

Globalization, Transformation Pressure, and Psychosocial Work Environment - the Implications of Management on Mental Health

PhD dissertation

Simon Grandjean Bamberger

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Aarhus University
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Preface

Acknowledgements

When I began the work on the GOPA project in the summer of 2009, I had no idea of the journey ahead of me. Much like *Homer's* hero Odysseus, the journey set before me was long and eventful (though I encountered statistically significant fewer Minotaurs), and would leave me a changed man. Luckily, I did not have to traverse the waters of research alone. Aboard my science vessel were many great women and men, and I would like to express my gratitude to the crew:

- To my head supervisor, *Øyvind Omland*, for giving me moral support and making sure that I kept the eye on the ball at all times. Thank you for teaching me to make sure my points were as obvious as if "pissed in snow!"
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- But most of all to my daughter Sofie and my love Jeanette, who both made sure I returned home every night, no matter how far my travels in research had taken me during the day. To you, I dedicate this thesis.

Simon Grandjean Bamberger
Aalborg, March 2013

Background

A rainy day in the early 2000s, Anker Lund Vinding came up with the idea of pairing data from a study on the Danish Innovation System with data on sick leave and to use of psychotropics. He met with psychologist Anelia Larsen, and together they formulated the groundwork for this research project. Unfortunately, their first application for funding was turned down with advice to contact the Department of Occupational Medicine for assistance on the issue of occupational epidemiology. Øyvind Omland showed an interest in the project, and the project was funded under a special fund for research into the effects of Globalization. At that time, Anker's research colleagues sociologist Peter Nielsen and business economist René Nesgaard Nielsen, who had both previously worked on the innovation study, had joined the project group. The group had also been joined by psychologist Pia Ryom and medical doctor Kirsten Fonager, which furthered the occupational health and epidemiology expertise. When funding from the Danish Research Fund for the Working Environment was secured, a PhD scholarship was created, and on 18 June 2009 the project group accepted my application for the position. The present thesis is the result of our work.

Structure of the thesis

The thesis presents three papers which each concerns associations between exposures at work and outcomes at the individual level. The following paragraphs give a short overview of the thesis.

After the preface, the thesis begins with an introduction of the overarching themes. The underlying theoretical model of the project is outlined. This is followed by an extensive introduction into our understanding of the central concepts of thesis: globalization, management, psychosocial work environment, sense of coherence (resilience) and psychological distress. The theoretical introduction finishes with an outline of the thesis' aims.

The next section presents the materials and methods of the study including the study design, data collection, definition of variables and statistical analysis of the three papers.

The results section presents baseline characteristics of the participating companies and employees, the main results of each paper, and supplementary analyses for Paper 1 and Paper 3.

The discussion section presents a separate discussion for each paper and provides an overall discussion of the results and methods of the thesis.

Conclusion and perspectives are the last main sections of the thesis. They are followed by thesis summaries in Danish and in English. Finally, the three papers are presented in the Appendix.

List of original papers

The thesis is based on the following three original papers, which will be referred to in the text by their numerals.

1. Bamberger S G, Larsen A, Vinding A L, Nielsen P, Fonager, K, Nielsen R N, Gorst-Rasmussen A, Ryom P & Omland Ø: *Management of Globalization, and the Derived Effects on Job Insecurity: a Multilevel Study*
Submitted for publication in the International Journal of Human Research Management
2. Bamberger S G, Larsen A, Vinding A L, Nielsen P, Fonager, K, Nielsen R N, Gorst-Rasmussen A, Ryom P & Omland Ø: *Sense of Coherence and Effects of Globalization on Distress: a Multilevel Study*
Submitted for publication in the Journal of Occupational Health Psychology
3. Bamberger S G, Larsen A, Vinding A L, Nielsen P, Fonager, K, Nielsen R N, Gorst-Rasmussen A, Ryom P & Omland Ø: *Ratings of Work Intensification Assessed by Companies and Psychologically Distressed and Non-distressed Employees: A Multilevel Comparison.*
Submitted for publication in the Scandinavian Journal of Work, Environment & Health

These papers are enclosed as appendices

Abbreviations

CAGE	A questionnaire on alcohol abuse (Cutting down, Annoyance by criticism, Guilty feelings, Eye openers)
CI	Confidence Interval
COPSOQ	Copenhagen Psychosocial Questionnaire
DISKO	Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks
ERI	Effort Reward Imbalance
GEE	Generalized Estimating Equations
GFC	Global Financial Crisis
GHQ	General Health Questionnaire
GOPA	Globalization, Transformation Pressure and Psychosocial Work Environment (Globalisering, Omstillingspres og Psykisk Arbejds miljø).
GSI	Global Severity Index
MEADOW	MEAsuring the Dynamics in Organisations and Work
OECD	Organisation for Economic Co-operation and Development
PR	Prevalence Ratio
PRISME	Psychosocial risk factors in long-term stress, burnout and depression when working professionally with people (Psykosociale risikofaktorer for langvarig stress, udbændthed og depression ved det professionelle arbejde med mennesker)
SOC	Sense of Coherence
SCL-90R	Symptoms Checklist 90 Revised

Introduction

“As the global economy unfolds, it is said, companies have less and less time to rest on their laurels before competition forces them to find ways of innovating new products, cutting costs, or both. The pressure on firms is then transferred to their workforces. Workers become more insecure.” (1) p.2

The above quote by Green sums up the subject of this thesis (1). When reviewing the occupational health psychology literature of the past few decades, globalization is often cited as an underlying cause of increasingly stressful working conditions. However, very few studies have examined how the external organizational environment precisely affects employees (2-5). Research in occupational health psychology has so far instead sought to deepen our understanding of the dynamics within organizations, based usually on self-reported data (6-11). These traditional studies generally target the immediate psychosocial environment; the collaboration between management and employees, or employees in between (12-14). Priority has been given to the study of the dynamics *within* the company, and the *external* organizational context has therefore largely been ignored as a research subject in occupational health psychology (15).

Conversely, company management of the company’s external context has been the source of much interest in traditional management literature, which, in turn, revealed that internal company dynamics are to a large degree dictated by developments in the external environment (16-18). Companies react differently to globalization, technological change and increased competitive pressures. Many companies develop and adapt their strategy, organization, production and use of staff to obtain the greatest possible preparedness and response capacity to operate competitively under new external conditions (19, 20). Some companies choose to handle the transformation pressure of globalization through organizational changes and the development of new products or services. Others tighten innovation capabilities and develop new forms of organization to increase their adaptability and competitiveness. Similarly, some companies develop the functional flexibility and competence of personnel groups, among others through greater employee involvement. Common to all these management initiatives is that they affect and change the stability of employees’ normal work routines.

The imminence, duration and temporal uncertainty surrounding events of change can have a negative impact on employees (21). Indeed, the increased uncertainty regarding job future or the direction of organizational change has been suggested to be a principal cause of stress (22, 23). Others propose that organizational change acts as a stressor through the individual’s negative appraisal of the changes (24).

Organizational change comes with a large number of well-documented risks such as intensification of job strain, time pressure, reduction of social support, lack of control, and role ambiguity. These risks have all been associated with mental health problems (25-27). Two systematic reviews of the relation between psychosocial factors at work and depression found evidence of such a relation between perceived psychosocial job strains and an elevated risk of depressive symptoms or a major depressive episode (28, 29). Job insecurity has also been consistently linked with detrimental mental health effects in both meta-analyses and reviews (30, 31). Another potential factor affected by organizational change: job dissatisfaction, has shown strong associations with depression and anxiety according to a meta-analysis (32). The tangible nature of organizational change makes it an easier target for investigation of the effect of work stressors than for example a change in the meaningfulness of work. Empirically, it is possible to determine whether or not a change has happened and whether or not the employees are feeling worse (or better) hereafter.

The effects of organizational change may be viewed as derived or indirect effects of globalization and the company's external context, but globalization is likely to have a direct effect as well. Fierce competition has been found to increase job demands and, in turn, increase employee exhaustion and cynicism (3). Growing world market competition has also been associated with job strain and feelings of depressed mood (4). Furthermore, macroeconomic changes like recessions have been shown to affect individuals' stress levels because they often give rise to changes in routine job structures (33). Houdmont (2) found adverse changes in the work-related prevalence of stress and stress-related sickness absence in the wake of the global financial crisis (GFC). In a study of Chinese finance workers, Tsai (5) found aggravated work stress and burnout after the GFC compared with the time before the GFC. We may thus assume that the external context has both a direct and an indirect effect on employees.

Antonovsky's concept of salutogenesis, or sense of coherence (SOC) (34), has been proposed as a moderator of the association between work environment and psychological distress (35). SOC focuses on the positive variables in relation to what maintains and promotes individual health and wellbeing (36). A strong SOC has previously been found to be a protective factor for mental health when employees were exposed to negative workplace events (24). However, no studies have examined if a strong SOC protects against the potential distressful effect of the macroeconomic context.

Studies on the effects of occupational exposure on mental health are usually biased by common method variance, i.e. the fact that both exposure and outcome are self-reported by employees (11, 28). This induces a risk of circular reasoning where the distressed employees are rating their working environment as stressful. This could lead to overestimation of the effects of occupational exposure (6-11). Conversely, it has

been argued that some employees are particularly resilient or never complain, even under harsh circumstances which, in turn, can lead to an underestimation of the effects of occupational exposure (10). By utilizing a multilevel study design, this type of bias can be prevented, as exposure and outcome are assessed separately (37).

This is the rationale behind *the GOPA project*; psychological distress may arise because of the growing awareness of the transformation pressure of globalization, the increasing number of organizational changes and the introduction of new types of work organization designed in response to these changes. More specifically, the present thesis examines how companies' perception/management of transformation pressure is associated with aspects of their employees' psychosocial work environment and mental health.

The present study

This PhD thesis presents the results of a study of associations between the external context (globalization), the organizational context (management), the work context (psychosocial work environment) and the individual context (mental health). The study is based on a large number of Danish companies in the private urban sector and their employees. The study population spans multiple industry types and company sizes. It is founded on data on company-perceived external conditions and management hereof, employees' perception of the psychosocial work environment and self-rated mental health, and registry data. The multilevel aspect of these data allows us to address some of the methodological problems usually encountered in studies using cross-sectional data, i.e. in most previous studies on occupational exposure and mental health outcomes. In addition, the availability of socio-demographic registry data allows us to perform relevant confounder analyses. This thesis:

- Explores the importance of the company's external conditions on the psychosocial work environment. This area is currently understudied and subject to conjecture on potential effect.
- Examines contemporary effects at the level of companies and the level of individuals of the GFC, one of (if not) the most influential socio-economic events in recent times.
- Compares company ratings of exposure with employees' ratings of exposure to examine the level of discrepancy and concordance.
- Offers a global perspective on the individual resilience of employees thereby providing valuable information for the planning of future interventions.

Outline of the study

A multi-disciplinary, explorative, multilevel study on globalization, management, psychosocial work environment and mental health is bound to examine associations at the macro level. This invariably encompasses utilizing a macro-theoretical framework that goes beyond the traditional critical theoretical presentations, presenting instead the connections between the different research domains. In this regard, it is equally important to explain what this thesis can and cannot offer.

First, and foremost this thesis presents results from the GOPA project. The GOPA project is the result of a multi-disciplinary research collaboration which encompasses both major and minor research agendas. The present thesis therefore draws on a vast collection of data far exceeding that of a single PhD study. This also implies that some of the data collected and described in the background and methods sections of the study will not be analyzed in this thesis, as it was collected to meet other research agendas. In the Appendix we elaborate on the future studies within the GOPA project.

A broad introduction to the history of globalization and the processes that fuel it is included to set the scope of the study, as there is no current uniform measure or understanding of the topic. It is beyond the scope of this thesis to present all the relevant management literature addressing efforts at alleviating the pressures of globalization; but for an extensive introduction into the relevant theories, the MEADOW guidelines are highly recommended. However, an introduction into dynamic capability management; i.e. the companies' adaptive response mechanisms, is relevant to understand the pathway from external context, to organizational context and further to the work context.

Part of the epidemiological foundation of this project lies in the idea that the work organization and changes herein have a potential impact on the employees' psychological health. Organizational changes represent a derived exposure of globalization, or an indirect effect of globalization as presented in the introduction. A literature review of this association has been undertaken in conjunction with the GOPA project, and it is recommended for more information into the existing knowledge in this area (38).

The psychosocial work environment encompasses everything from the employee's job satisfaction to role clarity and social support. For a broader introduction into the measurement and understanding of the psychosocial work environment, the Research Companion to Organizational Health Psychology is recommended (39). The focus of the present thesis is limited to two aspects of the psychosocial work: job

insecurity and work intensification (i.e. changes in work), which are believed to be the aspects most affected by the external context of globalization and the derived effects hereof (15, 40).

The individual, psychological level is also explored in two respects only: the employees' resilience and the employees' mental health of the employees. Both aspects can be measured in various ways, but in this thesis, SOC is the chosen measurement of resilience, and psychological distress is the mental health outcome. The subtitle of the project "implication of management on mental health" refers to management in a dualistic sense, meaning both company management *and* self-management in the form of individual resilience (SOC). Psychological distress is a general measure of mental health, signifying strain, but not necessarily illness. The concept of psychological distress was chosen to circumvent the morass of the stress-terminology, where (work) stress is often used synonymously with exposure, process and outcome (41).

Background

Theoretical model

The theoretical framework of this project draws on the division of organization of work published in the NIOSH report (15). As depicted in Figure 1, the NIOSH model has three contextual dimensions: the external context, the organizational context and the work context. These three levels collectively constitute the occupational framework for the individual employee. The NIOSH model serves as a feasible structure model. However, to fully incorporate it into this project's theoretical framework, the individual context, *the outcome*, has to be added. The addition of the "individual context" to the model allows us to span the full spectrum from extra-organizational exposures to intra-organizational management responses and how such responses affect the work environment and the employees' mental health

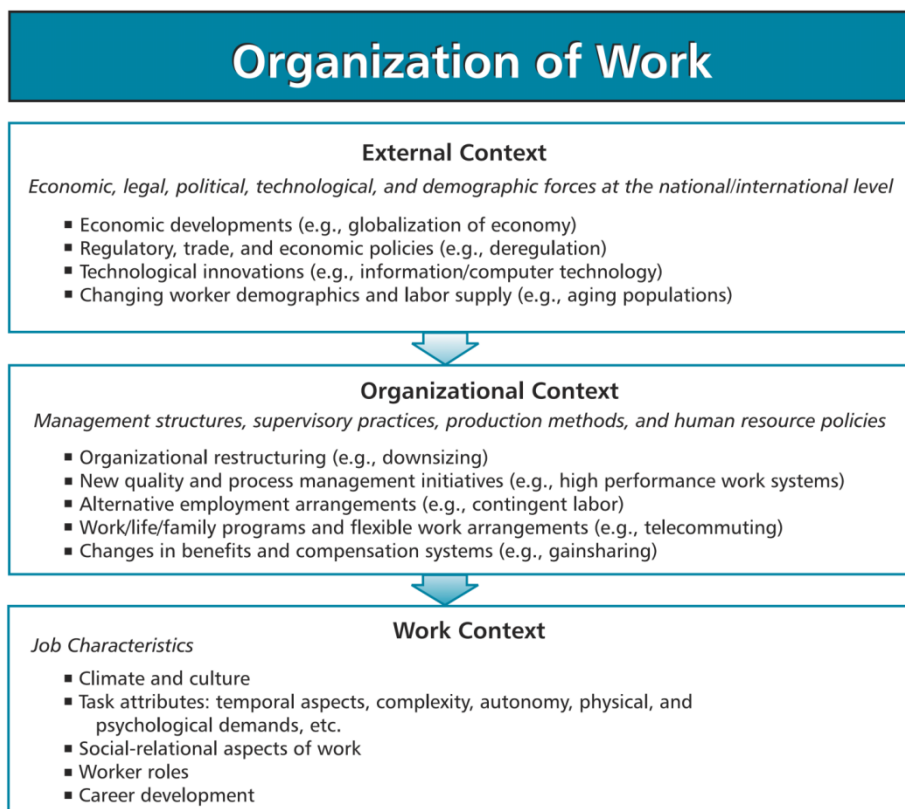


Figure 1. National Institute of Safety and Health (15) : presentation of Organization of Work. (May freely be copied or reprinted)

Our elaboration on the NIOSH model is presented in Figure 2. The external context is represented by globalization; the two main components are competition and market conditions in this case represented by the impact of the GFC (liberalization and technology are the two other components). The organizational context is the companies' management of the external context by way of dynamic capability management. The work context represents the employees' immediate psychosocial work environment; in this thesis with

a focus of job insecurity and work intensification. Last is the above-explained individual context representing both the employees' resilience and their general level of psychological distress.

In the following sections, the theoretical foundation of each of the topics in the model will be presented.

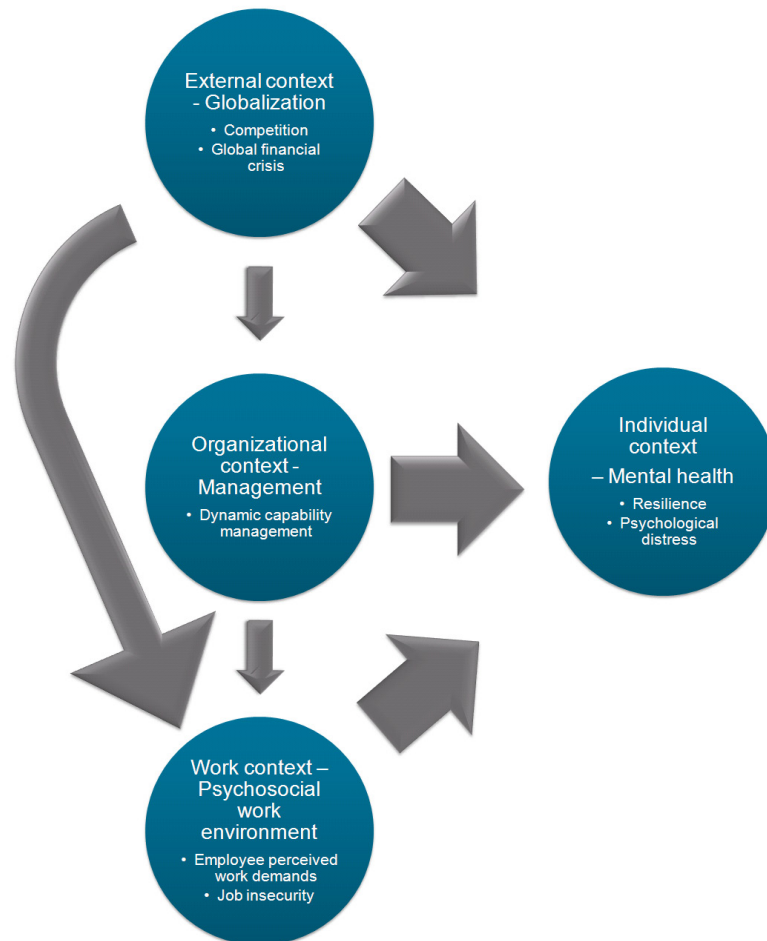


Figure 2 The GOPA project model; presentation of concepts and data

External context - globalization

Globalization has been cited as an emerging risk factor for the psychosocial work environment and a potential stressor, though little research has actually tested this (15). Globalization has received growing attention due to its impact on the pace of change in society. But what is globalization? Originally coined by Levitt in 1983 (42), the term is used in various contexts and has become a buzzword with multiple meanings and interpretations (43). Globalization spans economic, political, technological and cultural aspects (44). Spiegel (45) defines globalization as an exponential increase in global connectivity within economic, technologic and cultural domains, alongside similar expansions of trade, finance and production, in addition

to a dense web of international treaties and institutions. Due to the dynamics of globalization, it is difficult to entangle causes and effects, for instance the Internet being both a cause and a consequence of globalization (46).

Globalization as *economic development* can be viewed at two different levels: an overarching societal development level and an immediate business-to-business level. The expansion of globalization at societal level depends for a large part on furthering the integration and connectivity of national economies into a single world market. The past two decades have seen a rise in the trade in goods share (import and exports) of the gross domestic product of the EU15 by more than 15% (the pre-1994 15 EU countries) (47). Comparable figures from emerging economies like China and India show a growth in the value of trade in goods exceeding 50%. Thus, while growth is evident in developed countries, fierce competition from the emerging and developing countries places enormous pressure on both companies and governments of developed countries.

“... globalisation can provide better opportunities for producers, consumers, labour force and entrepreneurs, etc., who are in a position to exploit larger markets and competition. Under these conditions, living standards would be improved by lower prices and a wider choice of goods. A general increase in economic activity enhances labour demand and real wages for skilled labour. The diffusion of innovation and know-how would also increase productivity and favour enterprises and companies. However, if economic agents are not dynamic enough, negative impacts would be observed forcing a number of painful structural adjustments. Living standards would be lowered by the reduction of economic activities now free to delocalise to where conditions are more favourable. Rising import competition will further threaten local enterprises. Decline in economic activity generates job losses, a reduction of real wages for unskilled jobs and/or overall reduction of social welfare.” P. 10 (46).

At the immediate level, the economic development can best be described as the competition experienced by the individual companies. Hitt (48) describes the current development as a state of *hypercompetition* (rapidly escalating competition and strategic manoeuvring) with extreme emphasis on price, quality and innovation. Furthermore, the development in the global market is no longer reserved solely for large multinational enterprises. Advances in technology have allowed small business to transcend the domestic market, making local business global. Businesses in different parts of the world are competing with every other business in the same industry sector and often in related industries as well (49).

Globalization gives companies access to other countries' markets, but at the same time allows other companies access to the company's own local market too (46). International and national organizations, big and small alike, are all directly or indirectly affected by changes in the market conjuncture (50). This

growing economic interconnectedness across borders makes the local economy vulnerable to international incidents, like when the dotcom-bubble burst in 2000 which sent shockwaves through the stock markets across the globe. When the housing bubble burst in the United States in 2007, the economic downturn spread worldwide at an extremely fast pace resulting in a GFC (51). A rapid cooling of international activity followed, which exacerbated the pressure on the economy. Growth in virtually all countries decelerated, which made governments inject public capital into ailing industries to counteract threatening private sector insolvency, notably in the financial industry (52). The GFC also affected Denmark severely. Production fell; unemployment increased and wages, in turn, fell as well (53). According to the annual report from the World Economic Forum, Denmark was the third most competitive country in 2008/2009; however, by 2012/2013 Denmark was down to the 12th place (54). Decreasing competitiveness may indicate that more Danish companies are having difficulty selling their products or services compared with other companies and countries which, in turn, makes them more vulnerable (55).

With the recession follows downsizing and a change in *worker demographics and labour supply* is thus inevitable. A leaner labour market means that candidates are being educated for unemployment. At the same time, some industries need (and prioritize) other types of workers than they did 20 years ago. For developed countries like Denmark, a decline is seen in traditional, manual labour job types, which have been replaced by technology or have been outsourced to developing countries (46).

Technological innovation has in various ways been the pivotal catalyst for the rapid development of globalization. Technological innovation transcends previous boundaries of information, communication and transport. In his fundamental article on globalization, Levitt describes that there are three key proponents in technological success: quality, price and innovation (42). The technological revolution influences the companies at the external level, as previously described, but also at a more immediate, internal level because it brings organizational changes in what we may describe as a process of co-evolution: The changes in technology create changes in the organization, but at the same time, the organization evolves, requiring new technology to support this change. At the immediate, internal level changes are seen in the form of changes in equipment and production/services processes, automation, robots, information technologies, and computer-aided design and manufacturing (17).

The industrialized countries have undergone structural change from manufacturing towards the service industries during the past two decades. Moreover, technological innovation has allowed many low-level intellectual functions to be replaced by machines, and innovation in communication and transport has enabled rapid transfer of work to newly industrialized countries. Many workers who were formerly under the impression that their position in the organization was safe are now experiencing that had their position

is uncertain. Friedman proposes that globalization is defined by fear of rapid change “– a sense that your job, community or workplace can be changed at any moment by anonymous economic and technological forces that are anything but stable” P. 12 (56).

Organizational context – dynamic capability management

An external perspective on the conditions and challenges of competition, technology, liberalization and general market conditions cannot alone explain the effects of globalization on psychosocial work environment. This external perspective should be complemented with a more internal, resource-based perspective, which assumes that companies have the opportunity to actively adapt their internal requirements and resources, so that they can manage and exploit the changes in external conditions and competitive challenges (19, 20, 57).

Successful management of transformation pressure is crucial to any organization in order to survive and succeed in the present highly competitive and continuously evolving business environment. It is up to the company management to set a strategy and prioritize the company’s resources. Augier and Teece (58) propose that dynamic capability management is a key to survival (and success) in a globalized economy characterized by rapid change:

“Dynamic capabilities relate to the enterprise’s ability to sense, seize, and adapt, in order to generate and exploit internal and external enterprise specific competences and to address the enterprise’s changing environment” (58)

The paradox for many of the companies responding to the competitive or financial pressures of globalization and the current downturn may be that they are reorganizing structures, cultures, and processes to develop flexibility and innovation at a time when employees may feel insecure and less able to engage in change (59). The companies are dependent on the commitment, motivation and skills of their employees to innovate and survive. However, employees’ commitment and motivation are likely to decrease when they are experiencing insecurity, which will simultaneously halt any progress towards more organizational effectiveness (60) .

The following sections offer a theoretical exploration of two domains of dynamic capability management viz. the learning organization and organizational flexibility. A more detailed theoretical presentation of these subthemes is found in Paper 1.

Learning organization

The rapid introduction and diffusion of technology increases the speed which skills become obsolete, and it creates a continuous need for acquiring new knowledge, skills and competencies (17, 61) . According to

Nielsen (62), the importance of change lies not in the more intensive use of knowledge in the economy, but rather in the fact that knowledge becomes obsolete sooner than before. It is a competitive imperative that companies possess valuable skills to which other companies have no direct access; especially skills and competences competitors cannot easily copy. This can be achieved by strengthening the ability to continuously create, acquire and use knowledge (16). Companies can build and continually renew their unique skills in three ways: through internal or external staff training, networking with other organizations, or recruitment of new talent. Increased employee flexibility and competence development are necessary for the companies' ability to adapt; however, these demands increase the work demands of the employees (17).

Flexibility

To remain competitive, companies must develop flexible organizations and they must absorb new technology. Employees are increasingly confronted with frequent minor daily stressors related to changes in technology and workplace practices, and with the major upheavals brought about by mergers, downsizing and restructuring (63, 64). Fewer people at work are doing more and feeling less secure in their jobs because of radical organizational change (65). Flexibility promises more secure jobs through increased competitiveness, but it is also a highly effective cost-saving strategy. The closer adaptation of working hours to workload means that fewer employees are needed to provide the same services. The company's demand for flexibility is thereby translated into employee job insecurity (59).

Work context - Psychosocial Work Environment

Associations between psychosocial work conditions and mental health outcomes have been studied extensively both for singular topics like job satisfaction (32) and effort-reward imbalance, and in general (28, 29, 37). There are seven major theories on psychosocial factors at work: ¹the job characteristics model (66), ²the Michigan stress model (67), ³the job demand-control model(68), ⁴the sociotechnical approach(69), ⁵the action-theoretical approach(70), ⁶the effort-reward imbalance model(71), and ⁷the vitamin model (72). No single theory or model covers all important aspects of the psychosocial work environment, but the seven theories show considerable overlap between dimensions (12, 73). Some of the overlapping dimensions are: job demands (six out of seven theories), autonomy (six out of seven theories), social support (four to seven theories), and job insecurity (three out of seven theories) (12, 73) . However, in relation to derived effects of globalization, two particular aspects are frequently brought up: job insecurity and work intensification (increased job demands (74)) (15, 40). Burchell suggests that the two are actually linked phenomena; employees insecure in their position may be less inclined to oppose work intensification because of the risk of being fired (40).

Job insecurity

Job insecurity is conceived as an overall concern about the continued existence of the job in the future (75, 76). At the core of job insecurity lies the perceived threat of losing one's job or aspects of one's job combined with a sense of powerlessness or inability to do anything about it (77). As proposed by Lazarus (78), the anticipation of a stressful event represents an equally important, and in some situations greater, source of anxiety than the actual event itself. This has been confirmed in multiple studies which have consistently found associations between job insecurity and an increase in health problems due to stress and depression, for example (30, 31, 79). Besides unpredictability, *uncontrollability* also plays a crucial role (76). The lack of control, or the feeling of powerlessness towards the perceived threat, is considered to be at the core of job insecurity.

