Improving the primary task: effects of implementation intensity on employee health and organizational performance

Abstract

Purpose: To document and discuss the effects of a participatory intervention in preschools focusing upon improving the performance of the primary task on employee health and organizational effectiveness. Further, to investigate the role of implementation intensity on the outcomes.

Design: A longitudinal, participatory intervention study of 62 preschools involving approximately 1,800 employees. The evaluation uses short-term sickness absence to measure employee health, employee-assessed primary-task quality and parent-assessed user satisfaction to measure organizational effectiveness and implementation intensity was measured as hours per employee and as per the request by the workplace managers, and compensation was offered by the project.

Findings: The multi-level analyses show that preschools with higher implementation intensity have stronger effects on employee health and organizational effectiveness than preschools with lower implementation intensity. The differences indicate that the main intervention component, improving performance of the central work tasks through collaborative, participatory workplace activities, had effects on both health and effectiveness and that workplace and employee engagement in the intervention is crucial to its success.

Practical implications: Inspired by the Tavistock tradition for socio-technical systems design, the study indicates an avenue for conducting collaborative organizational change processes that benefit both employees and organizations. In addition, it proposes "hours used per employee" as a relatively simple measure of implementation intensity in such interventions.

Originality: The study contributes to research in the field of occupational psychological health by reporting on a comprehensive participatory intervention study comprising measures of employee health, organizational performance and implementation intensity.

Introduction

Despite decades of research into psychosocial health at work, evidence indicates that problems in these areas are increasing rather than decreasing (Cooper, 2013). For instance, high levels of absences related to sickness is a problem at many private and public workplaces (Black, 2008; CIPD, 2013). Occupational health organizations, researchers, governments and social partners have been searching for evidence-based tools and interventions that may improve workplace practices and performance and simultaneously reduce risks related to occupational health. However, there is a paucity of published longitudinal intervention studies

that focus on such simultaneous health and performance outcomes (Giga, Cooper, & Faragher, 2003; Siu, Cooper, & Phillips, 2014). Therefore, although there are many practical tools, management concepts and cross sectional studies, there is little evidence to guide how to choose the most applicable approach.

Two recent reviews expose the paucity of evidence-based organization level intervention research combining measures of organizational effectiveness and occupational health. Specifically, a comprehensive review identified only 19 longitudinal studies of which, only 11 of these studies tested organization-level performance outcomes, and none of them used a prospective intervention design (Nielsen et al., 2015). The review identifies a range of organizational resources that affect employee well-being and health and organizational performance, such as transformational leadership, positive labour-management relations, self-determination and autonomy, and training and development. Outcome measures included job satisfaction, well-being, employee turnover and commitment. Performance measures included management rated performance, financial performance, innovation performance, productivity and quality of service.

A similar review supports these conclusions. It proposes that the paucity may be not only be related to how this type research is organized, funded and published, but also to how workplaces organize occupational health and safety (Torvatn, Sørensen, Talja, & Eriksen, 2015). Management practices typically compartmentalize workplace development where line management and operations development departments typically have responsibility for developing performance and operations. Although managers have the responsibility for protecting and improving work-related health and well-being, the handling of such issues is often overseen by human resource departments (HR) or occupational health committees rather than line managers (Hasle & Sørensen, 2013). In addition, managerial rationalization strategies typically increase workload without improving the job design, e.g., job control (Westgaard & Winkel, 2011). Formally, as stipulated in EU directives, such as the EU Framework Directive 89/391/EEC[1], workplace assessment should be a central consideration in workplace development. In practice, even in the Nordic countries where this study was conducted, where we see some of the strongest, legislatively-based, representative occupational health and safety (OHS) organizations, such systems are often marginalized; OHS-organizations has a sidecar position with relatively low impact on general operations (Frick & Wren, 2000).

[1] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004DC0062&from=EN

To increase the chances of success of research based OHS-interventions, such interventions should be better embedded in line management rather than primarily in the OHS-organization (Hasle & Jensen, 2006). Such ideas were already introduced in Tavistock's sociotechnical systems design tradition through their focus on the organizations' primary task as a central component in change processes that benefit both organizations and employees (Rice, 1963; Sasser & Sørensen, 2016). However, the Tavistock tradition has primarily influenced action research (Emery & Thorsrud, 1976; Greenwood & Levin, 2006) and has only to a limited degree been translated into contemporary, rigorous intervention designs (Biron & Karanika-Murray, 2014). This paper fills this gap by reporting on a comprehensive longitudinal participatory intervention.

Participatory interventions that intend to improve both employee health and organizational performance face a basic implementation challenge. Due to the compartmentalization described above, such interventions are difficult to embed and implement efficiently (Kristensen, 2005). They are, therefore, inherently challenged on fidelity, i.e., which is the extent to which the intervention is delivered as it was intended (Augustsson, von Thiele Schwarz, Stenfors-Hayes, & Hasson, 2015). In a participatory intervention, fidelity crucially depends upon the *effort* participants (employee and managers) devote to implementing intervention initiatives. This article focuses on *implementation intensity* as a measure of participant effort to implement the intervention. It analyses the effects on outcomes of a simple quantitative indicator of implementation intensity (hours used per employee) to investigate whether such an indicator can be used to identify workplaces that directly benefitted from the intervention activities.

