

# Using health and safety monitoring routines to enhance sustainable employability

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## Abstract.

**BACKGROUND:** Traditionally, the field of health and employment has mainly focused on preventing unhealthy work practices. Nowadays, there is increasing interest in also promoting a positive work environment. It is relevant to investigate how organizations can integrate both approaches into their work practices. We posit this could promote the sustainable employability of employees.

**OBJECTIVE:** We explored whether a tool that monitors health and safety risks can also be used to create a positive work environment.

**METHODS:** Almost 600 employees completed the Dutch version of the Copenhagen Psychosocial Questionnaire (COPSOQ). We used regression analyses to investigate the associations between dimensions of work and employees' outcome (stress and sustainable employability). We also validated the Dutch version of this questionnaire by adding Sustainable employability and Vigor.

**RESULTS:** A theory-based selection of dimensions explained 32% of the variance in Sustainable employability, whereas a set of established predictors explained 16% in Stress. Confirmatory factor analyses indicated a good fit of the COPSOQ to the hypothesized model. Reliabilities of the dimensions were satisfactory to good.

**CONCLUSIONS:** Our study indicates that organizations can use COPSOQ both as a tool to monitor risk, as well as a means of promoting positive work practices.

Keywords: COPSOQ, psychosocial risks, work resources, sustainable employability, stress

## 1. Introduction

Using health and safety monitoring routines to enhance sustainable employability.

As the workforce ages in many parts of the world including Europe [1], United States [2], Australia [3], and East Asia [4], the importance of sustainable employability is growing. Organizations, aware of these changes, have focused not only on preventing unsafe or unhealthy work practices, within a risk management model, but also on enhancing the positive aspects of work [5]. In line with positive psychology [6, 7], positive health [8] and positive organizational behavior [9], they are paying increasing attention to

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employee motivation, resilience, vitality at work, sustainable employability, and their associations with positive employees' functioning [10].

Within organizations, one can identify positive resources to improve employees' wellbeing and performance at the individual, group, leadership and organizational level [11]. Organizations also tend to deploy these resources at different levels and typically separate departments monitor them. As an integrated approach is often lacking, there is a need for new routines that combine approaches and address resources on different levels at the same time. In this study, we explored this by using the Dutch version of the Copenhagen Psychosocial Questionnaire (COPSOQ)<sup>1</sup>.

We address two essential questions in organizations. Firstly, organizations need to know what can be done to promote sustainable employability. Eliminating poor working conditions turned out not to be the same as recognizing and promoting good conditions [5]. It is therefore necessary to better unravel which negative and positive factors affect human health and which ones further optimal functioning within organizations.

Secondly, we need to understand how we can efficiently implement and apply measures. The departments that are responsible for risk management are usually not the same that take care of staff wellbeing. They usually have different backgrounds and might take different positions within the organization structure.

Risk management requires the systematic monitoring of risk factors. When working conditions give rise to undesirable risk levels, work practices may need to change. In many countries, legislation mandates or at least encourages risk management, which is usually the domain of health and safety experts, for example the Occupational Health and Safety team. Other parts of the organization will usually take care of initiatives to foster motivation, ownership, agency, or personal leadership among employees. It might be the Human Resources team that will implement such actions. On the one hand, an Occupational Health and Safety team will tend not to focus on sustainable employability. On the other hand, while Human Resources are usually responsible for sustainable employability, they are not necessarily involved in the process of risk management. As a result, a Health and Safety team may not always have a positive psychology

perspective. Conversely, while management promotes sustainable employability, they may not pay sufficient attention to actual work practices.

For reasons of efficiency and good cooperation within the organization, there is a need for a more comprehensive approach, utilizing the strengths of different bodies of knowledge. Such an approach enables organizations to combine risk management and the prevention of unhealthy working conditions with the promotion of positive working conditions. A monitoring instrument that assesses both negative and positive working conditions may support this comprehensive approach.

