Industrial Work Groups
Agneta Brav

Industrial Work Groups

The Impact of Job Design, Leader Support and Group Processes on Initiative and Self-organization
ABSTRACT


From an organizational perspective the issue of which organizational solutions will benefit productivity, efficiency and the innovation process is central. Work groups can be an effective means. From a psychological perspective, the general aim in the thesis is directed towards work conditions, and how work conditions impact on the group’s redefining stipulated tasks to include taking initiative to implement meaningful change. Based on action regulation theory, detailed work task analysis is assumed to be worthwhile as it provides data that cannot be captured with interviews or questionnaires exclusively. Data for this thesis is based on work task analyses and questionnaires administered to work groups at four Swedish industrial organizations. In Study I a theoretical model of the relations of job design, work routines and social routines and reflexivity and learning processes was tested. Results showed that job design and work routines strongly impacted on reflexivity and learning processes. In Study II this model was extended into a theoretical input-process-output model to include group initiative and self-organizational activities as outcomes of job design, mediated by group processes. The model provided substantial, but not complete, support. Job design strongly impacts on reflexivity, and reflexivity directly impacts self-organizational activities. To explore the importance of leadership support and potency longitudinally for group initiative, in Study III two data collections were included. The findings showed that potency, compared to perceived autonomy and support from leader, was the best predictor of group initiative. Together the studies show that the dimensions of job design, support from leader, reflexivity, and potency as well as cooperation and social support are important for the outcomes of work groups if the organization wants groups to take initiative and engage in self-organizational activities. It is also advocated that job design contains an inherent potential for learning and the possibility to make use of one’s resources. Main findings, strengths, limitations, practical and theoretical implications, directions for future research and when it will be worthwhile to invest in group work are included in the discussion.

Keywords: Industrial work groups, job design, support from leader, group processes, potency, group initiative, self-organizational activities
LIST OF PAPERS

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals (I-III)


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# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ARIA</td>
<td>Acronym for the Swedish expression for work content analysis – Arbetsinnehållsanalys</td>
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<tr>
<td>CFA</td>
<td>Confirmatory Factor analysis</td>
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<tr>
<td>IMOI</td>
<td>Input-mediator-output-input model</td>
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<tr>
<td>I-P-O</td>
<td>Input-Process-Output Model</td>
</tr>
<tr>
<td>JDC</td>
<td>Job Demand Control Model</td>
</tr>
<tr>
<td>REBA</td>
<td>Rechnergestütztes Dialogverfahren zur psychologischen Bewertung von Arbeitsinhalten</td>
</tr>
<tr>
<td>RHIA</td>
<td>Verfahren zur Ermittlung von Regulationshindernissen in der Arbeitswelt</td>
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<td>SEM</td>
<td>Structural Equation Modeling</td>
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<td>T1</td>
<td>Data collection time 1</td>
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<td>T2</td>
<td>Data collection time 2</td>
</tr>
<tr>
<td>TBS</td>
<td>Tätigkeitsbewertungssystem</td>
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<tr>
<td>VERA</td>
<td>Verfahren zur Ermittlung von Regulationserfordernissen in der Arbeitstätigkeit</td>
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ACKNOWLEDGEMENT

First of all I would like to express my appreciation and deep gratitude to Örebro University, Mälardalen University, and my supervisors. The thesis has been financially supported by Mälardalen University, during the eight years I have shared my time between research studies and lecturing in psychology. My supervisor, Associate Professor Annika Lantz Friedrich inspired me from the first time we met, and without her there would never have been a thought in my mind to go into research. Thank you Annika, for still being here, after all the years with their ups and downs – I’ve learnt a lot from you! I would also like to thank my other supervisor Professor Kerstin Isaksson for being so encouraging: without you the thesis would probably never have been completed. All the organizations participating in the empirical studies also deserve all my gratitude, as do the organizations that served as pilots and tested the questionnaires. If I hold on to the input-process-output model, applied in the thesis, even in expressing my gratitude to all the people who have contributed to my accomplishment, this would be the input in form of job design and support from leaders.

During the process many people were involved in making this thesis possible. Professor Peter Richter has been helpful with advice, and provided me with the REBA instrument. Doctor Peter Friedrich has kindly given advice, and contributed with knowledge of action regulation theory. Associate Professor Anna-Christina Blomkvist and Associate Professor Petter Gustavsson have given invaluable help on statistical matters. I would also like to thank Professor Siv Boalt-Boëthius and all the participants at the final seminar, for constructive advice, comments, and support. Tomas Kumlin and Einar Jakobsson contributed with suggestions for improvements at the final stage of finishing the thesis. Librarian Margareta Roland definitely deserves a mention. The Psychology Group at Mälardalen University has been very supportive throughout the whole process – I am grateful to all of you. There are many other colleagues and friends as well, in Västerås and Eskilstuna, whom I would like to thank. Even if I don’t mention your names here, you all know who you are. Still, there are two very special people who have been particularly important for me during the years; Sandra Torres Örsten (my unofficial mentor) and Kin Andersson – thank you for always being there with me in good and not-so-good times!
As output I am hoping that, after finishing this thesis, I will be ready for some new exciting work tasks. I am not certain that I will be content and satisfied solely with prescribed and stipulated work. I would rather like to go beyond and experience further life-long learning opportunities. I will although ensure that in the future, I will be able to spend more time with my friends and my family. Finally, to all my beautiful boys; husband, sons, and grandson, Göran, Magnus, Mattias, Martin and Nino – I love you all most of all!

