

Critical Psychosocial Risk Treatment for Engineers and Technicians

R. Berglund, T. Backström, M. Bellgran

Abstract—This study explores how management addresses psychosocial risks in seven teams of engineers and technicians in the midst of the fourth industrial revolution. The sample is from an ongoing quasi-experiment about psychosocial risk management in a manufacturing company in Sweden. Each of the seven teams belongs to one of two clusters: a positive cluster or a negative cluster. The positive cluster reports a significantly positive change in psychosocial risk levels between two time-points and the negative cluster reports a significantly negative change. The data are collected using semi-structured interviews. The results of the computer aided thematic analysis show that there are more differences than similarities when comparing the risk treatment actions taken between the two clusters. Findings show that the managers in the positive cluster use more enabling actions that foster and support formal and informal relationship building. In contrast, managers that use less enabling actions hinder the development of positive group processes and contribute negative changes in psychosocial risk levels. This exploratory study sheds some light on how management can influence significant positive and negative changes in psychosocial risk levels during a risk management process.

Keywords—Group process model, risk treatment, risk management, psychosocial.

I. INTRODUCTION

MANAGEMENT behavior is important for mental health at work. Ensuring the good health and well-being of engineers and technicians is of key importance to be able embrace the opportunities Industry 4.0 brings [2], [3]. However, the mental health and wellbeing of staff in relation to Industry 4.0 is rarely addressed. In Sweden, work related stress contributes to 770 deaths every year [4]. Productivity decreases by up to 38% when employees experience problems related to the work environment. This decrease is more pronounced than the effect of health problems on productivity [5]. Exposure to work related stress and unaddressed psychosocial risks over time are associated with deteriorating productivity, higher levels of absenteeism and increased employee turnover [6], [7]. The accident rate can be up to five times higher for employees working under pressure compared to employees in other conditions [8]. One way of improving mental health at work is through psychosocial risk management [4], [7], [14]-[16], [27]. In fact some argue that “effective psychosocial risk management's benefits are so

great that policymakers should specifically promote psychosocial risk management.” [14, p.1475].

Managers across Europe are required to carry out risk assessments of the psychosocial work environment to identify and treat risks before anyone is harmed [17], [18]. However, only one third of companies in Sweden carry out psychosocial risk assessments, despite 1) having a legal obligation to do so 2) the health and wellbeing of staff being a key resource [4], [19], [20]. Identifying potential sources of harm and assessing the likelihood of the source causing harm should help employers make a more informed decision about what risks to address and in what order. Risk treatment is the “process of actions to modify risk” [21]. Risk treatment can involve eliminating psychosocial risks completely at their source or working to decrease their potential negative impact.

Although psychosocial risk assessments are one of the recommended practices for improving the psychosocial work environment, little is known about what actually happens during a psychosocial risk management process. Researchers call for a more in depth understanding of the psychosocial risk management process [18], [10], [11], [22], [23].

This study uses interviews with seven managers taking part in a quasi-experiment about psychosocial risk management [1]. Each of these managers has made significant positive or negative changes in their teams’ psychosocial risk levels. This interview study aims to gain valuable insights into managerial actions which contribute to changes in psychosocial risk levels. Qualitatively-oriented research methods are used [24] to address the following research questions.

- RQ1. How can management at the next level in the hierarchy influence the psychosocial work environment?
- RQ2. How can a team’s psychosocial work environment change through manager/team interaction?

A. Frame of Reference

The term psychosocial work environment is defined for the purpose of this paper as “organizational and social conditions in the work environment” [4, p.5]. Social conditions include “social interaction, collaboration, and social support from managers and colleagues” [4, p.5]; organizational conditions are the conditions and prerequisites for work (e.g. management, communication, participation, demands, resources) [25]. This definition is from the Swedish legislation regulating the psychosocial work environment. The Swedish legislation has been lifted as best practice in the EU compass for action on mental health and well-being in the workplace [26]. The legislation is very clear that psychosocial risk assessments are a requirement and that it is the employers’ responsibility to ensure psychosocial risk assessments are

This research was supported by AFA Insurance Company (# 160088).

R.B. is with Mälardalens University, Sweden (corresponding author, phone: +4673 558 5677; e-mail: rachael.tripney.berglund@mdh.se).

T.B. Author is with Mälardalens University, Sweden (e-mail: tomas.backstrom@mdh.se).

M.B. is with KTH Royal Institute of Technology, Sweden (e-mail: bellgran@kth.se).

carried out [17].

Psychosocial risk management is a specific branch of risk management focusing on “the risk of detriment to a worker’s psychological or physical well-being arising from the interaction between the design and management of work, within the organizational and social context” [7, p.8]. The individual teams in the quasi-experiment have completed a digital psychosocial risk assessment at time point 1 and then again 6 months later. The risks measured using a digital risk assessment tool are; demands, control, manager support, peer support, relationships, change and roles via the Republic Of Ireland – Management Standards Indicator Tool [28] and; management priority, management commitment, organizational participation and organizational communication using the psychosocial safety climate scale [9]. According to the risk management process, the step following risk assessment is risk treatment (Fig 1). Risk treatment is the actual action taken to influence the level of a risk. The section of risk management focused on in this paper is risk treatment.

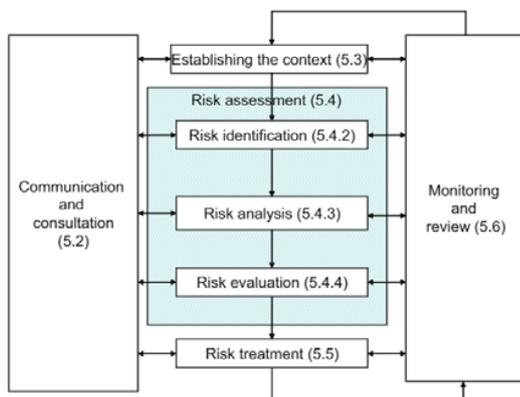


Fig. 1 Risk management process [29]

Psychosocial risk treatment should lead to different outcomes in psychosocial risk levels depending on the risk treatment actions selected and the way they are applied [12]. For the purposes of this paper, the three constructs of group dynamics (Fig. 2) from the Group Process model (GroPro) [22] will be used to help describe the manager’s role when exploring the different risk treatment actions taken. According to the GroPro model, the manager plays a key role in team outputs through the way in which they facilitate group dynamics. “The manager has to staff the teams in a good way, enable their creativity, and coach the teams work in the right direction” [22, p.2]. In the GroPro model, coaching the teams work is defined as “team coaching oriented, with a focus on enabling and affecting emergence and self-organization in clusters of subordinates.” [13, p.2]. This model may help understand the managers’ influence in the psychosocial work environment when comparing the risk treatment in the two different clusters.

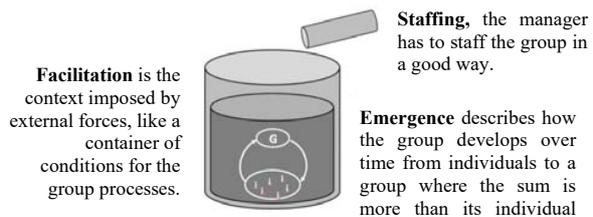


Fig. 2 Three constructs of a group dynamic [22]

1) Previous Research

Similar studies focusing on actual risk treatment methods as part of a psychosocial risk management process have been difficult to find. A literature review of work stress interventions between 1999 and 2005 includes a description of some risk treatment actions:

“job redesign, changes in work pacing, enhancement of social support, and the formation of joint labor-management health and safety committees...stress-management classes to help employees to either modify or control their perceptions of stressful situations, such as the development of muscle relaxation or meditation skills...counseling, return-to-work and other rehabilitation programs” [5, p.269].

