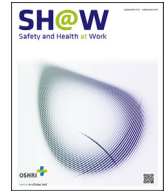




Contents lists available at ScienceDirect

Safety and Health at Work

journal homepage: www.e-shaw.net

Original Article

The Third Version of the Copenhagen Psychosocial Questionnaire

Hermann Burr^{1,*}, Hanne Berthelsen², Salvador Moncada³, Matthias Nübling⁴, Emilie Dupret⁵, Yucel Demiral⁶, John Oudyk⁷, Tage S. Kristensen⁸, Clara Llorens^{3,9}, Albert Navarro^{9,10}, Hans-Joachim Lincke⁴, Christine Bocéréan^{5,11}, Ceyda Sahan⁶, Peter Smith^{12,13,14}, Anne Pohrt¹⁵, on behalf of the international COPSOQ Network

¹ Division 3 Work and Health, Federal Institute of Occupational Safety and Health (BAuA), Berlin, Germany

² Center for Work Life and Evaluation Studies (CTA) and the Faculty of Odontology, Malmö University, Malmö, Sweden

³ Union Institute of Work, Environment and Health (ISTAS), Barcelona, Spain

⁴ Freiburg Research Centre for Occupational Sciences (FFAW), Freiburg, Germany

⁵ Preventis, Paris, France

⁶ Department of Public Health, Dokuz Eylül University, Izmir, Turkey

⁷ Occupational Health Clinics for Ontario Workers (OHCOW), Hamilton, Canada

⁸ Task-Consult, Gilleleje, Denmark

⁹ Research Group on Psychosocial Risks, Organization of Work and Health (POWAH), Autonomous University of Barcelona, Barcelona, Spain

¹⁰ Biostatistics Unit, Faculty of Medicine, Autonomous University of Barcelona, Barcelona, Spain

¹¹ Lorraine University, Nancy, France

¹² Institute for Work and Health (IWH), Toronto, ON, Canada

¹³ Department of Epidemiology and Preventive Medicine, Monash University, Victoria, Australia

¹⁴ Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada

¹⁵ Institut für Medizinische Psychologie, Charité-Universitätsmedizin Berlin, Berlin, Germany



ARTICLE INFO

Article history:

Received 25 July 2018

Received in revised form

20 September 2019

Accepted 23 October 2019

Available online 6 November 2019

Keywords:

Psychosocial risk factors

Psychosocial working conditions

Risk assessment

ABSTRACT

Introduction: A new third version of the Copenhagen Psychosocial Questionnaire (COPSOQ III) has been developed in response to trends in working life, theoretical concepts, and international experience. A key component of the COPSOQ III is a defined set of mandatory core items to be included in national short, middle, and long versions of the questionnaire. The aim of the present article is to present and test the reliability of the new international middle version of the COPSOQ III.

Methods: The questionnaire was tested among 23,361 employees during 2016–2017 in Canada, Spain, France, Germany, Sweden, and Turkey. A total of 26 dimensions (measured through scales or single items) of the middle version and two from the long version were tested. Psychometric properties of the dimensions were assessed regarding reliability (Cronbach α), ceiling and floor effects (fractions with extreme answers), and distinctiveness (correlations with other dimensions).

Results: Most international middle dimensions had satisfactory reliability in most countries, though some ceiling and floor effects were present. Dimensions with missing values were rare. Most dimensions had low to medium intercorrelations.

Conclusions: The COPSOQ III offers reliable and distinct measures of a wide range of psychosocial dimensions of modern working life in different countries; although a few measures could be improved. Future testing should focus on validation of the COPSOQ items and dimensions using both qualitative and quantitative approaches. Such investigations would enhance the basis for recommendations using the COPSOQ III.

© 2019 Occupational Safety and Health Research Institute, Published by Elsevier Korea LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author. Unit 3.4. Mental Health and Cognitive Capacity, Division 3 Work and Health, Federal Institute of Occupational Safety and Health (BAuA), Nöldnerstraße 40-42, 10317, Berlin, Germany.

E-mail address: burr.hermann@baua.bund.de (H. Burr).

1. Introduction

The objective of this article is to present and test the reliability of the third international middle version of the Copenhagen Psychosocial Questionnaire (COPSQ III). This third version has been developed by the International COPSQ Network reflecting its' increased international use [1]—the previous two versions were developed by the Danish National Research Centre of the Working Environment [2,3].

1.1. What is the COPSQ?

The COPSQ was originally developed for use in two settings: (1) occupational risk assessment and (2) research on work and health [2–4]. The COPSQ instrument covers a broad range of domains including Demands at Work, Work Organization and Job Contents, Interpersonal Relations and Leadership, Work–Individual Interface, Social Capital, Offensive Behaviors, Health and Well-being. Previous versions of the COPSQ were developed through factor analyses of a large range of items, and reliability of resulting scales was subsequently tested.

In the workplace setting, practitioners have an interest in measuring a broad range of psychosocial factors, both at the workplace level and for national monitoring [5,6]. In the research setting, it is likewise of interest to have broad coverage of psychosocial dimensions. This broad coverage also includes central elements of concepts widely used in research of work and health such as the demand control and the effort–reward imbalance (ERI) models [7–11], as well as other psychosocial factors such as emotional demands and quality of leadership [6,11–15].

The COPSQ I and II came in short, middle, and long versions [3]. Originally, the short and medium versions were intended to be used in practical settings and the long version in research settings. Later, it turned out that also in research there was a need for shorter versions and that the middle version had sufficient reliability [3]. The COPSQ has been recognized as a useful instrument by several organizations [16,17].

Previous to the development of the COPSQ III, the instrument had been translated into 18 different languages and was used in 40 countries worldwide [3,18–28,30–36]. The COPSQ is also widely used in research, being applied in more than 400 peer-reviewed articles [37]. Finally, the COPSQ has been applied to a variety of occupations and workplaces and has proven to be valid for national, as well as international comparisons [38–42].

1.2. Reasons for development of the COPSQ III

The push to redevelop the COPSQ II to a third version (COPSQ III) was based on three reasons:

- 1) Trends in the work environment: Work and working conditions have changed because of increased globalization and computerization to some extent intensified by the economic crisis in 2008. For example, types of management characterized by less trust (e.g., New Public Management; appraisal systems) have become more prevalent [43], along with the deterioration of working conditions in some [44,45], but not all countries [46,47]. Furthermore, income inequality has increased [48,49], and precarious work (e.g., involuntary part time work and short term contracts) has become more widespread [40,50,51], along with flexible timetables (e.g., weekend work, shift work), long working hours and lack of schedule adaptation. In addition, company restructurings and layoffs have led to less stable employment [43,49,51,52]. In recent decades technological change has been characterized by increased digitalization of

work life [53]. This implicates new ways of interacting not only with coworkers but also with customers, patients, clients, or pupils (e.g., in telemedicine, robotics, and by means of communication technologies like email and social media) [54–56].

- 2) Concepts: First, the Job demands-resources model (JD-R) through integration of classical work environmental models and job satisfaction research pointed at the need for a more comprehensive perspective than previous occupational health models [57,58]. This applies not merely to job demands and resources but also to a broader range of nontraditional health-related outcomes such as productivity and staff turnover. A wider focus regarding outcomes can facilitate integration of the perspective of occupational health and perspectives such as human resource management. In addition, there is an increasing awareness regarding trust, justice, reciprocity, and cohesion at the workplace pointing at the notion of social capital [13,59–61]. Another development is that new theories about stress in the workplace have evolved, such as the Stress-as-Offence-to-Self theory (SOS) [62]. This theory posits that how employees conceive they are treated by the management, through what tasks they are meant to do, and the circumstances under which they are to carry out tasks can be a source of stress [62]. In particular, when tasks and circumstances are laid out in a way that hinders the workers carrying out their work, this can be experienced as maltreatment and result in greater stress.

While these three topics (JD-R, social capital, and SOS) were already partly covered by earlier versions of the COPSQ, the evolution of these theories in the last two decades necessitated greater coverage of these theories in the updated COPSQ III.

- 3) International experience with the COPSQ: The questionnaire is being used in an increasing number of countries [1], which are very different regarding work and working conditions [40,63–65]. This development has led, on the one hand, to an increased need for adaptations to different national, cultural, and occupational contexts, and on the other hand, to suggestions for revision of existing items. For example, the international use of the COPSQ has raised issues regarding wording of items (i.e. do items measure what they should), translation issues (e.g., between the Danish and English versions of the COPSQ I and II) and differential item functioning (DIF) and differential item effects (DIEs). These experiences have also led to more knowledge on what dimensions are regarded as important on the shop floor level and what dimensions are most strongly associated with health.

1.3. The development process

In dealing with the aforementioned three reasons for further developing the questionnaire (societal trends, scientific concepts, and experience with the questionnaire), two strategic objectives were important. These were to update the instrument and, at the same time, allow comparability between populations and time periods. A test version was developed in a conceptual-guided consensus process to evaluate all items of versions I and II of the questionnaire according to their relevance for research and practice (Appendix Table 1). International Network members from Asia, the Americas and Europe were invited to assess items and dimensions of these versions. They were encouraged to comment and suggest changes on the network's regular biennial workshop meetings 2013–2017 in Ghent, Paris, and Santiago de Chile and in three online

rounds of evaluations 2013–2016. In addition, psychometrics findings from research [36,66], results of Swedish cognitive interviews [20,61], reanalyses of the existing COPSOQ I and II data by network members, and practical experiences were considered. Based on this process, a test version was finalized in spring 2016 and made available for further testing among network members.

1.4. What is new?

A number of changes were made in the third revised version of the COPSOQ (Table 1). These changes cover both the dimensions and the items of the questionnaire (Table 1). In addition, each dimension was defined in a few sentences to give reasons for the choice of items and improve the use of the questionnaire in general (Appendix Table 2). We have also further developed international guidelines regarding the use of the COPSOQ in practical settings [67].

1.4.1. The core item concept

The concept of core items was introduced to ensure flexibility, and continuity, simultaneously. This concept guarantees comparability internationally, nationally, and over time. Core items were defined as mandatory in all national versions of the COPSOQ III, but they cannot stand alone. In other words, core items are to be supplemented by further items to establish short, middle, or long versions of the instrument (Fig. 1). In national versions, choice of supplementary items can deviate. Middle and short versions are developed as a basis for use in measurements in companies; long and middle versions are developed as a basis for use in research. National middle versions should consist of enough items to form reliable scales, thus consisting of two to four items (in the COPSOQ III, some middle dimensions only comprise one item, which is an issue we return to in the discussion). Short versions should consist of preferably two items. As a starting point, we have defined items for an international middle version of the COPSOQ III; as said, national versions can deviate. We did not suggest short version items, but national versions should consider middle items to supplement mandatory core items. This implicates a new standard for flexibility for establishing national versions of the COPSOQ.

1.4.2. Trends

To keep the COPSOQ updated to new trends, we changed the questionnaire dealing with the issues precariousness, work life conflict, and negative acts. Regarding precariousness, we introduced the new dimension Insecurity over Working Conditions [21], thus letting the scale Job Insecurity focus only on insecurity concerning employment. As previously mentioned, we reintroduced a dimension from the COPSOQ I, Control over Working Time, to cover aspects of work life conflict better. This dimension also correlated well with Health and Well-being [36,68]. We expanded and relabeled the Work Life Conflict dimension (before called Work–Family Conflict), and we modified and included new items for this scale. To cover aspects related to work life conflict better, we reintroduced a dimension from the COPSOQ I, then called Degrees of Freedom, now relabeled Control over Working Time. In addition, as negative acts also take place in the internet, we introduced the dimension Cyber Bullying [20].

1.4.3. Concepts

To be better able to integrate the field of occupational health with the field of management and organization addressed in the JD-R model [57,58] and in line with the rationale of positive occupational psychology, we added the dimensions Work Engagement [69] and Quality of Work to the questionnaire (Table 1). These

dimensions complement the existing dimensions Meaning of Work, Job Satisfaction, and Commitment to the Workplace.

Furthermore, to better cover aspects often related to social capital [13,59,60], core items were defined for the scales on Sense of Community at Work and Social Support from Colleagues. This means that these dimensions are to be part of all national versions of the COPSOQ. In addition, the international middle version now includes Horizontal Trust, which before belonged to the long version (Table 1).

Finally, inspired by the SOS theory, we have now introduced the dimension Illegitimate Tasks [62].

1.4.4. Experience

The dimension Demands for Hiding Emotions was reintroduced from the COPSOQ I based on discussions with network members. This dimension also correlated well with Health and Well-being [36,68]. The dimension Social Inclusiveness was abandoned because of concerns about validity.

Several dimensions and items were also modified. Two items had translation issues between earlier Danish and English versions of the COPSOQ (Emotional Demands and Influence at Work); two items did not address the group level as intended (Quality of Leadership and Vertical Trust); four items were modified because of invalid wordings of questions not taking the need for support into account (Social Support from Supervisor and Colleagues, respectively); two other items were rephrased to increase clarity (Commitment to the Workplace and Social Support from Supervisor).

One item on satisfaction with salary was added to cover an aspect of the ERI model which was not included in the earlier COPSOQ versions (Job Satisfaction) [70]. Two items from the COPSOQ I were reintroduced as they better distinguished between those with low influence (Influence) (unpublished analyses); five items were introduced originating from national versions of the COPSOQ (Work Life Conflict, Bullying, Self-Rated Health); one of these items replaced an existing item (Work Life Conflict). Three items were dropped because of concerns regarding content validity (Emotional Demands, Possibilities for Development, and Stress); in the two latter cases, DIE [66] and DIF (unpublished analyses) were observed.

Three dimensions were relabeled. Now these dimensions are labeled as Vertical Trust, Horizontal Trust, and Organizational Justice; in the COPSOQ II, the corresponding labels were Trust regarding Management and Mutual Trust between Employees and Justice.

