional study. *Critical Public Health* doi: 10.1080/09581596.2019.1701183

Muntaner C (2016) Global precarious employment and health inequalities: working conditions, social class, or precariat? *Cad Saúde Pública* 32:e00162215

Muñoz-Bustillo R, Fernández-Macías E, Antón JI, & Esteve F (2009) *Indicators of job quality in the European Union*. Brussels: European Parliament.

Muthén B (1984) A general structural equation model with dichotomous, ordered categorical and continuous latent variable indicators. *Psychometrika* 49(1): 115-132

Nardo M, Saisana M, Saltelli A, Tarantola S, Hoffman A, & Giovannini E (2008) *Handbook on Constructing Composite Indicators: Methodology and User Guide*. OECD publishing.

O'Carroll A (2015) *Working Time, Knowledge Work and Post-Industrial Society: Unpredictable Work*. New York: Palgrave Macmillan.

OECD (2019a) *Temporary employment (indicator)*. Retrieved 17 June 2019 (https://doi.org/10.1787/75589b8a-en)

OECD (2019b) *Wage levels (indicator)*. Retrieved 17 June 2019 (https://doi.org/10.1787/0a1c27bc-en)

Owen JD (1978) Why part-time workers tend to be in low-wage jobs? *Monthly Lab Rev* 101:11

Peetz D, Townsend K, Russell B, Houghton C, Allan C, & Fox A (2003) Race against time: Extended hours in Australia. *Australian Bulletin of Labour* 29(2): 126-143

Porthé V, Ahonen E, Vazquez ML, Pope C, Agudelo AA, Garcia AM, et al. (2010) Extending a model of precarious employment: A qualitative study of immigrant workers in

Spain. *American Journal of Industrial Medicine* 53(4): 417-424

Preedy VR, & Watson RR (2009) *Handbook of Disease Burdens and Quality of Life Measures.* New York: Springer.

Puig-Barrachina V, Malmusi D, Martinez JM, & Benach J (2011) Monitoring social determinants of health inequalities: the impact of unemployment among vulnerable groups. *International Journal of Health Services* 41: 459-482

Puig-Barrachina V, Vanroelen C, Vives A, Martínez JM, Muntaner C, Levecque K, et al. (2014) Measuring employment precariousness in the European Working Conditions Survey: the social distribution in Europe. *Work* 49(1): 143-161

R Core Team (2017) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Retrieved 15 June 2019 (https://www.R-project.org/).

Raykov T (2001) Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. *British Journal of Mathematical and Statistical Psychology* 54(2): 315-323

Rodgers G (1989) Precarious Work in Western Europe. In Rodgers G, & Rodgers J (eds) *Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe*. Geneva: International Institute for Labour Studies, 1-16

Smits I, & Van Gyes G (2017) *Deliverable 21.4: European Measurement of Working Conditions and Related Policies:*

Inventory and Assessment of Available Data Tools. Leuven: FP7 InGRID project.

Standing G (2011) *The Precariat: The New Dangerous Class*. London: Bloomsbury Academic.

StataCorp (2013) *Stata Statistical Software: Release 13*. Texas: Stata Press College Station.

Tucker D (2002) *'Precarious' non-standard employment – A review of the literature*. Working Paper. New Zealand: Labour Market Policy Group, Department of Labour.

Turrell G (2000). Income non-reporting: implications for health inequalities research. *Journal of Epidemiology and Community Health* 54: 207-214

Van Aerden A, Moors G, Levecque K, & Vanroelen C (2014) Measuring Employment Arrangements in the European Labour Force: A Typological Approach. *Soc Indic Res* 116: 771-791

Vercruyssen A, & Van Gyes G (2017) *Measuring job quality with EWCS data: towards an international standard for scale construction with EWCS 2010* (working paper M21.13a). Leuven: InGRID.

Vives A (2010) *A multidimensional approach to precarious employment: measurement, association with poor mental health and prevalence in the Spanish workforce.* PhD dissertation. Barcelona: Universitat Pompeu Fabra.

Vives A, Amable M, Ferrer M, Moncada S, Llorens C, Muntaner C, et al. (2010) The Employment Precariousness Scale (EPRES): psychometric properties of a new tool for epidemiological

studies among waged and salaried workers. *Occupational & Environmental Medicine* 67(8): 548-555

Vives A, González F, Moncada S, Llorens S, & Benach J (2015) Measuring precarious employment in times of crisis: the revised Employment Precariousness Scale (EPRES) in Spain. *Gaceta Sanitaria* 29(5): 379-382

Vives A, González-López F, Solar O, Bernales-Baskai P, González MJ, & Benach J (2017) Precarious employment in Chile: psychometric properties of the chilean version of Employment Precariousness Scale in private sector workers. *Cuadernos de Saude Publica* 33: e00156215

Ware JE, & Gandek G (1998) Methods for testing data quality, scaling assumptions, and reliability: The IQOLA project approach. *Journal of Clinical Epidemiology* 51(11): 945-952

Yang-Wallentin F, Jöreskog KG, & Luo H (2010) Confirmatory Factor Analysis of Ordinal Variables With Misspecified Models. *Structural Equation Modeling: A Multidisciplinary Journal* 17(3): 392-423

Figures and tables

Figure 1. Factor structure of the EPRES-E (Spain, European Working Conditions Survey 2015).
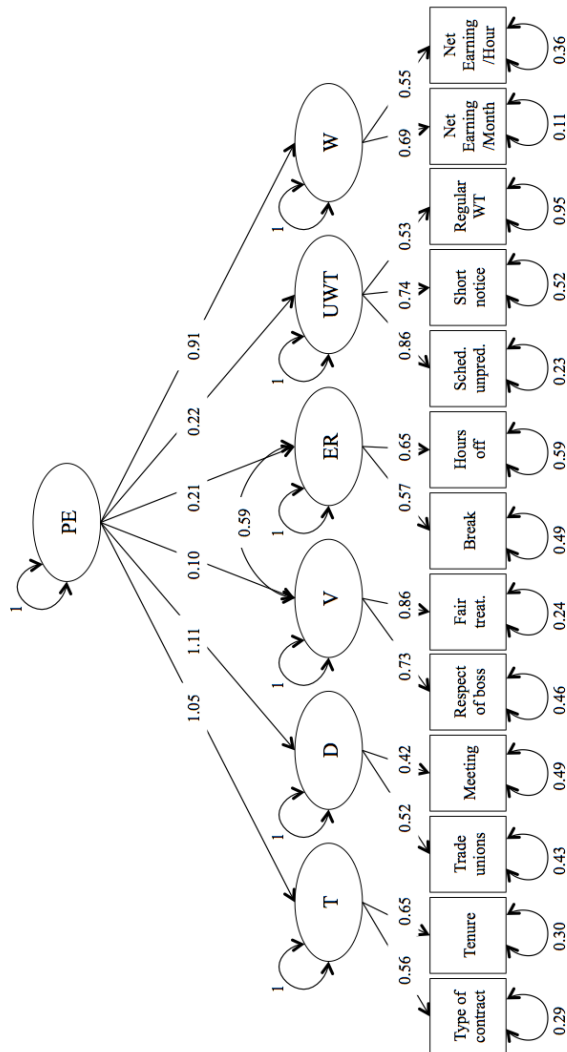
EPRES-E: Employment Precariousness Scale in the European Working Conditions Survey; PE: Precarious Employment; T: Temporariness; D: Disempowerment; V: Vulnerability; ER: Exercise of rights; UWT: Uncertain Working Times; W: Wages; Fair treat: fair treatment; Sched. unpred.: schedule unpredictability; WT: working times.

Table 1. Operationalization of the proposed EPRES-E structure.

	Indicator	Operationalisation	Response options
Temporariness	Duration of current contract	Combination of: a) what type of contract do you have; b) what is the duration of your current contract?	0. Permanent contract 1. Temporary contract, short duration 2. Temporary contract, long duration
	Tenure	How many years have you been in your company or organization?	0. More than 5 years 1. 3 to 5 years 2. 1 to 3 years 3. Less than 1 year
Disempowerment	Working times setting[a]	How are your working time arrangements set?	0. Entirely determined by yourself 1. You can adapt it within certain limits 2. You can choose between fixed working schedules determined by the organization 3. They are set by the company with no possibility for changes
	Trade unions	Does a trade union, works council or a similar committee representing employees exist at your organization?	0. Yes 1. No 2. Don't know
	Meetings	Does a regular meeting in which employees can express their views about what is happening in the organization exist at your organization?	0. Yes 1. No 2. Don't know
Vulnerability	Respect of boss	Your immediate boss respects you as a person	0. Strongly agree 1. Tend to agree 2. Neither agree nor disagree 3. Tend to disagree 4. Strongly disagree
	Fair treatment	You are treated fairly at your workplace	0. Always 1. Most of the time 2. Sometimes 3. Rarely or never
Exercise of rights	Break when you need it	You can take a break when you wish	0. Always 1. Most of the time 2. Sometimes 3. Rarely 4. Never

	Hours off for personal matters	Would you say that for you arranging to take an hour or two off during working hours to take care of personal or family matters is…	0. Very easy 1. Fairly easy 2. Fairly difficult 3. Very difficult
Unpredictability of working times	Schedule unpredic-tability	Do changes to your working time arrangements occur regularly? If yes, how long before are you informed about these changes?	0. No 1. Yes, several weeks in advance 2. Yes, several days in advance 3. Yes, the day before 4. Yes, the same day
	Work at short notice	How often have you been requested to come into work at short notice?	0. Never 1. Less often 2. Several times a month 3. Several times a week or daily
	Working times regularity	Combination of: do you work a) the same number of hours every day; b) the same number of days every week; c) the same number of hours every week; d) fixed starting and finishing times?	0. Very high (yes on all) 1. High (no on at least one) 2. Medium (no on at least two) 3. Low (no on at least three) 4. Very low (no on all)
Wages	Net earnings per month	Net monthly earnings from your main paid job	0. High earnings (above the median) 1. Medium-low earnings (between low earnings and the median) 3. Low earnings (less than 0.6 of the median population)
	Net earnings per hour	Net hourly earnings from your main paid job	0. High earnings (above the median) 1. Medium-low earnings (between low earnings and the median) 3. Low earnings (less than 0.6 of the median population)

EPRES-E: Employment Precariousness Scale in the European Working Conditions Survey; [a]Item discarded after further analysis.

Table 2. Sample description (Spain, European Working Conditions Survey 2015).

		N	(%)
Sex	Women	1,202	49.22
	Men	1,240	50.78
Age	16 to 25	202	8.27
	26 to 35	567	23.22
	36 to 45	806	33.01
	46 to 55	598	24.49
	56 to 64	269	11.02
Place of birth	Spain	2,182	89.39
	Other	259	10.61
Occupational social class	Non-manual	1,629	66.71
	Manual	813	33.29
Educational attainment	High	750	30.80
	Medium	1,064	43.70
	Low	621	25.50

Table 3. Goodness-of-fit indices from Confirmatory Factor Analyses (Spain, European Working Conditions Survey 2015).

	χ^2	df	p-value χ^2	CFI	TLI	RMSEA (95% CI)
Model A	1360.953	71	<0.0001	0.903*	0.876	0.101 (0.096-0.106)
Model B	1086.246	59	<0.0001	0.921*	0.895	0.099 (0.094-0.104)
Model C	830.650	70	<0.0001	0.943*	0.926*	0.078 (0.073-0.083)
Model D	530.432	58	<0.0001	0.964*	0.951*	0.067 (0.062-0.073)*

Model A: 14 items, no correlations; Model B: 13 items, no correlations; Model C: 14 items, correlation between Vulnerability and Exercise of Rights; Model D: 13 items, correlation between Vulnerability and Exercise of Rights; df: degrees of freedom; CFI: Comparative Fit Index; TLI: Tucker Lewis Index; RMSEA: Root Mean Square Error of Approximation; CI: Confidence Interval; *Acceptable according to specified cut-off values (χ^2 not significant, the lower the better; CFI < 0.9; TLI < 0.9; RMSEA and 95% CI < 0.08).

Table 4. Distribution and reliability of the EPRES-E and its dimensions (Spain, European Working Conditions Survey 2015).

	Non-response (%)	Mean	SD	Obs range	Floor (%)[a]	Ceiling (%)[b]	Omega coefficient
Temporariness	2.78	31.39	33.42	0 – 100	32.60	8.17	0.86
Disempowerment	0.16	28.20	24.47	0 – 100	32.69	2.30	0.68
Vulnerability	1.80	15.93	19.95	0 – 100	43.83	0.92	0.78
Exercise of rights	2.54	45.72	27.99	0 – 100	11.64	5.80	0.54
Uncertain WT	1.84	15.38	20.07	0 – 100	42.72	0.13	0.73
Wages	20.97	56.97	26.90	0 – 100	6.37	8.08	0.83
EPRES-E	26.62	32.48	14.12	0 – 87.5	0.17	0.06	0.80

EPRES-E: Employment Precariousness Scale in the European Working Conditions Survey; WT: Working Times; SD: Standard Deviation; aProportion of the sample with the lowest score; bProportion of the sample with the highest score.

Paper 2

Padrosa, E., Bolíbar, M., Julià, M., & Benach, J. (2021). Comparing Precarious Employment Across Countries: Measurement Invariance of the Employment Precariousness Scale for Europe (EPRES-E). *Social Indicators Research*, 154 (3), 893-915.

Comparing Precarious Employment Across Countries: Measurement Invariance of the Employment Precariousness Scale for Europe (EPRES-E)

Abstract

Comparing precarious employment (PE) across countries is essential in order to deepen understanding of the phenomenon and to learn from country-specific experiences. However, this is hampered by the lack of internationally meaningful measures of PE. We aim to address this point by assessing the measurement invariance (MI) of the Employment Precariousness Scale for Europe (EPRES-E), an adaptation of the EPRES construct in the European Working Conditions Survey (EWCS). EPRES-E consists of thirteen proxy indicators sorted into six dimensions: temporariness, disempowerment, vulnerability, wages, exercise of rights and unpredictable working times. Drawing on EWCS-2015, the MI of the second-order factor model was tested in a sample of 31,340 formal employees by means of a) multi-group confirmatory factor analyses, and b) the substantive exploration of EPRES-E mean scores in each country. The results demonstrate that threshold invariance holds for the first-order structure (dimensions) of 22 countries (Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK), but only metric invariance is attained by the second-

order structure. The latter is supported by exploration of the mean scores, where we found that different score patterns in each dimension lead to similar overall EPRES-E scores, suggesting that PE is configured by different sources within the six dimensions in each country according to their broader socio-political trajectories. We conclude that, although EPRES-E can be used for comparative purposes in 22 European countries, the scores of each dimension must be reported alongside the overall EPRES-E score.

Keywords: Precarious Employment, Europe, Measurement Invariance, Multi-Group Confirmatory Factor Analysis, Comparative Research

136

1 Introduction

Post-industrial societies have experienced a set of pivotal processes in recent decades, including the globalization of their economies, far-reaching technological innovations prompting the so-called fourth industrial revolution, the development of neoliberal macroeconomic policies, periodic economic downturns and demographic changes. Among other consequences, these have triggered a structural transformation of labor markets. Broadly, the unprecedented post-WWII socioeconomic order that gave rise to the Standard Employment Relationship (SER) – permanent full-time employment with social protection and benefits (Bosch, 2004) – is gearing towards a more flexible and individualized paradigm where collective bargaining schemes and social protection networks provided by welfare states are progressively being retrenched (Arnold & Bongiovi, 2013; Kalleberg, 2018). As a result, social, academic and political actors have drawn attention to the precarization of employment and the potential impact it may have on critical aspects such the health and well-being of workers (Benach, et al. 2013). However, little effective progress has been made in articulating precarious employment (PE) in public policy. A fundamental obstacle to doing so has been the lack of an internationally shared definition and operationalization of PE, engendering conceptual confusion and impeding proper monitoring of the phenomenon within and across countries that would sensitively inform both researchers and policy-makers. Hence, developing a theoretically sound measure of PE that transcends the singularities of territory is essential if decent and sustainable labor markets are to be

successfully introduced locally, nationally and globally (Benach, et al. 2012).

In this article, we add to this strand of research by examining the extent to which the Employment Precariousness Scale for Europe (EPRES-E), a multidimensional and theory-based instrument to measure PE that has been empirically validated in Spain (Padrosa, et al. 2021), can be used for comparative research in 35 European countries. Specifically, we explore the degree of measurement invariance (MI) for EPRES-E to determine whether the underlying concept (i.e. PE) is measured the same way in the countries in the study. This is both crucial in obtaining results that are meaningfully comparable across territories and a key challenge to understanding further how the precariousness of employment arrangements is made manifest in each national context.

The structure of the article is as follows. In the next section, we scrutinize current discussions of the conceptualization and operationalization of PE internationally and the challenges to conducting comparative research in this field, reporting the gaps in the literature that justify our approach from the theoretical and methodological points of view. Then we present our data along with a detailed commentary on the statistical analyses we use. Thereafter, the results are described and interpreted, revealing the potential reasons for the invariance or non-invariance of the instrument in each country. Lastly, we conclude with some observations on the implications of these findings for further research and policy-making.

2 Background

As briefly stated above, delineating what defines PE is an open source of debate among scholars in a variety of disciplines, as well as international institutions. To begin with, a distinction should be made between the three main sets of features that characterize jobs: the nature of the tasks in each job and their associated working conditions, employment conditions, and employment relations (Benach, et al. 2013). The former includes the physical and psychosocial aspects of employment. Employment conditions denote the circumstances in which a person is engaged in a job or occupation while employment relations refer to the power relations between employers and employees as both collective and individual actors. Because a detrimental employment experience can stem from any of these sources, some authors incorporate aspects of all three in their theorizations (e.g. Livanos & Papadopoulos, 2019). Nonetheless, the precariousness of employment arrangements results from the broader configuration of employment relationships that shape the extent to which workers are immersed in their jobs, regardless of their precise content (Benach, et al. 2016; Bodin, et al. 2020). Indeed, as PE taps a concept that goes deeper than job-specific working conditions, its conceptualization should focus on employment conditions and relations. Accordingly, departing from the definition proposed by Rodgers (1989), a dominant strand of research treats PE as a combination of the adverse characteristics of the employment relationship that differ from those manifested in the SER, mainly employment insecurity, low or inadequate wages, and reduced social protection and workplace rights (see Kreshpaj, et al. 2020 for a

review). As such, PE is commonly theorized as representing a continuum, with the SER lying at the upper end and the most de-standardized jobs at the lower end. However, it has been argued that this approach obscures the asymmetry of interpersonal power relations between employers and employees (Amable, 2006; Korpi, 2006; Benach, et al. 2013), a crucial aspect of the experience of PE that might be present even in the SER (Julià, et al. 2017). Additionally, an increasing number of commentators have politically and culturally criticized the idealization of the SER-like career-long contract with standardized working schedules and being bound to a specific workplace. They prefer to advocate flexible, worker-led working times, part-time employment or remote working as ways of emancipating workers from this disciplined and production-based model of the organization of work and life, which is sustained by the premises of Fordist accumulation regimes (Weeks, 2011; Fleming, 2014). On account of these positions, it can be concluded that not only is there a wide range of definitions of PE, some of them are contradictory. Nonetheless the concept is acknowledged globally as having two attributes in particular: first, its objective nature, since subjective perceptions and expectations might relate to circumstances other than the employment relationship (ILO, 2012); and second, its multidimensionality, in the sense that multiple aspects of the employment relationship, which do not need to occur simultaneously, combine in providing the overall experience of PE (Campbell & Burgess, 2018). The latter is particularly important in order to comprehend the vast array of nuances that make different employment situations precarious and to identify the sources of this

precariousness in each situation. This in turn is essential if effective tailored policies to minimize PE are to be designed. Therefore, the challenge in defining and measuring PE lays in determining the dimensions that frame it and whether these dimensions apply equally to different populations.

Another key issue underlying the absence of a consensus in conceptualizing PE is the socio-historical, economic, political and cultural particularities of the territories in which people experience their jobs. To elaborate, employment arrangements are embedded in the wider intersection between welfare states, labor markets and family models, which in turn are dynamically shaped by changing power relations between the main political and economic actors in society, namely institutions and political parties, unions, corporations and civil-society organizations (Esping-Andersen, 1999; Hall & Soskice, 2001; Benach, et al. 2016). Consequently, the mechanisms by which these intersections unfold into different types of employment arrangement are context-specific and determine what is considered precarious in each territorial reality (Duell, 2004; Muñoz-Bustillo, et al. 2009). Examples are zero-hour contracts, which are heavily restricted in Germany and the Netherlands but whose use is increasing in liberal countries such the UK (Farina, et al. 2019). On the other hand, Denmark and Greece have a similar share of fixed-term contracts (OECD, 2020), but the former's flexicurity model provides temporary workers with levels of social protection, career prospects and working conditions that resemble those of their permanent counterparts, while this is quite the opposite in Greece (Frade, et al. 2004). For this reason, contextualized theoretical

frameworks of PE that allow comparative research are rather scarce, let alone their methodological operationalization and empirical validation. Indeed, the majority of studies or reports that adopt a cross-national perspective rely on one-dimensional indicators such as temporary employment, perceived job insecurity or low salaries, which oversimplify both the all-embracing aspects that contour PE (Benach, et al. 2013) and the contrasting experiences that such workers may face in each country (Frade, et al. 2004; Muñoz-Bustillo, et al. 2009). This is a huge obstacle to achieving understanding of the phenomenon and of the implications that different policies and institutional frameworks might have for its deployment. Therefore, not only is a multidimensional and objective measure of PE that incorporates the different national contexts substantially needed, so also is the empirical assessment of its comparability in order to draw meaningful conclusions internationally.

EPRES-E was developed to fill this gap in the literature, (Anonymized, forthcoming). This measure consists of an adaptation of the Employment Precariousness Scale (EPRES) construct in the sixth wave of the European Working Conditions Survey (EWCS-2015). The original version of EPRES takes the form of a multidimensional scale that encompasses the following six dimensions: temporariness (contract duration), disempowerment (level of negotiation of employment conditions), vulnerability (being defenseless against workplace authoritarianism), low wages, workplace rights, and the capacity to exercise them. These dimensions are both theoretically and methodologically sound, as

they stem from a long-term interdisciplinary research project that involved, in the first place, an extensive literature review, followed by interviews with twelve key informants who were experts in various fields, such sociology, the labor economy or social epidemiology, and finally six focus-group discussions with temporary and permanent workers and trade union representatives (Amable, 2006; Vives, et al. 2010). The EPRES instrument is also unique in being empirically validated for use in countries with substantially different labor markets and institutional contexts, namely Spain (Vives, et al. 2010; Vives, et al. 2015), Chile (Vives, et al. 2017) and Sweden (Jonsson, et al. 2019); and is currently being tested in Belgium and Finland. Despite all these assets, use of EPRES in comparative research is not straightforward, since, to achieve this purpose, primary data that is cross-nationally homogenized ought to be fielded. In this scenario, the EWCS stands out as a great source of information, given that it is conducted periodically, permitting the availability of data over time and the study of trends at an aggregate level, and moreover it covers a large number of countries, thus providing a unique opportunity to perform Europe-wide comparative analyses. Therefore, the adaptation of a theoretically strong PE construct (i.e. EPRES) in a powerful international survey (i.e. EWCS) has potential as an insightful solution to the problem of assessing the phenomenon across countries.

Accordingly, EPRES-E was first developed using the EWCS-2015 subsample from Spain in order to ensure that the representativeness of the original construct, which had been engendered in the Spanish context, prevailed. Due to the closed nature of the questionnaire, the

rights dimension was omitted because of the unavailability of items (see Padrosa, et al. 2021 for further details), but a social component designed to capture precarious workers' lack of control over their own time was incorporated (Cano, 2004; Porthé, et al. 2010). That is, EPRES-E's dimensions are: (a) temporariness; (b) disempowerment; (c) low wages; (d) exercise of rights; (e) vulnerability; and (f) unpredictability of working times (uni-directionally led by employers). The instrument demonstrated good psychometric properties, construct validity and internal consistency reliability in the EWCS-2015 Spanish subsample (Anonymized, forthcoming). Taking this into account, and given the absence of theoretical support to employing PE measures across territories without further cautiousness mentioned earlier, the obvious next step in measuring PE from a comparative perspective is to examine the MIs of EPRES-E in the 35 European countries covered by the EWCS-2015 empirically.

2 Methods

2.1 Data and study population

As already noted, data used for the analyses were derived from the sixth phase of the EWCS, a cross-sectional European survey conducted quinquennially that is representative of the population in employment residing in private households in the countries covered. In this specific phase, which was administered in 2015, were included the European Union (EU's) 27 member states, the five EU-candidate countries (i.e. Albania, Republic of North Macedonia, Montenegro,

Serbia and Turkey), Norway, Switzerland and the UK. The overall response rate was 42.5%, ranging from 10.9% in Sweden to 78% in Albania (Eurofound, 2017). A total of 43,850 individuals aged fifteen and over (except for Bulgaria, Norway, Spain and the UK, where the specified age was sixteen or over due to the minimum legal working age being higher in these countries, were interviewed. For the purposes of this study, however, respondents in self-employment (n=9,245), without an employment contract (n=2,478), serving in the armed forces (n=149) or with unknown or non-eligible ages, i.e. 65 or over (n=638), were excluded. Thus, the final sample under analysis consisted of 31,340 individuals.

2.2 Measures

The main variable was EPRES-E, which was operationalized by thirteen proxy indicators sorted in the six dimensions already described above, that is, two items in "temporariness", two in "disempowerment", two in "wages", two in "exercise of rights", two in "vulnerability" and three in "unpredictability of working times". All six items were measured using frequency or ordinal scales, recoded so that the higher values correspond to the more precarious situations (Supplementary Material 1). A more detailed description of these indicators can be found in Table 1. Dimension scores were simple averages of the items transformed into a 0-100 scale, while the overarching EPRES-E score was the arithmetic mean of the six dimension scores (Supplementary Material 1).

Other variables used to describe the sample were gender (women, men), age (nine-year age groups), place of birth (country of residence or other), occupational social class (non-manual, manual), educational attainment according to the International Standard Classification of Education 2011 (high, medium, low) and country of residence.

2.3 Statistical analyses

EPRES-E comparability across countries was tested by means of multi-group confirmatory factor analysis (MGCFA) (Chen, 2008; Kim & Yoon, 2011). The EPRES-E-tested model was composed of the six latent dimensions as first-order factors that were, in turn, reflected by the overarching PE construct, which was modeled as a second-order factor (Figure 1). According to this configuration, to identify the covariance structure part of the model one factor loading for each first- and second-order factor was fixed at 1, since this is considered to be the best means of identification in MI models (Rudnev, et al. 2018). Besides, because of the ordinal nature of the observed variables, the MGCFAs were run with the mean- and variance-adjusted weighted least squares estimator (WLSMV) and polychoric correlations (Beauducel & Herzberg, 2006).

As regards the assessment of MI, briefly the basis of the MGCFA approach consists of investigating the invariance of the relations between underlying latent constructs and observed variables by imposing constraints on the measurement parameters of the model for every specified group and then comparing the model to more or

less restricted ones (Davidov, et al. 2014): the stricter the parameter equality constraints, the higher the degree of invariance (Meredith, 1993; Steenkamp & Baumgartner, 1998). Furthermore, to establish MI in second-order factor models, this must first be done by the first-order factors (Rudnev, et al. 2018). For this reason, we examined EPRES-E's MIs in five steps following a bottom-up approach (Figure 2). First of all, the configural invariance of the overall (first- and second-order factors) model was tested for all 35 countries. This level of invariance is encountered when the factor structures, and thus the latent constructs, are equal in all groups, that is, when those in the different groups respond to the items with the same construct in mind (Chen, 2008). The output of this model was explored in detail to check for negative latent variances, low omega reliability coefficients – that is, an estimator of the homogeneity of the items that takes into account the structure of the model (Raykov, 2001) – or other sources of misspecification in any of the countries studied. Individual CFAs were then run for countries displaying these characteristics, if any, to determine in addition whether the EPRES-E construct was applicable to that particular territorial context. If the individual model fitted the data poorly (see below), the country concerned was excluded from the analyses. Subsequently, configural invariance of the remaining countries was addressed, followed by metric invariance of the first-order factors. In this case, invariance requires factor loadings between the observed and latent variables to be equal, meaning that a unit increase on the measurement scale (i.e. latent variable) has the same implications in each group. In a fourth step, we examined threshold (or scalar) invariance of the first-order factors (Millsap &

Yun-Tein, 2004; Pendergast, et al. 2017). This indicates whether mean differences in the latent variables are tied in with the same shifts between the response options of the ordinal observed variables, making the raw scores of the latent variable comparable or non-comparable. Finally, the same procedure, namely threshold invariance, was performed in the second-order factor model. All the steps were conducted conditionally on the basis of the results of the preceding one. Note that residual invariance is the last and strictest level of MI, which is attained when residual variances (i.e. the sum of uniqueness and measurement error variances) are equal as well. However, examination of this degree of invariance in the context of the ordinal data is limited, and the literature disagrees over its requirement to uphold latent mean comparability (Vandenberg & Lance, 2000) because the residuals are not part of the latent variable, so it was not tested in this article.

Nor is there a consensus among scholars regarding which strategy is best at discerning whether the above equality constraints are violated (Vandenberg & Lance, 2000; Chen, et al. 2005). In this study, we evaluated the following models' goodness-of-fit indices according to their proposed cut-off values for acceptance (Hooper, et al. 2008; Kline, 2010): the chi-squared test (χ^2) and the associated degrees of freedom and p-value (the smaller the value of the statistic, the better the fit), the comparative fit index (CFI) (>0.90), the Tucker-Lewis index (TLI) (>0.90) and the root mean square error of approximation (RMSEA), along with its 90% confidence interval (CI) (<0.080 with the upper bound of its confidence interval <0.100). Nonetheless, this practice relies on the rather uncertain assumption that invariance

constraints have a sufficient impact on the global fit of the model to allow it to transcend the cut-off value of acceptability (Davidov, et al. 2014). Therefore, we combined this strategy with an assessment of the difference between these indices in the nested and increasingly constrained models (Cheung & Rensvold, 2002; Chen, 2007). Based on simulation studies, Chen (2007) formulated cut-off values for these differences in CFI and RMSEA (<–0.010 and <0.015, respectively), but when it comes to large-scale group comparisons, these criteria are unsuitable (Rutkowski & Svetina, 2014). Accordingly, they were only adopted to test for threshold invariance, while a more sensible cut-off of 0.030 for ΔRMSEA and of 0.020 for ΔCFA were adopted to test for metric invariance (Rutkowski & Svetina, 2014). Nonetheless, as Brown has argued (2015), the logic of comparisons requires not necessarily choosing the best-fitting model, but selecting the most parsimonious model that still fits well, so these cut-off values were used more as a reference than as a strict condition in deciding whether to accept or reject the models.

In a final stage of analysis, the EPRES-E mean scores and those of their dimensions were explored in each of the countries included in order to scrutinize the proposed EPRES-E structure in a more substantive manner. Note that, as stated above, we applied equal weights to every component of EPRES-E to compute these scores, regardless of the loadings retrieved from MGCFAs, because the weights obtained from MGCFAs might be unsuitable for other samples. Given that one of the strengths, and aims, of using the EWCS data is to be able to measure and compare PE in further cross-sectional samples, this data-driven weighting technique would

represent a serious drawback. Accordingly, in the absence of a methodological gold standard in the allocation of more specific weights, equal weighting is recommended as the most cautious option (Nardo, et al. 2008). Nevertheless, this issue should be explored in more detail when other data containing EPRES-E are available.

3 Results

The characteristics of the sample are shown in Table 2. In sum, 52.23% of the sample were women, half were middle-aged, i.e. 36 to 55 years old, 91.04% had been born in the country where they were residing, 28.58% had a manual job and 14.20% had low levels of education.

As for the models examined (Table 3), no solution was found for Model 1, which included configural constraints among the 35 countries studied. After further exploring the output of the model (not shown), we observed that up to thirteen countries either displayed a negative variance for the dimension "temporariness" (Cyprus), a low omega reliability coefficient (Latvia, Malta, Montenegro, Hungary, Estonia, Czech Republic, Bulgaria, Romania, Republic of North Macedonia, Serbia and Turkey) or non-computable results (Albania). Besides, the model displayed a fit below the acceptable level when run individually for these countries (not shown). Therefore, Model 2 was conducted without them, resulting this time in a good fit (χ^2 [df]=7097.326 [1276], p-value<0.001; CFI=0.945; TLI=0.926; RMSEA (90% CI)=0.074 (0.072-0.075)). This indicates that the

latent second-ordered structure was measured by the same items in the remaining 22 countries. Consequently, the following models were only performed in this set of countries. Model 3 produced an even better fit (χ^2 [df]=3611.558 [1247], p-value<0.001; CFI=0.978; TLI=0.969; RMSEA (90% CI)=0.048 (0.046-0.049)), so the first-order factors, or the dimensions, could be regarded as metrically invariant across countries. In the case of Model 4, with its threshold invariance for the first-order factors, it presented a good fit (χ^2 [df]=8304.920 [1646], p-value<0.001; CFI=0.937; TLI=0.934; RMSEA (90% CI)=0.069 (0.068-0.071)), but, in comparison with the previous model, ΔCFA exceeded the cut-off value of -0.030. Nevertheless, given both the good overall fit and the ΔRMSEA being really close to the proposed cut-off value (0.021), we assumed threshold invariance (albeit borderline) for the dimensions in the 22 examined countries. Accordingly, we analyzed Models 5 and 6 of the second-order factor, testing for metric and threshold invariance respectively. Regarding the former, both its good fit (χ^2 [df]=9007.871 [1528], p-value<0.001; CFI=0.929; TLI=0.921; RMSEA (90% CI)=0.076 (0.075-0.078)) and the absence of any significant deterioration of CFI and RMSEA indicated that metric invariance holds for the EPRES-E construct as a whole. That is, the underlying multidimensional PE construct had the same meaning in all the countries studied. This was not the case for Model 6, where a poor overall fit with the data (χ^2 [df]=13821.964 [1906], p-value<0.001; CFI=0.887; TLI=0.899; RMSEA (90% CI)=0.086 (0.085-0.088)) and a reduction in the CFI higher than -0.030 were obtained.