Västerås, August 2008

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BACKGROUND

Work groups bridge the gap between the organization and the individual (Kozlowski & Bell, 2003). Group work can be advantageous from innovational and developmental perspectives as well as for productivity, efficiency, and employee satisfaction (Kozlowski & Bell, 2003; Rousseau, Aubé & Savoie, 2006; West, Hirst, Richter & Shipton, 2004). Researchers point to the positive effects of the group form of working on performance (see Antoni, 2005; Campion, Medsker & Higgs, 1993; Richter, Scully, & West, 2005; Stewart, 2006), but there is no over-all consensus concerning how group work behavior will enable group members to work effectively to achieve collective tasks and thereby enhance group performance (Rousseau et al., 2006). Implementation of work groups does not always result in success: it is not enough to put employees together and expect them automatically to know how to work in a group (Rosseau et al., 2006).

The interest of this thesis lies in industrial work groups and the prerequisites for proactive behaviour and self-organizational activities. A distinction between work groups and work teams is made by some researchers, but this distinction is not consistent, and some use group and team interchangeably, referring to the same definition (Sundstrom, McIntyre, Halfhill & Richards, 2000). There are several definitions of groups in the literature, most of them viewing the group as an aggregate of individuals with inter-relations (Sandelands & St.Clair, 1993; Stiwne, 1995). According to Campion, Papper and Medsker’s (1996) definition a group is a group when its members identify with and regard themselves as a group. In line with Rousseau et al. (2006) in this thesis work groups are defined as “interdependent individuals who are collectively in charge of the achievement of one or several tasks defined by the organization” (Rosseau et al., 2006, p 541).

From the organizational perspective the issue is not only if group work is the most effective solution, but also a matter of deciding whether the group work is to result in what is explicitly expected by management, or if the group is expected to be part of an on-going change- and developmental process linked to innovation, for which the result cannot fully be foreseen. If the purpose of introducing group work is to increase productivity, stipulated work performed under good working conditions will be in focus. There is substantial evidence that the prerequisites as well as group processes differ from those in innovative
groups that go beyond the stipulated task and perform a qualitatively different work (West et al., 2004).

From a general psychological perspective the issue is to promote insights that can be helpful in the design of work conditions which allow people to use their full competence, and where they will be recognized and appreciated. A range of job design theories are listed and reviewed by researchers (see e.g. Kompier, 2003; Morgeson & Campion, 2003; Sackett & Laczo, 2003) and in this thesis action regulation theory is applied. This choice of theoretical frame is made because it contributes with a comprehensive theory in prescribing, describing and assessing humane work dimensions beneficial for employees. It also contributes with methods, not commonly used empirically (on group work), with emphasis on job redesign (Kompier, 2003). Activity theorists (Frese & Zapf, 1994; Hacker, 2001) use the term completeness to describe a humane work situation. A complete task allows employees to formulate goals (integrated in the overall organizational goals), and to prepare and plan the implementation of the work. The employees ought to be able to choose means, interactions, execute, control, and get feedback on the work performed. A potential for learning and development is included in a complete work, it constitutes a prerequisite for contribution of organizational effectiveness as well as (Ulich & Weber, 1996; Hacker, 2003). Why is it worthwhile to invest in group work, and what does it take? The answer might be innovative groups characterized by having a complex work task, a considerable degree of freedom in choosing how to perform the task, and substantial influence over the work itself and the working conditions (among others, West et al., 2004 conclude). Organizations require employees who are motivated and engaged in developmental- and innovative processes.

To also include the perspective of occupational health with its emphasis on humane work conditions the overall aim of this thesis is to investigate determinants for group work that result in the groups taking a proactive approach to work and going beyond what is expected by management. Industrial work groups seldom have innovative work as a task, but contribute to creating and facilitating conditions for the implementation and production of innovations on a daily basis. Industrial work groups need to be open and prepared for changes in technology. The inherent insecurity of not knowing what and how to do may convey amounts of uncertainty which the groups have to handle. The groups might continuously be involved in proactively creating conditions and organizing work so that they can handle and master new and unexpected situations. It is
advocated that these self-organizational activities are essential for ongoing change and developmental activities and for innovation, but still differ from “pure” innovation and innovative work. When defining innovation, West et al. (2004) distinguish creativity and innovation by defining creativity as idea generation, and innovation as development and implementation in practice. To characterize different types of innovations West et al. (2004) suggest that innovations should be rated in magnitude (size or scale of the innovation judged by experts), radicalness (how much change compared to status quo), and novelty dimensions. The concepts of self-organizational activities and innovation (as defined by West et al., 2004) are related, but differ in the central respect of the goal. The goal that regulates work activities for self-organizational activities is to handle and master uncertainty, unexpected situations and proactively create conditions so that new products/services can be produced, while innovative work activities are regulated by the goal of inventing new products or services.