2. Materials and methods

2.1. Population

The questionnaire was tested in six countries in 2016 and 2017—in Canada, both French and English language versions were tested (Table 3). A total of 23,361 employees took part in the test. Some populations were national random samples (Canada, Spain, and France); some were company based (Germany, Sweden, and Turkey). In Germany, the company populations were heterogeneous across industries, the Swedish population was from private and public companies with an overweight of human service workers, and the Turkish population consisted of employees within the service sector and manufacturing. The Swedish and Canadian samples were dominated by occupations with high socioeconomic position, while the French and the German samples had an average occupational composition. In contrast, the occupational composition of the Turkish and especially the Spanish sample was skewed toward low socioeconomic positions.

Table 1
Changes of the COPSQ III as compared with the COPSQ II

Domain	Dimension	Change	Reason*
Demands at Work	Emotional Demands	Item emotionally involved (ED4) was given up as it could be seen as describing commitment. In the same scale the item Deal with other people's problems (EDX2) replaced a previous item (ED2) as the new wording with better reflected the original Danish item.	Experience
	Demands for Hiding Emotions	Dimension from the COPSQ I was reintroduced. It was an important issue in shop floor measurements in, e.g., Belgium and Germany [36,68].	Experience.
Work Organization and Job Contents	Influence at Work	The item influence decisions concerning work (INX1) has replaced a previous item (IN1) as the new wording better reflected the original Danish item. In the same scale, two COPSQ I items how quickly and how you do work (IN5 and IN6) were reintroduced as they better distinguish between those with low influence (unpublished analyses).	Experience
	Possibilities for Development	The item take initiative (PD1) was given up as it performed poorly in the scale [66]; In addition, differential item effects (DIE) were found in analyses predicting self-rated health (unpublished analyses).	Experience
	Control over Working Time	Dimension from COPSQ I was reintroduced to better assess aspects of work life conflict and was relabeled. Formerly labeled Degrees of freedom. Control over Working Time was an important issue in shop floor measurements in, e.g., Belgium and Germany and also found to be associated to well-being and health [36,68].	Trends
Interpersonal Relations and Leadership	Recognition	Dimension was relabeled from Rewards to better reflect the content of the items included. Items not strictly measuring this relabeled dimension were dropped: <i>salary</i> (RE4) and prospects (RE5). The first item is partly covered by a new Job Satisfaction item on salary (JS5), the latter partly by a Job Satisfaction item on prospects (JS1).	Experience
	Role Conflicts	Items not strictly measuring this dimension were dropped: mixed acceptance (CO1) and unnecessary tasks (CO4).The last of these items was transferred into a new dimension 'illegitimate tasks' (IT1).	Experience
	Illegitimate Tasks Quality of Leadership	New dimension. Item taken from the COPSQ II role conflicts scale. Inspiration from the theory of stress as a threat to self [62]. The item development opportunities (QLX1) replaces a former item (QL1), where the new item does refer more generally to the whole staff and not to each individual	Concepts Experience
	Social Support from Colleagues	The two items Support colleagues (SCX1) and Colleagues listen to problems (SCX2) replace former items (SC1, SC2) now stressing that people should report their level of support when they needed support. Formerly it was not possible to distinguish between low support and no need for support.	Experience
	Social Support from Supervisor	The two items Support supervisor (SS1) and Supervisor listens to problems (SSX2) replace the former items (SS1, SS2) now stressing that people should report their level of support when they needed support. Formerly it was not possible to distinguish between low support and no need for support. In addition, the revised third item in this scale Supervisor talks about performance (SSX3) also now refers to "immediate" supervisor replacing a former item (COPSQ II: SS3).	Experience
	Sense of Community at Work	Dimension was relabeled. Formerly labeled as Social Community at Work.	Experience
Work–Individual Interface	Commitment to the Workplace	The item recommend other people (CWX3) replaced a COPSQ II item recommend a friend (CW3) as friend is a much more limited category than people.	Experience
	Work Engagement	New dimension was introduced to cover the Job demands resource (JD-R) model better [57,58].	Concepts
	Job Insecurity	The former Job Insecurity scale was split into this dimension and the dimension Insecurity over Working Conditions (Table 2).	Trends
	Insecurity over Working Conditions	The former Job Insecurity scale was split into this dimension and the dimension Job Insecurity (Table 2).	Trends
	Quality of Work	New dimension was introduced to cover the JD-R model better [57,58].	Concepts
	Job Satisfaction Work Life Conflict	A new item on Salary (JS5) was introduced to better measure rewards [70,100]. Dimension was relabeled to reflect various national contexts. Formerly labeled Work–family conflict. An item on being in two places was replaced with a similar item (WFX1) [21] and two new items were included (WF5 on interference and WF6 on changing plans) [18].	Experience Experience
Social Capital		The domain has been relabeled so as to reflect what these dimensions are now called in practical and scientific settings [13,59–61]. In the COPSQ II, the domain was called Values at the workplace level.	Concepts
	Vertical Trust	The dimension has been renamed from Trust regarding Management. The reason was that the new label has been used more often by network members. The item employees trust information (TMX2) has replaced a former item (TM2 in the COPSQ II). The new item asks if "the employees" instead of formerly "you" can trust information from the management as this scale is operating on the workplace level and not on the individual level.	Experience
	Horizontal Trust	The dimension has been renamed from Mutual Trust between Employees. The reason was that the new label has been used more often by network members.	
	Organizational Justice	The dimension has been renamed from Justice. The reason was that the new label has been used more often by network members.	
	Social Inclusiveness	The scale was given up, as the questions on discrimination processes are difficult to assess in self reports.	Experience
Offensive behaviors	Cyber Bullying	An item on Cyber Bullying (HSM) was introduced [20].	Trends
	Bullying	A new item on being unjustly criticized, bullied, and shown up was added [18,101].	Experience
Health and well-being	Self-rated Health	An item on self-rated health with other response options was added [18].	Experience
	Stress	The item on stress (ST4) was given up as it behaved differently from the rest of the items of the scale (differential item functioning; DIF); prevalence due to socioeconomic status deviated (unpublished analyses). The notion of stress has two meanings—both short-term healthy reaction and long-term unhealthy reaction—which makes this item difficult to interpret.	Experience

When no indication of earlier editions of the COPSQ is mentioned, there is referred to the COPSQ II. Item names are shown in parentheses. Short labels of items can be seen in Table 2; item wordings are also published [72].
HSM =

* See also under 'What is new?' in the Introduction.

Most populations had an average age between 40 and 45 years; the Canadian English population had an average age around 45 years; and the Turkish less than 35 years.

Most populations had an equal composition of men and women with two exceptions (Table 3). The German population consisted of 59% men (this is somewhat higher than the German average of 53%), and 68% of the Swedish population was women (reflecting the gender composition of the service sector in Sweden [71]).

In the national random samples, the participation rate ranged from 7.3% (Canada) to 70% (Spain), respectively. In the company-based samples, response rates were 59% (Germany), 82% (Sweden), and 83% (Turkey). The French sample was from internet polling survey, where a response rate could not be calculated.

The mode of data collection was internet survey in Canada, France, and Sweden and paper questionnaire in Turkey. Both these methods were used in Germany. In Spain, computer assisted personal interviews (CAPI) in the household were used.

The German data were weighted to reflect the composition of the German work force. No other data were weighted.

2.2. Variables

In the present article, the international middle version of the COPSOQ III was tested (Table 2). This international middle version consists of 60 items covering 26 dimensions (the COPSOQ III also comes in a long version consisting of 148 items covering 45 dimensions) [72]. In addition, two dimensions from the long version were tested (Commitment to the Workplace and Work Engagement; both belonging to the domain Work–Individual Interface). Four of the 27 tested international middle dimensions were on the domain Demands at Work (three of these including core items, Table 2), e.g., Quantitative Demands with three items, of which two were core items. Four dimensions were on the domain Work organization and Job Contents (three dimensions with core items), e.g., the dimension Influence at work with four items, of which one was core. Nine were on the domain Interpersonal Relations and Leadership (seven dimensions with core items), e.g., the dimension Predictability with two items, both core items. Five dimensions were on Work–Individual Interface (four dimensions with core items), e.g., the dimension Job Insecurity with two items, both being core. Three dimensions were on Social Capital (both dimensions had core items), e.g., the dimension Vertical Trust with three items, of which two were core, and one on General Health, namely Self-rated health consisting of one item, also being a core item. Of the 26 international middle version dimensions, 11 consisted of three to four items; 10 dimensions had two items. In five cases, the middle version dimensions were measured by one item (Recognition, Illegitimate Tasks, Quality of Work, Horizontal Trust, and Self-rated Health; the issue of only using one item is taken up in the beginning of the discussion section of the present article). The exact wordings of all items are available elsewhere [72]. All dimensions were measured with Likert Scale–type items and scaled to the interval 0–100 [72]. Each scale was scored in the direction indicated by the scale name [72].

The original English COPSOQ III wording was used without modifications as the Canadian English version. In all other versions, the new COPSOQ III items were established by translation–back translation from the English version. The Canadian French version took also the existing French COPSOQ translation and conducted field tests with translators. A translation–back translation procedure was performed when there was disagreement between translators.

In Turkey, the existing COPSOQ I and II questions were translated using translation–back translation based on the English

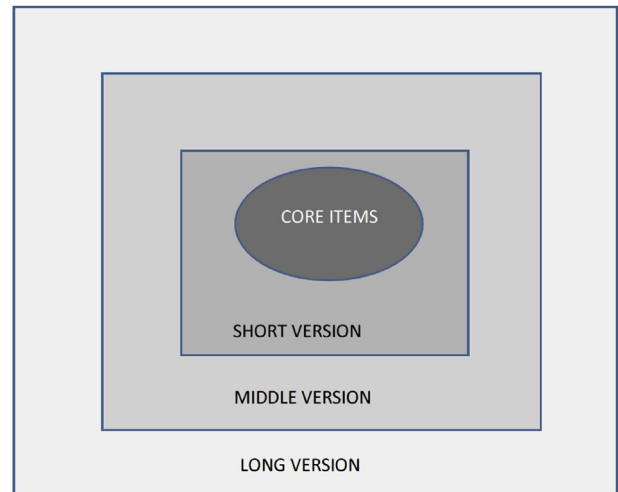


Fig. 1. The configuration of the COPSOQ III. For further explanation, refer to “The core item concept” in the Introduction.

version; the German and Swedish versions were based on both the Danish and English versions; the Spanish was based on the Danish version. Regarding the Canadian French version, translations were performed the same way as for the new COPSOQ III items, in addition, taking the existing Belgian version into account. The Swedish translation also took cognitive interview test results into account [20].

The international middle version was tested at least partly in all countries (Table 4).

2.3. Analyses

For each dimension in the international middle COPSOQ III, mean scale score and fractions with ceiling, floor, and missing values were calculated. For dimensions measured as multiitem scales, Cronbach α was calculated to assess reliability, an $\alpha \geq 0.7$ was deemed acceptable [2,3]. For each item in the scales, corrected item-total correlations were calculated; values ≥ 0.4 were deemed acceptable [73,74]. Spearman scale intercorrelations were calculated where possible to evaluate divergent and convergent validity [2,3].

Properties of the international middle dimensions were summarized as estimated overall means of the seven versions, where each of the seven populations analyzed had the same weight; 95% confidence intervals (CIs) of Cronbach α were estimated using a random effects model to account for heterogeneity of the results [75]. Lowest and highest values across populations were also identified.

3. Results

Summarized over all countries, most scales of the international middle version showed acceptable to good reliability, that is, Cronbach α more than 0.7 (Table 4). Most corrected item-total correlations had acceptable to good levels, i.e., more than 0.4 (Table 5).

Across populations, three of the 23 scales tested had a Cronbach α less than 0.7. These were Commitment to the Workplace (two items, mean $\alpha = 0.64$; 95% CI: 0.61 – 0.67), Demands for Hiding Emotions (three items, mean $\alpha = 0.66$; 95% CI: 0.58 – 0.73), and Control over Working Time (four items, mean $\alpha = 0.69$; 95% CI: 0.57 – 0.78). The Demands for Hiding Emotions scale had an item with a