Scott (80) hypothesizes that the causes of job insecurity can no longer be confined to the organizational micro level, i.e. the standard employment relationship. She argues that three decades of economic restructuring in the age of globalization have brought along a fundamental shift in employment relations, and that job insecurity constitutes a structural feature of the new labor market. The experience of job insecurity has shifted from a transient to a chronic state associated with long-term and traumatic forms of strain.

Work intensification

One of the underlying goals of the learning organization and of organizational changes is to make employees put more effort into their jobs during their working time. Such effort can be translated into work intensification. Work intensification is a popular management strategy to increase productivity, but at the possible expense of employee mental health (40, 81, 82). Employees can be affected by work intensity in different ways. The change in itself (i.e. adapting to something new) could have an impact (83), as could the actual work contents (i.e. more to do) – or perhaps both (38). Changes in work contents can manifest themselves in two ways according to Green: more work hours (extensive work intensification) or greater work effort during the time spent (intensive work intensification) (84). Work intensification may arise as a result of numerous changes in the organization of production: changes in the organization of production (84), particularly those linked to *lean* production and similar systems (85, 86); changes in work organization where relations become more hierarchical (86); the introduction of new technology (1); downsizing that reduces the number of hands without reducing the overall workloads (40); and the introduction of working time reductions with no compensatory increase in new hires (16, 40). The endless spiral of rationalization can increase job insecurity since employees will be worried that they cannot continue to meet the demands of the work intensification. Work intensification has been cited as an emergent risk factor for job strain

(15). Work intensification is inherently a limited process since human physical and mental capacities do not allow an endless extension of efforts (40).

Individual context

“As in other occupational health areas, individual characteristics and behavioural styles of employees do play a role in the complex and dynamic interplay between combinations of work characteristics, work behaviour and health outcomes. It is obvious that the pathway between the exposure to (combinations of) psychosocial work characteristics and health goes via the individual appraisal of these characteristics. It is also true that people differ in their knowledge, skills, abilities and in their attitudes and preferences. Some people may be more vulnerable to stress than others. Some personality characteristics, such as hardiness, may even have a certain protective value against stressful working conditions. Individual characteristics are often conceptualized as determinants of stress, that is as independent variables or causal factors. They may also strengthen or reduce the impact of psychosocial risk factors on stress reactions and ill-health, that is act as an intervening (moderator) factor. Finally individual characteristics may be conceptualized as an outcome (that is act as a dependent variable) of working in a certain work environment.” P. 61 (12)

The above quotation of Kompier (12) effectively captures the interplay between work characteristics and the individual, and the complexity involved in understanding and examining the relations between the two. The interaction between the individual and the possible stressful environment involves many internal and external factors that shape the outcome of the situation (87). Kompier proposes that individual characteristics like resilience (hardiness) are strongly related to health outcome, and the reason why some are affected while others are not. This sentiment is the basis of our conceptualization of the individual context.

Resilience and Sense of coherence

Resilience is regarded as a defence mechanism, which enables individuals to thrive in the face of adversity (88). It is a widely-used concept; however, studies vary substantially in their definition, and measurement (88, 89). Rutten (89) describes resilience as both the process of preventing or attenuating health disturbance after adversity, and the process of swift recovery from adversity-related mental ill health. Various measures of resilience mechanisms have been proposed, e.g. *locus of control* (90), *neuroticism and extraversion* (91), or *problem-focused and emotion-focused coping* (78) and Antonovsky's concept of *salutogenesis*, or *sense of coherence* (SOC) (34). These measures are commonly highly correlated with each other and with mental health in general (92). What makes SOC especially relevant for this project is that the concept signifies a global orientation towards both the world and the individual environment which are

perceived as comprehensible, manageable and meaningful (93). Hence, SOC involves the external, organizational and work context.

SOC has been proposed as a moderator of the association between work environment and psychological distress (35). SOC focuses on the positive variables in relation to what maintains and promotes individual health and wellbeing (36). A strong SOC heralds adequate coping strategies that, in turn, may buffer the impact of stressful life events on mental health (94). Three aspects are measured by SOC: comprehensibility, manageability and meaningfulness (34, 93). Comprehensibility is the ability to understand, find structure in, and anticipate events in the environment. Manageability is based on the experiences of exercising control over, and meeting the demands of, the environment (87). And, lastly, meaningfulness is the feeling that it is worthwhile to engage in the challenges one meets.

In a review on this issue, Eriksson (93) found that SOC is strongly related to perceived health, especially mental health. The stronger the SOC, the better is the perceived health in general. A strong SOC has previously been found to be a protective factor for mental health when employees were exposed to negative workplace events (24). However, no studies have examined if a strong SOC protects against the potential distressful effect of the economic context.

Psychological distress

Workers' psychological well-being or lack thereof is subject to much current interest. It is estimated that approximately 35,000 Danes are on sick leave any given day due to work-related psychosocial stress (95-97). The Danish white paper on *Mental Health Problems and Return to Work* estimates that the cost of mental health problems in Denmark poses an annual burden of €7.4 billion (98). The magnitude of the problem explains the intense interest in gaining knowledge about risk factors and avenues of possible intervention.

For our present purpose, it was essential to choose a mental health concept which entailed symptoms of strain, but not necessarily illness or disease, because we examine employees (currently) *in employment*. Psychological distress covers a broader range of conditions than mental illness and describes a situation that is psychologically more detrimental than that of 'simple' stress. There is no uniform definition or measure of psychological distress. In a practice-oriented definition, Goldberg (99) states that the psychological distress classification is, in effect, a classification of emotionally distressed people seen in general medical settings. In an analysis of the concept of psychological distress, Ridner (100) proposes the following definition: "*the unique discomforting, emotional state experienced by an individual in response to a specific stressor or demand that results in harm, either temporary or permanent, to the person*". This

definition has recently been challenged by Drapeau (101) on account of its inclusion of stress into the definition of distress. It thereby fails to recognize the possible presence of distress *in the absence of stress*. Drapeau proposes the following more widely accepted definition of psychological distress, “*a state of emotional suffering characterized by symptoms of depression and anxiety*” (101, 102).

The lack of a uniform definition is reflected in the different scales used to measure psychological distress. Popular scales include the General Health Questionnaire (GHQ) (103), The Kessler scales (K6 and K10) (104), and various versions of the Symptoms Checklist (SCL) (105), including the revised version, the SCL-90R. The scales have a number of similar items; however, the GHQ and the K6 are more general than the SCL-90R.

The prevalence of psychological distress in the working population is estimated to 15-20% in Europe and North America (106). The prevalence of psychological distress is typically higher in women than in men (107). In general, psychological distress decreases with age; however, this decline has been attributed to differential exposure to risk factors and survival bias (101). A lower prevalence in groups with higher income and education has been established in most studies across gender and age (107).

Aims of the thesis

Paper 1 examines the effect of the external context and its organizational counterpart on the psychosocial work environment in general and the employee-perceived job insecurity in particular. The aim of the paper was to analyze the associations between globalization and job insecurity; both the direct association between the external conditions and job insecurity and the indirect association brought about by management's organizational response to transformational pressure.

Paper 2 examines the effect of external context (globalization in the form of competition and the GFC) on mental health (psychological distress). The overall aim of the second paper was to investigate the association between globalization (in *casu* the level of competition and the impact of the GFC) and employees' psychological distress. The particular aims were to determine: i) whether exposure to competition or the GFC is associated with an increased prevalence ratio of psychological distress; ii) whether competition modifies the association between the GFC and the prevalence of psychological distress; and iii) whether the effect of SOC modifies the association between competition or the GFC and its association with an increased prevalence of psychological distress.

Paper 3 examines the association between organizational context, work context and mental health. The aim of the paper was twofold; first, to examine associations between ratings of work intensification and psychological distress and, second, to compare employees' assessment of work intensification with the company's assessment in order to identify agreement or lack thereof.

Materials and methods

This study is based on data from the GOPA project, a longitudinal, multi-level study combining employer level survey and registry data with employee level survey and registry data.

The GOPA project is the successor of a series of surveys on the “*Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks*” (DISKO) which began in the nineties. These questionnaire surveys were initiated in order to investigate the Danish innovation system (108). Of particular interest was how different management and organizational principles, including elements of the learning organization, and various types of organizational changes were related to innovation. The first DISKO survey was completed in 1996 and yielded 1,900 questionnaire responses. In the subsequent surveys, more companies were included to make the sample representative. In 2006, the DISKO 4 survey was completed with 1,770 questionnaire responses (109, 110). In 2010, the same companies were assessed in the GOPA project. The GOPA company sample was based on the companies participating in DISKO 4. While this thesis only utilizes part of the data from the GOPA project, a full introduction of the project is necessary to understand the scope and magnitude of the data collection process from the selection of study design to its execution.

Study design

Careful consideration was put into the study design of the GOPA project. The project was based on recommendations from the MEADOW Guidelines (MEAsuring the Dynamics of Organisations and Work), which is a measurement framework for collecting and interpreting data on organisational change and its economic and social impacts for both private and public sector organizations (16). According to the MEADOW guidelines, the richest survey setting for measuring organisational change and its impact is a survey that links employer and employee data; a multi-level study. This is considered the optimal solution because some aspects like the general information about the companies’ choice of policies and practices regarding strategy, work organization and external relations can only be accurately captured at company level. Likewise, only the employees concerned can express how the change is felt and experienced. Last, multi-level studies can provide different and complementary information on the same organizational characteristics or processes, like work intensification for example. In relation to occupational health epidemiology, multilevel studies also offer the possibility to examine exposure and outcome at separate levels whereby common method variance may be avoided (111).

In the GOPA project, the companies were chosen as the primary sampling units to be able to follow the companies from the DISKO surveys, as it was an initial intention of the GOPA project to compare the company data collected in DISKO 4 with the GOPA data to examine any changes. However, the DISKO 4

survey had no viable measures of the impact of globalization; furthermore, there were no survey data at the employee level. With the primary focus explicitly targeting globalization and with the combination of company and employee level data material, the data material of the present thesis could be drawn only from the two (company and employee) cross-sectional surveys performed in the GOPA project, and from demographic registries, i.e. we chose not to include the DISKO 4 data into our analyses.

Setting and data collection

Company sample

The companies participating in the DISKO surveys were selected to represent the general industry distribution across the private urban sector in regards to industry type and company size. Two exceptions were made: companies with more than 100 employees were all included as these were thought to be the most innovative companies. Conversely, companies with less than 10 employees were excluded as these were deemed too small to have relevant management practices. Of the 1,770 DISKO 4 companies, 254 were either closed or were listed as having fewer than 10 employees. During the initial company contact information, another 86 companies requested to be removed from the study. Unique login information for the GOPA web-questionnaire was emailed to 1,430 companies (if email information was unavailable, they were contacted by letter). The companies were reminded twice by email or letter to respond, and once by phone. The questionnaires were sent to the manager, or the HR manager, or someone holding a similar position within each company.

A total of 601 companies answered the survey, which corresponds to a response rate of 42%. Of these, another 31 had to be removed due to missing answers for key variables or lack of employee responses in paper 1, whereas the number was 33 in the paper 1 and 2. A total of 570 companies were included in Paper 1, and 568 companies were included in Paper 2 and Paper 3 (see Figure 3 for flowchart).

Employee sample

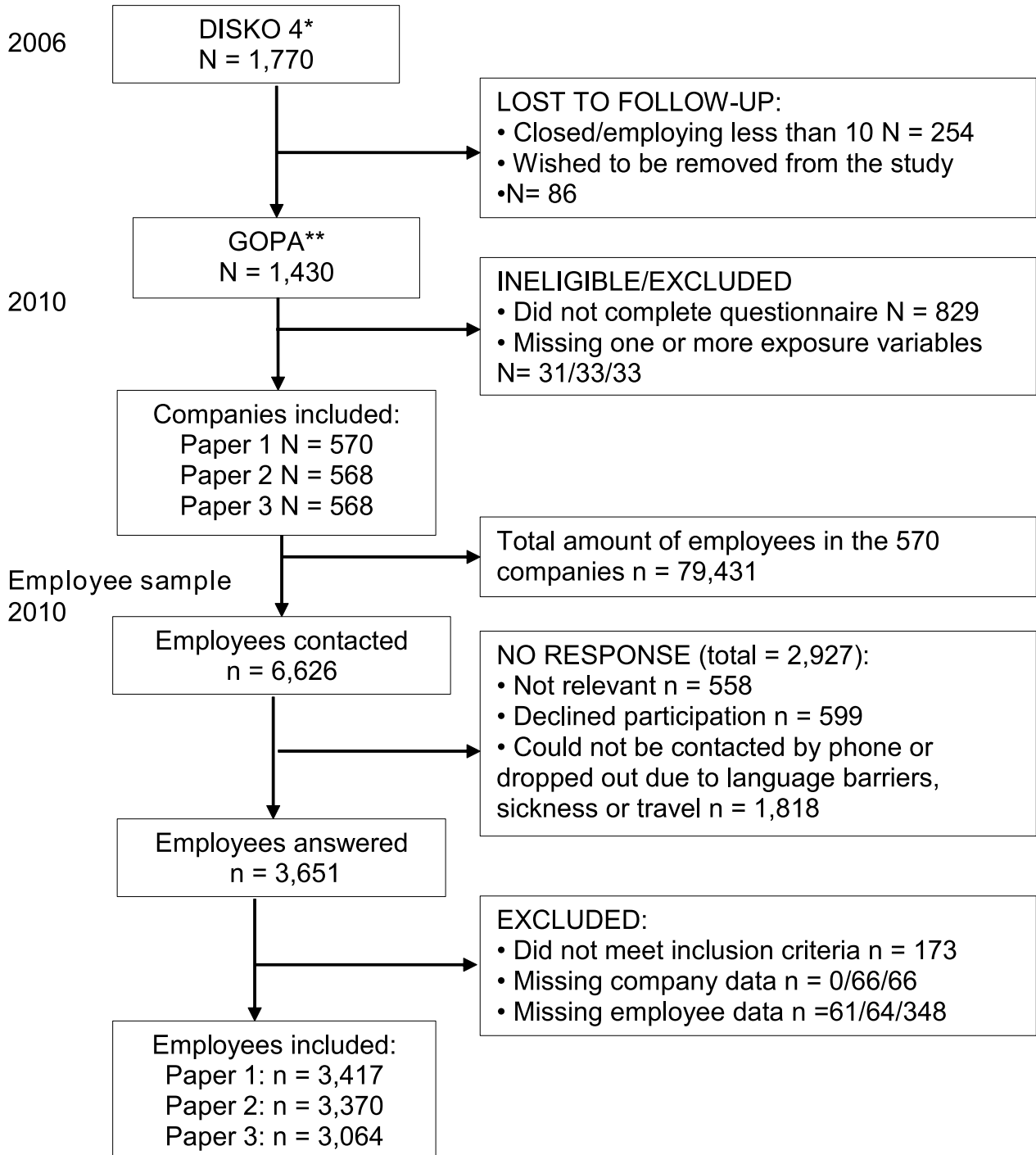
All potential salary earners ($n=79,431$) from the responding companies were extracted from Statistics Denmark's registry data (a collection of information supplied by administrative registers of governmental agencies). Based on preliminary statistical power calculations, approximately 2,000 respondents were deemed sufficient in order to detect relevant differences. According to estimates from Statistics Denmark, a total of 6,626 individuals had to be included in the study to guarantee the desired response rate. However, approx. 85% of the employees were employed in approx. 35% of the companies, which would lead to an under-representation of employee responses from smaller companies if simple random sampling was used to select companies. To avoid over-representation of larger companies, a weighted sampling strategy was used so that smaller companies would have a larger percentage of their employees selected.

The company responses spanned five different industries. Companies were divided into three size groups (20-49, 50-99 and >100 employees), which yielded a total of 15 analytical categories. If more than 50% of the companies within one of the 15 categories were non-responders, more participants would be sampled from responding companies within that category. Depending of the size of the company, up to 12 persons was selected for participation.

Employees were contacted by letter and invited to answer a web survey. A first reminder was sent by letter, a second reminder by telephone with an option to participate through phone interview instead of the web survey. A total of 6,626 employees were contacted. The employee response rate was 55%, corresponding to a sample size of 3,651 men and women aged 16 to 81 years. Of the 2,975 non-respondents, 558 persons reported to be not relevant to this survey, 599 refused to participate, and 1,818 could not be contacted by phone; or the interview had to be cancelled due to language barriers, sickness or travel.

A total of 173 employees were not employed in the company in which they were presently working during the time period 2007-2009 (which was the only employee inclusion criteria for the study). Another 61 employees were excluded due to missing company data. The final sample consisted of 3,417 employees in Paper 1, 3,370 in Paper 2 and 3,064 in Paper 3. The reason for the decrease in the number of included employees was missing items or “do not know”-answers. As Paper 1 analyzed fewer employee-measured variables, the number of employees that could be included was higher (see Figure 3 for flowchart).

Company sample



* DISKO 4: The Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks survey
 ** GOPA: Globalization, Transformational Pressure, and Psychosocial Environment survey

Figure 3 Flow-chart of company and employee respondents. In the exclusion boxes paper differences are marked by "/".

Survey instruments

The two survey instruments, i.e. the company questionnaire and the employee questionnaire, were developed by interdisciplinary groups over a series of meetings. The groups consisted of members from the GOPA project group¹. To increase the reliability of the measures, both questionnaires were discussed with Statistics Denmark's interview department for fine tuning and cohesion. Finally, the questionnaires were pilot-tested for understanding of the questions. In the following two sections, the concept and measures of each of the questionnaires will be presented. Even though there are parts of both questionnaires that are not subject to analysis in this thesis, they are presented to give an impression of the extent of each questionnaire.

Company questionnaire

The management questionnaire was based on questions used in the OECD Oslo Manual (112) as well as the MEADOW guidelines (16). In addition, parts of it were identical to the previous DISKO 4 questionnaire to allow for direct comparison. The questionnaire was divided into seven dimensions and 20 sub-dimensions as presented in Table 1 (see www.gopa-project.dk for the full questionnaire). Of particular importance for the present thesis was the development of the questions in relation to capturing the different aspects of globalization. As presented in the theoretical framework, the important drivers of globalization that can affect the companies and produce transformation pressure are competition, technology, liberalization and the market conditions (the GFC). We expanded the common focus of price competition with questions on quality and innovation as well to capture what type of competition the companies were experiencing. Furthermore, the general market conditions were at that time to a large degree influenced by the GFC, why specific questions on this topic were included. The organizational context was divided into questions on how the company managed the transformation pressure of globalization in their overall business strategy, in their external and internal collaboration, and in the everyday work organization and management. The strategic management questions comprised business strategy, innovation and external collaboration (and outsourcing). The strategy dimension includes both reactive and proactive management initiatives towards the external conditions; management at this level has a more indirect and overall role in relation to the employees. A more direct influence is found in the work organization and general management, as this part of the questionnaire dealt with the company's use of organizational principles (like teamwork, delegation of responsibility, etc.), different types of organizational changes, and so forth. The majority of the dimensions included in dynamic capability relate to this level of management. The last part of the questionnaire concerned institutional relations at work between company and employees; involvement

¹ The company questionnaire group consisted of Anker Lund Vinding, René Nesgaard Nielsen, Peter Nielsen, Simon Grandjean Bamberger and Øyvind Omland. The employee questionnaire group consisted of Anelia Larsen, Pia Ryom and Simon Grandjean Bamberger.

(direct) and participation (indirect) in decision-making processes and everyday work tasks, and employee education and skills development. The items found in the two dimensions on work organization and staff use/cooperation are complementary and overlap to some extent.

In general, we used retrospective questions to assess changes in the companies within the period of 2007-2009. According to the MEADOW guidelines, the advantage of using retrospective questions is that they can provide more coherent and comparable information on activities carried out by companies and workers, because all of the information is collected at a single point in time (16). Furthermore, the data are readily available to be analyzed immediately after the survey has been completed.

Table 1 Dimensions, scales, and number of items and sub-items in the company questionnaire

Dimension	Scale	Items	Subitems
Background information	Type	3	
	Ownership	1	
	Size	1	
	Revenue	2	
	Profit	1	
External context			
Globalization	Competition	3	6
	Technology	1	3
	Liberalization	1	3
	Financial crisis	1	6
	Governmental regulation	1	4
Organizational context			
Strategic management	Strategy	2	6
	Innovation	4	6
	External collaboration	1	6
Organization and management	Work organization	2	13
	Organizational change	5	15
	Management	2	4
Internal cooperative relations	Employee influence	4	8
Staff use and development of skills	Management tools	6	24
	Education and development	3	11
	Outsourcing	3	12

Employee questionnaire

The employee questionnaire primarily used validated questionnaires and scales (see

Table 2). It was based on the survey instrument proposed by Larsen (113). The questionnaire was divided into questions on the work context and on the individual context. The Copenhagen Psychosocial Questionnaire (COPSOQ) and the Effort-Reward Imbalance (ERI) questionnaire were used to capture the employees' work context. We chose to use the COPSOQ, because it is the most validated Danish questionnaire on the psychosocial work environment. The COPSOQ was developed as a comprehensive theory-based assessment tool. Contrary to other tools (like the ERI), the COPSOQ, however, does not build on one specific theory (114). We used questions from the long version of the COPSOQ, known as the research version, though our selection of questions in general was guided by the short version of the COPSOQ. In addition to the questions from the COPSOQ, two items on job insecurity specially related to globalization was developed in the same format as the COPSOQ. The ERI was supposed to be an indicator of work stress (not psychological distress). Unfortunately, it was wrongly set in the web survey, which allowed respondents to click two categories, where only one should have been allowed. Should the ERI have been included, it would mean that approximately 1000 employees would have to be removed from the survey. We therefore decided against using it in the analyses. In addition, the work context part of the questionnaire also included items corresponding to those of the company questionnaire, and it contained questions on how the employee perceived company's management of globalization in general. These questions were developed especially for the questionnaire.

The individual context part of the questionnaire featured the following scales: life-events, the SOC-13 questionnaire, the SCL-90R, a questionnaire on previous problems, lifestyle, and the CAGE (an alcohol screening tool). The life-events questionnaire was identical to the one used in the PRISME study (115). The SOC questionnaire exists in many versions, but we chose the SOC-13 as recommended by Erikson (116). As explained previously, we used the SCL-90R to examine psychological distress caseness. A modified version of the SCL-90-R was used on the recommendation of Statistics Denmark to avoid low response rate due the potentially invasive nature of some of the questions. Questions on suicide thoughts (15), hearing hallucinations (16) and the idea something is wrong with your mind (90) were excluded. Previous mental health problems were assessed using questions from the *Sense of coherence and mental health in a working population* study (113). Lifestyle questions assessed height, weight, smoking habits and exercise habits. The CAGE instrument (117) was used to screen for possible alcohol abuse.

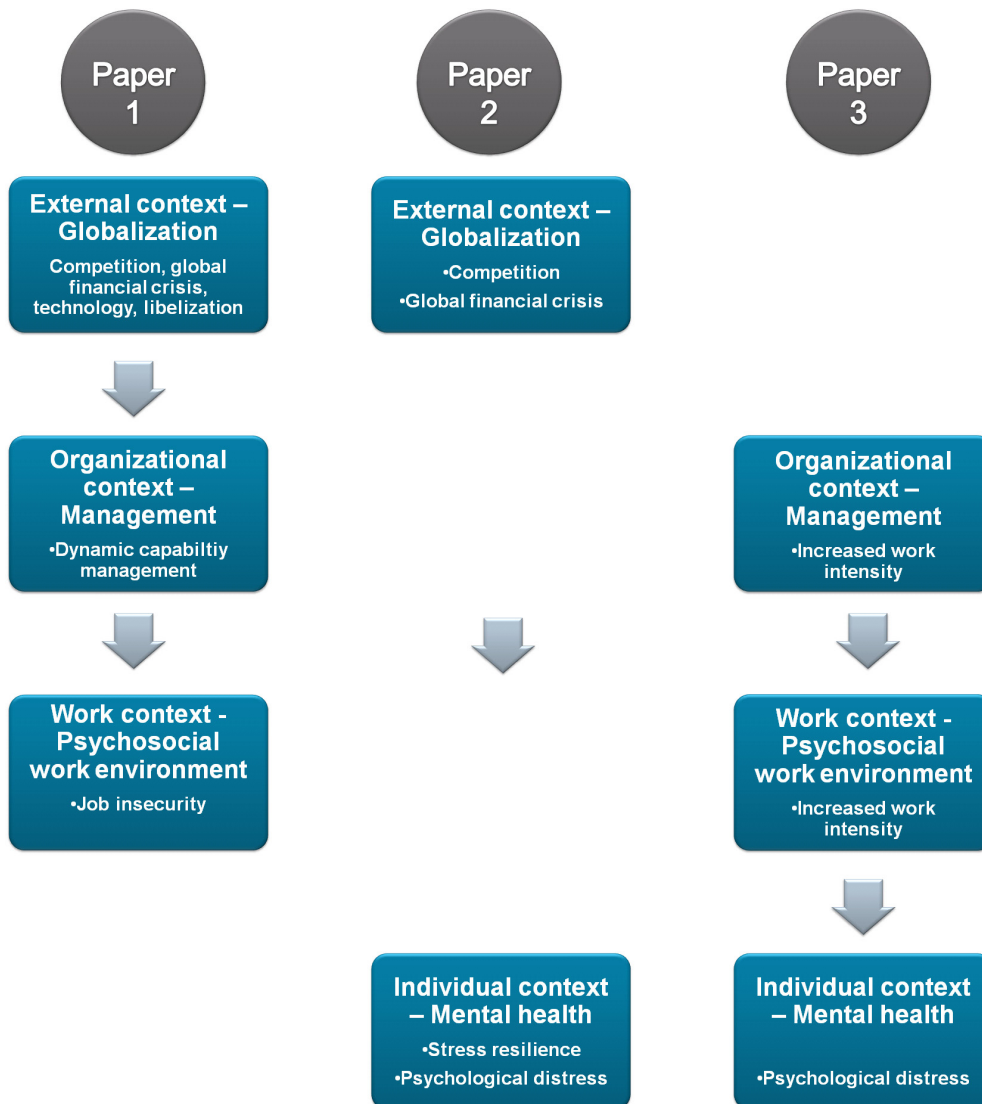
Table 2 Dimensions, scales, and number of items and sub-items in the employee questionnaire

Dimension	Scale	Items	Sub-items
	Background information	5	
Work context	COPSOQ	32	
	ERI	17	
	Corresponding company items	10	41
Individual context	Life events	1	9
	Sense of Coherence	1	13
	SCL-90R	1	87
	Previous problems	1	9
	Lifestyle	4	
	CAGE	1	4

Measures

The exposure and outcome measures of three papers are presented in Figure 4 under the related theoretical headlines. In Paper 1, the exposure measures are globalization and dynamic capability management and the outcome is job insecurity. In Paper 2, globalization is exposure, and outcome is psychological distress. In Paper 3, work intensification rated by companies and employees are exposures and psychological distress is outcome.

Figure 4 Overview of papers in accordance with the theoretical model



Globalization and company management

In Paper 1, a number of composite variables were created to measure the degree of globalization the company was exposed to and to quantify aspects of company management. Table 3 provides an overview of the operationalization process starting from general theoretical constructs, to variable names and, finally, to questionnaire items. All scales were coded to go from 1 to 5 and were afterwards standardized (rescaled to have a mean of zero and a standard deviation of one). The internal consistency of the variables was assessed using Cronbach's α (presented in Paper 1). The original items of the work intensity variable examined work intensification stratified by educational level, but the items were recoded to reflect the overall work intensification in the company instead.

In Paper 2, only competition and market conditions were used as indicators of globalization. They were measured the same way as in Paper 1, but both indicators were dichotomized at the median.