The reason for focusing on the prerequisites for group work, rather than processes and outcomes, is twofold. Pragmatically, prerequisites such as the designing of work are directly and more easily influenced by management and will impact on complex processes and outcomes, which are more difficult to control and influence. Secondly, although most of the work by organizational psychologists as well as group researchers recognizes the importance of the designing of work, it is a research area that in recent years has declined and has not given a large input to group research (Morgeson & Campion, 2003). The theoretical frame in this thesis combines knowledge from the domains of social psychology (i.e. group research), and work and organizational psychology (e.g job characteristics and perceived leadership support).

**Research model**

The input-process-out (I-P-O) model proposed by researchers (i.e, Gladstein, 1984; Hackman, 1987; McGrath, 1984; Steiner, 1972) is often used in group research (Antoni, 2005; Kozlowski & Bell, 2003; West et al., 2004). Inputs are conditions (e.g. member, group and organizational characteristics) that exist prior to performance, and outputs are results and products of the group activity (Rosseau et al., 2006). Processes describe how inputs are transformed into outputs, and include all behavioral, cognitive and affective phenomena existing in groups (Ilgen, Hollenbeck, Johnson & Jundt, 2005).
The I-P-O framework gives structure and creates similarity, but is also used with some modifications by different researchers (Kozlowski & Bell, 2003). Campion et al. (1993) examined work characteristics important for effectiveness and job satisfaction, and did not put process between input and output, but made it a characteristic or theme. In the model of Tannenbaum, Beard and Salas (1992) the feedback process was pointed out as important for group work, as feedback normally is not visible in the model. In contemporary research reciprocal interactions and feedback processes stand out as very important for all parts in the model. Ilgen et al. (2005) proposed an input-mediator-output-input (IMOI) model as an alternative, with the extra “I” for an explicit notation of cyclic causal feedback loops. However, different models contain different specific details regarding the nature of groups, as groups are complex dynamic systems, existing in larger contexts of people, tasks, technologies, and settings (Ilgen et al., 2005). It may be because of a pedagogical perspective, that the I-P-O model is widely used, because of the rapid overview that such a model presents, although it is well-known that no such linear progressing paths exist.

Previous research has shown that inputs (i.e. aspects of job design) and group processes impact on work group performance (Antoni, 2005; Campion et al., 1993; West et al., 2004) in both carrying out the stipulated tasks as well as on innovative work. West et al. (2004) assert that group processes provide the motivational force for group innovation and that these processes can mediate the relationship between input and output (innovation). Each empirical study in this thesis was focused on variables which all fit in an input-process-output research model with job design, perceived autonomy and support from leader as input variables. Group processes in the three studies altogether were work routines, social routines, cooperation, social support, reflexivity and learning processes, and potency. The output variables were group initiative and self-organizational activities.

To illuminate how the variables are related within a framework of the I-P-O model, see Figure 1. This rough model is presented as an orientation for the following overview of theories and research. This overview is also structured to follow the idea of the applied I-P-O model.
Inputs for group work

Job design within the framework of action regulation theory

As a reaction to stimuli-response models of how work conditions impact on work behaviour, action regulation theorists propose that mental regulation of activity is mediated by the object of that activity. That actions are regulated by motives and goals is the most important characteristic for action regulation, in the meaning that it involves cognitive ability to anticipate an intended result (Hacker, 2003). Over-arching goals will encompass employees’ intra models for work, and will at the same time serve as references for new experiences (Friedrich, 1992). When having a goal in mind, group members tend to focus on behaviours leading to goal attainment (Rosseau et al., 2006). This goal specification includes a redefinition of the task into a self-set goal, according to Hacker (2003). Different tasks provide different conditions for the mental regulation process, as the task-goal relationship differ. Work can be designed and carried out to ensure that an immediate goal is fulfilled. Or, it can be carried out to achieve an immediate goal as a means of achieving an overall goal. Further development of means, work processes, products or services, are overall goals that enable and put demands on goal-oriented-planned action. Work activities that are aimed at overall goals require an internal representation of an as-yet non-existent (future) reality, stored
in the memory as a representation of what the result should be (Friedrich, 1992; Hacker, 2003). Activity theory uses the term completeness to describe if the work task is designed in such a way that it allows the worker to act in a goal-oriented and planned manner.

As described above, completeness means that the employee can autonomously set goals, prepare and plan work implementation, and choose the means and interactions that benefit the work most effectively. The employee should also be able to implement, control and get feedback on his/her actions in relation to results and goal achievement. To grasp this completeness, two different criteria are used in action regulation theory: sequential and hierarchical completeness. Work activity is action built into chains in sequential phases, where every action is considered a part in attaining the goal in hierarchical structures and levels. The regulation process of work activities can be described as different hierarchical levels from unconsciously automated, possibly conscious knowledge based, or strictly conscious intellectual modes of regulation (Hacker, 2003). A hierarchically complete task requires knowledge-based and intellectual control processes, i.e. a hierarchically complete task could not be limited to automated processes. If employees sequentially apply functions such as preparation, execution, evaluation and adjustment, they can attain high performance levels (Rousseau et al., 2006). These functions are mentioned as phases or stages of regulation by Hacker (2003) and are captured as the sequential completeness. During the phase of action preparation of work accomplishment, group members can guide the accomplishment of work tasks by focusing on analyzing and planning activities. Activities in this phase may be identification of the groups’ main tasks and resources available, and goal specification. The next phase would be to execute, i.e. putting into action what has been planned through task related collaborative behaviours; coordination, cooperation, and information exchange (Hacker, 2003; Rosseau et al., 2006). In the phase of evaluation the group members are supposed to ensure that they are doing the right things when executing the work tasks. After that assessment the evaluation function may lead the group to make adjustments to progress toward task completion (Hacker, 2003; Rosseau et al, 2006).