To summarize, very few published occupational health intervention studies combine employee health and organizational effectiveness outcomes, and such intervention designs are difficult to implement effectively, making intervention intensity an important issue. The aim of this article is two-fold: to report the results of a prospective participatory occupational health intervention study with multiple intended outcomes and to investigate the usefulness of a simple quantitative organizational level measure of implementation intensity. The article contributes to the field by analysing and discussing the outcomes of this large-scale, organization-level, occupational health intervention aimed at improving primary tasks.

Theory

High levels of absences related to sickness affect both individual and organizational performance – not only because of the additional cost of hiring temporary workers, but also because skilled resources are missing or replaced with less-skilled resources, which affects the pace and quality of work, including effectiveness and user satisfaction (CIPD, 2013). In addition, research shows that well-functioning operations and meaningful work processes reduce threats to employee health (Kristensen, 2005; Semmer, 2006). However,

although there are statistically significant relationships between these outcomes, it is not clear that organization-level occupational health interventions can simultaneously improve these outcomes. Therefore, separate hypotheses are proposed related to testing whether the intervention affects all outcomes simultaneously.

The hypotheses are formulated in relation to *implementation intensity*, which is a measure of how much *effort* participants and researchers put into implementing the intervention (Egan, Bambra, Petticrew, & Whitehead, 2009). If the intervention is delivered uniformly to all participating organizational units, the level of implementation intensity primarily depends upon the effort of the participants. This effort is related to the intervention design, e.g., how employees are activated and involved and a good organizational fit is an example of implementation intensity, i.e., how well the intervention fits the particular organization (Nielsen & Randall, 2012). Therefore, the level of effort depends upon how management and employees are activated, which depends upon the particular intervention design, but also the manner in which management conducts the intervention activities (Nielsen, Randall, Holten, & González, 2010).

It is difficult to conduct thorough process evaluations because they are time-consuming and require organization access and resources. Hence, simple indicators of implementation intensity can be useful as a process evaluation measure. The degree of participation, e.g., the time that management and employees use on activities, is a possible indicator of implementation intensity. In some organizations, such a measure is relatively easy to acquire as it is already measured in the management information system. Unfortunately, the measure is relatively crude because it does not indicate how broadly employees are engaged or the quality of the activities. However, in a homogeneously-implemented intervention it may differentiate between various intervention units.

The evaluation concerns a participatory intervention that strives to improve the performance of the primary task at the organizational level, in particular the performance of what employees and management perceive as the central work tasks. According to Rice, the primary task is "the task an organization must perform to survive" (Rice, 1963, p. 13). The primary task can either be improved by performing the central work tasks more effectively, e.g., by using better tools or by removing barriers, such as unnecessary or inefficient work tasks. Proper performance of the primary task is essential for organizational effectiveness. *Primary task quality* can be defined as "employees' assessment of the quality in which they can perform their tasks" (Sasser & Sørensen, 2016, p. 324). An intervention that improves the performance of the primary task can be expected to positively affect employees' assessment of the primary-task quality. Higher implementation intensity, i.e., higher levels of participation, can be expected to lead to more

comprehensive changes of how the primary task is performed. Therefore, the following hypothesis is proposed:

H1: Higher implementation intensity results in a relatively higher increase in primary-task quality.

Absences due to sickness can be expected to be related to the performance for the primary task due to its importance for the employees' pride and engagement in their work (Rice, 1963). An intervention that focuses on improving the central work tasks may result in more effective procedures and more time for primary work tasks, which may cause employees to find work more meaningful and less stressful (Tufte, Clausen, & Nabe-Nielsen, 2012). Improvements in the performance of central work tasks may reduce absences if work procedures are more clearly defined (Bambra, Egan, Thomas, Petticrew, & Whitehead, 2007), if employee control is increased (Egan et al., 2007), if work distribution and procedures are more just (Ndjaboué, Brisson, & Vézina, 2012) or if work organization is more logically and less obtrusive (Semmer et al., 2015). Especially short-term absences can be expected to be related to motivational components of work, as it affects whether a health condition or a negative mood results in a sick-day or not. Higher implementation intensity, i.e., higher degrees of participation, is expected to lead to more comprehensive changes and to work-design solutions that respect employees' needs and reduces their absences. Therefore, the following hypothesis is proposed:

H2: Higher implementation intensity results in a relatively higher reduction of short-term sickness absence

User satisfaction, which is a measure of organizational effectiveness, can be expected to improve in an intervention that focuses on improving the performance of the primary task. If the performance of the central work tasks is improved, e.g., by using better tools, it is expected that improved effectiveness will lead to higher service-quality (Andersen & Kjeldsen, 2013; Favero & Meier, 2013). Measures of user satisfaction can therefore be expected to improve. Higher implementation intensity can be expected to create more comprehensive changes, which will increase the effect of the central intervention component. Some types of improvements of the performance of the primary task may, however, not translate into changes that users notice, e.g., improvements of organizational procedures and more efficient staff meetings. Nevertheless, over time it can be expected that the organizational resource which are freed by better performance of the primary task will be channelled into improving central work activities that positively affect user satisfaction. This leads to the third, and final, hypothesis:

H3: Higher implementation intensity results in a relatively greater improvement of user satisfaction.