Table 2
Dimensions and items in the COPSOQ III. A short overview

Domain	Dimension	Dimension name	II-long/middle/short	III-long	III-middle/core	Level	Item, item name, and short label
Demands at Work	Quantitative Demands	QD	4/4/2	4	3/2	J	QD1 Work piles up ^α ; QD2 Complete task; QD3 Get behind*; QD4 Enough time*
	Work Pace	WP	3/3/2	3	2/2	J	WP1 Work fast*; WP2 High pace*; WP3 High pace necessary
	Cognitive Demands	DC	4/0/0	4	0/0	J	CD1 Eyes on lots of things; CD2 Remember a lot; CD 3 New ideas; CD4 Difficult decisions
	Emotional Demands	ED	4/4/2	3	3/2	J	ED1 Emotional disturbing ^α ; EDX2 Deal with other people's problems* ; ED3 Emotionally demanding*
	Demands for Hiding Emotions	HE	3/0/0	4	3/0	JD	HE1 Treat equally; HE2 Hide feelings ^α ; HE3 Kind and open ^α ; <u>HE4 Not state own opinion^α</u>
Work Organization and Job Contents	Influence at Work	IN	4/4/2	6	4/1	J	INX1 Influence decisions on work* ; IN2 Say in choosing colleges; IN3 Amount of work ^α ; IN4 Influence work task ^α ; <u>IN5 Work Pace; IN6 How you work^α</u>
	Possibilities for Development	PD	4/4/2	3	3/2	J	PD2 Learning new things*; PD3 Use skills*; PD4 Develop skills ^α
	Variation of Work Control over Working Time (1)	VA CT	3/3/2 —	2 5	0/0 4/0	J JD	VA1 Work varied; VA2 Do things over and over again <u>CT1 Decide breaks^α; CT2 Take holidays; CT3 Chat with colleagues^α; CT4 Private business^α; CT5 Overtime</u> (2)
	Meaning of Work	MW	3/3/2	2	2/1	J	MW1 Work meaningful*; MW2 Work important ^α
Interpersonal Relations and Leadership	Predictability	PR	2/2/2	2	2/2	D	PR1 Informed about changes*; PR2 Information to work well*
	Recognition (3)	RE	3/3/2	3	1/1	DC	RE1 Recognized by management*; RE2 Respected by management; RE3 Treated fairly
	Role Clarity	CL	3/3/2	3	3/1	JD	CL1 Clear objectives*; CL2 Responsibility ^α ; CL3 Expectation ^α
	Role Conflicts	CO	4/4/0	2	2/2	JD	CO2 Contradictory demands*; CO3 Do things wrongly*
	<i>Illegitimate Tasks</i>	<i>IT</i>	—	1	1/0	JD	<u>IT1 Unnecessary tasks</u> (4)
	Quality of Leadership	QL	4/4/2	4	3/2	D	QLX1 Development opportunities^α ; QL2 Prioritize job satisfaction; QL3 Work planning*; QL4 Solving conflicts*
	Social Support from Supervisor	SS	3/3/2	3	2/1	JD	SSX1 Supervisor listens to problems^α; SSX2 Support supervisor* ; SSX3 Supervisor talks about performance
Social Support from Colleagues	SC	3/3/2	3	2/1	JD	SCX1 Support colleagues* ; SCX2 Colleagues listen to problems^α ; SC3 Colleagues talk about performance	
	Sense of Community at Work (5)	SW	3/3/0	3	2/1	JDC	SW1 Atmosphere*; SW2 Cooperation; SW3 Community ^α
Work–Individual Interface	Commitment to the Workplace	CW	4/4/2	5	0/0	IJC	CW1 Enjoy telling others; CW2 Workplace great importance; CWX3 Recommend to other people ; CW4 Looking for work elsewhere; CW5 Proud
	Work Engagement (6)	WE	—	3	0/0	IJC	WE1 Burst with energy; WE2 Enthusiastic; WE3 Immersed
	Job Insecurity (7)	JI	4/0/0	3	2/2	W	J11 Unemployed*; J12 Redundant; J13 Finding new job*
	<i>Insecurity over Working Conditions</i> (8)	<i>IW</i>	—	5	3/1	W	<u>IW1 Transferred another job</u> (9); <u>IW2 Transferred another task; IW3 Changed working time^α; IW4 Decreased salary^α; IW5 Good job prospects</u> (10)
	Quality of Work	QW	—	2	1/0	W	QW1 Possible to perform own tasks; QW2 Satisfied at workplace level ^α
	Job Satisfaction	JS	4/4/1	5	3/1	W	JS1 Work prospects ^α ; JS2 Work conditions; JS3 Work abilities; JS4 Job in general*; JS5 Salary ^α
	Work Life Conflict (11)	WF	4/4/2	6	2/2	W	WFX1 Being in both places ; WF2 Energy conflict*; WF3 Time conflict*; WF5 Work demands interfere; WF6 Change plans

(continued on next page)

Table 2 (continued)

Domain	Dimension	Dimension name	II-long/middle/short	III-long	III-middle/core	Level	Item, item name, and short label
Social Capital (12)	Vertical Trust (13)	TM	3/3/0	4	3/2	C	TM1 Management trust employees*; TM2 Employees trust information*; TM3 Management withhold information; TM4 Employees express views [¶]
	Horizontal Trust (14)	TE	4/4/2	3	1/0	C	TE1 Colleagues withhold information; TE2 Withhold information management; TE3 Trust colleagues [¶]
	Organizational Justice (15)	JU	4/4/2	4	2/2	C	JU1 Conflicts resolved fairly*; JU2 Employees appreciated; JU3 Suggestions treated seriously; JU4 Work distributed fairly*
Conflicts and offensive behaviors	Gossip and Slander	GS	1/0/0	1	0/0	W	GS Gossip and slander
	Conflicts and Quarrels	CQ	1/0/0	1	0/0	W	CQ1 Conflicts and quarrels
	Unpleasant Teasing	UT	1/0/0	1	0/0	W	UT1 Unpleasant teasing
	Cyber Bullying	HSM	—	1	0/0	JW	HSM1 Cyber bullying
	Sexual Harassment	SH	1/1/1	1	0/0	JW	SH1 Sexual harassment
	Threats of Violence	TV	1/1/1	1	0/0	JW	TV1 Threats of violence
	Physical Violence	PV	1/1/1	1	0/0	JW	PV1 Physical violence
	Bullying	BU	1/1/1	2	0/0	W	BU1 Bullying; BU2 Unjustly criticized, bullied, shown up
Health and well-being	Self-rated Health	GH	1/1/1	2	1/1	I	GH1 General health*; GH2 Rate in 10 points
	Sleeping Troubles	SL	4/4/0	4	0/0	I	SL1 Slept badly; SL2 Hard to sleep; SL3 Woken up early; SL4 Woken up several times
	Burnout	BO	4/4/2	4	0/0	I	BO1 Worn out; BO2 Physically exhausted; BO3 Emotionally exhausted; BO4 Tired
	Stress	ST	4/4/2	3	0/0	I	ST1 Problems relaxing; ST2 Irritable; ST3 Tense
	Somatic Stress	SO	4/0/0	4	0/0	I	SO1 Stomach ache; SO2 Headache; SO3 Palpitations; SO4 Muscle tension
	Cognitive Stress	CS	4/0/0	4	0/0	I	CS1 Problems concentrating; CS2 Difficult thinking clearly; CS3 Difficult taking decisions; CS4 Difficult remembering
	Depressive Symptoms	DS	4/0/0	4	0/0	I	DS1 Sadness; DS2 Lack of self-confidence; DS3 Feel guilty; DS4 Lack of interest in daily activity
Personality	Self-Efficacy	SE	6/0/0	6	0/0	I	SE1 Solve problems; SE2 Achieving what I want; SE3 Reach objectives; SE4 Handle unexpected events; SE5 Several ways solving problems; SE6 Usually manage

Exact formulation of items is available [72]. *Italic* denotes new Dimension or Item. **Bold and italic** denote a relabeled Domain, Dimension or wording of Item. Underscore and italic denote Dimension or Item from the COPSOQ I. Underscore, bold and italic denote a relabeled Dimension from the COPSOQ I. Double underscore and italic denote Item transferred from another the COPSOQ II scale. Level: Individual level; J, Job level; D, Department level; C, Company level; W, Work—individual interface.

Note that core items are mandatory in all short, middle, and long national versions of the COPSOQ. Choice of items national middle versions can deviate from the international version listed here.

Explanation of footnotes in the table: (1 In COPSOQ I & II labeled Degrees of freedom. (2 From the COPSOQ I Quantitative Demands scale. (3 In COPSOQ II labeled Recognition (Reward). (4 From COPSOQ II Role Conflicts scale, item CO4. (5 In COPSOQ I & II labeled Social Community at Work. (6 From the Work Engagement scale [69]. (7 In COPSOQ I & II labeled Job Insecurity. (8 Split out from the Job Insecurity scale from COPSOQ I & II. (9 From the COPSOQ I & II Job Insecurity scale, item J14. (10 From the test version of the COPSOQ II Rewards scale. (11 In COPSOQ II labeled Work—family conflict. (12 In COPSOQ 2 called Values on the workplace level (13 In COPSOQ II labeled Trust regarding management. (14 In COPSOQ II labeled Mutual trust between employees. (15 In COPSOQ II labeled Justice.

* Mandatory core item; ¶middle item; otherwise long item.

Table 3
Sociodemographic characteristics of the study populations

Country	Population	Collection method	N	Time period	Women, %	Age groups, %							ISCO occupational group, %			
						<20	20-29	30-39	40-49	50-59	60+	Missing	1-2 managers & professionals	3-4 technicians, associate professionals, and clerical workers	5-9 service, sales, agriculture trades, and manual workers	Missing
Canada, English	Canadians working in workplaces with more than 5 people	Electronic survey	3,328	2016	48	1	11	18	25	30	15	1	42	34	21	3
Canada, French			885	2016	49	0	17	25	23	26	9	0	35	40	21	4
						Age groups, %										
						<25	25-34	35-44	45-54	≥ 55	Missing					
Spain	Representative sample of salaried workers.	Household CAPI	1,807	2016	51	8	19	29	29	14	0	12	19	70	0	
France	Representative population of French employees	Electronic survey	1,027	2017	48	5	31	23	28	14	0	12	55	33	0	
Germany	Employees in organizations of different size and industry	Risk assessment surveys 60% online, 40 % paper	13,011	2017	41	6	22	24	30	17	1	21	38	29	11	
Sweden	Convenience sample from workplace surveys. 56% private, 44% public sector	Electronic surveys	2,110	2016-17	68	3	24	25	23	19	6	72	16	8	4	
Turkey	Company-based manufacturing industry samples from Aegean and Marmara regions, response rate 82.6%	Paper questionnaire	1,076	2016-17	54	30	38	26	5	0	0	26	36	38	0	
Total†			23,361	2016-17	52	9*	24*	26*	27*	13*	1*	33	36	28	3	

ISCO = International Classification of Occupations 2008, CAPI = Computer Assisted Personal Interview.

* Except English and French Canada.

† Total number of participants; mean proportion of women, age, and occupational groups where each population has the same weight.

Table 4
Scale characteristics for international standard middle and selected long version* dimensions among 23,361 employees in Canada, Spain, France, Germany, Sweden, and Turkey in 2016-2017

Domain	Dimension	Dimension name and country tested	No. of items	Scale mean	Observed range of scale means	Cronbach α	95% CI of α	Observed range of α	Floor answers, % (range)	Ceiling answers, % (range)	Missing answers, % (range)
Demands at Work	Quantitative Demands	QD ^{ES, SE, TR}	3	39	23 – 51	0.77	0.71 – 0.82	0.72 – 0.82	12 (1 – 30)	1 (0 – 2)	1 (0 – 2)
	Work Pace	WP ^{CA, ES, FR, DE, SE, TR}	2	61	52 – 68	0.80	0.75 – 0.83	0.69 – 0.86	2 (0 – 8)	9 (5 – 13)	1 (0 – 2)
	Emotional Demands	ED ^{CA, ES, FR, SE, TR}	3	47	37 – 58	0.80	0.78 – 0.82	0.76 – 0.83	7 (2 – 17)	3 (1 – 5)	0 (0 – 1)
	Hiding Emotions	HE ^{ES, TR}	3	57	56 – 58	0.66	0.58 – 0.73	0.62 – 0.70	2 (1 – 2)	6 (3 – 8)	1 (0 – 2)
Work Organization and Job Contents	Influence at Work	IN ^{ES, TR}	4	42	38 – 45	0.80	0.73 – 0.86	0.77 – 0.83	8 (6 – 10)	3 (1 – 5)	1 (0 – 2)
	Possibilities for Development	PD ^{ES, SE, TR}	3	66	64 – 68	0.82	0.76 – 0.87	0.78 – 0.87	2 (1 – 3)	14 (8 – 20)	0 (0 – 1)
	Control over Working Time	CT ^{ES, TR}	4	39	33 – 45	0.69	0.57 – 0.78	0.63 – 0.74	6 (6 – 7)	3 (1 – 4)	2 (0 – 4)
	Meaning of Work	MW ^{CA, ES, FR, DE, SE, TR}	2	72	53 – 80	0.81	0.74 – 0.87	0.62 – 0.91	2 (1 – 4)	25 (8 – 36)	1 (0 – 2)
Interpersonal Relations and Leadership	Predictability	PR ^{CA, ES, FR, DE, SE, TR}	2	56	52 – 64	0.73	0.69 – 0.76	0.66 – 0.79	3 (2 – 6)	6 (3 – 18)	0 (0 – 1)
	Recognition	RE ^{CA, ES, FR, DE, SE, TR}	1	55	44 – 68	†	†	†	12 (6 – 24)	14 (8 – 32)	1 (0 – 2)
	Role Clarity	CL ^{ES, DE, SE, TR}	3	75	71 – 81	0.82	0.79 – 0.85	0.79 – 0.86	0 (0 – 1)	18 (7 – 38)	1 (0 – 1)
	Role Conflicts	CO ^{CA, FR, DE, SE, TR}	2	45	43 – 47	0.73	0.67 – 0.77	0.61 – 0.8	6 (2 – 10)	3 (1 – 5)	0 (0 – 1)
	Illegitimate Tasks	IT ^{CA, ES, SE, TR}	1	43	30 – 48	†	†	†	18 (8 – 41)	8 (6 – 12)	0 (0 – 1)
	Quality of Leadership	QL ^{ES, DE, SE, TR}	3	61	53 – 66	0.87	0.86 – 0.88	0.85 – 0.87	3 (2 – 5)	10 (5 – 16)	2 (1 – 3)
	Social Support from Colleagues	SC ^{ES, FR, DE, SE, TR}	2	68	57 – 81	0.87	0.82 – 0.90	0.77 – 0.92	3 (2 – 4)	25 (11 – 46)	1 (0 – 2)
Social Support from Supervisor	Sense of Community at Work	SS ^{CA, ES, DE, SE, TR}	2	69	55 – 82	0.81	0.77 – 0.85	0.72 – 0.86	2 (0 – 4)	21 (6 – 38)	4 (0 – 16)
	Sense of Community at Work	SW ^{ES, SE, TR}	2	77	74 – 82	0.79	0.66 – 0.88	0.7 – 0.88	1 (0 – 1)	30 (29 – 32)	6 (0 – 16)
	Sense of Community at Work	SW ^{ES, SE, TR}	2	77	74 – 82	0.79	0.66 – 0.88	0.7 – 0.88	1 (0 – 1)	30 (29 – 32)	6 (0 – 16)
Work–Individual Interface	Commitment to the Workplace*	CW ^{SE}	2	69	69 – 69	0.64	0.61 – 0.67	0.64 – 0.64	1 (1 – 1)	13 (13 – 13)	0 (0 – 0)
	Work Engagement†	WE ^{DE, SE}	3	67	63 – 70	0.85	0.84 – 0.86	0.85 – 0.86	0 (0 – 1)	4 (3 – 4)	1 (0 – 2)
	Job Insecurity	JJ ^{CA, ES, FR, DE, SE, TR}	2	39	12 – 54	0.72	0.69 – 0.75	0.66 – 0.76	19 (4 – 42)	7 (0 – 17)	1 (0 – 2)
	Insecurity over Work Cond.	IW ^{ES, DE, TR}	3	41	30 – 52	0.76	0.72 – 0.79	0.73 – 0.79	13 (8 – 18)	5 (2 – 8)	1 (1 – 2)
	Quality of Work	QW ^{ES, SE}	1	71	68 – 75	†	†	†	2 (1 – 3)	26 (15 – 36)	1 (1 – 1)
	Job Satisfaction	JS ^{ES, TR}	3	56	53 – 60	0.80	0.76 – 0.83	0.78 – 0.81	2 (1 – 4)	5 (3 – 6)	1 (1 – 1)
Social Capital	Work Life Conflict	WF ^{CA, FR, DE, SE, TR}	2	42	35 – 51	0.84	0.80 – 0.87	0.78 – 0.88	15 (7 – 20)	8 (2 – 18)	0 (0 – 1)
	Vertical Trust	TM ^{ES, SE, TR}	3	64	56 – 70	0.82	0.79 – 0.85	0.8 – 0.85	2 (1 – 3)	9 (4 – 14)	1 (1 – 1)
	Horizontal Trust	TE ^{ES, FR, SE, TR}	1	62	50 – 73	†	†	†	5 (1 – 11)	15 (7 – 24)	5 (0 – 17)
Health and well-being	Organizational Justice	JU ^{CA, ES, FR, DE, SE, TR}	2	57	51 – 64	0.77	0.74 – 0.80	0.7 – 0.82	4 (2 – 7)	6 (4 – 13)	1 (0 – 2)
	Self-rated Health	GH ^{CA, ES, FR, SE}	1	63	60 – 66	†	†	†	2 (1 – 4)	12 (7 – 16)	1 (0 – 2)