It is a well known fact that individuals do not perceive and interpret work tasks in exactly the same way. Some persons redefine the objective work task that has to be performed, and some do not. This individual redefinition of work is related to previous experiences, knowledge, skills, abilities, values, motivation,
etc., often acquired at work. Hacker (2003) describes different types of redefinition, either as a translation-type of redefinition which equates the work with what was intended to be achieved, or as a re-interpretation type of process that can lead to results that differ from that first intended, but are in line with overall goals. Work regulated on a low hierarchical level (unconsciously automated, e.g. sensori-motor level routine task), or a sequentially incomplete job (involving only executing) will restrict the redefinition process. The designing of work in the terms of sequential and hierarchical completeness opens up or restricts possibilities for the redefinition process that are essential if the individual or group is to redefine the task to go beyond the stipulated task and act in a goal-oriented, planned manner. Action regulation theorists rely on analysis of the work conditions, rather that the appraisal of these conditions in evaluation and design of work content and job design (Hacker, 2001; 2003; Pohlandt et al., 2007; Richter, Hemman & Pohlandt, 1999) as the redefinition process is restricted by the regulation demands and employees can have different motives and interpret the task differently.

Regulation demand is closely related to the concepts of autonomy and degrees of freedom. Degrees of freedom are used to describe an employee’s choices in a given situation by Hacker (2003). Group autonomy is defined as the amount of control and discretion the group is allowed in carrying out tasks assigned by the organization, referring to the groups’ decision latitude (Rousseau et al., 2006). It is advocated that hierarchical and sequential completeness is essential for a collective redefinition process that will result in the groups autonomously and proactively carrying out self-organizational activities in a goal-oriented and planned manner. This assumption is supported by extensive research on the impact of autonomy on group processes and outcomes. Previous research reveals that group autonomy is considered a key characteristic of work groups, and there are a lot of positive outcomes of autonomous work group published (Antoni, 2005; Campion et al., 1993; West et al., 2004). Parker (2003) has shown that individual well-being and organizational commitment are enhanced by work autonomy. Autonomy is also presumed to enhance decision quality by the near connection to the operational level (Campion et al., 1993). Enhanced autonomy linked to cognitive development, personal initiative, interactions, psychological safety, learning and development are examples to some extent connected to the rapid changes of contemporary organizations pointed out by Parker and Wall (2001). For self-directed or self-managed work groups (alternative terms to
autonomous work groups) it is suggested that they should have meaningful work tasks, autonomy in decision-making and collective responsibility to go beyond the specific tasks (Parker & Wall, 2001). West claims, that the group task has “a fundamental influence on the group, defining its structural, process, and functional requirements” (West, 2002b, p 276). Researchers agree that the more complex the work tasks that are created, the more beneficial for humans to use and develop their ability of planning and decision-making (Friedrich, 1992). In production work groups, autonomy is found to be an important predictor of effectiveness (Sundstrom et al., 2000).

**Job design measures based on action regulation theory**

Action regulation theory means that job design is better comprehended by work task analysis than solely grasped by subjective apprehensions. There are a few objective methods, i.e. observations and assessments performed by experts (i.e. external researchers) measuring job design based on the theoretical grounds in action regulation theory; VERA (Volpert, Oesterreich, Gablenz-Kolovic, Krogoll, & Resh, 1983), RHIA (Leitner, Volpert, Greiner, Weber, & Hennes, 1987), TBS (Hacker, Fritsche, Richter & Iwanowa, 1995), REBA (Richter et al, 1999; Pohlandt et al., 2007), and ARIA (see Waldenström, 2007). These methods are not well known to all researchers and practitioners, which is the reason for introducing them in this section.

VERA (Verfahren zur Ermittlung von Regulationserfordernissen in der Arbeitstätigkeit) and RHIA (Verfahren zur Ermittlung von Regulationshindernissen in der Arbeitswelt) are designed to assess work characteristics in industrial work by what the authors refer to as “objective” observations. ARIA (an acronym for the Swedish expression for work content analysis) is not person independent but rather related to the specific employee’s knowledge and experience. ARIA is generated from VERA and RHIA and focus on psychosocial aspects, but physical environmental factors are not assessed. Initially ARIA was changed to be applicable for data collection by interviews, and to all kinds of occupations, not solely for use in industrial work. Thereby the dimensions from VERA and RHIA had to be simplified (Waldenström, 2007). Later the instrument also was revised to include observations and examination of work goals. Waldenström (2007) refers to the instrument as “external assessments” and not as “objective” measurements. The focus on the perceived
individual experience of work tasks makes ARIA different from VERA, RHIA, and REBA, where the work tasks are observed.

