Impact of organizational changes and resulting job stress on somatization, biology and absenteeism

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Introduction

During the last decades, working conditions and work environment have dramatically changed in most industrialized societies (Paoli, 1997, 2001). Economic, structural and organizational changes have become more and more common, resulting in privatization, successive merging, downsizing, and even bankruptcies. Although the overall unemployment rate has remained relatively unchanged in the recent years in the European Region (International Labor Office, 2004), some economic sectors have particularly suffered from an increased unemployment rate. The structural and organizational changes have contributed to the phenomenon of 'casualisation of labor'. The present research project is situated against this context. It focuses on the augmented levels of stress that are caused by these changes, and that have a negative impact on mental and physical well-being and lead to medical consumption and absenteeism among others. More specifically, the project was focused on the four following goals: namely (1) to estimate the psychosocial health risks linked to objective and subjective working conditions in various companies in Belgium; (2) to create a preliminary data bank of the prevalence of somatization and/somatoform disorders in a population at work, relative to stressful working conditions; (3) to establish which particular psychosocial factors or dimensions are harmful for the individuals' mental health, taking into account interpersonal variability and various mediating variables; and (4) to study the "stress-health" issue in a dynamic and global perspective (in a prospective design).

The present project is based on a general psycho-socio-biological model that sees the individual in relation to a particular socio-professional context and within a dynamic perspective. Within this model, *stressors* (both objective and subjective stressful working conditions), *mediated* by individual personality characteristics, can lead to both somatic and psychological *strain* that determine in the long run health *outcomes* such as absenteeism and medical consumption, among others.

For the objective stressors, the focus was on organizational change. Based upon a screening of the economic sectorial "instability" (Godin et al., 2002), four companies were selected that differ gradually on this variable ranging from a very stable company (a hospital) to a very unstable company (from the telecommunication sector).

A very broad screening was done with respect to the subjective stressors: 24 subjective stress dimensions were investigated of which most stem from the "Job-Demand-Control-Support" (JCD-S) model, the "Effort-Reward-Imbalance and Overcommitment" (ERI-O) model, and the TRIPOD model. According to the JCD-S model (Karasek 1979, 1985), high level of job demands (time pressure, work pace, deadlines), combined with a low level of job control (influence over own work, possibilities for learning new things or decision latitude) and low levels of social support can be considered as stressfull working conditions. The ERI-O model (Siegrist 1990, 1997 and 1998) is complementary to the JCD-S model. In this model, chronic work-related stress is defined as non-reciprocity or imbalance between high efforts spent at work (extra hours, personal investment) and low rewards (esteem, promotion, respect, salary) received. Moreover, its effects are assumed to be strengthened by the work attitude of overcommitment or the inability to withdraw from work. While the two former models focus on the job characteristics, the TRIPOD model focuses on organizational characteristics. The TRIPOD model was developed for identifying organizational characteristics that lead to an increased vulnerability for accidents at the work place. Recently, this model has been applied to stress research and offers an interesting new approach to work stressors. Besides the dimensions included in these three comprehensive stress models, other specific work and non-work stressors have also been included, such as globalization threat, bullying, client-patient interaction, work-home interference and stressors outside work.

Two personality traits were included as moderating variables, namely neuroticism and alexithymia. In the literature it is assumed that the extent to which people develop psychosomatic complaints in response to stressful working conditions depends on their personality characteristics. Especially people high in neuroticism and alexithymia are assumed to be particularly vulnerable to psychosomatic complaints. Besides these personality traits, also health behavior was included as a moderator variable.

Both more somatic and more psychological strains were studied in the present research. The somatic strains were functional dyspepsia and irritable bowel syndrome, two functional gastrointestinal disorders, and somatization and somatoform disorder which focus on medically unexplained symptoms. The psychological strains were depression, anxiety and chronic fatigue.

The main health outcomes of the present study were self-rated health, medical consultation, medical consumption, absenteeism, and presenteeism (working while feeling ill).

Methods

Participants. In 2000 – 2001 (first measure), 9634 workers were contacted in the 4 firms. Among them, 3803 answered to the questionnaire (global participation rate 40%). For the second measure, 2709 workers answered the questionnaire (global participation rate 37%), of which 1986 workers also participated in the first measure. The two measures occurred in a one-year interval.

Instruments. A questionnaire was constructed containing instruments for measuring sociodemographic and socioprofessional variables, the subjective stressors, personality traits, psychosomatic strains, and health outcomes. The stressors were measured by the Job Content Questionnaire (JCQ; Karasek, 1985), the Leiden Quality of Work Questionnaire (LQWQ; van der Doef et al., 1999), the items from the Effort-Reward-Imbalance-model (Siegrist et al., 1998), and the General Failure Types questionnaire which operationalizes the TRIPOD model (Akerboom & Maes, 2003). Work-home interference was measured by the Kelloway questionnaire (1999). We used the bullying scale of Quine (1999), and the questionnaire of Klitzman for the stressors outside work (1999).