Values for scale means, Cronbach α , 95% confidence intervals (CIs) of Cronbach α , and fractions with floor; ceiling; and missing answers were estimated as the overall mean of the 7 versions. Confidence intervals were calculated using a random effects model to account for heterogeneity [75]. Observed range of scale means and Cronbach α was lowest and highest values in each of the versions tested.

ES = Spain, SE = Sweden, TR = Turkey, CA = Canada, FR = France, DE = Germany.

* The selected long version scales are Commitment to the Workplace and Work Engagement.

† Single item dimension. Calculation of Cronbach α is not applicable.

Table 5
Corrected item-total correlations of international middle and selected long version* dimensions

Domain	Scale	Level	Item name	Item wording	Corrected item-total correlation	
					Mean	Range
Demands at work	Quantitative Demands (QD)	Middle	QD1	Is your workload unevenly distributed so it piles up?	0.56	0.52 - 0.61
		Core	QD2	How often do you not have time to complete all your work tasks?	0.64	0.53 - 0.70
	Work Pace (WP)	Core	QD3	Do you get behind with your work?	0.66	0.57 - 0.76
		Core	WP1	Do you have to work very fast?	0.64	0.52 - 0.73
	Emotional Demands (ED)	Core	WP2	Do you work at a high pace throughout the day?	0.64	0.52 - 0.73
		Middle	ED1	Does your work put you in emotionally disturbing situations?	0.68	0.65 - 0.72
	Demands for Hiding Emotions (HE)	Core	EDX2	Do you have to deal with other people's personal problems as part of your work?	0.59	0.49 - 0.65
		Core	ED3	Is your work emotionally demanding?	0.69	0.63 - 0.75
		Middle	HE2	Does your work require that you hide your feelings?	0.54	0.43 - 0.64
		Middle	HE3	Are you required to be kind and open towards everyone – regardless of how they behave towards you?	0.30	0.28 - 0.32
		Middle	HE4	Does your work require that you do not state your opinion?	0.50	0.34 - 0.66
Work Organization and Job Contents	Influence at Work (I)	Core	INX1	Do you have a large degree of influence on the decisions concerning your work?	0.57	0.49 - 0.65
		Middle	IN3	Can you influence the amount of work assigned to you?	0.55	0.49 - 0.60
		Middle	IN4	Do you have any influence on what you do at work?	0.71	0.68 - 0.75
	Possibilities for Development (Skill discretion) (PD)	Middle	IN6	Do you have any influence on HOW you do your work?	0.63	0.62 - 0.64
		Core	PD2	Do you have the possibility of learning new things through your work?	0.67	0.59 - 0.71
		Core	PD3	Can you use your skills or expertise in your work?	0.63	0.47 - 0.76
		Middle	PD4	Does your work give you the opportunity to develop your skills?	0.74	0.72 - 0.78
	Control over Working Time (CT)	Middle	CT1	Can you decide when to take a break?	0.53	0.49 - 0.57
		Middle	CT2	Can you take holidays more or less when you wish?	0.43	0.38 - 0.48
		Middle	CT3	Can you leave your work to have a chat with a colleague?	0.55	0.54 - 0.56
		Middle	CT4	If you have some private business is it possible for you to leave your place of work for half an hour without special permission?	0.40	0.28 - 0.53
Meaning of Work (MW)	Core	MW1	Is your work meaningful?	0.68	0.53 - 0.84	
	Middle	MW2	Do you feel that the work you do is important?	0.68	0.53 - 0.84	

(continued on next page)

Table 5 (continued)

Domain	Scale	Level	Item name	Item wording	Corrected item-total correlation	
					Mean	Range
Interpersonal Relations and Leadership	Predictability (PR)	Core	PR1	At your place of work, are you informed well in advance concerning, for example important decisions, changes or plans for the future?	0.58	0.50 - 0.66
		Core	PR2	Do you receive all the information you need to do your work well?	0.58	0.50 - 0.66
	Role Clarity (CL)	Core	CL1	Does your work have clear objectives?	0.63	0.57 - 0.71
		Middle	CL2	Do you know exactly which areas are your responsibility?	0.70	0.64 - 0.77
		Middle	CL3	Do you know exactly what is expected of you at work?	0.69	0.62 - 0.76
	Role Conflicts (CO)	Core	CO2	Are contradictory demands placed on you at work?	0.56	0.45 - 0.66
		Core	CO3	Do you sometimes have to do things which ought to have been done in a different way?	0.56	0.45 - 0.66
	Quality of Leadership (QL)	Middle	QLX1	To what extent would you say that your immediate superior makes sure that the members of staff have good development opportunities?	0.67	0.64 - 0.72
			Core	QL3	To what extent would you say that your immediate superior is good at work planning?	0.77
		Core	QL4	To what extent would you say that your immediate superior is good at solving conflicts?	0.76	0.74 - 0.78
	Social Support from Supervisor (SS)	Middle	SSX1	How often is your immediate superior willing to listen to your problems at work, if needed?	0.73	0.56 - 0.85
		Core	SSX2	How often do you get help and support from your immediate superior, if needed?	0.73	0.56 - 0.85
	Social Support from Colleagues (SC)	Core	SCX1	How often do you get help and support from your colleagues, if needed?	0.70	0.62 - 0.76
		Middle	SCX2	How often are your colleagues willing to listen to your problems at work, if needed?	0.70	0.62 - 0.76
	Sense of Community at Work (SW)	Core	SW1	Is there a good atmosphere between you and your colleagues?	0.61	0.56 - 0.66
		Middle	SW3	Do you feel part of a community at your place of work?	0.61	0.56 - 0.66
Work-Individual Interface	Commitment to the Workplace (CW)*	Long	CWX3	Would you recommend other people to apply for a position at your workplace?	0.63	0.63
		Long	CW4	How often do you consider looking for work elsewhere?	0.63	0.63
	Work Engagement (WE)*	Long	WE1	At my work, I feel bursting with energy	0.68	0.64 - 0.72
		Long	WE2	I am enthusiastic about my job	0.80	0.79 - 0.80
		Long	WE3	I am immersed in my work	0.70	0.65 - 0.74
	Job Insecurity (JI)	Core	JI1	Are you worried about becoming unemployed?	0.57	0.50 - 0.62
		Core	JI3	Are you worried about it being difficult for you to find another job if you became unemployed?	0.57	0.50 - 0.62
	Insecurity over Working Conditions (IW)	Core	IW1	Are you worried about being transferred to another job against your will?	0.58	0.55 - 0.61
		Middle	IW3	Are you worried about the timetable being changed (shift, weekdays, time to enter and leave ...) against your will?	0.58	0.53 - 0.65
		Middle	IW4	Are you worried about a decrease in your salary (reduction, variable pay being introduced ...)?	0.54	0.51 - 0.63
	Job Satisfaction (JS)	Middle	JS1	Regarding your work in general, how pleased are you with your work prospects?	0.70	0.66 - 0.73
		Core	JS4	Regarding your work in general, how pleased are you with your job as a whole, everything taken into consideration?	0.69	0.65 - 0.72
		Middle	JS5	Regarding your work in general, how pleased are you with your salary?	0.58	0.54 - 0.62
Work Life Conflict (WF)	Core	WF2	Do you feel that your work drains so much of your energy that it has a negative effect on your private life?	0.75	0.64 - 0.81	
	Core	WF3	Do you feel that your work takes so much of your time that it has a negative effect on your private life?	0.75	0.64 - 0.81	
Social Capital	Vertical Trust (TM)	Core	TM1	Does the management trust the employees to do their work well?	0.69	0.65 - 0.74
		Core	TMX2	Can the employees trust the information that comes from the management?	0.71	0.69 - 0.74
	Organizational Justice (JU)	Middle	TM4	Are the employees able to express their views and feelings?	0.64	0.58 - 0.71
		Core	JU1	Are conflicts resolved in a fair way?	0.63	0.54 - 0.69
		Core	JU4	Is the work distributed fairly?	0.63	0.54 - 0.69

Countries in which items have been tested are indicated in Table 4, 3rd column.

* The selected long version scales are Commitment to the Workplace and Work Engagement.

corrected item-total correlation less than 0.4 (HE3: having to be kind and open to everyone; mean-corrected item-total correlation = 0.30).

Looking at the specific populations, some countries had scales with insufficient Cronbach α 's, in addition to those previously mentioned. These were Predictability (two items; 0.62 in France and 0.66 in Turkey), Meaning of Work (two items; 0.62 in France), Job Insecurity (two items; 0.66 in France and 0.67 in Germany), and Work Pace (two items; 0.69 in Spain) (table not shown). Furthermore, in specific populations, some items—other than the item previously mentioned—had insufficient corrected item-total correlations: in Spain, one item belonging to the Demands on Hiding Emotions scale (HE4: requirements not stating opinion = 0.34), and two items in Turkey belonging to the Control over Working Time scale (CT2: holidays = 0.38; CT4 leave work for private business = 0.28) (Table 5).

The mean scores for the international middle dimensions ranged from 39 (Quantitative Demands) to 77 (Sense of Community at Work) (Table 4). For some dimensions, these means reflect large variations among the populations studied. The largest variations were found regarding Job Insecurity (from 12 in Sweden to 54 in Spain) and Work Life Conflict (where five countries reported values) (35 in Germany to 51 in Turkey). The smallest variation was found regarding Hiding Emotions (56 in Spain to 58 in Turkey). Note that these variations are partly due to variations in the number of countries that tested each scale (see Table 4, 3rd column). In some cases, floor and ceiling effects more than 15% were present. Floor effects were present for Illegitimate Tasks (18%) and Job Insecurity (19%). Ceiling effects were seen for Sense of Community at work (30%), Social Support from Colleagues and from Supervisor (21% and 25%, respectively) as well as Meaning of Work and Quality of Work (25% and 26%, respectively). In all cases, floor and ceiling effects reflected very high or low mean values of the dimensions.

Generally, there were low fractions of missing values (Table 4). In three scales, fractions of around 5% of missing values occurred. These were Social Support from Colleagues, Horizontal Trust, and Sense of Community at Work mainly corresponding to employees responding "I do not have colleagues".

The intercorrelations of the international middle dimensions—including two selected long version dimensions—corroborate, on the one hand, that all psychosocial working environment dimensions were distinct from each other, and on the other hand, that dimensions within each domain were generally related with each other to a higher degree than with dimensions from other domains (Appendix Table 3A-C). However, Commitment to the Workplace from the domain Work-Individual Interface was also correlated highly to some dimensions from the domains Work Organization and Job Contents, Interpersonal Relations and Leadership, and Social Capital. In addition, Vertical Trust and Organizational Justice from the domain Social Capital correlated highly with some dimensions from Interpersonal Relations and Leadership and Work-Individual Interface. Of 373 intercorrelations, only seven were more than 0.60 and none greater than 0.69 (the latter involving Organizational Justice and Vertical Trust). The highest mean intercorrelations regarded dimensions belonging to the domains Interpersonal Relations and Leadership (involving Recognition, Predictability, Social Support from Supervisor, and Quality of Leadership), Work-Individual Interface (involving Commitment to the Workplace and Job Satisfaction), and Social Capital (involving the dimensions Organizational Justice and Vertical Trust). Further details are presented in Appendix Table 3A-C, upper right parts. We found the same general pattern in each of the populations studied (ranges in lower left parts of Appendix Table 3A-C).

Sensitivity analyses show that the specific level of reliability and the level of intercorrelations to a large degree were influenced by the country.