In light of these results, threshold invariance of the first-order factor model and metric invariance of the second-order factor model could be assumed. Therefore, only the means of the dimensions should be compared across the 22 countries according to MI standards. However, we also delved into the means of EPRES-E for each country to interpret the above-mentioned findings more intuitively (Table 4). As observed, an interesting finding was that countries showing similar EPRES-E scores showed different score patterns to the dimensions. For instance, the Nordic countries had the lowest overall scores (24.09 for Finland, 24.48 for Sweden, 26.26 for Denmark, and 27.24 for Norway), alongside Luxembourg (25.73) and the Netherlands (27.12). This is potentially underpinned by their shared social-democratic traditions, or evolution towards them in the case of the Netherlands (Swank, 2000), characterized by high labor-market standards, collective bargaining schemes and sensible social protection benefits not overwhelmingly based on employment contributions (Esping-Andersen, 1999). Nonetheless, it appears that each country endorses this social and economic system through particular labor-market dynamics, leading to different scores for the six dimensions: the flexicurity Danish and Dutch model resulted in a higher degree of "temporariness" (23.82 for Denmark and 24.45 for the Netherlands, in contrast with 18.33 for Finland, 22.22 for Sweden and 22.93 for Norway), whereas the Rehn-Meidner Swedish model, based on the strong involvement of social partners through collective bargaining, showed an exceptionally low degree of "disempowerment" (10.81 against 15.61 for Denmark, 15.98 for Norway and 16.71 for Finland). Contrastingly, Norway showed the

poorest score in "wages" (58.67), followed by Germany (52.18). Given how the indicator was constructed to include monthly and hourly wages so as to encompass both the overall wage-incomes that workers receive to live on and the relative amount they receive for their human capital, we argue that this might relate to their high shares of part-time employees (OECD, 2020), most of whom were potentially low paid (Pfau-Effinger & Reimer, 2019). On the other side of the balance, we found mostly Central and East-European countries displaying the worst EPRES-E scores (33.93 for Poland, 32.93 for Slovakia, 31.54 for Croatia and 31.03 for Slovenia), but again differences in the source of this poor score were detected. This is probably related to variations in their transition to market capitalism and in the changes they had to make to enter the EU (along with some previous differences) that led to noticeable divergences between them in terms of their respective labor markets (Rys, 2001). Whereas Slovenia's welfare state development, degree of social partnership and public expenditure levels very much resemble those of many old EU member states (Fenger, 2007), Poland has gone through three phases of neoliberal labor-market reforms and the privatization of public companies since the 1990s, entailing extensive use of temporary employment contracts, the creeping deregulation and decentralization of the social security system, and a collapse in trade union density (Czarzasty & Mrozowicki, 2014; Maciejewska, et al. 2016). This empirically translates into its poor(est) scores in "temporariness" (29.97 versus 21.74 for Slovakia, 21.45 for Croatia and 16.64 for Slovenia) and "disempowerment" (35.36 versus 28.74 for Croatia, 28.69 for Slovakia and 22.64 for Slovenia). Furthermore,

even though the strictness of employment protection legislation and the strength of social dialogue appeared to be higher in some of these countries, such as Slovenia or Slovakia (Farkas, 2017), as captured by the dimensions "temporariness" and "disempowerment", their levels of unequal power relations demonstrated by the dimensions "vulnerability" (30.72 for Slovakia against 26.02 for Poland, 24.13 for Croatia and 20.34 for Slovenia) and "exercise of rights" (55.28 for Slovakia and 55.00 for Slovenia against 52.76 for Croatia and 48.27 for Poland) were prominently high, which might be linked to differences between legislated and actual practices in the workplace (Kovtun, et al. 2014).

Another striking case is Germany, which has the third poorest EPRES-E score (32.06), despite its good performance in respect of traditional labor-market indicators, such as unemployment rates, temporary employment, etc. (OECD, 2020). Concretely, as mentioned earlier, the country presented really high scores in "wages" and "exercise of rights" (53.61). We argue that this might be related to the rise of unprotected and low-paid (part-time) jobs generated as a consequence of the Hartz reforms – that is, a set of policy measures aimed at improving employment services and policy measures by activating the unemployed and fostering employment demand by deregulating the labor market (Jacobi & Kluve, 2006) – and the popularization of the so-called minijobs (Pfau-Effinger & Reimer, 2019). To end with other disruptive dimension scores that sum up rather similar EPRES-E scores, we discuss the neighboring countries of Portugal (28.80) and Spain (30.08). Even though commonalities in their respective labor-market structures and socio-

political models have been extensively reported (e.g. Hall & Soskice, 2001), in Spain PE appeared to stem from "temporariness" (29.25 in contrast to 19.36 in Portugal), while in Portugal it was more an issue of "disempowerment" (36.13 in contrast to 28.23 in Spain). Unsurprisingly, Spain's PE matches the country's traditionally high share of temporary employment (OECD, 2020), which was exacerbated after the major labor-market reform enacted in 2012 that introduced new ways of temporarily employing workers (Livanos & Papadopoulos, 2019). Portugal, on the other hand, saw its collective bargaining schemes particularly affected by the structural reforms sought by the Troika in the aftermath of the Great Recession (Cruces, et al. 2015). Although this was also experienced by other EU member states facing similar situations, such as Spain, Greece and Ireland, the changes in Portugal represented rather the continuation of a process that was already in motion, resulting in almost a million workers not being covered by a collective agreement since 2010 (Távora & González, 2016).

4 Discussion and conclusions

The purpose of this article has been to examine the MI of EPRES-E, an instrument to measure PE that consists of an adaptation of the EPRES construct in the EWCS in 35 European countries. The main rationale for this approach was the need to come up with a multidimensional and objective instrument that is able to measure PE in a meaningful manner beyond territorial characteristics. This is essential both to obtain the full or a more complete picture of the phenomenon in Europe and to conduct comparative research

providing researchers and policy-makers with sensible information about each country's reality and allowing lessons to be learned from this. However, given the vast heterogeneity of the Eurozone in terms of labor-market regulations and institutions, industrial relations and welfare-state regimes (Korpi, 1983; Esping-Andersen, 1999; Hall & Soskice, 2001), which decisively determine the ever-changing nature of precarious employment arrangements in each country (Duell, 2004; Benach, et al. 2016), MIs of the proposed instrument ought to be empirically assessed. To our knowledge, this is the first study to do this using a multidimensional approach with a sound theoretical basis. Consequently, the article makes an insightful contribution to a pivotal gap in the literature.

Accounting for the second-order factor structure of EPRES-E with its first-order dimensions (i.e. temporariness, disempowerment, vulnerability, exercise of rights, unpredictability of working times and wages), our results indicate that the metric invariance of the overall instrument holds for 22 out of the 35 countries studied, i.e. Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK. However, threshold invariance could only be assumed for the dimensions. In more operational terms, while the raw scores of the dimensions proved to be suitable for comparative research across these countries, this was not the case for the overall EPRES-E score, which only reached a degree of invariance that allowed us to compare its covariances and unstandardized regression coefficients.

Strictly speaking, this should prevent us from comparing the overall EPRES-E raw scores (Chen, et al. 2005). Nonetheless it should be noted that from a methodological perspective, and in the realm of higher-order factor models, the latent nature of the first-order factors (i.e. the dimensions), as opposed to the observed variables, sets up structural rather than measurement relationships with the second-order latent factor (i.e. EPRES-E). Correspondingly, the relative importance of each dimension may vary in the countries studied without changing the essence of the PE concept they are tackling, which is not the case for the first-order factor models and the observed variables composing them (Van de Vijver & Leung, 1997; Rudnev, et al. 2018). Instead, this variation of the structural parameters in the second-order EPRES-E factor points to divergence in the content and connotations of the underlying concept across groups, an interesting finding in itself (Rudnev, et al. 2018). As such, MGCFAs suggest that PE contouring emanates from different sources within the six dimensions identified for each country. This aligns with the results derived from the exploration of the mean scores outlined above, where different patterns of dimension mean scores led to similar EPRES-E mean scores. Therefore, we can conclude that the country-specific contexts that articulate the different institutional frameworks for work and employment (e.g. macro-level policies, labor-market reforms, social dialogue and welfare-state regimes) stand out as key factors in the configuration of PE.

From a substantive point of view, these findings provide empirical reasons for approaching PE from a multidimensional perspective,

especially when performing comparative research, since they make visible the fact that different dimensions have different magnitudes in different countries. Accordingly, focusing only on one of them might produce misleading conclusions. A highly illustrative example of this is the case of Germany, which was found to be the third worst-performing country in terms of its overall EPRES-E score, despite it usually being portrayed as one of the countries to demonstrate successful labor-market outcomes when only unemployment rates or temporary employment are considered (e.g. ILO, 2019). On the other hand, the results stemming from this study also constitute a step forward towards validating EPRES-E. That is, the dimension scores fruitfully captured the situation that labor markets in the analyzed countries were experimenting at the time, as we have described in the previous section. Therefore, this narrative reinforces use of EPRES-E in 22 European countries for comparative purposes provided it is displayed in conjunction with the scores of each dimension.

Moving to the thirteen European countries where the construct does not hold, namely Albania, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Malta, Montenegro, Republic of North Macedonia, Romania, Serbia and Turkey, further research should specifically delve into their labor-market structures in order to arrive at a more comprehensive understanding of how employment precariousness is shaped in these countries. A potential interpretation for their non-invariance lies in the institutional framework of these countries, which is characterized by their delayed transition from almost half a century of communist rule to market capitalism, making their labor markets substantially different from those of the older EU

member states. Accordingly, their welfare states and social protection networks present a lagged development, a marked dual structure between the public and private sectors, and a vastly expanded informal sector (Fenger, 2007). Indeed, the share of informal salaried workers in these countries is substantially higher compared to the 22 countries to which EPRES-E applies (Supplementary Material 2). This widens the array of forms that PE can take, which go beyond the dimensions captured in EPRES-E. To elaborate, PE measurement instruments tailored for these countries ought to encompass other aspects such the range of social risks that workers have covered and whether they are compulsorily or voluntarily entitled to such insurance schemes, the absence of formal contracts, or their irregularities in terms of the detailed number of working hours (Farkas, 2017). Finally, note that the instrument does indeed work for some post-communist countries, namely Croatia, Lithuania, Poland, Slovakia and Slovenia, but these happen to share a higher number of confluent points with West European countries (Fenger, 2007; Bohle & Greskovits, 2012; Farkas, 2017). This prompts the conclusion that EPRES-E is only applicable to post-industrial societies in the West, suggesting that the theoretical construct on which the instrument is grounded is limited in its ability to encapsulate the realities that stem from other socio-political trajectories. Future studies should nevertheless ask whether EPRES-E is suitable for groups of workers in these countries that resemble their West European counterparts, such those working in the public sector (Fenger, 2007), in order to increase the scope of the instrument.

This study has some limitations that need to be acknowledged. First, the secondary nature of the survey prevents us from tackling specific issues, detailed in the foregoing, which would enhance our capacity to measure PE in a higher number of countries. Nevertheless, the advantages gained by using this source of information are enormously superior to this drawback in the sense that the EWCS puts out homogenized information from a substantial sample in almost all European countries every five years. This permits not only the study of PE in further phases of the survey, which will allow the monitoring of a social phenomenon that is has increasingly attracted international concern down the years, but also the unique opportunity to do so on a Europe-wide scale. Second, EPRES-E is restricted to formal employees and does not tap other forms of employment that might also show signs of precariousness, such as self-employment, informal salaried employment, informal entrepreneurs, etc. (Benach, et al. 2013; Ruiz, 2018). Approaching these forms of employment would be greatly relevant for a set of countries where they are highly prevalent, mainly those in southern, Central and Eastern Europe (Supplementary Material 2). However, the precariousness of these forms of employment encompasses a wide set of aspects in addition to or different from those captured in both the EPRES and the EPRES-E constructs, and some of them (as mentioned earlier in this section) are not included in the EWCS, such the social protection rights to which workers are entitled (Gevaert, et al. 2018; Ruiz, 2018; ILO, 2020). Future research should therefore explore how to tackle these features in the EWCS as well.

Nevertheless EPRES-E demonstrates both the theoretical and the empirical properties of invariance that provide support for its use in up to 22 European countries. This is unprecedented in the field of PE research, particularly from a multidimensional perspective. Hence this article constitutes a significant contribution to establishing the comparability of PE in Europe, which is fundamental to deepening our understanding of the phenomenon and to working towards establishing decent and sustainable labor markets internationally in an era framed by globalization. At the same time, it also stresses the importance of directing further efforts towards the incorporation of questions related to employment conditions and relations in more frequent or longitudinal international surveys such as the Labor Force Survey (LFS) or the European Union Survey of Income and Living Conditions (EU-SILC), as well as conserving the EPRES-E items in further phases of the EWCS.

Our findings are also informative for the future conceptualization and operationalization of PE from a cross-national perspective. On the one hand, they enable the inference that the precariousness of employment arrangements is unequally contoured by a number of sources that in turn emerge from individual countries' broader socio-historical, political and cultural particularities. On the other hand, more conceptual and practical work is needed to identify what additional or different aspects delineate PE in societies other than those in the post-industrial West.

Acknowledgements

References

Amable, M. (2006). *La precariedad laboral y su impacto sobre la salud: Un estudio en trabajadores asalariados en España.* PhD dissertation. Barcelona: Universitat Pompeu Fabra.

Arnold, D., & Bongiovi, J. R. (2013). Precarious, informalizing and flexible work: Transforming concepts and understandings. *American Behavioral Scientist*, 57(3), 289-308.

Beauducel, A., & Herzberg, P.Y. (2006). On the performance of maximum likelihood versus means and variance adjusted weighted least squares estimation in CFA. *Structural Equation Modeling*, 13(2), 186-203.

Benach, J., Puig-Barrachina, V., Vives, A., Tarafa, G., & Muntaner, C. (2012). The challenge of monitoring employment-related health inequalities. *Journal of Epidemiology and Community Health*, 66(12), 1085-1087.

Benach, J., Muntaner, C., Solar, O., Santana, V., Quinlan, M., & EMCONET. (2013). *Employment, Work and Health Inequalities: a Global Perspective.* Barcelona: Icaria.

Benach, J., Vives, A., Tarafa, G., Delclos, C., & Muntaner, C. (2016). What should we know about precarious employment and health in 2025? Framing the agenda for the next decade of research. *International Journal of Epidemiology*, 45(1), 232-238.

Bodin, T., Çağlayan, C., Garde, A.H., Gnesi, M., Jonsson, J., Kiran, S., Kreshpaj, B., Leinonen, T., Mehlum, I.S., Nena, E., Orellana, C., Peckham, T., Seixas, N., Vanroelen, C., & Julià, M. (2020). Precarious employment in occupational health: an OMEGA-NET working group position paper. *Scandinavian*

Journal of Working Environment and Health, doi: 10.5271/sjweh.3860

Bohle, D., & Greskovits, B. (2012). *Capitalist Diversity on Europe's Periphery*. Ithaca: Cornell University Press.

Bosch, G. (2004). Towards a New Standard Employment Relationship in Western Europe. *British Journal of Industrial Relations*, 42(4), 617-636.

Brown, T.A. (2015). *Confirmatory factor analysis for applied research* (2nd edn.). New York: Guilford.

Campbell. I., & Burgess. J. (2018). Patchy progress? Two decades of research on precariousness and precarious work in Australia. *Labour & Industry: A Journal of the Social and Economic Relations of Work*. 28(1): 48-67

Cano, E. (2004). [Configurations, perceptions and consequences of precariousness]. *Mientras Tanto*, 93, 67-81.

Chen, F.F., Sousa, K.H., & West, S.G. (2005). Teacher's corner: Testing measurement invariance of second-order factor models. *Structural Equation Modeling*, 12(3), 471-492.

Chen, F.F. (2007). Sensitivity of goodness of fit indices to lack of measurement invariance. *Structural Equation Modeling*, 14, 464-504.

Chen, F.F. (2008). What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology*, 95(5), 1005.

Cheung, G.W., & Rensvold, R.B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233-255.

Cruces, J., Álvarez, A., Trillo, F., & Leonardi, S. (2015). Impact of the euro crisis on wages and collective bargaining in southern Europe: a comparison of Italy, Portugal and Spain. In G. Van Gyes, & Tu. Schulten (eds.), *Wage Bargaining under the New European Economic Governance. Alternative Strategies for Inclusive Growth* (pp. 93-137). Brussels: European Trade Union Institute.

Czarzasty, J., & Mrozowicki, A. (2014). *Trade union organising in Poland and in CEE*. Warsaw: Friedrich Ebert Foundation.

Davidov, E., Meuleman, B., Cieciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology*, 40, 55-75.

Duell, N. (2004). *Defining and assessing precarious employment in Europe: A review of main studies and survey.* Munich: Economic Research & Consulting.

Emmenegger, P. (2010). The Long Road to Flexicurity: The Development of Job Security Regulations in Denmark and Sweden. *Scandinavian Political Studies*, 33(3), 271-294.

Esping-Andersen, G. (1990). *The Three Worlds of Welfare Capitalism*. Princeton: Princeton University Press.

Eurofound. (2017a). European Working Conditions Survey 2015 Technical Report. Retrieved 24 January 2020 (https://www.eurofound.europa.eu/sites/default/files/ef_survey/field_ef_documents/6th_ewcs_-_technical_report.pdf).

Farina, E., Greenand, C., & McVicar, D. (2019). Zero Hour Contracts and Their Growth. *British Journal of Industrial Relations*, doi: 10.1111/bjir.12512

Farkas, B. (2017). Market Economies of Western Balkans Compared to the Central and Eastern European Model of Capitalism. *Croatian Economic Survey*, 19(1), 5-36.

Fenger, H.J.M. (2007). Welfare regimes in Central and Eastern Europe: incorporating post-communist countries in a welfare regime typology. *Contemporary Issues and Ideas in Social Science*, 3(2), 1-30.

Fleming, P. (2014). *Resisting Work: The Corporatization of Life and its Discontents.* Philadelphia: Temple University Press.

Frade, C., Darmon, I., & Laparra, M. (2004). *Precarious employment in Europe: A comparative study of labour market related risk in flexible economies, Final Report*. Retrieved 22 January 2020 (https://cordis.europa.eu/docs/projects/files/HPSE/HPSE-CT-2001-00075/82608321-6_en.pdf).

Gevaert, J., De Moortel, D., & Vanroelen, C. (2018). Does employment status matter for job quality? Working Paper. In F. Eiffe, A. Parent-Thirion, & I. Biletta (eds.), *Employment status and job quality.* Brussels: Publications Office of the European Union.

Hall, P.A., & Soskice, D.W. (2001). *Varieties of capitalism: The institutional foundations of comparative advantage.* Wiley Online Library.

166

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal on Business Research Methods,* 6, 53-60.

International Labor Organization. (2012). From precarious work to decent work: Outcome document to the workers' symposium on policies and regulations to combat precarious employment. Retrieved 31 January 2020 (https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/meetingdocument/wcms_179787.pdf)

International Labor Organization. (2019). *World Employment and Social Outlook: Trends 2019*. Geneva: International Labor Office.

International Labor Organization. (2020). Employment in the informal economy. *Key Indicators of the Labour Market (KILM)*. Retrieved 4 February 2020 (http://kilm.ilo.org)

Jacobi, L., & Kluve, J. (2006). Before and after the Hartz Reforms: The Performance of Active Labour Market Policy in Germany. *IZA Discussion Paper Nº 2100; RWI Discussion Paper Nº 41.*

Jonsson, J., Vives, A., Benach, J., Kjellberg, K., Selander, J., Johansson, G., & Bodin, T. (2019). Measuring precarious employment in Sweden: translation, adaptation and psychometric properties of the Employment Precariousness Scale (EPRES). *BMJ Open*, 9:e029577.

Julià, M., Vives, A., Tarafa, G., & Benach, J. (2017). Changing the way we understand precarious employment and health: Precarisation affects the entire salaried population. *Safety Science*, 100, 66-73.

Kalleberg, A. L. (2018). *Precarious lives: Job insecurity and well-being in rich democracies.* Cambridge: Polity Press.

Kim, E.S., & Yoon, M. (2011). Testing measurement invariance: A comparison of multiple-group categorical CFA and IRT. *Structural Equation Modeling*, 18, 212-228.

Kline, R.B. (2010). *Principles and practice of structural equation modeling*. (3rd edn.). New York: Guildford Press.

Korpi, W. (1983). *The democratic class struggle*. London: Routledge & Keagan Paul.

Korpi, W. (2006). The power resources model. In C. Pierson, & F. G. Castles (eds.), *The welfare state reader* (pp. 76). Cambridge: Polity Press.

Kovtun, D., Cirkel, A.M., Murgasova, Z., Smith, D., & Tambunlertchai, S. (2014). *Boosting Job Growth in the Western Balkans. IMF Working Paper, Nº 14/16*. Washington: International Monetary Fund.

Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D.H., & Bodin, T. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. *Scandinavian Journal of Work, Environment & Health*, 46(3), 235-247.

Livanos, I., & Papadopoulos, O. (2019). *The Rise of Precarious Employment in Europe. Theoretical Perspectives, Reforms and Employment Trends in the Era of Economic Crisis*. Bingley: Emerald Publishing Limited.

Maciejewska, M., Mrozowicki, A., & Piasna, A. (2016). The silent and crawling crisis: International competition, labour market reforms and precarious jobs in Poland. In M. Myant, S. Theodoropoulou, & A. Piasna (Eds.), *Unemployment, internal devaluation and labour market deregulation in Europe* (pp. 229-251). Brussels: ETUI.

Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, 58, 525-543.

Millsap, R.E., & Yun-Tein, J. (2004). Assessing factorial invariance in ordered-categorical measures. *Multivariate Behavioral Research*, 39, 479-515.

Muñoz-Bustillo, R., Fernández-Macías, E., Antón, J.I., & Esteve, F. (2009). *Indicators of job quality in the European Union*. Brussels: European Parliament.

Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffman, A., & Giovannini, E. (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris: OECD publishing.

OECD. (2020). *Temporary employment (indicator)*. doi: 10.1787/75589b8a-en / *Part-time employment rate (indicator)*. doi: 10.1787/f2ad596c-en. Retreived 24 January 2020.

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2021). Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain. *Quality & Quantity*, 55, 543-562.

Pendergast, L., von der Embse, N., Kilgus, S.P., & Eklund, K.R. (2017). Measurement equivalence: A non-technical primer on

categorical multi-group confirmatory factor analysis in school psychology. *Journal of School Psychology*, 60, 65-82.

Pfau-Effinger, B., & Reimer, T. (2019). The interplay of welfare state policies with supply- and demand-side factors in the production of marginalised part-time employment among women in Germany. In H. Nicolaisen, H.C. Kavli, & R.S. Jensen (eds.), *Dualisation of part-time work. The development of labour market insiders and outsiders* (pp. 245-264). Bristol: Policy Press.

Porthé, V., Ahonen, E., Vázquez, M.L., Pope, C., Agudelo, A.A., García, A.M., Amable, M., Benavides, F.G., & Benach, J. (2010). Extending a model of precarious employment: A qualitative study of immigrant workers in Spain. *American Journal of Industrial Medicine*, 53(4), 417-424.

Raykov, T. (2001). Estimation of congeneric scale reliability using covariance structure analysis with nonlinear constraints. *British Journal of Mathematical and Statistical Psychology*, 54(2), 315-323.

Rodgers, G. (1989). Precarious Work in Western Europe. In G. Rodgers, & J. Rodgers (Eds.), *Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe* (pp. 1-16). Geneva: International Institute for Labour Studies.

Rudnev, M., Lytkina, E., Davidov, E., Schmidt, P., & Zick, A. (2018). Testing Measurement Invariance for a Second-Order Factor. A Cross-National Test of the Alienation Scale. In B. Meuleman, E. Davidov, & D. Seddig (eds.), Comparative

Survey Analysis: Comparatibily and Equivalence of Measures. *Methods, data, analyses*, 12(1), 47-76.

Ruiz, M.E. (2018). *[Informal employment and health inequalities in Chile: A mixed-methods approach]*. PhD dissertation. Barcelona: Universitat Pompeu Fabra.

Rutkowski, L., & Svetina, D. (2014). Assessing the hypothesis of measurement invariance in the context of largescale international surveys. *Educational and Psychological Measurement*, 74, 31-57.

Rys, V. (2001). Transition countries of central Europe entering the European Union: Some social protection issues. *International Social Security Review*, 54(2), 177-189.

Steenkamp, J.B.E.M, & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25, 78-90.

Swank, D. (2000). Social Democratic Welfare States in a Global Economy: Scandinavia in Comparative Perspective. In R. Geyer, C. Ingebritsen, & J.W. Moses (eds.), *Globalization, Europeanization and the End of Scandinavian Social Democracy?* (pp. 85-138). London: Palgrave Macmillan.

Távora, I., & González, P. (2016). Labour market regulation and collective bargaining in Portugal during the crisis: Continuity and change. *European Journal of Industrial Relations,* 22(3), 251-265.

Van de Vijver, F.J., & Leung, K. (1997). Methods and data analysis for cross-cultural research. Newbury Park: Sage.

Vandenberg, R.J., & Lance, C.E. (2000). A review and synthesis of the measurement invariance literature: suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 2, 4-69.

Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F.G., & Benach, J. (2010). The Employment Precariousness Scale (EPRES): psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occupational & Environmental Medicine*, 67(8), 548-555.

Vives, A., González, F., Moncada, S., Llorens, S., & Benach, J. (2015). Measuring precarious employment in times of crisis: the revised Employment Precariousness Scale (EPRES) in Spain. *Gaceta Sanitaria*, 29(5), 379-382.

Vives, A., González-López, F., Solar, O., Bernales-Baskai, P., González, M.J., & Benach, J. (2017). Precarious employment in Chile: psychometric properties of the Chilean version of Employment Precariousness Scale in private sector workers. *Cuadernos de Saude Publica,* 33:e00156215.

Weeks, K. (2011). *The Problem with Work. Feminism, Marxism, Antiwork Politics, and Postwork Imaginaries.* Durham NC: Duke University Press.

Figures and tables

Figure 1. Factor structure of the EPRES-E (European Working Conditions Survey 2015).
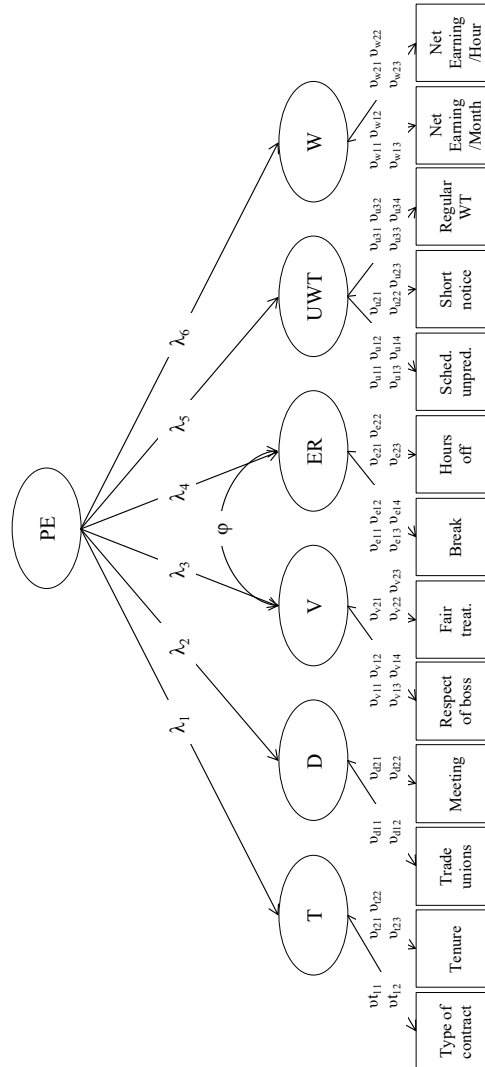
EPRES-E: Employment Precariousness Scale for Europe; PE: Precarious Employment; T: Temporariness; D: Disempowerment; V: Vulnerability; ER: Exercise of rights; UWT: Uncertain Working Times; W: Wages; Fair treat: fair treatment; Sched. unpre.: schedule unpredictability; WT: working times; λ factor loading; φ factor covariance; υ threshold.

Figure 2. Flowchart of multi-group confirmatory factor models analysed to test measurement invariance.
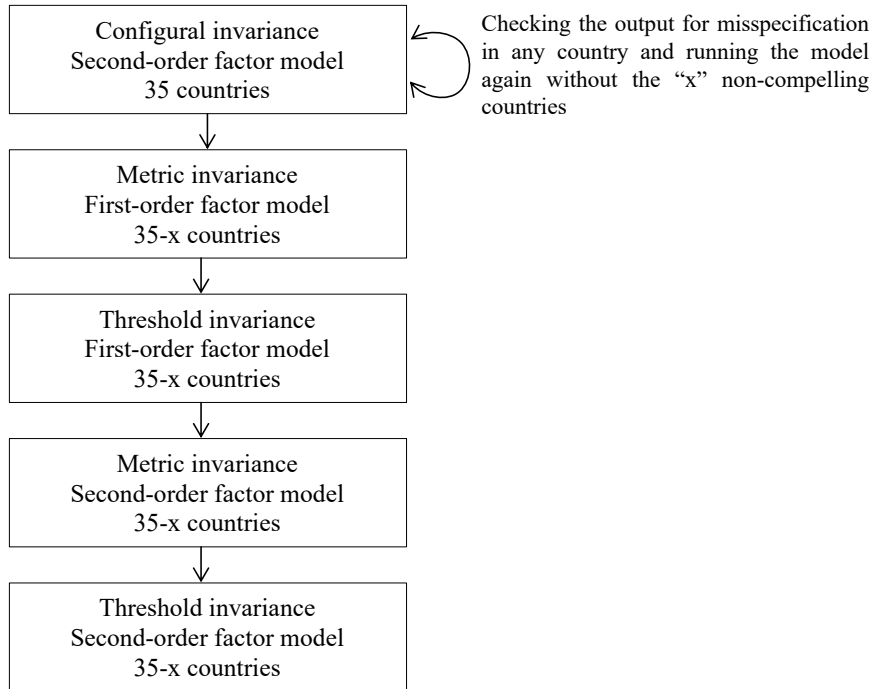
CFA: Confirmatory Factor Analysis.

Table 1. Operationalization of the Employment Precariousness Scale for Europe (EPRES-E).

	Indicator	Operationalization	Response options
Temporariness	Duration of current contract	Combination of: a) what type of contract do you have; b) what is the duration of your current contract?	0. Permanent contract 1. Temporary contract, short duration 2. Temporary contract, long duration
Temporariness	Tenure	How many years have you been in your company or organization?	0. More than 5 years 1. 3 to 5 years 2. 1 to 3 years 3. Less than 1 year
Disempowerment	Trade unions	Does a trade union, works council or a similar committee representing employees exist at your organization?	0. Yes 1. No 2. Don't know
Disempowerment	Meetings	Does a regular meeting in which employees can express their views about what is happening in the organization exist at your organization?	0. Yes 1. No 2. Don't know
Vulnerability	Respect of boss	Your immediate boss respects you as a person	0. Strongly agree 1. Tend to agree 2. Neither agree nor disagree 3. Tend to disagree 4. Strongly disagree
Vulnerability	Fair treatment	You are treated fairly at your workplace	0. Always 1. Most of the time 2. Sometimes 3. Rarely or never
Exercise of rights	Break when you need it	You can take a break when you wish	0. Always 1. Most of the time 2. Sometimes 3. Rarely 4. Never
Exercise of rights	Hours off for personal matters	Would you say that for you arranging to take an hour or two off during working hours to take care of personal or family matters is…	0. Very easy 1. Fairly easy 2. Fairly difficult 3. Very difficult
Unpredictability	Schedule unpredictability	Do changes to your working time arrangements occur regularly? If yes, how long before are you informed about these changes?	0. No 1. Yes, several weeks in advance 2. Yes, several days in advance 3. Yes, the day before 4. Yes, the same day

	Work at short notice	How often have you been requested to come into work at short notice?	0. Never 1. Less often 2. Several times a month 3. Several times a week or daily
	Working times regularity	Combination of: do you work a) the same number of hours every day; b) the same number of days every week; c) the same number of hours every week; d) fixed starting and finishing times?	0. Very high (yes on all) 1. High (no on at least one) 2. Medium (no on at least two) 3. Low (no on at least three) 4. Very low (no on all)
Wages	Net earnings per month	Net monthly earnings from your main paid job	0. High earnings (above the median) 1. Medium-low earnings (between low earnings and the median) 3. Low earnings (less than 0.6 of the median population)
	Net earnings per hour	Net hourly earnings from your main paid job	0. High earnings (above the median) 1. Medium-low earnings (between low earnings and the median) 3. Low earnings (less than 0.6 of the median population)

Table 2. Sample description (European Working Conditions Survey, 2015).

		N	**(%)**
Sex	Women	16,365	52.23
	Men	14,969	47.77
Age	15 to 25	2,815	8.98
	26 to 35	7,306	23.31
	36 to 45	8,394	26.78
	46 to 55	8,447	26.95
	56 to 64	4,378	13.97
Place of birth	Country of residence	28,383	91.04
	Other	2,793	8.96
Occupational social class	Non-manual	22,320	71.42
	Manual	8,932	28.58
Educational attainment	High	11,139	35.66
	Medium	15,660	50.13
	Low	4,437	14.20
Country	Austria	781	2.49
	Belgium	2,097	6.69
	Bulgaria	790	2.52
	Croatia	782	2.50
	Cyprus	455	1.45
	Czech Republic	772	2.46
	Denmark	871	2.78
	Estonia	803	2.56
	Finland	743	2.37
	France	1,295	4.13
	Germany	1,717	5.48
	Greece	443	1.41
	Hungary	776	2.48
	Ireland	692	2.21
	Italy	816	2.60
	Latvia	736	2.35
	Lithuania	827	2.64
	Luxembourg	866	2.76
	Malta	640	2.04
	Netherlands	816	2.60
	Poland	832	2.65
	Portugal	613	1.96
	Romania	804	2.57
	Slovakia	830	2.65
	Slovenia	1,298	4.14
	Spain	2,444	7.80
	Sweden	888	2.83
	United Kingdom	1,265	4.04
	Montenegro	601	1.92

Republic of North Macedonia	610	1.95
Serbia	584	1.86
Turkey	805	2.57
Norway	885	2.82
Switzerland	814	2.60
Albania	349	1.11

Table 3. Goodness-of-fit indices from multi-group confirmatory factor analyses of the EPRES-E (European Working Conditions Survey, 2015).