In our studies The REBA instrument is used (Rechnergestütztes Dialogverfahren zur psychologischen Bewertung von Arbeitsinhalten). It is a semi-standardized system of task analysis intended for analysis, evaluation and design of work content and job design, aiming to improve employee health and safety (Richter et al., 1999). REBA is not restricted to application only in industrial settings but can also be used for service environments, such as the work of hospital personnel, or of agents in call centres, and office tasks in public administration. REBA can be used in the early stages of job design and for evaluation of existing jobs as well (Pohlandt et al., 2007). The instrument is based on the Job Diagnostic Survey (Tätigkeitsbewertungssystem TBS). It is divided into five separate dimensions, describing the prerequisites for a humane meaningful work. The five dimensions are: organizational prerequisites for sequential completeness of work, demand on cooperation, demand on responsibility, cognitive demand, and learning opportunities. The REBA measure incorporates the aspects that were formulated by Hacker in his description of prerequisites for humanized work.

**Leader support for redefinition processes**

Group work can be supported in different ways. Above it has been shown how the prerequisites such as the job design with its focus on the goal-means relationship will impact on the group’s capacity to redefine the work to include proactive behavior and self-organizational activities. Social support is important for giving the group inspiration and a motive to redefine goals through communication and dialogue. Hacker (2003) refers to a constructive dialogue as a social support for the redefinition process. Important sources of social support in work settings come from leaders and co-workers (van Mierlo, Rutte, Vermunt, Kompier & Doorewaard, 2006).

Leadership is a big research domain in its own right, studied from different angles (psychology, management etc.). Here the focus is on how leaders can support the group’s proactivity, by creating both good work and working conditions and supporting the group processes. It was already well known 25 years ago that social supportive relations might reduce stress and improve health (House, 1981). House (1981) presented a taxonomy of four different types of support, instrumental, informational, appraisal and emotional, of which
emotional support seems to be the most important. Instrumental support involves activities that help people to do their work, or giving economical support and it has psychological consequences as well. Informational support is the type of support that incorporates information useful in coping with personal and environmental issues. Appraisal support is relevant for self-evaluation. Support of the emotional kind can be to provide empathy, care and trust. To summarize the typology, it “is a flow of emotional concern, instrumental aid, information, and/or appraisal (information relevant to self-evaluation) between people” (House, 1981, p 26).

Employees regard supervisors as the agents of organizations, thereby representing the whole organization’s support (Eisenberger, Stinglhamber, Vandenberghe, Sucharski, & Rhoades, 2002). If the groups have reason to believe that the management is negative towards group work as an organizational solution, or if the leaders do not interact in such a way that the group work is supported, it is obvious that this will diminish the groups’ possibilities to carry out the work effectively.

There are three important main tasks for a supportive leader in relation to group work. First, leaders have to consider and create an organizational context where groups will be empowered (i.e. autonomous) (Kirkman & Rosen, 1999). The job design and the work content will impact on both group processes and the outcome. As presented above, the job design will also restrict or open up possibilities for the redefinition process that might result in proactive behaviour, self-organizational activities or innovative work. In most organizations management take the decisions about production technology and job design that will restrict or open up for both sequential and hierarchical completeness.

Secondly, leaders need to facilitate intra-group interaction and the group’s interaction with other functions or work groups. The members in a group will be motivated by a supportive leader to seek help and share ideas even outside the group (Srivastava, Bartol & Locke, 2006). Group interaction can be demanding and conflicts and tensions that arise cannot always be handled without support from management. The coordination of work and cooperation within the group can be facilitated by a manager who takes an active interest in the group process as well as the result of the group’s work. Previous research has shown that a leader who provides support and shows concern also has a positive effect on team efficacy (Srivastava et al., 2006).
Thirdly, managers can enhance the group’s proactive behaviour and involvement in self-organizational activities and innovative work by providing time and forms for reflexivity, and stimulate reflexivity by putting questions or defining problems. The work redefinition process demands reflexivity on motives, activities, and goals, and this process can be supported in different ways. If not supported by the right prerequisites it will be more or less hindered. In most organizations the leader is in charge of creating these prerequisites, or has to delegate the decision to the group to create the right conditions.

A leader can through delegation support the group’s confidence in its capacity by providing a range of tasks or work experiences that they can learn to master. Guzzo, Yost, Campbell and Shea (1993) state, that an external leader, who is not a member of the group, is important for the group’s confidence in their abilities. Leaders who can inspire and support in different ways may thereby increase potency (the confidence the group has in its capacity), competence, performance (Kirkman & Rosen, 1999) and learning activities (Burke et al., 2006). To provide constructive performance feedback to the employees is found to be of great importance by Shalley and Gilson (2004).

Parker, Williams and Turner (2006) refer to previous research and state that supportive leaders influence employees to become more self-directed and self-managing. Social support has been studied both as an input variable (support from leader) and as a process (social support) in the empirical studies described later, which also can be seen in Figure 1 above. After the above description and discussion of input dimensions, below are the dimensions in the middle, “process box”, discussed.