Method

Intervention description

The organizational context of this study is municipal preschools with children in the age range of 0–3, 3–6, and 0–6 years (municipal nurseries and kindergartens) in Denmark. The setting was chosen because it was possible to recruit a large number of physically separated, similar workplaces (intervention units) with the same organizational conditions. All workplaces in the study worked within the same municipal administration and had comparable economic conditions and the same collective agreement. The levels of absences due to sickness was relatively high compared to other occupational groups, however, there was a large variance in means between workplaces, which indicates that occupational health improvements should be possible. Similarly, parent satisfaction was high, suggesting that improvements in organizational effectiveness should also be possible. Therefore, it was hypothesized that the variations were related to the effectiveness of the performance of the primary task.

The research group obtained an opportunity to study an organizational change process in the municipality. The municipality had already received external funding (REF Funding agency; grant No; grant) to improve working environments through a primary-task improvement intervention. The research group secured funding (REF Funding agency; grant No; grant) for a research-based evaluation comprising of elaborate data collection for both effect and process evaluation. Instead of focusing upon a specific job redesign factor, such as control, social support and rewards (M. Kompier, 2003), the project took an innovative participatory intervention approach that focused upon improving performance of the primary task (ThisAuthor, 2016).

The primary target group for the intervention was the pedagogical personnel in the preschools. The purpose of the intervention was to improve the working environment and the capacities of preschools to improve the working environment. The primary goal was to introduce and learn from workplace initiatives (action learning) in order to improve job-design and work practices (the performance of the primary task). The secondary goals were to reduce absences related to sickness and improve employee well-being. Workplaces were offered free assistance from professional process facilitators (OHS-consultants). Each preschool had a pedagogical leader, a safety representative and a shop steward. This group, also called the TRIO,[2] has the responsibility for local workplace development. Thus, it was chosen as the local implementation group in nearly all intervention units. A central intervention principle was that the local implementation group was responsible for conducting local improvement activities with assistance from

[2] In Denmark, all workplaces should elect an OHS-representative. In the public sector, the unions are strongly represented and coverage is 100 %. In the study, nearly all workplaces had an elected shop steward. A few organizations involved a different mix of employees.

the process facilitators. Local activities varied according to local interests and needs and workplaces were compelled to implement more than one change initiative (depending on their resources).

To induce local change activities, the intervention arranged a range of common intervention activities that were delivered uniformly to all intervention units by the consultants. All members of the local implementation groups from each of the 62 workplaces participated in 5 full-day seminars. Each seminar hosted 7-10 workplaces. The seminars aimed to increase the collaborative change management competencies of the local implementation groups. The seminars offered expert training in change management and evaluation and participants were encouraged to share their knowledge and experiences. The seminars offered inspiration for developing local implementation initiatives through best practice examples and expert presentations. The local implementation groups at each workplace were required to conduct a two-hour workshop with all employees to involve co-workers. At this workshop, they presented inspiration from the first project seminar. Based upon the workshop, they developed an action plan describing the change initiatives, which was subsequently implemented and evaluated.

The intervention involved approximately 1,800 employees. The 62 workplaces (10-60 employees) proposed 151 local workplace development initiatives during the action planning phase and more than 100 of these were completed during the implementation phase (1.6 per workplace). The main types of initiatives were: pedagogical improvements (35), meeting and structure (33), work culture (25), cooperation at work (21) and communication (18). A local intervention initiative to improve pedagogical practices could be to organize professional supervision or set aside time for collegiate coaching. An example of a meeting and structure initiative could be to improve how staff meetings were conducted. A work culture initiative could be a systematic process to rotate employee between work groups to obtain broader acquaintances at the workplace and to learn from each other. In essence, the purpose of all initiatives was to improve the performance of the primary task.

Evaluation design

The main evaluation design of the intervention study was a random control trial (RCT) with 44 intervention units and 34 control units. The RCT was embedded in a regression discontinuity (RD) design with 98 additional control units and 20 additional intervention units. The intervention included only workplaces with an average short-term absence rate above the median average absence of preschools in the municipality (9.8 days per employee). The results of the RCT-evaluations and the RD-evaluation for single outcomes have been reported elsewhere (CoAuthor 1; CoAuthor 2; ThisAuthor, 2016). The RCT-evaluation of short-term absences related to sickness showed that the intervention units had a lower incidence of

absence during the implementation of the intervention than the control units. However, the RCT and RD analyses did not indicate that the reduction of short-term absence or burn-out was larger in intervention units than in control units from baseline to follow-up. The analyses in this paper, therefore, focus upon the intervention units only. It evaluates three outcomes in relation to implementation intensity to assess whether the outcomes are affected by this particular process measure (Sørensen & Holman, 2015).

The intervention lasted 38 months and consisted of five phases (see Figure 1): preparation, screening, action planning, implementation and evaluation (Kompier, Cooper, & Geurts, 2000). The intervention was planned by a project management team with participation of the municipality, consultants and researchers. Intervention units were selected in the preparation and screening phases (2010/9-2011/9). The local implementation groups involved all employees in developing workplace specific intervention activities in the action planning phase (2011/9-2012/2). The implementation groups participated in common intervention activities, and workplace specific activities were implemented in the 17-month implementation phase (2012/2-2013/6). The implementation groups self-evaluated and received feedback from the project during the evaluation phase (2013/3-2013/6). The evaluation indicates that the central implementation mechanisms worked as intended (CoAuthor 3, 2016).