Table 3 Theoretical constructs, variables, and items

Theoretical construct	Variable	Items
Globalization The perceived impact of the external context on the companies	Competition	To which extent has the company experienced competition from other companies in the period 2007-2009? On the Danish Market, On the world market. At present, to which extent is the company experiencing competition on the following: Product or service prices, Product or service quality, Development of new products or services
	Liberalization	To which extent has liberalization of international trade affected the development of the company's competitive conditions in the period 2007 - 2009. On product or service prices, On product or service quality, on development of new products or services
	Technology	To which extent has the overall technology development in the industry influenced the development of the company's competitive conditions in the period 2007 - 2009: On product or service prices, On product or service quality, on development of new products or services
	Market conditions	Has the financial crisis changed the company's opportunities for: Sales on the domestic market, Sales on the international market, Financing, Liquidity.
	Organizational learning	How important are the following for the ongoing development of staff skills? Allocating time for sparring with management / other staff, Planned job rotation, The organizing of work in teams, Encouraging of cooperation and networking across departments and groups
Learning organization The ability to build and continually renew unique skills through internal or external staff training and networking with other organizations	Vocational training	How important are the following for the ongoing development of staff skills? Standard Courses / training (e.g. In vocational schools and AMU centers), Training tailored to business needs, Long-term educational planning
	National collaboration	To which extent has the company cooperated with the following partners regarding product and / or service development in 2007-2009? Danish customers, Danish suppliers
	International collaboration	To which extent has the company cooperated with the following partners regarding product and / or service development in 2007-2009? Foreign customers, Foreign suppliers
	Efficiency changes	Have organizational changes aimed to strengthen: Efficiency in daily operations, Cooperation and coordination across the organization, Quality and customer service
	Innovation changes	Have organizational changes aimed to strengthen: The ability to adapt to more changing environments, The ability to continuously develop new products / services, The ability to continuously strengthen and renew the company's knowledge and know-how
Flexibility The ability and process of adapting to external condition through organizational changes, staffing resources changes or work contents changes.	Institutional influence	How is the cooperation between management and employees organized in conjunction with processes of change in the company? Employee representatives participate in joint meetings with the management, It takes place in the Cooperation Committee, It is done by an employee representative on the company's Board of Directors
	Management influence	How is the cooperation between management and employees organized in conjunction with processes of change in the company? Creation of one or more project groups where management and employees are represented, Through the convening of joint meetings with the affected employees, The convening of joint meetings with all employees, By direct contact with individual employees as needed
	Numerical flexibility	Does the company use one or more of the following options to customize the staffing resources to business needs? Recruitment and dismissal, Adjustment of working hours (overtime, flextime, distribution), Temporary appointments, Agency appointments, Part-time work
	Work intensification	Has the work contents changed in the period 2007-2009 in the direction of: Increased autonomy and responsibility, Increased technical / professional demands, Increased knowledge contents, Increased interdisciplinary collaboration, Demand for increased labor productivity

Work intensification

Two aspects of work intensification were of interest in Paper 3; the degree of work intensification and the agreement between companies' and employees' ratings of work intensification. The literature offers no overarching theory or construct with which to measure work intensification (74). In the present study, we therefore simply compared the degree of work intensification as reported by the employees and the companies at company level and overall based on questions recommended in the OECD Oslo Manual (112).

The degree of work intensification during the 2007-2009-period was measured separately at employee level and company level by five dichotomous items, which explored whether the contents of the work had changed in the direction of: a) increased autonomy and responsibility, b) increased technical / professional demands, c) increased knowledge contents, d) increased interdisciplinary collaboration, and e) increased demand for labour productivity. The employee score and the company score were then combined to compare employees' assessment of work intensification with the company's assessment in order to identify agreement and discrepancy. Table 4 presents an overview of the different ratings and scores used in this study.

Table 4 Overview of the single item ratings of work intensification, and the aggregated ratings.

	Employee rating	Company rating	Discrepancy rating	Agreement rating
Single item ratings	0/1	0/1	0 if employee rating=company rating; 1 otherwise	1 if both employee and company rating = 1; 0 otherwise
Aggregated rating	Sum (0-5)	Sum (0-5)	Sum (0-5)	Sum (0-5)

Job insecurity

A measure of job insecurity was constructed using three items from the COPSOQ (73, 114) (JI1, JI2, and JI3 in Paper 1) alongside two new questions specifically designed for this study (JI4 and JI5 in Paper 1). As with the original COPSOQ scale, the job insecurity scale was transformed to go from 0-100, with 0 representing the highest degree of job insecurity.

Psychological distress

Psychological distress was estimated using the SCL 90R (105), which measures psychological complaints and symptom intensity on nine subscales; somatization, interpersonal sensitivity, depression, anxiety, phobic anxiety, obsession-compulsion, hostility, paranoid ideation and psychoticism, as well as a global severity index (GSI) (118). A Likert scale scoring system ranged from 0 (not at all) to 4 (extremely) was used to judge

the severity of the symptoms. The GSI scale is calculated by the sum of the scores (0-4) of 90 questions regarding mental distress symptoms divided by the number of items answered. The raw scores were converted into standardised scores (t-standard; mean=50, sd=10). A t-score of 63 or higher on the GSI, or two subscales with t-scores of 63 or higher were used to determine psychological distress (caseness) (105, 119).

Sense of coherence

To measure psychological resilience, the SOC-13 scale developed by Antonovsky was used (34). The SOC-13 is rated on a 7-point Likert scale, and total scores ranged from 13 to 91, with low scores indicating weak resilience. We chose to dichotomize the scale at the median, as previously done by Hanse (87).

Demographics

Additional covariates used in this study were gender, age (four categories: 15-34, 35-44, 45-54, 55+), education (white-collar, blue-collar, other), self-reported previous mental health problems (diagnosed (by doctor) and/or treated for depression, mania, anxiety, phobia, neurosis, personality disorder, stress, obsessive compulsive disorder or other, totalled and dichotomized into 'no previous psychological problems' versus 'diagnosed, and/or treated for psychological problems'), and self-reported stressful life events in the past 6 months (nine 4-level items totalled and dichotomized into 'no' or 'yes, it felt not so bad' versus 'yes, it felt bad' or 'very bad') (115).

Statistical Analyses

Due to the multilevel structure of the data, all regression models were based on generalized estimating equations (GEE), which allowed for correlated measurement errors within companies (exchangeable correlation structure; i.e. all observations within each company are equally correlated).

All statistical analyses were conducted in Stata 11.1 (StataCorp LP, 2008). A P-value less than 0.05 were considered statistically significant.

Paper 1

Descriptive summaries of industry type and company size were constructed. Cronbach's α and correlation analyses were performed for all composite variables. Non-parametric Spearman's rank correlation coefficients were used because of the Likert response categories of the original items.

We used linear regression models to assess the association between job insecurity and the indicators of globalization and management.

First, associations between job insecurity and each globalization variable was analyzed without taking other variables into account. Next, multivariate regression analyses were performed in which all globalization variables were included simultaneously. Finally, multivariate regression analyses were performed including all globalization variables and adjusted for industry type and company size.

The association between job insecurity and management variables was first analyzed without taking other variables into account. This analysis was followed by a multivariate regression analysis in which all globalization variables were adjusted for. Finally, multivariate regression analyses were performed in which we adjusted for globalization variables, industry type and company size. Due to the many subjective decisions involved in the construction of our variables and the large span across industry types and company sizes in our sample, the results of the regression analyses were considered primarily explorative. We therefore chose to present the results in the form of forest plots since the direction of the association and the relative sizes among variables are more sensible explorative summaries than the precise, numerical point estimates.

See Paper 1 for information on how sensitivity analyses were performed.

Paper 2

The distribution of covariates was examined according to psychological distress caseness and exposure (reported as frequencies/percentages). The association between indicators of globalization and psychological distress was assessed using simple prevalence ratios (PRs) and associated 95% confidence intervals (95% CI). To take into account the multilevel structure of the data, standard errors of PRs were calculated using Poisson regression models.

To evaluate associations, we first compared the prevalence of psychological distress caseness between the level of i) competition, ii) GFC and iii) SOC. Second, effect modification on the PR scale (henceforth simply "multiplicative interaction") between competition and the GFC on psychological distress caseness was examined. Third, multiplicative interaction between SOC and i) competition and ii) GFC was examined. As SOC has been split at the lowest quartile or used as a continuous variable in other studies, (116) sensitivity analyses were performed to assess the robustness of our findings to other ways of measuring resilience.

Paper 3

We examined the distribution of covariates according to psychological distress caseness (reported as frequencies/percentages), the employee/company work intensification measurements, and the two agreement measurements (reported by mean/ associated 95% CI).

We used linear regression models to assess the association between the aggregated ratings of work intensification/agreement and psychological distress caseness (exchangeable correlation structure). The results were reported as mean scores and 95% CIs. An a priori decision was made to adjust for the potentially confounding effect of age, company size and level of education. Multivariate regression analyses were performed to adjust the mean scores and 95% CI for age, education and company size.

The association between the single item ratings of work intensification/agreement and psychological distress was assessed using simple PRs and 95% CI using Poisson regression models based on GEE (accounting for within-company correlations; exchangeable correlation structure). Subsequently, multivariate regression analyses were performed on the single item ratings to adjust the PR and 95% CI for age, education and company size.

Results/Main findings

The sections below present the main results of the thesis. Additional results in the form of figures, tables and explanatory text can be found in the original papers.

Sample characteristics

The employees' socio-demographic characteristics are outlined in Table 5 stratified by each of the three papers. Approximately two-thirds of the study population counted men whose mean age was 48 years.

Table 6 presents the industry-type and company-size stratified distribution of company and employee respondents (of Paper 1). This table provides an overview of the multilevel aspect of the data.

Table 5 The employees' socio-demographic characteristics presented by Papers 1-3

	<i>Paper 1</i>		<i>Paper 2</i>		<i>Paper 3</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Total	3,417	100.00	3,370	100.00	3,064	100.00
Gender						
Men	2,317	67.81	2,279	67.63	2,085	68.05
Women	1,100	32.19	1,091	32.37	979	31.95
Age						
16-34	336	9.83	334	9.91	284	9.27
35-44	910	26.63	906	26.88	831	27.12
45-54	1,243	36.38	1,215	36.05	1,104	36.03
55+	928	27.16	915	27.15	845	27.58
Education						
White-collar	657	19.23	654	19.41	614	20.04
Blue-collar	1,947	56.98	1,932	57.33	1,753	57.21
Unskilled	813	23.79	784	23.26	697	22.75
Life-events						
No-life events	2,398	70.2	2,364	70.15	2,157	70.47
Major life-events	1,018	29.8	1,006	29.85	904	29.53
Previous psychological problems						
No psychological problems	2,556	75.18	2,525	74.93	2,285	74.99
History of psychological problems	844	24.82	845	25.07	762	25.01

Table 6 Industry-type and company-size-stratified distribution of company and employee respondents

	Small (<50)			Company size Medium (50-99)			Large (100+)			Total		
	Companies N=	%	Employees n=	Companies N=	%	Employees n=	Companies N=	%	Employees n=	Companies N=	%	Employees n=
1. Industry, quarrying, and supply	59	(27)	327	48	(32)	302	84	(42)	585	191	(34)	1,214
2. Construction and maintenance	28	(13)	122	16	(11)	84	16	(8)	91	60	(11)	297
3. Trade and transport	94	(43)	494	45	(30)	264	52	(26)	321	191	(34)	1,079
4. Information, communication, finance, and insurance	10	(5)	61	20	(13)	138	21	(10)	151	51	(9)	350
5. Real estate, rental business, services, and other	27	(12)	162	22	(15)	148	28	(14)	167	77	(14)	477
Total	218	(100)	1,166	151	(100)	936	201	(100)	1,315	570	(100)	3,417

The association between globalization, dynamic capability management and job insecurity (Paper 1)

To address the first research question of Paper 1, we analyzed the association between job insecurity and the four globalization variables: competition, liberalization, technology and market conditions.

The univariate analyses indicated that an increase in each of the globalization variables increased job insecurity with the most pronounced effects found for competition (-2.2 [-3.1 to -1.4]) and market conditions (-2.3 [-3.2 to -1.4]). However, in the model adjusted for all globalization variables, the effects were attenuated and the confidence intervals of liberalization (-.8 [-1.9 to .2]) and technology (.2 [-.8 to 1.3]) crossed from a negative to a possibly positive effect (most evident for the technology variable). Adjustment for size and industry further attenuated the effect of all variables. Market conditions and competition remained the most important variables. In regard to the first research question, our findings offer support for the hypothesis that job insecurity is influenced by market conditions, and, to a lesser extent, by competition as indicators of globalization. On the other hand, the effects of liberalization and technology on job insecurity were less clear.

In relation to the second research question, use of organizational learning (-1.0 [-1.9 to -.2]) and use of international collaboration (-2.6 [-3.5 to -1.7]) had the largest impact on job insecurity, whereas the univariate analyses of vocational training (-.5 [-1.4 to .5]) and national collaboration (.3 [-.6 to 1.8]) indicated that these variables had little or no association with job insecurity. In the model adjusted for globalization (competition, liberalization, technology and market conditions), the effects of organizational learning (-.7 [-1.6 to .2]) and vocational training (-.4 [-1.3 to .5]) were substantially lower, which leaves international collaboration (-1.9 [-2.8 to -1.0]) and national collaboration (.9 [.0 to 1.8]) as the two variables that were most strongly associated with job insecurity. Adjustment for industry type and company size in addition to globalization considerably attenuated the effect of organizational learning (-.1 [-1.0 to .8]), vocational training (.1 [-.8 to .9]) and international collaboration (-.3 [-1.2 to .7]). Only the positive effect of national collaboration (1.0 [.6 to 1.8]) remained sizeable.

The third research question on dynamic capabilities related to company flexibility were operationalized using six different variables. We found that all variables were associated with an increased job insecurity with the largest effect being that of numerical flexibility (-1.6 [-2.5 to -.7]). Adjustment for globalization attenuated the effects of all variables, except institutional influence (-1.5 [-2.4 to -.6]). Adjustment for industry type and company size further attenuated the effect of all flexibility variables. Only numerical flexibility (-1.1 [-1.9 to -.2]) was above -1. The effect of innovation changes changed from negative to a

modest, positive effect (.3 [-.5 to 1.2]).

Association between job insecurity and psychological distress (supplementary analyses for Paper 1)

The results of paper 1 indicate that globalization and some management variables were associated with job insecurity. Other studies show an association between job insecurity and psychological distress. Given the scope of this thesis, it is therefore relevant to examine whether this is also the case for our study population. The psychological distress variable of Paper 2 and Paper 3 was used for these supplementary analyses.

On a scale from 0-100 where low scores indicate high job insecurity, non-distressed employees had a mean job insecurity score of 75.02 (95% CI 74.10 to 75.94), whereas distressed employees had a mean job insecurity score of 61.65 (95% CI 60.02 to 63.30). The difference between the groups was statistically significant. Figure 5 shows the expected fitted line of the log odds (with 95% CI) of psychological distress caseness as well as the observed log odds of psychological distress caseness. The risk of psychological distress caseness with job insecurity was described by logistic regression with job insecurity as a continuous variable. The association between psychological distress and job insecurity seemed to be linear. The large CIs in the lower end of the job insecurity scale indicate few observations.

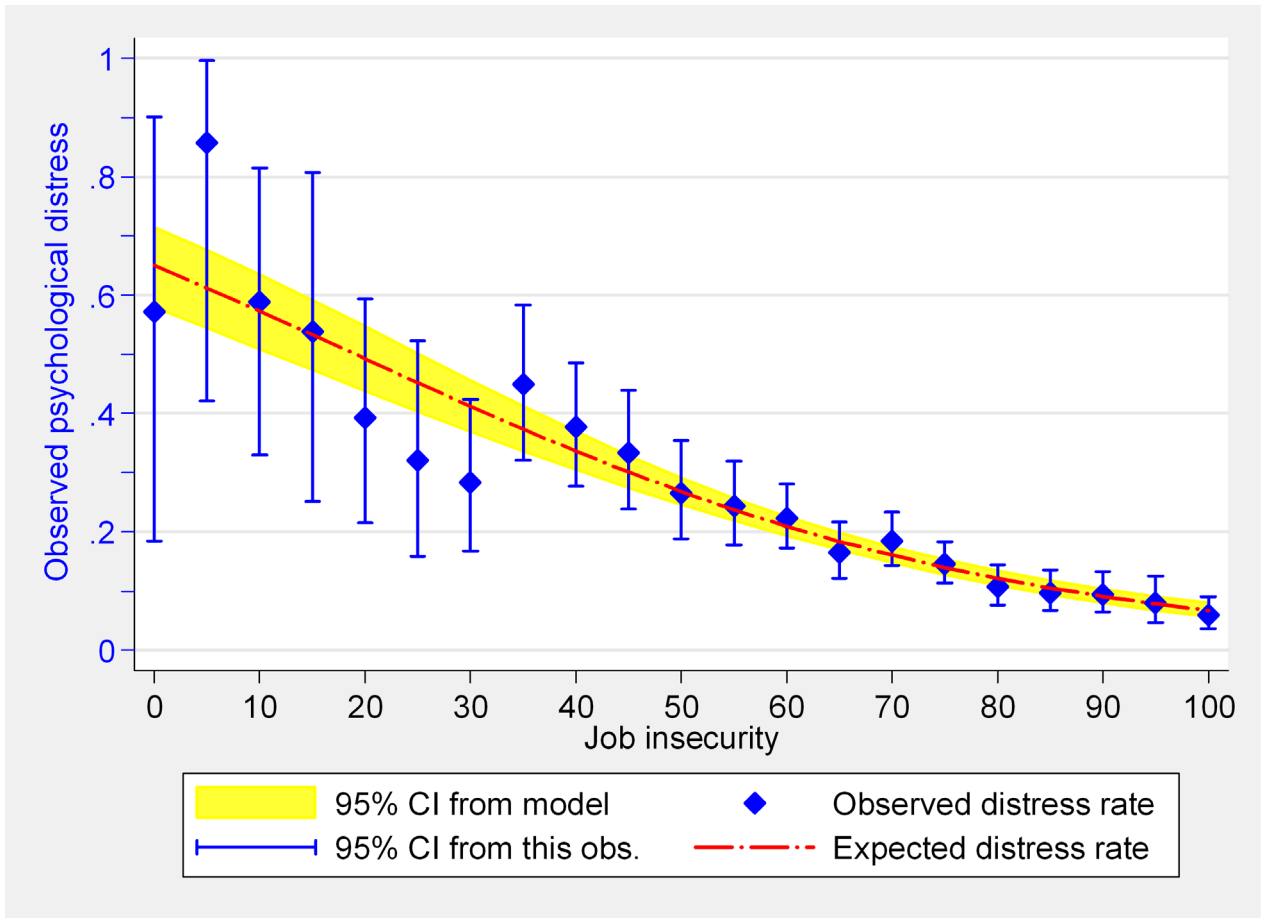


Figure 5 Log odds fitted line and observed log odds of psychological distress caseness. The risk of psychological distress caseness with job insecurity was described by logistic regression with job insecurity as a continuous variable (0 represents high job insecurity).

Associations between globalization and psychological distress (Paper 2)

The aim of Paper 2 was to describe the association between globalization (*in casu* competition and GFC impact) and psychological distress.

Psychological distress caseness was more common in employees facing much competition than among employees facing less competition. Likewise, employees in companies much affected by the GFC had a higher prevalence of psychological distress caseness than employees in companies less affected by the GFC. Compared with employees with a strong SOC, employees with a weak SOC had a fivefold- increased prevalence of psychological distress caseness, which indicates a strong association between the two variables.

We found no evidence of (multiplicative) interaction between competition and the GFC ($p=0.43$). The prevalence of psychological distress caseness was increased in both of the groups facing much competition and a high impact of the GFC compared with the reference group. A high GFC impact combined with little competition, however, was not significantly associated with caseness.

We found no evidence of an interaction between SOC and competition ($p=0.58$). The prevalence of psychological distress in the group with a strong SOC exposed to high levels of competition was increased compared with the reference group, but it was not significantly different. Employees with a weak SOC facing much competition had an increased prevalence (PR 1.30, 95% CI 1.11-1.53) of psychological distress compared with employees with a weak SOC exposed to little competition.

Finally, we found no interaction between SOC and the GFC ($p=0.14$). The psychological distress prevalence of a strong SOC and a high-impact GFC exposure was not significantly different from that of the reference group. Compared with the reference group, a weak SOC was associated with a higher prevalence of psychological distress both when the impact of the GFC on the company was low and when it was high. Furthermore, among subjects with a weak SOC, the high-impact GFC group had a higher prevalence (PR 1.20, 95% CI 1.01 -1.47) of psychological distress than the low-impact group.

Associations between work intensification and psychological distress (results Paper 3)

The aim of Paper 3 was twofold; first, to examine associations between ratings of work intensification and psychological distress caseness and, second, to compare employees' assessment of work intensification with the company's assessment in order to identify agreement or lack thereof.

The distressed employee group had a higher mean (2.68 95% CI 2.52-2.85) of self-rated (employee) work intensification than the non-distressed employees (the reference group, 2.33 95% CI 2.25-2.41). The

difference between the groups was statistically significant. Further comparison revealed that the non-distressed group reported a higher minimum intensification rate, while the distressed group reported a higher maximum intensification rate (data not shown). Both the crude and adjusted PRs of increased work intensification for the distressed group (with the non-distressed group as a reference group) showed a general tendency towards increased reported work intensification. The most pronounced difference in prevalence was found in the item demand for labour productivity (PR 1.30, 95% CI 1.21-1.40). Confounder adjustment did not alter the associations.

For company-rated work intensification, we found no difference between the distressed group and the non-distressed group (2.38 95% CI 2.21-2.55 versus 2.43 95% CI 2.29-2.57). We also found no difference in the prevalence of work intensification in the analysis of the single item ratings. Confounder adjustment did not alter the associations. In general, the discrepancy between employees' and companies' ratings of work intensification was close to what would be expected by chance (i.e. if employees and companies selected their ratings independently at random). No difference in the mean number of discrepant items was found between the distressed group (2.37 95% CI 2.23-2.51) and the non-distressed group (2.37 95% CI 2.30-2.43). Likewise, no difference in the prevalence of discrepancy in the single item analyses was found between the distressed group and the non-distressed group.

The distressed group had a significantly higher agreed rating of work intensification (1.35 95% CI 1.21-1.49) than the non-distressed group (1.21 CI 95% 1.20-1.30). No clear tendencies in the direction of association were observed in either the unadjusted or the adjusted single-item analysis, and only the PR of demands for labour productivity was significantly different from 1.0.

Association between globalization, work intensification and psychological distress (supplementary analyses for Paper 3)

As presented in Paper 1, work intensification is one of the possible management initiatives that may be taken to alleviate the pressures of globalization. For this thesis, we performed additional analyses on the association between globalization (*in casu* competition and the GFC impact, Paper 2), work intensification and psychological distress.

Competition

The distressed employee group exposed to high competition had a higher mean of self-rated (employee-rated) work intensification than the non-distressed employees (the reference group) as presented in Table 7. The difference between the groups was statistically significant. We found no statistically significant difference between the distressed and the non-distressed employees exposed to low competition in their rating of work intensification. For company-rated work intensification, we found no evidence of a

difference between the distressed group and the non-distressed group in either the groups exposed to low competition or in the groups exposed to high completion. However, a comparison between the two groups showed that the companies exposed to high competition reported statistically significantly higher degrees of work intensification than the companies exposed to low competition.

Table 7 Mean aggregated work intensification for distressed employees compared with non-distressed by employee ratings and company ratings stratified by competition

Aggregated rating	Employee rating				Company rating			
	Low competition		High competition		Low competition		High competition	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.28	(2.17-2.40)	2.39	(2.28-2.50)	2.24	(2.03-2.44)	2.63	(2.43-2.83)
Distressed	2.41	(2.15-2.67)	2.86***	(2.64-3.06)	2.14	(1.89-2.39)	2.60	(2.36-2.83)

Note: *p <.05 ** p <.01 *** p <.001. P-value for comparison of the non-distressed group mean to the distressed group mean

There was no difference between the distressed group and the non-distressed group in mean number of discrepant items in either the groups exposed to low competition or the groups exposed to high competition (Table 8). The distressed group exposed to high completion had a significantly higher agreed rating of work intensification than the non-distressed group. We found no statistically significant difference in the agreed rating of work intensification between the distressed and non-distressed employees exposed to low competition.

Table 8 Mean aggregated work intensification for distressed employees compared with non-distressed employees by discrepancy and agreed intensification ratings stratified by competition

Aggregated rating	Discrepancy rating				Agreed rating			
	Low competition		High competition		Low competition		High competition	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.38	(2.28-2.47)	2.36	(2.27-2.45)	1.09	(.97-1.21)	1.33	(1.20-1.47)
Distressed	2.40	(2.18-2.63)	2.32	(2.14-2.50)	1.09	(.88-1.30)	1.56*	(1.36-1.76)

Note: *p <.05 ** p <.01 *** p <.001. P-value for comparison of the non-distressed group mean with the distressed group mean

GFC

The distressed employee group exposed to a high impact of the GFC had a higher mean of self-rated (employee-rated) work intensification than the non-distressed employees (the reference group) as presented in Table 9. The difference between the groups was statistically significant. We found no statistically significant difference between the distressed and non-distressed employees exposed to a low impact of the GFC in their rating of work intensification. For company-rated work intensification, we found

no evidence of a difference between the distressed group and the non-distressed group in the groups exposed to a high impact of the GFC. In the group exposed to a low impact of the GFC, the companies rated work intensification lower for the distressed employees than for the non-distressed employees. A comparison between the two exposure groups showed that the companies exposed to a high impact of the GFC rated the degree of work intensification statistically significantly higher than the companies exposed to a low impact of the GFC.

Table 9 Mean aggregated work intensification for distressed employees compared with non-distressed employees by employee ratings and company ratings stratified by impact of global financial crisis (GFC)

Aggregated rating	Employee rating				Company rating			
	Low GFC		High GFC		Low GFC		High GFC	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.37	(2.24-2.50)	2.30	(2.19-2.40)	2.26	(1.20-1.30)	2.53	(2.36-2.71)
Distressed	2.43	(2.15-2.70)	2.83***	(2.63-3.04)	2.05*	(1.76-2.33)	2.57	(2.36-2.79)

Note: *p <.05 ** p <.01 *** p <.001. P-value for comparison of the non-distressed group mean with the distressed group mean

No difference was found between the distressed group and the non-distressed group in mean number of discrepant items either in the groups exposed to a low impact of the GFC or in the groups exposed to a high impact of the GFC (Table 10). The distressed group exposed to a high impact of the GFC had a significantly higher agreed rating of work intensification than the non-distressed group. We found no statistically significant difference between the distressed and non-distressed employees exposed to a low impact of the GFC in terms of the agreed rating of work intensification.

Table 10 Mean aggregated work intensification for distressed employees compared with non-distressed employees by discrepancy and agreed intensification ratings stratified by impact of global financial crisis (GFC)

Aggregated rating	Discrepancy rating				Agreed rating			
	Low GFC		High GFC		Low GFC		High GFC	
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.31	(2.20-2.43)	2.40	(2.32-2.48)	1.17	(1.03-1.32)	1.23	(1.12-1.34)
Distressed	2.29	(2.06-2.54)	2.41	(2.24-2.58)	1.10	(.87-1.33)	1.50**	(1.33-1.68)

Note: *p <.05 ** p <.01 *** p <.001. P-value for comparison of the non-distressed group mean with the distressed group mean

Additional analyses

In all models, confounder adjustment was performed for age, education and company size, and this did not alter any of the associations.

Discussion

The rationale behind *the GOPA project* is that psychological distress may arise in the wake of a growing instability and the transformation pressure of globalization, the increasing number of organizational changes and the new types of work organization that accompany these changes. Research based knowledge about the associations between globalization and psychological distress was very limited before the GOPA project. The few existing studies limited themselves to examining the effects of either competition or the GFC (2-5, 33)(2-5, 33), and the studies measured stress or similar constructs, not *distress*. The present study is one of the first studies to explore the derived effects of the external context (globalization), and it is the first study to collectively examine multiple aspects of the external context and the first external context study to use this type of validated outcome measures.

Main findings

Is globalization and dynamic capability management related to job insecurity?

The four globalization indicators presented in Paper 1 all showed a negative association between the globalization indicators and job insecurity in the univariate model. Only two variables, competition and market conditions, showed a negative association in the adjusted model. When analysed all together, the globalization indicators technology and liberalization seemed not to be associated with employees' feelings of job insecurity, most likely because they were highly correlated with competition (see Paper 1, Table 4).

Almost all of the management variables (four indicators of the learning organization and six indicators of flexibility) were negatively, statistically significantly associated with job insecurity in the univariate model. However, adjustment for indicators of globalization attenuated the effect size of almost all variables. When we also adjusted for industry type and company size, most associations were attenuated further, which indicates that industry type and company size are important factors to be considered. Regarding the management variables, the most consistent findings across all models were that national collaboration seemed to have a beneficial effect on job insecurity, whereas numerical flexibility seemed to have a negative effect on job insecurity. The remaining management results show a large degree of structural complexity as the associations between job insecurity and international collaboration, efficiency changes, institutional influence, and work intensification were dependent on industry type and company size.