More recently, Dollard carried out an intervention study in 2014 where psychosocial risk assessments were carried out by 5 teams at two time points [30]. The risk treatment actions are documented in action plans approved by the health and safety committees. One action plan is included as an appendix in her paper which exemplifies the risk treatment actions’ planned by one of the 5 teams [30]. However, it is unclear which actions were carried out from this action plan. There may have been other actions not included in the written action plan that could have influenced psychosocial risk levels. Risk treatment actions are touched upon, but not examined in depth since it was not the main aim of the study [30].

In another study, a two-wave longitudinal design study in a Spanish production company listed two main risk treatment actions. 1) Role re-design where the supervisor was given other duties and another resource took their place and 2) the team members were given more training related to their work duties. The risk treatment actions in Cifre et al.’s study were guided by theory and the results of in depth interviews with team members. The risk treatment implementation was driven by the researchers, not by the managers [31].

The sample used in this study is fundamentally different from Cifre et al.’s and Dollard’s studies. The participants in this study are managers who are wholly responsible for the initiation and implementation of risk treatment actions [1]; this is also the premise of current legislation [17] and more pragmatic from a resources perspective. Managers have access to support throughout the process and it is up to the manager if and how they access this support.

This is an explorative study. The study makes both practical and theoretical contributions to the field of psychosocial risk management. The theoretical contribution is adding knowledge about risk treatment actions taken between two

time points where two clusters have either significantly increased or decreased their psychosocial risk levels. The practical contribution is through trying to answer part of the recurring question from stakeholders, companies and researchers [32]: “yes I know there is a difference, but what actually happened?”

The research questions in this study aim to increase understanding about the managers’ role in the change that occurs in psychosocial risk levels between risk assessment 1 and 2:

- RQ1. How can management at the next level in the hierarchy influence the psychosocial work environment?
- RQ2. How can a team’s psychosocial work environment change through manager/team interaction?

II. METHOD

This is an explorative study carried out within the framework of psychosocial risk management. An explorative study is appropriate when researchers “have little or no scientific knowledge about the group, process, activity, or situation they want to examine but nevertheless have reason to believe it contains elements worth discovering” [23, p.5]. The study is exploring the black box, the gap in knowledge about what happened during a risk assessment process in which significant changes in psychosocial risk levels occurred.

A. Sample

The sample for this study is managers of engineers and technicians in a large manufacturing company in Sweden. The managers are currently taking part in a quasi-experiment. The quasi-experiment is an intervention study about psychosocial risk management [1] and includes 19 naturally occurring teams. 18 of the teams carried out a digital psychosocial risk assessment at two different time points. 7 of the teams belong to the intervention group. The intervention group has received training to help understand the psychosocial risk assessment process and how to facilitate team dialogue. The remaining 11 teams form the control group. The control group has received no training. Each of the 18 teams has access to their results, support via human resources and occupational health services throughout the study. Further information about the quasi-experiment is available in the original paper [1].

The criteria for inclusion in this study is that the team must have made a statistically significant positive or negative change in their psychosocial risk levels between the two time points. Seven of 18 teams met the criteria for inclusion. Four teams made a significant change in a positive direction on one or more of the variables; organizational communication, organizational participation and peer support ($P < 0.05$). These four teams together form the positive cluster (Fig. 3). The positive cluster had $N = 30$ at first measurement, $N = 33$ at the second measurement with a response rate of 94% and 90% respectively. Three of the teams in the positive cluster are from the intervention group in the quasi-experiment and one is from the control group. Significant negative changes were found in three teams on one or more of the variables; relationships, manager support ($P < 0.01$) and organizational

communication ($P < 0.05$). This negative cluster had $N = 27$ at the first measurement and $N = 27$ at the second with a participation rate of 40% and 43%. All three teams in the negative cluster are from the control group in the quasi-experiment (Fig. 3). No significant results were found in either group for the psychosocial risks demands, control, role, change, management priority or management commitment. The items used to measure the psychosocial risks are listed in appendix 2.

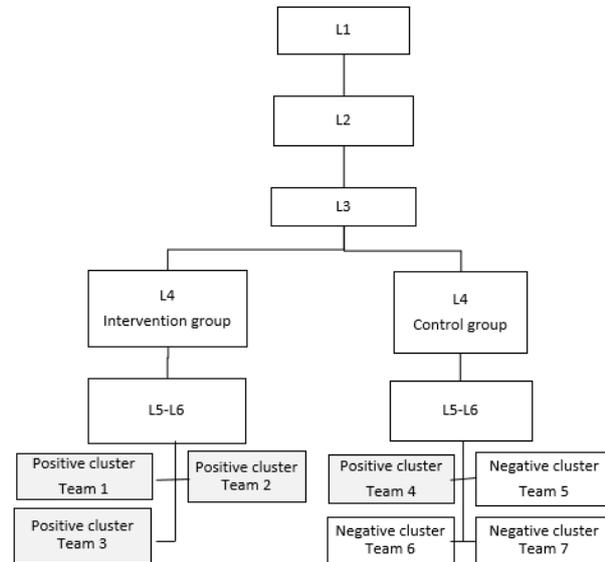


Fig. 3 The sample

B. Data Collection

To explore why the psychosocial risk levels changed between the first risk assessment in November 2017 and the second in April 2018, the managers were invited to take part in interview in September 2018. The semi-structured interviews were held in Swedish and resulted in 480 minutes of interview data. The invitation to the interview clarified that participation was voluntary and that the purpose of the interview was to understand what had happened in each of the teams between measurement 1 and measurement 2. A short list of questions was included in the invite alongside a consent form. The researcher conducted, recorded and transcribed the interviews. Transcription occurred as soon as possible after the interview. All consent papers are signed and stored digitally. Between the time of sending out the invites and the actual interview, some more questions were added (appendix 1). Probing questions were the main tool used during the interview. The purpose of the probing questions was to gain insight into the managers understanding and own explanation of what actions they believe may have contributed to the results at the second measurement.

C. Data Analysis

The method used to analyze the data is thematic analysis [33]. Specific focus was on risk treatment actions by the manager one level up and on actions at the team level in order

to answer the research questions.

Each of the seven interviews was uploaded into NVivo version 11. The complete data set was scanned and every item, which described actions being taken by the manager at the team level, was coded using In Vivo coding. In Vivo coding means using “words or short phrases from the participants own language” as the codes [26, p.274]. Once the separate nodes (individual parts of each interview) were coded, the codes were then inductively analyzed to find out if they belonged to similar areas. Based on these findings, second order themes were created which reflected the content of the underlying individual data nodes [Fig. 4 second order theme].

Once the second order themes were complete, aggregate dimensions emerged reflecting the content of the second order themes [Fig. 4]. The analysis process was repeated focusing on the actions taken by managers at the next level in the hierarchy. A framework matrix was created containing each of the cases coded as positive or negative data down the Y-axis, the second order themes were presented across the X-axis. The content of each box in the framework matrix was the data nodes. The framework matrix was then exported to excel where the positive and negative clusters could be separated more clearly and the content compared.

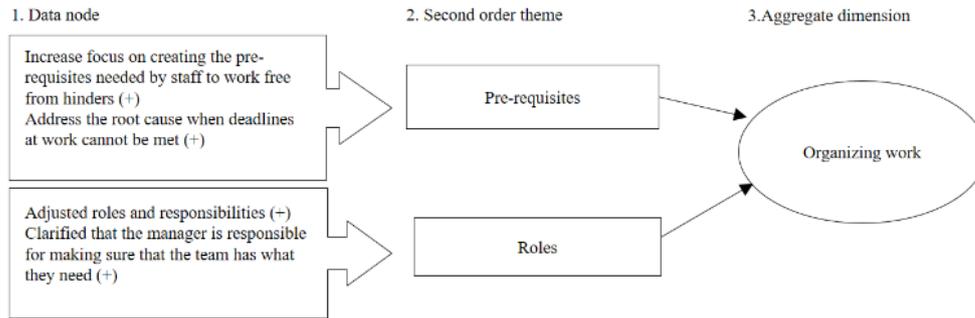


Fig. 4 Data analysis steps, inspired by [34]



Fig. 5 Similarities risk treatment by manager one level up - positive and negative cluster (see appendix 3 for complete figure)

The data were converted into diagram form to facilitate further analysis (see appendix 3-9). Additional descriptive coding was added when writing the results section. The reason for this was to visualize the differences in the node content underlying the second level themes. The codes (+) and (-) reflect if the content at the node level is described in a positive or negative way in the interviews.