**Group processes**

In the research model section above, it is mentioned that processes include all behavioral, cognitive and affective phenomena existing in groups (Ilgen et al., 2005). Rousseau et al. (2006) state that to have an effect on the environment, cognitions and feelings must be translated into behaviours, as cognitions and feelings are not observable. In their literature review they list several teamwork behaviours and divide them into two main categories: task work behaviours and group work behaviours. The first category is the operations-related activities, and the second refers to the overt actions and talk during interaction in work groups. Social support belongs to the second category.
Other researchers focus on other group processes (see e.g. Kozlowski & Bell, 2003; West et al., 2004), and Rousseau et al. (2006) report that different studies often use different labels to refer to the same or similar dimensions. West et al. (2004) state that group processes are the motivational force for group innovation, and that reflexivity is crucial for innovation. The mediating role of reflexivity is confirmed from a range of other input and output variables as well in the literature (Morrison, Cordery, Girardi, & Payne, 2005; Schippers, den Hartog, Koopman, & Wienk, 2003; Tjosvold, Tang, & West, 2004). Group members need to be intrinsically motivated to bring about change (West et al., 2004) and group initiative include active coping strategies such as having ideas, and making suggestions for improving methods etc.

The group processes studied in this thesis include work- and social routines, cooperation, social support, reflexivity- and learning processes, and potency, i.e. mainly focusing behavioural and cognitive dimensions. All group process variables are described below.

Work routines and cooperation

By habitual routines Gersick and Hackman (1990) mean the work routines, social routines, cooperation, and social support that exist in the work group. The group needs routines to ensure that they perform their work tasks well.

Knowledge sharing is important for group performance and includes the group members sharing task-relevant information within their group (Srivastava et al., 2006). Work routines need to be established before the group can reflect upon what in the daily routines can be changed to increase effectiveness (Gersick & Hackman, 1990). Just as leaders’ support and feedback influence the group, increased communication within groups is positively related to the generation of innovation (Shalley & Gilson, 2004). Speech is considered as a social tool for development by Hacker (2003). If the group members do not share information and knowledge the group’s full potential will not be utilised.

Knowledge sharing is connected with improved decision making due to a more comprehensive understanding and possible consideration of alternatives and coordination (Srivastava et al., 2006). Knowledge sharing is a key group process, but not yet considered in many field studies, according to Srivastava et al. (2006). Previous research suggests, that in groups where work information circulates freely the groups tend to be more effective, because the collective nature of group tasks implies that every group member possess the necessary
information to get the work done (Campion et al., 1993; Gladstein, 1984). Cooperation based on effective routines, can lead to mastery, as well as to confidence in one’s own competencies to deal with work (Munby, Versnel, Hutchinson, Chin, & Berg, 2003). The group taking a self-starting approach to work, and going beyond what is required, will demand discussions and reflexivity on the prerequisites of group work, tasks, work routines as well as the effects of work (Daudelin Woods, 1996; North, Friedrich & Lantz, 2005; West et al., 2004). In the empirical studies in this thesis the terms work routines (Study I) and cooperation (Study II) are used for instrumental habitual routines, such as workload-sharing, knowledge sharing and cooperative behavior to perform the work task (Brav, Andersson & Lantz, in press; Lantz & Brav, 2007).

**Social routines and social support**

Social support involves interaction between individuals, environment and the social structures in which they are embedded (House, 1981). Guzzo et al. (1993) state that the social context of groups was (at that time) not valued to its full extent. Social routines and support comprise how the group cooperate and support each other with encouragement, comfort and trust in the group. Eventual conflicts may be handled more constructively in trusting relationships (West et al., 2004).

Employees need to feel they have a supportive work environment (Shalley & Gilson, 2004). A climate with psychological safety should be created and supported where risk taking and uncertainty is not to be avoided. When such a climate exists, there will be no need for blame or punishment. Psychological safety is of great importance when creating or fostering well functioning groups where increased learning may take place (Edmondson, 1999). Questioning the habitual routines can be a delicate issue as it may reveal differences in opinions, attitudes towards work, differences in motives and motivation, but essential for a redefinition process. Group members who raise awkward questions might be criticized for being negativistic or problematic if the group climate is not amicable and open. Psychological safety is shown to be essential for reflexivity and learning (Edmondson, 1999) and it is advocated that the social support within the group is essential for the group’s taking responsibility for evaluating habitual routines. As a result of such reflexivity the group can find the motivational force to take the initiative to redefine work to go beyond the present.
The terms social routines (Study I) and social support (Study II) refer to socio-emotional processes, such as group support, psychological safety and trust (Brav et al., in press; Lantz & Brav, 2007).

**Reflexivity and learning processes**

It is of crucial importance and really necessary to have routines in the workplace, but it may be of great importance to sometimes also question those routines. Reflexivity and learning refers to the process whereby the group contemplate, discuss and evaluate work procedures, group processes, the result, and relate this to prerequisites and the overall goal. Meta-routines involve reflexivity and discussion of how habits might impede effectiveness, creativity and changes (Gersick & Hackman, 1990), and hence can provide insight into necessary changes that will be the motivational force for the group to take initiative to change. Group learning should still be regarded as a construct that is “at an early stage of conceptualization, definition, and development” (Kozlowski & Bell, 2003, p 366). There is no best way to learn at the workplace. Pisano (1994) concludes that different approaches are required, depending on the specific organization, its context and knowledge environment. The concept active learning, developed for capturing the active learning dimension from the Job Demand Control-model (JDC) of Karasek (1979), used by van Mierlo, Rutte, Vermunt, Kompier and Doorewaard (2007) incorporates challenges with new problems to solve.