-- Insert Figure 1: Timeline around here --

Participants

The study included preschool teachers ('pædagoger') and teaching assistants ('pædagogiske assistenter') in municipal childcare centres in a large Danish municipality. Teachers typically have a full-time position with a bachelor-level degree, whereas assistants typically are unskilled or semi-skilled. Each workplace employs a similar mixture of teachers and assistants. Three employees typically care for a group of 11 children aged 0-3 or 22 children aged 3-6 years. The preschools vary from 10 to approximately 60 employees with a mean of approximately 20. Parents were also invited to evaluate their child's preschool.

Data samples

Employee health data: We used sickness absence as an indicator of work-related health issues. We received data from the municipal register (2008-2013) where absences were registered monthly for each participant counting from the first to the last calendar day of absence. We excluded part-time sickness absence, absence due to pregnancy related sickness, and children's sick days. Short-term sickness absence is defined as spells of absence of up to 14 calendar days (10 work days), which was contingent on Danish reimbursement rules and nationwide municipal practices in 2010. The data did not allow us to evaluate

how other definitions of short-term sickness absence would affect the analyses. The total number of observations was 2761 at Time 1 was 2761 and 2549 at Time 2. The analyses included preschool teachers and teaching assistants only; a total of 2745 observations from Time 1 and Time 2.

Effectiveness data: Two different samples were used to assess effectiveness: One sample consisted of employee assessments and another sample of user assessments (from parents). The employee assessments were collected in a survey that was conducted at two different time points. The first round was conducted before the intervention activities began in September 2011. The second round was conducted exactly two years after in September 2013 once all intervention activities had ceased. A municipal project steering group with representatives from management, unions and HR allowed the project to distribute a paper-based confidential questionnaire. The employees could answer the questionnaire at work and the preschools received economic compensation for the time used. Questionnaires were either collected locally in closed envelopes or they could be mailed directly in a prepaid envelope.

At the workplaces, the survey was administered by the local implementation group. In the first round, the consultants coordinated the survey in the intervention units and researchers coordinated the control units. In the second round, the researchers coordinated the survey in all units. Questionnaires were delivered by hand to the workplaces and were collected 1-2 weeks after to ensure a high response rate. In the first round, employees returned 1745 valid, completed questionnaires with an overall response rate of 86 %. The pre-school teachers' mean age was 41.9 (SD = 10.7); 89.5 % were women. Teaching assistants' mean age was 36.9 (SD = 11.6); 79.7 % were women. In the second round, employees returned 1371 valid, completed questionnaires for an overall response rate of 78 %. The composition of the participants was similar to the first round. Answers from leaders, technical and administrative personnel were excluded from the analyses as they were not the main target of the intervention. The analyses included a total of 1464 observations from Time 1 and Time 2.

A second approach used user satisfaction as a proxy for organizational effectiveness. The project conducted two surveys with parents. The first round was conducted two months after the start of the implementation in April 2012 (political and administrative issues made it impossible to start earlier). The second round was conducted exactly one year after the first survey to avoid seasonal effects. We prioritized the seasonal criteria because the last three months of the intervention was focused upon self-evaluation. The survey was administered by a professional survey company (Enalyzer). Each parent received a letter explaining the survey with a unique link. At the workplace level, the local work group administered the survey. Unfortunately, a weakness was that less affluent families were less likely to

respond. In addition, a higher response rate could probably have been obtained had the institution been more actively involved in conducting the survey.

Two workplaces dropped out of the intervention due to organizational changes. Four workplaces refused to take part in the second round of the survey despite pressure from the municipality and the union. The leaders feared that the survey would negatively affect the already problematic working environment, since they felt the survey could raise expectations from the parents. Three workplaces did not participate due to practical and technical hindrances. These nine workplaces were excluded from the analysis.

In the first round, the parents returned 2,200 valid, completed questionnaires. The overall response rate was 29 %. In the second round, the parents returned 2,479 valid, completed questionnaires for an overall response rate of 32 %. Drop-out analyses did not indicate a systematic difference between respondents and non-respondents in terms of age, education or socio-economic status. However, although the questionnaire was provided in six languages, comparatively few parents with an ethnical background other than Danish responded. This group was, however, insignificantly small. Therefore, we believe the data is reliable for the comparative analyses presented in this paper.

Implementation intensity data: We relied upon the local workplaces registration of hours used on intervention activities. Each preschool manager could ask the municipality for compensation for hours employees used on the following: filling in questionnaires, participating in project seminars, conducting and participating in intervention meetings for employees as well as hours used by the local implementation group and workplace employees to implement initiatives in the intervention.

Measures

The project team decided to use short-term absence due to sickness as a measure of employee work-related health since long-term absence is unevenly influence by non-work related physical and mental trauma, whereas infectious diseases, such as the common cold affects intervention units more evenly. We used short-term absences due to sickness over the course of one year to correct for personal and seasonal variations. For the measurement of Time 1, we used the yearly absence for 2011, which is the year immediately before the commencement of the intervention. For Time 2 we used the yearly absence for 2013. This overlaps with the implementation period, but we had to use it for practical reasons. We considered it acceptable because the main thrust of the intervention was in 2011 and the last three months were primarily used for self-evaluation. Employees with less than eight months of employment were excluded from the analyses. Missing data were imputed based upon the individual employee's sickness pattern in the month of employment.