Quotations from the informants are included as illustrative examples in the results' section. The quotes are as close as possible to the original oral statement, but often somewhat changed to be reasonable in written text.

III. RESULTS

The results are presented in two sections; risk treatment by the manager one level up followed by the manager at the same level as the team. Similarities and differences between the clusters are presented in each section.

A. Similarities in Risk Treatment by the Manager One Level up

There is one similarity between the positive and negative clusters in the risk treatment by the manager one level up. Both clusters report that the first agenda points at management

team meetings is wellbeing or health checks. This is a 'round the table' exercise where the members of the management team take turns each to report on 'how things are'.

B. Differences in Risk Treatment by the Manager One Level up

Differences can be found between the clusters when looking at the content at the node level for second order themes. Three are specific to the positive cluster because they are described in a positive manner (+). The content of 6 second order themes at the node level are specific to the negative cluster in that 1) they either only appear in the negative cluster or 2) they are described in a negative way (-) [Fig. 6]. The aggregate dimension here for both clusters is "manager one level up".

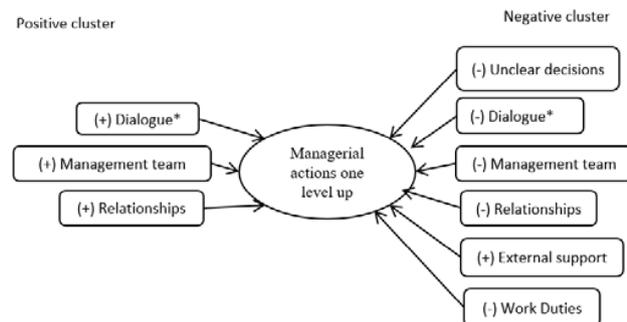


Fig. 6 Differences in risk treatment by manager one level up - positive and negative cluster* (+) and (-) reflect if the content at the node level is described in a positive or negative way (see appendix 4 for complete figure)

The results for the cluster that made a positive change will be presented first.

Dialogue: The positive cluster has a good dialogue with their manager about both private and work-related issues. The manager checks on the team's health in a way that is experienced as natural; "It's natural for our manager to think about mental health and not just results, there is no pressure from the manager". The manager also shows an interest in the psychosocial risk assessments further down in the organization.

Management team: The results here describe different aspects of the content of the management meeting; the manager talks about the psychosocial work environment regularly and tries to balance workload together with the management team by "matching capacity with how much we have to do". The manager states explicitly that it is important that they get to know each other. This is encouraged through a "get to know each other activity at each management meeting". At the management team level, they have also booked a specific stress education course between the first and second risk assessment provided by the occupational health services.

Relationships: The interviewees describe how they feel supported by the manager one level up. When asked for examples, the cluster states that the manager helps them when they ask and does not give the 'problem' back to them to solve.

Moving onto the cluster which made a negative change, there are six second-level themes: Unclear decisions, dialogue, management team, relationships, and work duties. The first five are described in negative way and the last one, external support in a positive way [Fig. 6]

Unclear decisions: There is a lack of response when suggestions for change are made by the management team and escalated to the manager at the next level up for a decision to be made. In time, the process of preparing material and escalating the problem to the next level is repeated. This causes frustration and worry.

Dialogue: Issues escalated to the manager in 1:1 support dialogue meetings are not resolved; "I need more management support to make changes which will help my department's wellbeing and my own wellbeing... dialogue is difficult, we talk past each other".

Management team: "when we lift things at the meeting, it's back to us managers to solve the problems". The management team also meets without the main manager present "because the management team does not work".

Relationships: there is a lack of support from manager.

External support: consultants have been brought in to help the management team one level up become more functional.

Workload: Actions to modify workload have been taken "Re-structuring left my department with demands that are too high, I have said [to my manager] that we cannot take this work load. There has been no change yet". Also related to work duties, the manager's role and management teams' roles are unclear.

C. Similarities in Risk Treatment by the Manager at the Team Level

Manager risk treatment actions' at the team level form three aggregate dimensions: Selecting areas, relationships and organizing work. "Selecting areas" describes how the actual risk assessment has been used. "Relationships" describes actions which facilitate relationship building through spending time with one another: manager and team, peer to peer, or employee and manager. "Organizing work" describes the risk treatment to address the pre-requisites for carrying out work duties such as workload, staffing, roles and expectations.

1) Similarities

The positive and negative clusters each describe actions belonging to selecting areas, relationships and organizing work [Fig. 7]. There are six second level themes. The content of the second level themes at the node level are similar [see appendix 5].

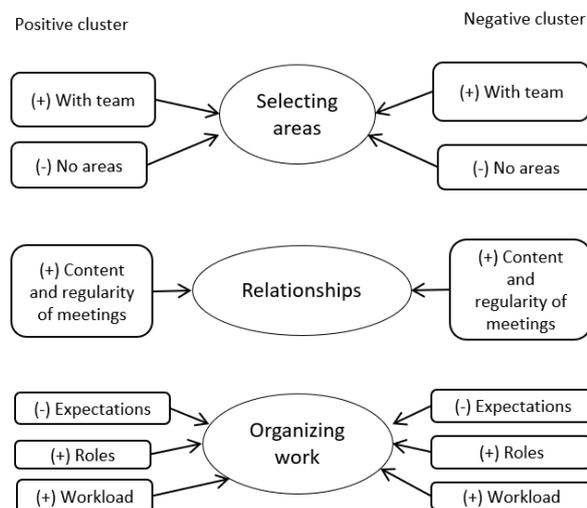


Fig. 7 Similarities in risk treatment by the manager at the same level - positive and negative cluster (see appendix 5 for complete figure)

Selecting areas (how the actual risk assessment has been used); **With team:** There are cases in both the positive and negative change clusters where the manager "talked through the results together with the team" and "agreed as a team on which areas to work on". **No areas:** In contrast to this, there are cases in both clusters where it is stated that they did not work directly with the results of the survey although during interviews examples were given by both clusters of actions they have taken that may have influenced their risk levels at second measurement.

Relationships (spending time with one another: manager and team, peers to peer, or employee and manager). **Content and regularity of meetings:** Both the positive and negative clusters describe that they have regular 1:1 manager and employee meetings, fewer structured meetings and some agenda free meetings.

Organizing work (pre-requisites for facilitating the employee's ability to carry out their work): There are three

second order themes in this category where the clusters report similar actions.

Expectations: A re-organization one year prior to the first risk assessment, which affected both clusters, still has an influence on role clarity.

Roles: The unclear role expectations have created worry. Both clusters have worked with role descriptions and adjusted roles and responsibilities.

Workload: They have also addressed workload through decreasing the actual workload or through lowering the team's ambition level.

As with the manager one level up, there are more differences than similarities between the positive taken by the positive and negative clusters.

2) Differences in Risk Treatment by the Manager at the Team Level

Moving on to differences: The results are presented in the following order; selecting areas, relationships and then organizing work.

Starting with the positive cluster, there are three, second order themes: without team, strategy and results. These themes occur only for the positive cluster and the content of each is described in a positive way (+).