The way renewal and learning are integrated into work are important for employees (Friedrich, 1992) as learning at work not only influences work results. It is also of importance for the individual’s long term employability and health. The option of learning is incorporated by sequential and hierarchical complete activities in action regulation theory (Hacker, 2003). Different regulation demands give more or less scope for cognitive processes, and sequential completeness provides a range of tasks that can be learning experiences. Extensive previous research (Kozlowski & Bell, 2003; West et al., 2004) has shown that reflexivity and learning presuppose a job design characterized by autonomy. Reflexivity not only directly impacts on the result, but is also crucial for enhancing the social climate that indirectly affects the outcome. If employees never reflect on their work, negative group processes may occur, e.g groupthink (Janis, 1982) or social loafing (Comer, 1995; Latané, Williams & Harkins, 1979).
Seibert (1999) differentiates between two kinds of reflection as means of learning from experiences in the workplace: structured reflections and reflection-in-action. West et al. (2004) recommend groups to occasionally “stop working” in order to enhance reflexivity. Reflexivity conceptually includes the elements of reflection, planning, and action, according to West et al. (2004). Reflexivity upon the present situation is a prerequisite for improving current circumstances or creating new ones (West et al., 2004). Collective reflexivity is an essential part of group learning, but requires a degree of safety as it may reveal that the group actually does not perform in the way the group members would like.

Learning has been studied both as process and output in previous research (Edmondson, 1999). Psychological safety and trust are important for group learning as people tend to act in ways that inhibit learning when they face potential threats or embarrassment (Edmondson, 1999).

**Potency**

If the group is to find the motivational force to go beyond the present way of working, to expand work goals and redefine work to be qualitatively different, it has to have reason to believe that the group has the capacity to perform a more complex and challenging task. If not, why invest time and effort? In line with the extensive research on the importance of self-efficacy on individual behavior (Bandura, 1982, 1997; Tett, Jackson & Rothstein, 1991) group researchers stress the importance of collective efficacy or potency for group behavior. Collective efficacy refers to a belief that the group can perform well, connected to the group’s specific task (Ilgen et al., 2005). The related concept used in this thesis, potency, also aims to describe the belief of competence and efficacy in the group (Guzzo et al., 1993) but refers to more generalized settings for past, present and future (Ilgen et al., 2005). Some researchers differentiate the concepts, when others regarded them as similar or over-lapping. Kozlowski and Bell (2003) agree with Guzzo et al. (1993) and state that potency consists of shared emotional beliefs of competence by the group members, across multiple tasks.

The possibly most robust predictor of group effectiveness is collective efficacy and safety as illustrated in a meta-analysis by Sundstrom et al. (2000). Ilgen et al. (2005) find that potency influence later performance. Whether the groups assess or label themselves as “good” or “bad” is an assessment that affects their performance. Self-fulfilling prophecies may arise and make it difficult for groups to break out from them (Guzzo et al., 1993). When group members have
confidence in their own group capacity, it will probably enhance both performance and wellbeing. Guzzo et al. (1993) who articulated the construct, found potency to be a predictor of group performance, and Ilgen et al. (2005) also reported unique reciprocal relations between potency and group performance. Previous research has given strong support for the argument that potency impacts on the group’s carrying out of the stipulated work, and it should be of equal importance for the group’s going beyond what is expected and redefining work into a more complex task.

Outcomes of working in groups
When it comes to results and effects of group work, performance, efficacy, productivity, and job satisfaction (Campion et al., 1993; Rousseau et al., 2006; Srivastava et al., 2006) are commonly studied and expected effects, as well as creativity and innovation (West, 2002a). The next section describes outputs such as the groups going beyond the stipulated work and doing more. These outcomes refer to the output box in Figure 1.

Group initiative and self-organization in groups
Proactive behaviour (Crant, 2000), proactive personality (Bateman & Crant, 1993), proactive work roles, work orientation (Wrzesniewski, McCauley, Rozin, & Schwartz, 1997), role orientation, role breadth self-efficacy (Parker, 2007), personal initiative (Frese & Fay, 2001), taking charge (Morrison & Phelps, 1999) are similar, or to some extent overlapping constructs. They all describe proactive behaviour as “taking initiative in improving current circumstances or creating new ones; it involves challenging the status quo rather than passively adapting to present conditions” (Crant, 2000, p 436). The concept captures a motivational force that might result in self-organizational activities, and/or innovative work and ultimately perhaps an innovation. It is considered as a positive outcome in most organizations but there are also work situations and settings where this is not even possible or even might be hazardous, e.g. in organizations where the work tasks are regulated by security rules, regulations, and laws that restrict the employee’s initiative-taking.