In order to better understand each enterprise features, interviews were conducted with key-informants at each measure, in each firm (90 interviews in total).

Neuroticism was operationalized by the neuroticism scale of the NEO-Five Factor Inventory (NEO-FFI; Costa et al., 1992) and alexithymia by the 'difficulty identifying feelings' scale of the Toronto Alexithymia Scale (TAS-20; Bagby et al., 1993). Health behavior is measured using items questioning tobacco consumption, alcohol use and dependence, and physical activity. An adapted version of Amirkhan for coping (1990) was used.

Functional dyspepsia and irritable bowel syndrome where diagnosed on the basis of 9 and 10 questions respectively which were specifically constructed for this research on the basis of the diagnostic criteria of the Rome II working groups (Drossman et al., 2000). Somatization was operationalized by the somatization subscale of the Symptom Checklist 90-R (SCL-90-R; adapted from Derogatis, 1997). Somatoform disorder was diagnosed by the Specialist Patient Health Questionnaire (SPEC-PHQ; Spitzer, Kroenke, & Williams, 1999). Anxiety and depression are measured by use of the anxiety and depression subscales of the SCL-90-R (Arrindell et al., 1986, adapted from Derogatis, 1997). Chronic Fatigue is measured by the Verkorte VermoeidheidsVragenlijst (VVV; Vercoulen et al., 1999).

For the health outcomes, the subjective experienced health or self-rated health (SRH) of the employee, as well as his or her weight and height – in order to calculate the Body Mass Index (BMI) – are questioned. Two items asked for medical consultation, and four items asked for medical drug consumption. Self-perceived impairment was investigated by means of two items of the Social Functioning scale (Social Functioning-36; Ware et al., 1992). For absenteeism, both the total number of days as well as the number of times an employee was absent during the last 12 months were asked for. Presenteeism was measured by the scale of Saksvik (1996).

Results

A four-year project brings about a vast amount of specific research questions and findings. Here we will focus on the most important findings in the light of the four major goals of the present research.

The first broad goal was 'to estimate the psychosocial health risks linked to objective and subjective working conditions in various companies in Belgium". The key focus for this goal was to investigate to which extent organizational changes have a direct or an indirect negative impact on the psychosomatic well-being of workers. Results from interviews conducted with key informants confirmed the selection of the enterprises that was based upon our index of instability (Godin et al., 2002). Organizational change, operationalized by selecting four companies that differed considerably from one another with respect to the instability of their economic environment, did have an effect on stressful working conditions, which in their turn had a negative impact on poor self-rated health and absenteeism (3 sick leaves or more, more than 1 week absence, 1 or more long spells (longer than 2 weeks) (Godin et al., 2004; Siegrist et al. 2004).

The effects, however, were stronger on the work stressors than on the strains. After controlling for sex, age, language, and socioprofessional class, workers in more stable companies reported less lack of control (from the JCD-S model, bèta value of -.14 for the most stable firm) and less lack of rewards (from the ERI-O model, a bèta value of -.20 for the most stable firm) than workers in less table companies. The strongest effect, however, was on the threat experienced by globalization. The more unstable the firm, the more globalization threat is experienced (with standardized regression weights up to -.59 when contrasting the least with the most stable firm). After controlling for sex, age, language, and socioprofessional class, there were no differences between the four firms in functional dyspepsia and irritable bowel syndrome. Depression, anxiety, somatization and fatigue did differ significantly, but the effects were small (standardized regression coefficients ranging from -.04 to -.08 when contrasting the least with the most stable firm). For the health outcomes, only absenteeism (coded

as one week or more absence the last 12 months) differentiated in the expected direction between the firms: at time 1 the percentage increased from 20.6%, over 24.6% and 29.0% to 39.6% from the most to the least stable firm. At time 2, the percentage increased from 22.5%, over 26.8% and 30.3% to 44.0%.
A possible explanation for the moderate direct effects of organizational change (as operationalized by the selection of the four firms) is that although the workers of the most stable firm scored lower on the stressors lack of control, lack of rewards, and especially on globalization threat (as had to be expected on the basis of the selection criteria of these firms), they also scored higher on the stressors demands and efforts. Thus, the workload was heavier in the more stable than in the less stable firms, probably due to their type of work. This might have reduced the overall effect of organizational change.
A further important issue of our results was to point out the gender discrepancies regarding negative work characteristics (like having to work in an uncomfortable position, being subject to patient/client aggressiveness, and reporting a negative impact of work on one's health). Additionally, women have undoubtfully more difficulties to combine harmoniously and satisfyingly their private and professional lives (Kittel et al., 2003, Personal Communication) . This certainly asks for the consideration of a reduction of those inequalities.