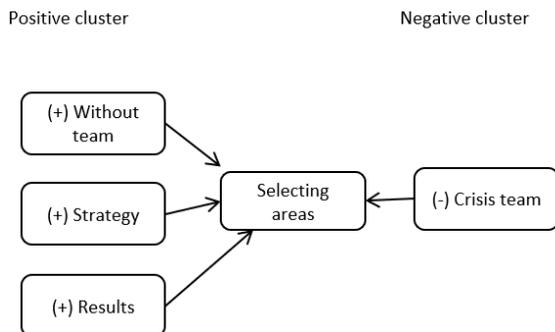


Fig. 8 Differences between the positive and negative cluster – selecting areas (see appendix 6 for complete figure)

Selecting Areas

Without team: the managers have encouraged their teams to discuss the results of the psychosocial risk assessment without the manager present. The manager then meets the team afterwards and they discuss the results together.

Strategy: working with the psychosocial risk assessment is included in the department's strategy.

Results: The negative cluster selected their areas to work with by choosing “the areas that looked the worst”, “had low scores” and “the risk assessment says work with roles – so let's work with roles, it was all a bit mechanical”. This later evolved to addressing; “the thing that disturbs us most at work” which was raised during the 1:1 manager employee discussion, replacing the “mechanical selection” based entirely on the outcome of the risk assessment. The function of the risk assessment has been described as a “good receipt to check if we are listening or not as managers”, and “the results remind us of the seriousness of taking actions”.

Moving on to the negative cluster: The category crisis team is unique to the negative cluster.

Crisis team: This means that the cluster needs support to address their challenges. Human resources were informed and the managers were aware of the availability of occupational health services. A decision was made to engage external consultants in the crisis team. The negative cluster did not have access to support from external consultants at the time of the interview.

Relationships

Starting with the positive cluster: The positive cluster has four, second level themes with a content at the node level which is described in a positive way (+). The themes are training, content and regularity of meetings, spending time together as a team and manager behavior [Fig. 9].

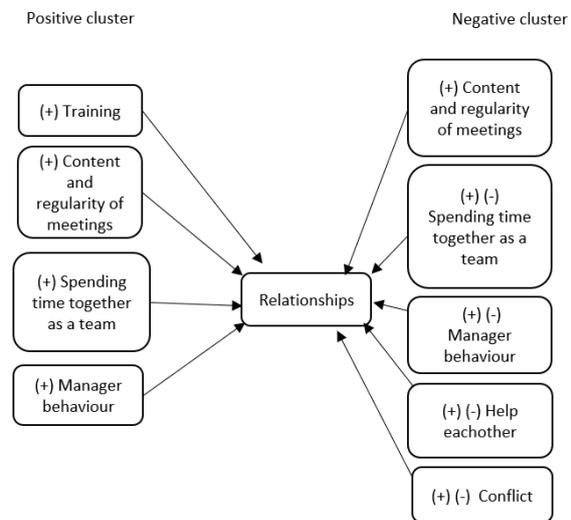


Fig. 9 Differences between the positive and negative cluster – relationships (see appendix 6 for complete figure)

Training: The cluster took part in a stress management training session which “improved dialogue about stress and helped us get started”.

Content and regularity of meetings: There is more time to talk freely at department meetings, agenda free meetings have been put in place. Problems are talked about and solved. There are specific planning meetings. Some departments have meetings a week, 2,5 h in total. The team is free to invite guests to meetings.

Spending time together as a team: The actions named here are team-building exercises, the manager taking the team for lunch, visiting on-site health activities together, visiting other sites and having coffee breaks together.

Manager behavior: People from different roles are to sit beside each other and learn about the other ones work for 30 minutes– this is actively encouraged and followed up by manager in an attempt to improve peer support. The manager also provides practical help and celebrates when small goals are achieved. The manager “jokes with team, because it is

important to laugh and have fun at work and know when to be serious”.

Moving on to the negative cluster, there are two themes unique to this group, help each other and conflict, the remaining 3 are second level themes which differ at the node level and have a mixed content of both positive and negatively described actions (+)/(-). These themes are; content and regularity of meetings, spending time together as a team and manager behavior.

Content and regularity of meetings: New team members completed a personality test and there was a discussion about the whole team’s results in a department meeting.

Spending time together as a team: On the one hand the cluster have organized a department day and discussed trust, on the other, the managers are “not spending much time with the department” and having “low presence as a manager.”

Manager behavior: The team decides what needs to be done with little involvement from the manager.

Help each other: This has been discussed in the cluster as difficult. Helping each other is “difficult... because [each of the team members] are specialists”. They can support each other but cannot practically help with each other’s work duties.

Conflict: There were conflicts in the cluster. The action taken here is that the manager created their “own survey about stress due to a conflict in the department which was identified in an earlier employee survey. The Survey revealed that the conflict was because roles were unclear. I think how we treat each other is related to the conflict but we spoke about role clarity after the smaller survey”. The action taken here was to address conflicts through having clear goals.

In the positive cluster, there is a clear focus on activities, which enables positive relationships to form. The manager creates formal and informal situations for team members to spend time with each other. The manager also takes part in these activities. In the negative cluster, some actions include spending time with each employee at some point during a department day, or the manager talking to team members every morning. However, the cluster also describes that there are conflicts where the suspected root cause is not addressed.

Organizing Work

Starting with the positive cluster: There are 7-second order themes; each of which is described in a positive way at the node level. These are change management, expectations, roles, pre-requisites, priorities, workload and staffing (Fig. 10)

Change management: The positive cluster is discussing change management and includes the teams more in decision-making. Decisions are taken more slowly so that everyone in the team has the time they need to reflect over the decision instead of rushing into decisions “too quickly” which was previously the case.

Expectations: The expectations communicated have changed. There has been a shift in focus from working faster to achieve the result stated in the Key Performance Indicators (KPI) to understanding deviations instead.

Roles: The positive cluster has worked to clarify roles.

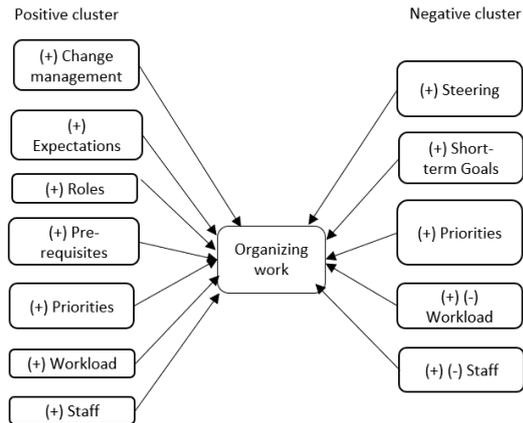


Fig. 10 Differences between the positive and negative cluster – organizing work (see appendix 6 for complete figure)

Pre-Requisites: The cluster has started to focus on prerequisites and making sure that the staff has what they need to work well from the start and address root causes when deadlines are not met instead of just “working faster”.

“I explained to the team that a KPI is, it's for me a figure on a paper. It can be between ... 0 percent and 100 percent... it is just a result of what we have done. If we can do the job then we can do the job, if we can't then [...] we have to look at why it was so... it really is good if we get deviations because then it means that we can do things better instead of focusing on KPI's. We could work like others, the KPI says 80%, and now we are at 79, we need to work faster! Instead of working faster we need to understand why, why did we not reach 80. I would rather work with the why. Why did this happen? The number is a number on the paper. It is what it is. I don't care much about numbers” (example from the positive cluster).

Priorities: The positive cluster describes that it has clear priorities and improvements are visualized.

Workload: The workload in some departments has remained the same between the first and second risk assessment whereas for others, it has decreased.

Staff: Staffing levels had increased. Additional staff addresses backlogs’ which means that “the department can now see the light at the end of the tunnel”. Staff that has left is replaced and there is a discussion about increasing the number of team leaders.

The cluster that made a change in a negative direction has five second order themes related to organizing work. Steering and short-term goals are unique to the negative cluster. Priorities, workload and staff are shared second order themes but differ at the node level regarding if the risk treatment is described as positive or not.