4. Discussion

The aim of the present article was to analyze the reliability of the international middle version of the COPSOQ III. The analyses demonstrated that most international middle scales of the COPSOQ III have an acceptable to good internal consistency, as measured through Cronbach α , across a heterogeneous set of worker samples, from multiple countries. Few scales had floor and ceiling effects or high fractions of missing values. The correlation analysis indicates that dimensions are measuring different constructs as expected.

In a few cases, possible problems with internal consistency were indicated, which we do not believe are due to translation issues. Across the populations being studied, three scales had insufficient Cronbach α 's ranging from 0.64 to 0.69. The Commitment to the Workplace scale had only two items and could be extended with more items. The Hiding Emotions scale had three items, of which one on being kind to everyone consistently correlated poorly with the scale. The selection of items within this scale should be reconsidered [20]. The Control over Working Time scale worked poorly in one country, Turkey, where items on holidays and opportunities to leave the workplace showed low correlations with the scale. Differences in the local context in Turkey (e.g., legislation or company policies) might affect specific aspects of control over working time. This points at examining items in this scale across countries and industrial sectors further, possibly also through cognitive interviewing [76].

In some language versions, specific scales—in addition to those previously mentioned—had insufficient Cronbach α 's ranging from 0.62 to 0.67. These were Predictability (France, Turkey), Meaning of Work (France), Job Insecurity (France, Germany), and Work Pace (Spain). Apart from possible translation issues, it might be that local context could play a role. For example, regarding Job Insecurity, it might be that conditions at the French and German labor markets lead to a lower correlation between experience of worries getting unemployed and worries finding a new job. A reason for this could be that even if many workers in these countries have permanent contracts, opportunities for further education throughout working life are largely lacking [51].

In the international middle version, some dimensions were only measured with one item, namely Recognition, Illegitimate Tasks, Quality of Work, Horizontal Trust, and Self-rated Health. Regarding self-rated health, even if a one item measure has good predictive validity, the use of a scale could improve reliability [77]. It remains to be investigated if this is the case regarding other one-item measures. Apart from Illegitimate Tasks, the COPSOQ III instrument offers additional long version items to increase reliability.

4.1. Strengths and weaknesses

It is a strength of the questionnaire that it has been developed in a joint process by different groups of practitioners and researchers from different social and national contexts. Further it is a strength that the test presented in this article has been carried out among 23,361 employees in seven language versions across six countries (Canada, Spain, France, Germany, Sweden, and Turkey). We are not aware of a generic questionnaire being tested at the same time in so many countries and languages. Previous developments of the COPSOQ were carried out in one European country, Denmark, and only subsequently adapted and validated in other countries. By including international experience from a number of countries in the development, as well as in the validation right from the

beginning of the COPSOQ III, the results of the present study are generalizable to a higher extent.

These strengths of the study must be seen in the light of some weaknesses. First, the response rate in Canada was low, and a response rate could not be calculated in France. As we are looking at associations between items in scales and associations between dimensions (measured by either scales or single items), low response rates could potentially be problematic if they led to less variation in responses. However, reliabilities estimate in the Canadian and French samples was on a similar level to that observed in countries with higher response rates. Second, we assessed reliability of scales by calculating Cronbach α . Our reason for using α is that it is widely known, making it easier for possible users to interpret our results. In practical and research settings, where groups are compared, the question of reliability is different from a clinical setting where a measurement on an individual level needs much more precision. It should be noted that with two item scales, one would not expect a very high α , as this would indicate unnecessary redundancy between the items, and potentially a lack of breadth in the information captured within the dimension under investigation. Third, owing to data protection issues (the last paragraphs in the 'Acknowledgments' subsection), we were not able to directly analyze DIF for evaluation of measurement invariance across countries. Given we observed differences in the reliability of scales across countries for some dimensions (e.g., Job Insecurity and Control over Working Time), DIF should be investigated in future studies.

4.2. Perspectives for further development of the COPSOQ

We now present some considerations regarding in what directions the COPSOQ could be developed and tested further in the decades to come. Our discussion focuses on reliability and validity, use of the COPSOQ in practical settings, social capital, and current trends in the working environment.

4.2.1. Reliability and validity

In the present article we have tested the reliability of scales of the COPSOQ and if dimensions of the questionnaire (represented by single items or scales) are different constructs. As previously mentioned, for both internal consistency and correlations, the results indicate differences between the samples. Some of these differences can be, of course, attributed to the fact that the Turkish, Swedish, and German data were company-based samples. However, differences in internal consistency and correlation estimates in the nationwide Canadian, Spanish, and French working populations were observed. Therefore, we recommend testing the instrument in each new language version being developed. A number of scales of the second version of the questionnaire have been tested using a test retest approach showing good reliability [66]. Test retest approaches of the new dimensions introduced in the COPSOQ III are still to come.

The overall structure of the questionnaire has previously been developed using factor analyses [2,3]. In two cases, this has already been performed regarding the present version [78,79], although additional studies are needed. Other aspects of construct validity should be tested. For example, the Swedish version has been adapted using cognitive interviewing; this approach seems to be useful for the adaptation of other national versions [20]. Further aspects of validity are yet to be investigated, not only regarding the COPSOQ but also regarding psychosocial questionnaire tools in general. External validity of experienced psychosocial factors should be investigated. Questionnaire data should optimally be compared with objective measurements or other data independent of the self-report, such as observational data or registers. In

addition, there is a need to achieve further knowledge about the extent to which dimensions of psychosocial working conditions attribute to different levels of work, such as the occupational level and the department/organizational level. Such studies are very rare [80–83]. Research on the COPSOQ and the JCQ support the intention that some dimensions mainly vary between occupations (e.g., job demands, variation, and influence), whereas others do not (e.g., leadership, organizational justice, and trust) [13,61,80–85]. Furthermore, the predictive validity of the instrument could be tested. A challenge is that there are several relevant outcomes to consider. For example, aspects of health (e.g., self-rated health, depressive symptoms), labor market attachment (e.g., turnover intentions, exit from work), and job satisfaction. Another challenge is that evidence from longitudinal studies regarding possible effects of psychosocial factors is limited, with most of the longitudinal research in this area focusing on demands, control, and social support [11].

4.2.2. Use in practical settings

Another issue is that the discourses and practices regarding psychosocial assessments in the workplaces are very different, not only between countries but also within countries. For example, differences exist between the area of psychosocial risk assessment [86] and the area of organizational development [57,58]. With its broad coverage of concepts, the COPSOQ is applicable to both these approaches. The COPSOQ was originally developed in a risk assessment discourse and is still widely used in this context. However, the instrument also makes possible a range of analyses in an organizational development framework as suggested by the JD-R model, owing to the relatively wide scope of dimensions [72]. This wide scope was already initiated in the COPSOQ I (covering more working conditions than demands and control such as Emotional Demands and Quality of Leadership, and covering also measures of burnout and stress) and has been developed further in the COPSOQ II (e.g., Recognition, Trust, Justice) and COPSOQ III (e.g., Work Engagement and Quality of Work). To our knowledge, the various ways of using the COPSOQ in practical settings have not been documented or investigated to a large extent. It is of interest to undertake and document these analyses to facilitate the use of the instrument and exchange of experience between users.

4.2.3. Social capital

As mentioned in the introduction, the concept of social capital as an indicator of resources of the organization has gained increasing interest in practice and research [59–61]. A number of studies have demonstrated that high organizational social capital is strongly connected to employee well-being [13,87–89], customer/patient satisfaction [90–92], sickness absence [93], productivity [94–97], and quality [90,91,98]. Many different indicators of organizational social capital have been applied, such as trust, justice, collaboration, mutual respect, workplace community, and common goals. In studies using the COPSOQ measures of trust, justice and collaboration have been the main indicators of social capital [13,93]. The concept of organizational capital has wide practical and theoretical implications because it is a characteristic of the whole workplace and because it does relate not only to employee well-being but also to productivity, quality, and customer satisfaction.

4.2.4. Trends

The digitalization of working life has led to new organization of work with respect to communication, place, and time [53]. There is a need to develop new measures to grasp important psychosocial aspects that arise with these developments. Particular dimensions include demands associated with the flood of information associated with electronic communication and with technological

changes which have increased employer expectations of worker availability outside of work hours. Seen in hindsight, one could wonder why we have not been aware of the need for addressing this in the COPSQO III. Whatever the answer is, this lack of coverage is shared by research of work and health in general [99]. This makes it urgent to expand the coverage of these issues in future psychosocial questionnaires.

4.2.5. The future

As the discussion of these issues indicates, the development of psychosocial questionnaires is a never-ending process. The challenge is to find a balance between needed revisions and keeping opportunities for comparisons between populations and time periods at the same time.

4.6. Concluding remarks

The present article has tested the internal consistency of the COPSQO III instrument in six countries. Future analyses should examine various aspects of validity, using both qualitative and quantitative approaches, across further countries and industrial sectors including comparisons with, for example, observational data. Such investigations would enhance the basis for recommendations regarding the use of the COPSQO III instrument.

Conflicts of interest

The authors declare no conflict of interest.

Acknowledgments

The authors wish to thank everyone making the testing of the COPSQO III possible: The employees responding to the questionnaire; employers in Germany, Sweden, and Turkey giving access to ask their employees; data-collecting companies EKOS Probit Panel and the LegerWeb Panel (subcontracted to EKOS) in Canada, DYM-Market and Social Research in Spain, and OpinionWay in France;

and all COPSQO international network members contributing to the development process. In addition, a special thanks to the anonymous reviewers of the present article.

Regarding ethics, the Canadian data were approved by the University Ethics Board of the University of Toronto, the Spanish data by the Research and Ethics Committee of the Trade Union Institute of Work, Environment and Health (ISTAS), the French data were collected in accordance with code of Ethics of Psychologists, the German data were in accordance with the ethical standards of the German Sociological Association, the Swedish study was approved by the Regional Ethics Board in Southern Sweden (Dnr. 215/476), and the Turkish data was approved of the Dokuz Eylül University Non-Interventional Ethics Committee.

Regarding funding, the Canadian test was funded from the operating budget of the Occupational Health Clinics for Ontario Workers (OHCOW) with "in-kind" analysis assistance from the Institute for Work and Health (IWH). The Spanish field work was supported by Instituto de Salud Carlos III, Spanish Ministry of Economy, Industry and Competitiveness under grant PI15/00161 and PI15/00858. The French test was funded by Preventis. The German test was funded internally by the FFAW. The Swedish test was funded by AFA insurance Grant No. 130301 & the Swedish Research Council for Health, Working Life and Welfare Grant No. 2016-07220 and the Turkish test was funded internally by the Dokuz Eylül University. The metaanalysis was funded internally by the BAuA. Those funding the national tests did not influence the analyses or interpretations of results of the present article.

The Turkish raw data can be obtained in an anonymized form. In the rest of the countries, no data are externally accessible. In Canada, participants were assured that external access could not be the case; in Spain, France, Germany, and Sweden data protection legislation prohibits it.

Appendix Table 1. The development process leading to the COPSQO III

Activity	Description	Participants	Period
First phase—defining contents			
Delphi-like round	Item punctuation—relevance (email round)	Network members and invited researchers	Jun-Aug 2013
Open comments	Email round	Network members and invited researchers	Sep 2013
Discussion—Ghent COPSQO International Workshop	First review of all comments and items COPSQO use guidelines	Network members and invited researchers	Oct 2013
Open comments analysis	Further review of all comments	Working group on comment analysis	May 2014
Steering group meeting (Barcelona)	Translation check, final review of comments & items and psychometrics test	Steering Committee	Sept-Oct 2014
Network's comment round	Email round	Network members and invited researchers	Jan-Mar 2015
Steering group meeting (Malmö)	Review of comments and items, Swedish cognitive interviews, and psychometrics test	Steering Committee	Jun 2015
COPSQO uses criteria	Defining use criteria for research and risk assessment	Working group on use criteria	Jun 2015–May 2018
Network's comment round	Email round	Network members and invited researchers	Jul-Aug 2015
Draft proposal and criteria sent to all networks	Email	Steering Committee	Sep 2015

(continued on next page)

(continued)

Activity	Description	Participants	Period
Discussion— the Paris COPSOQ International Workshop	Review of all comments and items of the draft proposal and the COPSOQ use criteria	Network members and invited researchers	Oct 2015
Final network's comment round	Email round	Network members and invited researchers	Dec 2015-Apr 2016
Beta version	Review of last comments, launch beta version	Steering Committee	May 2016
Second phase—empirical testing			
Data collection	Diverse methods depending on the country	Network research groups	Dec 2016-Dec 2017
Steering group meeting (Berlin)	Defining hypothesis and statistical analysis	Steering Committee	March 2017
Data analysis	Metaanalysis	Steering Committee and invited researchers	Oct 2017-Apr 2018
Final phase—agreement			
Discussion –Santiago de Chile COPSOQ International Workshop	Discussion of results	Network members and invited researchers	Nov 2017
Launching the COPSOQ III	Presenting the COPSOQ III for a wider audience.	Steering Committee	November 2019

COPSOQ = Copenhagen Psychosocial Questionnaire.