The COPSOQ may be a good starting point for such an approach. It is theoretically grounded in the Job-Strain model, the Demand-Control-Support model [12, 13] and the Effort-Reward Imbalance model [14]. COPSOQ identifies, locates and measures psychosocial work factors. The results can be used to stimulate preventive activities and thereby improve working conditions. The COPSOQ was originally developed to identify psychosocial risks at work and is commonly used in risk management. However, in line with the theoretical framework, COPSOQ also measures positive psychosocial dimensions, such as organizational social capital, social support, meaningful work, job control, variation in work, opportunities for development and sense of community. These dimensions are recognized as resources of positive functioning [5, 15]. Organizations that use COPSOQ may not have sufficiently identified these indicators as positive resources.

COPSOQ has been validated for many languages and in many different ways, but mostly in the context of psychosocial risks [e.g. 16; for an overview see the website of the COPSOQ network, 17–19]. Although the Dutch version of COPSOQ II has been used in numerous studies [20, 21], a formal validation study is lacking.

By using COPSOQ, this study addresses two goals. First, it investigates the relevance of the monitoring instrument COPSOQ for an integrated approach to negative and positive working factors. We will explore such a tactic by relating both risk factors and positive resources in work to stress and sustainable employability among employees. With this methodology, the study is in line with organizations' common practice and legal obligation to measure psychosocial factors, and adds the desired positive focus of organizations that is helps to promote sustainable employability. Secondly, we are able to validate the Dutch version of COPSOQ.

<sup>1</sup>The COPSOQ questionnaire is free to use under creative commons CC BY-NC-ND 4.0.

## 2. Method

### 2.1. Identifying models for stress and sustainable employability

We developed models on stress and sustainable employability that could be tested with dimensions from COPSOQ. First, we identified factors in COPSOQ that are known to be associated with stress. Quantitative demands, Emotional demands, Cognitive demands, and Work pace are well-documented predictors of stress [22]. Conversely, working in an environment where demands are reasonably predictable [23], where roles are clear and where one gets organizational support, generally predicts less stress as these variables often mitigate the effects of demands [24]. We also identified positive dimensions in COPSOQ that are known to be associated with employees' sustainable employability. Sustainable employability requires from workers an attitude and motivation to seize opportunities and from the organization a facilitating environment [25]. Important organizational-cultural factors that are associated with sustainable employability are transformational leadership, having a good work-life balance, organizational social capital, effective personal functioning, and quality of work [10].

### 2.2. Subjects

We asked employees who participated in a regular in-company assessment in the Netherlands to give permission for the use of their data for research purposes. The company is a specialized chemical company with a variety of departments and functions such as a laboratory, an R&D department, a sales department, legal and financial departments, as well as a production department with shift workers. Of those participants who consented, we selected those with a contract of at least 24 hours per week and working their usual hours at the time of filling out the survey. The sample consisted of 598 employees, 208 women, 377 men, and 13 persons who preferred not to disclose their gender. Mean age was 44.4 years,  $SD=9.5$ . Most employees had a contract of 32, 36 or 40 hours per week, 11.5%, 15.9%, and 49.2% respectively.

### 2.3. Materials

#### 2.3.1. COPSOQ

The Dutch version of COPSOQ III was based upon the approved Flemish translation of COPSOQ II.

Flemish and Dutch are similar languages and Flemish and Dutch persons understand each other almost perfectly, but may differ in pronunciation, vocabulary and/or word order. In close collaboration with our Belgian colleagues, we adapted the wording of some questions for our translation. Whenever we couldn't agree, we consulted the National Research Centre for the Working Environment by sending them Danish backtranslations of our Dutch questions. When COPSOQ II was revised to COPSOQ III, we made our own translations. The middle version of the COPSOQ was initially recommended for professional work environment experts, the long version for research purposes [26]. In time, the middle version III proved to be valid and reliable enough for research purposes [19]. This version is therefore sufficiently robust and at the same time not too long for practical use. We used the Middle version of COPSOQ III and added the following dimensions from the Long version: Cognitive demands in the domain Demands at work, Variation of work in the domain Work organization and job contents, Commitment to the workplace and Work engagement in the domain Work individual interface.