Steering: Teams in the cluster steer themselves more now.

Short term goals: The cluster has short-term goals which span 2 years instead of 7–10.

Priorities: There have been changes made about how work is prioritized so that prioritization can be done more quickly.

Another change related to priorities is that deadlines can be changed more easily now that the short-term goals span a shorter period of time.

Workload: The action taken to decrease workload is through decreasing the number of different projects one person is involved so that they can work with fewer project and be more focused. This is described positively in interviews. In some cases demands are too high; this is described negatively in the interviews. The action here is to escalate to the management team because the solution to address this risk is above the team manager's authority level.

Staff: Staffing is also an aspect of risk treatment. There is a need to increase the number of staff in the cluster "to be able to cope with the scope for my department. I have escalated issue this to my manager a number of times". Escalating the staffing issue is described as positive (+). In contrast, the issue not being resolved in a timely is described as negative (-). The manager at the same level as the team does not have the mandate to treat this risk.

In the positive cluster actions have been taken to address workload, staffing, roles etc. There has also been a shift in mindset from focusing on numbers and achieving goals to focusing on making sure the team has the pre-requisites for the job. In the negative cluster, actions are mixed. On the one hand, some changes in staffing have worked and on the other hand, the cluster needs to increase staffing. The cluster needs support and the process for this is yet to be put in place. Staffing issues have not been addressed.

IV. DISCUSSION

Psychosocial risk management is one of the recommended practices for improving psychosocial risk levels. Risk treatment is the actual action taken to influence a risk level. Management plays a key role in shaping the psychosocial work environment [22].

- How can management at the next level in the hierarchy influence the psychosocial work environment?

A. Similarities – Manager One Level up

The positive and negative clusters both have one enabling risk treatment action in common. Both the positive and negative clusters have wellbeing or health checks as the first point on the agenda at their management team meetings. This is a form of enabling. The interaction when going round the table and talking about how things are could influence the emergence of a change in the groups work environment.

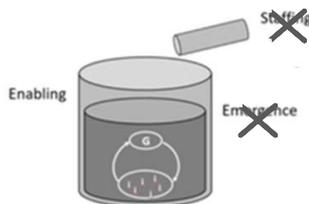


Fig. 11 Similarities – manager one level up

B. Differences Manager One Level up – Positive Cluster

There are a lot more differences between the manager behavior one level up than similarities. When the risk treatment actions are matched with the three group dynamic constructs, the manager one level up in the positive cluster displays risk treatment actions in each of the three constructs; enabling, staffing and emergence [Fig. 12].



Fig. 12 Differences - Positive cluster - manager one level up

Enabling

The manager at the next level up is actively working with their own psychosocial risk assessment. The manager has also included work with psychosocial risk assessments in the departments' strategy and initiated stress training for the management team. The manager one level up has a good dialogue with their employees; workload is balanced with resources at management meetings. The psychosocial work environment is spoken about regularly at management meetings.

Staffing

The manager at the next level supports team members who wish to test new roles and helps to solve the short-term effect on staffing this has.

Emergence

This describes how the group develops over time from individuals to a group where the sum is more than its individual parts. Here the manager one level up enables the process of getting to know each other by planning 'getting to know each other' activities at each management team meeting. The manager and the team take part in activities together; the new work environment emerges through the groups' interaction, of which the manager one level up is involved in.

C. Differences Manager One Level up – Negative Cluster

The risk treatment actions found specifically in the negative cluster are grouped into enabling, staffing and emergence [Fig. 14]. The content however facilitates a negative change in psychosocial risk levels.

Enabling

The risk treatment here enables a negative change in psychosocial risk levels. Risk treatment actions include an unclear decision-making process, lack of managerial support and the demands of the job being too high. In this case the enabling container enables a *negative* change in psychosocial risk levels.

Staffing

Staffing is problematic in the negative cluster and causes concern. This risk was not treated between the first and second risk assessments and was out with the mandate of the cluster managers. The cluster did not have the authority to address their psychosocial risks as they saw fit.

Emergence

The process of emergence is colored by the lack of supportive dialogue and actions taken to address risks by the manager one level up. The cluster meets without the manager one level up being present. From this, negative changes in the psychosocial work environment emerge.

The manager one level up has a strong impact on the psychosocial work environment. This is evident when comparing the risk treatment actions taken by the manager one level up in the positive and negative clusters. There are more differences than similarities when comparing the positive and negative clusters. The manager one level up in the positive cluster addressed all three group dynamic areas; staffing, enabling and emergence whereas the manager one level up of the negative cluster enabled the emergence of negative changes in the work environment and did not address staffing levels.

- RQ2. How can a team's psychosocial work environment change through manager/team interaction?

The positive cluster showed significant improvements in peer support. The improvement in peer support may be related to how well staff feel involved and listened regarding to psychosocial issues.

Enabling

The most striking element of the enabling actions of the manager at the same level is the actions taken to enable relationship building. The manager actively organizes, takes part in and follows up relationship building activities. The managers describe these relationship-building activities as the reason for observed improvements in the psychosocial work environment. These activities include; team building exercises, taking the team out for lunch and visiting other work sites (see appendix 6 for more examples). These activities named are similar to those named in a recent benchmarking study of how companies address psychosocial risks [35]. Changes in the meeting structure, supporting communication between different employees in a structured way, and practical help encourages having fun, laughing and joking, setting the tone. Other enablers are addressing change management, clarifying expectations and solving root causes to problems in the working process instead of just working faster. Taking part in a stress training session is also an enabling factor which may contribute to breaking down barriers and being more open about health aspects at work.

Staffing

Team level: Staff was added to specifically address backlogs. People who left the company were replaced.

Emergence (Internal Structures Emerging in the Interactions

between Group Members)

The manager takes part in many of the activities together with the team. Peer to peer relations were actively targeted. 6 month after the first risk assessment, peer support had improved significantly.

In the cluster which made a negative change, the management and team interaction had a disabling effect rather than an enabling one. Another type of psychosocial work environment emerged, psychosocial risks increased instead of decreasing.

Enabling (External Structures, Org Factors)

In this case, when compared to the positive cluster there is a lack of enabling structures. There are not so many meetings (opportunities for interaction), employee managerial contact varies and there also conflicts where the root cause is not addressed.

Staffing

Staffing levels have decreased which works for some of the clusters. Other parts of the cluster need to increase staff and do not have the authority to address this on their own.

Staffing issues, a lack of positive relationships and a negative relationship with the manager one level up seem to influence what actually emerges from the psychosocial risk assessment process i.e. negative changes in the psychosocial work environment.

Emergence

Some risk treatment actions could facilitate emergence such as discussing trust and trying to be available for the team however, this does not appear to be enough given the results of the risk assessment. Management support and relationships decreased significantly by the second measurement.

The results from this study suggest that the psychosocial work environment emerges from the interactions among group members. Positive or negative changes in the psychosocial work environment for engineers and technicians can be made depending on the different risk treatment actions taken to address psychosocial risks by management. If the manager one level up and the team manager addresses psychosocial risks in a way which facilitates the positive development of group processes, this contributes to significant improvements in psychosocial risk levels. In the same way, managerial risk treatment actions, which hinder the development of positive group processes, contribute negative changes in psychosocial risk levels.