	χ^2 [df]	CFI	ΔCFI	TLI	ΔTLI	RMSEA (90% CI)	ΔRMSEA
1. Configural invariance[a]				Solution not found			
2. Configural invariance[b]	7097.326 [1276]*	0.945	-	0.926	-	0.074 (0.072-0.075)	-
3. Metric invariance of the first-order factors[b]	3611.558 [1247]*	0.978	0.033	0.969	0.043	0.048 (0.046-0.049)	-0.026
4. Threshold invariance of the first-order factors[b]	8304.920 [1646]*	0.937	-0.041	0.934	-0.035	0.069 (0.068-0.071)	0.021
5. Metric invariance of the first- and second-order factors[b]	9007.871 [1528]*	0.929	-0.008	0.921	-0.013	0.076 (0.075-0.078)	0.007
6. Threshold invariance of the first- and second-order factors[b]	13821.964 [1906]*	0.887	-0.042	0.899	-0.022	0.086 (0.085-0.088)	0.010

EPRES-E: Employment Precariousness Scale for Europe; df: degrees of freedom; CFI: Comparative Fit Index; TLI: Tucker-Lewis Index; RMSEA: Root Mean Square Error of Approximation; CI: Confidence Interval; *Significant at p < 0.001; a35 countries included; b22 countries included.

Table 4. Means of the EPRES-E and its dimensions by country (European Working Conditions Survey, 2015).

	T	D	V	ER	UWT	W	EPRES-E
Austria	20.33	24.23	15.16	45.03	25.10	50.00	29.84
Belgium	20.61	20.88	19.25	44.73	18.62	45.81	27.95
Croatia	21.45	28.74	24.13	52.76	20.81	38.69	31.54
Denmark	23.82	15.61	15.16	36.49	27.99	39.47	26.26
Finland	18.33	16.71	17.20	33.75	23.76	35.33	24.09
France	21.38	20.42	21.85	42.44	21.30	42.64	27.83
Germany	21.14	25.15	18.36	53.61	22.76	52.18	32.06
Greece	22.31	30.11	20.31	57.34	16.52	38.11	31.33
Ireland	19.16	22.79	17.54	42.28	20.99	45.33	27.73
Italy	18.27	27.14	23.82	48.91	14.88	41.86	27.86
Lithuania	19.80	34.80	24.99	47.16	19.00	26.67	28.53
Luxembourg	16.97	22.23	18.28	40.47	18.85	37.21	25.73
Netherlands	24.45	22.55	14.41	38.09	22.20	42.51	27.12
Norway	22.93	15.98	11.94	32.75	23.12	58.67	27.24
Poland	29.97	35.36	26.02	48.27	19.96	46.56	33.93
Portugal	19.36	36.13	14.67	48.42	17.02	36.04	28.80
Slovakia	21.74	28.69	30.72	55.28	24.41	39.89	32.93
Slovenia	16.64	22.64	20.34	55.00	19.75	51.23	31.03
Spain	29.25	28.23	17.75	45.70	16.71	41.65	30.08
Sweden	22.22	10.81	16.60	36.75	24.92	37.50	24.48
Switzerland	20.20	30.66	17.50	49.03	23.97	33.25	29.36
UK	22.86	23.28	20.01	41.58	21.91	43.41	28.43

EPRES-E: Employment Precariousness Scale for Europe; T: Temporariness; D: Disempowerment; V: Vulnerability; ER: Exercise of Rights; UWT: Unpredictable Working Times; W: Wages; brighter colors correspond to higher means.

Paper 3

Padrosa, E., Vanroelen, C., Muntaner, C., Benach, J., & Julià, M. (Forthcoming). Precarious employment and mental health across European welfare states: a gender perspective.

Precarious employment and mental health across European welfare states: a gender perspective

Abstract

Objective: The aim of this article was to examine the relationship between precarious employment (PE) and mental health in Europe, as well as whether welfare states (WS) interact in this relationship, from a gender perspective.

Methods: Data were derived from the European Working Conditions Survey 2015. PE was measured through the Employment Precariousness Scale for Europe (EPRES-E), validated for comparative research in 22 European countries, and categorized into quartiles. Countries were classified into Continental, Anglo-Saxon, Scandinavian, Southern and Central-Eastern WS. Poor mental health was assessed through the WHO-5 Well-Being Index. In a sample of 22,555 formal employees, we performed gender-stratified multi-level logistic regression models.

Results: Results showed greater prevalences of PE and poor mental health among women. However, the association between them was deeper among men. Cross-country differences were observed in multi-level regressions, but the interaction effect of WS was only significant among women. More precisely, the odds of poor mental health were greater among women in EPRES-E quartiles 3 and 4 of Central-Eastern WS.

Conclusions: These findings suggest the interaction between contextual and individual factors in the production of mental health

inequalities, both within and across countries. They also call for the incorporation of gender-sensitive welfare policies if equitable and healthy labor markets are to be achieved in Europe.

1 Introduction

Precarious employment (PE) is a key social determinant of health and health inequalities (Bodin et al., 2020). Over the past decades, a growing body of research documented its association with a host of adverse physical and mental health outcomes (Benach et al., 2014; Koranyi et al., 2018; Rönnblad et al., 2019; Utzet et al., 2020). However, limited work has examined cross-national differences in this association, let alone the role of contextual factors such as welfare states (Kim et al., 2012). We know that employment is embedded in and shaped by the broader political, economic and cultural system in which it takes place. Legal and regulatory structures that derive from this all-embracing framework thus determine the various forms employment arrangements can take and what is considered precarious in each national context (Muñoz-Bustillo et al., 2009). At the same time, evidence suggests that welfare states mediate the extent to which employment status impacts people's living conditions and health (Chung & Muntaner, 2006). Briefly, countries that have more developed welfare systems have social protection schemes and labor market regulations that protect workers from the worst consequences of unemployment and non-standard employment arrangements (Kim et al., 2012; Shahidi, De Moortel, et al., 2016; Shahidi, Siddiqi, et al., 2016). Therefore, the negative consequences of PE might also be buffered by protective welfare states. All said, failing to consider welfare states when examining the consequences of PE might obscure a range of social experiences that have a bearing upon the health of workers.

Against this background, the aim of this study is to investigate the relationship between PE and mental health, both among women and men; and to explore whether welfare states interact in this relationship.

1.1 Defining and measuring precarious employment

The Standard Employment Relationship (SER) (i.e. permanent full-time employment with benefits, social guarantees and possibilities for career progression) was coined in the midst of an unprecedented economic, political and ideological scenario that characterized post-industrial societies in the aftermath of the World War II (Kuttner, 2018). By the late seventies, this historically-contingent landscape underwent (and is still undergoing) a profound transformation resulting in the flexibilization of labor markets, the declining influence of unions and the degradation of workers' social protection (Kalleberg, 2018; Piketty, 2015). Consequently, what was once presumed to have become a standard in high-income countries, eroded progressively, giving rise to various forms of non-standard, flexible, unprotected employment. In this conjuncture, the concept "precarious employment" was introduced to encapsulate the full range of these non-standard employment arrangements (Benach et al., 2016).

The use of this concept originated in the field of social sciences (Rodgers, 1989), but is gaining popularity in other disciplines, including public health and social epidemiology (Bodin et al., 2020). These have engendered several pragmatic definitions and approaches

to measure PE (Kreshpaj et al., 2020). Nevertheless, international consensus on a specific measure has not yet been reached, jeopardizing the development of cross-nationally comparative indicators of PE. One of the few extant examples is the Employment Precariousness Scale (EPRES) (Vives et al., 2010). Broadly, EPRES is a multidimensional instrument that emphasizes the asymmetry in power relations between employers and employees, which is measured through the following dimensions: temporariness, low wages, lack of rights, vulnerability (powerlessness against authoritarian treatments), disempowerment (ability to negotiate over employment conditions), and incapacity to exercise workplace rights. To date, it has been validated in Spain (Vives et al., 2015), Chile (Vives et al., 2017) and Sweden (Jonsson et al., 2019), and is currently being tested in Belgium and Finland. However, the challenges and costs associated to the collection of primary data hinder the use of this tool to monitor PE cross-nationally.

To transcend this limitation, the Employment Precariousness Scale for Europe (EPRES-E) was put forth (Padrosa, Belvis, et al., 2021). As the name suggests, EPRES-E is conceptually grounded on the EPRES construct but is built with proxy-indicators derived from the European Working Conditions Survey (EWCS). By using this data source, indicators can be constructed with harmonized information across a wide range of European countries (Eurofound, 2021), opening up an opportunity to reproduce and compare results at a European-level. The measure is composed of 13 proxy-indicators sorted into the EPRES dimensions stated above except for the one related to low rights. However, EPRES-E incorporates a new

dimension that measures the unpredictability of working times (unidirectionally led by employers). The main strength of EPRES-E is that it was empirically validated in 22 countries (i.e. Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK) and therefore comparisons across them can be performed meaningfully (Padrosa, Bolíbar, et al., 2021). On top of that, it was reported to be equally valid among women and men (Padrosa, Belvis, et al., 2021). This is of particular interest since it allows the assessment of employment-related gender (health) inequalities (Campos-Serna et al., 2013; Menéndez et al., 2007), an insufficiently explored topic (Valero et al., 2020).

1.2 Precarious employment and mental health

The detrimental effects of PE on mental health have been reported in studies from multiple countries (Rönnblad et al., 2019; Utzet et al., 2020). Nevertheless, most of these studies rely on one-dimensional proxy-indicators such as temporary employment (Virtanen et al., 2005) and job insecurity (De Witte et al., 2016). Even if these approaches have provided fruitful information to unravel PE as a social determinant of health, they still over-simplify the myriad forms PE can take (Carles Muntaner, 2016), which might lead to the misclassification of precarious workers as non-precarious and vice-versa (Vives, Benmarhnia, et al., 2020). Consequently, the use of one-dimensional proxy-indicators might prompt inconclusive or even misleading results.

Considering this, researchers are progressively adopting multidimensional approaches that capture PE in a more holistic manner. Yet, only a handful of studies have assessed the association between multidimensional PE and mental health cross-nationally (Gevaert et al., 2021; van Aerden et al., 2016).

Another key issue that is often neglected in this field of research is the differential effect of PE on mental health according to gender (Menéndez et al., 2007; Valero et al., 2020). Briefly, the dominating male power structure and the gendered division of labor promote occupational segregation alongside gender-lines (Rubery & Fagan, 1995) and other labor market mechanisms that are unfavorable to women, compared to men (O'Campo et al., 2004). As a consequence, women are channeled into precarious forms of employment more frequently than men. Moreover, even if holding the same job as men, women are usually exposed to poorer employment conditions such as low salaries (International Labour Organization, 2018) and low flexibility in determining their working schedule (Puig-Barrachina et al., 2014). This has been argued to boost the negative consequences of PE on mental health among women (Menéndez et al., 2007). The need for a gender-sensitive perspective is therefore crucial. Nevertheless, gender health inequalities related to PE have gone largely untested (Valero et al., 2020).

1.3 The role of welfare states

The term "welfare state" (WS) is often narrowly used to designate a set of social transfers (e.g. unemployment benefits, pensions) and key

services (e.g. healthcare, education) provided by states in an attempt to dilute social stratification (Esping-Andersen, 1990) and contract subsequent health inequalities (Muntaner et al., 2010). However, these social protection schemes stem from wider factors such as the distribution of power resources across the main economic and political actors in (post-industrial) societies, the assembly and development of labor and social movements, and the political tradition of nation states and federations (Esping-Andersen, 1990; Korpi, 2016). Accordingly, legal and institutional regulatory features that forge how the economy is reproduced and redistributed should also fall under the conception of WS (Briggs, 1961).

From this broad perspective, WS substantially determine the configuration, development, distribution and implications of PE in each national context (Benach et al., 2014). For instance, governments of countries with strong class-based worker organizations that have been capable of solidifying their influence in the political sphere, and thereby have been instrumental to policy reforms and redistributive goals, tend to be less prone to deregulate their labor markets in response to pressures related to economic downturns and unemployment growth (Auer & Cazes, 2003). Hence, these countries provide a less favorable environment for the rise of extremely flexible and unprotected forms of employment (e.g. zero-hour contracts) than more liberal countries (Farina et al., 2020). Likewise, they often have more generous and far-reaching income replacement schemes, which create a buffer against low paid employment insofar as they decrease competition in the lower spectrum of labor markets (Alsos et al., 2019). On another account,

the structure of WS has also a bearing upon the health of the population: countries with more egalitarian and progressive WS tend to achieve better indicators of health and wellbeing (Muntaner et al., 2011; Navarro et al., 2006).

This scenario prompts the question of whether cross-national differences in the effects of PE on mental health also follow WS patterns. Analogue research on other unfavorable labor market outcomes (e.g. unemployment, temporary employment, job insecurity) suggests that their adverse health effects are mitigated in countries with universal access to key services and strong decommodification and social policies (Kim et al., 2012; Shahidi, Siddiqi, et al., 2016). However, when results are stratified by gender, and family policy models are taken into account, this protective effect is less consistent (De Moortel et al., 2014; Mensah & Adjei, 2020). This is also the case with specific labor market policies targeting unemployed or temporary workers, whose protective health effects proved elusive (Shahidi, De Moortel, et al., 2016). Therefore, there is great need for full assessment of the role of WS (in their broader sense) in the relationship between PE and mental health, particularly with a focus on gender.

Hereby we aim to evaluate this topic applying a "WS regime" approach (E. Dahl & Van der Wel, 2013): countries are sorted into a WS typology according to commonalities in social, political and legal characteristics (Eikemo & Bambra, 2008). This approach gives the opportunity to assess the interconnectedness of these characteristics

as opposed to other more specific approaches such as the "institutional" or the "expenditure" approach (Bergqvist et al., 2013).

Currently, a variety of typologies are available (Arts & Gelissen, 2010), but they are rather overlapping despite employing different theoretical and methodological approaches. In the European context, five distinct WS types are commonly identified. Scandinavian WS (also known as Social-democratic or Nordic) are characterized by the principle of universalism, strong interventionism, high decommodification and a dual-earner family model that encourages women's engagement in (full-time) paid work (H Chung & Muntaner, 2007; Esping-Andersen, 1990; Fritzell, Hvinden, Kautto, Kvist, & Uusitalo, 2005; Korpi, 2016). Continental WS (Christian-democratic, Bismarckian, Conservative, Corporativist) are also based on generous state interventions but the provision of welfare is organized according to occupational lines, thereby maintaining social stratification (Daly, 2001; Esping-Andersen, 1990). They generally rely on the traditional male breadwinner model, which presumes that women are mainly responsible for unpaid domestic work and enter the labor market mostly as secondary earners (Korpi et al., 2013; Lewis, 1992). In Anglo-Saxon WS (Liberal, Residual) decommodification policies are minimal and the state provision of welfare is usually means-tested or subject to strict entitlement criteria, which reinforces already stark social patterns (Esping-Andersen, 1990; C Muntaner et al., 2011). Family policies are also residual and market-oriented (Korpi et al., 2013; Lewis, 1992). Southern WS (Mediterranean, Post-fascist) are rather undeveloped, fragmented, and rely heavily on the family and voluntary sector,

echoing an authoritarian fascist past where any source of social or labor movement was repressed (Navarro & Shi, 2001). Their family model resembles that of Continental WS but with lower levels of social expenditure dedicated to families, children and dependent individuals (Ferrera, 1999; Naldini, 2004). Finally, Central-Eastern WS (Transitional) are mainly found among formerly communist countries that transitioned into market capitalism throughout the 1990s (Cerami & Vanhuysse, 2009). This transition involved extensive social reforms and a shift towards commodification, decentralization and privatization of social protection structures (Fenger, 2007).

2 Methods

2.1 Data and study population

We used data from the sixth wave of the European Working Conditions Survey (EWCS), fielded in 2015 (Eurofound, 2021). In this 2015-wave, a total of 43 850 individuals residing in 35 countries responded to the survey. However, following EPRES-E's criteria (Padrosa, Bolíbar, et al., 2021) only respondents residing in Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK were considered in this paper. Other exclusion criteria were being self-employed (n=9 245), not having an employment contract (n=2 478), working in the armed forces (n=149), being 65 years old or over (n=638), and having missing information in the

outcome variable (n=87), leading to a final sample of 22,555 individuals.

2.2 Measures

Mental health was measured through the 5-item World Health Organization Well-Being Index (WHO-5) (World Health Organization, 1998). The index consists of 5 positively phrased statements that were rated by interviewees from 0 (none of the time) to 5 (all of the time). The raw score of the scale was the sum of item scores multiplied by 4, therefore ranging from 0 (absence of well-being) to 100 (maximal well-being). Individuals with more than one missing item were excluded from the analyses. Scores of individuals with only one missing item were computed through the rounded mean of the other four items. Final scores were dichotomized into good and poor mental health using an advised cut-off point of 50: individuals scoring less than 50 were classified as having poor mental health (Topp et al., 2015).

Precarious employment was measured through EPRES-E, which is composed of 13 proxy-indicators sorted into temporariness (2 items); wages (2); exercise of rights (2); disempowerment (2); vulnerability (2); and unpredictable working times (3) (Appendix 1). Response options were 3, 4 or 5-point ordinal or frequency scales where higher values corresponded to more precarious situations. Dimension scores were computed through averaging item scores and transforming the result into a 0-100 scale; and EPRES-E overall score was the arithmetic mean of the six dimension's scores. To deal with missing

values in the overall score (18.26%), Little's test of Missing Completely at Random (MCAR) was performed (Li, 2013), which assessed whether a complete case analysis would lead to biased estimates. Results from this test indicated that missing data were not MCAR (not shown). Accordingly, we carried out 5 multiple imputations using chained equations (White et al., 2011). These consisted of ordered-logistic models including EPRES-E's 13 items as well as the following auxiliary variables: sex (men, women), age, place of birth (country of residence, other), occupational social class (manual, non-manual), sector of economic activity (agriculture, forestry and fishing; industry; construction; services; and public administration and other services), educational attainment according to the International Standard Classification of Education 2011 (high, medium, low), household financial strain (low, medium, high) and country of residence. This procedure reduced the amount of missing EPRES-E values to 1% (n=225). EPRES-E final scores were categorized into quartiles so that individuals with fewer PE features fell into the first quartile, and those in the most precarious employment situation into the fourth.

Individual-level variables used for adjustment in statistical analyses were age, place of birth and educational attainment.

Finally, countries were distributed into five WS types according to the classification outlined above. That is, Austria, Belgium, France, Germany, Luxembourg, Netherlands and Switzerland were classified as Continental WS; Denmark, Finland, Norway and Sweden as Scandinavian WS; Ireland and the UK as Anglo-Saxon WS; Greece,

Italy, Portugal and Spain as Southern WS; and Croatia, Lithuania, Poland, Slovakia and Slovenia as Central-Eastern WS.

2.3 Statistical analyses

Descriptive analyses were performed to illustrate the characteristics of the sample, and the prevalences of EPRES-E quartiles and of poor mental health across WS. We thereafter applied increasingly complex multilevel logistic regression models (Hox et al., 2017). Firstly, we computed an intercept-only model (M0) without any explanatory variable in order to examine whether there were differences in the odds of poor mental health across countries. Subsequently, we included individual-level (M1) and country-level (M2) explanatory variables to explore variations in the outcome according to these variables. In model 3 we included a random slope for the EPRES-E categorical variable to test whether there was random variation in the relationship between PE and mental health across countries (Heisig & Schaeffer, 2019). To explore this cross-national variation further, in model 4 we included an interaction term between EPRES-E quartiles (individual-level) and WS (country-level).

The analyses were gender-stratified (binary) and performed using Stata/MP 14 (StataCorp, 2015).

3 Results

Overall, the sample was predominantly composed by employees aged between 36 and 55 years old (53.75% men [M], 56.29% women

[W]), non-migrant (88.45% M, 89.19% W) and with medium educational attainment (52.12% M, 47.38% W) (Table 1). Slight differences in these distributions across WS can be found in Table 1. The prevalence of poor mental health was higher among women (17.90%) than men (14.39%), which was consistent in all WS types. Aside from that, Anglo-Saxon WS presented the highest prevalences of poor mental health in both genders (19.69% M, 22.22% W), followed by Central-Eastern (17.23% M, 20.28% W), Continental (14.42% M, 17.95% W), Southern (11.87% M, 14.79% W), and Scandinavian WS (10.94% M, 15.74% W). As regards EPRES-E, women also showed higher scores than men in all WS types. Looking into each gender specifically, among men highest scores were found in Central Eastern WS (mean 30.82, SD 0.31), followed by Southern (28.81, 0.32), Continental (27.32, 0.32), Anglo-Saxon (27.28, 0.61), and Scandinavian WS (23.95, 0.32). Contrastingly, women working in Continental WS showed the highest EPRES-E scores (32.31, 0.33), followed by Central-Eastern (32.04, 0.27), Anglo-Saxon (30.76, 0.62), Southern (30.24, 0.31), and Scandinavian WS (27.51, 0.30). Descriptive results of the six EPRES-E dimensions (i.e. temporariness, wages, disempowerment, vulnerability, exercise of rights, unpredictable working times) are also displayed in Table 1.

Figure 1 depicts the prevalence of poor mental health across EPRES-E quartiles. As observed, there seems to be a gradient, whereby the greater the EPRES-E quartile the greater the prevalence of poor mental health. This is consistent in all genders and WS types. The abruptness of this gradient diverged across WS, though. For instance, among men the total difference in the proportion of poor mental

health across EPRES-E quartiles was less than 10 points in Southern WS, while it was over 20 points in Central-Eastern WS. Further, the proportion of poor mental health in quartile 4 of Scandinavian WS doubled that in quartile 3. A steep difference between quartiles 3 and 4 was also observed in Anglo-Saxon WS, although the total proportion numbers were higher. Regarding women, the smallest total difference was observed in Scandinavian WS, and the highest in Anglo-Saxon WS. Again, stark differences between quartiles 3 and 4 were observed in some WS, namely Anglo-Saxon WS and Central-Eastern WS.

This relationship between EPRES-E and mental health was further explored in multilevel models (Table 2). The intercept-only model (M0) showed that the odds of poor mental health over all individuals of all countries were 0.17 (95% Confidence Interval 0.14, 0.19) among men and 0.21 (0.18, 0.24) among women. Model 0 also added support to the use of random effects, since the estimated individual-level random variance in poor mental health was significantly non-zero in both genders ($\hat{\sigma}_u^2$=0.10 [95%CI 0.05, 0.20] M, 0.11 [0.06, 0.21] W). These estimates slightly increased when individual-level variables were added in the model (M1) ($\hat{\sigma}_u^2$=0.11 [0.06, 0.23] M, 0.13 [0.07, 0.25] W). Model 1 also confirmed the gradient of poor mental health across EPRES-E quartiles: the odds of poor mental health were gradually greater for individuals in quartiles 2 (OR=1.47 [95%CI 1.21, 1.78] M, 1.25 [1.04, 1.49] W), 3 (2.19 [1.80, 2.65] M, 1.80 [1.51, 2.14] W) and 4 (4.10 [3.37, 4.98] M, 3.00 [2.52, 3.58] W), compared to those in quartile 1. Significance of these gradual associations remained in models 2, 3 and 4, even though their

magnitude decreased progressively. Age was the only other individual-level variable that showed a significant (albeit slight) association with mental health in model 1 (1.02 [1.01, 1.02] M, 1.02 [1.01, 1.02] W). Adding country-level variables (M2), a random slope (M3) or interaction effects (M4) to the model caused little change to the effects of this variable. Neither in models 2, 3 or 4, had our country-level variable (i.e. WS types) a significant effect on mental health. However, in model 3 we found the random slope for EPRES-E to be significant (0.07 [0.03, 0.16] M, 0.10 [0.05, 0.20] W), supporting that the association between EPRES-E and mental health varied across countries, both among men and women. Therefore, in model 4 we tested whether WS contributed to this variation through the inclusion of an interaction term between EPRES-E and WS. This interaction term was not significant among men, but it was among women. More concretely, the odds of poor mental health were significantly higher for women in EPRES-E quartiles 3 (OR=2.06 [95%CI 1.23, 3.46]) and 4 (1.95 [1.18, 3.22]) of Central-Eastern WS than for their counterparts in Continental WS.

Conclusions

The aims of this study were twofold: first, to investigate the association between multidimensional PE and mental health in 22 European countries, both among women and men, using a multilevel approach; second, to explore the interaction effect of WS in this potential association, again by women and men separately.

In line with previous research employing multidimensional measures of PE (Julià, Vives, et al., 2017) the results presented above highlight the gradual association between PE and mental health in both genders, whereby the greater the degree of PE the greater the likelihood of poor mental health. Notwithstanding, the magnitude of these associations was steeper in men than in women. This contrasts with the prevalences of EPRES-E and poor mental health, which were both greater among women. These findings therefore emphasize the need to incorporate a gender-sensitive framework when analyzing and interpreting the consequences of PE on mental health (Valero et al., 2020).

Indeed, gender has extensively been identified as an important determinant of social inequalities (Marmot & Wilkinson, 2005). As such, women experience multiple sources of social disadvantage that place them into a more vulnerable position to access to and successfully perform in labor markets. That is, the cumulative interplay between these social disadvantages translates into several mechanisms that hamper women's opportunities for career progression, including the gendered division of work and employment (Barnett & Hyde, 2001) and the gendered segregation of occupations, both horizontal (Hanson & Pratt, 1991) and vertical (Christofides et al., 2013). Consequently, as seen in our analyses, women fall into precarious jobs more frequently than men (L. Vosko et al., 2009; Young, 2010). But employment is not the only domain of women's living conditions jeopardized by these social disadvantages (WHO Commission on Social Determinants of Health, 2008), and all these domains combined generate a larger burden on

women's mental health (Rosenfield & Mouzon, 2013). Hence, the greater prevalence of both PE and poor mental health observed among women potentially stems from the unfavorable position into which they are socially placed. Because of this same reason, though, women confront many other adversities beyond PE that negatively affect their mental health. This accumulation of social disadvantages might therefore underpin the smaller association between PE and mental health observed among women, compared to men.

Our findings also reveal cross-country variations in the relationship between PE and mental health in both genders. However, variations in this relationship across WS were only found among women. More precisely, the adverse health consequences of PE among women were stronger in Central-Eastern WS than among their equivalents in other WS. Gender equality in Central-Eastern WS is an intricate topic. As mentioned before, the institutional, economic, and cultural structure of these countries is characterized by continued influences from the rapid transition from socialism to market capitalism. Former socialist regimes in these countries were strongly concerned with female labor market participation and gender equality (Pascall & Manning, 2000), involving opportunities for education, gender-specific workplace social protection schemes (e.g. maternity leave), and in-kind benefits such as childcare (Pollert, 2003). However, the traditional roles of gender remained in the private sphere and, generally, the actual capacity of women to actively drive this emancipation process was rather limited (Pascall & Manning, 2000). As a consequence, when market transition started to unfold, women bore most of its economic and social burden. Gender inequalities re-entered the public sphere,

showcased by a sharp increase in female unemployment –and those who kept their job were overstaffed in feminized occupations–, in the gender pay gap, and a decrease in their political representation (Kovačević & Šehić, 2015; Plomien, 2006; Pollert, 2003). While similar processes were present in European countries with other WS, including those deemed more egalitarian such as the Scandinavian (Daly, 2020), this back-and-forth experience of women's emancipation in Central-Eastern WS could potentially have tainted their perceptions and expectations of participation in the labor market (Lokar, 2000). Thus, the stronger consequences of PE on women's mental health in Central-Eastern WS, compared to other European WS, might be explained by this transition from socialism, which partially suppressed patriarchy in the labor market, to capitalism, which magnified it (Weiner, 2010).

Aside from that, the fact that Scandinavian WS were not found to provide a buffer against the adverse mental health effects of PE, neither in men or women, suggests that their more protective and egalitarian policies are not sufficient for precarious workers, or don't cover the precarious labor force. This aligns with existing research exploring other unfavorable labor market outcomes such as unemployment or temporary employment (Bambra & Eikemo, 2009; Shahidi, De Moortel, et al., 2016).

There are some limitations in our study that ought to be acknowledged. First, the cross-sectional nature of our data impedes making strong claims on causality. Additionally, we cannot rule out a health selection bias (Bardasi & Francesconi, 2004). Second, we

relied on a self-assessed measure of mental health. Even though the EWCS data is rigorously harmonized (Eurofound, 2021), and the WHO-5 questionnaire has been empirically validated in a wide set of countries (Topp et al., 2015), health expectations and thus the criteria by which people assess their mental health might still vary cross-nationally. Finally, our findings also indicate that WS (as we approached them) exerted no differential influence in the relationship between PE and mental health among men. Nonetheless, cross-country variations in this relationship were observed. These variations might therefore be driven by specific welfare policies. To elaborate, the use of a typological WS approach allowed us to simultaneously consider the institutional, legal and cultural structures that shape people's working and living conditions. Despite the advantages offered by this approach, it has a major drawback: the clustering of countries with different historical traditions and regulatory frameworks (Bergqvist et al., 2013). A striking example is the Netherlands and its flexicurity framework, which diverges from other Continental countries' treatment of flexible employment (Shahidi, De Moortel, et al., 2016). Such particularities might have been overlooked in our analyses. Future studies should therefore explore this phenomenon from policy-oriented approaches.

Despite these limitations, this study is the first of its kind to use a multidimensional measure of PE that has been empirically validated across countries (Padrosa, Bolíbar, et al., 2021). Furthermore, it points out that welfare states have a bearing upon processes that occur at the individual-level, ultimately impacting the health of workers. This urges national and international decision-makers to embrace

policies that minimize precarious forms of employment on the one hand, and that effectively counter the adverse health effects of such forms of employment on the other. Finally, it also highlights the strong need for a gender-sensitive perspective in the design, implementation and evaluation of these policies if more egalitarian and healthy labor markets are to be achieved.

Acknowledgements

References

Acemoglu, D., Autor, D. H., & Lyle, D. (2004). Women, war, and wages: The effect of female labor supply on the wage structure at midcentury. *Journal of Political Economy*, *112*(3), 497–551.

Alsos, K., Nergaard, K., & Van den Heuvel, A. (2019). Collective bargaining as a tool to ensure a living wage. Experiences from the Nordic countries. *Transfer: European Review of Labour and Research*, *25*(3), 351–365.

Amable, M. (2009). *La precariedad laboral y su impacto sobre la salud. Un estudio en trabajadores asalariados en España.*

Anker, R. (1997). Theories of occupational segregation by sex: An overview. *International Labour Review*, *136*(3), 315–339.

Anxo, D., Fagan, C., Cebrián, I., & Moreno, G. (2007). Patterns of labour market integration in Europe—a life course perspective on time policies. *Socio-Economic Review*, *5*(2), 233–260.

Appelbaum, E. (2012). Reducing Inequality and Insecurity: Rethinking Labor and Employment Policy for the 21st Century. *Work and Occupations*, *39*(4), 311–320. https://doi.org/10.1177/0730888412444883

Arlinghaus, A., Bohle, P., Iskra-Golec, I., Jansen, N., Jay, S., & Rotenberg, L. (2019). Working Time Society con- sensus statements: evidence-based effects of shift work and non-standard working hours on workers, family and community. *Industrial Health*, *57*(2), 184–200.

Armstrong, P., Glyn, A., & Harrison, J. (1984). *Capitalism since World War II*. Fontana.

Arnold, D., & Bongiovi, J. R. (2013). Precarious, informalizing, and flexible work: Transforming concepts and understandings. *American Behavioral Scientist*, *57*(3), 289–308.

Aroles, J., Mitev, N., & de Vaujany, F.-X. (2019). Mapping themes in the study of new work practices. *New Technology, Work and Employment*, *34*(3), 285–299. https://doi.org/https://doi.org/10.1111/ntwe.12146

Arts, W., & Gelissen, J. (2010). Models of the welfare state. In S. Leibfried, J. Lewis, H. Obinger, & C. Pierson (Eds.), *The Oxford Handbook of the welfare state*. Oxford University Press.

Atkinson, J. (1987). Flexibility or fragmentation? The United Kingdom labour market in the eighties. *Labour and Society*, *12*(1), 86–105.

Auer, P., & Cazes, S. (2003). *Employment stability in an age of flexibility: evidence from industrialized countries*. International Labour Organization.

Bambra, C., & Eikemo, T. A. (2009). Welfare state regimes, unemployment and health: A comparative study of the relationship between unemployment and self-reported health in 23 European countries. *Journal of Epidemiology and Community Health*, *63*(2), 92–98. https://doi.org/10.1136/jech.2008.077354

Bardasi, E., & Francesconi, M. (2004). The impact of atypical employment on individual wellbeing: evidence from a panel of British workers. *Social Science & Medicine*, *58*, 1671–1688.

Barnett, R., & Hyde, J. (2001). Women, men, work, and family: An expansionist theory. *American Psychologist*, *56*(10), 781–796.

Beck, U. (1992). *Risk Society: Towards a New Modernity*. SAGE Publications. https://books.google.es/books?id=QUDMaGlCuEQC

Beckers, D. G. J., Kompier, M. A. J., Kecklund, G., & Härmä, M. (2012). Worktime control: theoretical conceptualization, current empirical knowledge, and research agenda. *Scandinavian Journal of Work, Environment & Health*, *38*(4), 291–297.

Benach, J. (2021). We Must Take Advantage of This Pandemic to Make a Radical Social Change: The Coronavirus as a Global Health, Inequality, and Eco-Social Problem. *International Journal of Health Services*, *51*(1), 50–54. https://doi.org/10.1177/0020731420946594

Benach, J., Muntaner, C., Solar, O., Santana, V., Quinlan, M., & EMCONET. (2013). *Employment, Work and Health Inequalities: A Global Perspective* (Issue January). Icaria. https://doi.org/10.13140/2.1.3521.1528

Benach, J., Vives, A., Amable, M., Vanroelen, C., Tarafa, G., & Muntaner, C. (2014). Precarious employment: Understanding an emerging social determinant of health. *Annual Review of Public Health*, *35*, 229–253. https://doi.org/10.1146/annurev-publhealth-032013-182500

Benach, J., Vives, A., Tarafa, G., Delclos, C., & Muntaner, C. (2016). What should we know about precarious employment and health in 2025? Framing the agenda for the next decade of research. *International Journal of Epidemiology*, *45*(1), 232–238. https://doi.org/10.1093/ije/dyv342

Bergqvist, K., Yngwe, M., & Lundberg, O. (2013). Understanding the role of welfare state characteristics for health and inequalities - an analytical review. *BMC Public Health*, *13*(1), 1–20.

Betti, E. (2016). Gender and precarious labor in a historical perspective: Italian women and precarious work between Fordism and post-Fordism. *International Labor and Working-Class History*, *89*, 64–83.