### 2.4. Constructs and variables

We operationalized constructs as follows. We measured Transformational leadership with the COPSOQ dimension Quality of leadership, having a balanced workstyle by COPSOQ dimension Work-life conflict, Organizational social capital by the three COPSOQ dimensions Vertical trust, Horizontal trust and Organizational justice [27], and effective personal functioning by the COPSOQ dimension Possibilities for development (Skill discretion). Work pace, Stress, Social support from supervisor, and Role clarity by the COPSOQ scales with the same labels.

In order to investigate the associations between the working conditions and positive employees' outcomes, we added Vigor and Sustainability to the questionnaire. We operationalized these constructs as follows.

### 2.5. Vigor

COPSOQ contains the VII vigor item from the UWES, "At my work, I feel bursting with energy". We added two other items from the short version of the UWES vigor scale [28]: "At my job, I feel strong and vigorous" (VI2); "When I get up in the morning, I feel like going to work" (VI3).

## 2.6. Sustainable employability

We measured Sustainable employability with one item: “When you look at the developments in work, and at your health, competencies, motivation, and work-private balance – do you expect that you will be able to continue working?” with response options: to a very large extent, to a large extent, somewhat, to a small extent, to a very small extent.

## 2.7. Statistical approach

We first calculated scale scores and checked these on normal distribution with Kolmogorov Smirnov tests. All scales were normally distributed.

We then performed confirmatory factor analyses (CFAs) for five separate domains using the Lavaan program in R [29]. A good fit of a suggested factor structure is indicated when  $CFI \geq 0.90$  and  $RMSEA < 0.08$ . Subsequently, we then calculated reliabilities for all the separate dimensions. Dimensions that are only measured with one item (Recognition, Illegitimate tasks, and Horizontal trust) do not allow for an estimate of a latent variable within a structural equational model and are therefore omitted from these CFAs.

Finally, we assessed the criterion validity of COPSOQ by performing two regression analyses with forced entry of predictors. The first analysis assessed which dimensions statistically predict Sustainable employability; the other second one assessed which dimensions predict Stress. We entered all the specified variables in order of decreasing tolerance with probability of F-to-enter 0.05, probability of F-to-remove value 0.10.

## 3. Results

### 3.1. Confirmatory factor analyses

The first CFA was performed on the domain Demands at work. This domain contains the dimensions Quantitative demands, Work pace, Cognitive demands, Emotional demands, and Demands for hiding emotions. Fit indices indicated a good fit of the factor structure,  $CFI = 0.96$  and  $RMSEA = 0.06$ .

The next CFA tested the factor structure for the domain Work organization and Job contents, comprising the dimensions Influence at work, Possibilities for development, Variation of work, Control over working time and Meaning of work. Fit indices

indicated a good fit of this factor structure too,  $CFI = 0.97$  and  $RMSEA = 0.05$ .

The third CFA was applied to the domain Interpersonal relations and leadership that contains dimensions Predictability, Role clarity, Role conflicts, Quality of leadership, Social support from supervisor, Social support from colleagues and Sense of community at work. Here again, fit indices supported the factor structure too,  $CFI = 0.98$  and  $RMSEA = 0.05$ . Illegitimate tasks are also an element of this domain, but as it is only measured with one item, it could not be tested within a CFA.

Our fourth CFA tested the factor structure of the domain Work individual interface with dimensions Commitment to the workplace, Work engagement, Insecurity over employment, Insecurity over working conditions, Quality of work, Job satisfaction, Work-life conflict. Here again, the factor structure was supported,  $CFI = 0.92$  and  $RMSEA = 0.07$ . Recognition is also part of this domain. Because it is measured with only one item it could not be tested within a CFA.