V. LIMITATIONS AND ADDITIONAL SUGGESTIONS FOR FUTURE RESEARCH

The obvious limitation of this study is the small sample size, which limits transferability out with the studied clusters. However, the findings related to the significance of supportive relationships for the psychosocial work environment are in line with current stress theories; they therefore support the potential transferability of these findings to other contexts. Social desirability may also have played a role causing the

interviewees to report actions which contribute to them being seen in a positive light [37]. This was addressed by introducing each participant explaining the purpose of the study and that the aim was to understand what happened between the first and second measurement. Future research could consider managerial risk perception in relation to decision making in the psychosocial risk management process. In this study the manager had access to the actual measurement of the results and support from HR and occupational services. The managers' perception of the potential consequences of addressing or not addressing psychosocial risks could also impact on subsequent risk treatment actions [36]. Future research could consider including risk perception as a potential mediating factor when understanding the results of a risk assessment intervention and actions taken to address risks. Furthermore, adding data collection methods such as journals throughout the risk management process may provide more examples of risk treatment and perhaps even increase the robustness of the data collected through providing 'live data' as a complement to retrospective data collection. Interventions addressing competence and work practices related to Industry 4.0 should also address the psychosocial work environment given its strong impact on health and wellbeing at work. The psychosocial work environment is an important prerequisite to be able to succeed in the long term.

APPENDIX 1

Interview questions

1. Can you please tell me what the term "psychosocial work environment" means to you?
2. How is it going for Company X right now?
3. How does Company X work with the psychosocial work environment?
4. Does Company X have any targets related to the psychosocial work environment?
5. Does your section of the company work with the psychosocial work environment?
6. Does your section of the company have any targets related to psychosocial work environment?
7. Does your manager work with psychosocial work environment?
8. Has your manager set any targets related to psychosocial work environment?
9. What was the situation with your team when the first measurement was carried out?
10. Starting with the results from your first risk assessment, can you please talk me through them?
11. Did you take any specific actions in relation to the results of the survey the first time around?
12. Has your manager shown an interest in your results?
13. Has HR shown an interest in your results?
14. How would you describe your results in comparison to the first measurement?
15. What do you think might have influenced your results at the second measurement? (went through risk assessment risk by risk)
16. Is there anything else you would like to add?
17. Is there anything else that may have affected the outcome of your results (out with your control)?

APPENDIX 2

The psychosocial constructs that significantly improved in the positive cluster between the first and second measurement:
Peer support [28]

- If work gets difficult, my colleagues will help me if I ask
- I get the help and support I need from my colleagues if I ask
- Colleagues generally treat me respectfully at work
- I feel I can talk to my colleagues to solve work-related issues

Organizational participation [9]

- My contributions to resolving occupational health and safety concerns in the organization are listened to
- Participation and consultation in psychological health and safety occurs with employees', unions and health and safety representatives in my workplace
- Employees are encouraged to become involved in psychological safety and health matters
- In my organization, the prevention of stress involves all levels of the organization

Organizational communication [9]

- Information about workplace psychological well-being is always brought to my attention by
- There is good communication here about psychological safety issues which affect me

The psychosocial constructs that made a significantly negative change in the negative cluster between the first and second measurement:

Relationships [28]

- I am subject to personal harassment in the form of unkind words or behavior at work
- There is friction or anger between colleagues
- I am subject to bullying at work

Manager support [28]

- I am given supportive feedback on the work I do by my line manager
- I can rely on my line manager to help me out with a work-related problem if I ask
- I feel I can talk to my line manager about something that has upset or annoyed me about work
- I feel I would be supported by management if I had emotionally demanding work

My line manager encourages me at work

Organizational communication [9]

- Information about workplace psychological well-being is always brought to my attention
- There is good communication here about psychological safety issues which affect me

APPENDIX 3

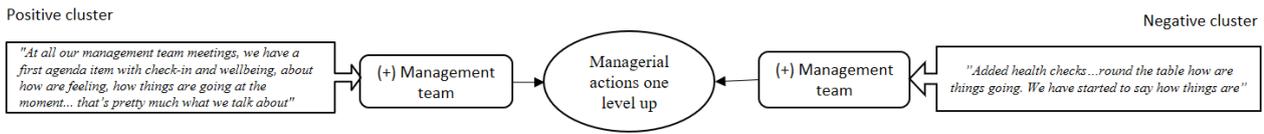


Fig. 13 Similarities between the Positive and Negative Clusters – Manager One Level Up

APPENDIX 4

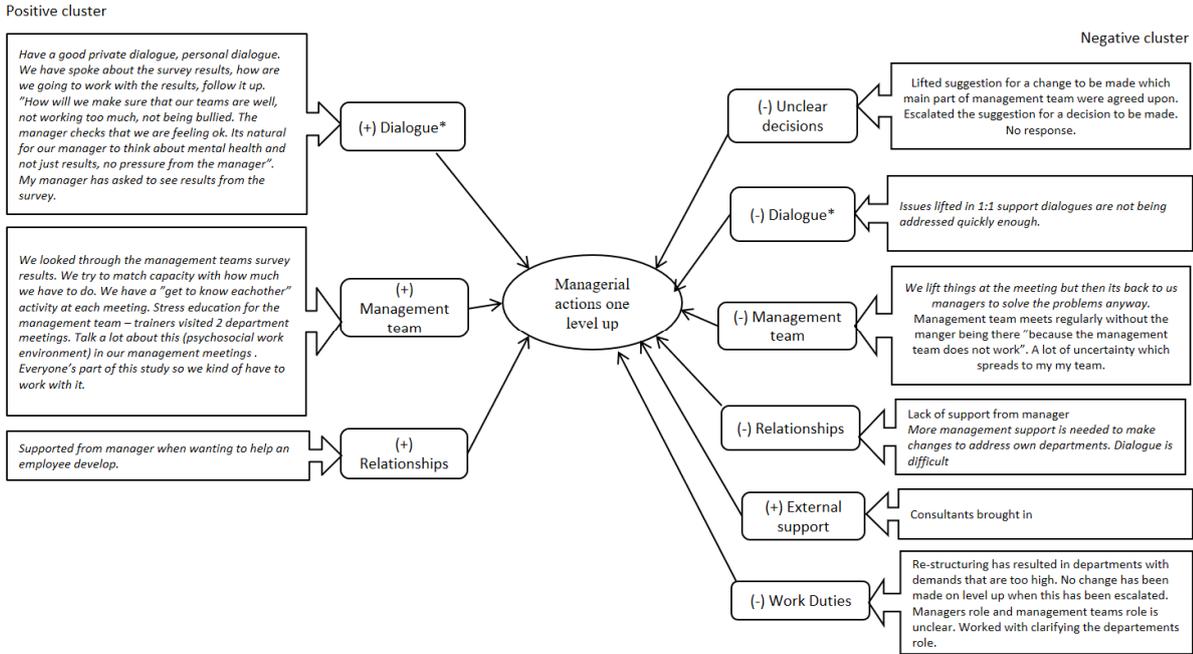


Fig. 14 Differences between the Positive and Negative Clusters – Manager One Level Up