To analyse the employee data, we used a scale, *primary-task quality,* which had been previously tested and published (Sasser & Sørensen, 2016). This scale is composed of three questions that measure the organizational conditions for performing adequate quality work. The employees were asked: "How often can you perform work in a quality standard which you are satisfied with?", "How often are work procedures changed if you point out that it can be done better?" and "How often are the organizational conditions conducive to solving your work tasks adequately?"

The *user satisfaction* measure was based upon two questions from the parent survey. The questions in the survey were selected from a national survey provided by the employers association KL (Municipalities Denmark), and they were discussed and accepted by the municipality and the union. The union was concerned that the survey did not ask parents about issues they had no skills to assess, such as the pedagogical capabilities of the employees. The questionnaire was piloted with managers and employee representatives in two non-participating workplaces. The questions were divided into four sections: general satisfaction (2), satisfaction with facilities (2), satisfaction with parent involvement and dialogue (3) and satisfaction with pedagogical activities (4).

Factor analyses indicated that nine questions could be combined into one scale. However, the two questions about general satisfaction correlated closest to the employee measures. Consequently, we selected the general satisfaction scale for the analyses. The two questions were: "How satisfied are you all-in-all with your child's preschool?" (Mean=4.1; SD=0.9) and "How satisfied are you all-in-all with the daily activities?" (Mean=3.9; SD=0.99). The two questions were combined into one scale (α=0.83). The parents responded on a Likert scale ranging from one (very dissatisfied) to five (very satisfied). The mean values indicate that the parents are generally quite satisfied. The main part of the distribution falls between the middle of the scale to very satisfied.

The *Implementation intensity* measure was constructed based upon the compensation hours claimed by the workplace. The total compensation hours are proportional to the number of employees. The intervention effect, however, can be expected to be related closer to the relative time used. Therefore, we used *hours per employee* as a proxy for implementation intensity. The variable had a mean of 21.5 hours per employee (SD=14.4). Three to four hours per employee were used to fill in the survey and to participate in the employee workshop.

Analysis strategy

All analyses were conducted at the level of individuals. We used a multi-level mixed linear regression with three embedded levels: time within individuals within organizations. Both employees and children had a

unique ID assigned. Thereby, the analyses used all possible information and accounted for co-variance between individuals within the same organization and between individuals over time. The analyses included an interactions term between time and implementation intensity as an independent variable to determine the effect of implementation intensity over time. Analyses were performed in SAS version 9.4 with Proc Corr and Proc Mixed (DDFM=SATTERTHWAITE). Proc Mixed takes account of both repeated measures and pre- and post-mean values at the organizational level.

In the analyses of employee data, we used individual-level control variables (age, gender, position: teacher/assistant), and organizational level control variables (type of institution: 0-3 years, 3-6 years, or 0-6 years). Finally, we controlled for the original inclusion criteria: organization level short-term sickness absence in 2010. Workplace size was tested, but not included, as it had no significant impact in any of the analyses.

In the analysis of user satisfaction data, we used parent education as the individual control variable: ”short education” (below bachelor level) and ”long education” (bachelor level and over). Additionally, we used the same organizational control variable (type of institution and controlled for total sickness absence in the period immediately before the survey was conducted (first quarter of the year). The dataset did not include information about child age and gender.

Both sickness data and user data were slightly skewed. In both cases, additional analyses were performed on the log-transform outcome variable, which resulted in an outcome variable closer to the normal distribution. These analyses confirmed the main analyses and are not reported. In the analysis of sickness data, we used all possible data points – i.e., the employee sample is different from the sample used to evaluate primary-task quality. We did this to get the best possible measure. Therefore, the three samples are not directly comparable, but they pertain to the same organizations. Two preschools quit the intervention; one because it never participated and one because it was closed down. To make the analyses comparable, an additional seven preschools were excluded from all the analyses due to issues related to the user survey (N<5).

Results

The correlation analyses confirm that the health measure (short-term sickness absence) is correlated to the organizational effectiveness measures (primary-task quality and user satisfaction). However, the correlations are not strong and they are only significant at Time 2 (see Table 1).

-- insert Table 1 around here --

H1 states that higher implementation intensity results in a relatively higher increase in primary-task quality. The analysis shows that primary-task quality increases more in the units that spend more hours on implementation ($\beta = 0.006$; $p < .05$; Table 2, line 3). The hypothesis is therefore confirmed. The control variables indicate that the preschool teachers are more dissatisfied with the primary-task quality than the assistants ($\beta = -0.101$; $p = .01$; Table 2, line 8). Short-term sickness-related absence in 2010 had a significant negative relation to primary-task quality ($\beta = -0.026$; $p < .05$; Table 2, line 11).

-- insert Table 2 around here --

H2 states that higher implementation intensity results in a relatively higher reduction of short-term sickness-related absence. The analysis shows that short-term sickness-related absence decreased more in units that spend more hours devoted to implementation ($\beta = -0.046$; $p < .05$; Table 2, line 3). The hypothesis is therefore confirmed. An additional analysis including only absence data from survey respondents corroborates the result ($\beta = -0.055$; $p < .05$; $N = 1492$; Table not included). The control variables show that older employees have lower levels of short-term sickness absence ($\beta = -0.029$; $p < .05$; Table 2, line 6) and that the preschool teachers have lower levels of absence than the assistants ($\beta = -0.824$; $p < .05$; Table 2, line 8). Short-term sickness absence is lower in preschools with children of all ages (0-6 years) than in preschools with small children (0-3 years) ($\beta = -1.248$; $p < .05$; Table 2, line 9). Short-term absences due to sickness in 2010 had a significant positive relation to short-term sickness absence in the intervention period ($\beta = 0.324$; $p < .001$; Table 2, line 11).