The second goal was to create a preliminary data bank of the prevalence of somatization and/somatoform disorders in a population at work, relative to stressful working conditions. Based on the diagnostic criteria which are used in the international literature (for FD, IBS, and somatoform disorder) or based on the criteria used in previous large scale community research in the Belgian population (for SCL somatization, depression, and anxiety), we found the following prevalences on the first moment of measurement: 5.8% for functional dyspepsia, 17.6% for irritable bowel syndrome, 2.9% for somatoform disorder, 2.61% for somatization (SCL), 3.6% for depression (SCL), and 3.0% for anxiety (SCL). Except for irritable bowel syndrome, the prevalences are lower in the present working samples than in the general population. One possible explanation is the so-called 'healthy worker effect' whereby paid work forms a protective factor for psychosomatic complaints, even if one works under the pressure of organizational change. Another possible explanation is that people that are vulnerable to or suffer from psychosomatic conditions are more easily dismissed than others, which makes these conditions as a consequence less prevalent among a working population. Still another explanation could be that respondents were reluctant to report all their psychosomatic symptoms. Since the current study was a longitudinal research, there was no anonymity. Although confidentiality was and is guaranteed, some workers were anxious that their company would learn about their answers.

The third goal was to establish which particular psychosocial factors or dimensions are harmful for the individuals' mental health, taking into account interpersonal variability and various mediating variables. Four stress models, namely the Job-Demand-Control-Support model, its extension as operationalized by the Leiden Quality of Work Questionnaire, the Effort-Reward Imbalance model, and the TRIPOD model, were compared with respect to their predictive power for functional dyspepsia, irritable bowel syndrome, depression, somatization, anxiety, and fatigue (see Table 1) (see also Fontaine et al., 2003). The conclusions of these comparisons are unequivocal: each stress model has a unique contribution to the prediction of psychosomatic well-being at the workplace. Moreover, jointly these four stress models account for up to 30% of psychosomatic well-being, and thus we can conclude to a substantial impact of the work stressors. Together with the fact that each of the stress models has a unique contribution, the present results form a strong case for the interpretation that it is the accumulation of a range of work stressors that produce serious effects on psychosomatic well-being.
Still another perspective was to look at other possible determinants of health problems. Bullying, for example, is a rather recently tackled question at the workplace. Bullying showed, after having performed logistic regressions on cross-sectional data, to be associated with most of the health indicators such as depression, anxiety, somatization, psychotropic drug consumption and absenteeism (Godin , 2004).

Table 1.
Percentage of variance accounted for the psychosomatic well-being by JCDS, ERI, LQWQ, TRIPOD, and all stress models jointly at time 1 and time 2

	JCDS		ERI		LQWQ		TRIPOD		ALL	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
Depression	12.1	14.3	16.2	18.2	14.7	23.6	9.9	26.4	21.5	29.5
Somatization	9.9	12.7	12.5	13.8	15.2	21.5	9.6	22.8	21.7	27.4
Anxiety	10.2	11.5	12.2	13.8	12.8	21.2	7.2	24.0	17.0	26.3
Fatigue	10.1	12.2	12.9	13.0	12.8	16.5	9.1	20.4	20.5	23.8
FD	4.3	5.4	5.3	5.8	6.9	11.9	6.1	15.1	13.1	22.8
IBS	4.6	4.9	4.5	4.4	6.6	9.6	4.7	11.9	11.3	21.4

The fourth and last goal was to study the "stress-health" issue in a dynamic and global perspective (in a prospective design). The longitudinal design with two moments of measurement allowed us to justify the genuine impact of work stressors on psychosomatic well-being. In a longitudinal design the interpretation of observed relationships in terms of causal mechanisms is far less liable to alternative interpretations than in a cross-sectional design. In the present study, changes in work stressors across the two moments of measurement have been related to changes in psychosomatic well-being in using different analyses strategies. Each time, substantial relationships could be identified between changes in work stressors and changes in psychosomatic well-being. In one analysis, for instance, the respondents that collaborated at both measurement moments where divided into four groups, namely (1) the group with no effort-reward imbalance at time 1 and time 1 (no-no group), (2) the group with effort reward imbalance at time 1 but not at time 2 (yes-no group), (3) the group with no effort-reward imbalance at time 1 but with imbalance at time 2 (no-yes group), and (4) the group with effort-reward imbalance at both time 1 and time 2 (yes-yes group). It was investigated how these four groups differed from one another with respect to depression, anxiety, somatization, psychotropic drug use, self-rated health, and chronic fatigue. In this analysis the strains and outcome measures were dichotomized at the upper quartile of each score distribution. For each of these strains and outcome measures a significant and systematic effect can be observed of the evolution of work stressors (see Figure 1 and 2). The prevalence is lowest in the no-no group and highest in the yes-yes group. Moreover, the prevalence is nearly as high in the no-yes group than in the yes-yes group for all measures. For the yes-no group, the prevalences are still somewhat higher than for the no-no group, but still lower than for the two other groups. These analyses clearly indicate that an increase in work stressors during the last 12 months leads to an increase of strains, while a decrease in work stressors leads to a substantial decrease in strains.