Bodin, T., Çağlayan, Ç., Garde, A. H., Gnesi, M., Jonsson, J., Kiran, S., Kreshpaj, B., Leinonen, T., Mehlum, I. S., Nena, E., Orellana, C., Peckham, T., Seixas, N., Vanroelen, C., & Julià, M. (2020). Precarious employment in occupational health – An omega-net working group position paper. *Scandinavian Journal of Work, Environment and Health*, *46*(3), 321–329. https://doi.org/10.5271/sjweh.3860

Bordo, M. D., & Eichengreen, B. (2007). *A retrospective on the Bretton Woods system: lessons for international monetary reform*. University of Chicago Press.

Bosch, G. (2004). Towards a new standard employment relationship in Western Europe. *British Journal of Industrial Relations, 42*(4), 617–636.

Boyer, R. (1993). The economics of job protection and emerging new capital-labor relations. In C. F. Buechtemann (Ed.), *Employment sexurity and labour market behaviour. Interdisciplinary approaches and international evidence* (pp. 69–125). ILR Press.

Boyer, R., & Durand, J. P. (1993). *After Fordism*. Macmillan Press Ltd.

Braverman, H. (1974). Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century. In *Telos* (Vol. 1976, Issue 29). Monthly Review Press. https://doi.org/10.3817/0976029199

Briggs, A. (1961). The welfare state in historical perspective. *European Journal of Sociology*, *2*(2), 221–258.

Brocklehurst, M. (2001). Power, Identity and New Technology Homework: Implications for `New Forms' of Organizing. *Organization Studies*, *22*(3), 445–466. https://doi.org/10.1177/0170840601223003

Burawoy, M. (1979). *Manufacturing Consent. Changes in the Labor Process under Monopoly Capitalism*. The University of Chicago Press.

Campos-Serna, J., Ronda-Pérez, E., Artazcoz, L., Moen, B. E., & Benavides, F. G. (2013). *Gender inequalities in occupational health related to the unequal distribution of working and employment conditions: a systematic review*.

Castel, R. (2002). *From Manual Workers to Wage Laborers:Transformation of the Social Question*. Transaction Publishers.

Castel, R. (2003). *L'Insecurité sociale : Qu'est-ce qu'être protégé?* Éditions du Seuil.

Cerami, A., & Vanhuysse, P. (2009). *Post-communist welfare pathways: Theorizing social policy transformations in Central and Eastern Europe*. Palgrave Macmillan Ltd.

Chang, H.-J. (2003). *Globalisation, Economic Development & the Role of the State*. Zed Books.

Christofides, L. N., Polycarpou, A., & Vrachimis, K. (2013). Gender wage gaps, "sticky floors" and "glass ceilings" in Europe. *Labour Economics*, *21*, 86–102.

Chung, H., & Muntaner, C. (2006). Political and welfare state determinants of infant and child health indicators: an analysis of wealthy countries. *Social Science & Medicine*, *63*(3), 829–842.

Chung, H., & Muntaner, C. (2007). Welfare state matters: a typological multilevel analysis of wealthy countries. *Health Policy*, *80*(2), 328–339.

Crompton, R. (1999). *Restructuring Gender Relations and Employment: The Decline of the Male Breadwinner*. Oxford University Press.

Crompton, R. (2006). *Employment and the family: The reconfiguration of work and family life in contemporary societies*. Cambridge University Press.

Dahl, A. L. (2012). *Alternatives to the Consumer Society*.

Dahl, E., & Van der Wel, K. A. (2013). Educational inequalities in health in European welfare states: a social expenditure approach. *Social Science & Medicine*, *81*, 60–69.

Daly, M. (2001). Globalization and the Bismarckian Welfare States. In R. Skyes, B. Prior, & P. M. Palier (Eds.), *Globalization and European Welfare States: Challenges and Change*. Palgrave Macmillan Ltd.

Daly, M. (2020). *Gender Inequality and Welfare States in Europe*. Edward Elgard Publishing.

De Moortel, D., Vandenheede, H., & Vanroelen, C. (2014). Contemporary employment arrangements and mental well-

being in men and women across Europe: A cross-sectional study. *International Journal for Equity in Health*, *13*(1). https://doi.org/10.1186/s12939-014-0090-6

De Witte, H., Pienaar, J., & De Cuyper, N. (2016). Review of 30 Years of Longitudinal Studies on the Association Between Job Insecurity and Health and Well-Being: Is There Causal Evidence? *Australian Psychologist*, *51*(1), 18–31.

DeMartino, G. F. (2000). *Global Economy, Global Justice. Theoretical Objections and Policy Alternatives to Neoliberalism*. Routledge.

Drahokoupil, J., & Piasna, A. (2017). Work in the Platform Economy: Beyond Lower Transaction Costs. *Intereconomics*, *52*(6), 335–340. https://doi.org/10.1007/s10272-017-0700-9

Duncan, S., & Pfau-Effinger, B. (2000). *Gender, Economy and Culture in the European Union*. Routledge.

Eichengreen, B. (2007). *The European Economy since 1945*. Princeton University Press.

Eikemo, T. A., & Bambra, C. (2008). The welfare state: A glossary for public health. *Journal of Epidemiology and Community Health*, *62*(1), 3–6. https://doi.org/10.1136/jech.2007.066787

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton University Press.

Eurofound. (2020). *European Working Conditions Survey*. https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys-ewcs

Farina, E., Green, C., & McVicar, D. (2020). Zero hour contracts and their growth. *British Journal of Industrial Relations*, *58*(3), 507–531.

Fenger, H. (2007). Welfare regimes in Central and Eastern Europe: incorporating post-communist countries in welfare regime typology. *Contemporary Issues and Ideas in Social Science*, *3*(2), 1–20.

Ferrera, M. (1999). The "Southern model" of welfare in social Europe. *Journal of European Social Policy*, *6*, 17–37.

Frege, C. E., & Kelly, J. E. (2013). *Comparative employment relations in the global economy*. Routledge.

Fritzell, J., Hvinden, B., Kautto, M., Kvist, J., & Uusitalo, H. (2005). *Nordic Welfare States in the European Context*. Routledge.

Gevaert, J., Van Aerden, K., De Moortel, D., & Vanroelen, C. (2020). Employment quality as a health determinant: Empirical evidence for the waged and self-employed. *Work and Occupations*. https://doi.org/10.1177/0730888420946436

Giddens, A. (2007). *Europe in the global age*. Polity Press.

Goldin, C. (1991). The Role of World War II in the Rise of Women's Employment. *The American Economic Review*, *81*(4), 741–756.

Gorz, A. (1982). *Farewell to the Working Class: An essay on Post-Industrial Socialism*. Pluto Press.

Gramsci, A. (1971). *Selections from the prison notebooks* (Q. Hoare & G. Nowell-Smith, Eds.). International Publishers.

Hanson, S., & Pratt, G. (1991). Job Search and the Occupational Segregation of Women. *Annals of the Association of American Geographers*, *81*(2), 229–253.

Harvey, D. (1990). The condition of postmodernity. An Enquiry into the origins of Cultural Change. In *Ekonomicheskaya Sotsiologiya* (Vol. 21, Issue 2). Blackwell Publishers. https://doi.org/10.17323/1726-3247-2020-2-62-75

Harvey, D. (2007). *A brief history of neoliberalism*. Oxford University Press.

Heisig, J., & Schaeffer, M. (2019). Why You Should Always Include a Random Slope for the Lower-Level Variable Involved in a Cross-Level Interaction. *European Sociological Review*, *35*(2), 258–279.

Hox, J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications* (3rd ed.). Routledge.

Hudson, R. (2009). Fordism. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 226–231). Elsevier Ltd.

Humphries, J., & Sarasúa, C. (2012). Reconstructing Women's Labor Force Participation in the European Past. *Feminist Economics*, *18*(4), 39–67.

International Labour Organization. (2018). *Global Wage Report 2018/19. What lies behind gender pay gaps*.

Jones, B. L. (1972). The Role of Keynesians in Wartime Policy and Postwar Planning, 1940-1946. *The American Economic Review*, *62*(1/2), 125–133. http://www.jstor.org/stable/1821532

Jonsson, J., Vives, A., Benach, J., Kjellberg, K., Selander, J., Johansson, G., & Bodin, T. (2019). Measuring precarious employment in Sweden: Translation, adaptation and psychometric properties of the Employment Precariousness

Scale (EPRES). *BMJ Open*, *9*(9). https://doi.org/10.1136/bmjopen-2019-029577

Judt, T. (2005). *Postwar: A History of Europe Since 1945*. Penguin Books. https://books.google.es/books?id=1oOPnprPjcgC

Julià, M., Vives, A., Tarafa, G., & Benach, J. (2017). Changing the way we understand precarious employment and health: Precarisation affects the entire salaried population. *Safety Science*, *100*, 66–73. https://doi.org/10.1016/j.ssci.2017.01.015

Kalleberg, A. (2018). *Precarious Lives: Job Insecurity and Well-Being in Rich Democracies*. Polity Press.

Kim, I. H., Muntaner, C., Vahid Shahidi, F., Vives, A., Vanroelen, C., & Benach, J. (2012). Welfare states, flexible employment, and health: A critical review. In *Health Policy* (Vol. 104, Issue 2, pp. 99–127). https://doi.org/10.1016/j.healthpol.2011.11.002

Koranyi, I., Jonsson, J., Rönnblad, T., Stockfelt, L., & Bodin, T. (2018). Precarious employment and occupational accidents and injuries-a systematic review. *Scandinavian Journal of Work, Environment Health*, *44*(4), 341–350.

Korpi, W. (2016). *The democratic class struggle*. Routledge.

Korpi, W., Ferrarini, T., & Englund, S. (2013). Women's opportunities under different family policy constellations: Gender, class and inequality tradeoffs in western countries re-examined. *Social Politics: International Studies in Gender, State & Society*, *20*, 1–40.

Kovačević, J., & Šehić, D. (2015). The pursuit of a remedy for gender inequality in wider Europe: Comparison of policies and indices

in the EU, Nordic Countries, and sout east Europe. *Economic Annals*, *60*(204), 127–156.

Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D. H., & Bodin, T. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. In *Scandinavian Journal of Work, Environment and Health* (Vol. 46, Issue 3, pp. 235–247). Scandinavian Journal of Work, Environment and Health. https://doi.org/10.5271/sjweh.3875

Kuttner, R. (2018). *Can democracy survive global capitalism?* Norton.

Leonardi, P. M. (2021). COVID-19 and the New Technologies of Organizing: Digital Exhaust, Digital Footprints, and Artificial Intelligence in the Wake of Remote Work. *Journal of Management Studies*, *58*(1), 249–253. https://doi.org/https://doi.org/10.1111/joms.12648

Lewis, J. (1992). *Gender and the development of welfare regimes*. Norton.

Li, C. (2013). Little's test of missing completely at random. *The Stata Journal*, *13*(4), 795–809.

Lokar, S. (2000). The Situation of Women in Eastern Europe: Five Theses. *Labour Force on Eastern Europe*, *66*, 66–78.

Marglin, S. A., & Schor, J. B. (1991). *The golden age of capitalism: reinterpreting the postwar experience*. Oxford University Press.

Marmot, M., & Wilkinson, R. (2005). *Social Determinants of Health*. Oxford University Press.

Menéndez, M., Benach, J., Muntaner, C., Amable, M., & O'Campo, P. (2007). Is precarious employment more damaging to women's health than men's? *Social Science and Medicine*, *64*(4), 776–781. https://doi.org/10.1016/j.socscimed.2006.10.035

Mensah, A., & Adjei, N. (2020). Work-life balance and self-reported health among working adults in Europe: a gender and welfare state regime comparative analysis. *BMC Public Health*, *20*, 1052.

Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Harvard University Press.

Muñoz-Bustillo, R., Fernández-Macías, E., Antón, J., & Esteve, F. (2009). *Indicators of job quality in the European Union*. European Parliament.

Muntaner, C. (2016). Global precarious employment and health inequalities: working conditions, social class or precariat? *Cadernos de Saude Publica*, *32*, e00162215. https://doi.org/10.1590/0102-311X00162215

Muntaner, C., Borrell, C., Ng, E., Chung, H., Espelt, A., Rodríguez-Sanz, M., Benach, J., & O'Campo, P. (2011). Politics, welfare regimes, and population health: controversies and evidence. *Sociology of Health and Illness*, *33*(6), 946–964.

Muntaner, C., Chung, H., Solar, O., Santana, V., Castedo, A., Benach, J., & E. N. (2010). A macro-level model of employment relations and health inequalities. *International Journal of Health Services*, *40*(2), 215–221.

Naldini, M. (2004). *The family in the Mediterranean welfare states*. Routledge.

Navarro, V. (1998). Neoliberalism, "globalization", unemployment, inequalities, and the welfare state. *International Journal of Health Services*, *28*(4), 607–682.

Navarro, V., Muntaner, C., Borrell, C., Benach, J., Quiroga, Á., Rodríguez-Sanz, M., Vergés, N., & Pasarín, M. I. (2006). Politics and health outcomes. *The Lancet*, *368*(9540), 1033–1037.

Navarro, V., & Shi, L. (2001). The political context of social inequalities and health. *International Journal of Health Services*, *31*(1), 1–21.

O'Campo, P., Eaton, W. W., & Muntaner, C. (2004). Labor market experience, work organization, gender inequalities and health status: results from a prospective analysis of US employed women. *Social Science & Medicine*, *58*(3), 585–594.

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2021). Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain. *Quality and Quantity*, *55*(2), 543–562. https://doi.org/10.1007/s11135-020-01017-2

Padrosa, E., Bolíbar, M., Julià, M., & Benach, J. (2021). Comparing Precarious Employment Across Countries: Measurement Invariance of the Employment Precariousness Scale for Europe (EPRES-E). *Social Indicators Research*, *154*, 893–915. https://doi.org/10.1007/s11205-020-02539-w

Palier, B. (2015). *Gouverner la sécurité sociale*. Presses Universitaires de France.

Pascall, G., & Manning, N. (2000). Gender and social policy: comparing welfare states in Central and Eastern Europe and the former Soviet Union. *Journal of European Social Policy*, *10*(3), 240–266.

Picchio, A. (1981). Social Reproduction and the Basic Structure of Labour Markets. In F. Wilkinson (Ed.), *The Dynamics of Labour Market Segmentation* (pp. 193–209). Academic Press.

Piketty, T. (2015). About capital in the twenty-first century. *American Economic Review*, *105*(5), 48–53.

Plomien, A. (2006). Women and the labor market in Poland: from socialism to capitalism. In *Globalization, uncertainty and women's careers: an international comparison*. Edward Elgar Publishing.

Pollert, A. (2003). Women, work and equal opportunities in post-Communist transition. *Work, Employment & Society*, *17*(2), 331–357.

Porthé, V., Ahonen, E. Q., Vázquez, M. L., Pope, C., Agudelo, A. A., Garcia, A. M., Amable, M., Benavides, F. G., & Benach, J. (2010). Extending a model of precarious employment: a qualitative study of immigrant workers in Spain. *American Journal of Industrial Medicine*, *53*(4), 417–424.

Puig-Barrachina, V., Vanroelen, C., Vives, A., Martínez, J. M., Muntaner, C., Levecque, K., Benach, J., & Louckx, F. (2014). Measuring employment precariousness in the European

Working Conditions Survey: The social distribution in Europe. *Work*, *49*(1), 143–161. https://doi.org/10.3233/WOR-131645

Rodgers, G. (1989). Precarious Work in Western Europe. In G. Rodgers & J. Rodgers (Eds.), *Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe* (pp. 1–16). International Institute for Labour Studies.

Rönnblad, T., Grönholm, E., Jonsson, J., Koranyi, I., Orellana, C., Kreshpaj, B., Chen, L., Stockfelt, L., & Bodin, T. (2019). Precarious employment and mental health: a systematic review and meta-analysis of longitudinal studies. *Scandinavian Journal of Work, Environment & Health*, *45*(5), 429–443.

Rosenfield, S., & Mouzon, D. (2013). Gender and mental health. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health*. Springer.

Rubery, J. (1998). *Women in the Labour Market: A Gender Equality Perspective', OECD Directorate for Education, Employment, Labour and Sccial Affairs*. OECD Directorate for Education, Employment, Labour & Social Affairs.

Rubery, J., & Fagan, C. (1995). Gender Segregation in Societal Context. *Work, Employment & Society*, *9*(2), 213–240.

Rubery, J., & Grimshaw, D. (2003). *The organization of employment*. Palgrave Macmillan.

Rubery, J., Smith, M., & Fagan, C. (1999). *Women's employment in Europe: Trends and prospects*. Routledge.

Ryan, L., Lavelle, J., O'Sullivan, M., McMahon, J., Murphy, C., Turner, T., Gunnigle, P., & O'Brien, M. (2019). Defining and regulating zero hours work. Lessons from a liberal market

economy. *Nordic Journal of Working Life Studies*, *9*(S6), 75–93.

Sabel, C. F. (1982). *Work and politics. The division of labor in industry*. Cambridge University Press.

Shahidi, F., De Moortel, D., Muntaner, C., Davis, O., & Siddiqi, A. (2016). Do flexicurity policies protect workers from the adverse health consequences of temporary employment? A cross-national comparative analysis. *SSM-Population Health*, *2*, 674–682.

Shahidi, F., Siddiqi, A., & Muntaner, C. (2016). Does social policy moderate the impact of unemployment on health? A multilevel analysis of 23 welfare states. *The European Journal of Public Health*, *26*(6), 1017–1022.

Shutt, H. (1998). *The trouble with capitalism : an enquiry into the causes of global economic failure*. Zed Books.

Silver, B. J. (2003). *Forces of labor: workers' movements and globalization since 1870*. Cambridge University Press.

Standing, G. (1997). Globalization, Labour Flexibility and Insecurity: The Era of Market Regulation. *European Journal of Industrial Relations*, *3*(1), 7–37.

StataCorp. (2015). *Stata Statistical Software: Release 14*. StataCorp LP.

Topp, C., Østergaard, S., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychotherapy & Psychosomatics*, *84*, 167–176.

Utzet, M., Valero, E., Mosquera, I., & Martin, U. (2020). Employment precariousness and mental health – Understanding

a complex reality: A systematic review. *International Journal of Occupational Medicine and Environmental Health*, *33*(5), 569–598. https://doi.org/10.13075/IJOMEH.1896.01553

Valero, E., Martin, U., Bacigalupe, A., & Utzet, M. (2020). The impact of precarious jobs on mental health: a gender-sensitive literature review. *International Archives of Occupational and Environmental Health*. https://doi.org/10.1007/s00420-020-01605-7

Van Aerden, K., Puig-Barrachina, V., Bosmans, K., & Vanroelen, C. (2016). How does employment quality relate to health and job satisfaction in Europe? A typological approach. *Social Science and Medicine*, *158*, 132–140. https://doi.org/10.1016/j.socscimed.2016.04.017

Vanroelen, C., Levecque, K., Moors, G., & Louckx, F. (2010). Linking credentialed skills, social class, working conditions and self-reported health: A focus on health inequality-generating mechanisms. *Sociology of Health and Illness*, *32*(6), 948–964. https://doi.org/10.1111/j.1467-9566.2010.01260.x

Virtanen, M., Kivimäki, M., Joensuu, M., Virtanen, P., Elovainio, M., & Vahtera, J. (2005). Temporary employment and health: a review. *International Journal of Epidemiology*, *34*(3), 610–622.

Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F. G., & Benach, J. (2010). The Employment Precariousness Scale (EPRES): Psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occupational and Environmental*

Medicine, *67*(8), 548–555. https://doi.org/10.1136/oem.2009.048967

Vives, A., Benmarhnia, T., González, F., & Benach, J. (2020). The importance of using a multi-dimensional scale to capture the various impacts of precarious employment on health: Results from a national survey of Chilean workers. *PLoS ONE*, *15*(9), e0238401.

Vives, A., González, F., Moncada, S., Llorens, C., & Benach, J. (2015). Measuring precarious employment in times of crisis: The revised Employment Precariousness Scale (EPRES) in Spain. *Gaceta Sanitaria*, *29*(5), 379–382. https://doi.org/10.1016/j.gaceta.2015.06.008

Vives, A., González-López, F., Solar, O., Bernales-Baksai, P., González, M. J., & Benach, J. (2017). Precarious employment in Chile: Psychometric properties of the chilean version of Employment Precariousness Scale in private sector workers. *Cadernos de Saude Publica*, *33*, e00156215. https://doi.org/10.1590/0102-311X00156215

Vosko, L. F. (2010). *Managing the Margins: Gender, Citizenship, and the International Regulation of Precarious Employment*. Oxford University Press.

Vosko, L., MacDonald, M., & Campbell, I. (2009). *Gender and the Contours of Precarious Employment*. Routledge.

Wajcman, J. (1996). Women and men managers: Careers and equal opportunities. In R. Crompton, D. Gallie, & K. Purcell (Eds.), *Changing forms of employment: Organizations, skills and gender* (pp. 259–277). Routledge.

Weiner, E. S. (2010). *Market dreams: Gender, class, and capitalism in the Czech Republic*. University of Michigan Press.

White, I., Royston, P., & Wood, A. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine*, *30*, 377–399.

WHO Commission on Social Determinants of Health. (2008). *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health: Commission on Social Determinants of Health Final Report*. World Health Organization.

World Health Organization. (1998). *Wellbeing Measures in Primary Health Care/The Depcare Project*. WHO Regional Office for Europe.

Young, M. (2010). Gender Differences in Precarious Work Settings. *Industrial Relations*, *65*(1), 74–97.

Figures and tables

Figure 1. Prevalence of poor mental health across EPRES-E quartiles (European Working Conditions Survey 2015, selected countries*).
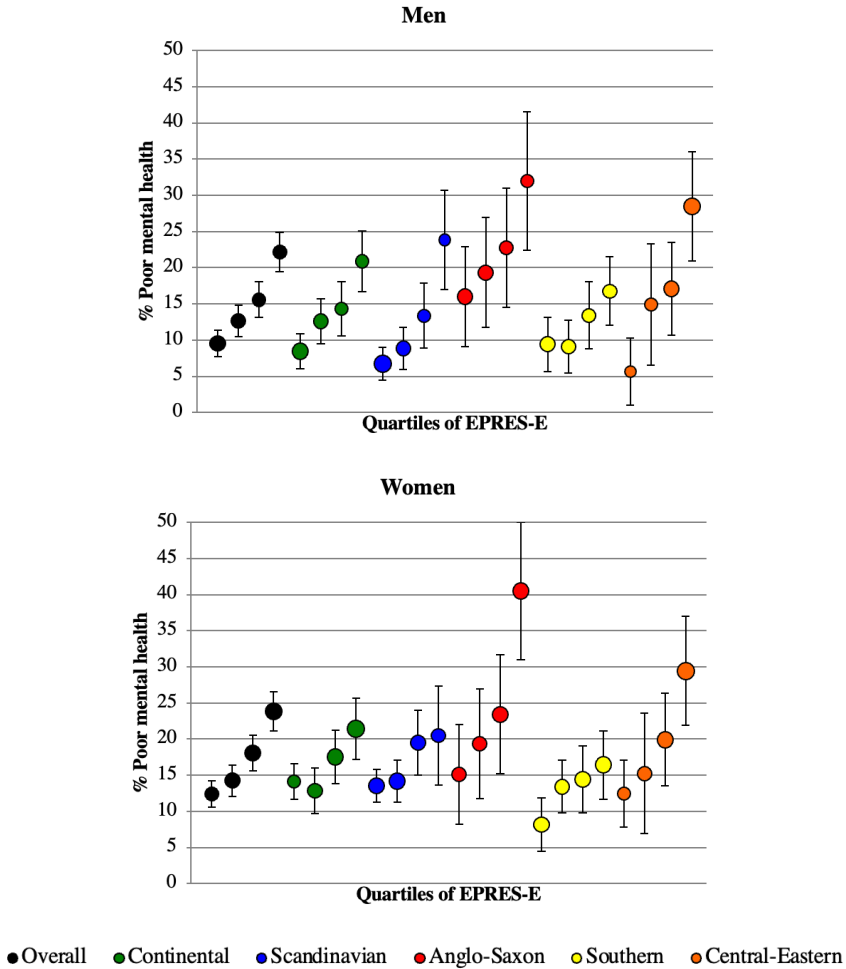
EPRES-E: Employment Precariousness Scale for Europe. Quartiles of EPRES-E from left to right: Q1, Q2, Q3, Q4. The size of the bubbles corresponds to the size of each quartile. *Countries included: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK.

Table 1. Sample characteristics (European Working Conditions Survey 2015, selected countries*).

	Overall Men	Overall Women	Continental Men	Continental Women	Scandinavian Men	Scandinavian Women	Anglo-Saxon Men	Anglo-Saxon Women	Southern Men	Southern Women	Central-Eastern Men	Central-Eastern Women
Age												
16-25	945 (8.81)	955 (8.07)	373 (9.15)	356 (8.29)	151 (9.61)	182 (10.05)	104 (10.83)	91 (9.19)	141 (6.59)	159 (7.35)	176 (8.92)	167 (6.50)
26-35	2406 (22.44)	2592 (21.91)	929 (22.79)	1011 (23.53)	307 (19.53)	335 (18.50)	212 (22.08)	225 (22.73)	483 (22.58)	464 (21.44)	475 (24.08)	557 (21.68)
36-45	2833 (26.42)	3253 (27.50)	1039 (25.48)	1159 (26.98)	386 (24.55)	418 (23.08)	260 (27.08)	267 (26.97)	650 (30.39)	698 (32.26)	498 (25.24)	711 (27.68)
56-55	2930 (27.33)	3406 (28.79)	1130 (27.72)	1220 (28.40)	448 (28.50)	501 (27.66)	238 (24.79)	288 (29.09)	589 (27.54)	613 (28.33)	525 (26.61)	784 (30.52)
56-64	1607 (14.99)	1624 (13.73)	606 (14.86)	550 (12.80)	280 (17.81)	375 (20.71)	146 (15.21)	119 (12.02)	276 (12.90)	230 (10.63)	299 (15.15)	350 (13.62)
Place of birth												
Country of residence	9416 (88.45)	10483 (89.19)	3416 (83.87)	3639 (84.79)	1434 (91.34)	1639 (90.50)	798 (83.39)	833 (84.23)	1950 (91.16)	2005 (92.74)	1818 (95.33)	2367 (94.72)
Other	1230 (11.55)	1270 (10.81)	657 (16.13)	653 (15.21)	136 (8.66)	172 (9.50)	159 (16.61)	156 (15.77)	189 (8.84)	157 (7.26)	89 (4.67)	132 (5.28)
Educational attainment												
Low	1762 (16.51)	1550 (13.14)	610 (15.01)	573 (13.38)	159 (10.13)	125 (6.91)	257 (27.28)	232 (23.51)	619 (29.02)	492 (22.79)	117 (5.95)	128 (5.00)
Medium	5563 (52.12)	5590 (47.38)	2250 (55.35)	2238 (52.25)	752 (47.93)	673 (37.22)	255 (27.07)	269 (27.25)	956 (44.82)	924 (42.80)	1350 (68.70)	1486 (58.00)
High	3349 (31.38)	4659 (39.49)	1205 (29.64)	1472 (34.37)	658 (41.94)	1010 (55.86)	430 (45.65)	486 (49.24)	558 (26.16)	743 (34.41)	498 (25.34)	948 (37.00)
Mental health												
Good	9178 (85.61)	9713 (82.10)	3489 (85.58)	3525 (82.05)	1400 (89.06)	1526 (84.26)	771 (80.31)	770 (77.78)	1885 (88.13)	1844 (85.21)	1633 (82.77)	2048 (79.72)
Fair	1543 (14.39)	2117 (17.90)	588 (14.42)	771 (17.95)	172 (10.94)	285 (15.74)	189 (19.69)	220 (22.22)	254 (11.87)	320 (14.79)	340 (17.23)	521 (20.28)

Precarious employment. Mean (SD)

EPRES-E	27.87 (0.20)	31.18 (0.20)	27.32 (0.32)	32.31 (0.33)	23.95 (0.32)	27.51 (0.30)	27.28 (0.61)	30.76 (0.62)	28.81 (0.32)	30.24 (0.31)	30.82 (0.31)	32.04 (0.27)
Temporariness	23.17 (0.45)	24.80 (0.46)	20.33 (0.68)	24.02 (0.77)	24.02 (0.80)	24.22 (0.76)	23.86 (1.28)	24.77 (1.17)	25.51 (0.90)	25.55 (0.93)	27.59 (1.41)	26.40 (1.13)
Wages	35.94 (0.47)	50.09 (0.52)	36.82 (0.77)	55.26 (0.83)	39.10 (0.87)	48.45 (0.80)	35.90 (1.55)	51.52 (1.73)	34.17 (0.84)	43.83 (0.97)	35.44 (1.38)	44.54 (1.21)
Disempowerment	23.93 (0.34)	25.45 (0.34)	20.49 (0.52)	24.71 (0.54)	15.44 (0.61)	14.07 (0.54)	24.87 (0.96)	23.60 (1.00)	27.60 (0.67)	27.73 (0.69)	32.88 (0.87)	31.98 (0.77)
Vulnerability	19.80 (0.30)	18.85 (0.30)	18.83 (0.48)	18.13 (0.47)	15.11 (0.56)	15.64 (0.46)	20.28 (0.97)	18.16 (0.93)	19.95 (0.56)	18.44 (0.56)	26.74 (0.81)	25.80 (0.78)
Exercise of rights	43.17 (0.41)	48.79 (0.42)	44.71 (0.66)	50.40 (0.70)	31.72 (0.76)	40.77 (0.74)	37.25 (1.29)	46.22 (1.27)	44.77 (0.71)	48.93 (0.74)	48.36 (1.04)	50.40 (1.00)
Unpredictable working times	21.72 (0.33)	19.25 (0.30)	23.14 (0.51)	21.45 (0.48)	25.36 (0.59)	25.48 (0.55)	22.77 (1.04)	20.25 (1.01)	17.84 (0.58)	14.49 (0.54)	23.94 (1.01)	17.74 (0.71)

M: Men; W: Women; SD: Standard deviation. *Countries included: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK.

Table 2. Multilevel models of mental health (European Working Conditions Survey 2015, selected countries*).

Men		M0 OR	M0 95% CI	M1 OR	M1 95% CI	M2 OR	M2 95% CI	M3 OR	M3 95% CI	M4 OR	M4 95% CI
Fixed effects											
Intercept		0.17	(0.14-0.19)	0.04	(0.02-0.05)	0.04	(0.03-0.06)	0.04	(0.04-0.06)	0.04	(0.03-0.07)
EPRES-E	Q1	-	-	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
	Q2	-	-	1.47	(1.21-1.78)	1.46	(1.21-1.78)	1.46	(1.21-1.78)	1.50	(1.12-1.99)
	Q3	-	-	2.19	(1.80-2.65)	2.17	(1.79-2.63)	2.17	(1.79-2.63)	1.96	(1.47-2.63)
	Q4	-	-	4.10	(3.37-4.98)	4.06	(3.34-4.94)	4.06	(3.34-4.94)	3.84	(2.89-5.11)
Age		-	-	1.02	(1.01-1.02)	1.02	(1.01-1.02)	1.02	(1.01-1.02)	1.02	(1.01-1.02)
Place of birth	Country of residence	-	-	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
	Other	-	-	0.94	(0.77-1.14)	0.93	(0.77-1.13)	0.95	(0.77-1.13)	0.95	(0.78-1.15)
Educational attainment	Low	-	-	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
	Medium	-	-	1.03	(0.86-1.24)	1.02	(0.86-1.22)	1.01	(0.86-1.22)	1.01	(0.84-1.21)
	High	-	-	1.13	(0.93-1.38)	1.12	(0.92-1.36)	1.11	(0.92-1.36)	1.11	(0.91-1.35)
Welfare state	Continental	-	-	-	-	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
	Scandinavian	-	-	-	-	0.75	(0.49-1.14)	0.62	(0.49-1.14)	0.62	(0.37-1.04)
	Anglo-Saxon	-	-	-	-	1.23	(0.79-1.91)	1.36	(0.79-1.91)	1.36	(0.74-2.51)
	Southern	-	-	-	-	0.72	(0.47-1.10)	0.97	(0.47-1.10)	0.97	(0.57-1.67)
	Central-Eastern	-	-	-	-	1.03	(0.70-1.51)	0.70	(0.70-1.51)	0.70	(0.38-1.30)
EPRES-E*Welfare states	Q2*Scandinavian	-	-	-	-	-	-	-	-	1.11	(0.64-1.91)
	Q2*Anglo-Saxon	-	-	-	-	-	-	-	-	0.94	(0.52-1.70)
	Q2*Southern	-	-	-	-	-	-	-	-	0.65	(0.37-1.17)
	Q2*Central-Eastern	-	-	-	-	-	-	-	-	1.33	(0.69-2.55)
	Q3*Scandinavian	-	-	-	-	-	-	-	-	1.42	(0.82-2.48)
	Q3*Anglo-Saxon	-	-	-	-	-	-	-	-	1.23	(0.68-2.20)
	Q3*Southern	-	-	-	-	-	-	-	-	0.78	(0.45-1.37)
	Q3*Central-Eastern	-	-	-	-	-	-	-	-	1.57	(0.85-2.92)
	Q4*Scandinavian	-	-	-	-	-	-	-	-	1.41	(0.81-2.44)
	Q4*Anglo-Saxon	-	-	-	-	-	-	-	-	0.91	(0.51-1.60)
	Q4*Southern	-	-	-	-	-	-	-	-	0.68	(0.40-1.14)
	Q4*Central-Eastern	-	-	-	-	-	-	-	-	1.65	(0.91-2.99)
Random effects											
Intercept		0.10	(0.06-0.23)	0.08	(0.06-0.23)	0.08	(0.04-0.17)	0.08	(0.04-0.17)	0.08	(0.03-0.16)
EPRES-E		-	-	-	-	-	-	0.08	(0.04-0.17)	0.08	(0.03-0.16)
Covariance		-	-	-	-	-	-	0.08	-	0.08	-

Women

Fixed effects

		M0	M1	M2	M3	M4
Intercept		0.21 (0.18-0.24)	0.07 (0.05-0.25)	0.07 (0.05-0.11)	0.07 (0.06-0.24)	0.08 (0.05-0.12)
EPRES-E	Q1	-	(ref)	(ref)	(ref)	(ref)
	Q2	-	**1.25 (1.04-1.49)**	**1.24 (1.04-1.49)**	**1.24 (1.03-1.49)**	1.11 (0.84-1.47)
	Q3	-	**1.80 (1.51-2.14)**	**1.80 (1.51-2.14)**	**1.80 (1.50-2.15)**	**1.41 (1.08-1.85)**
	Q4	-	**3.00 (2.52-3.58)**	**2.99 (2.51-3.57)**	**3.00 (2.50-3.60)**	**2.48 (1.91-3.23)**
Age		-	**1.02 (1.01-1.02)**	**1.02 (1.01-1.02)**	**1.02 (1.01-1.02)**	**1.02 (1.01-1.02)**
Place of birth		-	(ref)	(ref)	(ref)	(ref)
	Other	-	0.93 (0.78-1.11)	0.93 (0.78-1.11)	0.93 (0.78-1.11)	0.93 (0.78-1.10)
Educational attainment	Low	-	(ref)	(ref)	(ref)	(ref)
	Medium	-	0.87 (0.73-1.03)	0.86 (0.73-1.02)	0.86 (0.72-1.02)	0.85 (0.72-1.01)
	High	-	1.07 (0.89-1.27)	1.06 (0.89-1.27)	1.06 (0.89-1.27)	1.06 (0.89-1.27)
Welfare state	Continental	-	-	(ref)	(ref)	(ref)
	Scandinavian	-	-	0.85 (0.53-1.35)	0.84 (0.53-1.34)	0.78 (0.45-1.34)
	Anglo-Saxon	-	-	0.98 (0.58-1.64)	0.97 (0.58-1.63)	0.97 (0.48-1.95)
	Southern	-	-	0.79 (0.49-1.27)	0.79 (0.49-1.27)	0.68 (0.37-1.24)
	Central-Eastern	-	-	1.05 (0.68-1.62)	1.04 (0.67-1.61)	0.64 (0.35-1.14)
EPRES-E*Welfare states	Q2*Scandinavian	-	-	-	-	1.09 (0.67-1.75)
	Q2*Anglo-Saxon	-	-	-	-	1.08 (0.58-2.03)
	Q2*Southern	-	-	-	-	1.29 (0.74-2.27)
	Q2*Central-Eastern	-	-	-	-	1.50 (0.87-2.59)
	Q3*Scandinavian	-	-	-	-	1.30 (0.81-2.07)
	Q3*Anglo-Saxon	-	-	-	-	1.22 (0.67-2.21)
	Q3*Southern	-	-	-	-	1.47 (0.87-2.49)
	Q3*Central-Eastern	-	-	-	-	**2.06 (1.23-3.45)**
	Q4*Scandinavian	-	-	-	-	1.10 (0.69-1.76)
	Q4*Anglo-Saxon	-	-	-	-	1.52 (0.87-2.67)
	Q4*Southern	-	-	-	-	1.09 (0.65-1.83)
	Q4*Central-Eastern	-	-	-	-	**1.95 (1.18-3.22)**

Random effects

	M0	M1	M2	M3	M4
Intercept	0.11 (0.06-0.21)	0.13 (0.07-0.25)	0.12 (0.06-0.23)	0.12 (0.06-0.24)	0.11 (0.06-0.22)
EPRES-E	-	-	-	0.12	0.11
Covariance	-	-	-	0.12	0.11

M0: intercept-only. M1: individual-level variables. M2: M1 + country-level variable. M3: M2 + random slope for EPRES-E. M4: M3 + interaction term. *Countries included: Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK.