A fifth CFA tested the factor structure of the domain Social capital. This domain contains dimensions Vertical trust and Organizational justice. The suggested factor structure is not fully supported,  $CFI = 0.96$ , but  $RMSEA = 0.136$ , which is too large. Allowing for covariation between the error terms of two Trust Management items, TM1 and TMX2, solved this issue and resulted in  $CFI = 0.997$  and  $RMSEA = 0.043$ . Horizontal trust is an element of this domain, but is only measured with one item. A subsequent PCA that included Vertical trust, Organizational justice and Horizontal trust resulted in one factor only.

### 3.2. Reliability

Table 1 shows the reliability scores of the COPSOQ scales. Reliability is considered good when Cronbach’s alpha values are  $> 0.70$  [30]. Most reliabilities are good and they are satisfactory for Demands for hiding emotions,  $\alpha = 0.65$ , Sense of Community at work,  $\alpha = 0.65$ , for Control over working time,  $\alpha = 0.69$ , and Predictability,  $\alpha = 0.68$ . The reliability of Quality of Work is low,  $\alpha = 0.53$ .

### 3.3. Regression analyses

#### 3.3.1. Stress

A regression analysis was performed with Stress as dependent variable and Quantitative demands, Work pace, Cognitive demands, Emotional demands,

Table 1  
Reliabilities of the COPSOQ III scales.

Dimension	Alpha	Version	# items	
Quantitative demands	0.86	M	QD1, QD2, QD3	3
Work pace	0.77	M	WP1, WP2	2
Cognitive demands	0.70	L	CD1, CD2, CD3, CD4	4
Emotional demands	0.76	L	ED1, EDX2, ED3	3
Demands for hiding emotions	0.65	M	HE2, HE3, HE4	3
Influence at work	0.72	M	INX1, IN3, IN4, IN6	4
Possibilities for development	0.83	M	PD2, PD3, PD4	3
Variation of work	0.73	L	VA1, VA2	2
Control over working time	0.69	M	CT1, CT2, CT3, CT4	4
Meaning of work	0.86	M	MW1, MW2	2
Predictability	0.68	C	PR1, PR2	2
Recognition	–	C	RE1	1
Role clarity	0.79	M	CL1, CL2, CL3	3
Role conflicts	0.73	C	CO2, CO3	2
Illegitimate tasks	–	C	IT1	1
Quality of leadership	0.80	M	QLX1, QL3, QL4	3
Social support from supervisor	0.83	M	SSX1, SSX2	2
Social support from colleagues	0.83	M	SCX1, SCX2	2
Sense of community at work	0.65	M	SW1, SW3	2
Commitment to the workplace	0.84	L	CW1, CW2, CWX3, CW4, CW5	5
Work engagement	0.79	L	WE1, WE2, WE3	3
Insecurity over employment	0.74	C	JI1, JI3	2
Insecurity over working conditions	0.71	M	IW1, IW3, IW4	3
Quality of work	0.53	L	QW1, QW2	2
Satisfaction with work	0.71	M	JS1, JS4, JS5	3
Work life conflict	0.84	C	WF2, WF3	2
Horizontal trust		C	TE3	1
Vertical trust	0.77	M	TM1, TMX2, TM4	3
Organizational justice	0.70	C	JU1, JU4	2
Sleeping troubles	0.90	L	SL1, SL2, SL3, SL4	4
Burnout	0.88	L	BO1, BO2, BO3, BO4	4
Stress	0.86	L	ST1, ST2, ST3	3
Total number of items				85

Predictability, Role clarity and Social support from supervisor as predictors. The regression model explained 16% of the variance in Stress,  $F(7, 561) = 17.93$ ,  $p < 0.001$ . There were five significant predictors in the model, Quantitative demands,  $\beta = 0.11$ ,  $p = 0.02$ , Work pace,  $\beta = 0.13$ ,  $p = 0.01$ , Emotional demands,  $\beta = 0.18$ ,  $p < 0.001$ , Predictability,  $\beta = -0.11$ ,  $p = 0.01$ , Social support from supervisor,  $\beta = -0.14$ ,  $p = 0.001$ . As the value of all the variance inflation factors was between 1.226 and 1.725, there were no concerns about collinearity of the predictors. Cognitive demands and Role clarity did not significantly predict Stress.