The effect of the different variables on the outcome may seem rather small with a maximum three-point change on a 100-point scale as the most pronounced result. However, considering that most of the variation in job insecurity is likely to be attributable to individual-level characteristics, the fact that company-level variables can account for even a small part of the variation is an interesting finding. Furthermore, an overall tendency was found for all the management variables (except for national

collaboration) to be associated with an increase in job insecurity, but a large part of this negative effect is attenuated in the multivariate analysis. This attenuation may to some extent be attributed to the correlations between the management variables (reported in Paper 1, Table 4).

Supplementary analyses for Paper 1 showed that the distressed employees felt more insecure in their jobs than the non-distressed employees, and there seemed to be a dose-response association between insecurity and distress (indicating that the higher the job insecurity is, the higher is the risk of being psychologically distressed). These results corroborate previous findings of an association between job insecurity and mental health (4, 30, 31, 120). Though we did not examine this in our present study, job insecurity has also been associated with elevated psychotropic drug use (120) and with an increase in BMI and blood pressure (121). If the association demonstrated between globalization and job insecurity is of a causal nature, these detrimental health effects will be evidence of the potentially negative outcome of globalization.

The results present us with a conundrum; flexibility is regarded as a prerequisite for company competitiveness and survival (122). However, at the same time some aspects of flexibility (in particular *numerical* flexibility) can increase employee job insecurity (at the possible expense of employee health). On the one hand, if companies reduce their flexibility, they may lose their competitive edge and ultimately close down which effectively means that all employees lose their job. On the other hand, if companies increase their flexibility, they may heighten employee job insecurity, which is shown to affect employee health. Ill mental health increases the risk of sick leave (98), presenteeism (123), and loss of company performance/production (124). These findings implies that companies must find a delicate flexibility balance to uphold their competitiveness while at the same time avoiding that their employees are subject to excessive strain. Our results suggests that this is actually possible by utilizing some of the other aspects of dynamic capability management that were found not to be associated with increased job insecurity, like innovation changes, national collaboration, organizational learning and vocational training.

Is globalization associated with psychological distress?

We found an association between an increased prevalence of psychological distress and exposure to either fierce competition or a heavy impact of the GFC (Paper 2), but we found no evidence of any interaction between the two exposures. Although most of the variation in psychological distress can likely be attributed to individual-level characteristics, external company-level exposure may account for a small part of the variation, which is, indeed, an interesting finding and possibly of clinical relevance.

The effect of competition on psychological distress reported here corroborates previous findings by Idris (3) and Pelfrene (4). Likewise, we replicated the findings by Fenwick (33), Houdmont (2) and Tsai (5) as far as the associations between increased risk of psychological distress and exposure to the GFC are concerned.

The findings in Paper 2 indicate that employees in companies exposed to the pressures of globalization have an increased prevalence of psychological distress. For a deeper understanding of this matter, we must look to the results of the other two papers. The exact exposure assessment is complex, because we assume that the pressures of globalization and the management of these pressures are closely related in most companies (17). Thus, the results of Paper 1 suggest that the combination of globalization and the management hereof affect job insecurity (which again was associated with psychological distress). This corroborates our introductory statement which hypothesized that there are both direct and indirect (derived) effects of globalization. The results of Paper 3 add to our understanding of the matter because they indicate that the degree of work intensification is highest in those companies that are facing the heaviest pressure of globalization. They also show an association between work intensification and psychological distress effectively creating an indirect link from globalization to psychological distress.

Our results may indicate that globalization is associated with psychological distress (and job insecurity); but it is important to note that globalization is not always associated with negative consequences (125). For some companies, the GFC has opened up new possibilities, just as developments in technology have allowed some companies to transcend the national borders and gain access to new markets. When companies perish they leave room for other companies to emerge and take their place.

Does resilience protect against the impact of globalization?

A strong association between SOC and psychological distress was observed (Paper 2), which corroborates previous findings (35, 126). In addition, a weak SOC was associated with a much higher prevalence of psychological distress than both competition and GFC. This is also in accordance with the results of Albertsen (35), who found that SOC explained at least twice as much variance as the work environmental variables combined. This signifies two things; first, that individual-level factors weigh heavier in association with mental health problems than the external context, and second; that this is consistent across other work environmental variables

As stated in the introduction, no previous studies have examined if a strong SOC protects against the potential distressful effect of the external context. Our interaction analyses indicated that a weak SOC was associated with increased psychological vulnerability when the company was faced with fierce competition or a heavy GFC impact. No significant differences in the prevalence of psychological distress were observed

between employees with a strong SOC exposed to a high level of competition or a high GFC impact and employees exposed to less competition or a milder GFC impact.

SOC has previously been proposed as moderator of the associations between work environment and psychological distress (35). Our findings expand this to include the external context as well. Employees with a weak SOC may not be adequately equipped to manage the intangible demands of globalization. Rutten's (89) literature review on resilience suggests that positive emotions are crucial to counteract stress because positive feelings are strongly related to sense of meaning and life purpose; conversely, negative emotions following job insecurity may be a key component in how and why the pressures of globalization are affecting employees' mental health.

Is work intensification associated with psychological distress?

Distressed employees had a higher prevalence of self-reported work intensification than the non-distressed employees (Paper 3), but no difference in company-rated work intensification between the two groups was observed. Nor did the two groups differ in terms of discrepancy in company-employee ratings of work intensification. The employee/company-agreed work intensification was slightly (statistically significantly) increased in the distressed employee group compared with the non-distressed group.

The association between work intensification and psychological distress is less commonly examined (81, 127), and has never been explored in a multilevel study like the present. However, Waldenström (7) examined associations between psychological distress and work demands assessed separately by employees and experts. No systematic differences were found between self-reported and externally assessed working conditions for respondents reporting different levels of psychological distress. This is in accordance with our discrepancy results, and it indicates that self-reports of work intensification is as valid a reporting instrument for psychologically distressed employees as for non-distressed employees. This contrasts somewhat with the findings of for example Kolstad (11), who found inflated associations between self-reported work strain and mental health. However, it is worth noting, though, that the outcome measure of Kolstad's study was a depression diagnosis; a condition more detrimental than psychological distress (at commonly occurring levels in the working population), which may explain the contradictory results.

A very large proportion of employees had experienced at least some work intensification, which confirms the few previous findings (40, 128). Companies and employees did not agree about which single items of work had become more intense, but they did agree that work in general had become more intense. This is in contrast to the previous findings of Green (81) who found very little work intensification in Denmark

compared to Britain (and the rest of Europe) in the nineties. The time between Green's findings and ours is characterized by increased competition and the GFC (129), which could explain the rise in intensification. The supplementary analyses presented in Paper 3 showed that those distressed employees who were most exposed to globalization rated the degree of work intensification higher than both distressed and non-distressed employees who were exposed to less globalization. The companies exposed to most globalization rated the degree of work intensification higher than the companies exposed to less globalization. No difference was seen between the distressed employees and the non-distressed employees in terms of discrepancies in company-employee ratings of work intensification across globalization exposure. Finally, a higher level of employee/company-agreed work intensification was seen in the distressed employees exposed to most globalization than in the non-distressed employees and the distressed employees exposed to less globalization. Collectively these results suggests that there is an association between globalization and work intensification, and that distressed employees in globalised companies experience most work intensification.

Methodological issues/study design

The generalizability, validity and reliability of our study are limited by our choice of design. The cross-sectional nature of the study precludes assessments of causality. Still, there is little reason to believe that naturally insecure or distressed employees would seek employment in companies exposed to high levels of competition or where the market conditions had been particularly rough on the company. However, longitudinal studies are needed to move beyond such speculations.

Reporting bias in psychosocial research has been studied and discussed extensively for many years (6-11). The pivotal point is that of circular reasoning; distressed employees may rate work contents as more stressful than their non-stressed colleagues which would lead to overestimation of risk factors. Many explanations have been offered for this; negative affectivity (9, 92), persistent sadness or low mood of depression (11, 28), or low resilience (92). Conversely, underreporting by employees who never complain may lead to underestimation (10).

Various research methods have been proposed and brought to bear to circumvent the reporting bias so that more accurate risk factors or exposure levels may be found (37): first, estimation by group mean (shared job strain concept) – the entire working unit's mean estimation of the work contents (11); second, job exposure matrix - imputation using large-scale population studies or registry data mean values across the job titles or industry types have been developed (130); and, third, use of expert observation to evaluate the daily routines (131). While all of these methods each have their merit, they also come with their own set of bias. The working unit mean estimation could, for example, still be influenced by reporting bias, and

the subjective evaluation is left out. The job exposure matrix fails to account for company-level differences (10). The experts are only allowed to see through a small window of time (6), and those studies may further be biased by the Hawthorne effect (132), i.e. employees behave differently when being observed. In this study, we chose a multilevel design so that exposure and outcome were assessed separately. This approach increases the validity and reliability of our results because the assessment of the impact of globalization or its management will remain unaffected by the employees' mental health and resilience.

Setting and data collection

Response rates were 42% at the company level and 55% at the individual level. This could be considered rather low. However, these response rates are in line with response rates reported in meta-analysis findings at both executive and employee levels (133, 134). Web-surveys in general receive low response rates, and there is an overall trend over time towards declining response rates. The most important implications of low response rates are potential bias. Analysis of non-response shows that the number of non-respondents in both the company and the employee samples did not differ substantially between industry types or company sizes as presented in Table 11 and Table 12. Nor were any demographic differences found between responders and non-responder (data not shown).

Table 11. Company response rates by industry type and company size.

	Total	Respondents		Non-respondents	
	n	n	%	n	%
Total	1,383	589	42.6	794	57.4
Industry type					
Industry, quarrying, and supply	452	194	42.9	258	57.1
Construction and maintenance	168	64	39.1	104	61.9
Trade and transport	450	198	44.0	252	56.0
Information, communication, finance, and insurance	122	53	43.4	69	56.6
Real estate, rental business, service, and other	191	80	41.9	111	58.1
Company size					
Small (<50)	507	226	44.6	281	55.4
Medium (50-99)	377	156	41.4	221	58.6
Large (100+)	499	207	41.5	292	58.5

Table 12. Employee response rate by industry type and company size.

	Total		Respondents		Non-respondents	
	n		n	%	n	%
Total	6,626		3,646	55.0	2,980	45.0
Industry type						
Industry, quarrying, and supply	2,247		1,254	55.8	993	44.2
Construction and maintenance	701		333	47.5	368	52.5
Trade and transport	2,159		1,167	54.1	992	45.9
Information, communication, finance, and insurance	613		369	60.2	244	39.8
Real estate, rental business, service, and other	906		523	57.7	383	42.3
Company size						
Small (<50)	2,355		1,231	52.3	1,124	47.7
Medium (50-99)	1,837		1,018	55.4	819	44.6
Large (100+)	2,434		1,397	57.4	1,037	42.6

Company sample

Because of our weighted sampling strategy, replies from employees in smaller firms are over-represented in the study sample. The results are therefore not immediately generalizable to the general population of companies and employees in Denmark, although we have tried to improve the generalizability by adjusting the results for industry type and company size in the regression models. Our sample is based on the surviving DISKO 4 companies (which again are based on the surviving companies of the preceding DISKO surveys, though these surveys were supplemented with additional companies for representativeness). Thus, there is bound to be a *healthy company effect* (equivalent to the healthy worker effect (135)), as these companies have so far been able to persevere, where others have not. The companies worst at competing or most impacted by the GFC are most likely those companies that ceased to exist in the period between the DISKO 4 and the GOPA study (or even prior to that), which could lead to a possible exposure underestimation in our sample.

Employee sample

Our only employee inclusion criterion was that employees should have been employed within a given company for at least two years before answering the questionnaire. This criterion was implemented to ensure that they were employed for the entire period covered by the questionnaire. However, this inclusion criterion may have led to a lower overall prevalence of psychological distress in our sample than in the general population because individuals with common mental disorders are at a higher risk of long-term sickness absence and disability pension than the general population (136-138).

The inclusion criterion may also have implied that the proportion of long-term employed employees in our sample was higher than in the general working population. This added seniority may imply that these employees are not “first-in-line” in potential downsizing situations, which will contribute to a decreased feeling of job insecurity. However, these design-dependent circumstances should not affect the generalizability of our findings to employees in general, unless, of course, tenure affects reactions to management initiatives.

Our data was gathered from companies in the private sector so our findings are not generalizable to the public sector.

Survey instruments & measures

The company and employee questionnaires were both generic, meaning that the same questions were used across industry types and job titles. These types of questionnaires have been criticized because they use the same yardstick for measuring different work environments and work contents (114). This ultimately increases the risk of respondents answering questions with little relevance to their immediate context. This is the price of macro-studies. More context-specific questionnaires may be closer to the everyday problems of the work place; however, this specificity reduces the generalizability and the possibility for overall comparison.

Globalization and company management

The management part of the company questionnaire was based on the DISKO 4 survey, and had thus been tested before, but the globalization questions were new and had only been tested in the pilot study. In our initial assessment of globalization in Paper 1, four indicators were operationalized. Due to the high correlation between the competition, liberalization and technology indicators, we chose only to include competition and market conditions (GFC) in Paper 2 (and in the supplementary analyses for Paper 3).

It is conceivable that companies that were severely affected by the GFC would be less likely to take the time to answer a long questionnaire. This could have led to an underestimation of the impact of the GFC. Likewise, the companies most affected by competition would most likely be those that closed in the time period between the DISKO 4 survey and the GOPA study (though some of the attrition may also be attributed to mergers and acquisitions). This would again lead to a potential underestimation of the impact of the GFC in our study. Due to our weighted sampling strategy, replies from smaller firms are over-represented in the study sample. However, this would only result in bias if the effect of a high level of competition and a heavy GFC impact on psychological distress differs between small, medium and large companies. We have found no such indications in our data.

Work intensification

We have no reason to believe that companies having undergone work intensification would be less likely to answer a survey than companies where no work intensification had taken place. Employees who have experienced much work intensification could be under greater time pressure which would make it harder to find the time to answer the survey. This could lead to a possible underestimation of work intensification in the sample. Conversely, employees experiencing high work intensification may be more likely to participate in a study on working conditions to report this.

Job insecurity

Data were obtained during the financial crisis. This may have added to the general level of job insecurity since companies are more reluctant to hire new personnel in recession times; hence, it is more difficult to be reemployed if one loses one's job. The media was filled with news about the financial crisis, bank closures and falling real estate prices, which could make job insecurity a more urgent issue than in more financially secure times. While the increased focus of the financial crisis could lead to potential overestimation of job insecurity, the fact that the unemployment rate rose steadily during the entire period documents that the potentially heightened feelings of job insecurity are, indeed, warranted (Statistics Denmark).

Psychological distress caseness & sense of coherence

The SCL-90R and the SOC scale are well-validated questionnaires, which have both shown good reliability in the Danish working population (35). Our measurement of psychological distress was based on the SCL-90, but three questions were omitted since they were deemed inappropriate for use in general population studies. Since our distress outcome variable was based on the total score of the remaining 87 questions, and not on the subscales, we believe that this bias has only caused minor if any underestimation in the study.

Strength of evidence

The limitations described above indicate that the evidence provided by this thesis must be interpreted with some caution. The major limitations of the study are the low response rate, the reduced specificity of macro-studies and the cross-sectional study design. These limitations imply a preclusion of causality in the study and reduced generalizability; however, they do not affect the strength of the observed associations between companies and employees. The reliability and validity of these associations are supported by our multilevel approach, a large sample size and the robust outcome measures which are the major strengths of this study. In summary, we believe that our results may only be biased to a lesser degree and that these possible biases have not skewed data or critically interfered with the analysed associations between exposure and outcome.

Conclusions

Globalization described in terms of competition pressure and market conditions is associated with job insecurity, whereas the pressures of liberalization and technology are not (Paper 1). Furthermore, certain types of management aimed at alleviating the effects of globalization are also associated with job insecurity; however, these effects are not all consistent across industry types and company sizes.

Competition and to a lesser degree the impact of the GFC at the company level are associated with an increased prevalence of psychological distress among employees (Paper 2). There seems to be no interaction between the two exposure variables. Resilience is inversely associated with an increasing prevalence of psychological distress when employees are exposed to a high level of competition or a high GFC impact. Both the macroeconomic context and the internal organizational context should be taken into consideration when the impact of work on employees' mental health is investigated.

Minor differences in work intensification ratings between distressed and non-distressed employees exist, and these differences persist in company-employee-agreed ratings of work intensification (Paper 3). Distressed employees had a higher prevalence of self-reported work intensification than the non-distressed employees, but there was no difference in company-rated work intensification between the two groups. Nor did the two groups differ in terms of discrepancy in company-employee ratings of work intensification. The employee/company-agreed work intensification was slightly increased in the distressed employee group compared with the non-distressed group.

The effect sizes and prevalence ratios reported in the three papers indicate that the association between the external context and employees' mental health explains only a fraction of the entire mental health variance. Further, resilience might have a protective effect of the consequence of high level of competition or a high GFC impact. However, employees in companies that utilize numerical flexibility to manage globalization have a higher prevalence of job insecurity, and work intensification is associated with psychological distress. Our data suggests that globalization as an occupational exposure might influence the employee's mental health.

Perspectives

The present thesis adds to the knowledge of the association between company-experienced globalization pressures and employee mental health. However, the general lack of theoretical and practical knowledge in this field underlines the need for further comprehensive exploration of how the different contexts are associated.

To meet this need, more management strategies beside dynamic capability management should be examined. A strong focus on industry-specific differences and company size differences is also needed to arrive at a more nuanced understanding of the external context. Likewise, the effects of other company-related indicators of globalization like outsourcing, foreign ownership and multi-ethnic workplaces deserve attention.

In addition, the derived effects of globalization on other aspects of the psychosocial work environment should be examined, as the present study was limited to job insecurity and work intensification. The large discrepancy in company-employee ratings of work intensification observed in Paper 3 is another issue that deserves further examination.

At the individual level, other health-related outcomes like cardiovascular disease, sleep disturbances, sick leave and disability pension, mortality, as well as more specific mental health outcomes like depression, anxiety and psychotropic drug use should be examined. These outcomes have previously been associated with other types of workplace exposures.

Our findings on the importance of the external context on the work and individual context have two major research implications. First, the affirmation of external conditions as a potential harmful exposure warrants the need for future studies. Change lies in the very nature of globalization, why continuous monitoring might be considered necessary. Competitive pressures will undoubtedly rise with continuing globalization, and after completing the data collection, competitiveness (i.e. the ability to compete) has decreased even further among Danish companies (54). The labour market is still marked by growing long-term unemployment with the financial crisis going on its 7th year (129), and the impact of market conditions/GFC may even become more detrimental in the future should this trend continue. Second, contemporary studies on associations between the organizational context and the work or the individual context should be interpreted in the context of the external conditions. The GFC impact in particular can be regarded as a recent and temporary exposure, whereas the pressures of competition amount to a more permanent exposure.

Practice and policies

The effect sizes and prevalence ratios reported in the three papers indicate that the association between the external context and employees' mental health explains only a fraction of the entire mental health variance. This was expected, but it beckons the question how much emphasis should be given to future research and possible intervention. The annual burden of mental health problems of €7.4 billion in Denmark reported in the Background section indicates that even a fraction of psychological distress can ultimately cost millions in public funding (98). Notwithstanding this is the potential company loss of labour and production.

From a company perspective, the results of this study suggest that it could prove counterproductive to introduce too much work intensification as a way to overcome the transformation pressure of globalization as it may ultimately result in sick leave or worse for the employees (74). The same goes for numerical flexibility as a way for companies to adjust their staff needs; if numerical flexibility causes job insecurity among employees, and if job insecurity is associated with psychological distress as indicated by the present study, this may ultimately result in sick leave or presenteeism. Thus, managers should be aware of the potential employee costs of company flexibility.

As the pressure of globalization is hardly likely to diminish, companies should explore ways to mitigate its adverse effects. If low resilience (in the form of SOC) is associated with an increased risk of psychological distress when employees are exposed to globalization, as suggested by the results of Paper 2, intervention to improve resilience, for example through mindfulness courses (89), could be a preventive step companies should consider (139).

English Summary

Background and aims

Globalization in the form of growing competition and pressures of the financial crisis forces companies to find new ways of innovating products/services, increase productivity and cut costs. The pressure on the companies is transferred to their employees through organizational changes and work intensification. A multilevel theoretical framework is presented to describe the external, organizational, work and individual contexts. The aim of the present thesis is to examine how companies' perception/management of globalization is associated with aspects of their employees' psychosocial work environment and mental health. This is done in three papers:

Paper 1 examines the associations between globalization, management and job insecurity. Organizational flexibility and use of the learning organization are management initiatives that may be taken to alleviate the pressures of international competition, liberalization, technology development and market conditions.

Paper 2 examines associations between globalization measured at company level and psychological distress measured at employee level and the possible moderation of this association by an individual's sense of coherence (SOC).

Paper 3 examines associations between ratings of work intensification and psychological distress caseness, and the level of agreement between employee-rated and company-rated work intensification

Materials and methods

In this quantitative study, questionnaire data were collected in 2010 from 3,417 employees of 570 companies from the private sector (the exact number of eligible participants varies in the papers).

Regression models were used in Paper 1 to assess the association between globalization, management, and job insecurity. Prevalence ratios (PRs) were used in Paper 2 to compare the relative prevalence of psychological distress due to exposure to competition and the global financial crisis, and SOC, respectively.

Regression models were used in Paper 3 to compare different work intensification ratings across psychological distress strata.

Results

Competition pressure and market conditions were associated with increased job insecurity (Paper 1).

Likewise, numerical flexibility increased job insecurity. Collaboration with national customers and suppliers decreased job insecurity. The association between job insecurity and international collaboration, efficiency changes, institutional influence and work intensification depended on industry type and company size.

A high degree of competition was associated with an increased prevalence of psychological distress, as was a high exposure to the global finance crisis (Paper 2). A weak SOC was associated with a high degree of psychological distress. No interaction was present between the exposure to a high degree of competition and exposure to the global finance crisis and the prevalence of psychological distress, nor between either of the exposure variables and SOC.

Distressed employees rated the degree of total work intensification higher than non-distressed employees (Paper 3). The total score of employee/company-agreed work intensification and the prevalence of increased demands of labour productivity were higher among distressed than among non-distressed employees. In general, agreement between employee and company ratings of work intensification was poor. Neither company-rated work intensification nor employee/company discrepancy in work intensification ratings was associated with psychological distress.

Conclusion and perspectives

The results indicate that globalization contributes to a minor degree both directly and indirectly to psychological distress. Employees in companies that utilize numerical flexibility to manage globalization have a higher prevalence of job insecurity (a known risk factor for psychological distress). Both self-rated work intensification and work intensification agreed upon by company and employee are associated with psychological distress. This study establishes that globalization as an occupational exposure might influence the employee's mental health.

Danish Summary

Baggrund og mål

Globalisering har i de seneste mange år været citeret som årsag til arbejdsmæssig belastning uden, at denne påstand har været særlig veldokumenteret. Globalisering i form af eksempelvis øget konkurrence og finanskrisen (som udtryk for de generelle markedsvilkår) tvinger virksomheder til at finde nye måder at innovere produkter/ydelser, øge produktiviteten og reducere deres omkostninger. Gennem organisationsændringer og arbejdsintensivering bliver presset på virksomhederne dermed overført til deres ansatte. Denne afhandling præsenterer en multilevel teoretisk ramme til at beskrive sammenhænge mellem den eksterne, organisatoriske, arbejdsmæssige og individuelle kontekst. Formålet med afhandlingen er at undersøge, hvordan virksomhedernes opfattelse/håndtering af globaliseringen er forbundet med aspekter af deres medarbejders psykiske arbejdsmiljø og psykisk sundhed. Dette gøres i tre artikler:

Artikel 1 undersøger sammenhænge mellem globalisering, ledelsens håndtering af globalisering og medarbejder-oplevet jobusikkerhed. Ledelsens håndtering bliver set i et dynamisk kapabilitetsperspektiv, hvor organisatorisk fleksibilitet og anvendelse af den lærende organisation bruges som ramme til at forstå virksomhedernes håndtering af presset fra globalisering i form af konkurrencepres, liberalisering, teknologisk udvikling og de generelle markedsvilkår.

Artikel 2 undersøger sammenhænge mellem globalisering målt på virksomhedsniveau og psykisk belastning målt på medarbejderniveau og den mulige modererende effekt af den enkeltes følelse af sammenhæng (sense of coherence (SOC)).

Artikel 3 undersøger sammenhænge mellem vurderinger af arbejdsintensivering og psykologisk belastning, og sammenligner medarbejder og firmaers vurdering af arbejdsintensivering.

Metode og materiale

Datagrundlaget for dette studie er spørgeskemadata indsamlet fra 570 virksomheder fra den private sektor og 3.417 af deres medarbejdere (det nøjagtige antal af deltagere varierer i artiklerne) i 2010. I artikel 1 bruges regressionsmodeller til at vurdere sammenhængen mellem globalisering, ledelse og jobusikkerhed. I artikel 2 bruges prævalens ratio (PR) til at sammenligne den relative forekomst af psykiske lidelser på grund af udsættelse for hhv. konkurrence og den globale finansielle krise, og SOC. I artikel 3 bruges regressionsmodeller til at sammenligne forskellige typer af arbejdsintensiveringsvurderinger i forhold til psykisk belastning.

Resultater

Resultaterne af artikel 1 viste, at konkurrencepres og de generelle markedsforhold var forbundet med øget jobusikkerhed. Ligeledes var numerisk fleksibilitet forbundet med øget jobusikkerhed. Samarbejde med nationale kunder og leverandører var associeret med fald i jobusikkerhed. Sammenhængen mellem jobusikkerhed og internationalt samarbejde, effektivitetsændringer, institutionel indflydelse og arbejdsintensivering afhæng af industritype og virksomhedsstørrelse.

I artikel 2 var eksponering for en høj grad af konkurrence eller stor påvirkning af finanskrisen forbundet med en øget forekomst af psykisk belastning. En svag SOC var forbundet med en høj grad af psykisk belastning. Ingen interaktion var til stede mellem eksponering for en høj grad af konkurrence og eksponering for den globale finanskrisen i forhold til forekomsten af psykisk belastning, eller mellem nogen af de to eksponeringsvariabler og SOC.

I artikel 3 vurderede belastede medarbejdere graden af samlet arbejdsintensivering højere end ikke-belastede medarbejdere. Den samlede score af medarbejder-virksomhedsvurderet arbejdsintensitet var også højere blandt belastede medarbejdere. Generelt var der dog lav enighed mellem medarbejdere og virksomheder i deres vurdering af arbejdsintensivering. Hverken virksomhedernes vurdering af arbejdsintensivering eller forskellen mellem medarbejdere og virksomheders vurdering af arbejdsintensivering er forbundet med psykisk belastning.

Konklusion og perspektiver

Resultaterne af undersøgelsen indikerer, at globalisering, både direkte og indirekte, bidrager i mindre grad til psykisk belastning. Medarbejdere i virksomheder, der benytter numerisk fleksibilitet til at håndtere globaliseringen, har en højere forekomst af jobusikkerhed (en kendt risikofaktor for psykiske lidelser). Både selvurderet arbejdsintensivering og arbejdsintensivering, som virksomhed og medarbejder er enige om, er forbundet med psykisk belastning. Samlet set indikerer resultaterne af afhandlingen, at globalisering er en relevant arbejdsmiljøeksponering at undersøge nærmere i fremtidige epidemiologiske studier.

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Appendices

Papers 1-3

The GOPA project: publications and future studies

Paper 1

Management of Globalization and the Derived Effects on Job Insecurity: a

Multilevel Study

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Keywords: Globalization; management; job insecurity; psychosocial work environment; flexibility



Management of Globalization and the Derived Effects on Job Insecurity: a Multilevel Study

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Keywords:	Globalization, Management, Job Insecurity, Psychosocial Work Environment, Flexibility

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Management of Globalization and the Derived Effects on Job Insecurity: a multilevel study

This study focuses on associations between globalization, management, and job insecurity. Organizational flexibility and use of the learning organization are management initiatives that may be taken to alleviate the pressures of international competition, liberalization, technology development, and market conditions. Globalization has long been a proposed cause of job insecurity, but little research has focused on its indirect effect through companies' use of dynamic capability management: flexibility and the learning organization. In this quantitative study, questionnaire data were collected in 2010 from 3,417 employees of 570 companies from the private sector. We used regression models to assess the association between globalization, management, and job insecurity. The results showed that competition pressure and market conditions were associated with increased job insecurity. Likewise, numerical flexibility increased job insecurity. Collaboration with national customers and suppliers decreased job insecurity. The association between job insecurity and international collaboration, efficiency changes, institutional influence, and work intensification depended on industry type and company size. The study indicates that globalization and companies' management of globalization are associated with employee job insecurity. Future studies with more detailed employee-level information are needed to explore this association further.