H3 states that higher implementation intensity results in a relatively greater improvement of user satisfaction. The analysis shows that the measure of user satisfaction (parents' general satisfaction) decreased more in the units that used more hours on implementation ($\beta = 0.003$; $p = 0.062$; Table 2, line 14). As the test is two-sided and the hypothesis is one-sided, the hypothesis can be accepted at $p < .05$. We controlled for total sickness-related absence three months prior to the survey because we expected this level to negatively affect user satisfaction. This was confirmed ($\beta = -0.035$; $p < .0001$, Table 2, line 18). Parents of children in 0-6 year preschools were less satisfied than parents in 0-3 year preschools ($\beta = -0.260$; $p < .01$; Table 2, line 19). Short-term sickness-related absence in 2010 had a significant negative relation to user satisfaction ($\beta = 0.032$; $p < .001$; Table 2, line 21).

It is interesting to observe that organization level short-term absences due to sickness in 2010 significantly affected all outcome variables even though they were collected one to three years after. This indicates that not only does short-term absence have an important effect on employee health and organizational

effectiveness, it is also a sticky organizational characteristic that seems to be difficult to change. Finally, it is worth noticing that none of the analyses (H1-H3) showed that the outcome variables improved significantly for the workplaces as such from Time 1 to Time 2 with the exception of short-term sickness absence (one-sided $p < .05$). Model fit was checked and all models (H1-H3) were significantly better than the null-model ($p < .0001$).

Discussion and future research

The results support the already established proposition that employee health and organizational effectiveness is related. However, more importantly, the results support the proposal that a participative intervention focusing on improving the performance of the primary task can positively affect employee health and organizational effectiveness – provided that the participants actually implemented it with sufficient effort. By collaborating with the employees and by focusing on the organizational needs that the employees find most salient (restructuring of work tasks, more effective meetings, social coherence, improved professionalism, etc.), management can create improvements that benefit both employees and users.

The analyses showed that it was mainly the workplaces that requested (and supposedly used) most hours per employee that significantly improved the outcomes and that there were few global improvements. This result indicates that the preschools that had greatest need for the intervention spent the most hours and got the best results. The analyses confirm the theoretical expectation that it is beneficial to include a measure of fidelity, in this case implementation intensity, in future evaluations of occupational health interventions. The selected measure, hours claimed per employee, turned out to be an indicator that could distinguish between units who benefitted from the intervention and units who did not. Compared to other process evaluation measures, such as interviews, surveys and diary studies, it may be easier to obtain this type of data from the participating workplaces, e.g., if it can be measured as part of their daily practices or is already included in their management information system.

This study had some limitations, where the main concern is the low response rate of the parent survey. Another concern may be whether user satisfaction is a good measure of organizational effectiveness. However, the significant relationship between the employees' assessment of primary-task quality and parents' general satisfaction indicates that it is an adequate indicator of organizational effectiveness. Another limitation is that short-term sickness-related absence is influenced by many other factors than work, such as the common cold. This makes it difficult to use short-term absence as a good indicator of

workplace-related health, but in comparative analyses of different but similar intervention units, it is only the large variance that is a problem, not the absolute levels. Finally, it can be discussed whether the differences in the samples and sampling periods make comparison of the findings incomparable. However, as all the samples included the same organizational units and approximately the same timeframe, this should not be a problem.

The results presented here may be generalized to other empirical settings as none of the common intervention activities were specific for the particular sector. Nevertheless, it may be difficult to transfer the results outside of the national context except for similar coordinated economies, as the intervention depends upon collaboration between management and employee representatives. There are, however, many other ways to improve the performance of the central work tasks. Examples could be value stream mapping in lean management (Hasle, 2014), high-performance work systems (Appelbaum, 2000), job-redesign (Holman, 2013) and others (Nielsen et al., 2015). An important issue for management to consider is that a predominant focus on improving organizational effectiveness through rationalization without involving employees will most likely have a negative effect on employee health (Westgaard & Winkel, 2011).

This project gathered organizational effectiveness data at two time points only. Therefore, it was not possible to conduct a longitudinal test of mediation. Future projects should consider gathering data at more time points, e.g., by using SMS. Future intervention studies should also include other measures of effectiveness. In industrial companies, data can be gathered from management systems, such as enterprise resource planning systems (ERP). In the service sector and public sector, similar IT-systems exists, which include data regarding waiting time, patient health, pupil tests, etc. Such data will not require costly surveys and they are often measured frequently. Strong intervention designs with many comparable units and control groups should exploit such data opportunities and combine them with occupational health data. In this way, we should be able to explore the relationship between organizational effectiveness and occupational health in greater depth.

Andersen, L. B., & Kjeldsen, A. M. (2013). Public Service Motivation, User Orientation, and Job Satisfaction: A Question of Employment Sector? *International Public Management Journal*, *16*(2), 252–274. http://doi.org/10.1080/10967494.2013.817253

Appelbaum, E. (2000). *Manufacturing advantage: Why high-performance work systems pay off*. Ithaca: Cornell University Press.