### 3.4. Sustainable employability

A regression analysis was performed with sustainable employability as dependent variable and Quality of leadership, Work-family conflict, Horizontal trust, Vertical trust, Organizational justice, Sense of community at work, and Possibilities for development,

Vigor, and Quality of work as predictors. The regression model explained 32% of the variance in sustainable employability,  $F(9, 554) = 31.01$ ,  $p < 0.001$ . There were five significant predictors in the model, Work-family conflict,  $\beta = -0.29$ ,  $p < 0.001$ , Vertical trust,  $\beta = 0.13$ ,  $p = 0.013$ , Vigor,  $\beta = 0.08$ ,  $p = 0.048$ , Possibilities for development  $\beta = 0.13$ ,  $p = 0.002$ , Quality of work,  $\beta = 0.13$ ,  $p = 0.001$ . Organizational justice was a marginally significant predictor,  $\beta = 0.09$ ,  $p = 0.057$ , whereas Quality of leadership, Horizontal trust and Sense of community at work did not significantly predict sustainable employability.

## 4. Discussion

Organizations have increasingly realized that they need to invest time and money in retaining valuable employees. Companies will try to increase sustainable employability by deploying initiatives from

various departments or services. This can lead to fragmentation and suboptimal results. There could be value in developing new practices that combine programs. In the current study, we explored the possibilities for a tandem approach by using the Dutch language version of the internationally widely used COPSOQ questionnaire [19]. By using COPSOQ, and adding sustainable employability, we investigated the relative contribution of both negative and positive work conditions to stress and sustainable employability. At the same time, we validated the Dutch COPSOQ version.

COPSOQ measures many important predictors of stress. This study indicates that COPSOQ also measures dimensions that promote the sustainable employability of employees. By building upon a risk-based tradition, COPSOQ can help stimulate positive developments in organizations as well. COPSOQ may contribute to an understanding of how risk factors and resources within organizations are intertwined.

The combination of risk management with the promotion of positive developments within organizations can result in an integrated approach and better cooperation between departments. Using a monitoring tool, such as COPSOQ, that combines negative and positive work factors, can facilitate this integrated approach.

We evaluated the psychometric properties of COPSOQ in a specialized chemical company with a wide range of functions, shift workers, administrative staff, financial and legal specialists. The CFAs confirmed the originally proposed structure of the factors, with one exception. The three dimensions that make up the domain Social capital might better be regarded as one dimension.

According to the rule of George and Mallery [31] reliabilities of most of the scales are good to excellent ( $\alpha$  ranging from 0.70 to 0.90), whereas four scales have acceptable values ( $\alpha > 0.65$ ). The reliability of Quality of work is questionable,  $\alpha = 0.53$ , but we have to note that this scale consists of only two items. Because the value of  $\alpha$  also depends on the number of items in a scale, this might have had an effect. In contrast, the Flemish validation study reported a higher  $\alpha$  of 0.92 for the same scale [32]. The Flemish study reported on healthcare workers. Further research is needed to investigate to what extent these items are context specific or whether we need to adapt the translated version of COPSOQ. Until then, users of COPSOQ may prefer to use only one of the two items.

Regression analyses revealed predictive indicators of stress and sustainable employability. Quantitative and emotional demands and work pace contributed to self-reported stress in this organization. However, cognitive demands did not contribute substantially to stress. Predictability and supervisor support acted as protective factors. In the regression analysis on data from all employees, the selected predictors explained only 16% of the variance in stress. Apparently, factors other than those we selected for these analyses contribute to stress as well. However, additional regression analyses within departments revealed that the proportion explained variance in stress within departments varied from 0.15 to 0.60. The specific factors that contribute to stress clearly differ between divisions in this company. Such department-specific information may be useful at follow-up meetings within the organization, in which opportunities for organizational change are explored.