APPENDIX 5

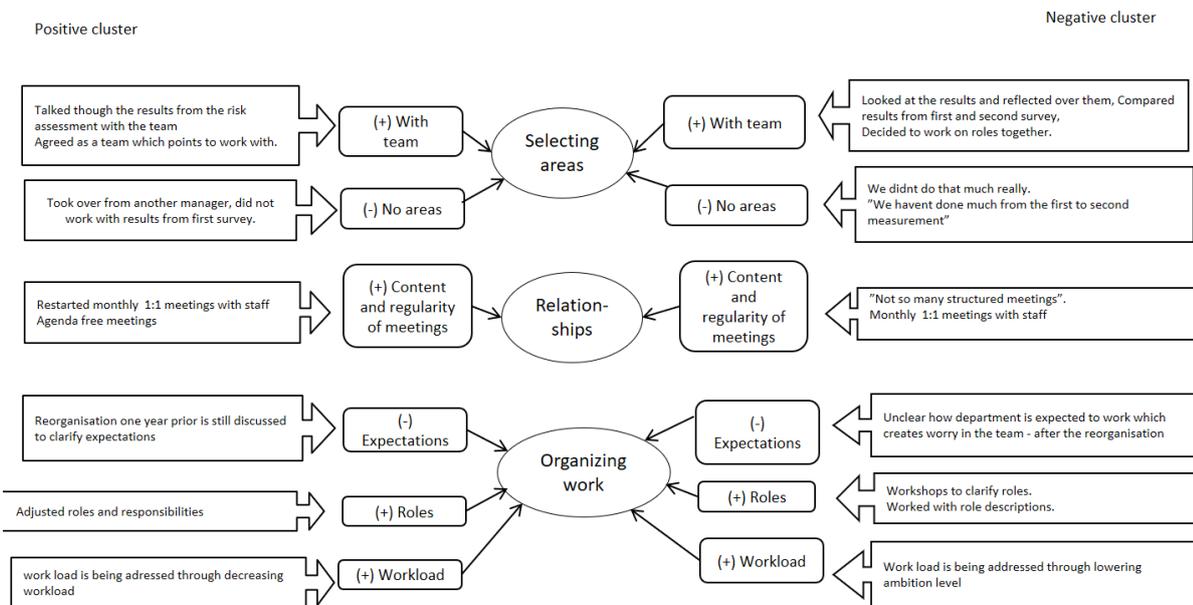


Fig. 15 Similarities between the Positive and Negative Clusters – Manager at the same level

APPENDIX 6

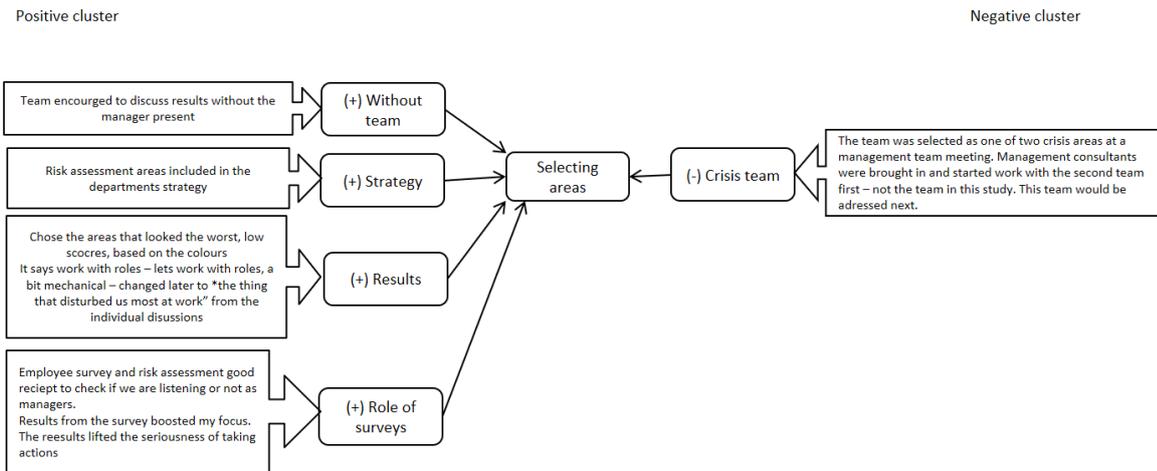


Fig. 16 Differences in selecting areas between the Positive and Negative Clusters – Manager at the same level

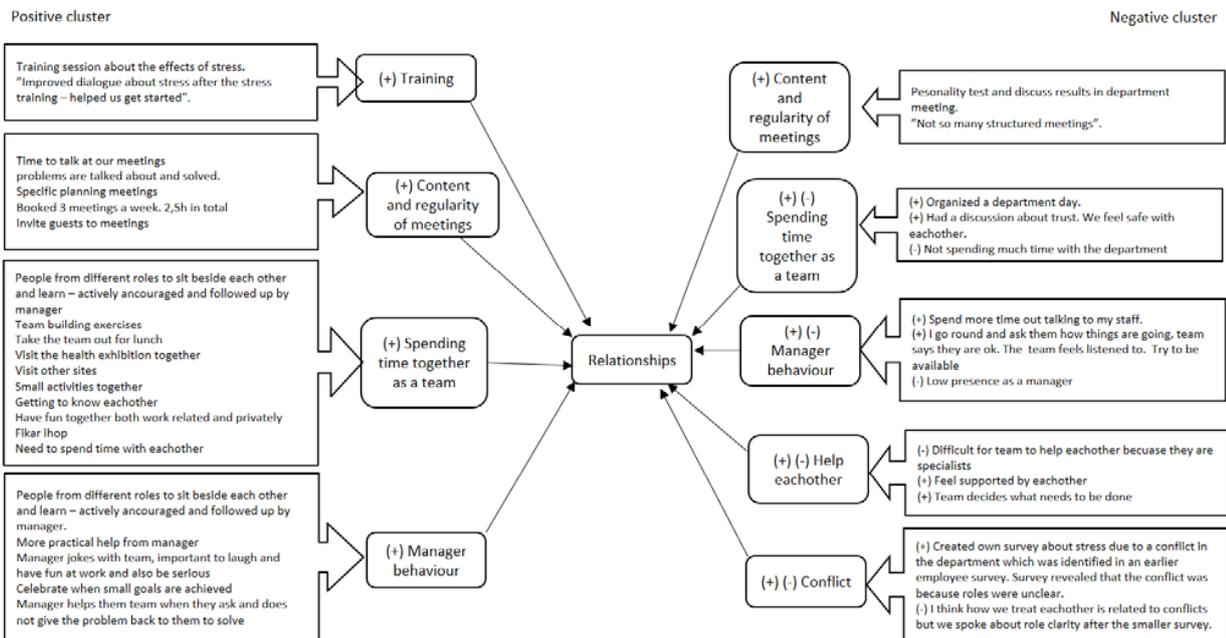


Fig. 17 Differences in relationships between the Positive and Negative Clusters – Manager at the same level

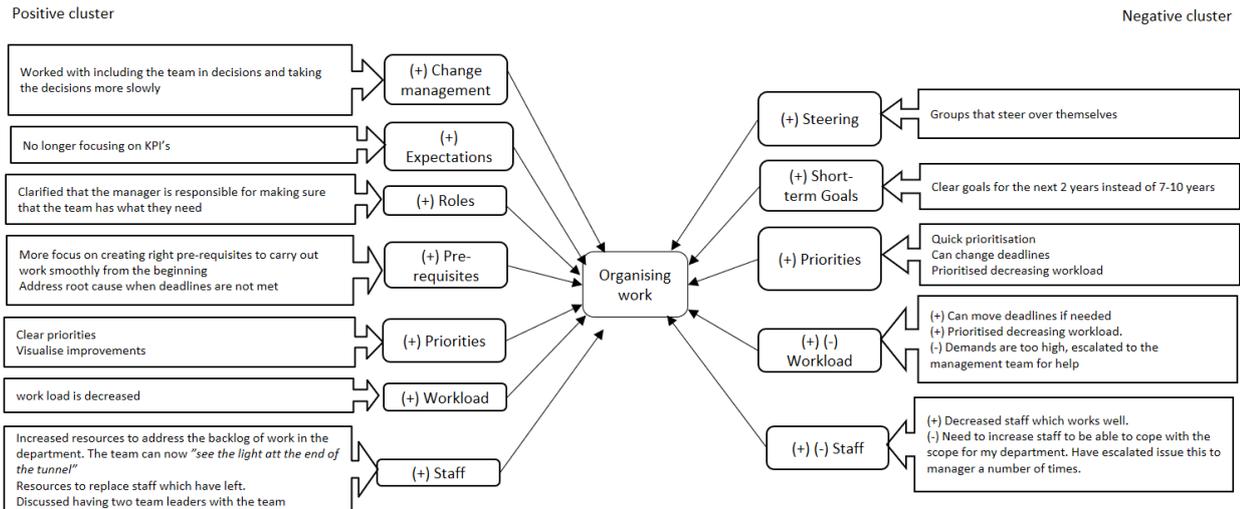


Fig. 18 Differences in organizing work between the Positive and Negative Clusters – Manager at the same level