Augustsson, H., von Thiele Schwarz, U., Stenfors-Hayes, T., & Hasson, H. (2015). Investigating Variations in

Implementation Fidelity of an Organizational-Level Occupational Health Intervention. *International Journal of Behavioral Medicine*, *22*(3), 345–355. http://doi.org/10.1007/s12529-014-9420-8

Bambra, C., Egan, M., Thomas, S., Petticrew, M., & Whitehead, M. (2007). The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions. *Journal of Epidemiology and Community Health*, *61*(12), 1028–37. http://doi.org/10.1136/jech.2006.054999

Biron, C., & Karanika-Murray, M. (2014). Process evaluation for organizational stress and well-being interventions: Implications for theory, method, and practice. *International Journal of Stress Management*, *21*(1), 85–111. http://doi.org/10.1037/a0033227

Black, C. (2008). *Working for a healthier tomorrow. Work and Health in Britain*. London: Department for Work and Pensions.

CIPD. (2013). *Absence management: annual survey report*. London: CIPD.

Cooper, C. (2013). The Future of Stress and Health Research. *Stress and Health*, *29*(349). http://doi.org/10.1002/smi.2544

Egan, M., Bambra, C., Petticrew, M., & Whitehead, M. (2009). Reviewing evidence on complex social interventions: appraising implementation in systematic reviews of the health effects of organisational-level workplace interventions. *Journal of Epidemiology and Community Health*, *63*(1), 4–11. http://doi.org/10.1136/jech.2007.071233

Egan, M., Bambra, C., Thomas, S., Petticrew, M., Whitehead, M., & Thomson, H. (2007). The psychosocial and health effects of workplace reorganisation. 1. A systematic review of organisational-level interventions that aim to increase employee control. *Journal of Epidemiology and Community Health*, *61*(11), 945–54. http://doi.org/10.1136/jech.2006.054965

Emery, F., & Thorsrud, E. (1976). *Democracy at work: The report of the Norwegian industrial democracy program*. Springer.

Favero, N., & Meier, K. J. (2013). Evaluating Urban Public Schools: Parents, Teachers, and State Assessments. *Public Administration Review*, *73*(3), 401–412. http://doi.org/10.1111/puar.12022

Frick, K., & Wren, J. (2000). Reviewing occupational safety and health management - multiple roots, diverse perspectives and ambiguous outcomes. In K. Frick, P. L. Jensen, & T. Wilthagen (Eds.), *Systematic Occupational Health and Safety Management* (pp. 17–42). Oxford: Pergamon.

Giga, S., Cooper, C., & Faragher, B. (2003). No The development of a framework for a comprehensive approach to stress management interventions at work. *Journal of Stress Management*, *10*(4), 280–296.

Greenwood, D., & Levin, M. (2006). *Introduction to Action Research: Social Research for Social Change*. Thousand Oaks: SAGE Publications.

Hasle, P. (2014). Lean production - An evaluation of the possibilities for an employee supportive lean practice. *Human Factors and Ergonomics In Manufacturing*, *24*(1), 40–53.

Hasle, P., & Jensen, P. L. (2006). Changing the Internal Health and Safety Organization Through Organizational Learning and Change Management. *Human Factors*, *16*(3), 269–284. http://doi.org/10.1002/hfm

Hasle, P., & Sørensen, O. (2013). Employees as Individually and Collectively Acting Subjects—Key Contributions from Nordic Working Life Research. *Nordic Journal of Working Life Studies*, *29*(3), 9–29. Retrieved from http://rossy.ruc.dk/ojs/index.php/njwls/article/download/3009/1272

Holman, D. (2013). Job types and job quality in Europe. *Human Relations* , *66* (4), 475–502. http://doi.org/10.1177/0018726712456407

Kompier, M. (2003). Job Design and Well-Being. In M. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), *The handbook of work and health psychology* (2. ed., re, pp. 429–454). Chichester: J. Wiley & Sons. Retrieved from http://www.loc.gov/catdir/toc/wiley024/2002027200.html

Kompier, M. A. J., Cooper, C. L., & Geurts, S. A. E. (2000). A multiple case study approach to work stress prevention in Europe. *European Journal of Work and Organizational Psychology*, *9*(3), 371–400. http://doi.org/10.1080/135943200417975

Kristensen, T. S. (2005). Intervention studies in occupational epidemiology. *Occupational and Environmental Medicine*, *62*(3), 205–10. http://doi.org/10.1136/oem.2004.016097

Ndjaboué, R., Brisson, C., & Vézina, M. (2012). Organisational justice and mental health: a systematic review of prospective studies. *Occupational and Environmental Medicine* . http://doi.org/10.1136/oemed-2011-100595

Nielsen, K., Lackmaker, J., Känsälä, M., Saari, E., Isaksson, K., & Nielsen, M. B. (2015). *Resource A literature review on the relationship between resources, employees well-being and performance with specific*

attention to Nordic issues. Copenhagen: Nordisk Ministeråd.

Nielsen, K., & Randall, R. (2012). Opening the black box: Presenting a model for evaluating organizational-level interventions. *European Journal of Work and Organizational Psychology*, *22*(5), 1–17. http://doi.org/10.1080/1359432X.2012.690556

Nielsen, K., Randall, R., Holten, A.-L., & González, E. R. (2010). Conducting organizational-level occupational health interventions: What works? *Work & Stress*, *24*(3), 234–259. http://doi.org/10.1080/02678373.2010.515393

Rice, A. K. (1963). *The Enterprise and Its Environment: A System Theory of Management Organization*. Tavistock Press.