Appendix Table 2. Definitions of dimensions of the COPSOQ III

Domain	Dimension	Name	Definition
Demands at Work	Quantitative Demands	QD	Quantitative Demands deal with how much one has to achieve in ones work. Quantitative Demands can be assessed as an incongruity between the amount of tasks and the time available to perform these tasks in a satisfactory manner.
	Work Pace	WP	Work Pace deals with the speed at which tasks have to be performed. Work Pace is a measure of the intensity of work.
	Cognitive Demands	CD	Cognitive Demands deal with demands involving the cognitive abilities of the worker
	Emotional Demands	ED	Emotional Demands occur when the worker has to deal with or is confronted with other people's feelings at work. Other people comprise both people who are not employed at the workplace, e.g., customers, clients, or pupils, and people employed at the workplace, such as colleagues, superiors, or subordinates.
	Demands for Hiding Emotions	HE	Demands for Hiding Emotions occur when the worker has to conceal her or his own feelings at work from other people. Other people comprise both people who are not employed at the workplace, e.g., customers, clients, or pupils, and people employed at the workplace, such as colleagues, superiors, or subordinates.
Work Organization and Job Contents	Influence at Work	IN	Influence at Work deals with the degree to which the employee can influence aspects of work itself, ranging from, e.g., planning of work to e.g., the order of tasks.
	Possibilities for Development	PD	Possibilities for Development deal with if the tasks are challenging for the employee and if tasks provide opportunities for learning, and thus provide opportunities for development not only in the job but also at the personal level. Lack of development can create apathy, helplessness, and passivity.
	Variation of Work	VA	Variation of Work deals with the degree to which work (tasks, work process) is varied or not, that is, if tasks are not repetitive or repetitive.
	Control over Working Time	CT	Control over Working Time deals with the degree to which the employee can influence conditions surrounding work, e.g., breaks, length of the working day, or work schedules.
	Meaning of Work	MW	Meaning of Work concerns both the meaning of the aim of work tasks and the meaning of the context of work tasks. The aim is "vertical", i.e., that the work or product is related to a more general purpose, such as healing the sick or to produce useful products. The context is "horizontal", i.e., that one can see how ones' own work contributes to the overall product of the organization.

(continued)

Domain	Dimension	Name	Definition
Interpersonal Relations and Leadership	Predictability	PR	Predictability deals with the means to avoid uncertainty and insecurity. This is achieved if the employees receive the relevant information at the right time.
	Recognition	RE	Recognition deals with the recognition by the management of your effort at work.
	Role Clarity	CL	Role Clarity deals with the employee's understanding of her or his role at work, i.e., content of the tasks, expectations to be met, and her or his responsibilities.
	Role Conflicts	CO	Role Conflicts stem from two sources. The first source is about possible inherent conflicting demands within a specific task. The second source is about possible conflicts when prioritizing different tasks.
	Illegitimate Tasks	IT	Illegitimate Tasks cover tasks that violate norms about what an employee can properly be expected to do because they are perceived as unnecessary or unreasonable; they imply a threat to one's professional identity.
	Quality of Leadership	QL	Quality of Leadership deals with the next higher managers' leadership in different contexts and domains.
	Social Support from Colleagues	SC	Social Support from Colleagues deals with the employees' impression of the possibility to obtain support from colleagues if one should need it.
	Social Support from Supervisors	SS	Social Support from Supervisors deals with the employees' impression of the possibility to obtain support from the immediate superior if one should need it.
Sense of Community at Work	SW	Sense of Community at Work concerns whether there is a feeling of being part of the group of employees at the workplace, e.g., if employees relations are good and if they work well together.	
Work–Individual Interface	Commitment to the Workplace	CW	Commitment to the Workplace deals with the degree to which one experiences being committed to ones' workplace. It is not the work by itself or the work group that is the focus here, but the organization in which one is employed.
	Work Engagement	WE	This dimension deals with the attachment you feel to the task independently of how you experience your workplace [69].
	Job Insecurity	Jl	Job Insecurity deals with aspects of security of the employment of the employee, e.g., regarding the risk of being fired or the certainty of being reemployed if fired.
	Insecurity over Working Conditions	IW	Insecurity over Working Conditions deals with aspects of security of working conditions such as the content of work, e.g., if one is reallocated within the company, change of working hours, or deterioration of pay.
	Quality of Work	QW	Quality of Work deals with the employee's experience of the immediate output of one's work, e.g., the product made, the service accomplished, etc.
	Job Satisfaction	JS	Job Satisfaction—satisfaction with work—deals with the employees' experience of satisfaction with various aspects of work.
	Work Life Conflict	WF	Work Life Conflict deals with the possible consequences of work on privacy or on personal and family life and includes conflict regarding energy (mental and physical energy) and conflict regarding time.
Social Capital	Vertical Trust	TM	Vertical Trust deals with whether the employees can trust the management and vice versa. Vertical Trust can be observed in the communication between the management and the employees.
	Horizontal Trust	TE	Horizontal Trust deals with whether the employees can trust each other in daily work or not. Trust can be observed in the communication in the workplace; e.g., if one can freely express attitudes and feelings without fear of negative reactions.
	Organizational Justice	JU	Justice and respect in the workplace is about if workers are treated fairly. Four aspects are considered: First the distribution of tasks and recognition, second the process of sharing, third the handling of conflicts and fourth the handling of suggestions from the employees.

(continued on next page)

(continued)

Domain	Dimension	Name	Definition
Conflicts and offensive behavior		COB	Conflicts and offensive behavior cover on the one hand being subjected to negative acts such as bullying and Threats of Violence at the workplace and on the other hand conflicts between people at the workplace.
	Gossip and Slander	GS	Gossip and Slander is in this context if one has experienced this at the workplace.
	Conflicts and Quarrels	CQ	Conflicts and Quarrels are in this context if one has been involved in such occurrences at the workplace.
	Unpleasant Teasing	UT	Unpleasant Teasing is in this context if one has experienced this at the workplace.
	Cyber Bullying	HSM	Cyber Bullying is in this context if one has been subjected to work-related harassment in the social media.
	Sexual Harassment	SH	Sexual Harassment is in this context if one has experienced this at the workplace.
	Threats of Violence	TV	Threats of Violence is in this context if one has experienced this at the workplace.
	Physical Violence	PV	Physical Violence is in this context if one has experienced this act at the workplace.
	Bullying	BU	Bullying is in this context if one has experienced this act at the workplace. Bullying is defined as being exposed repeatedly over a longer period to unpleasant or degrading treatment and not being able to defend himself or herself against this treatment
Health and well-being	Self-rated Health	GH	Self-rated/perceived health is the person's assessment of her or his own general health.
	Sleeping Troubles	SL	Sleeping Troubles deal with sleep length, determined by e.g., sleeping in, waking up and interruptions of sleep, and quality of sleep.
	Burnout	BO	Burnout concerns the degree of physical and mental fatigue/exhaustion of the employee.
	Stress	ST	Stress here is defined as a reaction of the individual. Stress is here defined as a combination of tension and displeasure. As elevated stress levels over a longer period are detrimental to health, it is necessary to determine long-term states of stress.
	Somatic Stress	SO	Somatic Stress is here defined as a physical health indicator of a sustained stress reaction of the individual.
	Cognitive Stress	CS	Cognitive Stress is here defined as cognitive indicators of a sustained stress reaction of the individual.
	Depressive Symptoms	DS	Depressive Symptoms cover aspects which together indicate depression.
Personality	Self-Efficacy	SE	Self-Efficacy is the extent of one's belief in one's own ability to complete tasks and reach goals. Here self-efficacy is understood as global self-efficacy not distinguishing between specific domains of life.

COPSOQ = Copenhagen Psychosocial Questionnaire.

Appendix Table 3.A. Inter Spearman correlations of international middle* dimensions

Domain	Dimension	Demands at Work				Work organization and Job Contents			
		Quantitative Demands (QD)	Work Pace (WP)	Emotional Demands (ED)	Demands for hiding emotions (HE)	Influence at Work (IN)	Possibilities for Development (PD)	Control over Working Time (CT)	Meaning of Work (MW)
Demands at Work	Quantitative Demands (QD)	1	0.47	0.41	0.22	-0.03	-0.08	-0.03	-0.11
	Work Pace (WP)	0.32 - 0.58	1	0.39	0.29	-0.05	0.02	-0.19	0.02
	Emotional Demands (ED)	0.31 - 0.47	0.26 - 0.53	1	0.53	0.09	0.07	-0.08	0.05
	Demands for Hiding Emotions (HE)	0.14 - 0.30	0.27 - 0.33	0.48 - 0.58	1	0.05	0.02	-0.08	-0.01
Work Organization and Job Contents	Influence at Work (IN)	-0.20 - 0.14	-0.20 - 0.04	0.00 - 0.16	0.04 - 0.06	1	0.46	0.38	0.32
	Possibilities for Development (PD)	-0.12 - -0.03	-0.08 - 0.22	-0.05 - 0.19	-0.06 - 0.10	0.34 - 0.55	1	0.23	0.60
	Control over Working Time (CT)	-0.07 - 0.01	-0.27 - -0.10	-0.15 - -0.01	-0.13 - -0.02	0.34 - 0.43	0.21 - 0.27	1	0.16
	Meaning of Work (MW)	-0.19 - -0.06	-0.05 - 0.24	-0.07 - 0.17	-0.09 - 0.07	0.25 - 0.41	0.46 - 0.71	0.12 - 0.20	1

(continued)

Domain	Dimension	Demands at Work				Work organization and Job Contents			
		Quantitative Demands (QD)	Work Pace (WP)	Emotional Demands (ED)	Demands for hiding emotions (HE)	Influence at Work (IN)	Possibilities for Development (PD)	Control over Working Time (CT)	Meaning of Work (MW)
Interpersonal Relations and Leadership	Predictability (PD)	-0.28 - -0.13	-0.20 - 0.19	-0.28 - 0.04	-0.14 - -0.02	0.28 - 0.52	0.31 - 0.45	0.24 - 0.32	0.27 - 0.47
	Recognition (RE)	-0.27 - -0.16	-0.21 - 0.09	-0.35 - -0.04	-0.13 - 0.01	0.22 - 0.46	0.22 - 0.52	0.18 - 0.30	0.12 - 0.52
	Role Clarity (CL)	-0.29 - -0.18	-0.06 - 0.20	-0.20 - -0.09	-0.07 - 0.05	0.14 - 0.36	0.25 - 0.53	0.02 - 0.21	0.29 - 0.61
	Role Conflicts (CO)	0.26 - 0.48	0.21 - 0.42	0.28 - 0.62	0.21 - 0.21	-0.30 - 0.11	-0.22 - 0.11	0.02 - 0.02	-0.26 - -0.11
	Illegitimate Tasks (IT)	0.30 - 0.34	0.18 - 0.27	0.23 - 0.38	0.19 - 0.26	-0.27 - -0.05	-0.25 - -0.06	-0.09 - -0.01	-0.27 - -0.15
	Quality of Leadership (QL)	-0.25 - 0.15	-0.18 - 0.06	-0.21 - -0.04	-0.09 - -0.03	0.24 - 0.54	0.26 - 0.46	0.20 - 0.30	0.28 - 0.44
	Social support from Supervisor (SS)	-0.19 - -0.10	-0.19 - 0.09	-0.31 - -0.06	-0.05 - -0.04	0.23 - 0.51	0.21 - 0.45	0.22 - 0.36	0.14 - 0.46
	Social support from Colleagues (SC)	-0.19 - 0.00	-0.13 - 0.16	-0.12 - 0.13	-0.01 - 0.00	0.13 - 0.36	0.14 - 0.41	0.14 - 0.32	0.07 - 0.44
	Sense of Community at Work (SW)	-0.21 - -0.10	-0.10 - 0.06	-0.18 - -0.04	-0.07 - -0.01	0.10 - 0.41	0.19 - 0.45	0.12 - 0.30	0.18 - 0.47
	Work-Individual Interface	Commitment to the Workplace* (CW)	-0.17 - -0.08	-0.12 - 0.10	-0.04 - -0.04	—	0.44 - 0.53	0.50 - 0.57	—
Work Engagement* (WE)		-0.15 - -0.15	-0.04 - -0.04	-0.03 - -0.03	—	0.42 - 0.42	0.52 - 0.52	—	0.59 - 0.59
Job Insecurity (JI)		-0.02 - 0.21	0.01 - 0.13	-0.08 - 0.22	-0.01 - 0.11	-0.16 - 0.08	-0.23 - 0.02	-0.18 - -0.04	-0.27 - 0.03
Insecurity over Working Conditions (IW)		-0.24 - 0.14	-0.10 - 0.14	-0.24 - 0.16	0.13 - 0.17	-0.15 - -0.09	-0.21 - 0.01	-0.15 - -0.06	-0.20 - 0.06
Quality of Work (QW)		-0.29 - -0.29	-0.16 - -0.16	-0.13 - -0.13	—	0.30 - 0.30	0.36 - 0.36	—	0.35 - 0.35
Job Satisfaction (JS)		-0.34 - -0.15	-0.28 - -0.17	-0.43 - -0.11	-0.23 - -0.10	0.09 - 0.47	0.25 - 0.54	0.08 - 0.29	0.27 - 0.51
Work Life Conflict (WF)		0.11 - 0.51	0.09 - 0.41	0.12 - 0.55	0.12 - 0.12	-0.24 - 0.12	-0.20 - 0.10	-0.12 - -0.12	-0.22 - -0.07
Social Capital	Vertical Trust (TM)	-0.26 - -0.11	-0.17 - 0.13	-0.32 - -0.02	-0.17 - -0.06	0.24 - 0.57	0.29 - 0.50	0.19 - 0.31	0.27 - 0.50
	Horizontal Trust (TE)	-0.16 - -0.07	-0.13 - 0.13	-0.14 - 0.02	-0.07 - -0.01	0.19 - 0.43	0.14 - 0.46	0.17 - 0.25	0.15 - 0.46
	Organizational Justice (JU)	-0.35 - -0.15	-0.26 - 0.03	-0.34 - -0.03	-0.15 - -0.08	0.21 - 0.52	0.23 - 0.43	0.22 - 0.32	0.18 - 0.45
Health and Well-being	Self-rated Health (GH)	-0.23 - 0.05	-0.14 - 0.05	-0.20 - -0.06	-0.01 - -0.01	0.06 - 0.27	0.11 - 0.30	0.10 - 0.10	0.04 - 0.29

Numbers in upper right half are mean correlations across populations. These mean correlations were summarized as estimated overall means of the versions being tested. Ranges in lower left half are minimum and maximum correlations of the populations studied.

*And two selected long version dimensions: Commitment to the Workplace and Work Engagement.