228

8

DISCUSSION

The current dissertation aimed to add to the research field of precarious employment and health by developing, validating, and exploring the associations with mental health of a novel cross-national measure. Accordingly, the first objective of the dissertation was to adapt EPRES, a multidimensional measure of precarious employment (Amable, 2006; Vives et al., 2010, 2015), to the available information in the EWCS-2015 (Eurofound, 2021), as well as to test the psychometric properties and construct validity of the ensuing measure (i.e., EPRES-E) in Spain. Thereafter, the second objective was to extend the validation of EPRES-E to the remaining countries covered in the survey. Finally, in the countries where EPRES-E proved valid, the third objective was to examine the association between EPRES-E and mental health both among women and men, taking into consideration the interactions with welfare states.

This chapter is geared towards discussing the results of this work, both from a methodological and conceptual perspective, in an integrated manner. That is, exposing the mutual complementarity and the dialogue between the findings of each research study to provide an all-embracing viewpoint of the contributions of this dissertation to the existing knowledge. The discussion is followed by a description of the limitations and strengths of the overall dissertation. Lastly, future research lines and policy implications of the findings are outlined.

8.1 Main research findings

The incorporation of the social determinants of health into the epidemiologic and public health research agenda involved a major challenge. Due to their embeddedness in the broader context in which they are both shaped and experienced, the social determinants of health are dynamic and vary across national realities and population groups (Comisión para reducir las desigualdades sociales en salud en España, 2015; Dahlgren & Whitehead, 1992; Krieger, 2001). Therefore, coming up with comprehensive measures that capture the full scope of each social determinant of health is a complex endeavor. Precarious employment is no exception. Yet, developing a measurement instrument that can be applied meaningfully in multiple countries is a cornerstone to advance research in occupational and public health any further (Benach et al., 2016). More than that, the measure needs to be incorporated into data sources that are conducted on a regular basis in order to systematically retrieve data with which to design, implement, and evaluate employment- and health-related policies (Bodin et al., 2020). That being said, the current dissertation is, to my knowledge, the first of its kind to propose such a measure of precarious employment, namely, EPRES-E, which stands for Employment Precariousness Scale for Europe.

Broadly, EPRES-E consists of 13 items sorted into six dimensions, i.e., temporariness, wages, disempowerment, exercise of rights, vulnerability, and unpredictability of working times.

As observed, the dimensions vary slightly from the ones included in the original version of EPRES (i.e., temporariness, wages, disempowerment, rights, exercise of rights, and vulnerability). First, the "rights" dimension is missing, due to the fact that no items were found in the EWCS-2015 questionnaire that conceptually reflected it. In contrast, a new dimension related to the unpredictability of working times was included. Briefly, the EPRES construct builds on the grounds that precarious employment is the materialization of the asymmetry of power relations between employers and employees (Amable, 2006; Korpi, 2006). Dimensions are thus the forms in which this asymmetry is made manifest. This broad understanding opens the door to the inclusion or removal of dimensions according to the specificities of labor markets while safeguarding the nature of the construct, in the sense that the manifestations of this asymmetry are tightly related to socioeconomic, political, and cultural patterns (Muntaner, 2016). In that behalf, the source of uncertainty posed by the unpredictability of working times, either due to employer-led decisions, great workloads, or volatile work tasks, was not grasped by any of the other dimensions (Arlinghaus et al., 2019; Porthé et al., 2010; Vanroelen et al., 2021). For this reason, the dimension was incorporated into the Belgian version of EPRES (Vandevenne, 2020) and was considered an insightful dimension to be added to the EPRES-E structure as well.

It is also worth mentioning that the original proposal of EPRES-E included an additional item in the "disempowerment" dimension related to the setting of working times. Conceptually, the item was devised to inform about the power position of workers in the bargaining

process. However, the response alternatives focused on the individual level, neglecting collective agreements and other fundamental forms of collective negotiation. These are crucial in the European context and determine the employment conditions of a large share of the workforce (Keune, 2006; Traxler & Mermet, 2003). This conceptual weakness was empirically reflected in the descriptive, psychometric, and confirmatory factor analyses, which showed poor results. As such, the item was removed.

Aside from that, the version of EPRES-E detailed above demonstrated good psychometric properties and construct validity in the Spanish context. As a first relevant issue, all the 13 items proved to be unique, insofar as they did not retrieve redundant information, and were placed in its corresponding dimension. Dimensions, in turn, showed to be correlated with each other while also contributing distinctively to the configuration of the all-embracing construct of precarious employment. This is of special interest in the case of the new dimension, namely, "unpredictability of working times", since these results empirically confirmed its involvement in the contouring of the construct. On another note, almost all omega reliability scores were equal to or greater than the cut-off value set for acceptance, which is particularly insightful considering the low number of items conforming each dimension (i.e., 2 or 3). An exception was the reliability of the "exercise of rights" dimension. Certainly, the dimension would benefit from additional items that grasped better the full breadth of rights that precarious workers have difficulty exercising, such as paid vacations or sick leave (Porthé et al., 2010). But these were not available in the EWCS-2015. Similarly, four out of the six dimensions (i.e., vulnera-

bility, unpredictability of working times, disempowerment, and temporariness) showed high floor effects, which pointed out the incapacity of these dimensions to capture mild precarious employment situations. Ultimately, the share of non-response was below 3% across all the items except for those related to wages, which is a frequent shortcoming in survey research (Riphahn & Serfling, 2005). Despite these drawbacks, the overall structure of EPRES-E proved to be valid in confirmatory factor analyses. Therefore, the scale was considered a suitable measure of precarious employment in the Spanish context, both in terms of psychometric properties and construct validity.

These findings set the grounds to extend the validation of EPRES-E to the other countries covered in the EWCS-2015. By means of multi-group confirmatory factor analyses (Rudnev et al., 2018) and the substantive exploration of dimension and overall EPRES-E scores, the scale proved to be equivalent in Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the UK.

This ought to be nuanced, though. While the first-order structure of the model (i.e., the dimensions) attained a sufficient degree of measurement invariance or equivalence, this was not the case for the higher-order structure, that is, the overall EPRES-E structure. In other words, EPRES-E scores do not derive from the same combination of dimension scores in all countries. The substantive exploration of mean scores aided in illustrating this finding. Portugal and Spain, for instance, obtained similar EPRES-E mean scores. In the Portu-

guese case, this was mainly triggered by high mean scores in the "disempowerment" dimension, which aligns with the scarcity of collective bargaining schemes in the country, severely affected by the policies deployed within the framework of the Great Recession (Addison et al., 2017). As for Spain, it was more a matter of "temporariness", echoing a significant distinction of the Spanish labor market (Polavieja, 2006). On that account, equal EPRES-E scores in these countries are likely to be reflecting distinct employment situations.

Therefore, raw EPRES-E scores can only be meaningfully compared across countries if accompanied by the scores of each dimension (Chen et al., 2005). However, this was considered a strength of the measure rather than a hindrance. This malleability in the composition of overall EPRES-E scores confers the opportunity to capture better the contextual reality of each country, as illustrated by the examples of Portugal and Spain, while still being able to compare correlations and regressions across countries (Rudnev et al., 2018).

Indeed, the substantive exploration of EPRES-E and dimension scores gave insights into the configuration of precarious employment in the 22 countries. The results suggested that although Scandinavian countries (i.e., Denmark, Finland, Norway, Sweden) enjoy solid collective bargaining schemes, showcased by particularly low mean scores in the "disempowerment" dimension, the "unpredictability of working times" emerges as a striking labor market risk in this group of countries. Another suggestive finding was that employment relationships in the Central-Eastern European countries where EPRES-E proved valid (i.e., Croatia, Lithuania, Poland, Slovakia, Slovenia)

shared few aspects beyond being at the bottom end of European labor standards, at least in the 22 countries examined, insofar as they showed the poorest EPRES-E scores. While temporary contracts and low opportunities for worker representation were the main sources of precariousness in the Polish labor market, it was poor interpersonal relationships (i.e., vulnerability and inability to exercise rights) in Slovakia, and low wages in Slovenia. Low wages and the inability to exercise rights also stood as a matter of concern in Germany, probably related to the rise in minijobs and other forms of unprotected and low-paid part-time employment since the Hartz reforms were implemented (Pfau-Effinger & Reimer, 2019). Finally, the contrasts in the Danish and Dutch approaches to flexicurity (Bekker & Mailand, 2019) prompted unequal dimension mean scores. In the Danish case, their flexicurity system is centered at combining liberal redundancy regulations with high unemployment benefits and active labor market policies. This translated into high scores in "temporariness", which was also the case for the Netherlands. However, the Dutch approach to flexicurity rather advocates for protecting temporary and part-time workers further, and this was reflected by high scores in "wages"[10] as well.

---

[10]Note that the "wages" dimension is the combination of two indicators related to monthly wages and hourly wages (see chapter 7). Part-time workers have poor monthly wages regardless of their income per hour, insofar as their overall income is inherently lower than that of full-time workers. Therefore, countries with high percentages of part-time workers score higher in this dimension.

It is also worth mentioning that EPRES-E was found to be unapplicable in 13 (Central-Eastern) European countries, i.e., Albania, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Malta, Montenegro, Republic of North Macedonia, Romania, Serbia, and Turkey. This is suggestive of the prominent distinctions between post-communist labor markets and those of their Western European counterparts (Haggard & Kaufman, 2008; Judt, 2005; Standing, 1996). Indeed, the rapid transition from communist regimes to a market economy that these countries experienced throughout the 1990s amplified the risks to which workers were exposed, both within and beyond the boundaries of labor markets (Eichengreen, 2007; Standing, 1996). These risks were not adequately captured by EPRES-E, inherently implying that precarious employment is configured by a different or extended set of features in this group of countries. It should still be noted that EPRES-E did apply in five Central-Eastern European countries, i.e., Croatia, Lithuania, Poland, Slovakia, and Slovenia. However, these happen to be, in general terms, the ones that share the most traits with Western European labor markets (Mrak et al., 2004; Orosz, 2019).

A further requirement for a construct to be valid in a cross-national setting is to demonstrate consistent associations with related constructs in an expected direction (O'Leary-Kelly & J. Vokurka, 1998). As such, the relationship between EPRES-E and mental health was examined, separately by women and men, in the 22 countries where EPRES-E was applicable. In line with a growing body of research on precarious employment and mental health (Rönnblad et al., 2019; Utzet et al., 2020), EPRES-E was found to be associated with poor

mental health in all countries and genders analyzed. On top of that, these associations followed a dose-response pattern, aligning with theory of the social determinants of health inequalities (Marmot & Bell, 2016; Marmot & Wilkinson, 2005) and with the findings of analogous research tackling other health outcomes (Julià, Vives, et al., 2017). Accordingly, EPRES-E not only showed to be valid for comparative research but also an insightful tool to analyze the health-damaging effects of precarious employment.

Beyond that, the latter research study also offered insights on the unequal mental health effects of precarious employment on men and women. The prevalence of poor mental health was found to be greater among women than men, as was the degree of precarious employment. Contrastingly, the association between the two was found to be stronger among men. The fact that women are more frequently exposed to precarious forms of employment than men is not a revelation (Menéndez et al., 2007; Vosko et al., 2009). The gendered division of labor, which makes women responsible for domestic and caring activities even in dual-earner family models, their lower representation in the political system and collective bargaining schemes, and other structural sources of discrimination against women constrain their opportunities in the labor market (Christofides et al., 2013; Korpi et al., 2013; Menéndez et al., 2007; Vosko et al., 2009). However, the pervasiveness of the male power structure results in multiple other sources of disadvantage outside the boundaries of paid employment (Weber & Parra-Medina, 2003). All these sources of disadvantage combined result in a greater burden of mental distress for women (Carmen et al., 1981). Yet, precarious employment in itself

may not be as determinant for mental ill-health as among their male homologues who, in their traditional role of breadwinners, are more strongly compelled to succeed in the labor market, both financially and socially (Creighton, 1996; Muntaner et al., 2009).

Against this background, the role of welfare states and family policies emerges as an intricate topic, in the sense that they have the potential to relieve women of reproductive tasks to pursue a professional career (Daly, 2020), on the one hand, and to redistribute resources and assets to prevent or offset the adversities of labor markets (Shahidi, Siddiqi, et al., 2016), on the other.

Drawing on a regime approach, none of the welfare states analyzed (i.e., Continental, Scandinavian, Anglo-Saxon, Southern, Central-Eastern) were found to exert any differential influence on the relationship between EPRES-E and mental health among men. In contrast, among women, Central-Eastern European welfare states were found to aggravate the deleterious effects of precarious employment on mental health, compared to Continental welfare states.

Central-Eastern welfare states are often regarded as contradictory in terms of family policies and gender equality (De Moortel et al., 2014). That is, a central goal of the communist approach was to suppress gender constraints in the labor market by socializing reproductive activities and endorsing women's opportunities for social reproduction. Nevertheless, structural adjustments to attain market-capitalism triggered the retrenchment of family-friendly policies, the privatization of childcare services, and the decline in the real value of

social benefits (Plomien, 2006; Pollert, 2003; Weiner, 2010). As such, in the transition from socialism to capitalism, women became particularly overburdened with productive and reproductive activities (Pollert, 2005). Undeniably, women's double burden of work is almost ubiquitous in contemporary wealthy societies (Daly, 2020). Still, the tainted experience of women in Central-Eastern labor markets is likely to pose a greater toll on their mental health (Lokar, 2000; Pollert, 2005).

Aside from that, the allegedly protective health effects of Scandinavian welfare states proved elusive in this study, both among men and women. It is worth mentioning that the idealized social-democratic model of the post-war era eroded substantially in recent decades, as a result of demographic, socioeconomic, political, and cultural transformations (Fritzell et al., 2005; Kangas & Palme, 1992). However, Scandinavian welfare states still stand out as the most comprehensive and equitable and are therefore best suited to counteract the adverse mental health effects of precarious employment (Muntaner et al., 2011). That being so, the findings suggest that welfare states may be ineffective in responding to the ever-changing needs of an increasingly diverse workforce (Mackenbach, 2012).

Overall, the work performed within the framework of this dissertation contributed greatly to the existing literature by proposing a multidimensional measure of precarious employment theoretically sound and empirically valid in 22 European countries. It also weighs in the compelling debate of how, where and why precarious employment unequally affects the mental health of men and women. Undeniably,

there are some limitations of this work that warrant further investigation. Among others, future waves of the EWCS should address further characteristics of employment conditions and relations to expand the viability of the scale in Central and Eastern Europe. Yet, the findings are of interest to occupational and public health researchers, professionals, and policymakers seeking to promote more equitable and healthy labor markets.

8.2 Limitations and strengths

As said, this dissertation is not without limitations, and the results must be interpreted accordingly. First and foremost, EPRES-E is restricted to the boundaries of formal salaried employment relationships. In other words, it neglects other potentially precarious forms of employment such as informal employment and self-employment (Gevaert et al., 2021; Julià et al., 2019; Ruiz, 2018). However, the configuration of the precariousness of self-employment and informal employment is not yet well understood, particularly from a cross-national perspective (Benach et al., 2016). And this dissertation was aimed at adapting a sound conceptualization of precarious employment in an international and periodic data source, rather than advancing current knowledge on the determinants of precarious employment beyond formal wage-earning relationships. Therefore, broadening the scope of EPRES-E (and EPRES, by allusion) to include the self-employed and informal workers exceeded the objectives of this dissertation.

In another instance, the EWCS-2015 was not designed for the specific purpose of measuring precarious employment. As such, the questionnaire lacked discerning characteristics of the precariousness of employment relationships. For instance, the rights to which workers are (not) entitled. In the same line, the wording of the items and their response alternatives could not be reformulated to capture the nature of the construct better. Lastly, the placement of the selected EPRES-E items within the questionnaire was not successive. All in all, the overall psychometric properties and construct validity of the

scale proved to be acceptable in a large number of countries, but EPRES-E would still benefit from the incorporation of additional items and the unification of items within the structure of the EWCS survey.

Another methodological limitation is the decision to assign equal weights to the dimensions (Benach, Vanroelen, et al., 2013; Muñoz-Bustillo et al., 2011; Nardo et al., 2008). Nevertheless, there were no conceptual grounds or standardized methodological procedures to allocate weights in a more precise manner. Rather the opposite. While Amable's (2006) qualitative study suggested that "vulnerability" and "exercise of rights" were the most significant dimensions in the configuration of precarious employment relationships, the results of papers 1 and 2 pointed out that these were "temporariness", "disempowerment", and "wages". In the absence of more compelling evidence that illustrates which dimensions play the most important role in the experience of precarious employment situations, the procedure of equal weighting is the most recommended (Muñoz-Bustillo et al., 2011).

Moving on to the epidemiological findings, the cross-sectional nature of the EWCS-2015 posed two major threats to internal validity. First, cross-sectional data sources do not allow making strong claims on causality. Nor can reverse causality or the healthy worker effect be ruled out. The latter refers to the mechanisms by which workers with ill-health are clustered into precarious forms of employment or unemployment, since they have fewer resources and assets to find and stay in high-quality employment relationships (Dahl, 1993). Yet,

qualitative (Bosmans, 2016; Porthé et al., 2010) and longitudinal (Jonsson, Muntaner, et al., 2021) research studies support the causal relationship between precarious employment and mental health. Similarly, cross-national data do not capture the dynamism of precarious employment relationships. Precarious workers, by definition, change jobs and employment conditions far more frequently than stable, non-precarious workers (Standing, 2011). This ever-changing situation has the potential to entail cumulative effects on the mental health of workers (Benach et al., 2014). However, it could not be apprehended in the current study.

The second threat to internal validity lied in the fact that both the exposure (i.e., EPRES-E) and the outcome (i.e., mental health) were drawn from self-reported data. That being the case, subjectivity bias cannot be excluded. However, the findings reported in this dissertation align with those of a similar study drawn from administrative data sources (Jonsson, Muntaner, et al., 2021). Therefore, subjectivity bias is unlikely to cancel out all the observed associations.

To end with, the regime approach to welfare states employed in paper 3 potentially oversaw the effects of national welfare states or specific welfare policies on the relationship between precarious employment and mental health (Bergqvist et al., 2013). Clustering countries according to the characteristics of their welfare state structure permits the simultaneous assessment of multiple welfare policies and interventions (Esping-Andersen, 1990). On the negative side, however, the approach does not capture the particularities of each country. This could be solved by introducing a wide range of country-level

indicators related to individual social policies into the same analytical model. Yet, this procedure runs the risk of losing statistical power, particularly in multi-level analyses with few higher-level units (i.e., 22 in this case).

Despite these shortcomings, this dissertation has a number of strengths. Most importantly, it is the first of its kind to extend the validation of a multidimensional measure of precarious employment in up to 22 European countries. In the absence of an internationally agreed conceptualization of precarious employment, this was strongly required to advance comparative occupational and public health research any further. To that should be added that the short structure of the scale (i.e., 13 items versus 22 in EPRES) allows the possibility to incorporate EPRES-E in other large-scale or purposedly-collected surveys where space constraints are a major issue. From a more conceptual perspective, the results obtained throughout the validation process also shed light on the configuration of precarious employment in the European context.

Another insightful strength is the use of a large data base representative of the population in employment in each of the covered countries. On top of that, the organizers of the EWCS pay meticulous attention to the field work of the survey, in order to safeguard the homogenization of data within and across countries, and the minimization of measurement, selection, interviewer, and other biases (Eurofound, 2017). This allows the generalization of the results to the entire formal salaried population within and between the countries where EPRES-E proved valid.

Lastly, this dissertation is based on a holistic conceptual framework of the social determinants of health (Comisión para reducir las desigualdades sociales en salud en España, 2015; Muntaner et al., 2010) that pictures the intersections and interactions between structural determinants (e.g., welfare states), intermediate determinants (e.g., precarious employment), and the axes of social inequalities (e.g., gender) in the production of social inequalities in (mental) health. Understanding the relationship between precarious employment and mental health as embedded in the broader context in which both phenomena are shaped and experienced is a strength in itself (Benach et al., 2016). Beyond that, however, this all-embracing perspective allowed for a more comprehensive analysis and interpretation of the role of gender and welfare states in this relationship. Previous similar research addressed this intricate by stratifying the results both by welfare states and gender (De Moortel et al., 2014; Fujishiro et al., 2021). The approach is definitively illustrative of the gender and health differential that precarious employment generates across welfare states. However, it only does so in a substantive manner, neglecting the interactions between precarious employment and welfare states in the distribution of poor mental health across genders. The current dissertation thus adopted another methodological approach to this interaction, pointing out the additive effect that some welfare states may have on the health-damaging consequences of precarious employment.

8.3 Future research lines

The limitations outlined above put forward future lines for interdisciplinary research. On a first account, the EPRES (and EPRES-E) construct should be expanded to encapsulate a broader share of the labor force, namely, the self-employed and informal workers. This requires the integrated effort of researchers, policymakers, and stakeholders to engage in the complex endeavor of exploring the legal and regulatory system of each country that gives rise to unequal forms of self-employment and informal employment (and informal self-employment), the sources and manifestations of unbalanced power relations in these settings, the implications of the on-the-rise digital economy in the configuration of these forms of employment, and how all the above intersects and interacts to bring about detrimental experiences of the employment situation.

Likewise, it is necessary to expand current knowledge of the precariousness of employment relationships in Central and Eastern European countries. In that regard, the allocation of further resources to build high-quality information systems to monitor employment conditions and relations from a public health perspective in this group of countries is a cornerstone (Santoro et al., 2016). Future studies in this field of research should also examine the public-private divide in Central and Eastern European labor markets, and its consequences for the configuration and distribution of precarious employment (Lausev, 2014).

Occupational and public health researchers should also be devoted to exploring further the unequal burden that each dimension of precarious employment represents for the health and well-being of the working population, in order to achieve a more precise weighting procedure to calculate both EPRES and EPRES-E, as well as a better understanding of how and why precarious employment situations result in ill-health. As regards the latter, a promising strand of research proposed the use of typologies, that is, clustering workers into rather homogeneous categories according to their employment conditions and relations (Van Aerden et al., 2016). Employing this approach could aid in providing a bigger picture of the health differential across distinct combinations of precarious employment conditions and relations (Vanroelen et al., 2021).

Other than that, the construction and validation of EPRES-E ought to be reproduced in future waves of the EWCS. Validating the measure in different datasets will broaden the external validity of the measure. Moreover, it will allow the analysis of time trends and cross-country variations at the aggregate level, which is the first step towards a monitoring system of precarious employment (Benach et al., 2012). To that should be added that the seventh wave of the EWCS was fielded after the outbreak of the pandemic, in 2021 (Eurofound, 2021). Therefore, validating EPRES-E in the EWCS-2021 gains particular importance to analyze the adverse consequences that the pandemic had and is still having for the precarious workforce (Matilla-Santander et al., 2021).

In the epidemiological field, longitudinal studies that address the issue of causality, on the one hand, and the cumulative effect of precarious employment trajectories, on the other, are also strongly claimed for. This entails multiple conceptual and methodological endeavors to be addressed, though. First, precarious or low-quality employment trajectories are not confined precarious employment relationships. These also include the back-and-forth combination of unemployment and precarious employment, or the downward mobility from high-quality to precarious employment relationships (Jonsson, Muntaner, et al., 2021), which are likely to pose a different toll on the health of workers. Second, precarious employment trajectories potentially set in motion vicious cycles between health causation and health selection. That is, precarious employment trajectories that result in ill-health may be inherently reducing the employability of workers, selecting them into precarious employment relationships and starting over the cycle. Third, contextual (e.g., social benefits, income replacement schemes) and life-course-related (e.g., having children) variables that change over time have a strong bearing upon the experience of precarious employment (Clarke et al., 2007). Finally, longitudinal surveys or linked administrative data sources do not incorporate measures of precarious employment. The work of adaptation and validation performed within the framework of this dissertation may thus be of great interest to scholars who wish to engage in this strand of research.

Qualitative studies could also expand the findings retrieved in this dissertation. The complex relationships between welfare states, gender, and precarious employment in producing health inequalities are

difficult to address from a quantitative perspective. Qualitative analyses are better suited to disentangle the macro-, meso-, and micro-level mechanisms through which social factors affect health and well-being. These also have the potential to shed light on the intersectionality of gender with the other axes of social inequalities in the embodiment of precarious employment, which was not analyzed in the current dissertation (Weber & Parra-Medina, 2003).

On a final note, future research ought to explore the gendered distribution of precarious employment and its health effects from a non-binary perspective. Non-binary individuals experience multiple sources of social disadvantage that place them in a more vulnerable situation to succeed in all life domains (Krieger, 2001). Yet, their opportunities and expectations in labor markets, as well as its potential health-damaging effects, remain largely understudied.

Certainly, there are multiple other lines of research that should be explored, including the effects of precarious employment on the health of family members, the associations with biomarkers, and the identification of the pathways and mechanisms through which precarious employment affects health (Benach et al., 2016; Bodin et al., 2020). Those stressed above are just impressions of how the research performed within the framework of this dissertation can be advanced.

8.4 Implications for policy and practice

"Health in all policies" is an interdisciplinary approach to public policies that systematically addresses the health effects of decisions, programs, and interventions (Leppo et al., 2013). It builds on the grounds that all public policies, and not only those directly related to health or the healthcare system, are determinant for the health and well-being of the population. As such, it aims to enhance the accountability of researchers, stakeholders, and policymakers for health consequences at all levels of decision-taking, as well as to seek synergies to improve health. Policies directed at eradicating precarious should thus be framed within this holistic strategy. That being said, the results reported in this dissertation can aid in tailoring public policies to support the health of the working population in the European context.

A first action plan towards this goal relates to the need to implement high-quality surveillance systems of precarious employment to map the distribution of the phenomenon within and across countries, identify and prioritize public policy entry points, design and implement effective interventions, and evaluate their impact from an interdisciplinary perspective (Benach et al., 2012). This dissertation proposed a promising tool for this strategy. Moreover, the development and validation of EPRES-E can act as a methodological blueprint to draw similar tools from longitudinal large-scale surveys or administrative databases. Aside from that, the results stress the importance of strengthening public health research and surveillance capacities in Central and Eastern European countries (Cash-Gibson et al., 2020).

Efforts should also be centered at incorporating a gender perspective into the strategies to prevent or counteract the health-damaging implications of precarious employment. This goes beyond the deployment of family-friendly policies and the suppression of gender discriminatory practices in the labor market. Public policies devoted to this goal should tackle all life domains that have a bearing upon women's experience in the labor market (Borchorst & Siim, 2002). For this all-embracing purpose, policymakers ought to integrate women in the decision-making process to enable them to actively drive their course of emancipation.

On another note, the dialogue between employment regimes and welfare states should be revisited to meet the ever-changing needs of an increasingly diverse workforce (Kolberg & Esping-Andersen, 1991). That is, welfare states have the potential both to narrow down and reinforce employment-related health inequalities (Muntaner et al., 2011). Failing to capture a growing share of the labor force is likely to trigger the latter scenario. Therefore, more integrated approaches to social protection should range from broadening the scope of the employment protection legislation to incorporate old and new forms of precarious employment, to expanding the entitlement criteria for social transfers and benefits. These initiatives should be accurately tailored to reach all population groups.

To all these points should be added that policymakers and other active agents in the design, implementation, and evaluation of occupational and public health policies would definitely benefit from improved channels of communication at an international level. Precari-

ous employment is not a uniform phenomenon, nor are its health-damaging effects. Lessons from national experiences are thus an insightful source of policy recommendations. Besides, building an international roadmap towards the eradication of precarious employment is imperative to deal with the challenges posed by the globalization of economies.

All in all, precarious employment stems from the unequal distribution of power and resources to the detriment of the working class (Muntaner, 2016). Therefore, the elimination or effective reduction of precarious employment largely requires the allocation of power back to workers through policies that strengthen economic and labor democracy (Dahl, 1985).

9

CONCLUSIONS

Several conclusions emerge from the results presented in this dissertation. First, the Employment Precariousness Scale for Europe (i.e., EPRES-E) proved to be valid for comparative research in 22 European countries, i.e., Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the UK. This is particularly insightful to advance current knowledge on the adversities of precarious employment from a cross-national perspective.

Second, the combination of the dimensions or facets that make up precarious employment in these countries varies according to the socioeconomic, political, and cultural characteristics of each country. As such, the multidimensional nature of EPRES-E allows to capture better the contextual realities of each country.

Third, EPRES-E was not applicable in most Central and European countries, i.e. Albania, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Malta, Montenegro, Republic of North Macedonia, Romania, Serbia, and Turkey. The configuration of precarious employment in this group of countries therefore differs from that of the 22 countries listed above. Further efforts should be devoted to disentangling the features that shape precarious employment relationships in Central and Eastern Europe, and future waves of the EWCS ought to tackle a wider range of employment characteristics and relations, such as whether or not workers are entitled to statutory rights, to broaden the scope of EPRES-E conceptually and geographically.

Fourth, precarious employment, measured through EPRES-E, is consistently associated with poor mental health. The relationship followed a dose-response pattern in all the countries and genders analyzed, wherein workers in the most precarious employment situations were more likely to suffer from poor mental health compared to those in more the least precarious employment situation.

Fifth, in the European context women are more frequently exposed to precarious employment and suffer from poorer mental health than men. However, the relationship between precarious employment and poor mental health is greater among men than women. Future studies are thus needed to identify the mechanisms through which precarious employment unequally affects the health of men and women.

Sixth, contextual factors have a bearing upon the health-damaging effects of precarious employment. In the particular case of welfare states, those of Central-Eastern European countries appeared to aggravate the deleterious effects of precarious employment on the mental health of women, but not of men. Scandinavian welfare states, on the contrary, were not found to alleviate these adverse effects, neither among women nor men. The interaction between welfare states and family models and precarious employment in the production of inequalities in mental health should be explored in more depth.

To conclude with, precarious employment should be incorporated into official international, national, and regional policy to counteract its adverse health effects. This calls for interdisciplinary action tailored to meet the specificities of labor markets and population groups.

Additionally, the unequal needs of men and women both within and outside the boundaries of labor markets should be taken into consideration. Only by using this holistic approach will we effectively deal with the challenges posed by increasingly globalized, individualized, and, in sum, precarized labor markets.

REFERENCES

Acemoglu, D., Autor, D. H., & Lyle, D. (2004). Women, war, and wages: The effect of female labor supply on the wage structure at midcentury. *Journal of Political Economy*, *112*(3), 497–551.

Addison, J. T., Portugal, P., & Vilares, H. (2017). Unions and Collective Bargaining in the Wake of the Great Recession: Evidence from Portugal. *British Journal of Industrial Relations*, *55*(3), 551–576. https://doi.org/10.1111/bjir.12198

Alsos, K., Nergaard, K., & Van den Heuvel, A. (2019). Collective bargaining as a tool to ensure a living wage. Experiences from the Nordic countries. *Transfer: European Review of Labour and Research*, *25*(3), 351–365.

Amable, M. (2006). *La precariedad laboral y su impacto sobre la salud. Un estudio en trabajadores asalariados en España.* Barcelona: Universitat Pompeu Fabra.

Anker, R. (1997). Theories of occupational segregation by sex: An overview. *International Labour Review*, *136*(3), 315–339.