Sasser, M., & Sørensen, O. H. (2016). Doing a good job - the effect of primary task quality on well-being and job satisfaction. *Human Factors and Ergonomics in Manufacturing & Service Industries*.

Semmer, N. K. (2006). Job stress interventions and the organization of work. *Scandinavian Journal of Work, Environment & Health*, *32*(6), 515–27. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17173207

Semmer, N. K., Jacobshagen, N., Meier, L. L., Elfering, A., Beehr, T. A., Kälin, W., & Tschan, F. (2015). Illegitimate tasks as a source of work stress. *Work & Stress*, *29*(1), 32–56.

Siu, O. L., Cooper, C., & Phillips, D. R. (2014). Intervention studies on enhancing work and well-being, reducing burnout, and improving recovery experiences among Hong Kong health care workers and teachers. *International Journal of Stress Management*, *21*(1), 69–84.

Sørensen, O. H., & Holman, D. (2015). A participative intervention to improve employee well-being in knowledge work jobs: A mixed-methods evaluation study. *Work & Stress*, *28*(1), 67–86.

Torvatn, H. Y., Sørensen, O. H., Talja, H., & Eriksen, B. (2015). *Good Nordic management practices*. Copenhagen: Nordisk Ministeråd.

Tufte, P., Clausen, T., & Nabe-Nielsen, K. (2012). Client-related work tasks and meaning of work: results from a longitudinal study among eldercare workers in Denmark. *International Archives of Occupational and Environmental Health*, *85*(5), 467–472. http://doi.org/10.1007/s00420-011-0692-x

Westgaard, R. H., & Winkel, J. (2011). Occupational musculoskeletal and mental health: Significance of rationalization and opportunities to create sustainable production systems - A systematic review.

Applied Ergonomics, *42*(2), 261–96. http://doi.org/10.1016/j.apergo.2010.07.002

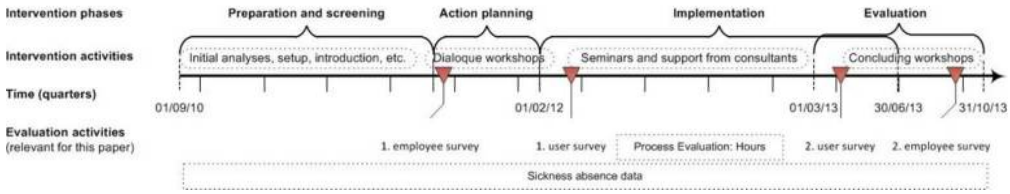

Figure 1: Timeline
Figure 1
284x58mm (96 x 96 DPI)

Tables for article: JOEPP

Table 1: Inter-correlations, means and standard deviation for organizational means of intervention outcome variables

	1	2	3	Mean	SD	N
1. Short-term sickness absence	-	-0.10	-0.20	8.80	2.76	55
2. Primary-task quality	*-0.50*	0.75	*0.57*	3.39	0.38	55
3. User satisfaction	*-0.37*	*0.46*	0.83	4.02	0.43	55
Mean	9.01	3.47	4.10			
SD	2.23	0.32	0.28			
N	55	55	55			

Explanation:2012 above diagonal; 2013 below. Italicized numerical values above 0.28 are significant at p<.05. Cronbach's alphas are presented in diagonal.

Tables for article: JOEPP

Table 2: Effects of implementation intensity on primary-task quality, short-term sickness absence and user satisfaction.

	Dependent variable	Primary-task quality			Short-term sickness absence		
Data source		Estimate	t-value	Pr>|t|	Estimate	t-value	Pr>|t|
Employee survey and sickness absence register	N/Org N/Max(N) per Org	1464 55 51			2745 55 100		
	Intercept	4.0	21.52	<.0001	8.7	6.15	<.0001
	Intensity * Time	0.006	2.79	.005	-0.046	-2.6	.009
	Intensity (Hours/employee)	-0.009	-3.08	.003	0.015	0.7	.486
	Time (2011/2013)	-0.053	-0.99	.321	-0.826	-1.86	.063
	Age	0.000	0.02	.982	-0.029	-2.23	.026
	Gender (F vs M)	-0.094	-1.74	.083	0.161	0.42	.674
	Position (skilled/unskilled)	-0.101	-2.59	.010	-0.824	-2.7	.007
	0-6 years/0-3 years	-0.107	-1.32	.193	-1.248	-2.03	.048
	3-6 years/0-3 years	0.223	1.45	.151	-1.006	-0.83	.410
	Short term sickness absence 2010	-0.026	-2.2	.033	0.324	3.59	.0008
	Dependent variable	User satisfaction					
Parent survey	N/Org N/Max(N) per Org	3171 55 113					
	Intercept	4.93	27.37	<.0001			
	Intensity * Time	0.003	1.87	0.062			
	Intensity (Hours/employee)	-0.004	-1.71	0.093			
	Time (2013/2012)	0.010	0.22	0.824			
	Education	0.002	0.05	0.957			
	Total sickness absence	-0.035	-6.13	<.0001			
	0-6 years/0-3 years	-0.260	-3.32	0.002			
	3-6 years/0-3 years	-0.214	-1.48	0.145			
	Short term sickness absence 2010	-0.032	-2.82	0.007			