Keywords: Globalization; management; job insecurity; psychosocial work environment; flexibility

Background:

The turbulent environment created by a globalized market produces substantial uncertainty and reduces the time frame for strategic actions in many companies. More than a decade ago, Hitt (1998) described the market situation as a state of *hypercompetition* (rapidly escalating competition and strategic maneuvering) with extreme emphasis on price, quality, and innovation. Given increased levels of competition, many companies strive to develop more dynamic, competitive, and

1
2
3 sustainable organizations. Across industries and company sizes, there are large
4
5 discrepancies in how companies develop their dynamic capabilities. Some choose to
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7 develop their organizational structure by prioritizing a learning organization; others
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9 implement organizational change to increase the company's flexibility.
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12 Technological innovation has allowed many basic repetitive functions to be replaced by
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14 machines, and innovations in communication and transport have enabled rapid transfer
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16 of work to newly industrialized countries. As a result many workers formerly under the
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18 impression that their position in the organization was safe now perceive their position to
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20 be more uncertain (Ferrie 2001).
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24 Scott (2004) hypothesizes that the causes of job insecurity can no longer be
25
26 confined to an organizational micro level, i.e. the standard employment relationship.
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28 She argues that three decades of economic restructuring in the age of globalization have
29
30 brought along a fundamental shift in employment relations, and that job insecurity
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32 constitutes a structural feature of the new labor market. The experience of job insecurity
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34 has shifted from a transient to a chronic state associated with long-term and traumatic
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36 forms of strain.
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40 The perceived threat of job loss or loss of aspects of one's job combined with a
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42 sense of powerlessness or inability to do anything about it is the focal point of job
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44 insecurity (Baran, Kanten 2009). As proposed by Lazarus and Folkman (1997), the
45
46 anticipation of a stressful event represents an equally important, and in some situations
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48 greater, source of anxiety than the actual event itself. This has been confirmed in
49
50 multiple studies which have consistently found associations between job insecurity and
51
52 increased health problems like stress and depression (Sverke, Hellgren 2002, Quinlan
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54 and Bohle 2009, Ferrie 1998).
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3 The present study focuses on the relationships between globalization, dynamic
4 capability management, and job insecurity among Danish companies and their
5 employees. It is widely assumed that the increasing globalization of the economy has
6 led to an increased transition pressure among companies. This would be expected to be
7 particularly visible in Denmark where many companies operate within an open
8 economy with limited market growth, which demands that the company is able to
9 respond rapidly to market signals via organizational flexibility and a learning
10 organization. We aim to analyze the associations between job insecurity and
11 globalization; both directly as external conditions and indirectly through the
12 management efforts implemented by companies in an effort to respond to
13 transformational pressure. Our empirical analyses are based on cross-sectional
14 multilevel questionnaire data on the 2007-2009 time period collected in the Danish
15 private sector in 2010 among both employers and employees.
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33 **Theoretical overview**

34 ***Globalization***

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36
37 Friedman (2000) proposes that if the defining anxiety of the Cold War was fear of
38 nuclear annihilation, the defining anxiety of globalization is fear of rapid change “– a
39 sense that your job, community or workplace can be changed at any moment by
40 anonymous economic and technological forces that are anything but stable” (Friedman
41 2000, p. 12). Among the many definitions of globalization, we choose to limit our
42 understanding to four continuous, interrelated processes. *Liberalization* and opening of
43 free markets have opened up potential cross-border markets for companies. Advances in
44 *technology* have made this economically viable as a result of falling transport prices and
45 developments in communication. In many ways, technological innovations have been
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2
3 the pivotal catalyst for the rapid development of today's competition transcending the
4
5 previous boundaries of information, communication, and transport. This has led to
6
7 increased levels of *competition* for many companies, which compete with companies
8
9 around the world for their share of the market. A rising global interdependence of the
10
11 economy is a consequence of this development, and the financial crisis may be seen as
12
13 an example of the current *market conditions*. Lundvall (2002) states that the context of
14
15 increasing competition and advancements in technology can be viewed as a
16
17 transformation pressure. Either the companies keep up innovation and development of
18
19 new products or they perish when competitors develop similar products that are cheaper
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21 and better.
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26 • Research question 1: Is company exposure to globalization associated with
27
28 increased job insecurity for employees?
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31 32 ***Management***

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34 Augier and Teece (2008) propose that dynamic capability management is a key
35
36 component to survive (and succeed) in a globalized economy characterized by rapid
37
38 change:
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42
43 “*Dynamic capabilities relate to the enterprise's ability to sense, seize, and adapt, in*
44
45 *order to generate and exploit internal and external enterprise specific competences and*
46
47 *to address the enterprise's changing environment*“ (Augier and Teece 2008, p. 1190)
48

49 The paradox for many of the companies responding to competitive or financial
50
51 pressures of globalization and the current downturn may be that they are reorganizing
52
53 work and structures to develop flexibility and innovation at a time when employees may
54
55 feel insecure and less able to engage in change (Ferrie and World Health Organization.
56
57 Regional Office for Europe 1999). The companies are dependent on the commitment,
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1
2
3 motivation, and skills of their employees to innovate and survive. However, employees'
4
5 commitment and motivation are likely to decrease when they experience insecurity,
6
7 which will simultaneously halt organizational effectiveness (Greenhalgh and Sutton
8
9 1991).

10
11 The following sections will offer a theoretical exploration of the possible
12
13 associations between job insecurity and two domains of dynamic capabilities, the
14
15 learning organization and organizational flexibility.
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18 19 20 ***Learning organization***

21
22 The rapid introduction and diffusion of technology increases the speed of erosion of
23
24 skills and creates a continuous need for acquiring new knowledge, skills, and
25
26 competencies (Nielsen, Lund 2008, Cegarra-Navarro and Dewhurst 2007). According to
27
28 Nielsen and Lundvall (2003), the important change is not the more intensive use of
29
30 knowledge in the economy, but rather that knowledge becomes obsolete sooner than
31
32 before. It is a competitive imperative that companies possess valuable skills to which
33
34 other companies have no access; especially skills and competences competitors that
35
36 cannot easily copy. This can be achieved by strengthening the ability to create, acquire,
37
38 and use knowledge (MEADOW consortium 2010). Companies can build and
39
40 continually renew their unique skills in three ways: through internal or external staff
41
42 training, networking with other organizations, or recruitment of new talent. Increased
43
44 employee flexibility and formal qualifications are necessary for the companies' ability
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46 to adapt; however, these demands increase the work demands of the employees
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48 (Nielsen, Lund 2008).
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53 54 55 ***Organizational learning***

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57 According to a report on Danish flexicurity (Bredgaard, Larsen 2006), the upgrading of
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3 skills and qualifications of the workforce is crucial to meet the challenges of
4
5 globalization. This upgrading should increase quality and innovation so that Danish
6
7 companies do not have to compete on price. Organizational learning can be divided into
8
9 formal and informal learning. (Nielsen and Lundvall 2003). Formal learning refers to
10
11 continuous or vocational training like standard courses / training, or training tailored to
12
13 specific business needs. Informal learning refers to intra-firm processes such as
14
15 sparring, job rotation, and team work, which can be regarded as more practice-related
16
17 skill development. While organizational learning decreases the employees' job
18
19 insecurity because they gain relevant skills that enhance their value to their
20
21 organizations, the employees left out of the education loop will be more vulnerable.
22
23 Furthermore, the employees might be under pressure to develop or they may risk to be
24
25 left behind on the career ladder (Standing 1997).
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30 31 *Networking/use of external collaborators*

32
33 The current technological development generates a growing flow of information which,
34
35 in turn, increases the need for inter-company relationships to manage and convert the
36
37 information for use in product development (Cegarra-Navarro and Dewhurst 2007,
38
39 Lundvall 1999). Access to knowledge through international partners can provide access
40
41 not only to technological capabilities embedded in partner firms, but also to capabilities
42
43 embedded in the partner's national environment. By merging separate home-based
44
45 technological capabilities, international collaboration can create unique and powerful
46
47 competitive opportunities (Vinding and Drejer 2006). However, these types of
48
49 collaborations do not come without risk or costs. One such risk is that the collaborators
50
51 will go elsewhere with their newly gained knowledge. The companies are potentially
52
53 revealing key aspects of their products and services, which leaves them vulnerable.
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55 Furthermore, they are making themselves more dependent on outside forces (Bruce,
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3 Leverick 1995). Employees may see the inter-enterprise collaboration as the first step in
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5 the direction of franchising, subcontracting, or outsourcing, which will increase their
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7 job insecurity.
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- 10 • Research question 2: Is company use of the learning organization associated
11
12 with increased job insecurity for employees?
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15 *Flexibility*

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17 To remain competitive, companies must develop flexible organizations and they must
18
19 absorb new technology. Employees are increasingly confronted with frequent minor
20
21 daily stressors related to changes in technology and workplace practices, and with the
22
23 major upheavals of mergers, downsizing, and restructuring (Sikora, Beaty 2004, Di
24
25 Nunzio, Hohnen 2009). Fewer people at work are doing more and feeling less secure in
26
27 their jobs because of radical organizational changes (Sparks, Faragher 2001).
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30
31 Flexibility promises more secure jobs through increased competitiveness, but also
32
33 represents a highly effective cost-saving strategy. The closer adaptation of working
34
35 hours to workload means that fewer employees are needed to provide the same services.
36
37 The company's demand for flexibility is translated into job insecurity for the employees
38
39 (Ferrie and World Health Organization. Regional Office for Europe 1999).
40
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45 *Organizational change*

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47 In principle, there are two types of situations that can lead a company to implement
48
49 organizational change in pursuit of a higher degree of flexibility. The first situation is
50
51 one where the company is subject to crisis-like conditions that may, for example, result
52
53 from increased competition. Such conditions will force the company into a search for
54
55 new ways to become more efficient. The second situation is one where the company is
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1
2
3 developing a strategy for organizational renewal and innovation. In a previous study on
4
5 the Danish innovation system, a clear tendency was shown to the effect that an
6
7 increasingly competitive environment would be countered by organizational change
8
9 (Lundvall 1999). Many companies are introducing new forms of organization or new
10
11 products in response to growing competition. Inversely, companies acting under stable
12
13 conditions are more likely to achieve good performance with less organizational and
14
15 technical innovation because competitive pressures remain modest.
16
17

18
19 Companies are rarely static entities these days; most are in a state of permanent
20
21 change, and an important role of management is to direct the pace of change.
22

23
24 Organizational change can be divided into two categories: efficiency-related change or
25
26 innovation-related change. As implied by the name, efficiency-related change aims to
27
28 improve the company's effectiveness, which can be achieved through a strengthening of
29
30 the efficiency of its daily operations like in the process-trimming of LEAN. Efficiency-
31
32 related change may also refer to efforts to improve the cooperation and coordination
33
34 across the organization to improve communication internally, but also externally.
35

36
37 Efficiency is extremely important in open markets because the level of efficiency often
38
39 determines a company's profit and, ultimately, its survival. Innovation-related
40
41 organizational change is implemented to increase the company's adaptation capacity,
42
43 but also the development of new products or services. The degree of organizational and
44
45 technical innovation is strongly related to production levels (Lundvall 1999).
46
47

48 49 *Influence on decisions in organizational change processes*

50
51 It is important to distinguish between the contents and the process of organizational
52
53 change (Tvedt, Saksvik 2009). While the contents refer to actual change implemented,
54
55 the process concerns how the change is planned, launched, and carried out. Tvedt
56
57 (2009) suggests that the lack of success in many organizational change projects and the
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1
2
3 subsequent psychosocial work environment problems may be due to an underestimation
4
5 of the significance of the quality of the organizational change process. The change
6
7 process can either be participatory or institution-driven in which case the employees are
8
9 represented in the joint meetings with managers or project groups. This type of process
10
11 will often instill a firmer commitment to change and involve less insecurity since
12
13 employees will receive more information which, in return, creates fewer negative
14
15 rumors (Bordia, Hobman 2004). Alternatively, the change process can be management-
16
17 driven, which represents a more top-down type of management that leaves employee
18
19 participation out of the equation. The advantages of including the employees in the
20
21 change processes are many: the employees' knowledge about local conditions is more
22
23 likely to emerge and to be used when participation is encouraged. Thus, resources that
24
25 are important to a successful change process are brought into play (Rasmussen,
26
27 Glasscock 2006). According to Vakola and Nikolaou (2005), employees come to
28
29 organizations with certain needs, skills, and expectations, and they hope to find a work
30
31 environment where they can use their abilities and satisfy their needs. When an
32
33 organization can provide these opportunities, it is likely to increase employee
34
35 commitment. If the employees are not included properly in the decision processes or the
36
37 organizational changes, their needs and skills are not being honed, and insecurity in
38
39 regards to their future employability may arise.
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45 During organizational change, employees are required to adapt to the changes in
46
47 order to accommodate to the needs of the organization. However, change requires that
48
49 the employees alter their usual modus operandi which, in itself, requires substantial
50
51 expenditure of energy. Furthermore, the move from something well-known pre-
52
53 organizational change to something unknown post-change may also contribute to job
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55 insecurity (Alexander-Stamatios G. Antoniou and Cooper 2005).
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Numerical flexibility

Numerical flexibility refers to the customization of the workforce through recruitment and dismissal, adjustment of working hours (overtime, flextime, and distribution), and use of temporary appointments (Burchell, Ladipo 2001). Use of temporary appointments has been associated with an increase in job insecurity (Banerjee, Tolbert 2012). Another possible aspect of numerical flexibility, i.e. downsizing, affects the sense of job insecurity of the “surviving” workers. Furthermore, downsizing comes with the risk of attenuating company’s competitiveness due to the reduction of resources which, in turn, actually decreases the company’s flexibility (Luan, Tien 2012, Kawai 2011). Downsizing has also been consistently linked to detrimental health effects, albeit the risk varies by age, socioeconomic status, and health (Kivimaki, Honkonen 2007, Vahtera, Kivimaki 1997). The long-lasting effects of downsizing and restructuring may be that employees no longer take their jobs for granted (Alexander-Stamatios G. Antoniou and Cooper 2005).

Work intensification

One of the goals of the adaptation to a learning organization and to organizational changes is to increase the effort employees put into their jobs during their working time. Such effort can be translated into work intensification. Numerous factors can contribute to work intensification: changes in the organization of production, particularly those linked to lean production systems; changes in work organization, particularly in regards to increased authority; the technological changes linked to advances in automation and computerization; downsizing that reduces the number of hands without reducing the overall workloads; the introduction of working time reductions without any compensatory increases in new hires (MEADOW consortium 2010, Burchell, Ladipo

2001). Work intensification is inherently a limited process since human physical and mental capacities do not allow an endless extension of efforts. The endless spiral of rationalization can increase job insecurity since employees will be worried if they can continue to honor the work intensification.

- Research question 3: Is company use of flexibility associated with increased job insecurity for employees?

Materials and Methods:

Study design

The empirical analyses were based on cross-sectional multilevel questionnaire data regarding the time period 2007-2009 collected among both employers and employees in the Danish private sector in 2010. The data collection process was similar to that of a previous survey (Gjerding 1997), and this process is explained in detail in the *setting and data collection* section. We subsequently explain the construction of the numerical scores used to assess the association between job insecurity and globalization as well as management of globalization.

Setting and data collection

Company sample

In the mid-nineties, the “*Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks*” (DISKO) questionnaire surveys were initiated in order to investigate the Danish innovation system (Gjerding 1997). Of particular interest was how different management and organizational principles, including elements of the learning organization, and various types of organizational changes were related to

1
2
3 innovation. The companies participating in the DISKO surveys were selected to
4
5 represent the general industry distribution across the private urban sector in regards to
6
7 industry type and company size. Two exceptions were made: companies with more than
8
9 100 employees were all included as these were thought to be the most innovative
10
11 companies. Conversely, companies with less than 10 employees were excluded as these
12
13 were deemed too small to have relevant management practices. The first DISKO survey
14
15 was completed in 1996 and yielded 1,900 questionnaire responses. The subsequent
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17 surveys were supplemented with additional companies to make the sample
18
19 representative. In 2006, the DISKO 4 was completed with 1,770 questionnaire
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21 responses (Zimmermans 2008, Dahl 2011).
22
23

24
25 In 2010, the same companies were assessed in the *Globalization,*
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27 *Transformational Pressure, and Psychosocial Work Environment* (GOPA) study. The
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29 GOPA company sample was based on the remaining companies participating in DISKO
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31 4. Of the 1,770 DISKO 4 companies, 254 were either closed or were listed as having
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33 fewer than 10 employees (a company size which was deemed too small to be relevant
34
35 for this study). During the initial establishment of the updated company contact
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37 information (email, address, and phone number), another 86 companies requested to be
38
39 removed from the study. Unique login information for the GOPA web-questionnaire
40
41 was emailed to 1,430 companies (if email information was unavailable, they were
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43 contacted by letter). The companies were reminded twice by email or letter to respond,
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45 and once by phone. The questionnaires were sent to the manager, or the HR manager, or
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47 someone holding a similar position within each company.
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52 A total of 601 companies answered the survey, which corresponds to a response
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54 rate of 42%. Of these, another 31 had to be removed due to missing answers for key
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56 variables or lack of employee responses. A total of 570 companies were included.
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Employee sample

All potential salary earners (n=79,431) from the responding companies were extracted from Statistics Denmark's registry data (a collection of information supplied by administrative registers of governmental agencies). Based on preliminary statistical power calculations, approximately 2,000 respondents were deemed sufficient in order to detect relevant differences. According to estimates from Statistics Denmark, a total of 6,626 individuals had to be included in the study to guarantee the desired response rate. However, approx. 85% of the employees were employed in approx. 35% of the companies, which would lead to an under-representation of employee responses from smaller companies if simple random sampling was used to select companies. To avoid over-representation of larger companies, a weighted sampling strategy was used so that smaller companies would have a larger percentage of their employees selected.

The company responses spanned five different industries. Companies were divided into three size groups (20-49, 50-99 and >100 employees), which yielded a total of 15 analytical categories. If more than 50% of the companies within one of the 15 categories were non-responders, more participants would be sampled from responding companies within that category. Depending of the size of the company, up to 12 persons were selected for participation.

Employees were contacted by letter and informed to answer a web survey. A first reminder was sent by letter, a second reminder by telephone with an option to participate through phone interview instead of the web survey. A total of 6,626 employees were contacted. The employee response rate was 55% corresponding to a sample size of 3,651 men and women aged 16 to 81 years. Of the 2,975 non-respondents, 558 persons reported to be not relevant to this survey, 599 refused to

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3 participate, and 1,818 could not be contacted by phone; or the interview had to be
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5 cancelled due to language barriers, sickness, or travel.
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8 A total of 173 employees were not employed in the company in which they were
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10 presently working during the time period 2007-2009 (which was the only employee
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12 inclusion criteria for the study). Another 61 employees were excluded due to missing
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14 company data. The final sample consisted of 3,417 employees of whom 68% were men
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16 and 32% were women. Their age ranged from 16 years to 82 years, with the median age
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18 being 48 years.
19

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23 INSERT FIGURE 1 HERE

24
25 Figure 1 Recruitment and follow-up flow diagram for the DISKO study and the GOPA
26
27 study.

28 29 *Variables*

30 31 *Job insecurity*

32
33 A measure of job insecurity was constructed by using three items from the Copenhagen
34
35 Psychosocial Questionnaire (COPSOQ) (Pejtersen, Kristensen 2010, Kristensen,
36
37 Hannerz 2005). (JI1, JI2, and JI3 in Table 3) alongside two new questions specifically
38
39 designed for this study (JI4 and JI5 in Table 3). As with the original COPSOQ scale, the
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41 job insecurity scale was transformed to go from 0-100, with 0 representing the highest
42
43 degree of job insecurity.
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48 49 *Globalization and company management*

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51 The management questionnaire was inspired by questions used in the OECD Oslo
52
53 Manual (Organisation for Economic Co-operation and Development and Statistical
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55 Office of the European Communities 1997) as well as the MEADOW guidelines
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57 (MEADOW consortium 2010). Response categories were formulated as bipolar Likert
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3 rating scales. To measure the degree of company globalization and to quantify aspects
4
5 of company management, we created a number of composite variables. The theory
6
7 presented in the theoretical overview was used to select relevant items for each of the
8
9 variables.
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12
13 Table 1 Theoretical constructs, variables, and items

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19 Table 1 provides an overview of the operationalization process starting from general
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21 theoretical constructs, to variable names, and finally to questionnaire items. All scales
22
23 were coded to go from 1 to 5 and afterwards standardized (rescaled to have a mean of
24
25 zero and a standard deviation of one). The internal consistency of the variables was
26
27 assessed using Cronbach's α (as presented in Table 4). The original items of the work
28
29 intensity variable examined work intensification stratified by educational level, but they
30
31 were recoded to reflect the overall work intensification in the company instead.
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36 ***Statistical analyses***

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38 Descriptive summaries of industry type and company size were constructed. Cronbach's
39
40 α and correlation analyses were performed for all composite variables. Non-parametric
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42 Spearman's rank correlation coefficients were used because of the Likert response
43
44 categories of the original items.
45

46
47 We used linear regression models to assess the association between job
48
49 insecurity and the indicators of globalization and management. Due to the multilevel
50
51 structure of the data, the regression models were based on generalized estimating
52
53 equations (GEE), which allowed for correlated measurement errors within companies
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3 (exchangeable correlation structure; i.e. all observations within each company are
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(exchangeable correlation structure; i.e. all observations within each company are equally correlated).

The data were analyzed according to a predefined schedule. The first step focused on the association between globalization and job insecurity. We first analyzed the association between job insecurity and each globalization variable without taking other variables into account. Next, we performed multivariate regression analyses in which all globalization variables were included simultaneously. Finally, we performed multivariate regression analyses including all globalization variables and adjusted for industry type and company size. This concluded the initial analysis of globalization and job insecurity. The association between job insecurity and management variables was first analyzed without taking other variables into account. This analysis was followed by a multivariate regression analysis in which we adjusted for all globalization variables. We finally performed multivariate regression analysis adjusting for globalization variables, industry type, and company size. Due to the many subjective decisions involved in the construction of our variables and the large span across industry types and company sizes in our sample, the results of the regression analyses are primarily explorative. We therefore chose to present the results in the form of forest plots since the direction of the association and the relative sizes among variables are more sensible explorative summaries than the precise, numerical point estimates. Seven of the 570 companies had missing data on a single item within a variable. Such missing values were replaced with the average score among valid questions within the given variable. The management questionnaire featured an answer category “do not know” in all questions. This indicated that the given management strategy was not present/important in the company. This item was given a zero score when the composite score was computed. Sensitivity analyses to establish the effect of these choices were

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2
3 performed and are reported in the Results Section. First, a sensitivity analysis where the
4
5 10% of companies with the highest number of “don’t know” answers were removed
6
7 (n=520) was performed. We also performed an analysis where all companies with “do
8
9 not know” answers were removed (n=249).
10

11 All data analyses were done using Stata/IC 11.2 (StataCorp LP, 2008).
12

13 14 **Results**

15 16 *Descriptive statistics*

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18 Table 2 summarizes the distribution by industry type, company size, and number of
19
20 employee respondents. For the small companies (<50 employees), the commerce sector
21
22 (3. Trade and transport industry) was the best represented with 94 companies (43% of
23
24 the group). The medium-sized companies (50-99 employees) and large companies
25
26 (100+ employees) followed a similar pattern with the industry sector (1. Industry,
27
28 quarrying, and supply) as the best represented group.
29
30
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35 In total, both the industry sector and the commerce sector were represented by
36
37 191 companies each (34%). but more employees had answered from the industry sector
38
39 (1,214 employees) than in the commerce sector (1,079 employees) because of the semi-
40
41 weighted sampling design. The three other industries construction (2. Construction and
42
43 maintenance), information (4. Information, communication, finance, and insurance),
44
45 and real estate (5. Real estate, rental business, service, and other) represented the
46
47 remaining third of the companies.
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50
51 Table 2 Industry type and company size stratified by distribution of company and
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53 employee respondents
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56 INSERT TABLE 2 HERE
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3 Table 3 presents the internal consistency of the job insecurity variable. Most of the
4 items comprising the job insecurity variable were highly correlated, as also indicated by
5 a Cronbach's α of 0.81. JI3 was only modestly correlated with the other items, and least
6 with JI1 and JI2. However, leaving JI3 out of the scale did not substantially alter the
7 Cronbach's α . In the job insecurity scale, 0 represented high job insecurity and 100
8 represented low job insecurity. The median job insecurity was 75 (interquartile range:
9 60-90).
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19 Table 3 Spearman's correlation matrix of the job insecurity variables ($n=3,417$)
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22 INSERT TABLE 3 HERE
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24

25 Table 4 presents the Cronbach's α and Spearman correlation between the exposure
26 variables. The Cronbach's α values are generally high across all variables, which
27 suggests a high internal consistency of the scales except for the variables institutional
28 influence ($\alpha=.55$), market conditions ($\alpha=.62$), numerical flexibility ($\alpha=.66$), and
29 international collaboration ($\alpha=.68$), which are low according to Nunnally's (Nunnally
30 1978) rule of thumb.
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38 Overall, two conclusions can be drawn from the correlation matrix. First, none
39 of the variables are substantially negatively correlated. Second, the correlation
40 coefficients are generally modest with only one correlation (efficiency
41 changes/innovation changes ($r_s=.82$) above $r_s=.50$). Focusing on the globalization
42 variables, competition, liberalization, and technology were positively correlated with r_s
43 $=.42$ or above. This was to be expected as all items within the scales refer to
44 competition. Market conditions showed a low correlation with competition ($r_s=.26$) and
45 liberalization ($r_s=.15$), and no correlation with technology ($r_s=.04$). Among the
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3 globalization variables, market conditions were also the item that correlated least with
4
5 the management variables.
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7

8 In the management section, all variables within the learning organization were
9
10 somewhat correlated, with the largest correlation coefficient between organizational
11
12 learning and vocational learning ($r_s = .48$). These two variables were also correlated with
13
14 the remaining management variables. This suggests that all companies give some
15
16 priority to education of their employees. In contrast, external collaboration correlated to
17
18 a lesser degree with the flexibility variables. Within the flexibility variables, efficiency
19
20 changes and innovation changes were highly correlated ($r_s = .82$), while institutional
21
22 influence was the variable least correlated with the other variables in the group.
23
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26
27 Table 4 Cronbach's α and Spearman correlation matrix of globalization and
28
29 management variables
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36 ***Globalization***

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38 To address the first research question posed in the theoretical overview, we analyzed the
39
40 association between job insecurity and the four globalization variables: competition,
41
42 liberalization, technology, and market conditions. The results of the regression analyses
43
44 are reported in Figure 2. The regression shown represents the expected change in job
45
46 insecurity for a one-standard-deviation increase in the independent variable (as all
47
48 variables were standardized); negative coefficients imply an increase in job insecurity,
49
50 whereas positive coefficients imply a decrease in job insecurity. Since independent
51
52 variables are standardized, it is meaningful to compare the relative sizes of regression
53
54 coefficients.
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3 The univariate analyses indicate that an increase in each of the globalization variables
4 will increase job insecurity with the most pronounced effect found for competition (-2.2
5 [-3.1 to -1.4]) and market conditions (-2.3 [-3.2 to -1.4]). However, in the model
6
7
8 adjusted for all globalization variables, the effects are attenuated and the confidence
9
10 intervals of liberalization (-.8 [-1.9 to .2]) and technology (.2 [-.8 to 1.3]) cross from a
11
12 negative to a possibly positive effect (most evident for the technology variable).
13
14 Adjustment for size and industry further attenuated the effect of all variables. Market
15
16 conditions and competition remained the most important variables. In regard to the first
17
18 research question, our findings offer support for the hypothesis of an effect of market
19
20 conditions, and, to a lesser extent, an effect of competition as indicators of globalization
21
22 in association with job insecurity. On the other hand, the effects of liberalization and
23
24 technology on job insecurity seem less clear.
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30 INSERT FIGURE 2 HERE
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33 Figure 2 Univariate and adjusted regression coefficients of the association between
34 globalization and job insecurity with 95% confidence intervals. The regression
35 coefficients represent the expected change in job insecurity for a one-standard-deviation
36 increase in the independent variable.
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43 ***Learning organization***

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45 The first row in Figure 3 presents the univariate analyses of the four learning
46 organization variables used to analyze the second research question. Use of
47 organizational learning (-1.0 [-1.9 to -.2]) and use of international collaboration (-2.6 [-
48 3.5 to -1.7]) had the largest impact on job insecurity, whereas the univariate analyses of
49 vocational training (-.5 [-1.4 to .5]) and national collaboration (.3 [-.6 to 1.8]) indicated
50 that these variables had little or no association with job insecurity. In the model adjusted
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3 for globalization (competition, liberalization, technology, and market conditions), the
4
5 effects of organizational learning (-.7 [-1.6 to .2]) and vocational training (-.4 [-1.3 to
6
7 .5]) were substantially lowered, which leaves international collaboration (-1.9 [-2.8 to -
8
9 1.0]) and national collaboration (.9 [.0 to 1.8]) as the two variables most strongly
10
11 associated with job insecurity. Adjustment for industry type and company size in
12
13 addition to globalization considerably attenuated the effect of organizational learning (-
14
15 .1 [-1.0 to .8]), vocational training (.1 [-.8 to .9]), and international collaboration (-.3 [-
16
17 1.2 to .7]). Only the positive effect of national collaboration (1.0 [.6 to 1.8]) remained
18
19 sizeable.
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22

23 24 *Flexibility*

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26
27 Dynamic capabilities related to company flexibility were operationalized using six
28
29 different variables. Figure 3 shows the univariate associations with job insecurity. We
30
31 found that all variables were associated with an increased job insecurity with the largest
32
33 effect being that of numerical flexibility (-1.6 [-2.5 to -.7]). Adjustment for
34
35 globalization attenuated the effects of all variables, except institutional influence (-1.5 [-
36
37 2.4 to -.6]). Adjustment for industry type and company size further attenuated the effect
38
39 of all flexibility variables. Only numerical flexibility (-1.1 [-1.9 to -.2]) was above -1.
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41 The effect of innovation changes changed from negative to a modest, positive effect (.3
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43 [-.5 to 1.2]).
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INSERT FIGURE 3 HERE

Figure 3 Univariate and adjusted GEE coefficients of the association between job
insecurity and management with 95% confidence intervals. The regression coefficients
represent the expected change in job insecurity for a one-standard-deviation increase of
the independent variable.