Our aim was to investigate if data from an originally risk-based survey can be used for positive development in organizations as well. For that aim, we incorporated Sustainable employability within the questionnaire. Predictors of Sustainable employability were Vertical trust, Vigor, Possibilities for development, Quality of work and Organizational justice. Together with a negative predictor, Work-family conflict, they explained almost one third of the variance. These insights give organizations a key to improve sustainable employability. Different departments can reflect on these insights and share their experiences. Both low and high scores on these predictors should be seen learning opportunities. With a view to promoting a positive movement towards sustainable employability, departments with higher scores can serve as an example and explain how they achieve high scores.

Some researchers see a constraint in originally risk-based questionnaires, a 'negativity bias' and propose an index, dividing the number of negative constructs in a questionnaire by the number of positive constructs [1]. A focus on negativity would underestimate the positive value of work. However, as this study demonstrates, categorizing dimensions or constructs as positive or negative is quite arbitrary. Every single dimension in most of the surveys that measure psychosocial characteristics at work, including COPSOQ III, refers to a work characteristic that can be positive or negative for an employee. As Kristensen [26] noted, COPSOQ was specifically designed to include the majority of dimensions of seven influential psychosocial theories

[33]. Whether these factors have a positive or a negative effect depends, in the end, on the complex mutual interaction between individuals and their (work) environment.

Filling out the middle version of COPSOQ, that was used in this study, takes some 15 minutes. This might be too long in certain settings. Depending on the purpose of a survey, one might prefer to use the core version, that comprises fewer dimensions and often fewer items within a dimension. Gathering information about the psychosocial characteristics of an organization is meaningful. Results of such an assessment can be used for further analysis and discussion, and lead to further learning and improvements. Apart from these organizational advantages, several employees in this survey indicated that filling out the questionnaire had led them to reflect critically on their own working conditions and sustainable employability. The questionnaire can thus become an intervention in itself. Whether, and to what extent this leads to actual personal initiatives for change or further reflection on sustainable employability requires further investigation.

Our study has some limitations. We investigated both determinants of sustainable employability and stress in a case study to illustrate the advantage of paying attention to negative and positive working conditions simultaneously. This is just one example and another theoretical approach, another country, another company, or another era may raise interest in other aspects of work. An example of a recent development is the new work environment that emerges from the COVID-19 pandemic. Working more often from home may result in new challenges to maintain a balanced workstyle [34]. Another limitation of our study is that we used one specific instrument, the COPSOQ. The COPSOQ is very suitable for a combined approach, but other validated questionnaires might be equally fitting because they also contain the necessary range of psychosocial measures [35]. Finally, we focused on an approach of measuring psychosocial working conditions, which is usually only one element in a series of actions to promote creative, comfortable and safe work environments. Others have outlined that the effects of time and money invested in such procedures can be maximized by organizational critical elements such as identifying needs, risk assessment, involvement of staff, training of workers, and evaluation [36].

COPSOQ measures different aspects of organizational social capital, a social-cultural dimension of trust, justice and collaboration. Organizational social

capital serves a dual (health and business) interest [37], and is increasingly seen as an important factor in contemporary work. According to Kristensen, who initiated the development of COPSOQ, the interest in organizational social capital illustrates the transition from job factors to company factors. This may stimulate a further integration of the domains of work, health and organizational business [38].

COPSOQ has made a major contribution to the “development of a more global understanding of psychosocial factors” [26]. The development of this relatively new instrument has clearly contributed to new insights and perspectives in work and organizational psychology. This study shows that COPSOQ can stimulate the further integration of work and health approaches.

### Conflict of interest

None to report.

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