REFERENCES

- [1] T. Backström and R. Berglund, "The role of facilitated assessment in creating a better psychosocial work environment" *In Work*.
- [2] T. Stock and G. Seliger, "Opportunities of Sustainable Manufacturing in Industry 4.0," *Procedia CIRP*, vol. 40, no. 1, pp. 536–541, 2016.
- [3] R. Y. Zhong, X. Xu, E. Klotz, and S. T. Newman, "Intelligent Manufacturing in the Context of Industry 4.0: A Review," *Engineering*, vol. 3, no. 5, pp. 616–630, 2017.
- [4] M. Andersson, L. Slunga Järholm, and B. Järholm, "Arbetsrelaterad dödlighet," Sweden, 2019.
- [5] M. Lohela Karlsson, G. Bergström, C. Björklund, J. Hagberg, and I. Jensen, "Measuring production loss due to health and work environment problems: Construct validity and implications," *J. Occup. Environ. Med.*, vol. 55, no. 12, pp. 1475–1483, 2013.
- [6] ILO, "Workplace Stress, A collective challenge," *Int. Labour Organ.*, vol. 1, no. April, 2016.
- [7] A. Nyberg, P. Peristera, C. Bernhard-oettel, and C. Leineweber, "Does work-personal life interference predict turnover among male and female managers, and do depressive symptoms mediate the association? A longitudinal study based on a Swedish cohort," *BMC Public Health*, vol. 18, no. 828, pp. 1–12, 2018.
- [8] Eurofound and EU-OSHA, *Psychosocial risks in Europe - Prevalence and strategies for prevention*. 2014.
- [9] G. B. Hall, M. F. Dollard, and J. Coward, "Psychosocial safety climate: Development of the PSC-12.," *Int. J. Stress Manag.*, vol. 17, no. 4, pp. 353–383, 2010.
- [10] C. Biron and M. Karanika-Murray, "Process evaluation for organizational stress and well-being interventions: Implications for theory, method, and practice," *Int. J. Stress Manag.*, vol. 21, no. 1, pp. 85–111, 2014.
- [11] K. Nielsen, R. Randall, A.-L. Holten, and E. R. González, "Conducting organizational-level occupational health interventions: What works?," *Work Stress*, vol. 24, no. 3, pp. 234–259, 2010.
- [12] A. D. La Montagne, T. Keegel, A. M. Louie, A. Ostry, A. D. Lamontagne, T. Keegel, A. M. Louie, and A. Ostry, "A Systematic Review of the Job-stress Intervention Evaluation Literature, 1990–2005," *Int. J. Occup. Environ. Health*, vol. 13, no. 3, pp. 268–280, 2013.
- [13] D. Lundgren, M. Ernsth Bravell, U. Börjesson, and I. Kåreholt, "The Impact of Leadership and Psychosocial Work Environment on Recipient Satisfaction in Nursing Homes and Home Care," *Gerontol. Geriatr. Med.*, vol. 5, p. 233372141984124, 2019.
- [14] K. Petrie, A. Gayed, B. T. Bryan, M. Deady, I. Madan, A. Savic, Z. Wooldridge, I. Counson, R. A. Calvo, N. Glozier, and S. B. Harvey, "The importance of manager support for the mental health and well-being of ambulance personnel," *PLoS One*, vol. 13, no. 5, pp. 1–13, 2018.
- [15] A. Stavroula, Leka, Jain, "Health Impact of Psychosocial Hazards at Work: An Overview," *WHO Libr. Cat. Data*, 2010.
- [16] J. Guadix, J. Carrillo-Castrillo, L. Onieva, and D. Lucena, "Strategies for psychosocial risk management in manufacturing," *J. Bus. Res.*, 2015.
- [17] The Swedish Work Environment Authority, "AFS 2001:1 Systematic Work Environment Management," 2001.
- [18] J. Rick and R. B. Briner, "Psychosocial risk assessment: problems and prospects," *Occup. Med. Occup. Med.*, vol. 50, no. 50, pp. 310–314, 2000.
- [19] Unionen, "Arbetsmiljöbarometern," 2017.
- [20] J. Barney, "Firm Resources and Sustained Competitive Advantage," *J. Manage.*, vol. 17, no. 1, pp. 99–120, 1991.
- [21] T. Aven, Y. Ben-Haim, H. Boje Andersen, T. Cox, E. L. Drogett, M. Greenberg, S. Guikema, W. Kröger, O. Renn, K. M. Thompson, and E. Zio, "Society for Risk Analysis Glossary," 2018. (Online). Available: <http://www.sra.org/resources>. (Accessed: 19-Jan-2019).
- [22] T. Backstrom, "Understanding and Facilitating Creative Group Processes: The GroPro Model," *Work progress, available Res. Gate*, no. December, 2018.
- [23] K. Nielsen, "What works for whom in which circumstances? On the need to move beyond the 'what works?' question in organizational intervention research," *Hum. relations*, vol. Vol. 70, no. 1, pp. 40–62, 2017.
- [24] Guest G, Mitchell M, and Namey E, *Collecting Qualitative Data: A Field Manual for Applied Research*. 2013.
- [25] 2015:4 AFS, *Organisational and social work environment*. Sweden: Swedish Work Environment Authority, 2015.
- [26] L. Stavroula and A. Jain, "EU Compass for Action on Mental Health and Well-Being Mental Health in the Workplace," 2016.
- [27] S. Leka and T. Cox, "Best Practice in Work-related Stress Interventions," *PRIMA-EF Guid. Eur. Framew. Psychosoc. risk Manag. Retrieved from <http://www.who.int/occupational_health/ Publ. >*, p. 2, 2008.
- [28] S. E. Boyd, "The psychometric properties of the Irish Management Standards Indicator Tool and its associations with the WHO-Five Well-being Index," University of Ulster, 2014.
- [29] Swedish Standards Institute, "Risk Management - Principles and guidelines (ISO 31000:2009, IDT)," 2015.
- [30] M. F. Dollard, J. A. Gordon, C. Boyd, A. Zadow, and P. Brough, "Evaluation of a Participatory Risk Management Work Stress Intervention thank Dale Nissen for high involvement in the program of work," *Int. J. Stress*, vol. 21, no. 1, pp. 27–42, 2014.
- [31] E. Cifre, M. Salanova, and A. M. Rodriguez-Sanchez, "Dancing between theory and practice: Enhancing work engagement through work stress intervention," *Hum. Factors Ergon. Manuf.*, vol. 21, no. 3, pp. 269–286, 2011.
- [32] A. Langley, C. Smallman, H. Tsoukas, and A. H. Van de Ven, "Process Studies of Change in Organization and Management: Unveiling Temporality, Activity, and ELOW University of Western Sydney University of Cyprus and University of Warwick Process Questions: The Centrality of Time," *Acad. Manag. J.*, vol. 56, no. 1, pp. 1–13,

- 2013.
- [33] V. Braun, V. Clarke, V. Braun, and V. Clarke, "Using thematic analysis in psychology Using thematic analysis in psychology," vol. 3, no. 2, pp. 77–101, 2006.
 - [34] D. A. Gioia, K. G. Corley, and A. L. Hamilton, "Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology," vol. 16, no. 1, pp. 15–31, 2012.
 - [35] R. Berglund, T. Backström, and M. Bellgran, "Corporate Approaches for Managing the Psychosocial Work Environment," in *Submitted to Policy and Practice in Health and Safety*, pp. 1–14.
 - [36] P. Slovic, M. L. Finucane, E. Peters, and D. G. Macgregor, "Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality," vol. 24, no. 2, 2004.
 - [37] Hewstonem M., & Stroebe, W. (2001). *Introduction to Social Psychology* (Third Edit). UK: Blackwell publishers.