Appendix Table 3.B. Inter Spearman correlations of international middle* dimensions

Domain	Dimension	Interpersonal relations and Leadership								
		Predictability (PD)	Recognition (RE)	Role Clarity (CL)	Role Conflicts (CO)	Illegitimate Tasks (IT)	Quality of Leadership (QL)	Social Support from supervisor (SS)	Social Support from Colleagues (SC)	Sense of Community at Work (SW)
Demands at Work	Quantitative Demands (QD)	-0.21	-0.20	-0.22	0.38	0.32	-0.13	-0.15	-0.10	-0.16
	Work Pace (WP)	-0.11	-0.13	0.02	0.33	0.25	-0.09	-0.11	-0.01	-0.04
	Emotional Demands (ED)	-0.15	-0.19	-0.13	0.42	0.31	-0.12	-0.17	0.01	-0.12
	Demands for Hiding Emotions (HE)	-0.08	-0.06	-0.01	0.21	0.23	-0.06	-0.04	-0.01	-0.04
Work Organization and Job Contents	Influence at Work (IN)	0.38	0.36	0.23	-0.07	-0.14	0.37	0.35	0.26	0.27
	Possibilities for Development (PD)	0.41	0.43	0.38	-0.06	-0.15	0.40	0.37	0.32	0.35
	Control over Working Time (CT)	0.28	0.24	0.12	0.02	-0.05	0.25	0.30	0.24	0.21
	Meaning of Work (MW)	0.39	0.40	0.47	-0.19	-0.22	0.37	0.32	0.30	0.36

(continued on next page)

(continued)

Domain	Dimension	Work–Individual Interface							Social Capital			Health & Well-being
		Commitment to the Workplace* (CW)	Work engagement* (WE)	Job Insecurity (JI)	Insecurity over Working Conditions (IW)	Quality of Work (QW)	Job Satisfaction (JS)	Work Life Conflict (WF)	Vertical Trust (TM)	Horizontal Trust (TE)	Organizational Justice (JU)	Self-rated Health (GH)
Interpersonal Relations and Leadership	Predictability (PD)	0.55	0.35	-0.09	-0.15	0.41	0.47	-0.20	0.58	0.36	0.58	0.21
	Recognition (RE)	0.62	0.45	-0.13	-0.04	0.38	0.51	-0.22	0.60	0.38	0.56	0.23
	Role Clarity (CL)	0.40	0.33	-0.03	-0.06	0.32	0.37	-0.11	0.45	0.30	0.41	0.16
	Role Conflicts (CO)	-0.20	-0.29	0.13	-0.03	-0.36	-0.27	0.36	-0.25	-0.16	-0.25	-0.14
	Illegitimate Tasks (IT)	-0.32	-0.32	0.08	0.14	-0.28	-0.29	0.30	-0.33	-0.19	-0.37	-0.12
	Quality of Leadership (QL)	0.57	0.37	-0.02	-0.10	0.40	0.46	-0.16	0.59	0.39	0.62	0.21
	Social support from Supervisor (SS)	0.52	0.35	-0.09	-0.08	0.36	0.42	-0.22	0.54	0.36	0.53	0.20
	Social support from Colleagues (SC)	0.39	0.24	-0.05	-0.07	0.31	0.29	-0.09	0.37	0.43	0.41	0.19
	Sense of Community at Work (SW)	0.47	0.31	-0.01	-0.05	0.35	0.39	-0.12	0.45	0.54	0.47	0.23
	Work–Individual Interface	Commitment to the Workplace* (CW)	1	0.60	-0.07	-0.16	0.52	0.62	-0.30	0.61	0.44	0.57
Work Engagement* (WE)		0.60 - 0.60	1	-0.20	-0.19	0.40	0.58	-0.32	0.42	0.25	0.38	0.35
Job Insecurity (JI)		-0.22 - 0.08	-0.20 - -0.20	1	0.34	-0.14	-0.07	0.21	-0.03	-0.03	-0.07	-0.16
Insecurity over Working Conditions (IW)		-0.22 - -0.10	-0.19 - -0.19	-0.48 - 0.62	1	-0.14	-0.12	0.00	-0.16	-0.08	-0.12	-0.08
Quality of Work (QW)		0.52 - 0.52	0.40 - 0.40	-0.14 - -0.14	-0.14 - -0.14	1	0.49	-0.31	0.46	0.35	0.44	0.27
Job Satisfaction (JS)		0.59 - 0.65	0.58 - 0.58	-0.20 - 0.18	-0.23 - 0.04	0.49 - 0.49	1	-0.23	0.52	0.34	0.48	0.32
Work Life Conflict (WF)		-0.30 - -0.30	-0.32 - -0.32	0.09 - 0.31	-0.34 - -0.18	-0.31 - -0.31	-0.38 - -0.15	1	-0.23	-0.09	-0.24	-0.26
Social Capital	Vertical Trust (TM)	0.60 - 0.62	0.42 - 0.42	-0.26 - 0.13	-0.31 - -0.08	0.46 - 0.46	0.46 - 0.56	-0.27 - 0.00	1	0.51	0.69	0.22
	Horizontal Trust (TE)	0.38 - 0.50	0.25 - 0.25	-0.17 - 0.08	-0.17 - -0.03	0.35 - 0.35	0.27 - 0.41	-0.18 - -0.01	0.45 - 0.58	1	0.50	0.20
	Organizational Justice (JU)	0.54 - 0.60	0.38 - 0.38	-0.23 - 0.11	-0.24 - -0.03	0.44 - 0.44	0.39 - 0.52	-0.37 - -0.02	0.58 - 0.75	0.42 - 0.59	1	0.23
Health and Well-being.	Self-rated Health (GH)	0.29 - 0.32	0.35 - 0.35	-0.21 - -0.07	-0.24 - 0.08	0.27 - 0.27	0.19 - 0.39	-0.38 - -0.10	0.02 - 0.34	0.04 - 0.28	0.05 - 0.31	1

Numbers in upper right half are mean correlations across populations. These mean correlations are summarized as estimated overall means of the versions being tested. Ranges in lower left half are minimum and maximum correlations of the populations studied.

*And two selected long version dimensions: Commitment to the Workplace and Work Engagement.

References

- Nübling M, Burr H, Moncada S, Kristensen TS. COPSQ International Network: Co-operation for research and assessment of psychosocial factors at work. *Public Health Forum* 2014;22: 18.e1–e3.
- Kristensen TS, Hannerz H, Hogh A, Borg V. The Copenhagen Psychosocial Questionnaire – a tool for the assessment and improvement of the psychosocial work environment. *Scand J Work Environ Health* 2005;31:11.
- Pejtersen JH, Kristensen TS, Borg V, Bjorner JB. The second version of the Copenhagen psychosocial questionnaire. *Scand J Public Health* 2010;38:8–24.
- Kristensen TS. A questionnaire is more than a questionnaire. *Scand J Public Health* 2010;38:149–55.
- Dollard M, Skinner N, Tuckey MR, Bailey T. National surveillance of psychosocial risk factors in the workplace: an international overview. *Work & Stress* 2007;21:1–29.
- Formazin M, Burr H, Aagestad C, Tynes T, Thorsen SV, Perkiö-Makela M, et al. Dimensional comparability of psychosocial working conditions as covered in European monitoring questionnaires. *BMC Public Health* 2014;14: 1251.
- Rugulies R, Aust B, Siegrist J, von dem Knesebeck O, Bultmann U, Bjorner JB, et al. Distribution of effort–reward imbalance in Denmark and its prospective association with a decline in self-rated health. *J Occup Environ Med* 2009;51: 870–8.
- Burr H, Albertsen K, Rugulies R, Hannerz H. Do dimensions of the Copenhagen Psychosocial Questionnaire predict vitality and mental health over and above the job strain and effort–reward imbalance models? *Scand J Public Health* 2010;38:59–68.
- Fransson EI, Nyberg ST, Heikkilä K, Alfredsson L, Bacquer de D, Batty GD, et al. Comparison of alternative versions of the job demand–control scales in 17 European cohort studies: the IPD–Work consortium. *BMC Public Health* 2012;12:62.
- Siegrist J, Dragano N, Nyberg ST, Lunau T, Alfredsson L, Erbel R, et al. Validating abbreviated measures of effort–reward imbalance at work in European cohort studies: the IPD–Work consortium. *Int Arch Occup Environ Health* 2014;87:249–56.
- Burr H, d'Errico A. Priority, methodological and conceptual issues regarding epidemiological research of occupational psychosocial risk factors for poor mental health and coronary heart disease. *Socil Lav* 2018;63: 159–81.
- Lund T, Labriola M, Christensen KB, Bültmann U, Villadsen E, Burr H. Psychosocial work environment exposures as risk factors for long-term sickness absence among Danish employees: results from DWECs/DREAM. *J Occup Environ Med* 2005;47:1141–7.
- Kiss P, De Meester M, Kristensen TS, Braeckman L. Relationships of organizational social capital with the presence of "gossip and slander," "quarrels and conflicts," sick leave, and poor work ability in nursing homes. *Int Arch Occup Environ Health* 2014;87:929–36.
- Madsen IE, Larsen AD, Thorsen SV, Pejtersen JH, Rugulies R, Sivertsen B. Joint association of sleep problems and psychosocial working conditions with registered long-term sickness absence. A Danish cohort study. *Scand J Work Environ Health* 2016;42:299–308.
- Nuebling M, Seidler A, Garthus-Niegel S, Latza U, Wagner M, Hegewald J, et al. The Gutenberg Health Study: measuring psychosocial factors at work and predicting health and work-related outcomes with the ERI and the COPSQ questionnaire. *BMC Public Health* 2013;13:538.
- Leka SJA, Jain A. Health impact of psychosocial hazards at work: an overview. Geneva: World Health Organization; 2010.
- ILO. Workplace stress: a collective challenge. Geneva: International Labour Organization; 2016.
- Nübling M, Stöbel U, Hasselhorn HM, Michaelis M, F. H. Measuring psychological stress and strain at work – evaluation of the COPSQ Questionnaire in Germany. *Psychosoc Med* 2006;3:Doc05.
- Dupret E, Bocerean C, Teherani M, Feltrin M, Pejtersen JH. Psychosocial risk assessment: French validation of the Copenhagen psychosocial questionnaire (COPSQ). *Scand J Public Health* 2012;40:482–90.