Anxo, D., Fagan, C., Cebrián, I., & Moreno, G. (2007). Patterns of labour market integration in Europe—a life course perspective on time policies. *Socio-Economic Review*, *5*(2), 233–260.

Appelbaum, E. (2012). Reducing Inequality and Insecurity: Rethinking Labor and Employment Policy for the 21st Century. *Work and Occupations*, *39*(4), 311–320. https://doi.org/10.1177/0730888412444883

Arlinghaus, A., Bohle, P., Iskra-Golec, I., Jansen, N., Jay, S., & Rotenberg, L. (2019). Working Time Society con- sensus statements: evidence-based effects of shift work and non-

standard working hours on workers, family and community. *Industrial Health*, *57*(2), 184–200.

Armano, E., Bove, A., & Murgia, A. (2017). *Mapping Precariousness, Labour Insecurity and Uncertain Livelihoods* . London and New York: Routledge.

Armstrong, P., Glyn, A., & Harrison, J. (1984). *Capitalism since World War II*. London: Fontana.

Arnold, D., & Bongiovi, J. R. (2013). Precarious, informalizing, and flexible work: Transforming concepts and understandings. *American Behavioral Scientist*, *57*(3), 289–308.

Aroles, J., Mitev, N., & de Vaujany, F.-X. (2019). Mapping themes in the study of new work practices. *New Technology, Work and Employment*, *34*(3), 285–299. https://doi.org/https://doi.org/10.1111/ntwe.12146

Artazcoz, L., Benach, J., Borrell, C., & Cortès, I. (2005). Social inequalities in the impact of flexible employment on different domains of psychosocial health. *Journal of Epidemiology & Community Health*, *59*(9), 761–767. https://doi.org/10.1136/jech.2004.028704

Arts, W., & Gelissen, J. (2010). Models of the welfare state. In S. Leibfried, J. Lewis, H. Obinger, & C. Pierson (Eds.), *The Oxford Handbook of the welfare state*. Oxford: Oxford University Press.

Atkinson, J. (1987). Flexibility or fragmentation? The United Kingdom labour market in the eighties. *Labour and Society*, *12*(1), 86–105.

Auer, P., & Cazes, S. (2003). *Employment stability in an age of flexibility: evidence from industrialized countries*. Geneva: International Labour Organization.

Balogh, R., Gadeyne, S., & Vanroelen, C. (2021). Non-standard employment and mortality in Belgian workers: A census-based investigation. *Scandinavian Journal of Work, Environment & Health*, *47*(2), 108–116. https://doi.org/10.5271/sjweh.3931

Bambra, C., & Eikemo, T. A. (2009). Welfare state regimes, unemployment and health: A comparative study of the relationship between unemployment and self-reported health in 23 European countries. *Journal of Epidemiology and Community Health*, *63*(2), 92–98. https://doi.org/10.1136/jech.2008.077354

Bambra, C., Lunau, T., van der Wel, K. A., Eikemo, T. A., & Dragano, N. (2014). Work, Health, and Welfare: The Association between Working Conditions, Welfare States, and Self-Reported General Health in Europe. *International Journal of Health Services*, *44*(1), 113–136. https://doi.org/10.2190/HS.44.1.g

Barbier, J. (2005). La précarité, una catégorie française à l'épreuve de la comparaison internationale. *Revue Française de Sociologie*, *46*(2), 351–371.

Bardasi, E., & Francesconi, M. (2004). The impact of atypical employment on individual wellbeing: evidence from a panel of British workers. *Social Science & Medicine*, *58*, 1671–1688.

Barnett, R., & Hyde, J. (2001). Women, men, work, and family: An expansionist theory. *American Psychologist*, *56*(10), 781–796.

Beck, U. (1992). *Risk Society: Towards a New Modernity*. London and New York: SAGE Publications.

Bekker, S., & Mailand, M. (2019). The European flexicurity concept and the Dutch and Danish flexicurity models: How have they managed the Great Recession? *Social Policy & Administration*, *53*(1), 142–155. https://doi.org/10.1111/spol.12441

Benach, J. (2021). We Must Take Advantage of This Pandemic to Make a Radical Social Change: The Coronavirus as a Global Health, Inequality, and Eco-Social Problem. *International Journal of Health Services*, *51*(1), 50–54. https://doi.org/10.1177/0020731420946594

Benach, J., Julià, M., Tarafa, G., Mir, J., Molinero, E., & Vives, A. (2015). Multidimensional measurement of precarious employment: social distribution and its association with health in Catalonia (Spain). *Gaceta Sanitaria*, *29*(5), 375–378.

Benach, J., & Muntaner, C. (2007). Precarious employment and health: Developing a research agenda. *Journal of Epidemiology and Community Health*, *61*(4), 276–277. https://doi.org/10.1136/jech.2005.045237

Benach, J., Muntaner, C., Solar, O., Santana, V., Quinlan, M., & EMCONET. (2013). *Employment, Work and Health Inequalities: A Global Perspective*. Barcelona: Icaria.

Benach, J., Puig-Barrachina, V., Vives, A., Tarafa, G., & Muntaner, C. (2012). The challenge of monitoring employment-related health inequalities. *Journal of Epidemiology and Community Health*, *66*(12), 1085–1087. https://doi.org/10.1136/jech-2012-201103

Benach, J., Vanroelen, C., Vives, A., de Witte, H., Puig Barrachina, V., Belvis-Costes, F., Ferrer-Armengou, O., & Van Aerden, K. (2013). *Quality of employment conditions and employment relations in Europe: A report based on the fifth European Working Conditions Survey*. Dublin: Eurofound.

Benach, J., Vives, A., Amable, M., Vanroelen, C., Tarafa, G., & Muntaner, C. (2014). Precarious employment: Understanding an emerging social determinant of health. *Annual Review of Public Health*, *35*, 229–253. https://doi.org/10.1146/annurev-publhealth-032013-182500

Benach, J., Vives, A., Tarafa, G., Delclos, C., & Muntaner, C. (2016). What should we know about precarious employment and health in 2025? Framing the agenda for the next decade of research. *International Journal of Epidemiology*, *45*(1), 232–238. https://doi.org/10.1093/ije/dyv342

Benavides, F. G., Benach, J., Muntaner, C., Delclos, G. L., Catot, N., & Amable, M. (2006). Associations between temporary employment and occupational injury: what are the mechanisms? *Occupational and Environmental Medicine*, *63*(6), 416–421. https://doi.org/10.1136/oem.2005.022301

Bergqvist, K., Yngwe, M., & Lundberg, O. (2013). Understanding the role of welfare state characteristics for health and inequalities - an analytical review. *BMC Public Health*, *13*(1), 1–20.

Betti, E. (2016). Gender and precarious labor in a historical perspective: Italian women and precarious work between

Fordism and post-Fordism. *International Labor and Working-Class History*, *89*, 64–83.

Bodin, T., Çağlayan, Ç., Garde, A. H., Gnesi, M., Jonsson, J., Kiran, S., Kreshpaj, B., Leinonen, T., Mehlum, I. S., Nena, E., Orellana, C., Peckham, T., Seixas, N., Vanroelen, C., & Julià, M. (2020). Precarious employment in occupational health – An omega-net working group position paper. *Scandinavian Journal of Work, Environment and Health*, *46*(3), 321–329. https://doi.org/10.5271/sjweh.3860

Borchorst, A., & Siim, B. (2002). The women-friendly welfare states revisited. *Nordic Journal of Feminist and Gender Research*, *10*(2), 90–98. https://doi.org/10.1080/080387402760262186

Bordo, M. D., & Eichengreen, B. (2007). *A retrospective on the Bretton Woods system: lessons for international monetary reform*. Chicago: University of Chicago Press.

Bosch, G. (2004). Towards a new standard employment relationship in Western Europe. *British Journal of Industrial Relations, 42*(4), 617–636.

Bosmans, K. (2016). *Workers' perceptions of precarious employment.: A qualitative study of the psychosocial processes linking employment experiences to mental well-being*. Brussels: Vrije Universiteit Brussel.

Bosmans, K., Hardonk, S., de Cuyper, N., & Vanroelen, C. (2016). Explaining the relation between precarious employment and mental well-being. A qualitative study among temporary agency workers. *Work*, *53*(2), 249–264. https://doi.org/10.3233/WOR-152136

Bowles, S., & Edwards, R. (1985). *Understanding capitalism. Competition, command and change in the US economy*. New York: Harper and Row.

Boyer, R. (1993). The economics of job protection and emerging new capital-labor relations. In C. F. Buechtemann (Ed.), *Employment sexurity and labour market behaviour. Interdisciplinary approaches and international evidence* (pp. 69–125). New York: ILR Press.

Boyer, R., & Durand, J. P. (1993). *After Fordism*. Houndmills and London: Macmillan Press Ltd.

Braverman, H. (1974). Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century. New York: Monthly Review Press.

Briggs, A. (1961). The welfare state in historical perspective. *European Journal of Sociology*, *2*(2), 221–258.

Brocklehurst, M. (2001). Power, Identity and New Technology Homework: Implications for `New Forms' of Organizing. *Organization Studies*, *22*(3), 445–466. https://doi.org/10.1177/0170840601223003

Burawoy, M. (1979). *Manufacturing Consent. Changes in the Labor Process under Monopoly Capitalism*. Chicago: University of Chicago Press.

Burgess, J., & Campbell, I. (1998). The nature and dimensions of precarious employment in Australia. *Labour & Industry1*, *8*(3), 5–21.

Campos-Serna, J., Ronda-Pérez, E., Artazcoz, L., Moen, B. E., & Benavides, F. G. (2013). Gender inequalities in occupational

health related to the unequal distribution of working and employment conditions: a systematic review. *International Journal for Equity in Health*, 12, 57.

Canivet, C., Bodin, T., Emmelin, M., Toivanen, S., Moghaddassi, M., & Östergren, P. O. (2016). Precarious employment is a risk factor for poor mental health in young individuals in Sweden: a cohort study with multiple follow-ups. *BMC Public Health*, *16*(1), 687. https://doi.org/10.1186/s12889-016-3358-5

Cano, E. (2000). Análisis de los procesos socioeconómicos de precarización laboral. In E. Cano, A. Bilbao, & G. Standing (Eds.), *Precariedad laboral, flexibilidad y desregulación* (pp. 25–68). Valencia: Germania.

Carmen, E., Russo, N. F., & Miller, J. B. (1981). Inequality and Women's Mental Health. In P. P. Rieker & E. Carmen (Eds.), *The Gender Gap in Psychotherapy* (pp. 17–39). Boston: Springer US.

Cash-Gibson, L., Harris, M., Guerra, G., & Benach, J. (2020). A novel conceptual model and heuristic tool to strengthen understanding and capacities for health inequalities research. *Health Research Policy and Systems*, *18*(1), 42. https://doi.org/10.1186/s12961-020-00559-z

Cassel, J. (1976). The contribution of the social environment to host resistance: the Fourth Wade Hampton Frost Lecture. *American Journal of Epidemiology, 104*(2), 107–123.

Castel, R. (2002). *From Manual Workers to Wage Laborers:Transformation of the Social Question*. New Brunswick: Transaction Publishers.

Castel, R. (2003). *L'Insecurité sociale : Qu'est-ce qu'être protégé?* Paris: Éditions du Seuil.

Cerami, A., & Vanhuysse, P. (2009). *Post-communist welfare pathways: Theorizing social policy transformations in Central and Eastern Europe*. London: Palgrave Macmillan Ltd.

Chang, H.-J. (2003). *Globalisation, Economic Development & the Role of the State*. London: Zed Books.

Chen, F. F., Sousa, K. H., & West, S. G. (2005). Teacher's corner: Testing measurement invariance of second-order factor models. *Structural Equation Modeling*, *12*(3), 471–492.

Christofides, L. N., Polycarpou, A., & Vrachimis, K. (2013). Gender wage gaps, "sticky floors" and "glass ceilings" in Europe. *Labour Economics*, *21*, 86–102.

Chung, H., & Muntaner, C. (2006). Political and welfare state determinants of infant and child health indicators: an analysis of wealthy countries. *Social Science & Medicine*, *63*(3), 829–842.

Chung, H., & Muntaner, C. (2007). Welfare state matters: a typological multilevel analysis of wealthy countries. *Health Policy*, *80*(2), 328–339.

Clarke, M., Lewchuk, W., de Wolff, A., & King, A. (2007). 'This just isn't sustainable': Precarious employment, stress and workers' health. *International Journal of Law and Psychiatry*, *30*(4–5), 311–326. https://doi.org/10.1016/j.ijlp.2007.06.005

Comisión para reducir las desigualdades sociales en salud en España. (2015). *Avanzando hacia la equidad. Propuestas de políticas e intervenciones para reducir las desigualdades sociales en salud*

en España. Madrid: Ministerio de Sanidad, Servicios Sociales e Igualdad.

Creighton, C. (1996). The Rise of the Male Breadwinner Family: A Reappraisal. *Comparative Studies in Society and History*, *38*(2), 310–337. https://doi.org/10.1017/S0010417500020296

Crompton, R. (1999). *Restructuring Gender Relations and Employment: The Decline of the Male Breadwinner*. Oxford: Oxford University Press.

Crompton, R. (2006). *Employment and the family: The reconfiguration of work and family life in contemporary societies*. Cambridge: Cambridge University Press.

Dahl, A. L. (2012). *Alternatives to the Consumer Society*. Berlin: PERL International Conference.

Dahl, E. (1993). Social inequality in health—The role of the healthy worker effect. *Social Science & Medicine*, *36*(8), 1077–1086. https://doi.org/10.1016/0277-9536(93)90126-O

Dahl, E., & Van der Wel, K. A. (2013). Educational inequalities in health in European welfare states: a social expenditure approach. *Social Science & Medicine*, *81*, 60–69.

Dahl, R. A. (1985). *A Preface to Economic Democracy*. Berkeley: University of California Press.

Dahlgren, G., & Whitehead, M. (1992). *Policies and strategies to promote social equity in health* (EUR/ICP/RPD 414 (2)). Copenhagen: WHO Regional Office for Europe.

Dahlgren, G., & Whitehead, M. (2021). The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. *Public Health*, *199*, 20–24.

https://doi.org/10.1016/j.puhe.2021.08.009

Daly, M. (2001). Globalization and the Bismarckian Welfare States. In R. Skyes, B. Prior, & P. M. Palier (Eds.), *Globalization and European Welfare States: Challenges and Change*. New York: Palgrave Macmillan Ltd.

Daly, M. (2020). *Gender Inequality and Welfare States in Europe*. Cheltenham: Edward Elgard Publishing.

Davidov, E., Meuleman, B., Cieciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology*, 40(1), 55-75. https://doi.org/10.1146/annurev-soc-071913-043137

De Moortel, D., Dragano, N., & Wahrendorf, M. (2020). Involuntary Full- and Part-Time Work: Employees' Mental Health and the Role of Family- and Work-Related Resources. *Societies*, *10*(4), 81. https://doi.org/10.3390/soc10040081

De Moortel, D., Vandenheede, H., & Vanroelen, C. (2014). Contemporary employment arrangements and mental well-being in men and women across Europe: A cross-sectional study. *International Journal for Equity in Health*, *13*(1). https://doi.org/10.1186/s12939-014-0090-6

De Witte, H., Pienaar, J., & De Cuyper, N. (2016). Review of 30 Years of Longitudinal Studies on the Association Between Job Insecurity and Health and Well-Being: Is There Causal Evidence? *Australian Psychologist*, *51*(1), 18–31.

Deaton, A. (2008). Income, Health, and Well-Being around the World: Evidence from the Gallup World Poll. *Journal of Economic Perspectives*, *22*(2), 53–72.

https://doi.org/10.1257/jep.22.2.53

DeMartino, G. F. (2000). *Global Economy, Global Justice. Theoretical Objections and Policy Alternatives to Neoliberalism*. London: Routledge.

Doll, R. (1955). Mortality from Lung Cancer in Asbestos Workers. *Occupational and Environmental Medicine*, *12*(2), 81–86. https://doi.org/10.1136/oem.12.2.81

Dooley, D., Fielding, J., & Levi, L. (1996). Health and unemployment. *Annual Review of Public Health*, *17*(1), 449–465.

Drahokoupil, J., & Piasna, A. (2017). Work in the Platform Economy: Beyond Lower Transaction Costs. *Intereconomics*, *52*(6), 335–340. https://doi.org/10.1007/s10272-017-0700-9

Duell, N. (2004). *Defining and assessing precarious employment in Europe: A review of main studies and surveys*. Munich: Economic Research & Consulting.

Duncan, S., & Pfau-Effinger, B. (2000). *Gender, Economy and Culture in the European Union*. London and New York: Routledge.

Eichengreen, B. (2007). *The European Economy since 1945*. Princeton: Princeton University Press.

Eikemo, T. A., & Bambra, C. (2008). The welfare state: A glossary for public health. *Journal of Epidemiology and Community Health*, *62*(1), 3–6. https://doi.org/10.1136/jech.2007.066787

Engels, J. A., van der Gulden, J. W., Senden, T. F., & van't Hof, B. (1996). Work related risk factors for musculoskeletal complaints in the nursing profession: results of a questionnaire

survey. *Occupational and Environmental Medicine*, *53*(9), 636–641.

Ervasti, J., & Virtanen, M. (2019). Research strategies for precarious employment. *Scandinavian Journal of Work, Environment and Health*, *45*(5), 425–427. https://doi.org/10.5271/sjweh.3845

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton: Princeton University Press.

Eurofound. (2017). *European Working Conditions Survey 2015 Technical Report*. Dublin: Eurofound.

Eurofound. (2021). *European Working Conditions Survey*. https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys-ewcs

Fagan, C., Lyonette, C., Smith, M., & Saldaña-Tejeda, A. (2012). *The influence of working time arrangements on work-life integration or 'balance': A review of the international evidence*. Geneva: International Labour Organization.

Fagan, C., Norman, H., Smith, M., & González-Menéndez, M. (2014). *In search of good quality part-time employment*. Geneva: International Labour Organization.

Farina, E., Green, C., & McVicar, D. (2020). Zero hour contracts and their growth. *British Journal of Industrial Relations*, *58*(3), 507–531.

Fenger, H. (2007). Welfare regimes in Central and Eastern Europe: incorporating post-communist countries in welfare regime typology. *Contemporary Issues and Ideas in Social Science*, *3*(2), 1–20.

Ferrera, M. (1999). The "Southern model" of welfare in social Europe. *Journal of European Social Policy*, *6*, 17–37.

Ferrie, J., Shipley, M., Stansfeld, S., & Marmot, M. (2002). Effects of chronic job insecurity and change in job security on self-reported health, minor psychiatric morbidity, physiological measures, and health-related behaviours in British civil servants: the Whitehall II study. *Journal of Epidemiology and Community Health*, *56*(6), 450–454.

Fleming, P. (2014). *Resisting work. The corporatization of life and its discontents*. Philadelphia: Temple University Press.

Frege, C. E., & Kelly, J. E. (2013). *Comparative employment relations in the global economy*. Oxon Abingdon: Routledge.

Fritzell, J., Hvinden, B., Kautto, M., Kvist, J., & Uusitalo, H. (2005). *Nordic Welfare States in the European Context*. London: Routledge.

Fujishiro, K., Ahonen, E. Q., & Winkler, M. (2021). Poor-quality employment and health: How a welfare regime typology with a gender lens Illuminates a different work-health relationship for men and women. *Social Science & Medicine*, *291*, 114484. https://doi.org/10.1016/j.socscimed.2021.114484

Gevaert, J., van Aerden, K., de Moortel, D., & Vanroelen, C. (2021). Employment quality as a health determinant: Empirical evidence for the waged and self-employed. *Work and Occupations*, *48*(2), 146–183. https://doi.org/10.1177/0730888420946436

Giddens, A. (2007). *Europe in the global age*. Cambridge: Polity Press.

Goldin, C. (1991). The Role of World War II in the Rise of Women's Employment. *The American Economic Review*, *81*(4), 741–756.

Gorz, A. (1982). *Farewell to the Working Class: An essay on Post-Industrial Socialism*. London and Sydney: Pluto Press.

Gramsci, A. (1971). *Selections from the prison notebooks* (Q. Hoare & G. Nowell-Smith, Eds.). New York: International Publishers.

Gray, B. J., Grey, C. N. B., Hookway, A., Homolova, L., & Davies, A. R. (2021). Differences in the impact of precarious employment on health across population subgroups: a scoping review. *Perspectives in Public Health*, *141*(1), 37–49. https://doi.org/10.1177/1757913920971333

Grimshaw, D., Rubery, J., & Keizer, A. (2016). *Reducing Precarious Work Protective gaps and the role of social dialogue in Europe*. https://documents.manchester.ac.uk/display.aspx?DocID=48958

Haggard, S., & Kaufman, R. R. (2008). Development, Democracy, and Welfare States: Latin America, East Asia, and Eastern Europe. Princeton: Princeton University Press.

Hall, P. A., & Soskice, D. (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford: Oxford University Press.

Hanson, S., & Pratt, G. (1991). Job Search and the Occupational Segregation of Women. *Annals of the Association of American Geographers*, *81*(2), 229–253.

Harvey, D. (1990). The condition of postmodernity. An Enquiry into the origins of Cultural Change. Cambridge and Oxford: Blackwell Publishers.

274

Harvey, D. (2007). *A brief history of neoliberalism*. Oxford: Oxford University Press.

Havel, V., & Keane, J. (1985). *The power of the Powerless: Citizens Against the State in Central Eastern Europe*. New York: Routledge.

Heery, E., & Abbott, B. (2000). Trade unions and the insecure workforce. In E. Heery & J. Salmon (Eds.), *The Insecure Workforce* (pp. 167–192). London and New York: Routledge.

Heisig, J., & Schaeffer, M. (2019). Why You Should Always Include a Random Slope for the Lower-Level Variable Involved in a Cross-Level Interaction. *European Sociological Review*, *35*(2), 258–279.

Hox, J., Moerbeek, M., & Van de Schoot, R. (2017). *Multilevel analysis: Techniques and applications* (3rd ed.). New York: Routledge.

Hudson, R. (2009). Fordism. In R. Kitchin & N. Thrift (Eds.), *International Encyclopedia of Human Geography* (pp. 226–231). Amsterdam: Elsevier Ltd.

Humphries, J., & Sarasúa, C. (2012). Reconstructing Women's Labor Force Participation in the European Past. *Feminist Economics*, *18*(4), 39–67.

International Labour Organization. (2018). *Global Wage Report 2018/19. What lies behind gender pay gaps*. Geneva: International Labour Office.

Jones, B. L. (1972). The Role of Keynesians in Wartime Policy and Postwar Planning, 1940-1946. *The American Economic Review*, *62*(1/2), 125–133. http://www.jstor.org/stable/1821532

Jonsson, J., Matilla-Santander, N., Kreshpaj, B., Johansson, G., Kjellberg, K., Burström, B., Östergren, P. O., Nilsson, K., Strömdahl, S., Orellana, C., & Bodin, T. (2021). Precarious employment and general, mental and physical health in Stockholm, Sweden: a cross-sectional study. *Scandinavian Journal of Public Health*, *49*(2), 228–236. https://doi.org/10.1177/1403494820956451

Jonsson, J., Matilla-Santander, N., Kreshpaj, B., Orellana, C., Johansson, G., Burström, B., Alderling, M., Peckham, T., Kjellberg, K., Selander, J., Östergren, P. O., & Bodin, T. (2021). Exploring multidimensional operationalizations of precarious employment in Swedish register data–a typological approach and a summative score approach . *Scandinavian Journal of Work, Environment & Health*, *47*(2), 117–126.

Jonsson, J., Muntaner, C., Bodin, T., Alderling, M., Balogh, R., Burström, B., Davis, L., Gunn, V., Hemmingsson, T., Julià, M., Kjellberg, K., Kreshpaj, B., Orellana, C., Padrosa, E., Wegman, D. H., & Matilla-Santander, N. (2021). Low-quality employment trajectories and risk of common mental disorders, substance use disorders and suicide attempt: a longitudinal study of the Swedish workforce. *Scandinavian Journal of Work, Environment & Health*, *47*(7), 509–520.

Jonsson, J., Vives, A., Benach, J., Kjellberg, K., Selander, J., Johansson, G., & Bodin, T. (2019). Measuring precarious employment in Sweden: Translation, adaptation and psychometric properties of the Employment Precariousness Scale (EPRES). *BMJ Open*, *9*(9).

https://doi.org/10.1136/bmjopen-2019-029577

Judt, T. (2005). *Postwar: A History of Europe Since 1945*. New York: Penguin Books.

Judt, T. (2011). *A Grand Illusion? An Essay on Europe*. New York: New York University Press.

Julià, M., Belvis, F., Vives, A., Tarafa, G., & Benach, J. (2019). Informal employees in the European Union: working conditions, employment precariousness and health. *Journal of Public Health*, *41*(2), 141–151.

Julià, M., Vanroelen, C., Bosmans, K., van Aerden, K., & Benach, J. (2017). Precarious Employment and Quality of Employment in Relation to Health and Well-being in Europe. *International Journal of Health Services*, *47*(3), 389–409. https://doi.org/10.1177/0020731417707491

Julià, M., Vives, A., Tarafa, G., & Benach, J. (2017). Changing the way we understand precarious employment and health: Precarisation affects the entire salaried population. *Safety Science*, *100*, 66–73. https://doi.org/10.1016/j.ssci.2017.01.015

Kalleberg, A. (2018). *Precarious Lives: Job Insecurity and Well-Being in Rich Democracies*. Cambridge: Polity Press.

Kangas, O., & Palme, J. (1992). Statism Eroded? Labor-Market Benefits and Challenges to the Scandinavian Welfare States. *International Journal of Sociology*, *22*(4), 1–24. https://doi.org/10.1080/15579336.1992.11770044

Keune, M. (2006). *Collective bargaining and working time in Europe: an overview*. Brussels: European Trade Union Institute.

Kim, I. H., Muntaner, C., Vahid Shahidi, F., Vives, A., Vanroelen, C., & Benach, J. (2012). Welfare states, flexible employment, and health: A critical review. *Health Policy*, 104(2), 99-127. https://doi.org/10.1016/j.healthpol.2011.11.002

Kolberg, J. E., & Esping-Andersen, G. (1991). Welfare States and Employment Regimes. *International Journal of Sociology*, *21*(1), 3–35. https://doi.org/10.1080/15579336.1991.11770006

Koranyi, I., Jonsson, J., Rönnblad, T., Stockfelt, L., & Bodin, T. (2018). Precarious employment and occupational accidents and injuries-a systematic review. *Scandinavian Journal of Work, Environment Health*, *44*(4), 341–350.

Korpi, W. (2006). Power Resources and Employer-Centered Approaches in Explanations of Welfare States and Varieties of Capitalism: Protagonists, Consenters, and Antagonists. *World Politics*, *58*(2), 167–206. https://doi.org/10.1353/wp.2006.0026

Korpi, W. (2016). *The democratic class struggle*. London: Routledge.

Korpi, W., Ferrarini, T., & Englund, S. (2013). Women's opportunities under different family policy constellations: Gender, class and inequality tradeoffs in western countries re-examined. *Social Politics: International Studies in Gender, State & Society*, *20*, 1–40.

Kovačević, J., & Šehić, D. (2015). The pursuit of a remedy for gender inequality in wider Europe: Comparison of policies and indices in the EU, Nordic Countries, and sout east Europe. *Economic Annals*, *60*(204), 127–156.

Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D. H., & Bodin, T. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. In *Scandinavian Journal of Work, Environment and Health* (Vol. 46, Issue 3, pp. 235–247). Scandinavian Journal of Work, Environment and Health. https://doi.org/10.5271/sjweh.3875

Krieger, N. (1994). Epidemiology and the web of causation: Has anyone seen the spider? *Social Science & Medicine*, *39*(7), 887–903. https://doi.org/10.1016/0277-9536(94)90202-X

Krieger, N. (2001). Theories for social epidemiology in the 21st century: an ecosocial perspective. *International Journal of Epidemiology*, *30*(4), 668–677.

Kunst, A. E., & Mackenbach, J. P. (2000). *Measuring socioeconomic inequalities in health*. Copenhagen: World Health Organization.

Kuttner, R. (2018). *Can democracy survive global capitalism?* New York: Norton.

Lausev, J. (2014). What has 20 years of public-private pay gap literature told us? Eastern European transitioning vs. developed economies. *Journal of Economic Surveys*, *28*(3), 516–550. https://doi.org/10.1111/joes.12039

Leppo, K., Ollila, E., Peña, S., Wismar, M., & Cook S. (2013). *Health in all policies: seizing opportunities, implementing policies*. Helsinki: Ministry of Social Affairs and Health.

Lewchuk, W. (2017). Precarious jobs: Where are they, and how do they affect well-being? *Economic and Labour Relations Review*, *28*(3), 402–419. https://doi.org/10.1177/1035304617722943

Lewis, J. (1992). *Gender and the development of welfare regimes*. New York: Norton.

Li, C. (2013). Little's test of missing completely at random. *The Stata Journal*, *13*(4), 795–809.

Link, B. G., & Phelan, J. (1995). Social Conditions As Fundamental Causes of Disease. *Journal of Health and Social Behavior*, *35*, 80. https://doi.org/10.2307/2626958

Lokar, S. (2000). The Situation of Women in Eastern Europe: Five Theses. *Labour Force on Eastern Europe*, *66*, 66–78.

Lorey, I. (2015). *State of Insecurity: Government of the Precarious*. New York: Verso Books.

Mackenbach, J. P. (2012). The persistence of health inequalities in modern welfare states: The explanation of a paradox. *Social Science & Medicine*, *75*(4), 761–769. https://doi.org/10.1016/j.socscimed.2012.02.031

Macmillan, R., & Shanahan, M. J. (2021). Why Precarious Work Is Bad for Health: Social Marginality as Key Mechanisms in a Multi-National Context. *Social Forces*, *100*(2), 821–851. https://doi.org/10.1093/sf/soab006

Marglin, S. A., & Schor, J. B. (1991). *The golden age of capitalism: reinterpreting the postwar experience*. Oxford: Oxford University Press.

Marmot, M. (2015). The health gap: The challenge of an unequal world. *The Lancet*, 386(10011), 2242-2444.

https://doi.org/10.1016/S0140-6736(15)00150-6

Marmot, M., & Bell, R. (2016). Social inequalities in health: A proper concern of epidemiology. *Annals of Epidemiology*, *26*(4), 238–240. https://doi.org/10.1016/j.annepidem.2016.02.003

Marmot, M., & Wilkinson, R. (2005). *Social Determinants of Health*. Oxford: Oxford University Press.

Marshall, T. (1961). The Welfare State: A Sociological Interpretation. *European Journal of Sociology*, *2*(2), 284–300.

Marusic, A., & Bhugra, D. (2008). One Health Only. *International Journal of Social Psychiatry*, *54*(6), 483–485. https://doi.org/10.1177/0020764007084605

Matilla-Santander, N., Ahonen, E., Albin, M., Baron, S., Bolíbar, M., Bosmans, K., Burström, B., Cuervo, I., Davis, L., Gunn, V., Håkansta, C., Hemmingsson, T., Hogstedt, C., Jonsson, J., Julià, M., Kjellberg, K., Kreshpaj, B., Lewchuk, W., Muntaner, C., O'Campo, P., Orellana, C., Östergren, P. O., Padrosa, E., Ruiz, M. E., Vanroelen, C., Vignola, E., Vives, A., & Bodin, T. (2021). COVID-19 and Precarious Employment: Consequences of the Evolving Crisis. *International Journal of Health Services*, *51*(2), 226–228.

Matilla-Santander, N., Martín-Sánchez, J. C., González-Marrón, A., Cartanyà-Hueso, À., Lidón-Moyano, C., & Martínez-Sánchez, J. M. (2020). Precarious employment, unemployment and their association with health-related outcomes in 35 European countries: a cross-sectional study. *Critical Public Health*, *00*(00), 1–12. https://doi.org/10.1080/09581596.2019.1701183

McCartney, G., Popham, F., McMaster, R., & Cumbers, A. (2019). Defining health and health inequalities. *Public Health*, 172, 22-30. https://doi.org/10.1016/j.puhe.2019.03.023

Menéndez, M., Benach, J., Muntaner, C., Amable, M., & O'Campo, P. (2007). Is precarious employment more damaging to women's health than men's? *Social Science and Medicine*, *64*(4), 776–781. https://doi.org/10.1016/j.socscimed.2006.10.035

Mensah, A., & Adjei, N. (2020). Work-life balance and self-reported health among working adults in Europe: a gender and welfare state regime comparative analysis. *BMC Public Health*, *20*, 1052.

Messing, K., Punnett, L., Bond, M., Alexanderson, K., Pyle, J., Zahm, S., Wegman, D., Stock, S. R., & de Grosbois, S. (2003). Be the fairest of them all: Challenges and recommendations for the treatment of gender in occupational health research. *American Journal of Industrial Medicine*, *43*(6), 618–629. https://doi.org/10.1002/ajim.10225

Milanovic, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Boston: Harvard University Press.

Mrak, M., Rojec, M., & Silva-Jáuregui, C. (2004). *Slovenia: From Yugoslavia to the European Union*. Washington DC: World Bank Publications.

Muñoz-Bustillo, R., Fernández-Macías, E., Antón, J., & Esteve, F. (2009). *Indicators of job quality in the European Union*. Brussels: European Parliament.

Muñoz-Bustillo, R., Fernández-Macías, E., Antón, J. I., & Esteve, F. (2011). *Measuring more than money: The social economics of job quality*. Cheltenham and Northampton: Edward Elgar Publishing.

Muntaner, C. (2016). Global precarious employment and health inequalities: working conditions, social class or precariat? *Cadernos de Saude Publica*, *32*, e00162215. https://doi.org/10.1590/0102-311X00162215

Muntaner, C., Borrell, C., Ng, E., Chung, H., Espelt, A., Rodríguez-Sanz, M., Benach, J., & O'Campo, P. (2011). Politics, welfare regimes, and population health: controversies and evidence. *Sociology of Health and Illness*, *33*(6), 946–964.

Muntaner, C., Borrell, C., Solà, J., Marì-Dell'Olmo, M., Chung, H., Rodríguez-Sanz, M., Benach, J., & Noh, S. (2009). Capitalists, managers, professionals and mortality: Findings from the Barcelona Social Class and All Cause Mortality Longitudinal Study. *Scandinavian Journal of Public Health*, *37*(8), 826–838. https://doi.org/10.1177/1403494809346870

Muntaner, C., Chung, H., Solar, O., Santana, V., Castedo, A., Benach, J., & EMCONET Network. (2010). A macro-level model of employment relations and health inequalities. *International Journal of Health Services*, *40*(2), 215–221.