Sensitivity analyses

Sensitivity analyses to determine the effect our scoring of the “don’t know” category were performed. These analyses did not substantially alter the above conclusions.

Discussion

In the theoretical overview, we raised three research questions to examine the associations between globalization, management, and job insecurity. The first research question was assessed by examining four indicators of globalization. All showed a negative association between globalization and job insecurity in the univariate model, but only two variables, competition and market conditions, showed a negative association with job insecurity in the adjusted model.

We examined the second and third research questions using four indicators of the learning organization and six indicators of flexibility. Almost all management variables were negatively, statistical significantly associated with job insecurity in the univariate model. However, adjustment for indicators of globalization attenuated the effect size of almost all variables. When we also adjusted for industry type and company size, most associations were attenuated further, which indicates that industry type and company size are important factors to be considered. Regarding the management variables, the most consistent findings across all models was that national collaboration seemed to have a beneficial effect on job insecurity, whereas numerical flexibility seemed to have a negative effect on job insecurity. The remaining results show a larger degree of situational complexity as the associations between job insecurity and international collaboration, efficiency changes, institutional influence, and work intensification were dependent on industry type and company size.

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3 Two additional aspects deserve attention. First, the effect of the different
4 variables on the outcome may seem rather small with a maximum three point change on
5 a 100-point scale as the most pronounced effect. However, considering that most of the
6 variation in job insecurity is likely to be attributable to individual-level characteristics,
7 the fact that company-level variables can account for even a small part of the variation
8 is an interesting finding. Second, an overall tendency was found for all the management
9 variables (except for national collaboration) to be associated with an increase in job
10 insecurity, but a large part of this negative effect is attenuated in multivariate analysis.
11 This attenuation may to some extent be attributed to the correlations between the
12 management variables, which cause the variables to "share the effect" in the regression
13 analyses.
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30 ***Globalization***

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32 In a review of the Danish flexicurity model, Bredgaard (2005) suggested that the
33 association between job insecurity and globalization should be found primarily in
34 relation to fear of outsourcing (but this possible association has been overhyped by
35 media). However, our results suggest that other relevant indicators of globalization like
36 competition and general market conditions are also important. While the effect of
37 globalization is an often cited contributing cause of job insecurity, little research has
38 analyzed this association at greater depth (Wilpert 2009, Pelfrene, Vlerick 2003). The
39 present study is the first to examine a multilevel association between globalization and
40 job insecurity.
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52 ***Organizational learning***

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56 Organizational learning has been associated with a decrease in job insecurity (Rhoades
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3 and Eisenberger 2002). However, this was not the case in our data. In Ferrie's (1999)
4 report on job insecurity, it is suggested that the backside of organizational learning is
5 one of de-skilling, where skills and expertise built up over a period of time lose value
6 (leading to job insecurity), and new skills and expertise must be developed rapidly.
7
8 However, this finding could not be replicated in our study. The lack of effect in the
9 present study is more in line with Elman and O'Rand (2002), where employer support
10 for training had no effect on job insecurity as job training was seen as a matter of
11 gaining company job-specific skills rather than transferable skills.
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16 In our study, national collaborations with customers and suppliers were shown
17 to be associated with decreased job insecurity, while the opposite was true in regard to
18 collaboration with international customers and suppliers. These two types of
19 collaboration are not mutually exclusive, which makes this finding an interesting one.
20
21 These results could possibly be related to fear of outsourcing or similar activities. The
22 more the company is active in other countries, the more likely it is that the company
23 will move production and jobs out of the country if costs at home become too high
24 (Davis-Blake and Broschak 2009, Maertz, Wiley 2010).
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40 ***Flexibility***

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42 When exploring the associations between job insecurity and flexibility, it is important to
43 bear in mind the cultural context. According to Casey (1999), flexibility is often being
44 seen as synonymous with deregulation and employer-led imposed changes to patterns of
45 work and terms and conditions of employment in the United Kingdom, whereas the
46 Danish definition of flexibility refers to learning structures and processes that allow the
47 company to respond with new products and technology to a changing environment
48 (Bernard Casey, Ewart Keep 1999). In this respect, the national labor market legislation
49 and trade union power could be important factors to consider. Denmark is known to
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3 have a flexible work market, where it is easy to hire and fire people. At the same time,
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5 however, a high level of social security and an active labor market policy (high
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7 employment security) collectively procure a safety blanket (this model is known as
8
9 flexicurity) (Jensen 2011). This has been dubbed “a move from job security to
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11 employment security” (Bredgaard , Larsen 2005).
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14 All the indicators of flexibility presented in the study are in some way related to
15
16 change; or rather the dynamic capability of adapting to changing conditions. Certain
17
18 overlaps between efficiency-related organizational changes and work intensification do
19
20 exist. The indicated association with job insecurity is therefore, perhaps, more related to
21
22 the implementation of such types of practices than the actual practices themselves.
23
24 When the changes are no longer new and when they have been integrated into the
25
26 everyday workday, they cease to be a harmful exposure (Bamberger, Vinding 2012).
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28 Organizational changes and work intensification have previously been found to be
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30 associated with job insecurity (Burchell, Ladipo 2001), but we found no evidence of
31
32 these associations in this present study.
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36 In our study, management influence shows no strong associations with job
37
38 insecurity, while institutional influences where employees are being included in the
39
40 decision process showed associations with increased job insecurity. This contrasts
41
42 previous findings which indicated that a certain degree of control has a beneficial effect
43
44 on job insecurity (Elst, De Cuyper 2011, Barling and Kelloway 1996). We speculate
45
46 that the use of a “change-agent” can create more uncertainty about the future, since
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48 employees will know which changes are in store for them, while the use of top-down
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50 management only will create job insecurity when actual changes are in store, in motion
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52 and planned out.
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3 Among all the management variables used in this study, numerical flexibility
4 was associated with the largest increase in job insecurity. According to the reviews by
5 Sverke (2002) and Quinlan and Bohle 2009), the effects of downsizing and
6 organizational changes on job insecurity are the most commonly analyzed and best
7 explored topics. Job insecurity refers to more than just the risk of job loss; it can also
8 encompass other radical changes of work aspects. By its very definition, numerical
9 flexibility is more dynamic in nature than downsizing, since it also encompasses
10 changes of work time and use of agency, which have an impact on work life, even in
11 general. Indeed, the use of contingency labor has recently been associated with an
12 increase in job insecurity (Banerjee, Tolbert 2012).
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27 ***Limitations and strengths***

28 The generalizability, validity, and reliability of our study are limited by certain
29 design choices. Our only employee inclusion criteria was that employees should have
30 been employed within a given company at least two years before the time of answering
31 the questionnaire. This criterion was implemented to ensure that the employees were
32 employed for the entire period covered by the questionnaire. However, this inclusion
33 criterion may have implied that the rate of long-term employed employees in our
34 sample was higher than in the general working population. The added seniority may
35 imply that these employees are not “first-in-line” in potential downsizing situations,
36 which will contribute to a decreased feeling of job insecurity. However, these design-
37 dependent circumstances should not affect the generalizability of our findings to
38 employees in general, unless, of course, tenure affects reactions to management
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55 Furthermore, data were obtained during the financial crisis, which might have
56 added to the general level of job insecurity since companies are more reluctant to hire
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3 new personnel in recession times, which makes it more difficult to be reemployed if one
4
5 loses his or her job. Further, media was filled with news about the financial crisis, bank
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7 closures, and falling real estate prices, which could make job insecurity a more urgent
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9 issue than it would have been in a financially more secure times. While the increased
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11 focus of the financial crisis could lead to potential overestimation of job insecurity, the
12
13 fact that the unemployment rate has been steadily rising during the entire period
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15 documents that there are good grounds for heightened feelings of job insecurity
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17 (Statistics Denmark).
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21 Response rates of 42% at the company level and 55% at the individual level
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23 could be considered to be rather low. However, they are in line with response rates
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25 reported in meta-analysis findings at both executive and employee levels (Shih and
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27 Xitao Fan 2008, Anseel, Lievens 2010). Web-surveys in general receive lower response
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29 rates, and there is an overall trend towards declining response rates. The number of non-
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31 respondents did not differ substantially between across industry types or company sizes.
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33 Due to our weighted sampling strategy, replies from smaller firms are over-represented
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35 in the study sample. The results are therefore not immediately generalizable to the
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37 general population of companies and employees in Denmark, although we have tried to
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39 improve the generalizability by adjusting the results for industry type and company size
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41 in the regression models.
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45 The cross-sectional nature of the study precludes assessments about causality.
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47 Still, there is little reason to believe that naturally insecure employees would seek
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49 employment in companies exposed to high levels of competition or where the market
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51 conditions had been particularly rough on the company. However, to move beyond such
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53 speculations, longitudinal studies are needed.
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Conclusion

Our results indicate that globalization described in terms of competition pressure and market conditions is associated with job insecurity, whereas the pressures of liberalization and technology are not. Furthermore, certain types of management aimed at alleviating the effects of globalization are also associated with job insecurity; however, these effects are not all consistent across industry types and company sizes. The fact that we find an overall association between globalization, management, and job insecurity highlights the need for further studies in which the impact of industry type and company size should be duly taken into account.

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Table 1 Theoretical constructs, variables, and items

Theoretical construct	Variable	Items
Globalization The perceived impact of the external context on the companies	Competition	To which extent has the company experienced competition from other companies in the period 2007-2009? On the Danish Market, On the world market. At present, to which extent is the company experiencing competition on the following: Product or service prices, Product or service quality, Development of new products or services
	Liberalization	To which extent has liberalization of international trade affected the development of the company's competitive conditions in the period 2007 - 2009: On product or service prices, On product or service quality, on development of new products or services
	Technology	To which extent has the overall technology development in the industry influenced the development of the company's competitive conditions in the period 2007 - 2009: On product or service prices, On product or service quality, on development of new products or services
	Market conditions	Has the financial crisis changed the company's opportunities for: Sales on the domestic market, Sales on the international market, Financing, Liquidity.
Learning organization The ability to build and continually renew unique skills through internal or external staff training and networking with other organizations	Organizational learning	How important are the following for the ongoing development of staff skills? Allocating time for sparring with management/ other staff, Planned job rotation, The organizing of work in teams, Encouraging of cooperation and networking across departments and groups
	Vocational training	How important are the following for the ongoing development of staff skills? Standard Courses / training (e.g. in vocational schools and AMU centers), Training tailored to business needs, Long-term educational planning
	National collaboration	To which extent has the company cooperated with the following partners regarding product and / or service development in 2007-2009? Danish customers, Danish suppliers
	International collaboration	To which extent has the company cooperated with the following partners regarding product and / or service development in 2007-2009? Foreign customers, Foreign suppliers
Flexibility The ability and process of adapting to external condition through organizational changes, staffing resources changes or work contents changes.	Efficiency changes	Have organizational changes aimed to strengthen: Efficiency in daily operations, Cooperation and coordination across the organization, Quality and customer service
	Innovation changes	Have organizational changes aimed to strengthen: The ability to adapt to more changing environments, The ability to continuously develop new products / services, The ability to continuously strengthen and renew the company's knowledge and know-how
	Institutional influence	How is the cooperation between management and employees organized in conjunction with processes of change in the company? Employee representatives participate in joint meetings with the management, It takes place in the Cooperation Committee, It is done by an employee representative on the company's Board of Directors
	Management influence	How is the cooperation between management and employees organized in conjunction with processes of change in the company? Creation of one or more project groups where management and employees are represented, Through the convening of joint meetings with the affected employees, The convening of joint meetings with all employees, By direct contact with individual employees as needed
Numerical flexibility Work intensification	Numerical flexibility	Does the company use one or more of the following options to customize the staffing resources to business needs? Agency appointments, Part-time work
	Work intensification	Has the work contents changed in the period 2007-2009 in the direction of: Increased autonomy and responsibility, Increased technical / professional demands, Increased knowledge contents, Increased interdisciplinary collaboration, Demand for increased labor productivity

Table 2 Industry-type and company-size-stratified distribution of company and employee respondents

	Small (<50)		Medium (50-99)		Large (100+)		Total	
	Companies N = %	Employees n = %	Companies N = %	Employees n = %	Companies N = %	Employees n = %	Companies N = %	Employees n = %
1. Industry, quarrying, and supply	59 (27)	327 (28)	48 (32)	302 (32)	84 (42)	585 (44)	191 (34)	1,214 (36)
2. Construction and maintenance	28 (13)	122 (10)	16 (11)	84 (9)	16 (8)	91 (7)	60 (11)	297 (9)
3. Trade and transport	94 (43)	494 (42)	45 (30)	264 (28)	52 (26)	321 (24)	191 (34)	1,079 (32)
4. Information, communication, finance, and insurance	10 (5)	61 (5)	20 (13)	138 (15)	21 (10)	151 (11)	51 (9)	350 (10)
5. Real estate, rental business, service, and other	27 (12)	162 (14)	22 (15)	148 (16)	28 (14)	167 (13)	77 (14)	477 (14)
Total	218 (100)	1,166 (100)	151 (100)	936 (100)	201 (100)	1,315 (100)	570 (100)	3,417 (100)

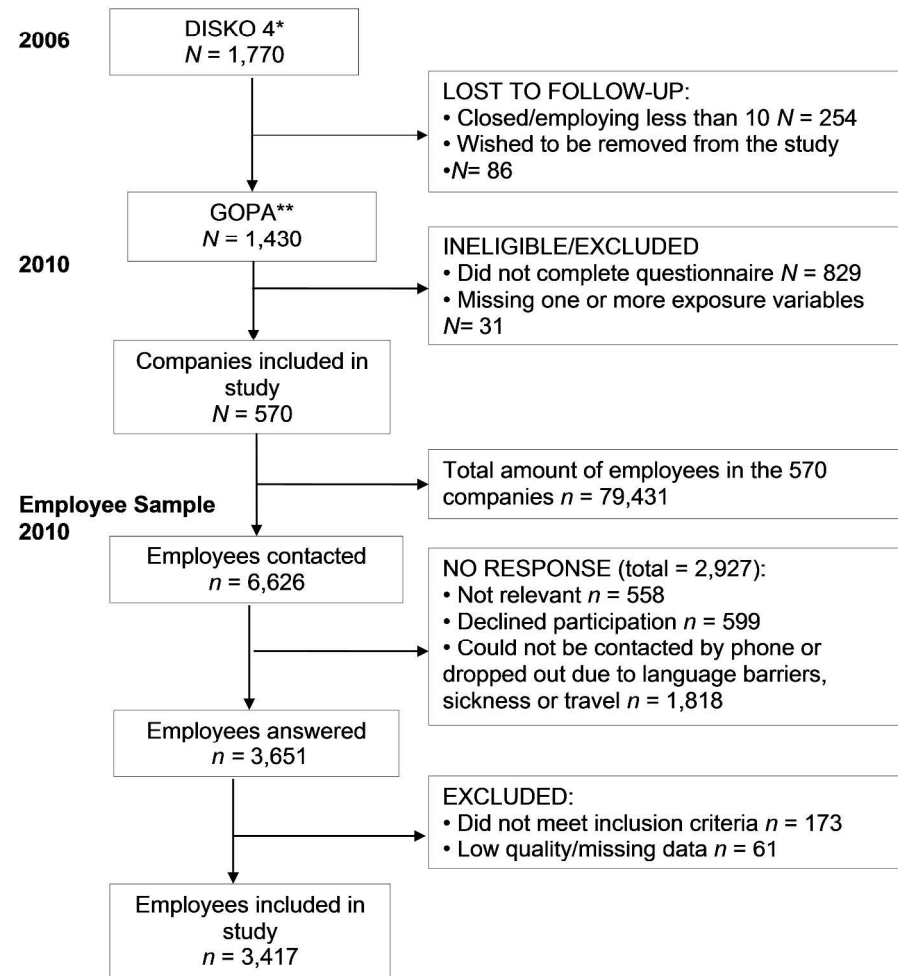
Table 3 Spearman's correlation matrix of the job insecurity variables (n=3,417)

	Correlation				
	J11	J12	J13	J14	J15
J11: Are you worried about new technology making you redundant?	1				
J12: Are you worried about it being difficult for you to find another job if you became unemployed	.59	1			
J13: Are you worried about being transferred to another job against your will?	.37	.34	1		
J14: Are you worried about being laid off because management is moving production to another country or another company?	.50	.50	.42	1	
J15: Are you worried about losing your job because your company can not survive due to international competition?	.43	.41	.42	.65	1

Table 4 Cronbach's α and Spearman correlation matrix of globalization and management variables

Variables	Cronbach's α	Globalization				Learning organization				Flexibility						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1. Competition	.69	1														
2. Liberalization	.94	.43	1													
3. Technology	.92	.43	.42	1												
4. Market conditions	.62	.26	.15	.04	1											
5. Organizational learning	.73	.21	.16	.24	.01	1										
6. Vocational training	.76	.06	.07	.20	.03	.48	1									
7. National collaboration	.70	.20	.15	.22	.06	.20	.23	1								
8. International collaboration	.68	.35	.34	.22	.15	.26	.16	.30	1							
9. Efficiency changes	.93	.18	.04	.16	.08	.38	.29	.21	.20	1						
10. Innovation changes	.91	.19	.08	.18	.09	.40	.30	.22	.28	.82	1					
11. Institutional influence	.55	.02	.15	.10	-.03	.28	.24	.12	.12	.14	.17	1				
12. Management influence	.70	.14	.07	.19	.00	.42	.37	.12	.20	.32	.35	.30	1			
13. Numerical flexibility	.66	.16	.09	.15	.08	.35	.29	.14	.15	.27	.22	.23	.23	1		
14. Work intensification	.78	.20	.10	.20	.11	.30	.26	.16	.22	.33	.34	.13	.30	.25	1	

Company sample



* DISKO 4: the Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks survey
 ** GOPA: Globalization, Transformational Pressure, and Psychosocial Environment survey

Figure 1 Recruitment and follow-up flow diagram for the DISKO study and the GOPA study.
 369x409mm (300 x 300 DPI)

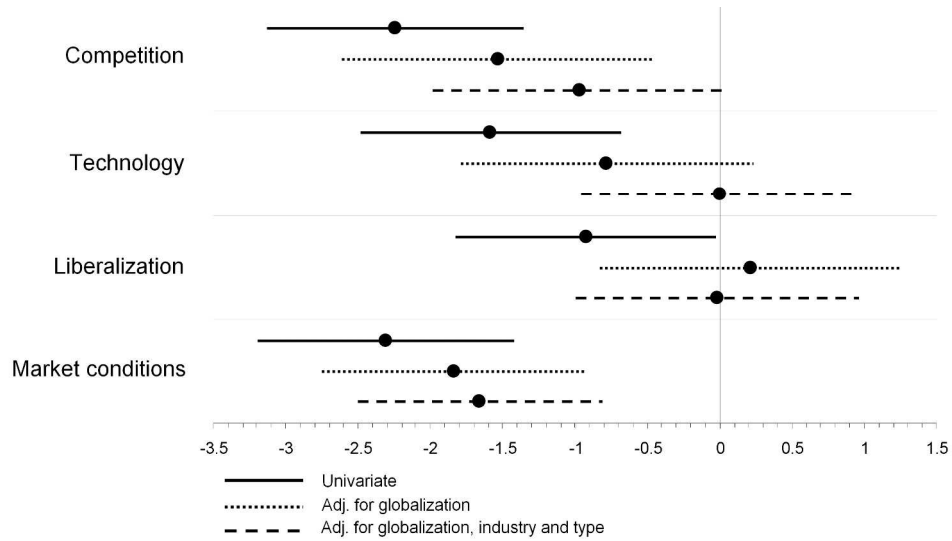


Figure 2 Univariate and adjusted regression coefficients of the association between globalization and job insecurity with 95% confidence intervals. The regression coefficients represent the expected change in job insecurity for a one-standard-deviation increase of the independent variable.
766x426mm (96 x 96 DPI)

Review Only

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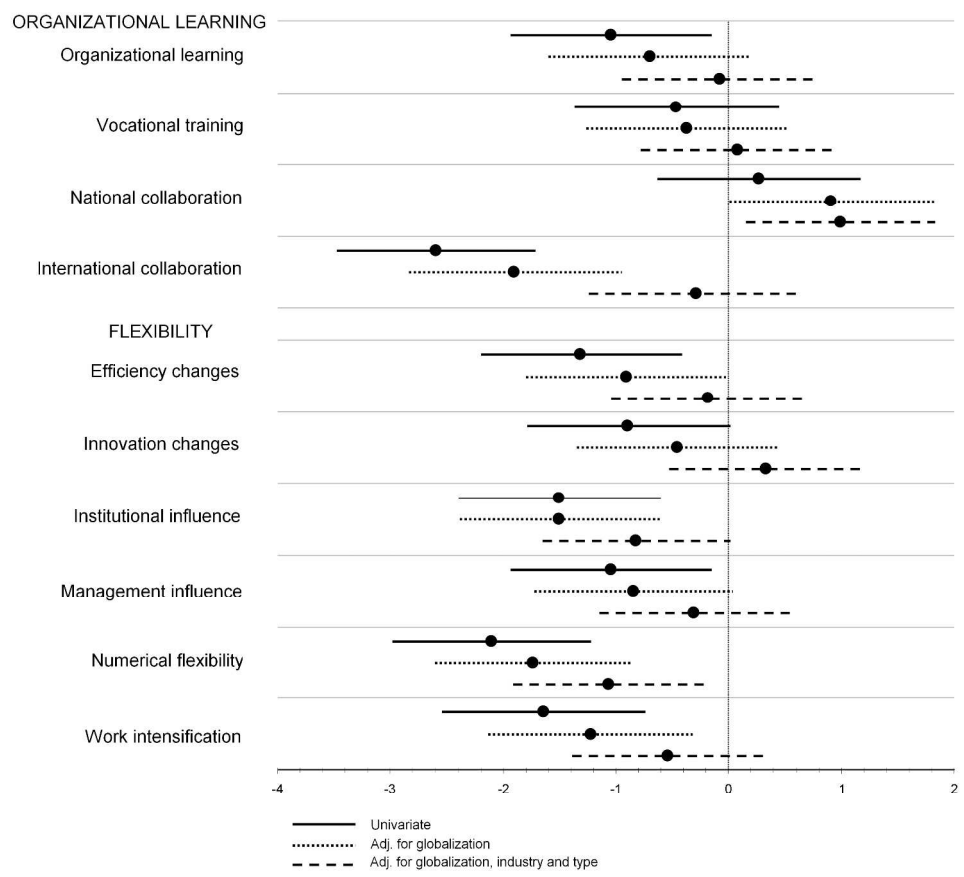


Figure 3 Univariate and adjusted GEE coefficients of the association between job insecurity and management with 95% confidence intervals. The regression coefficients represent the expected change in job insecurity for a one-standard-deviation increase of the independent variable.
305x269mm (300 x 300 DPI)

Only

Paper 2

Sense of Coherence and Effects of Globalization on Distress: a Multilevel Study

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ABSTRACT

Globalization has been proposed as a potential stressor and a risk factor of the psychosocial work environment. The possibly harmful effects of the psychosocial work environment have previously been shown to be moderated by an individual's sense of coherence (SOC). This study focuses on associations between globalization measured at company level and psychological distress measured at employee level. In this quantitative, multilevel study, survey data were collected from 3,370 employees of 568 companies from the private sector in 2010. Prevalence ratios (PR) were used to compare the relative prevalence of psychological distress due to exposure to competition and the global financial crisis, and SOC, respectively. A high degree of competition was associated with an increased prevalence of psychological distress (PR 1.38, 95% CI 1.17 to 1.63), as was a high exposure to the global finance crisis (PR 1.18, 95% CI 1.00 to 1.40). A weak SOC was associated with a high degree of psychological distress (PR 5.27, 95% CI 4.23 to 6.56). No interaction was present between the exposure to a high degree of competition and exposure to the global finance crisis and the prevalence of psychological distress, nor between either of the exposure variables and SOC. This study indicates that increased globalization at company level is associated with an increased prevalence of employee psychological distress. SOC is inversely associated with increasing employee psychological distress when the company is exposed to high competition or much affected by the global financial crisis.

INTRODUCTION:

Globalization has been cited as an emerging risk factor for the psychosocial work environment and a potential stressor. However, little research has tested this assumption (National Institute for Occupational Safety and Health, 2002). Globalization has fundamentally changed the market economy by accelerating the pace of innovation and making competition more fierce (Sklair, 2007). Fierce competition has been found to increase job demands and, in turn, increase employee exhaustion and cynicism (Idris, Dollard, & Winefield, 2011). Growing world market competition has also been associated with job strain and feelings of depressed mood (Pelfrene et al., 2003). Furthermore, macroeconomic changes like recessions have been shown to affect individuals' stress levels because they often give rise to changes in routine job structures (Fenwick & Tausig, 1994) Houdmont (Houdmont, Kerr, & Addley, 2012). found adverse changes in the work-related prevalence of stress and stress-related sickness absence in the wake of the global financial crisis (GFC). In a study of Chinese finance workers Tsai(Tsai & Chan, 2011), found aggravated work stress and burnout after the GFC compared with the time before the GFC.

While these results suggest that competition and the GFC constitute individually potentially harmful exposures, their combined effect has yet to be examined. Moreover, previous research has done little to assess degrees of exposure and has reported the outcome of both by means of employee self-report which involves a risk of reporting bias. Reporting bias has been shown to inflate associations between job strain and psychological distress in cases where studies rely on self-reports (Kolstad et al., 2011; Näswall, Sverke, & Hellgren, 2005). Kolstad (Kolstad et al., 2011) advocates the use of unbiased measurements that are independent of a specific, individual worker to identify pertinent risk factors within the psychosocial work environment (Frese & Zapf, 1988; Kolstad et al., 2011).

Antonovsky's concept of salutogenesis, or sense of coherence (SOC) (Antonovsky, 1993), has been proposed as a moderator of the association between work environment and psychological distress (Albertsen, Nielsen, & Borg, 2001). SOC focuses on the positive variables in relation to what maintains and promotes individual health and wellbeing (Hassard, Cox, Murawski, De Meyer, & Muylaert, 2011). A strong SOC heralds adequate coping strategies that, in turn, may buffer the impact of stressful life events on mental health. (Richardson & Ratner, 2005) In a review on the matter, Eriksson (Eriksson & Lindström, 2006) found that SOC is strongly related to perceived health, especially mental health. The stronger the SOC, the better the perceived health in general. Moreover, a strong SOC was associated with a reduced risk of psychiatric disorders in a Finnish longitudinal register-based study (Kouvonen et al., 2010). A strong SOC has previously been found to be a protective factor for mental health when employees were exposed to negative workplace events (Pahkin, Vaanaen, Koskinen, Bergbom, & Kouvonen, 2011). However, no studies have examined if a strong SOC protects against the potential distressful effect of the macroeconomic context.