- [20] Berthelsen H, Westerlund H, Kristensen TS. COPSQ II - an update and linguistic validation of the Swedish version of a survey for the monitoring of the psychosocial work environment at workplaces. Stockholm, Sweden: Stressforskningsinstitutet, Stockholms Universitet; 2014 [In Swedish].
- [21] Moncada S, Utzet M, Molinero E, Llorens C, Moreno N, Galtes A, et al. The Copenhagen psychosocial questionnaire II (COPSQ II) in Spain—a tool for psychosocial risk assessment at the workplace. *Am J Ind Med* 2014;57:97–107.
- [22] Rosario S, Azevedo LF, Fonseca JA, Nienhaus A, Nubling M, da Costa JT. The Portuguese long version of the Copenhagen Psychosocial Questionnaire II (COPSQ II) - a validation study. *J Occup Med Toxicol* 2017;12:24.
- [23] Pournik O, Ghalichi L, TehraniYazdi A, Tabatabaee SM, Ghaffari M, Vingard E. Measuring psychosocial exposures: validation of the Persian of the Copenhagen psychosocial questionnaire (COPSQ). *Med J Islam Repub Iran* 2015;29:221.
- [24] Shang L, Liu P, Fan L, Huakang G, Li J. Psychometric properties of the Chinese version of Copenhagen psychosocial questionnaire. *J Environ Occup Med* 2008;25:572–6.
- [25] Alvarado R, Pérez-Franco J, Saavedra N, Fuentealba C, Alarcón A, Marchetti N, et al. Validación de un cuestionario para evaluar riesgos psicosociales en el ambiente laboral en Chile. *Rev Med Chile* 2012;140:1154–63.
- [26] Widerszal-Bazyl M. The Copenhagen Psychosocial Questionnaire (COPSQ) - psychometric properties of selected scales in the Polish version. *Medycyna Pracy* 2017;68. In Polish.
- [27] Setti I, d'Errico A, di Cuozzo D, Fiabane E, Argentero P. Validation and psychometric properties of the Italian Copenhagen Psychosocial Questionnaire II - short version. *Boll Psicol Appl* 2017;65:48–57.
- [28] Nübling M, M.V. Haug A, Nübling T, Adiwidjaja A. European wide survey on teachers work related stress - assessment, comparison and evaluation of the impact of psychosocial hazards on teachers at their workplace. Freiburg, Germany: FFAS Freiburg Research Centre Occupational and Social Medicine; 2011.
- [30] Moncada S, Llorens C, Navarro A, Kristensen TS. ISTAS21 COPSQ: castilian language version of the Copenhagen psychosocial questionnaire. *Arch Preven Riesgos Laboral* 2005;8:18–29 [In Spanish].
- [31] Iordache R, Petreanu V. The Romanian version of the Copenhagen psychosocial questionnaire - short report. *Procedia - Soc Behav Sci* 2014;149:424–7.
- [32] Gerke J, Cornelio C, Zelaschi Alberto M, Amable M, Contreras A, et al. Cultural adaptation and validation of the COPSQ ISTAS21 questionnaire in Argentina. *EPICOH*. Barcelona: OEM; 2016A101.
- [33] Rodrigues CA, Meister de Almeida R, Villar Pellegrin L. Adaptation of an instrument to assess psychosocial risks at work. Sao Paulo: VII Congresso Brasileiro de Avaliação Psicológica; 2015 [In Portuguese].
- [34] Zárate Castillo BG. Validation of the questionnaire COPSQ Istars21 on health workers of the HGZMF-21 IMSS in Leon. Guanajuato: Convención Internacional de Salud Pública Cuba Salud; 2012. La Habana 2012.
- [35] Nistor K, Ádám S, Cserháti Z, Szabó A, T.Z., A.S.. Psychometric characteristics of the Hungarian version of the Copenhagen psychosocial questionnaire II (COPSQ II). *Mentálhigiéné És Pszichoszomatika* 2015;16:179–207 [In Hungarian].
- [36] Kiss P, De Meester M, Kruse A, Chavee B, Braeckman L. Comparison between the first and second versions of the Copenhagen Psychosocial Questionnaire: psychosocial risk factors for a high need for recovery after work. *Int Arch Occup Environ Health* 2013;86:17–24.
- [37] Nolle I. List of Publications with COPSQ published in peer-reviewed indexed journals. Freiburg, Germany: COPSQ International Network. <https://www.copsoq-network.org/assets/Uploads/Literaturliste-Mai18-Netzwerk-peer-reviewed-only-V1.pdf>.
- [38] Li J, Shang L, Galatsch M, Siegrist J, Miuller BH, Hasselhorn HM. Psychosocial work environment and intention to leave the nursing profession: a cross-national prospective study of eight countries. *Int J Health Serv* 2013;43:519–36.
- [39] Berthelsen H, Pejtersen JH, Soderfeldt B. Measurement of social support, community and trust in dentistry. *Community Dent Oral Epidemiol* 2011;39:289–99.
- [40] Moncada S, Pejtersen JH, Navarro A, Llorens C, Burr H, Hasle P, et al. Psychosocial work environment and its association with socioeconomic status. A comparison of Spain and Denmark. *Scand J Public Health* 2010;38:137–48.
- [41] Kristensen TS, Bjorner JB, Christensen KB, Borg V. The distinction between work pace and working hours in the measurement of quantitative demands at work. *Work & Stress* 2004;18:305–22.
- [42] Estryng-Behar M, Van der Heijden BI, Oginska H, Camerino D, Le Nezet O, Conway PM, et al. The impact of social work environment, teamwork characteristics, burnout, and personal factors upon intent to leave among European nurses. *Med Care* 2007;45:939–50.
- [43] Schnall PL, Dobson M, Landsbergis P. Globalization, work, and cardiovascular disease. *Int J Health Serv* 2016;46:656–92.
- [44] Malard L, Chastang JF, Niedhammer I. Changes in psychosocial work factors in the French working population between 2006 and 2010. *Int Arch Occup Environ Health* 2015;88:235–46.
- [45] Utzet M, Moncada S, Molinero E, Llorens C, Moreno N, Navarro A. The changing patterns of psychosocial exposures at work in the south of Europe: Spain as a labor market laboratory. *Am J Ind Med* 2014;57:1032–42.
- [46] LaMontagne AD, Krnjacki L, Kavanagh AM, Bentley R. Psychosocial working conditions in a representative sample of working Australians 2001–2008: an analysis of changes in inequalities over time. *Occup Environ Med* 2013;70:639–47.
- [47] Smith P, Morassaei S, Mustard C. Examining changes in reported work conditions in Quebec, Ontario and Saskatchewan between 1994 and 2003–05. *Can J Public Health* 2011;102:127–32.
- [48] OECD. Employment outlook. Paris: OECD Publishing; 2017.
- [49] European Commission. Directorate-general for employment SAaI. Labour market and wage developments in Europe. Luxembourg: Publications Office of the European Union; 2017.
- [50] Benach J, Vives A, Amable M, Vanroelen C, Tarafa G, Muntaner C. Precarious employment: understanding an emerging social determinant of health. *Annu Rev Public Health* 2014;35:229–53.
- [51] Buchholz S, Hofacker D, Mills M, Blossfeld HP, Kurz K, Hofmeister H. Life courses in the globalization process: the development of social inequalities in modern societies. *Eur Sociol Rev* 2009;25:53–71.
- [52] Sixth Eurofound. European working conditions survey – overview report. Luxembourg: Publications Office of the European Union; 2016.
- [53] Berger T, Frey C. Structural transformation in the OECD: digitalisation, deindustrialisation and the future of work. Paris: OECD Publishing; 2016.
- [54] Chretien KC, Kind T. Social media and clinical care: ethical, professional, and social implications. *Circulation* 2013;127:1413–21.
- [55] Privitera C, Campbell MA. Cyberbullying: the new face of workplace bullying? *Cyberpsychol Behav* 2009;12:395–400.
- [56] Jönsson S, Muhonen T, Forssell RC, Bäckström M. Assessing exposure to bullying through digital devices in working life: two versions of a cyberbullying questionnaire (CBQ). *Psychology* 2017;8:477–94.
- [57] Bakker AB, Demerouti E. Job demands–resources theory. In: Chen PY, Cooper CL, editors. *Work and wellbeing: a complete reference guide*. Hoboken, New Jersey: John Wiley & Sons; 2014.
- [58] Schaufeli WB, Taris TW. A critical review of the job demands–resources model: implications for improving work and health. Bridging occupational, organizational and public health: a transdisciplinary approach. Dordrecht: Springer Science+Business Media; 2014. p. 43–68.
- [59] Oksanen T, Kawachi I, Jokela M, Kouvonen A, Suzuki E, Takao S, et al. Workplace social capital and risk of chronic and severe hypertension: a cohort study. *J Hypertens* 2012;30:1129–36.
- [60] Oksanen T, Kivimäki M, Kawachi I, Subramanian SV, Takao S, Suzuki E, et al. Workplace social capital and all-cause mortality: a prospective cohort study of 28,043 public-sector employees in Finland. *Am J Public Health* 2011;101:1742–8.
- [61] Berthelsen H, Hakanen J, Kristensen TS, Lönnblad A, Westerlund H. A qualitative study on the content validity of the social capital scales in the Copenhagen psychosocial questionnaire (COPSQ II). *Scand J Work Organ Psychol* 2016;1:1–13.
- [62] Semmer NK, Tschan F, Jacobshagen N, Beehr TA, Elfering A, Kälin W, et al. Stress as offense to self: a promising approach comes of age. *Occup Health Sci* 2019:1–34.
- [63] Holman D. Job types and job quality in Europe. *Hum Relat* 2013;66:475–502.
- [64] Smulders P. Work in 27 European countries: testing the north-south hypothesis. *Tijdschr Arb* 2004;20:275–87.
- [65] Dragan N, Siegrist J, Wahrendorf M. Welfare regimes, labour policies and unhealthy psychosocial working conditions: a comparative study with 9917 older employees from 12 European countries. *J Epidemiol Community Health* 2011;65:793–9.
- [66] Thorsen SV, Bjorner JB. Reliability of the Copenhagen psychosocial questionnaire. *Scand J Public Health* 2010;38:25–32.
- [67] Llorens C, Pérez-Franco J, Oudyk J, Berthelsen H, Dupret E, Nübling M, et al. Agreed guidelines for the use of COPSQ III. 2nd ed. Freiburg, Germany: COPSQ International Network. 2018. <https://www.copsoq-network.org/assets/Uploads/COPSQ-network-guidelines-for-the-use-of-COPSQ-III-290618sig.pdf>.
- [68] Nübling M, Lincke HJ, Schröder H, Knerr P, Gerlach I, Laß I. Desired and experienced quality of work. In: Hofmann F, Reschauer G, Stöbel U, editors. *Arbeitsmedizin im Gesundheitsdienst. Tagungsband 29 des Freiburger Symposiums Arbeitsmedizin im Gesundheitsdienst*. Germany: Freiburg; 2015 [In German].
- [69] Schaufeli WB, Bakker AB, Salanova M. The measurement of work engagement with a short questionnaire. *Educ Psychol Meas* 2006;66:701–16.
- [70] Siegrist J, Wege N, Puhhofer F, Wahrendorf M. A short generic measure of work stress in the era of globalization: effort-reward imbalance. *Int Arch Occup Environ Health* 2009;82:1005–13.
- [71] World Bank. Employment in services, female (% of female employment) (modeled ILO estimate). World Bank Group; 2019.
- [72] Burr H, Moncada S, Berthelsen H, Nübling M, Dupret E, Perez J, et al. The COPSQ III questionnaire. Freiburg, Germany: The COPSQ International Network. 2018. <https://www.copsoq-network.org/assets/Uploads/annex1-Dimensions-and-items-in-the-COPSQ-III-questionnaire-060718.pdf>.
- [73] Gliem JA, Gliem RR. Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In: Midwest research-to-practice conference in adult, continuing, and community education 2003.
- [74] Boronat M, Gonzalez-Lleo A, Rodriguez-Perez C, Feldt-Rasmussen U, Lopez-Plasencia Y, Rasmussen AK, et al. Adaptation and cross-cultural validation of

- the Spanish version of the thyroid-related quality-of-life patient-reported outcome questionnaire. *Endocrinol Diabetes Y Nutr* 2018;65:500–7.
- [75] Hakstian AR, Whalen TE. A k-sample significance test for independent alpha coefficients. *Psychometrika* 1976;41:219–31.
- [76] Willis GB, Miller K. Cross-cultural cognitive interviewing: seeking comparability and enhancing understanding. *Field Methods* 2011;23:331–41.
- [77] Bjorner JB, Kristensen TS, Orth-Gomér K, Tibblin G, Sullivan M, Westerholm P. Self-rated health: a useful concept in research, prevention and clinical medicine. Stockholm: Swedish Council for Planning Coordination of Research F. R. N.; 1996.
- [78] Ramkissoon A, Smith P, Oudry J. Dissecting the effect of workplace exposures on workers' rating of psychological health and safety. *Am J Ind Med* 2019;62:412–21.
- [79] Sahan C, Baydur H, Demiral Y. A novel version of Copenhagen Psychosocial Questionnaire-3: Turkish validation study. *Arch Environ Occup Health* 2018;1–13.
- [80] Bültmann U, Kant I, van Amelsvoort LG, van den Brandt PA, Kasl SV. Differences in fatigue and psychological distress across occupations: results from the maastricht cohort study of fatigue at work. *J Occup Environ Med* 2001;43:976–83.
- [81] Fredlund P, Hallqvist J, Diderichsen F. Psychosocial job exposure matrix. An update of a classification system for work-related psychosocial exposures. In: Marklund S, editor. *Arbete och Hälsa*. Stockholm: National Institute for working life; 2000 [In Swedish].
- [82] Schwartz J, Pieper C, Karasek R. A procedure for linking psychosocial job characteristics data to health surveys. *Am J Public Health* 1988;78:904–9.
- [83] Nübling M, Vomstein M, Haug A, Lincke HJ. Are reference data from the COPSQ database suitable for a JEM on psychosocial factors at work? *Zbl Arbeitsmed* 2017;67:151–4 [In German].
- [84] Berthelsen H, Conway PM, Clausen T. Is organizational justice climate at the workplace associated with individual-level quality of care and organizational affective commitment? A multi-level, cross-sectional study on dentistry in Sweden. *Int Arch Occup Environ Health* 2018;91:237–45.
- [85] Berthelsen H, Westerlund H, Hakanen JJ, Kristensen TS. It is not just about occupation, but also about where you work. *Community Dent Oral Epidemiol* 2017;45:372–9.
- [86] Janetzke H, Ertel M. *Psychosocial risk management in a european comparison*. Dortmund: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin; 2017.
- [87] Tsuboya T, Tsutsumi A, Kawachi I. Change in psychological distress following change in workplace social capital: results from the panel surveys of the J-HOPE study. *Occup Environ Med* 2015;72:188–94.
- [88] Driller E, Ommen O, Kowalski C, Ernstmann N, Pfaff H. The relationship between social capital in hospitals and emotional exhaustion in clinicians: a study in four German hospitals. *Int J Soc Psychiatr* 2011;57:604–9.
- [89] Kouvonen A, Oksanen T, Vahtera J, Stafford M, Wilkinson R, Schneider J, et al. Low workplace social capital as a predictor of depression: the Finnish Public Sector Study. *Am J Epidemiol* 2008;167:1143–51.
- [90] Gittel JH. *High performance healthcare: using the power of relationships to achieve quality, efficiency and resilience*. New York: McGraw-Hill; 2009.
- [91] Gittel JH. *The southwest airlines way: using the power of relationships to achieve high performance*. New York: McGraw-Hill; 2003.
- [92] Perzynski AT, Caron A, Margolius D, Sudano Jr JJ. Primary care practice workplace social capital: a potential secret sauce for improved staff well-being and patient experience. *J Patient Exp* 2019;6:72–80.
- [93] Rugulies R, Hasle P, Pejtersen JH, Aust B, Bjorner JB. Workplace social capital and risk of long-term sickness absence. Are associations modified by occupational grade? *Eur J Public Health* 2016;26:328–33.
- [94] Burchell M, Robin J. *The great workplace: how to build it, how to keep it, and why it matters*. New York: Wiley; 2010.
- [95] de Jong T. *Linking social capital to knowledge productivity: an explorative study on the relationship between social capital and learning in knowledge-productive networks*. Enschede, Netherlands: Springer Uitgeverij; 2010.
- [96] Maurer I, Bartsch V, Ebers M. The value of intra-organizational social capital: how it fosters knowledge transfer, innovation performance, and growth. *Organ Stud* 2011;32:157–85.
- [97] Boedker C, Meagher K, Vidgen R, Cogin J, Mouritsen J. Doing more with less: productivity or starvation? The intellectual asset health check. *Public Money Manag* 2017;37:31–8.
- [98] Leana CR, Pil FK. Social capital and organizational performance: evidence from urban public schools. *Organ Sci* 2006;17:353–66.
- [99] Müller-Thur K, Angerer P, Körner U, Dragano N. Working with digital technologies, psychosocial stress and potential health consequences. *Arbeitsmed Sozialmed Umweltmed* 2018;53:387–91 [In German].
- [100] Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol* 1996;1:27–41.
- [101] Garthus-Niegel S, Nubling M, Letzel S, Hegewald J, Wagner M, Wild PS, et al. Development of a mobbing short scale in the gutenber health study. *Int Arch Occup Environ Health* 2016;89:137–46.