Naldini, M. (2004). *The family in the Mediterranean welfare states*. New York: Routledge.

Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffmann, A., & Giovanni, E. (2008). *Handbook on Constructing Composite*

Indicators: Methodology and User Guide. Paris: OECD publishing.

Navarro, V. (1998). Neoliberalism, "globalization", unemployment, inequalities, and the welfare state. *International Journal of Health Services*, *28*(4), 607–682.

Navarro, V. (2004). *The political and social contexts of health*. Amityville: Baywood Publishing.

Navarro, V., Muntaner, C., Borrell, C., Benach, J., Quiroga, Á., Rodríguez-Sanz, M., Vergés, N., & Pasarín, M. I. (2006). Politics and health outcomes. *The Lancet*, *368*(9540), 1033–1037.

Navarro, V., & Shi, L. (2001). The political context of social inequalities and health. *International Journal of Health Services*, *31*(1), 1–21.

O'Campo, P., Eaton, W. W., & Muntaner, C. (2004). Labor market experience, work organization, gender inequalities and health status: results from a prospective analysis of US employed women. *Social Science & Medicine*, *58*(3), 585–594.

Oddo, V. M., Zhuang, C. C., Andrea, S. B., Eisenberg-Guyot, J., Peckham, T., Jacoby, D., & Hajat, A. (2021). Changes in precarious employment in the United States: A longitudinal analysis. *Scandinavian Journal of Work, Environment & Health*, *47*(3), 171–180. https://doi.org/10.5271/sjweh.3939

O'Leary-Kelly, S. W., & J. Vokurka, R. (1998). The empirical assessment of construct validity. *Journal of Operations Management*, *16*(4), 387–405. https://doi.org/10.1016/S0272-6963(98)00020-5

Orfao, G., del Rey, A., & Malo, M. Á. (2021). A Multidimensional Approach to Precarious Employment Among Young Workers in EU-28 Countries. *Social Indicators Research*, *158*(3), 1153–1178. https://doi.org/10.1007/s11205-021-02734-3

Orosz, Á. (2019). The Emergence of East Central Europe in a Welfare Regime Typology. *Border Crossing*, *9*(2), 97–112. https://doi.org/10.33182/bc.v9i2.880

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2021). Measuring precarious employment in the European Working Conditions Survey: psychometric properties and construct validity in Spain. *Quality and Quantity*, *55*(2), 543–562. https://doi.org/10.1007/s11135-020-01017-2

Padrosa, E., Bolíbar, M., Julià, M., & Benach, J. (2021). Comparing Precarious Employment Across Countries: Measurement Invariance of the Employment Precariousness Scale for Europe (EPRES-E). *Social Indicators Research*, *154*, 893–915. https://doi.org/10.1007/s11205-020-02539-w

Palier, B. (2015). *Gouverner la sécurité sociale*. Paris: Presses Universitaires de France.

Pascall, G., & Manning, N. (2000). Gender and social policy: comparing welfare states in Central and Eastern Europe and the former Soviet Union. *Journal of European Social Policy*, *10*(3), 240–266.

Peckham, T., Fujishiro, K., Hajat, A., Flaherty, B. P., & Seixas, N. (2019). Evaluating Employment Quality as a Determinant of Health in a Changing Labor Market. *RSF: The Russell Sage*

Foundation Journal of the Social Sciences, *5*(4), 258–281.
https://doi.org/10.7758/rsf.2019.5.4.09

Peckham, T., & Seixas, N. (2021). What's casual? What's causal?
Advancing research on employment relationships and health.
Occupational and Environmental Medicine, *78*(1), 1–3.
https://doi.org/10.1136/oemed-2020-107136

Pfau-Effinger, B., & Reimer, T. (2019). The interplay of welfare state
policies with supply- and demand-side factors in the production
of marginalised part-time employment among women in
Germany. In N. Nicolaisen, H. C. Kavli, & R. S. Jensen (Eds.),
*Dualisation of part-time work. The development of labour
market insiders and outsiders* (pp. 245–264). Bristol: Policy
Press.

Picchio, A. (1981). Social Reproduction and the Basic Structure of
Labour Markets. In F. Wilkinson (Ed.), *The Dynamics of
Labour Market Segmentation* (pp. 193–209). London:
Academic Press.

Piketty, T. (2015). About capital in the twenty-first century.
American Economic Review, *105*(5), 48–53.

Plomien, A. (2006). Women and the labor market in Poland: from
socialism to capitalism. In *Globalization, uncertainty and
women's careers: an international comparison*. Cheltenham:
Edward Elgar Publishing.

Polavieja, J. G. (2006). The Incidence of Temporary Employment in
Advanced Economies: Why is Spain Different? *European
Sociological Review*, *22*(1), 61–78.
https://doi.org/10.1093/esr/jci042

Pollert, A. (2003). Women, work and equal opportunities in post-Communist transition. *Work, Employment & Society*, *17*(2), 331–357.

Pollert, A. (2005). Gender, Transformation and Employment in Central Eastern Europe. *European Journal of Industrial Relations*, *11*(2), 213–230. https://doi.org/10.1177/0959680105053964

Pollert, A., & Charlwood, A. (2009). The vulnerable worker in Britain and problems at work. *Work, Employment and Society*, *23*(2), 343–362. https://doi.org/10.1177/0950017009106771

Porthé, V., Ahonen, E. Q., Vázquez, M. L., Pope, C., Agudelo, A. A., Garcia, A. M., Amable, M., Benavides, F. G., & Benach, J. (2010). Extending a model of precarious employment: a qualitative study of immigrant workers in Spain. *American Journal of Industrial Medicine*, *53*(4), 417–424.

Puig-Barrachina, V., Vanroelen, C., Vives, A., Martínez, J. M., Muntaner, C., Levecque, K., Benach, J., & Louckx, F. (2014). Measuring employment precariousness in the European Working Conditions Survey: The social distribution in Europe. *Work*, *49*(1), 143–161. https://doi.org/10.3233/WOR-131645

Razzu, G. (2016). *Gender Inequality in the Eastern European Labour Market: Twenty-five years of transition since the fall of communism*. London and New York: Routledge.

Ridgeway, C. L., & Correll, S. J. (2004). Unpacking the Gender System. *Gender & Society*, *18*(4), 510–531. https://doi.org/10.1177/0891243204265269

Riphahn, R. T., & Serfling, O. (2005). Item non-response on income and wealth questions. *Empirical Economics*, *30*(2), 521–538. https://doi.org/10.1007/s00181-005-0247-7

Rodgers, G. (1989). Precarious Work in Western Europe. In G. Rodgers & J. Rodgers (Eds.), *Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe* (pp. 1–16). Geneva: International Institute for Labour Studies.

Rönnblad, T., Grönholm, E., Jonsson, J., Koranyi, I., Orellana, C., Kreshpaj, B., Chen, L., Stockfelt, L., & Bodin, T. (2019). Precarious employment and mental health: a systematic review and meta-analysis of longitudinal studies. *Scandinavian Journal of Work, Environment & Health*, *45*(5), 429–443.

Rosenfield, S., & Mouzon, D. (2013). Gender and mental health. In C. S. Aneshensel, J. C. Phelan, & A. Bierman (Eds.), *Handbook of the sociology of mental health*. Dordrecht: Springer.

Rubery, J. (1998). *Women in the Labour Market: A Gender Equality Perspective', OECD Directorate for Education, Employment, Labour and Sccial Affairs*. Paris: OECD Directorate for Education, Employment, Labour & Social Affairs.

Rubery, J., & Fagan, C. (1995). Gender Segregation in Societal Context. *Work, Employment & Society*, *9*(2), 213–240.

Rubery, J., & Grimshaw, D. (2003). *The organization of employment*. Basignstoke: Palgrave Macmillan.

Rubery, J., Smith, M., & Fagan, C. (1999). *Women's employment in Europe: Trends and prospects*. London and New York: Routledge.

Rudnev, M., Lytkina, E., Davidov, E., Schmidt, P., & Zick, A. (2018). Testing Measurement Invariance for a Second-Order Factor: A Cross-National Test of the Alienation Scale. *Methods, Data, Analyses*, *12*(1), 47–76.

Ruiz, M. E. (2018). *Empleo informal y desigualdades en salud en chile. Un enfoque de investigación integrado*. Barcelona: Universitat Pompeu Fabra.

Ryan, L., Lavelle, J., O'Sullivan, M., McMahon, J., Murphy, C., Turner, T., Gunnigle, P., & O'Brien, M. (2019). Defining and regulating zero hours work. Lessons from a liberal market economy. *Nordic Journal of Working Life Studies*, *9*(S6), 75–93.

Sabel, C. F. (1982). *Work and politics. The division of labor in industry*. Cambridge: Cambridge University Press.

Santoro, A., Glonti, K., Bertollini, R., Ricciardi, W., & McKee, M. (2016). Mapping health research capacity in 17 countries of the former Soviet Union and south-eastern Europe: an exploratory study. *The European Journal of Public Health*, *26*(2), 349–354. https://doi.org/10.1093/eurpub/ckv186

Scott-Marshall, H., & Tompa, E. (2011). The health consequences of precarious employment experiences. *Work*, *38*(4), 369–382. https://doi.org/10.3233/WOR-2011-1140

Shahidi, F., De Moortel, D., Muntaner, C., Davis, O., & Siddiqi, A. (2016). Do flexicurity policies protect workers from the adverse health consequences of temporary employment? A cross-national comparative analysis. *SSM-Population Health*, *2*, 674–682.

Shahidi, F., Siddiqi, A., & Muntaner, C. (2016). Does social policy moderate the impact of unemployment on health? A multilevel analysis of 23 welfare states. *The European Journal of Public Health*, *26*(6), 1017–1022.

Shutt, H. (1998). *The trouble with capitalism : an enquiry into the causes of global economic failure*. London: Zed Books.

Siaroff, A. (1994). Work, welfare and gender equality: a new tpology. In D. Sainsbury (Ed.), *Gendering Welfare States* (pp. 82–100). Thousand Oaks: Sage.

Silver, B. J. (2003). *Forces of labor: workers' movements and globalization since 1870*. Cambridge: Cambridge University Press.

Solar, O., & Irwin, A. (2010). *A Conceptual Framework for Action on the Social Determinants of Health*. Geneva: WHO Document Production Services.

Standing, G. (1996). Social protection in central and eastern europe: a tale of slipping anchors and torn safety nets. In G. Esping-Andersen (Ed.), *Welfare states in transition: National adaptations in global economies* (pp. 225–255). London: SAGE Publications Ltd.

Standing, G. (1997). Globalization, Labour Flexibility and Insecurity: The Era of Market Regulation. *European Journal of Industrial Relations*, *3*(1), 7–37.

Standing, G. (2011). *The Precariat: The New Dangerous Class*. London: Bloomsbury Academic.

Stansfeld, S., & Candy, B. (2006). Psychosocial work environment and mental health—a meta-analytic review. *Scandinavian Journal of Work, Environment & Health*, *32*(6), 443–462.

StataCorp. (2015). *Stata Statistical Software: Release 14*. StataCorp LP.

Stronks, K., van de Mheen, H., van den Bos, J., & Mackenbach, J. (1997). The interrelationship between income, health and employment status. *International Journal of Epidemiology*, *26*(3), 592–600. https://doi.org/10.1093/ije/26.3.592

Topp, C., Østergaard, S., Søndergaard, S., & Bech, P. (2015). The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychotherapy & Psychosomatics*, *84*, 167–176.

Traxler, F., & Mermet, E. (2003). Coordination of collective bargaining: the case of Europe. *Transfer: European Review of Labour and Research*, *9*(2), 229–246. https://doi.org/10.1177/102425890300900206

Tucker, D. (2002). *"Precarious" Non-Standard Employment - A Review of the Literature*. Wellington: Labour Market Policy Group.

Utzet, M., Valero, E., Mosquera, I., & Martin, U. (2020). Employment precariousness and mental health – Understanding a complex reality: A systematic review. *International Journal of Occupational Medicine and Environmental Health*, *33*(5), 569–598. https://doi.org/10.13075/IJOMEH.1896.01553

Valenduc, G., & Vendramin, P. (2016). *Work in the digital economy: sorting the old from the new*. Brussels: European Trade Union Institute.

Valero, E., Martin, U., Bacigalupe, A., & Utzet, M. (2020). The impact of precarious jobs on mental health: a gender-sensitive literature review. *International Archives of Occupational and Environmental Health*. https://doi.org/10.1007/s00420-020-01605-7

van Aerden, K., Puig-Barrachina, V., Bosmans, K., & Vanroelen, C. (2016). How does employment quality relate to health and job satisfaction in Europe? A typological approach. *Social Science and Medicine*, *158*, 132–140. https://doi.org/10.1016/j.socscimed.2016.04.017

van Wijk, D. C., de Valk, H. A. G., & Liefbroer, A. C. (2021). Temporary Employment and Family Formation: An Income or Insecurity Effect? *European Sociological Review*, *37*(4), 641–658. https://doi.org/10.1093/esr/jcab007

Vandevenne, E. (2020). *Precaire tewerkstelling en welzijn. De rol van het huishoudinkomen en de werk-privé balans*. Brussels: Vrije Universiteit Brussel.

Vanroelen, C. (2019). Employment Quality: An Overlooked Determinant of Workers' Health and Well-being? *Annals of Work Exposures and Health*, *63*(6), 619–623. https://doi.org/10.1093/annweh/wxz049

Vanroelen, C., Julià, M., & van Aerden, K. (2021). Precarious Employment: An Overlooked Determinant of Workers' Health and Well-Being? In C. Korunka (Ed.), *Flexible Working Practices and Approaches: Psychological and Social Implications of a Multifaceted Phenomenon* (pp. 231–255). Cham: Springer.

Vanroelen, C., Levecque, K., Moors, G., & Louckx, F. (2010). Linking credentialed skills, social class, working conditions and self-reported health: A focus on health inequality-generating mechanisms. *Sociology of Health and Illness*, *32*(6), 948–964. https://doi.org/10.1111/j.1467-9566.2010.01260.x

Vercruyssen, A., & van Gyes, G. (2017). *Measuring job quality with EWCS data: Towards an international standard for scale construction with EWCS. February*. InGRID-2 Working Paper.

Virtanen, M., Kivimäki, M., Joensuu, M., Virtanen, P., Elovainio, M., & Vahtera, J. (2005). Temporary employment and health: a review. *International Journal of Epidemiology*, *34*(3), 610–622.

Vives, A. (2010). *A multidimensional approach to precarious employment: measurement, association with poor mental health and prevalence in the Spanish workforce*. Barcelona: Universitat Pompeu Fabra.

Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F. G., & Benach, J. (2010). The Employment Precariousness Scale (EPRES): Psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occupational and Environmental Medicine*, *67*(8), 548–555. https://doi.org/10.1136/oem.2009.048967

Vives, A., Benmarhnia, T., González, F., & Benach, J. (2020). The importance of using a multi-dimensional scale to capture the various impacts of precarious employment on health: Results from a national survey of Chilean workers. *PLoS ONE*, *15*(9), e0238401.

Vives, A., González, F., Moncada, S., Llorens, C., & Benach, J. (2015). Measuring precarious employment in times of crisis: The revised Employment Precariousness Scale (EPRES) in Spain. *Gaceta Sanitaria*, *29*(5), 379–382. https://doi.org/10.1016/j.gaceta.2015.06.008

Vives, A., González-López, F., & Benach, J. (2020). Measuring precarious employment: type of contract can lead to serious misclassification error. *Annals of Work Exposures and Health*, *64*(9), 1035–1038.

Vives, A., González-López, F., Solar, O., Bernales-Baksai, P., González, M. J., & Benach, J. (2017). Precarious employment in Chile: Psychometric properties of the chilean version of Employment Precariousness Scale in private sector workers. *Cadernos de Saude Publica*, *33*, e00156215. https://doi.org/10.1590/0102-311X00156215

Vosko, L. F. (2006). *Precarious employment: Understanding labour market insecurity in Canada*. Quebec: McGill-Queen's University Press.

Vosko, L. F. (2010). *Managing the Margins: Gender, Citizenship, and the International Regulation of Precarious Employment*. Oxford: Oxford University Press.

Vosko, L., MacDonald, M., & Campbell, I. (2009). *Gender and the Contours of Precarious Employment*. New York: Routledge.

Wajcman, J. (1996). Women and men managers: Careers and equal opportunities. In R. Crompton, D. Gallie, & K. Purcell (Eds.), *Changing forms of employment: Organizations, skills and gender* (pp. 259–277). London and New York: Routledge.

Weber, L., & Parra-Medina, D. (2003). Intersectionality and women's health: Charting a path to eliminating health disparities. In M. T. Segal, V. Demos, & J. J. Kronenfeld (Eds.), *Gender Perspectives on Health and Medicine: Key Themes*. Amsterdam: Elsevier.

Weeks, A. C. (2017). *Quotas Matter: The Impact of Gender Quota Laws on Work-Family Policies*. Cambridge: Harvard University.

Weeks, K. (2011). *The problem with work. Feminism, marxism, antiwork politics, and postwork imaginaries*. Durham: Duke University Press.

Weiner, E. S. (2010). *Market dreams: Gender, class, and capitalism in the Czech Republic*. University of Michigan Press.

White, I., Royston, P., & Wood, A. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine*, *30*, 377–399.

Whitehead, M. (2007). A typology of actions to tackle social inequalities in health. *Journal of Epidemiology & Community Health*, *61*(6), 473–478. https://doi.org/10.1136/jech.2005.037242

WHO Commission on Social Determinants of Health. (2008). *Closing the Gap in a Generation: Health Equity through Action on the Social Determinants of Health: Commission on Social Determinants of Health Final Report*. Geneva: World Health Organization.

Woolfson, C. (2010). Pushing the envelope: the informalization of labour in post-communist new EU member states. *Work, Employment & Society*, *21*(3), 551–564.

World Health Organization. (1946). Constitution of the World Health Organization. *American Journal of Public Health and the Nations Health*, *36*(11), 1315–1323. https://doi.org/10.2105/AJPH.36.11.1315

World Health Organization. (1998). *Wellbeing Measures in Primary Health Care/The Depcare Project*. Copenhagen: WHO Regional Office for Europe.

World Health Organization. (2021, November 29). *Mental health*. https://www.who.int/health-topics/mental-health#tab=tab_1.

Young, M. (2010). Gender Differences in Precarious Work Settings. *Industrial Relations*, *65*(1), 74–97.

APPENDICES

Appendix I. Supplementary material of Paper 1

Table 1. Item descriptive statistics of the proposed EPRES-E structure, N = 2,442 (Spain, European Working Conditions Survey 2015).

		Non-response (%)	Mean	SD	Response value frequency (%)					Polychoric correlations		
					0	1	2	3	4			
Temporariness	Duration of current contract	2.09	0.88	1.48	70.39	3.55	6.44	6.61	13.01	1	-	-
	Tenure	0.70	1.65	1.52	33.69	20.74	9.94	18.31	17.32	0.756	1	-
Disempowerment	Working times setting [a]	0.33	2.63	0.78	2.34	11.83	6.20	29.62	-	1	-	-
	Trade unions	0.08	0.56	0.61	50.82	42.70	6.48	-	-	0.083	1	-
	Meetings	0.12	0.57	0.56	46.49	49.82	3.69	-	-	0.139	0.498	1
Vulnerability	Respect of boss	1.64	0.44	0.83	71.02	19.28	6.20	1.62	1.87	1	-	
	Fair treatment	0.25	0.83	1.01	47.87	31.20	14.12	3.69	3.12	0.630	1	
Exercise of rights	Break when you need it	0.98	2.00	1.38	19.81	16.71	26.10	18.61	18.78	1	-	
	Hours off for personal or family matters	1.72	1.22	1.03	29.79	33.21	22.67	14.33	-	0.373	1	
Uncertain Working times	Schedule unpredictability	0.94	0.49	1.09	80.28	3.64	6.74	5.37	3.97	1	-	-
	Work at short notice	0.57	0.48	0.80	66.89	21.91	7.91	2.64	0.66	0.583	1	-
	Working times regularity	0.37	0.88	1.30	60.83	13.65	8.92	9.95	6.66	0.452	0.384	1
Wages	Net earnings per month	20.97	1.52	0.93	15.91	31.45	37.77	14.87	-	1	-	
	Net earnings per hour	20.97	1.90	0.86	8.81	15.85	51.66	23.68	-	0.704	1	

EPRES-E: Employment Precariousness Scale in the European Working Conditions Survey; SD: Standard Deviation; a Item discarded after further analysis.

Table 2. Item-subindex polychoric correlations of the proposed EPRES-E structure, N = 2,442 (Spain, European Working Conditions Survey 2015).

		T	D	V	ER	UWT	W
Temporariness	Duration of current contract	0.756	0.326	0.027	0.184	0.118	0.375
	Tenure	0.756	0.318	-0.016	0.104	0.094	0.428
Disempowerment	Working times setting [a]	0.108	0.151	0.203	0.350	-0.028	0.120
	Trade unions	0.413	0.389	-0.051	-0.008	0.041	0.395
	Meetings	0.268	0.398	0.180	0.114	0.101	0.343
Vulnerability	Respect of boss	-0.005	0.148	0.630	0.317	0.148	0.062
	Fair treatment	-0.008	0.123	0.630	0.400	0.193	0.007
Exercise of rights	Break when you need it	0.083	0.179	0.323	0.373	0.142	0.047
	Hours off for personal or family matters	0.146	0.154	0.368	0.373	0.156	0.015
Uncertain working times	Schedule unpredictability	0.123	0.182	0.250	0.258	0.563	0.079
	Work at short notice	0.153	0.035	0.216	0.203	0.492	0.072
	Working times regularity	0.057	-0.094	0.104	0.088	0.419	-0.070
Wages	Net earnings per month	0.442	0.351	0.002	0.045	-0.020	0.704
	Net earnings per hour	0.374	0.325	0.060	0.057	0.047	0.704

EPRES-E: Employment Precariousness Scale in the European Working Conditions Survey; a Item discarded after further analysis; T: Temporariness; D: Disempowerment; V: Vulnerability; ER: Exercise of Rights; UWT: Uncertain Working Times; W: Wages.

Appendix II. Supplementary material of Paper 2

Supplementary material 1. Share of informal employment and self-employment by country (European Working Conditions Survey, 2015).
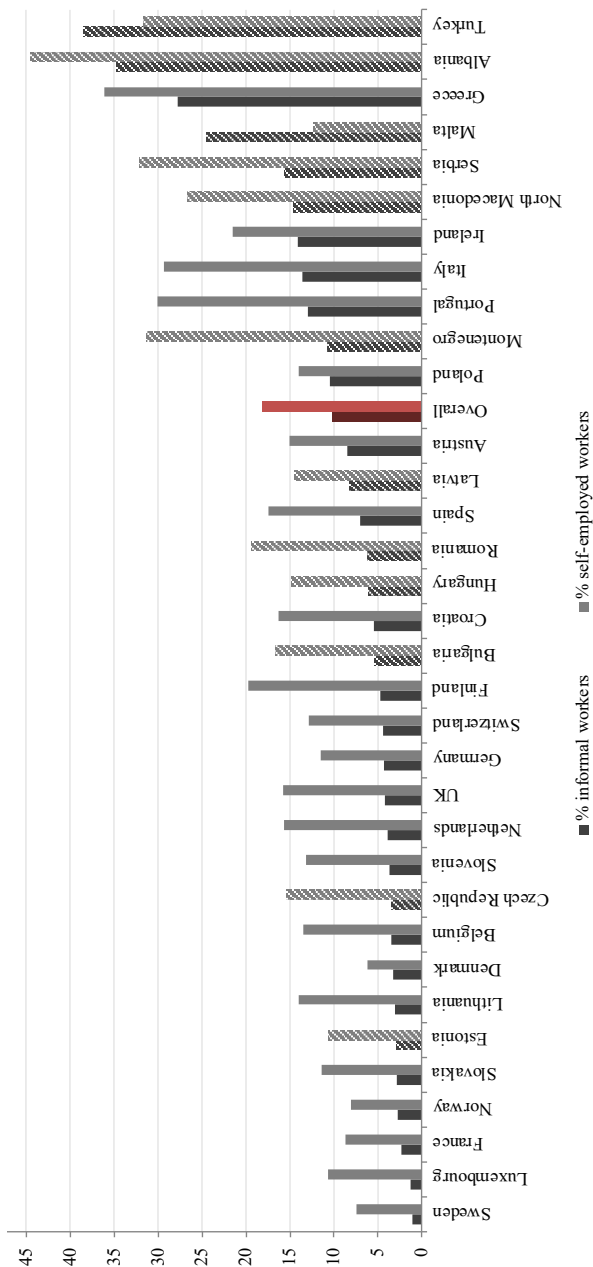
Striped bars correspond to countries where the Employment Precariousness Scale for Europe (EPRES-E) does not apply. According to the structure of the European Working Conditions Survey, the share of informal workers only includes salaried informal workers and does not account for informal entrepreneurs.

Supplementary material 2. Distribution of the EPRES-E proxy-indicators by country (European Working Conditions Survey, 2015).

	Type and length of contract, N (%)		
	Permanent	Temporary, long duration	Temporary, short duration
AUS	719 (92.3)	33 (4.24)	27 (3.47)
BEL	1,813 (88.61)	94 (4.59)	139 (6.79)
BUL	699 (89.5)	49 (6.27)	33 (4.23)
CRO	629 (81.79)	65 (8.45)	75 (9.75)
CYP	379 (84.22)	40 (8.89)	31 (6.89)
CZE	614 (81.65)	59 (7.85)	79 (10.51)
DK	762 (88.19)	41 (4.75)	61 (7.06)
EST	718 (91.00)	49 (6.21)	22 (2.79)
FIN	655 (88.39)	30 (4.05)	56 (7.56)
FRA	1,078 (84.42)	61 (4.78)	138 (10.81)
GER	1,488 (87.68)	84 (4.95)	125 (7.37)
GRE	376 (86.24)	23 (5.28)	37 (8.49)
HUN	679 (89.11)	32 (4.20)	51 (6.69)
IRE	576 (86.49)	40 (6.01)	50 (7.51)
ITA	668 (83.50)	52 (6.50)	80 (10.00)
LAT	642 (88.55)	41 (5.66)	42 (5.79)
LIT	778 (94.53)	31 (3.77)	14 (1.70)
LUX	794 (92.43)	25 (2.91)	40 (4.66)
MAL	562 (88.64)	34 (5.36)	38 (5.99)
NL	623 (77.39)	59 (7.33)	123 (15.28)
POL	548 (71.45)	152 (19.82)	67 (8.74)
POR	494 (82.47)	41 (6.84)	64 (10.68)
ROM	747 (93.96)	19 (2.39)	29 (3.65)
SLK	702 (86.56)	45 (5.55)	64 (7.89)
SLN	1,092 (85.31)	69 (5.39)	119 (9.30)
SPA	1,684 (70.40)	239 (9.99)	469 (19.61)
SWE	767 (87.56)	67 (7.65)	42 (4.79)
UK	1,146 (92.57)	33 (2.67)	59 (4.77)
MON	428 (72.67)	95 (16.13)	66 (11.21)
FYROM	483 (81.18)	68 (11.43)	44 (7.39)
SRB	448 (77.78)	67 (11.63)	61 (10.59)
TUR	715 (90.05)	62 (7.81)	17 (2.14)
NOR	765 (88.85)	49 (5.69)	47 (5.46)
SWZ	749 (92.81)	32 (3.97)	26 (3.22)
ALB	282 (82.22)	17 (4.96)	44 (12.83)

	Tenure, N (%)			
	>5 years	3 to 5 years	1 to 3 years	<1 year
AUS	430 (55.20)	94 (12.07)	154 (19.77)	101 (12.97)
BEL	1,186 (57.02)	243 (11.68)	397 (19.09)	254 (12.21)
BUL	408 (52.11)	108 (13.79)	192 (24.52)	75 (9.58)
CRO	456 (59.14)	97 (12.58)	134 (17.38)	84 (10.89)
CYP	196 (43.46)	65 (14.41)	123 (27.27)	67 (14.86)
CZE	406 (53.14)	115 (15.05)	174 (22.77)	69 (9.03)
DK	453 (52.01)	77 (8.84)	228 (26.18)	113 (12.97)
EST	397 (50.44)	105 (13.34)	195 (24.78)	90 (11.44)
FIN	457 (61.51)	85 (11.44)	149 (20.05)	52 (7.00)
FRA	768 (59.49)	136 (10.53)	240 (18.59)	147 (11.39)
GER	943 (55.80)	208 (12.31)	347 (20.53)	192 (11.36)
GRE	237 (53.99)	59 (13.44)	98 (22.32)	45 (10.25)
HUN	403 (52.54)	118 (15.38)	173 (22.56)	73 (9.52)
IRE	422 (61.34)	61 (8.87)	136 (19.77)	69 (10.03)
ITA	532 (67.26)	71 (8.98)	101 (12.77)	87 (11.00)
LAT	339 (46.89)	109 (15.08)	195 (26.97)	80 (11.07)
LIT	424 (51.52)	116 (14.09)	208 (25.27)	75 (9.11)
LUX	530 (61.20)	92 (10.62)	184 (21.25)	60 (6.93)
MAL	341 (53.45)	75 (11.76)	167 (26.18)	55 (8.62)
NL	475 (58.28)	81 (9.94)	160 (19.63)	99 (12.15)
POL	348 (43.66)	119 (14.93)	189 (23.71)	141 (17.69)
POR	399 (65.95)	50 (8.26)	90 (14.88)	66 (10.91)
ROM	373 (48.25)	138 (17.85)	198 (25.61)	64 (8.28)
SLK	418 (53.05)	109 (13.83)	186 (23.60)	75 (9.52)
SLN	891 (68.91)	119 (9.20)	184 (14.23)	99 (7.66)
SPA	1,321 (54.43)	241 (9.93)	444 (18.29)	421 (17.35)
SWE	457 (51.70)	101 (11.43)	235 (26.58)	91 (10.29)
UK	623 (49.25)	152 (12.02)	311 (24.58)	179 (14.15)
MON	333 (55.97)	86 (14.45)	108 (18.15)	68 (11.43)
FYROM	318 (53.63)	77 (12.98)	124 (20.91)	74 (12.48)
SRB	309 (54.12)	68 (11.91)	120 (21.02)	74 (12.96)
TUR	245 (30.82)	153 (19.25)	285 (35.85)	112 (14.09)
NOR	436 (19.32)	106 (11.99)	242 (27.38)	100 (11.31)
SWZ	418 (51.41)	110 (13.53)	221 (27.18)	64 (7.87)
ALB	116 (22.53)	56 (16.18)	98 (28.32)	76 (21.97)

	Trade unions, N (%)		
	Yes	No	Don't know
AUS	404 (51.93)	357 (45.89)	17 (2.19)
BEL	1,347 (64.27)	684 (32.63)	65 (3.10)
BUL	240 (30.53)	495 (62.98)	51 (6.49)
CRO	363 (46.42)	401 (51.28)	18 (2.30)
CYP	174 (38.41)	269 (59.38)	10 (2.21)
CZE	257 (33.42)	492 (63.98)	20 (2.60)
DK	622 (71.41)	195 (22.39)	54 (6.20)
EST	206 (25.81)	550 (68.92)	42 (5.26)
FIN	542 (73.05)	173 (23.32)	27 (3.64)
FRA	846 (65.33)	400 (30.89)	49 (3.78)
GER	831 (48.43)	837 (48.78)	48 (2.80)
GRE	176 (40.00)	250 (56.82)	14 (3.18)
HUN	228 (29.57)	520 (67.44)	23 (2.98)
IRE	347 (50.29)	319 (46.23)	24 (3.48)
ITA	407 (50.25)	377 (46.54)	26 (3.21)
LAT	262 (35.99)	403 (55.36)	63 (8.65)
LIT	199 (24.15)	532 (64.56)	93 (11.29)
LUX	569 (65.70)	251 (28.98)	46 (5.31)
MAL	327 (51.09)	286 (44.69)	27 (4.22)
NL	500 (61.27)	259 (31.74)	57 (6.99)
POL	231 (27.83)	575 (69.28)	24 (2.89)
POR	198 (32.30)	383 (62.48)	32 (5.22)
ROM	315 (39.38)	442 (55.25)	43 (5.38)
SLK	307 (37.26)	487 (59.10)	30 (3.64)
SLN	792 (61.21)	470 (36.32)	32 (2.47)
SPA	1,241 (50.82)	1,042 (42.67)	159 (6.51)
SWE	727 (81.87)	128 (14.41)	33 (3.72)
UK	590 (46.71)	608 (48.14)	65 (5.15)
MON	315 (52.41)	270 (44.93)	16 (2.66)
FYROM	264 (43.56)	322 (53.14)	20 (3.30)
SRB	261 (44.77)	299 (51.29)	23 (3.95)
TUR	157 (19.55)	627 (78.08)	19 (2.37)
NOR	650 (73.45)	179 (20.23)	56 (6.33)
SWZ	286 (35.18)	470 (57.81)	57 (7.01)
ALB	98 (28.24)	231 (66.57)	18 (5.19)

	Meetings, N (%)		
	Yes	No	Don't know
AUS	427 (54.88)	342 (43.96)	9 (1.16)
BEL	1,215 (58.00)	824 (39.33)	56 (2.67)
BUL	468 (59.47)	293 (37.23)	26 (3.30)
CRO	336 (42.97)	430 (54.99)	16 (2.05)
CYP	231 (50.99)	218 (48.12)	4 (0.88)
CZE	418 (54.29)	344 (44.68)	8 (1.04)
DK	645 (74.05)	211 (24.23)	15 (1.72)
EST	453 (56.77)	328 (41.10)	17 (2.13)
FIN	488 (65.77)	239 (32.21)	15 (2.02)
FRA	761 (58.76)	508 (39.23)	26 (2.01)
GER	958 (55.89)	719 (41.95)	37 (2.16)
GRE	196 (44.34)	240 (54.30)	6 (1.36)
HUN	201 (26.07)	549 (71.21)	21 (2.72)
IRE	436 (63.19)	246 (35.65)	8 (1.16)
ITA	376 (46.48)	416 (51.42)	17 (2.10)
LAT	410 (56.40)	284 (39.06)	33 (4.54)
LIT	428 (51.82)	367 (44.43)	31 (3.75)
LUX	460 (53.12)	385 (44.46)	21 (2.42)
MAL	343 (53.59)	285 (44.53)	12 (1.88)
NL	482 (59.07)	305 (37.38)	29 (3.55)
POL	299 (35.98)	513 (61.73)	19 (2.29)
POR	200 (32.63)	387 (63.13)	26 (4.24)
ROM	483 (60.38)	295 (36.88)	22 (2.75)
SLK	438 (53.28)	371 (45.13)	13 (1.58)
SLN	683 (52.78)	584 (45.13)	27 (2.09)
SPA	1,134 (46.46)	1,216 (49.82)	91 (3.73)
SWE	709 (79.84)	168 (18.92)	11 (1.24)
UK	842 (66.61)	406 (32.12)	16 (1.27)
MON	305 (50.75)	289 (48.09)	7 (1.16)
FYROM	343 (56.60)	252 (41.58)	11 (1.82)
SRB	251 (43.13)	315 (54.12)	16 (2.75)
TUR	278 (34.62)	508 (63.26)	17 (2.12)
NOR	635 (71.83)	223 (25.23)	26 (2.94)
SWZ	423 (51.97)	369 (45.33)	22 (2.70)
ALB	176 (50.72)	162 (46.69)	9 (2.59)