The aim of the present study is to describe the association between globalization (in casu competition and GFC impact) and psychological distress. We want to determine: i) if competitive pressures or the GFC is associated with an increased prevalence of psychological distress; ii) whether competition modifies the association between the GFC and psychological distress; and iii) whether SOC modifies the association between competition and psychological distress; or the association between the GFC and psychological distress.

We performed a multilevel study to assess exposure at the organizational level and psychological distress at the individual level.

METHODS AND MATERIALS

Study population and data collection

This study is the successor of a series of studies on the Danish Innovation System (the DISKO surveys) (Gjerding & Rasmussen, 1997). The companies participating in the DISKO surveys were selected to represent the general industry distribution across the private urban sector in regards to industry type and company size. Two exceptions were made: all companies with more than 100 employees in Denmark were included as they were thought to be the most innovative companies. Conversely, companies with fewer than 10 employees were excluded as they were deemed too small to have relevant organizational practices. The first DISKO survey was completed in 1996. It yielded 1,900 questionnaire responses at company level. The subsequent surveys were supplemented with additional companies to make the sample representative. In 2006, the DISKO 4 was completed with 1,770 questionnaire responses (Dahl, 2011; Zimmermans, 2008).

In 2010, the same companies were assessed in the *Globalization, Transformational Pressure, and Psychosocial Work Environment* (GOPA) study. That study focused on the derived effects of globalization on management, psychosocial work environment, and mental health in Danish companies and their employees. Data collection was performed by the Danish governmental organization Statistics Denmark which previously had collected the data for the DISKO surveys. The GOPA company sample was based on the companies participating in DISKO 4. Prior to data collection, the company questionnaire was piloted in a sample of ten companies (not part of the potential respondent group) to verify that the questions were understood correctly. Unique login information for the GOPA web-questionnaire was emailed to 1,430 companies (if email information was unavailable, they were contacted by letter). The companies were reminded twice by email or letter to respond, and once by phone. The questionnaires were sent to the manager or the human resource

manager, or someone holding a similar position within each company. The questionnaires included questions on the impact of the companies' external environment, and how they internally managed this impact.

A total of 601 companies answered the survey (response rate 42%). Out of these, another 31 were excluded due to missing answers for key variables or lack of employee responses. A total of 568 companies were included in the final sample.

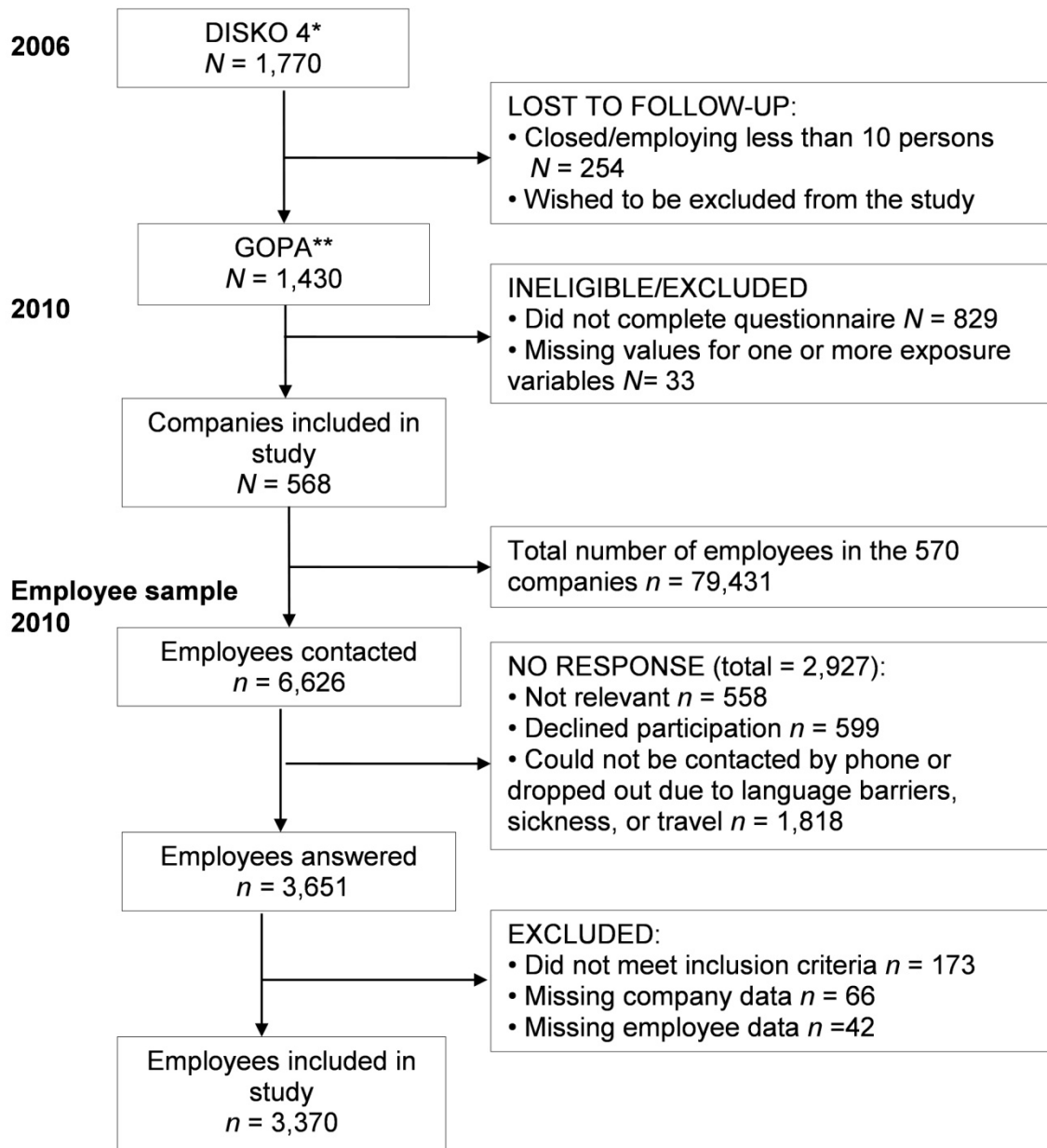
Employee sample

All potential salary earners (n=79,431) from the final sample of companies were extracted from Statistics Denmark's registry data (a collection of information supplied by administrative registers of governmental agencies). The study aimed to include approximately 2,000 respondents in the final sample. According to estimates from Statistics Denmark, a total of 6,626 individuals had to be included to provide the desired number of responses. However, approximately 85% of the employees were employed in approximately 35% of the companies. This meant that simple random sampling of employees would under-represent employee responses from smaller companies. To avoid over-representation of larger companies, a weighted sampling strategy was used, so that smaller companies had a larger percentage of their employees selected. Depending of the size of the company, up to 12 persons were selected for participation.

The company responses spanned five different industries. Companies were divided into three size groups (10-49, 50-99 and >100 employees). This yielded a total of 15 categories across industry type and size. If more than 50% of the companies within one of the 15 categories were non-responders, more participants would be sampled from responding companies within that category.

Employees were contacted by letter and invited to answer a web survey. A first reminder was sent by letter, and a second reminder by telephone with an option to participate in a phone interview instead of in the web survey. A total of 6,626 employees were contacted. The employee response rate was 55%, corresponding to 3,651 men and women aged 16 to 81 years. A total of 173 employees were excluded since they were no longer employed in the company in which they were working during the entire time period of 2007-2009 (which was the only employee inclusion criterion in the study). Another 66 employees were excluded due to missing company data, and 42 employees were excluded due to missing employee data. The final sample consisted of 3,370 employees. Anonymized demographic registry data delivered by Statistics Denmark were made available for the entire sample (both respondents and non-respondents).

Company sample



* DISKO 4: The Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks survey

** GOPA: Globalization, Transformational Pressure, and Psychosocial Environment survey

Figure 1 Recruitment and follow-up flow diagram for the DISKO study and the GOPA study.

Competition and global financial crisis

The degree of globalization was measured using two indicators: degree of competition and impact of the GFC. Data were obtained at the company level. Five items were used to estimate the extent of the competition the companies were facing on i) the domestic market, ii) the foreign market, iii) price of products/services, iv) quality of products/services, and v) innovation of products/services. Respondents were asked to indicate their response to each question on a 5-point Likert scale ranging from *a lot* (1) to *not at all* (5). The scale was the sum of the score for each question divided by the number of questions answered (not all companies were active on both the domestic and the foreign market).

A measure of the impact of the GFC was based on four items targeting whether the GFC had changed the company's opportunities for: i) sales on the domestic market, ii) sales on the foreign market, iii) financing, and iv) liquidity. Respondents were asked to indicate their response to each question on a scale ranging from *improved a lot* (1) to *decreased a lot* (5). The scale was the sum of the score for question item divided by the number of questions answered (not all companies were active on both the domestic and the foreign market). Both the competition and GFC scales were subsequently dichotomized at the median.

Psychological distress

Psychological distress was estimated using the Symptoms Checklist 90 revised (SCL-90-R) (Derogatis, 1994) which measures psychological complaints and symptom intensity on nine subscales: somatization, interpersonal sensitivity, depression, anxiety, phobic anxiety, obsession-compulsion, hostility, paranoid ideation, and psychoticism, as well as a global severity index (GSI) (Olsen, Mortensen, & Bech, 2006). A Likert scale scoring system ranging from 0 (not at all) to 4 (extremely) was used to judge the severity of the symptoms. The GSI scale was calculated as the sum of the scores (0-4) of 90 questions regarding mental

distress symptoms divided by the number of questions answered. The raw scores were converted into standardised scores (t-standard; mean=50, standard deviation (sd)=10). A t-score of 63 or higher on the GSI, or two subscales with t-scores of 63 or higher were used to determine psychological distress caseness (Derogatis, 1994; Olsen, Mortensen, & Bech, 2004).

A modified version of the SCL-90-R was used by recommendation of Statistics Denmark in order to avoid a low response rate due invasive questions. Questions on suicide thoughts (15), hearing hallucinations (16) and the idea that something is wrong with your mind (90) were excluded.

SOC

To measure psychological distress resilience, the SOC 13-item scale developed by Antonovsky was used (Antonovsky, 1993). SOC-13 was rated on a 7-point Likert scale, and the total score ranged from 13-91, with low scores indicating weak resilience. We dichotomized the scale at the median, as previously done by Hanse (Hanse & Engstrom, 1999).

Demographics

Additional covariates used in this study were gender, age (four categories: 15-34, 35-44, 45-54, 55+), education (white-collar, blue-collar, other), self-reported previous mental health problems (diagnosed (by doctor) and/or treated for depression, mania, anxiety, phobia, neurosis, personality disorder, stress, obsessive compulsive disorder or other, totalled and dichotomized into 'no previous problems' versus 'diagnosed, and/or treated for problems'), and self-reported stressful life events in the past 6 months (nine 4-level items totalled and

dichotomized into 'no' or 'yes, it felt not so bad' versus 'yes, it felt bad' or 'very bad')
(Allard et al., 2011).

Statistical analysis

We first examined the distribution of covariates according to psychological distress caseness and exposure (reported as frequencies/percentages). The association between indicators of globalization and psychological distress was assessed using simple prevalence ratios (PRs) and associated 95% confidence intervals (95% CI). We chose to analyse our cross-sectional dataset using PRs rather than odds ratios, as the PR is more “conservative, consistent and interpretable” (Thompson, Myers, & Kriebel, 1998). To take into account the multilevel structure of the data, standard errors of PRs were calculated using Poisson regression models based on generalized estimating equations (accounting for within-company correlations; exchangeable correlation structure).

In evaluating associations, we first compared the prevalence of psychological distress caseness between the two levels of i) competition, ii) GFC and iii) SOC. Second, effect modification on the PR scale (henceforth simply "multiplicative interaction") between competition and the GFC on psychological distress caseness was examined. Third, multiplicative interaction between SOC and i) competition, ii) GFC was examined. As SOC has been split at the lowest quartile or used as a continuous variable in other studies (Eriksson & Lindstrom, 2005), sensitivity analyses were performed to assess the robustness of our findings to other ways of measuring resilience. All statistical analyses were conducted in Stata 11.1 (StataCorp LP, 2008). A P-value less than 0.05 were considered statistically significant.

RESULTS

Descriptive analyses of data

The characteristics of the participants stratified by caseness status, competition and GFC indicators are presented in Table 1. Of the 3,370 employees who participated in the survey, 555 (16.5%) fulfilled the psychological distress caseness criteria. Two thirds (67.6%) of our sample were men, and 15.3% of these were classified as cases. Among the women, 19% fulfilled the psychological distress caseness criteria. Employees in the age group 16-34 years were the least represented in the study. They also had the highest psychological distress prevalence (23.4%) among the different age groups. Unskilled workers had the highest psychological distress prevalence (20.1%), followed by blue-collar (17.0%) and then white-collar (10.5%)

One fourth of the participants had a history of mental health problems, and 30% of the participants had been exposed to a major life-event within the past 6 months. The prevalence of psychological distress was increased among individuals with previous mental health problems or exposure to life-events.

Most of the participants came either from the industry sector (35.5%) or the commerce sector (31.3%). Three other industry types represented the remaining third of the companies.

Employees in the industry sector had a higher prevalence of psychological distress (18.6%) than the other sectors. The large companies were slightly better represented (38.3%) than the small and medium-sized companies because of the semi-weighted sampling design. The prevalence of psychological distress was similar across company sizes.

Table 1 features the distribution across industry type and company size among the participating companies according to competition and exposure to the GFC. The employees in the industry sector had experienced more competition (63.1% of the employees) than the

other industry types, whereas the construction sector had experienced least competition (31.8% of the employees). Furthermore, exposure to competition tended to increase with company size. The industry sector was also the sector most affected by the GFC (69.9% of the employees). The information sector was the least affected (44.2% of the employees). The companies were similarly affected by the GFC across company sizes. A small tendency was seen for the medium-sized companies to be most affected.

Table 1 Characteristics of participants stratified by psychological distress caseness, competition and GFC

	Psychological Distress				Competition				GFC			
	Non-case		Case		Low		High		Low		High	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
All employees	2,815	83.5	555	16.5	1,623	48.2	1,747	51.8	1,322	39.2	2,048	60.8
Gender												
Male	1,931	84.7	348	15.3	1,084	47.6	1,195	52.4	864	37.9	1,415	62.1
Female	884	81.0	207	19.0	539	49.4	552	50.6	458	42.0	633	58.0
Age												
16-34	256	76.7	78	23.4	156	46.7	178	53.3	114	34.1	220	65.9
35-44	759	83.8	147	16.2	416	45.9	490	54.1	350	38.6	556	61.4
45-54	1,005	82.7	210	17.3	587	48.3	628	51.7	495	40.7	720	59.3
55+	795	86.9	120	13.1	464	50.7	451	49.3	363	39.7	552	60.3
Education												
White-collar	585	89.5	69	10.5	340	52.0	314	48.0	275	42.0	379	58.0
Blue-collar	1,604	83.0	328	17.0	930	48.1	1,002	51.9	760	39.3	1,172	60.7
Other	626	79.9	158	20.1	353	45.0	431	55.0	287	36.6	497	63.4
Life-events												
No major life-events	2,046	86.6	318	13.5	1,164	49.2	1,200	50.8	928	39.3	1,436	60.7
Major life-events	769	76.4	237	23.6	459	45.6	547	54.4	394	39.2	612	60.8
Mental health problem history												
No history of problems	2,240	88.7	285	11.3	1,228	48.6	1,297	51.4	996	39.5	1,529	60.6
History of mental health problems	575	68.1	270	32.0	395	46.8	450	53.3	326	38.6	519	61.4
Industry type												
Industry	967	81.4	221	18.6	439	37.0	749	63.1	358	30.1	830	69.9
Construction	255	84.4	47	15.6	206	68.2	96	31.8	133	44.0	169	56.0
Commerce	883	83.8	171	16.2	456	43.3	598	56.7	463	43.9	591	56.1
Information	305	85.9	50	14.1	236	66.5	119	33.5	198	55.8	157	44.2
Real estate	405	86.0	66	14.0	286	60.7	185	39.3	170	36.1	301	63.9

Company size

10-49	965	84.7	175	15.4	602	52.8	538	47.2	455	39.9	685	60.1
50-99	781	83.1	159	16.9	462	49.1	478	50.9	351	37.3	589	62.7
100+	1,069	82.9	221	17.1	559	43.3	731	56.7	516	40.0	774	60.0

Note: Global financial crisis (GFC)

Distribution and PR by exposure and SOC

Table 2 shows the distribution of psychological distress caseness across the exposure variables and SOC, alongside PRs. Psychological distress caseness was more common in employees facing much competition than among employees facing less competition.

Likewise, employees in companies much affected by the GFC had a higher prevalence of psychological distress caseness than employees in companies less affected by the GFC.

Compared with employees with a strong SOC, employees with a weak SOC had a fivefold increased prevalence of psychological distress caseness, which indicates a strong association between the two variables.

Table 2 Distribution and PRs of psychological distress caseness when exposed to globalization and by SOC. P-values are for the comparison to the reference group.

	Caseness				PR	95% CI
	No		Yes			
	N	%	N	%		
Competition						
Low	1,400	82.3	223	13.7	1.00	(reference)
High	1,415	81.0	332	19.0	1.38***	(1.17-1.63)
GFC						
Low	1,126	85.2	196	14.8	1.00	(reference)
High	1,689	82.5	359	17.5	1.18*	(1.00-1.40)
SOC						
Strong SOC	1,616	94.7	90	5.3	1.00	(reference)
Weak SOC	1,199	72.1	465	27.9	5.27***	(4.23-6.56)

Note: *p<.05. **p<.01. *** p<.001. Global financial crisis (GFC), Sense of coherence (SOC)

Table 3 examines the pair wise joint associations between each of the exposure variables competition, GFC, and SOC and psychological distress caseness. We found no evidence of (multiplicative) interaction between competition and the GFC ($p=0.43$). The prevalence of psychological distress caseness was increased in both the groups facing much competition and a high impact of the GFC compared with the reference group. A high GFC impact combined with little competition, however, was not significantly associated with caseness. We found no evidence of an interaction between SOC and competition ($p=0.58$). The prevalence of psychological distress in the group with a strong SOC exposed to high levels of competition was increased compared with the reference, but it was not significantly different. Employees with a weak SOC facing much competition had an increased prevalence (PR 1.30, 95% CI 1.11-1.53) compared with employees with a weak SOC exposed to little competition. Finally, we found no interaction between SOC and the GFC ($p=0.14$). The psychological distress prevalence of a strong SOC and a high-impact GFC exposure was not significantly different from that of the reference group. Compared with the reference group, a weak SOC was associated with a higher prevalence of psychological distress both impact both when the impact of the GFC on the company was low and when it was high. Furthermore, among subjects with a weak SOC, the high-impact GFC group had a higher prevalence (PR 1.20, 95% CI 1.01 -1.47) of psychological distress than the low-impact group.

Table 3 Cross-tabulations of psychological distress caseness by competition, GFC, and SOC and PRs (95% CI). P-values show comparison with the reference group.

	Low impact of GFC	High impact of GFC
Low competition	1.00 (reference)	1.19 (.93 -1.53)
High competition	1.47 (1.14 - 1.91)**	1.53 (1.23 - 1.91)***

	Strong SOC	Weak SOC
Low competition	1.00 (reference)	5.63 (4.04 - 7.84)***
High competition	1.47 (.97-2.23)	7.32 (5.28- 10.15)***

	Strong SOC	Weak SOC
Low impact of GFC	1.00 (reference)	4.31 (3.07- 6.04)***
High impact of GFC	.86 (.57-1.31)	5.17 (3.73-7.16)***

Note: *p<.05. **p<.01. *** p<.001 vs. reference group. Global financial crisis (GFC), Sense of coherence (SOC)

Other analyses

Several sensitivity analyses were made to test the results (data not shown). Instead of splitting SOC at the mean value, employees with a weak SOC were defined as those in the bottom quartile group of the score. This did not substantially alter the findings. The analyses were also repeated with SOC as a continuous variable. This yielded qualitative associations similar to those reported.

DISCUSSION

This multilevel study of Danish companies and employees examined the prevalence of psychological distress and the association between such distress and competition and the GFC. We found an association between an increased prevalence of psychological distress and exposure to either fierce competition or a heavy impact of the GFC. We found no evidence of any interaction between the two exposures; or between each of these exposures and SOC. Although most of the variation in psychological distress can likely be attributed to individual-level characteristics, external company-level exposure may account for a small part of the variation, which is, indeed, an interesting finding and possibly of clinical relevance.

The effect of competition on psychological distress reported here corroborates previous findings by Idris (Idris et al., 2011) and Pelfrene (Pelfrene et al., 2003). The finding also supports the hypothesis that macroeconomic conditions affect the individual through the workplace. Likewise, we replicated the findings by Fenwick (Fenwick & Tausig, 1994), Houdmont (Houdmont et al., 2012), and Tsai (Tsai & Chan, 2011) as far as the associations between increased risk of psychological distress and exposure to the GFC are concerned. The relative prevalence of psychological caseness for higher versus lower levels of competition was comparatively larger than the relative prevalence of caseness for higher versus lower GFC impact; a potentially interesting finding considering the large impact of the GFC in general.

The pathways via which companies' external environment may affect the employees are many. Employees may worry about market conditions and the company's position in the market; they may be targeted by management initiatives to remedy the effects of globalization, e.g. through organizational changes and restructuring; and they may experience

a rise in psychosocial demands and face greater job insecurity. Sharma(Sharma & Sharma, 2010) suggests that the uncertainty that often accompanies changes brought along by globalization poses a threat to the individual's usual habitat, and that such threats have been associated with mental health problems.

The observed strong association between SOC and psychological distress corroborates previous findings (Albertsen et al., 2001; Kivimaki, Feldt, Vahtera, & Nurmi, 2000). In her review, Eriksson (Eriksson & Lindström, 2006) suggested that psychological distress and SOC were two independent, but correlated constructs. Our investigation of interactions indicated that a weak SOC was associated with increased psychological vulnerability when the company was faced with fierce competition or a heavy GFC impact. No significant differences in the prevalence of psychological distress were observed in employees with a strong SOC who were exposed to high levels of competition or a high GFC impact compared with lower levels of competition or a low GFC impact; although for competition, the PR was of similar magnitude. No significant differences in the prevalence of psychological distress were observed in employees with a strong SOC exposed to a high level of competition or a high GFC impact compared with employees exposed to less competition or a milder GFC impact; although for competition, the PR was of similar magnitude as for employees with a weak SOC. Examining effect sizes rather than statistical significance, prevalence of psychological distress appears to lie at a more stable level and to be more unaffected by the relative strength or weakness of SOC in the face of fierce competition than when GFC is taking a heavy toll on the company. To better understand this finding, it is necessary to examine the three aspects measured by SOC: comprehensibility, manageability and meaningfulness (Antonovsky, 1993; Eriksson & Lindström, 2006). Comprehensibility is the ability to understand, find structure in, and anticipate events in the environment.

Manageability is based on the experiences of exercising control over, and meeting the demands of, the environment (Hanse & Engstrom, 1999). And, lastly, meaningfulness is the feeling that it is worthwhile to engage in the challenges one meets. The rapid pace and unpredictable dynamics that characterize globalization are beyond the control of any individual (Wallis & Dollard, 2008). This could explain why employees with a weak SOC seem to be more vulnerable to globalization pressures; they are simply not adequately equipped to manage the intangible demands of globalization. If a causal association between exposure to globalization and psychological distress exists, intervention to improve SOC could be a preventive step companies should consider (Kähönen, Näätänen, Tolvanen, & Salmela-Aro, 2012).

In contrast to the cross-sectional studies by Pelfrene (Pelfrene et al., 2003) and Idris (Idris et al., 2011), the present study does not rely on self-reported exposure. This alleviates the issue of reporting bias that may arise when distressed employees report whether their work environment is stressing (Kolstad et al., 2011). This is particularly important in relation to the association between a weak SOC and a high level of competition or a heavy GFC impact as the assessment of the impact of globalization will remain unaffected by the employees' mental health and resilience. This will, in turn, increase the validity and reliability of the results. The cross-sectional nature of the present study precludes statements about causality. However, there is little reason to believe that psychologically distressed employees would seek employment in companies exposed to high levels of competition; or in companies where the market conditions had been particularly rough on the company.

The generalizability, validity and reliability of our study are limited by our choice of design. The strength of the study lies in its multilevel approach and its large sample size. The

globalization measurements were fairly crude (only two aspects of globalization were examined) and study-specific. On the other hand, the SCL-90R and SOC are well-validated questionnaires, which have both shown good reliability in the Danish working population (Albertsen et al., 2001). Our only employee inclusion criterion was that employees should have been employed within a given company for at least two years before answering the questionnaire. This criterion was implemented to ensure that they were employed for the entire period covered by the questionnaire. However, this inclusion criterion may have led to a lower overall prevalence of psychological distress in our sample than in the general population because individuals with common mental disorders are at a higher risk of long-term sickness absence and disability pension than the general population (Bültmann et al., 2006; Mykletun et al., 2006; Stansfeld, Fuhrer, & Head, 2011). Our measurement of psychological distress was based on the SCL-90, but three questions were omitted since they were deemed inappropriate. Since our distress variable was based on the total score of the remaining 87 questions, and not on the subscales, we believe that this bias has only caused minor underestimation in the study.

Response rates were 42% at the company level and 55% at the individual level. This could be considered rather low. However, these response rates are in line with response rates reported in meta-analysis findings at both executive and employee levels (Anseel, Lievens, Schollaert, & Choragwicka, 2010; Shih & Xitao Fan, 2008). Web-surveys in general receive low response rates, and there is an overall trend over time towards declining response rates. The number of non-respondents did not differ substantially across industry types or company sizes. It is conceivable that companies who were severely affected by the GFC would be less likely to prioritize the time to answer a long questionnaire. This could have led to an underestimation of the impact of the GFC. Likewise, the companies most affected by

competition would most likely be those that closed in the time period between the DISKO 4 survey and the GOPA study. This would again lead to a potential underestimation of the impact of the GFC in our study.

Due to our weighted sampling strategy, replies from smaller firms are over-represented in the study sample. However, this would only result in bias if the effect of a high level of competition and a heavy GFC impact on psychological distress differs between small, medium and large companies.

Conclusion

In summary, our findings indicate that competition and to a lesser degree the impact of the GFC at the company level are associated with an increased prevalence of psychological distress among employees. There seems to be no interaction between the two exposure variables. Resilience is inversely associated with an increasing prevalence of psychological distress when employees are exposed to a high level of competition or a high GFC impact.

No significant difference in prevalence is observed for employees with high resilience.

The results of this study indicate that globalization is a potential stressor, especially for the less resilient employees. Both the macroeconomic context and the internal organizational context should be taken into consideration when the impact of work on employees' mental health is investigated. Longitudinal studies are needed to more fully understand the causal connection between globalization and the occurrence of psychological distress; in particular whether there is a causal relationship. Furthermore, the indirect pathways of globalization through management and the psychosocial work environment should be examined in order to more fully understand the effects of globalization.

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Paper 3

Assessment of Work Intensification in Companies and Psychological Distressed and Non-distressed Employees: a Multilevel Comparison.

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Keywords: Stress, SCL-90r; productivity; employee-employer correspondence

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Abstract

Objectives: The dual purpose of this study is to examine, first, associations between ratings of work intensification and psychological distress and, second, the level of agreement between employee-rated and company-rated work intensification

Methods: Multilevel survey data were collected from 3,064 employees of 573 companies from the private sector in 2010. Regression models were used to compare different work intensification ratings across psychological distress strata.

Results: Distressed employees rated the degree of total work intensification higher than non-distressed employees, and their work intensification score was higher on three out of five sub-ratings. The total score of employee/company-agreed work intensification and the prevalence of increased demands of labour productivity were higher among distressed than among non-distressed employees. In general, agreement between employee and company ratings of work intensification was poor. Neither company-rated work intensification nor employee/company discrepancy in work intensification ratings was associated with psychological distress.