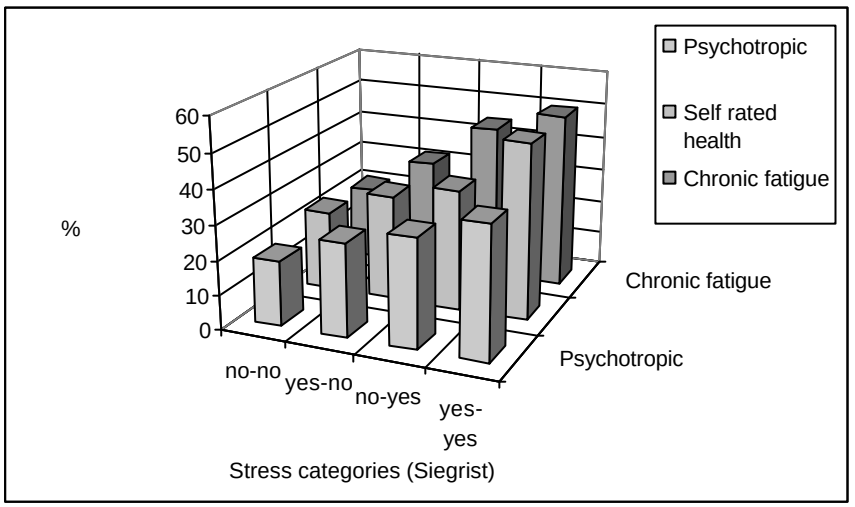

Figure 1. *Stress evolution (Siegrist model) and impact on health (at T2)*

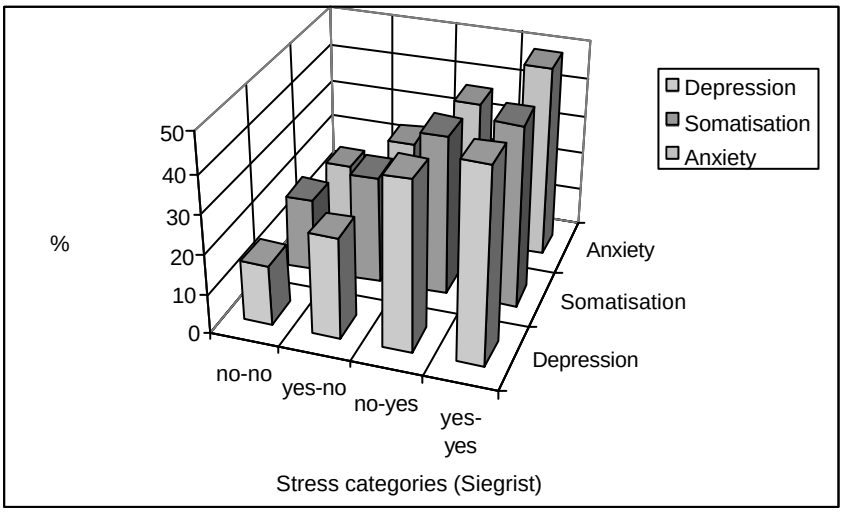

Figure 2. *Stress evolution (Siegrist model) and impact on mental health (at T2)*

Another unexpected finding of the analysis of the longitudinal data, was that the neuroticism and the alexithymia measures demonstrated substantial state effects. As the strain variables, they were sensitive in increases and decreases of work stressors. Because of this state sensitiveness, these measures are unsuited to investigate the moderating role of personality traits on strains and stressor outcomes. These findings have important consequences for the practice of controlling stress-strain relationships for negative affectivity, which is common in stress research. Based on the present findings we can conclude that the impact of work stressors is underestimated in this way.

Conclusions

It can be concluded from the present study that work instability has an impact on work stressors and health outcomes. Moreover, because of its longitudinal design, it has been demonstrated unequivocally that work stressors lead to a broad range of psychosomatic conditions ranging from functional dyspepsia and irritable bowel syndrome, over somatization and somatoform disorder, to depression and anxiety. These psychosomatic conditions are related themselves to medical consultation, drug consumption, negative self-rated health, and absenteeism. All these outcomes are negative for the individual en the firm and the society at large, and therefore call for accompanying measures for organizations that have to go through a reorganization, and for the individual workers within those organizations.

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