	Respect of boss, N (%)				
	Strongly agree	Agree	Neither	Disagree	Strongly disagree
AUS	513 (66.19)	189 (24.39)	43 (5.55)	20 (2.58)	10 (1.29)
BEL	1,172 (57.59)	628 (30.86)	122 (6.00)	68 (3.34)	45 (2.21)
BUL	468 (59.77)	248 (31.67)	44 (5.62)	14 (1.79)	9 (1.15)
CRO	356 (46.54)	301 (39.35)	75 (9.80)	18 (2.35)	15 (1.96)
CYP	258 (58.11)	147 (33.11)	25 (5.63)	8 (1.80)	6 (1.35)
CZE	377 (49.67)	271 (35.70)	83 (10.94)	21 (2.77)	7 (0.92)
DK	652 (76.26)	144 (16.84)	31 (3.63)	19 (2.22)	9 (1.05)
EST	357 (46.24)	330 (42.75)	60 (7.77)	20 (2.59)	5 (0.65)
FIN	470 (63.86)	192 (26.09)	43 (5.84)	21 (2.85)	10 (1.36)
FRA	721 (57.31)	393 (31.24)	50 (3.97)	48 (3.82)	46 (3.66)
GER	971 (57.59)	550 (32.62)	111 (6.58)	36 (2.14)	18 (1.07)
GRE	240 (54.79)	164 (37.44)	27 (6.16)	4 (0.91)	3 (0.68)
HUN	395 (52.11)	205 (27.04)	112 (14.78)	30 (3.96)	16 (2.11)
IRE	422 (62.89)	170 (25.34)	42 (6.26)	14 (2.09)	23 (3.43)
ITA	226 (29.12)	457 (58.89)	75 (9.66)	12 (1.55)	6 (0.77)
LAT	323 (45.30)	285 (39.97)	58 (8.13)	31 (4.35)	16 (2.24)
LIT	299 (37.24)	367 (45.70)	117 (14.57)	17 (2.12)	3 (0.37)
LUX	529 (62.38)	219 (25.83)	56 (6.60)	28 (3.30)	16 (1.89)
MAL	413 (65.87)	151 (24.08)	43 (6.86)	9 (1.44)	11 (1.75)
NL	557 (69.97)	185 (23.24)	26 (3.27)	15 (1.88)	13 (1.63)
POL	276 (33.87)	424 (52.02)	86 (10.55)	19 (2.33)	10 (1.23)
POR	451 (75.29)	112 (18.70)	27 (4.51)	7 (1.17)	2 (0.33)
ROM	503 (64.65)	162 (20.82)	77 (9.90)	29 (3.73)	7 (0.90)
SLK	256 (31.57)	415 (51.17)	105 (12.95)	28 (3.45)	7 (0.86)
SLN	730 (58.54)	372 (19.83)	79 (6.34)	21 (1.68)	45 (3.61)
SPA	1,706 (71.02)	463 (19.28)	149 (6.20)	39 (1.62)	45 (1.87)
SWE	566 (64.91)	236 (27.06)	43 (4.93)	17 (1.95)	10 (1.15)
UK	665 (54.20)	403 (32.84)	87 (7.09)	41 (3.34)	31 (2.53)
MON	369 (63.73)	168 (19.02)	29 (5.01)	8 (1.38)	5 (0.86)
FYROM	449 (75.46)	104 (17.48)	25 (4.20)	8 (1.34)	9 (1.51)
SRB	340 (60.18)	158 (27.96)	43 (7.61)	11 (1.95)	13 (2.30)
TUR	493 (62.25)	205 (25.88)	55 (6.94)	22 (2.78)	17 (2.15)
NOR	705 (80.39)	126 (14.37)	20 (2.28)	18 (2.05)	8 (0.91)
SWZ	456 (56.65)	279 (34.66)	50 (6.21)	11 (1.37)	9 (1.12)
ALB	154 (44.51)	133 (38.44)	44 (12.72)	9 (2.60)	6 (1.73)

	Fair treatment, N (%)			
	Always	Most of the time	Sometimes	Rarely
AUS	442 (56.96)	247 (31.83)	54 (6.96)	33 (4.25)
BEL	954 (45.98)	824 (39.17)	194 (9.35)	103 (4.96)
BUL	410 (52.10)	269 (34.18)	71 (9.02)	37 (4.70)
CRO	269 (34.71)	329 (42.45)	125 (16.13)	52 (6.71)
CYP	157 (34.89)	172 (38.22)	79 (17.56)	42 (9.33)
CZE	362 (47.14)	290 (37.76)	94 (12.24)	22 (2.86)
DK	358 (41.29)	423 (48.79)	66 (7.61)	20 (2.31)
EST	274 (34.86)	410 (52.16)	63 (8.02)	39 (4.96)
FIN	300 (40.43)	384 (51.75)	45 (6.06)	13 (1.75)
FRA	555 (43.33)	461 (35.99)	129 (10.07)	136 (10.62)
GER	694 (40.82)	827 (48.65)	118 (6.94)	61 (3.59)
GRE	140 (31.82)	229(52.05)	54 (12.27)	17 (3.86)
HUN	353 (45.96)	304 (39.58)	66 (8.59)	45 (5.86)
IRE	375 (54.35)	217 (31.45)	61 (8.84)	37 (5.36)
ITA	356 (44.39)	308 (38.40)	78 (9.73)	60 (7.48)
LAT	284 (39.89)	310 (43.53)	65 (9.13)	53 (7.44)
LIT	295 (36.29)	328 (40.34)	146 (17.96)	44 (5.41)
LUX	440 (51.04)	289 (33.53)	76 (8.82)	57 (6.61)
MAL	292 (45.62)	235 (36.72)	82 (12.81)	31 (4.84)
NL	426 (52.40)	320 (39.36)	42 (5.17)	25 (3.08)
POL	289 (35.20)	328 (39.95)	138 (16.81)	66 (8.04)
POR	297 (48.77)	221 (36.29)	68 (11.17)	23 (3.78)
ROM	429 (54.51)	239 (30.37)	75 (9.53)	44 (5.59)
SLK	154 (18.99)	380 (46.86)	201 (24.78)	76 (9.37)
SLN	599 (46.54)	431 (33.49)	162 (12.59)	95 (7.38)
SPA	1167 (47.87)	760 (31.17)	344 (14.11)	167 (6.85)
SWE	412 (46.45)	367 (41.38)	80 (9.02)	28 (3.16)
UK	586 (46.43)	478 (37.88)	151 (11.97)	47 (3.72)
MON	344 (57.91)	193 (32.49)	39 (6.57)	18 (3.03)
FYROM	351 (57.83)	157 (25.86)	64 (10.54)	35 (5.77)
SRB	287 (49.57)	183 (31.61)	70 (12.09)	39 (6.74)
TUR	291 (36.28)	252 (31.42)	138 (17.21)	121 (15.09)
NOR	468 (53.00)	360 (40.77)	42 (4.76)	13 (1.47)
SWZ	376 (46.53)	348 (43.07)	62 (7.67)	22 (2.72)
ALB	79 (22.77)	184 (53.03)	59 (17.00)	25 (7.20)

	Scope to take a break, N (%)				
	Always	Most of the time	Sometimes	Rarely	Never
AUS	197 (25.22)	160 (20.49)	112 (14.34)	123 (15.75)	189 (24.20)
BEL	509 (24.59)	512 (24.73)	254 (12.27)	222 (10.72)	573 (27.68)
BUL	104 (13.18)	121 (15.34)	177 (22.43)	175 (22.18)	212 (26.87)
CRO	120 (15.40)	148 (19.00)	152 (19.51)	176 (22.59)	183 (23.49)
CYP	94 (20.94)	91 (20.27)	133 (29.62)	76 (16.93)	55 (12.25)
CZE	90 (11.72)	172 (22.40)	221 (28.78)	181 (23.57)	104 (13.54)
DK	232 (26.73)	254 (29.26)	134 (15.44)	119 (13.71)	129 (14.86)
EST	205 (25.69)	185 (23.18)	183 (22.93)	111 (13.91)	114 (14.29)
FIN	223 (30.01)	253 (34.05)	95 (12.79)	98 (13.19)	74 (9.96)
FRA	440 (34.06)	279 (21.59)	173 (13.39)	137 (10.60)	263 (20.36)
GER	171 (10.00)	434 (25.38)	390 (22.81)	381 (22.28)	334 (19.53)
GRE	34 (7.76)	72 (16.44)	137 (31.28)	121 (27.63)	74 (16.89)
HUN	111 (14.45)	219 (28.52)	149 (19.40)	146 (19.01)	143 (18.62)
IRE	160 (23.60)	162 (23.89)	98 (14.45)	73 (10.77)	185 (27.29)
ITA	98 (12.10)	169 (20.86)	249 (30.74)	189 (23.33)	105 (12.96)
LAT	143 (19.81)	145 (20.08)	236 (32.69)	100 (13.85)	98 (13.57)
LIT	136 (16.50)	181 (21.97)	206 (25.00)	160 (19.42)	141 (17.11)
LUX	329 (38.08)	170 (19.68)	77 (8.91)	82 (9.49)	206 (23.84)
MAL	157 (24.84)	133 (21.04)	76 (12.03)	60 (9.49)	206 (32.59)
NL	224 (27.65)	169 (20.86)	84 (10.37)	96 (11.85)	237 (29.26)
POL	145 (17.55)	170 (20.58)	216 (26.15)	149 (18.04)	146 (17.68)
POR	103 (16.91)	114 (18.72)	172 (28.24)	140 (22.99)	80 (13.14)
ROM	156 (19.65)	193 (24.31)	218 (27.46)	143 (18.01)	84 (10.58)
SLK	82 (9.89)	184 (22.20)	217 (26.18)	173 (20.87)	173 (20.87)
SLN	240 (18.53)	189 (14.59)	196 (15.14)	228 (17.61)	442 (34.13)
SPA	480 (19.83)	404 (16.69)	631 (26.07)	450 (18.60)	455 (18.80)
SWE	202 (22.77)	225 (25.37)	202 (22.77)	143 (16.12)	115 (12.97)
UK	328 (25.99)	298 (23.61)	192 (15.21)	157 (12.44)	287 (22.74)
MON	56 (9.43)	67 (11.28)	144 (24.24)	189 (31.82)	138 (23.23)
FYROM	123 (20.23)	114 (18.75)	90 (14.80)	85 (13.98)	196 (32.24)
SRB	102 (17.59)	103 (17.76)	137 (23.62)	104 (17.93)	134 (23.10)
TUR	177 (22.01)	192 (23.88)	209 (26.00)	126 (15.67)	100 (12.44)
NOR	241 (27.26)	243 (27.49)	199 (22.51)	121 (13.69)	80 (9.05)
SWZ	151 (18.62)	170 (20.96)	143 (17.63)	163 (20.10)	184 (22.69)
ALB	28 (8.02)	53 (15.19)	114 (32.66)	89 (25.50)	65 (18.62)

	Hours off for personal or family matters, N (%)			
	Very easy	Fairly easy	Fairly difficult	Very difficult
AUS	235 (30.32)	256 (33.03)	165 (21.29)	119 (15.35)
BEL	585 (28.27)	789 (38.13)	354 (17.11)	341 (16.48)
BUL	128 (16.35)	385 (49.17)	162 (20.69)	108 (13.79)
CRO	166 (21.45)	261 (33.72)	146 (18.86)	201 (25.97)
CYP	72 (15.86)	142 (31.28)	179 (39.43)	61 (13.44)
CZE	48 (6.28)	225 (29.45)	221 (28.93)	270 (35.34)
DK	340 (39.35)	321 (37.15)	109 (12.62)	94 (10.88)
EST	106 (13.45)	428 (54.31)	164 (20.81)	90 (11.42)
FIN	240 (32.48)	344 (46.55)	84 (11.37)	71 (9.61)
FRA	252 (19.70)	540 (42.22)	251 (19.62)	236 (18.45)
GER	213 (12.61)	624 (36.94)	486 (28.77)	366 (21.67)
GRE	30 (6.88)	139 (31.88)	191 (43.81)	76 (17.43)
HUN	68 (9.03)	292 (38.78)	230 (30.54)	163 (21.65)
IRE	232 (34.07)	275 (40.38)	95 (13.95)	79 (11.60)
ITA	79 (10.09)	403 (51.47)	219 (27.97)	82 (10.47)
LAT	124 (17.51)	355 (50.14)	136 (19.21)	93 (13.14)
LIT	131 (16.17)	387 (47.48)	195 (24.07)	97 (11.98)
LUX	205 (23.92)	370 (43.17)	163 (19.02)	119 (13.89)
MAL	218 (34.33)	286 (45.04)	85 (13.39)	46 (7.24)
NL	385 (47.77)	293 (36.35)	74 (9.18)	54 (6.70)
POL	91 (11.23)	410 (50.62)	196 (24.20)	113 (13.95)
POR	67 (11.06)	273 (45.05)	212 (34.98)	54 (8.91)
ROM	98 (12.60)	389 (50.00)	237 (30.46)	54 (6.94)
SLK	71 (8.71)	289 (35.46)	292 (35.83)	163 (20.00)
SLN	287 (22.27)	417 (32.35)	226 (17.53)	359 (27.85)
SPA	716 (29.82)	797 (33.19)	544 (22.66)	344 (14.33)
SWE	357 (40.57)	339 (38.52)	126 (14.32)	58 (6.59)
UK	377 (30.26)	521 (41.81)	194 (15.57)	154 (12.36)
MON	54 (9.17)	123 (20.88)	197 (22.45)	215 (36.50)
FYROM	207 (34.27)	232 (38.41)	89 (14.74)	76 (12.58)
SRB	87 (15.18)	158 (27.57)	124 (21.64)	204 (35.60)
TUR	143 (17.90)	385 (48.19)	211 (26.41)	60 (7.51)
NOR	399 (45.44)	315 (35.88)	108 (12.30)	56 (6.38)
SWZ	176 (22.80)	293 (36.76)	188 (23.59)	140 (17.57)
ALB	28 (8.02)	125 (35.82)	146 (41.83)	50 (14.33)

	Schedule unpredictability, N (%)				
	No	Yes, weeks in advance	Yes, days in advance	Yes, the day before	Yes, the same day
AUS	601 (77.25)	23 (2.96)	62 (7.97)	49 (6.30)	43 (5.53)
BEL	1,730 (83.37)	48 (2.31)	143 (6.89)	91 (4.39)	63 (3.04)
BUL	717 (90.76)	19 (2.41)	27 (3.42)	12 (1.52)	15 (1.90)
CRO	558 (71.63)	31 (3.98)	84 (10.78)	71 (9.11)	35 (4.49)
CYP	337 (74.23)	6 (1.32)	45 (9.91)	38 (8.37)	28 (6.17)
CZE	529 (68.61)	39 (5.06)	126 (16.34)	56 (7.26)	21 (2.72)
DK	707 (81.17)	28 (3.21)	42 (4.82)	28 (3.21)	66 (7.58)
EST	580 (73.79)	43 (5.47)	105 (13.36)	36 (4.58)	22 (2.80)
FIN	595 (80.41)	19 (2.57)	58 (7.84)	34 (4.59)	34 (4.59)
FRA	1,017 (79.02)	40 (3.11)	101 (7.85)	67 (5.21)	62 (4.82)
GER	1,215 (71.22)	59 (3.46)	280 (16.41)	105 (6.15)	47 (2.75)
GRE	322 (72.85)	11 (2.49)	42 (9.50)	46 (10.41)	21 (4.75)
HUN	589 (76.20)	20 (2.59)	86 (11.13)	53 (6.86)	25 (3.23)
IRE	541 (79.21)	26 (3.81)	41 (6.00)	30 (4.39)	45 (6.59)
ITA	663 (81.75)	36 (4.44)	75 (9.25)	32 (3.95)	5 (0.62)
LAT	565 (78.58)	22 (3.06)	58 (8.07)	42 (5.84)	32 (4.45)
LIT	606 (73.45)	94 (11.39)	103 (12.48)	13 (1.58)	9 (1.09)
LUX	697 (80.76)	32 (3.71)	61 (7.07)	32 (3.71)	41 (4.75)
MAL	575 (89.98)	8 (1.25)	28 (4.38)	14 (2.19)	14 (2.19)
NL	686 (84.28)	44 (5.41)	45 (5.53)	19 (2.33)	20 (2.46)
POL	564 (70.32)	45 (5.61)	99 (12.34)	70 (8.73)	24 (2.99)
POR	462 (75.74)	16 (2.62)	58 (9.51)	54 (8.85)	20 (3.28)
ROM	500 (62.97)	26 (3.27)	143 (18.01)	89 (11.21)	36 (4.53)
SLK	505 (61.59)	53 (6.46)	104 (12.68)	101 (12.32)	57 (6.95)
SLN	1,052 (81.30)	38 (2.94)	72 (5.56)	62 (4.79)	70 (5.41)
SPA	1,943 (80.29)	88 (3.64)	163 (6.74)	130 (5.37)	96 (3.97)
SWE	712 (81.28)	57 (6.51)	54 (6.16)	29 (3.31)	24 (2.74)
UK	980 (78.78)	49 (3.94)	78 (6.27)	67 (5.39)	70 (5.63)
MON	349 (58.36)	13 (2.17)	112 (18.73)	85 (14.21)	39 (6.52)
FYROM	442 (73.18)	5 (0.83)	57 (9.44)	50 (8.28)	50 (8.28)
SRB	374 (65.04)	27 (4.70)	91 (15.83)	51 (8.87)	32 (5.57)
TUR	636 (79.80)	44 (5.52)	46 (5.77)	40 (5.02)	31 (3.89)
NOR	746 (84.48)	35 (3.96)	49 (5.55)	29 (3.28)	24 (2.72)
SWZ	540 (66.50)	57 (7.02)	114 (14.04)	63 (7.76)	38 (4.68)
ALB	212 (61.27)	3 (0.87)	30 (8.67)	83 (23.99)	18 (5.20)

	Working times regularity, N (%)				
	Very high	High	Medium	Low	Very low
AUS	244 (31.32)	163 (20.92)	136 (17.46)	129 (16.56)	107 (13.74)
BEL	886 (42.45)	436 (20.89)	288 (13.80)	300 (14.37)	177 (8.48)
BUL	583 (74.08)	55 (6.99)	66 (8.39)	42 (5.34)	41 (5.21)
CRO	445 (57.35)	88 (11.34)	97 (12.50)	70 (9.02)	76 (9.79)
CYP	276 (60.66)	70 (15.38)	48 (10.55)	39 (8.57)	22 (4.84)
CZE	368 (47.85)	81 (10.53)	106 (13.78)	88 (11.44)	126 (16.38)
DK	143 (16.47)	183 (21.08)	179 (20.62)	241 (27.76)	122 (14.06)
EST	351 (44.83)	83 (10.60)	110 (14.05)	140 (17.88)	99 (12.64)
FIN	254 (34.37)	124 (16.78)	120 (16.24)	140 (18.94)	101 (13.67)
FRA	469 (36.27)	249 (19.26)	220 (17.01)	218 (16.86)	137 (10.60)
GER	767 (44.80)	310 (18.11)	249 (14.54)	249 (14.54)	137 (8.00)
GRE	298 (67.57)	52 (11.79)	43 (9.75)	39 (8.84)	9 (2.04)
HUN	449 (58.16)	86 (11.14)	88 (11.40)	76 (9.84)	73 (9.46)
IRE	336 (48.70)	117 (19.96)	79 (11.45)	93 (13.48)	65 (9.42)
ITA	506 (62.47)	99 (12.22)	68 (8.40)	84 (10.37)	53 (6.54)
LAT	418 (57.58)	88 (12.12)	80 (11.02)	62 (8.54)	78 (10.74)
LIT	468 (56.80)	85 (10.32)	83 (10.07)	90 (10.92)	98 (11.89)
LUX	401 (46.30)	192 (22.17)	122 (14.09)	90 (10.39)	61 (7.04)
MAL	406 (63.74)	69 (10.83)	70 (10.99)	57 (8.95)	35 (5.49)
NL	280 (34.36)	151 (18.53)	121 (14.85)	155 (19.02)	108 (13.25)
POL	473 (57.26)	89 (10.77)	95 (11.50)	101 (12.23)	68 (8.23)
POR	401 (65.42)	64 (10.44)	48 (7.83)	72 (11.75)	28 (4.57)
ROM	481 (60.73)	110 (13.89)	84 (10.61)	68 (8.59)	49 (6.19)
SLK	429 (52.38)	99 (12.09)	110 (13.43)	121 (14.77)	60 (7.33)
SLN	618 (48.06)	197 (15.32)	163 (12.67)	163 (12.67)	145 (11.28)
SPA	1,481 (60.82)	333 (13.68)	217 (8.91)	242 (9.94)	162 (6.65)
SWE	242 (27.38)	156 (17.65)	132 (14.93)	243 (27.49)	111 (12.56)
UK	562 (44.50)	225 (17.81)	156 (12.35)	200 (15.84)	120 (9.50)
MON	361 (60.47)	57 (9.55)	72 (12.06)	63 (10.55)	44 (7.37)
FYROM	415 (68.60)	67 (11.07)	53 (8.76)	35 (5.79)	35 (5.79)
SRB	358 (61.83)	56 (9.67)	58 (10.02)	58 (10.02)	49 (8.46)
TUR	603 (75.94)	50 (6.30)	41 (5.16)	56 (7.05)	44 (5.54)
NOR	312 (35.37)	136 (15.42)	154 (17.46)	168 (19.05)	112 (12.70)
SWZ	388 (47.90)	124 (15.31)	102 (12.59)	106 (13.09)	90 (11.11)
ALB	267 (77.39)	35 (10.14)	13 (3.77)	21 (6.09)	9 (2.61)

	Come to work at short notice, N (%)			
	Never	Less often	Several times a month	Several times a week
AUS	431 (55.40)	267 (34.32)	70 (9.00)	10 (1.29)
BEL	1,477 (71.22)	436 (21.02)	123 (5.93)	38 (1.83)
BUL	528 (67.26)	203 (25.86)	39 (4.97)	15 (1.91)
CRO	450 (58.06)	238 (30.71)	67 (8.65)	20 (2.58)
CYP	280 (61.54)	119 (26.15)	40 (8.79)	16 (3.52)
CZE	346 (45.11)	301 (39.24)	99 (12.91)	21 (2.74)
DK	511 (59.01)	265 (30.60)	76 (8.78)	14 (1.62)
EST	439 (55.43)	265 (33.46)	72 (9.09)	16 (2.02)
FIN	439 (59.57)	232 (31.48)	52 (7.06)	14 (1.90)
FRA	970 (75.37)	212 (16.47)	72 (5.59)	33 (2.56)
GER	873 (51.11)	630 (36.89)	182 (10.66)	23 (1.35)
GRE	269 (61.28)	138 (31.44)	23 (5.24)	9 (2.05)
HUN	373 (49.08)	310 (40.79)	57 (7.50)	20 (2.63)
IRE	395 (57.58)	197 (28.72)	75 (10.93)	19 (2.77)
ITA	539 (67.12)	201 (25.03)	53 (6.60)	10 (1.25)
LAT	425 (58.70)	230 (31.77)	57 (7.87)	12 (1.66)
LIT	510 (62.27)	195 (23.81)	108 (13.19)	6 (0.73)
LUX	528 (61.54)	248 (28.90)	57 (6.64)	25 (2.91)
MAL	472 (74.33)	129 (20.31)	22 (3.46)	12 (1.89)
NL	500 (61.80)	209 (25.83)	82 (10.14)	18 (2.22)
POL	507 (61.90)	237 (28.94)	68 (8.30)	7 (0.85)
POR	389 (64.19)	166 (27.39)	36 (5.94)	15 (2.48)
ROM	439 (55.50)	269 (34.01)	65 (8.22)	18 (2.28)
SLK	426 (51.76)	314 (38.15)	68 (8.26)	15 (1.82)
SLN	845 (64.45)	330 (25.56)	94 (7.28)	22 (1.70)
SPA	1,626 (66.91)	532 (21.89)	192 (7.90)	80 (3.29)
SWE	525 (59.39)	259 (29.30)	79 (8.94)	21 (2.38)
UK	761 (60.78)	319 (25.48)	125 (9.98)	47 (3.75)
MON	269 (45.13)	196 (32.89)	84 (14.09)	47 (7.89)
FYROM	387 (63.55)	149 (24.47)	55 (9.03)	18 (2.96)
SRB	315 (54.50)	173 (29.93)	73 (12.63)	17 (2.94)
TUR	444 (56.20)	198 (25.06)	86 (10.89)	62 (7.85)
NOR	486 (55.04)	282 (31.94)	88 (9.97)	27 (3.06)
SWZ	425 (52.66)	285 (35.32)	82 (10.16)	15 (1.86)
ALB	125 (36.55)	133 (38.89)	62 (18.13)	22 (6.43)

	Monthly income, N (%)		
	High	Medium	Low
AUS	200 (27.66)	320 (44.26)	203 (28.08)
BEL	763 (39.72)	964 (50.18)	194 (10.10)
BUL	349 (50.95)	288 (42.04)	48 (7.01)
CRO	435 (70.05)	161 (25.93)	25 (4.03)
CYP	209 (48.83)	173 (40.42)	46 (10.75)
CZE	278 (48.26)	216 (37.50)	82 (14.24)
DK	561 (65.85)	198 (23.24)	93 (10.92)
EST	361 (51.65)	230 (32.90)	108 (15.45)
FIN	418 (57.18)	255 (34.88)	58 (7.93)
FRA	540 (42.86)	545 (43.25)	175 (13.89)
GER	594 (38.60)	533 (34.63)	412 (26.77)
GRE	279 (76.23)	73 (19.95)	14 (3.83)
HUN	232 (52.49)	135 (30.54)	75 (16.97)
IRE	346 (55.72)	162 (26.09)	113 (18.20)
ITA	285 (48.31)	231 (39.15)	74 (12.54)
LAT	285 (41.42)	282 (40.99)	121 (17.59)
LIT	492 (62.04)	226 (28.50)	75 (9.46)
LUX	295 (40.85)	285 (39.20)	147 (20.22)
MAL	308 (51.08)	257 (42.62)	38 (6.30)
NL	366 (48.28)	215 (28.36)	177 (23.35)
POL	304 (48.64)	256 (40.96)	65 (10.40)
POR	192 (38.71)	283 (57.06)	21 (4.23)
ROM	539 (81.67)	117 (17.73)	4 (0.61)
SLK	328 (48.24)	296 (43.53)	56 (8.24)
SLN	314 (27.99)	572 (50.98)	236 (21.03)
SPA	914 (47.33)	729 (37.75)	288 (14.91)
SWE	567 (65.17)	221 (25.40)	82 (9.43)
UK	559 (49.29)	342 (30.16)	233 (20.55)
MON	129 (24.57)	320 (60.95)	76 (14.48)
FYROM	447 (81.87)	82 (15.02)	17 (3.11)
SRB	376 (84.49)	65 (14.61)	4 (0.90)
TUR	730 (95.18)	28 (3.65)	9 (1.17)
NOR	288 (33.18)	396 (45.62)	184 (21.20)
SWZ	406 (58.76)	184 (26.63)	101 (14.62)
ALB	173 (55.81)	99 (31.94)	38 (12.26)

	Hourly income, N (%)		
	High	Medium	Low
AUS	161 (22.27)	404 (55.88)	158 (21.85)
BEL	280 (14.58)	1,114 (57.99)	527 (27.43)
BUL	362 (52.85)	263 (38.39)	60 (8.76)
CRO	107 (17.23)	278 (44.77)	236 (38.00)
CYP	174 (40.65)	165 (38.55)	89 (20.79)
CZE	213 (36.98)	268 (46.53)	95 (16.49)
DK	121 (14.20)	501 (58.80)	230 (27.00)
EST	290 (41.49)	250 (35.77)	159 (22.75)
FIN	192 (26.27)	416 (56.91)	123 (16.83)
FRA	325 (25.79)	616 (48.89)	319 (25.32)
GER	257 (16.70)	709 (46.07)	573 (37.23)
GRE	72 (19.67)	131 (35.79)	163 (44.54)
HUN	65 (14.71)	155 (35.07)	222 (50.23)
IRE	113 (18.20)	278 (44.77)	230 (37.04)
ITA	114 (19.32)	343 (58.14)	133 (22.54)
LAT	232 (33.72)	245 (35.61)	211 (30.67)
LIT	443 (55.86)	230 (29.00)	120 (15.13)
LUX	328 (45.12)	295 (40.58)	104 (14.31)
MAL	184 (30.51)	323 (53.57)	96 (15.92)
NL	175 (23.09)	446 (58.84)	137 (18.07)
POL	130 (20.80)	212 (33.92)	283 (45.28)
POR	161 (32.46)	280 (56.45)	55 (11.09)
ROM	156 (23.64)	293 (44.39)	211 (31.97)
SLK	176 (25.88)	331 (48.68)	173 (25.44)
SLN	265 (23.62)	459 (40.91)	398 (35.47)
SPA	476 (24.65)	998 (51.68)	457 (23.67)
SWE	144 (16.55)	532 (61.15)	194 (22.30)
UK	310 (27.34)	487 (42.95)	337 (29.72)
MON	102 (19.43)	223 (42.48)	200 (38.10)
FYROM	148 (27.11)	166 (30.40)	232 (42.49)
SRB	111 (24.94)	152 (34.16)	182 (40.90)
TUR	143 (18.64)	207 (26.99)	417 (54.37)
NOR	49 (5.65)	365 (42.05)	454 (52.30)
SWZ	254 (36.76)	341 (49.35)	96 (13.89)
ALB	184 (59.35)	87 (28.05)	39 (12.58)

Appendix III. Other papers related to the thesis

In addition to the research performed within the framework of this PhD dissertation, I participated in other research projects that also contributed to the understanding of the implications of precarious employment for the health and well-being of workers. Publications resulting from these collaborations are listed below:

1. Méndez, F., **Padrosa, E**., Utzet, M., Benach, J., & Julià, M. (2021). Precarious employment, psychosocial risk factors and poor mental health: A cross-sectional mediation analysis. *Safety Science*, 143, 105439

2. Bolíbar, M., Belvis, F., Jódar, P., Vives, A., Méndez, F., Bartoll-Roca, X., Pozo, O.J., Gomez-Gomez, A., **Padrosa, E**., Benach, J., & Julià, M. (2021). Precarious Employment and Stress: The Biomedical Embodiment of Social Factors. PRESSED Project Study Protocol. *Frontiers in public health*, 9, 649447.

3. Jonsson, J., Muntaner, C., Bodin, T., Alderling, M., Balogh, R., Burström, B., Davis, L., Gunn, V., Hemmingsson, T., Julià, M., Kjellberg, K., Kreshpaj, B., Orellana, C., **Padrosa, E**., Wegman, D.H., & Matilla-Santander, N. (2021). Low-quality employment trajectories and risk of common mental disorders, substance use disorders and suicide attempt: a longitudinal study of the Swedish workforce. *Scandinavian Journal of Work, Environment & Health*, 47(7), 509-520.

4. Matilla-Santander, N., Ahonen, E.Q., Albin, M., Baron, S., Bolíbar, M., Bosmans, K., Burström, B., Cuervo, I., Davis, L., Gunn, V., Håkansta, C., Hemmingsson, T., Hogsted, C., Jonsson, J., Julià, M., Kjellberg, K., Kreshpaj, B., Lewchuk, W., Muntaner, C., O'Campo, P., Orellana, C., Östergren, P.O., **Padrosa, E**., Ruiz, M.E., Vanroelen, C., Vignola, E., Vives, A., Wegman, D.H., Bodin, T., & All Members of the PWR Study. (2021). COVID-19 and Precarious Employment: Consequences of the Evolving Crisis. *International Journal of Health Services*, 51(2), 226-228.

Appendix IV. Dissemination

The results of this dissertation were presented at the following national and international congresses:

1. **Padrosa, E**., & Julià, M. (2020). Precarious employment and mental health in European welfare state regimes: a multilevel approach. *16th World Congress of Public Health.* Virtual, October 16. Abstract published in:
   https://doi.org/10.1093/eurpub/ckaa165.1353

2. **Padrosa, E**., & Julià, M. (2020). Precariedad laboral y salud mental en los estados del bienestar europeos: una aproximación multinivel. *I Cognreso Virtual de la Sociedad Española de Epidemiologia (SEE) & Associação Portuguesa de Epidemiologia (APE)*. Virtual, October 29. Abstract published in:
   https://static.elsevier.es/miscelanea/congreso_gaceta2020.pdf

3. **Padrosa, E**., Bolíbar, M., Julià, M., & Benach, J. (2020). Precariedad laboral desde una perspectiva comparativa: Medición de la invariancia de la Employment Precariousness Scale for Europe (EPRES-E). *V Encuentro / Reunión Intercongresual de la Federación Española de Sociología (FES)*. Virtual, December 10.

4. **Padrosa, E**., Bolíbar, M., Julià, M., & Benach, J. (2021). Comparing precarious employment across countries:

measurement invariance of the Employment Precariousness Scale for Europe (EPRES-E). *19th ILERA World Congress.* Virtual, June 24.

5. **Padrosa, E**., Bolíbar, M., Julià, M., & Benach, J. (2021). Comparing precarious employment across countries: measurement invariance of the Employment Precariousness Scale for Europe (EPRES-E). *15th ESA Conference.* Virtual, August 31.