Conclusion: This study demonstrates minor differences in work intensification ratings between distressed and non-distressed employees, and these differences persists in company-employee agreed ratings of work intensification

Introduction

Work intensification has been cited as an emergent risk factor for job strain (1). According to Green, changes in the contents of work can manifest themselves either as more work hours (extensive work intensification) or as greater work effort during the time spent (intensive work intensification) (2). As a management strategy, work intensification is devised to increase productivity, but it may be pursued at the expense of employees' mental stress (3-5). Work intensification may arise as a result of changes in the organization of production (6, 7) or the organization of work, particularly in regards to increased responsibility (7); it may also accompany the introduction of new technology (8) or result from downsizing which reduces the number of available hands without diminishing the overall workload (5); and it may stem from working time reductions with no compensatory increase in new hires (5, 9). Work intensification is inherently a limited process given that employees cannot either physically or mentally endlessly increase their efforts (5). Self-reported effort levels have been shown to correlate with measures of work stress and measures of productivity (3).

Previous studies have found that bias can inflate associations between job strain and psychological distress when studies rely on self-reports (10, 11). Such bias can be pronounced, especially in cross-sectional studies where exposure and outcome are often self-reported (12, 13). Bias may be avoided by adopting multilevel designs, i.e. by conducting studies that evaluate work contents both by management and by employees (9, 14, 15). Multilevel studies may explore work intensification from different perspectives, i.e. workers' versus management's perspectives. They may also explore different aspects of work intensification by targeting questions addressing strategy and formal work organization to managers, while directing questions about workers' adaptation to changing work and work circumstances to the workers themselves (16). Such multilevel studies hence give us

deeper insight into the relation between work intensification and employee mental stress. In addition, they allow us to identify discrepancies between management and employee level perceptions, which could, indeed, be an important variable in explaining work-related distress.

The aim of the present study is twofold; first, to examine associations between ratings of work intensification and psychological distress and, second, to compare employees' assessment of work intensification with the company's assessment in order to identify agreement or lack thereof.

Methods and materials:

Study population and data collection

The present multilevel study was performed within the *Globalization, Transformational Pressure, and Psychosocial Work Environment* (GOPA) study, which is aimed at examining the effects of external and internal company level exposures on the psychosocial work environment and employees' mental health.

Company sample

The GOPA study is the successor of a series of studies on the Danish Innovation System (the DISKO surveys) (17). In 2006, the fourth and last DISKO 4 was completed with 1,770 questionnaire responses at company level (18, 19). In 2010, the same companies were assessed for the GOPA study (see Figure 1 for flowchart). Data collection was performed by the Danish governmental organization Statistics Denmark, which previously had collected the data for the DISKO surveys. Prior to data collection, the company questionnaire was piloted in a sample of ten companies (not part of the potential respondent group) to verify that the questions were understood correctly. Unique login information for the GOPA web-questionnaire was emailed to 1,430 companies (if email information was unavailable, they were contacted by letter). The companies were reminded twice by email or letter to respond, and once by phone. Company respondents were managers, HR managers, or someone holding a similar position within each company.

A total of 601 companies answered the survey (response rate 42%). Among these, 31 were excluded due to missing answers for key variables or lack of employee responses. A total of 568 companies were included in the final sample.

Employee sample

All potential salary earners (n=79,431) from the final sample of companies were extracted from Statistics Denmark's registry data (a collection of data supplied by administrative registers of governmental agencies). The study aimed to include approximately 2,000 respondents in the final sample. According to estimates from Statistics Denmark, a total of 6,626 individuals had to be included to provide the desired number of responses. We used weighted sampling to ensure that smaller companies would not be under-represented in the sample which would have been the case if we had used simple random sampling because approximately 86% of the employees were employed in approximately 35% of the companies. Depending on the size of the company, up to 12 persons were selected for participation. The companies were from five different industries. The companies were divided into three size groups (10-49, 50-99 and >100 employees). This yielded a total of 15 categories across industry types and sizes. If more than 50% of the employees within one of the 15 categories were non-responders, more participants would be sampled from responding companies within that category.

A total of 6,626 employees were contacted by letter and invited to answer a web survey. The employee response rate was 55%, corresponding to 3,651 men and women aged 16 to 81 years. The number of non-respondents did not differ substantially across industry types or company sizes. A total of 173 employees were excluded since they were no longer employed in the company where they worked during the entire time period of 2007-2009 (which was the only employee inclusion criterion in the study). Another 66 employees were excluded due to missing company data, and 348 employees were excluded due to missing or incomplete employee data. The final sample consisted of 3,064 employees. Anonymised demographic registry data delivered by Statistics Denmark were made available for the entire sample (both respondents and non-respondents).

INSERT FIGURE 1 HERE

Variables:

Work intensification

The literature offers no overarching theory or construct with which to measure work intensification (20), i.e. in the present study the degree of work intensification and the agreement between companies' and employees' ratings of work intensification. Questions were therefore based on the recommendation of the OECD Oslo Manual (21).

The degree of work intensification during the 2007-2009-period was measured separately at employee level and company level by five dichotomous items which explored whether the contents of the work had changed in the direction of: a) increased autonomy and responsibility, b) increased technical / professional demands, c) increased knowledge contents, d) increased interdisciplinary collaboration, e) increased demand for labour productivity. The employee score and the company score was combined to compare employees' assessment of work intensification with the company's assessment in order to identify agreement and discrepancy. Table 1 presents an overview of how the different ratings and scores were constructed.

INSERT TABLE 1 HERE

Psychological distress

Psychological distress was estimated using the Symptoms Checklist 90 revised (SCL-90-R) (22) which measures psychological complaints and symptom intensification on a global severity index (GSI) (23). The GSI scale was calculated by the sum of the scores (0-4) of 90 questions regarding mental distress symptoms divided by the items answered. The raw scores were converted into standardised scores (t-standard; mean=50, sd=10). A t-score of 63 or higher on the GSI, or two subscales with t-scores of 63 or higher were used to determine psychological distress (22, 24).

Demographics

Covariates included in the study at the employee level were gender, age (four categories: 15-34, 35-44, 45-54, 55+) and education (white-collar, blue-collar, unskilled). At the organisational level, two covariates were included: industry type and company size. All information was obtained from registry data provided by Statistics Denmark.

Statistical analysis

We examined the distribution of covariates according to psychological distress caseness (reported as frequencies/percentages), the employee/company work intensification measurements, and the two agreement measurements (reported by mean/ associated 95% confidence intervals (95% CI)).

We used linear regression models to assess the association between the aggregated ratings of work intensification/agreement and psychological distress. Due to the multilevel structure of the data, the regression models were based on generalized estimating equations (GEE), which allowed for correlated measurement errors within companies (exchangeable correlation structure; i.e. all observations within each company are equally correlated). The results were reported by mean scores and 95% CIs. An a priori decision was made to adjust for the potentially confounding effect of age, company size, and level of education.

The association between each of the single item ratings of work intensification/agreement and psychological distress was assessed using simple prevalence ratios (PRs) and 95% CI using Poisson regression models based on GEE (accounting for within-company correlations; exchangeable correlation structure). Analyses were adjusted for the potentially confounding effect of age, education, and company size.

All statistical analyses were conducted in Stata 11.1 (StataCorp LP, 2008). A p-value less than 0.05 was considered statistically significant.

Results

Table 2 features the participant characteristics stratified by psychological distress status, employee mean intensification rating, company mean intensification rating, mean discrepancy rating, and mean agreed increased rating. Of the 3,064 employees who participated in the survey, 478 (16%) fulfilled the psychological distress criteria. Two thirds (68%) of our sample were men, and 15% of these were classified as distressed. Among the women, 18% met the psychological distress criteria. Employees in the age group 16-34 years were least represented in the study. They also had the highest psychological distress prevalence (19%) among all the age groups. Unskilled workers had the highest psychological distress prevalence (20%), followed by blue-collar workers (16%), and then white-collar workers (10%).

Most of the participants came either from the industry sector (36%) or the commerce sector (31%). Three other industry types represented the remaining third of the companies. Employees in the industry sector had the highest prevalence of psychological distress (19%) compared with the other sectors. The prevalence of psychological distress was similar across company sizes, but slightly higher among employees in the industry sector.

Three overall tendencies stood out from the employees' self-rated work intensification; age was inversely associated with increased work intensification rating, higher degree of education was associated with increased work intensification rating, and employees in smaller companies reported less intensification than employees in larger companies. Higher level of education was associated with increased company-rated work intensification. The discrepancy rating did not appear to be associated with any of the covariates, whereas the agreed work intensification ratings followed the general direction of the employees' self-rated work intensification.

INSERT TABLE 2 HERE

Intensification ratings measures

The distressed employee group had a higher mean of self-rated (employee) work intensification than the non-distressed employees (the reference group) (Table 3). The difference between the groups was statistically significant. Further comparison revealed that the non-distressed group reported a higher minimum intensification rate, while the distressed group reported a higher maximum intensification rate (data not shown). Table 3 also shows the crude and adjusted PRs of increased work intensification for the distressed group with the non-distressed group as a reference group. There was a general tendency towards increased reported work intensification in the distressed group. The most pronounced difference in prevalence was found in the item demand for labour productivity. Confounder adjustment did not materially change the associations.

For company-rated work intensification, we found no difference between the distressed group and the non-distressed group. We also found no difference in the prevalence of work intensification in the analysis of the single item ratings as presented in Table 3. Confounder adjustment did not materially change the associations.

INSERT TABLE 3 HERE

Agreement measures

In general, the discrepancy between employees' and companies' ratings of work intensification was close to what would be expected by chance (i.e. if employees and companies selected their ratings independently at random). No difference in the mean number of discrepant items was found between the distressed group and the non-distressed group. Likewise, no difference in the prevalence of discrepancy in the single item analyses was found between the distressed group and the non-distressed group (Table 4).

The distressed group had a significantly higher agreed rating of work intensification than the non-distressed group. No clear tendencies in the direction of association were observed in either the unadjusted or the adjusted single-item analysis, and only the PR of demands for labour productivity was significantly different from 1.0.

INSERT TABLE 4 HERE

Discussion

This multilevel study on Danish companies and employees examined associations between psychological distress and self-rated work intensification, company-rated work intensification, discrepancy in company-employee ratings of work intensification, and company-employee agreed work intensification. Distressed employees had a higher prevalence of self-reported work intensification than the non-distressed employees, but there was no difference in company rated work intensification between the two groups. Nor did the two groups differ in terms of discrepancy in company-employee ratings of work intensification. The employee/company agreed work intensification was slightly increased in the distressed employee group compared with the non-distressed group.

The results of this study suggest that self-rated increased autonomy and responsibility were associated with psychological distress. *Increased autonomy and responsibility* could be interpreted as "increased control", which is typically regarded as a protective aspect of work strain in the popular demand/control model (25). On the other hand, Delbridge (7) argues that the real production decisions are dictated by management-decreed goals and regulations, which could explain our findings.

Self-rated increase in technical and professional demands was associated with psychological distress in this study. The introduction of computerized technologies into everyday work routines creates a continuous need for acquiring new knowledge and skills (3), but at the same time technological innovation and development makes skills obsolete more quickly than ever (26, 27). Computerisation, mechanisation, and automatisisation often replace repetitive, routine (manual and mental) operations, thus increasing the ratio of non-routine-to-routine tasks. Work becomes more mentally demanding as non-routine tasks involve greater mental resources (demands) than do

routine ones (28). However, no association between psychological distress and increase in knowledge contents was found.

Increased interdisciplinary collaboration showed no associations with psychological caseness. Previously sharp professional boundaries in industry are disappearing and interdisciplinary collaboration has blurred the distinctions between different trades {{2429 Chan, Antony T.S. 2001 }}(29), Although these changes may still be the source of conflict and confusion, we find no link to psychological distress.

Increased demand for labour productivity was most clearly associated with psychological distress in both the self-rated and agreed work intensification measurements. This exposure variable is probably the most traditional or “raw” measurement of work intensification among the five variables (2, 30). Cowan (28) suggests that during stress, productivity first increases and then decreases if stress continues to rise. If work intensification is associated with psychological distress, it could prove counterproductive as a management strategy in the long run.

A very large proportion of employees had experienced at least some work intensification, which confirms previous findings (5, 30). Companies and employees did not agree about which single items of work had become more intense, but they did agree that work in general had become more intense. As work intensification is hardly likely to diminish in the near future in light of the current pace of globalization, which brings on growing competition and technological innovation, future research should explore ways to mitigate the adverse effects of work intensification.

We found that *self-rated work intensification* was associated with psychological distress; a finding which echoes previous findings by Green (2). However, self-reported work intensification is a measure that may be biased because both exposure and outcome are self-reported (12, 13).

Reporting bias in psychosocial research has been studied and discussed extensively (11-13, 31-33).

The pivotal point is that of circular reasoning: distressed employees may rate work contents as more stressful than their non-stressed colleagues which leads to an overestimation of risk factors.

However, the results of the agreement analyses presented in the present study challenge previous findings on reporting bias of distressed employees. First, no difference in company/employee discrepancy in assessment of work intensification was found across psychological distress status.

Second, distressed employees had a higher mean of company/employee agreed intensification than non-distressed employees.

Response rates were 42% at the company level and 55% at the individual level. These rates could be considered rather low. However, they are in line with response rates reported in a meta-analysis at both executive and employee levels (34, 35). We have no reason to believe that companies would be un-inclined to answer a survey due to employee work intensification. Employees experiencing much work intensification could be under increased time pressure which would make it harder for them to find time to answer the survey. This could entail a possible underestimation of work intensification in the present sample.

We used a weighted sampling strategy to avoid under-representation of small-company employees.

This may have implied that replies from smaller firms are over-represented in the final sample, which might therefore not truly mirror the associations in the general population of companies and employees in Denmark.

The validity and reliability of company assessments of increased job intensification may depend on the closeness of manager and employee (9, 13, 36, 37). But we found no evidence of an association between discrepancy and company size, which suggests that the extent of any such bias was small. In a study of similar size and design, Härenstam (38) examined the correspondence between researchers', managers' and employees' assessments of whether organisational change had occurred or not. The results showed that the correspondence between their assessments was below 50%. Though our variables were more detailed, we had approximately the same level of correspondence (or lack of correspondence) between employee and company ratings. Both employee and company questionnaires were piloted to check for cohesion and understanding before launching the main survey, and no problems were found regarding the comprehensibility of the questions. Identical questions for the management and employees were used, but most workers do not understand the vocabulary of business surveys according to Greenan (16). She (16) suggested that questions directed at employees should be factual and simple. Perhaps the question on knowledge contents in our employee questionnaire was too intangible. However, a similar low correspondence was found in all of the items, which makes it less likely that the reason for the discrepancy lay in the immediate understanding of some of the questions. Nevertheless, management may still take a strategic position while answering the questions, whereas most employees will understand the questions from a practical everyday viewpoint (16).

Our aggregated scores were created by simple summing up of the single item ratings, in effect letting each item "weigh" the same. However, we do not know, for example, whether an increase in interdisciplinary collaboration intensifies work as much as an increase in the demand of labour productivity. Furthermore, work intensification was measured dichotomously; and we neglected to measure decrease in work intensification, an outcome that might be associated with psychological distress.

In summary, this study demonstrates minor differences in work intensification ratings between distressed and non-distressed employees, and these differences persists in company-employee agreed ratings of work intensification. Longitudinal multilevel studies are needed to more fully understand the causal connection between work intensification and psychological distress. Such studies should focus on more nuanced work intensification measures assessed at individual, co-worker, and manager levels (39).

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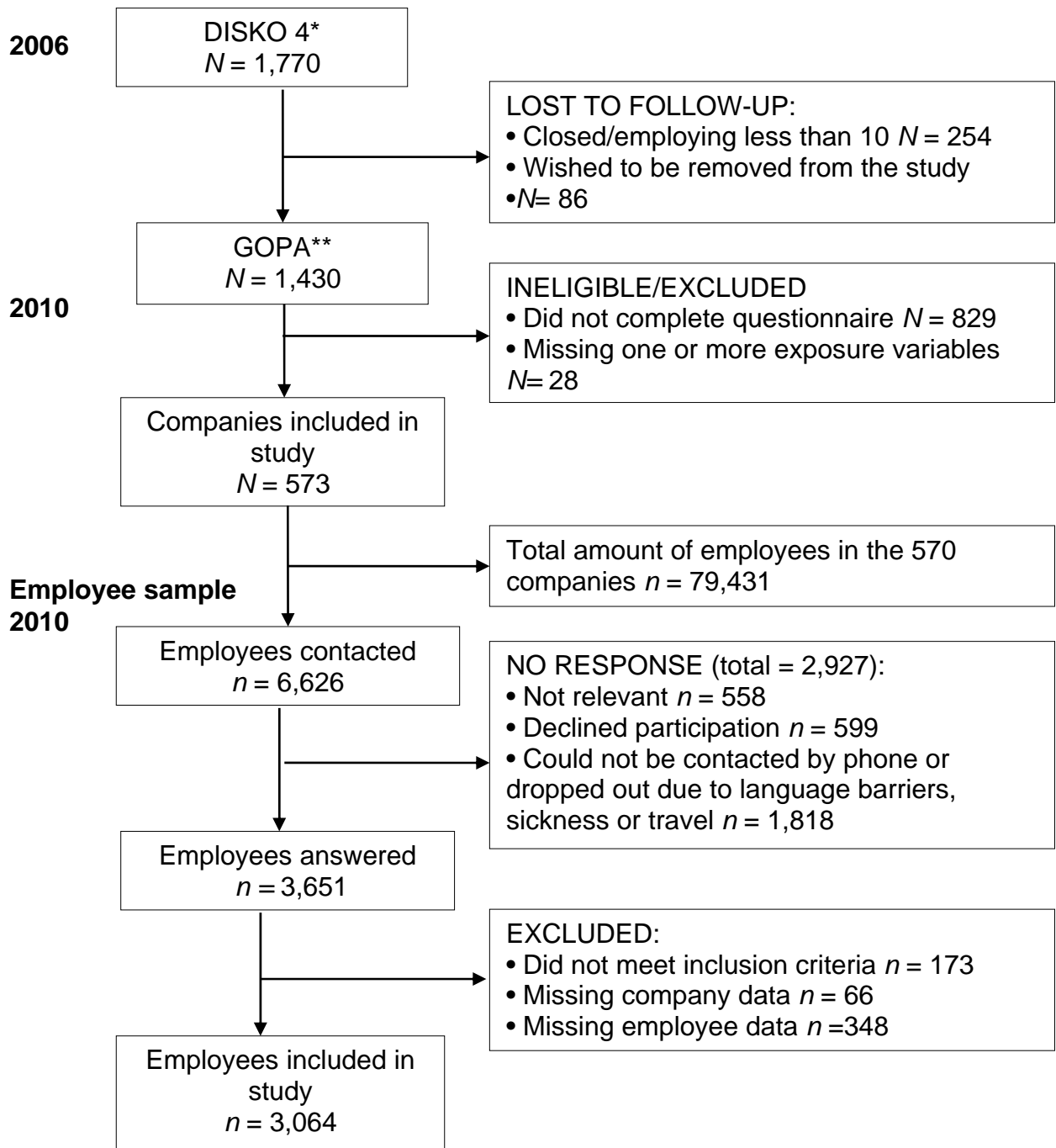
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Company sample



* DISKO 4: The Danish Innovation System: Comparative analysis of challenges, strengths and bottlenecks survey

** GOPA: Globalization, Transformational Pressure, and Psychosocial Environment survey

Figure 1 Flow-chart over companies and employee respondents

Table 1 Overview of the single item ratings of work intensification and the aggregated ratings.

	Employee rating	Company rating	Discrepancy rating	Agreement rating
Single item ratings	<i>0/1</i>	<i>0/1</i>	<i>0 if employee rating=company rating; 1 otherwise</i>	<i>1 if both employee and company rating = 1; 0 otherwise</i>
Aggregated rating	Sum (0-5)	Sum (0-5)	Sum (0-5)	Sum (0-5)

Table 2 Frequency of covariates by psychological distress caseness. Mean aggregated intensification ratings. Mean aggregated agreement ratings (N=3,064)

	Distress frequency		Intensification ratings				Agreement ratings			
			Employee rating		Company rating		Discrepancy rating		Agreed intensification rating	
			Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
	N	% ^a								
Total	478	15.60	2.40	(2.33-2.46)	2.52	(2.45-2.59)	2.37	(2.32-2.43)	1.27	(1.22-1.33)
Gender										
Male	308	14.58	2.40	(2.31-2.48)	2.44	(2.29-2.58)	2.38	(2.31-2.46)	1.25	(1.15-1.34)
Female	170	17.77	2.36	(2.24-2.48)	2.39	(2.23-2.54)	2.33	(2.23-2.44)	1.20	(1.08-1.31)
Age groups										
16-34	55	19.37	3.05	(2.91-3.20)	2.46	(2.30-2.63)	2.40	(2.28-2.52)	1.56	(1.43-1.69)
35-44	134	16.13	2.69	(2.60-2.78)	2.44	(2.30-2.59)	2.38	(2.31-2.46)	1.38	(1.28-1.47)
45-54	178	16.12	2.32	(2.25-2.39)	2.42	(2.28-2.56)	2.37	(2.30-2.43)	1.20	(1.11-1.28)
55+	11	13.14	1.95	(1.85-2.06)	2.39	(2.24-2.54)	2.35	(2.26-2.44)	1.02	(0.91-1.12)
Education										
White-collar	62	10.10	2.54	(2.41-2.66)	2.81	(2.66-2.97)	2.36	(2.25-2.47)	1.50	(1.38-1.62)
Blue-collar	280	15.97	2.39	(2.32-2.47)	2.44	(2.30-2.58)	2.37	(2.31-2.43)	1.24	(1.16-1.33)
Unskilled	136	19.51	2.24	(2.12-2.37)	2.07	(1.92-2.23)	2.38	(2.28-2.48)	0.99	(0.88-1.10)
Sector										
Industry	197	18.27	2.32	(2.21-2.44)	2.43	(2.22-2.65)	2.35	(2.26-2.44)	1.22	(1.09-1.35)
Construction	40	15.44	2.36	(2.28-2.44)	2.43	(2.27-2.58)	2.36	(2.29-2.43)	1.23	(1.13-1.32)
Commerce	138	14.41	2.40	(2.32-2.48)	2.42	(2.27-2.57)	2.37	(2.31-2.44)	1.23	(1.14-1.32)
Information	45	14.02	2.44	(2.33-2.55)	2.41	(2.21-2.61)	2.39	(2.30-2.47)	1.24	(1.12-1.36)
Real estate	58	12.95	2.48	(2.33-2.63)	2.41	(2.12-2.69)	2.40	(2.28-2.52)	1.24	(1.07-1.42)
Size										
10-49	150	14.52	2.18	(2.06-2.30)	2.33	(2.11-2.54)	2.35	(2.25-2.45)	1.10	(0.97-1.23)
50-99	134	15.71	2.38	(2.31-2.45)	2.42	(2.28-2.56)	2.37	(2.31-2.43)	1.23	(1.14-1.32)
100+	194	16.57	2.58	(2.47-2.69)	2.52	(2.30-2.74)	2.39	(2.29-2.48)	1.36	(1.23-1.49)

^a Per cent of subgroup

Table 3 Prevalence of increased work intensification for distressed group compared with non-distressed group by employee ratings and company ratings, and mean aggregated ratings (n=3,064)

	Employee rating				Company rating			
	Crude		Adjusted ^a		Crude		Adjusted ^a	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Autonomy and responsibility	1.16**	(1.05-1.28)	1.12*	(1.02-1.24)	1.01	(0.95-1.07)	1.03	(0.97-1.09)
Technical / professional demands	1.15**	(1.04-1.26)	1.13*	(1.03-1.24)	0.97	(0.90-1.04)	0.98	(0.92-1.05)
Knowledge contents	1.07	(0.98-1.17)	1.07	(0.99-1.17)	0.93	(0.87-1.00)	0.96	(0.89-1.03)
Interdisciplinary collaboration	1.07	(0.95-1.20)	1.06	(0.95-1.19)	0.99	(0.93-1.06)	1.01	(0.95-1.07)
Demand for labour productivity	1.30***	(1.21-1.40)	1.27***	(1.18-1.36)	0.99	(0.93-1.06)	0.99	(0.92-1.06)
Aggregated rating	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.33	(2.25-2.41)	2.34	(2.26-2.41)	2.43	(2.29-2.57)	2.45	(2.31-2.59)
Distressed	2.68*** ^b	(2.52-2.85)	2.69*** ^b	(2.53-2.85)	2.38	(2.21-2.55)	2.39	(2.22-2.55)

Note: *p <.05 ** p <.01 *** p <.001.

^a Adjusted for age, education, and company size

^b P-value for comparison of the non-distressed group mean to the distressed group mean

Table 4 Prevalence of increased work intensification for distressed compared with non-distressed by discrepancy and agreed intensification ratings and mean aggregated rating (n=3,064)

	Discrepancy rating				Agreed rating			
	Crude		Adjusted ^a		Crude		Adjusted ^a	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Autonomy and responsibility	0.99	(0.90-1.10)	0.99	(0.90-1.10)	1.16	(1.00-1.34)	1.15	(0.99-1.33)
Technical / professional demands	1.02	(0.91-1.13)	1.02	(0.91-1.13)	1.08	(0.92-1.26)	1.09	(0.94-1.26)
Knowledge contents	1.10	(1.00-1.21)	1.09	(0.99-1.20)	0.91	(0.76-1.08)	0.95	(0.80-1.12)
Interdisciplinary collaboration	0.96	(0.86-1.07)	0.96	(0.86-1.07)	1.11	(0.93-1.33)	1.13	(0.95-1.34)
Demand for labour productivity	0.92	(0.83-1.03)	0.92	(0.83-1.03)	1.33***	(1.17-1.50)	1.29***	(1.14-1.45)
Aggregated rating	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Non-distressed	2.37	(2.30-2.43)	2.37	(2.30-2.43)	1.21	(1.20-1.30)	1.22	(1.13-1.31)
Distressed	2.37	(2.23-2.51)	2.37	(2.23-2.51)	1.35 ^b	(1.21-1.49)	1.36 ^b	(1.22-1.50)

Note: *p <.05 ** p <.01 *** p <.001.

^a Adjusted for age, education, and company size

^b P-value for comparison of the non-distressed group mean to the distressed group mean

The GOPA project: publications and future studies

Publications

2012

1. Published

Capabilities for innovation : The Nordic model and employee participation. / Nielsen, Peter; Nielsen, Rene Nesgaard; Bamberger, Simon Grandjean; Stamhus, Jørgen; Fonager, Kirsten; Larsen, Anelia; Vinding, Anker Lund ; Ryom, Pia Køhler; Omland, Øyvind.

In: Nordic Journal of Working Life Studies, Vol. 2, No. 4, 2012, p. 85-115.

Publication: Research - peer-review › Journal article

2. Published

Impact of organisational change on mental health : a systematic review. / Bamberger, Simon Grandjean; Vinding, Anker Lund; Larsen, Anelia; Nielsen, Peter; Fonager, Kirsten; Nielsen, René Nesgaard; Ryom, Pia; Omland, Øyvind.

In: Occupational and Environmental Medicine, Vol. 69, No. 8, 2012, p. 592-8.

Publication: Research - peer-review › Review

2011

3. Published

Globalisering, omstillingspres og psykisk arbejdsmiljø. / Nielsen, P; Omland, Øyvind; Larsen, Anelia; Ryom, Pia Køhler; Fonager, Kirsten; Nielsen, René Nesgaard; Bamberger, Simon Grandjean; Vinding, Anker Lund.

Arbejdsmiljø og arbejdsliv i et socialt ressource perspektiv. 2011. p. 153-84.

Publication: Research - peer-review › Book chapter

4. Published

Globaliseringsparat? Om udviklingen af danske virksomheder mod globaliseringen – et dynamisk ressourceperspektiv. / Nielsen, Peter; Nielsen, René Nesgaard; Bamberger, Simon Grandjean; Fonager, Kirsten; Vinding, Anker Lund; Larsen, Anelia; Omland, Øyvind; Ryom, Pia.

In: Tidsskrift for Arbejdsliv, Vol. 13, No. 3, 2011, p. 12-29.

Publication: Research › Journal article

Future studies under the GOPA project

Future studies are planned to verify the findings of this study and to examine other areas of relevance.

There are still many potential ways in which the GOPA project can expand the knowledge on associations between work and health, and currently two studies are planned:

1. A longitudinal registry study. Instead of using the questionnaire data, globalization is to be operationalized through economic key variables. Relevant registry outcome data include mortality, psychotropic drug use, sick leave and sick pension. Two models are viable
 - a. Only look at registry data (2000-2010);
 - b. Combination of registry data and questionnaire data.
2. A follow-up study of the GOPA project. A follow-up study assessing the companies and employees again to examine longitudinal effects on psychological distress. Given the persistent nature of the GFC and the decline in Denmark's competitive abilities, a follow-up study would provide even more information on the impact of the external conditions on the employees. This study could be performed on both questionnaire and/or registry level.