There is a fine line between that motivational force and the overt behaviour that it results in. Different constructs of proactive behaviour all regard it as an inclination towards work, but differ somewhat as to whether that inclination is measured indirectly through overt behaviour or directly as an attitude (Lantz,
Within the perspective of action regulation theory Fay and Frese (2001) present the construct personal initiative as self-starting (implying that behaviour is regulated by self-set goals), proactive (meaning long-term focus, instead of only responding to external demands), and as persistence in overcoming barriers and setbacks (Fay & Frese, 2001). The concept personal initiative was further developed by use of theoretical frameworks such as reciprocal determinism (Bandura, 1997) and occupational socialization (Frese, 1982; Kohn & Shooler, 1978) “to understand how people can change the situation in which they work and how they determine changes in work, in processes, in products, and in society” (Frese, Garst & Fay, 2007, p 1085.) Frese’s (2001) model assumes that environmental support, skills and personality factors contribute to personal initiative. Personal initiative is enhanced by complexity, autonomy, social support and support for taking initiative (Fay & Frese, 2001; Frese, 2001; Frese, Fay, Hilburger, Leng, & Tag, 1997). The reconstruction process of work allows employees to define extra-role goals and actions that are self-starting, proactive, have a long-term focus and lie outside role requirements (Fay & Frese, 2001; Frese et al., 1997). Control and complexity affect control orientation (a belief of having control of issues at work and that this control is valuable) (Frese et al., 2007). Control orientation includes control aspiration, perceived opportunity for control, and self-efficacy, and effects personal initiative. Work characteristics (control and complexity) change control orientation, which has reciprocal relations to work characteristics mediated by initiative. There are also reciprocal relations from initiative to work characteristics mediated by control orientation according to Frese et al. (2007).

Group initiative is explored as a motivational force in accordance with the concept of personal initiative and is defined as a group’s proactive approach to work linked to work activities that go beyond the stipulated work in order to achieve meaningful change. Group initiative can be regarded as a process but is also the result of a process. Group initiative presupposes reflexivity and a collective redefinition process of work through communication. Reflexivity on the group’s motives, objectives, strategies, and processes has been related to group initiative and self-organizational activities in a previous study (North, Friedrich & Lantz, 2006). Group initiative is probably also related to potency, (in line with the developed model of Frese et al., 2007, where control orientation impacts on personal initiative) as the belief in the groups’ capacity will determine whether the groups are willing to take initiative. Parker et al. (2006) state that
there are only a few studies of supervisors’ direct effect on proactivity. Frese and Fay (2001) show that supervisors’ behavior may not be very important for enhancing proactivity at individual level, but other researchers have found contradicting results. Crant (2000) concludes that supervisory support stimulates proactivity and it is one important determinant to proactive behaviour and innovative work according to West et al. (2004).

In many types of work the employees can go beyond what is prescribed, and contribute to the development of improved work and strategies. From the viewpoint of action regulation theory this is described as innovative style of action (Hacker, 2003). Innovative acting aims for improvement of procedures, working conditions and results (Hacker, 2003), and Hacker uses a wide definition of innovation, i.e. in the sense of referring to processes and not only to the product or service. It is meaningful to distinguish between work processes that contribute to successful innovations and the innovation itself. Otherwise the concept of innovation can be used for any change and changes that are too low in magnitude, radicalness and novelty (West et al., 2004) to be regarded as innovations.

Self-organization refers to a general competence in self-starting and proactively organizing and carrying out work activities, the results of which cannot be predicted due to uncertainty and complexity in the prerequisites, the situation or in the surrounding system (North et al., 2006). By self-organizational activities is meant the overt behavior, i.e. the result of general competence in self-starting and proactively organizing and carrying out work activities. Such activities presuppose a redefinition process of work through collective reflexivity and a motivational force to take initiative to implement meaningful change. It involves proactively creating conditions and organizing work, handling and mastering unexpected situations, problems or new tasks. It is clearly related to innovative work in Hacker’s sense (Hacker, 2003) but differs from innovation in one important aspect as mentioned initially: the goal for innovation is to create a new product/service and the goal for self-organizational activities is to be able to handle the change itself (i.e. to develop the competence to be part of innovation processes). Self-organization (from a competence perspective) is regarded as a competence that might result in innovation, but differs from innovation as the two concepts are regulated by different goals (North et al., 2006).
MAJOR AIM

General aim
There is a widespread belief among both researchers and practitioners that group work can be one way to increase organizational effectiveness, productivity and innovation. The aim for this thesis was to study determinants for group work that result in the groups taking a proactive approach to work and going beyond what is expected by management. More specifically the importance of job design, perceived leader support, and group process, and their impact on the outcomes, group initiative and self-organization, in order to enhance development in natural (existing) work groups in industry. On the basis of a psychological perspective, this illumination of work dimensions might be beneficial for promoting insight on healthy workplaces where people are able to develop and learn. The overall aim was divided into separate empirical studies with specific research questions and hypotheses for each respective study.

Research questions
This thesis is based on data from three empirical studies that address the issues referred to above. Here the aims are presented in a concise form, and the specific aims of each study will be given in the presentation of that study.

Study I set out to examine the importance of job design and habitual routines (work routines and social routines) for reflexivity and learning processes (meta-routines) in work groups. The dimensions of job design were the organizational prerequisites for sequential completeness, demand on cooperation, demand on responsibility, cognitive demand, and learning opportunities.

In the next empirical study (Study II) the job design dimensions, organizational prerequisites for sequential completeness, demand on cooperation, cognitive demand, and learning opportunities were investigated in relation to reflexivity, with group initiative and self-organizational activities as output variables. The group processes cooperation and social support were also entered in that specific research model for investigation of their impact on reflexivity and group initiative.

In the third study (Study III) the individual group members’ assessments of support from leader, perceived autonomy and potency and how they contributed to group initiative were examined. Whether the dimensions of leadership,
perceived autonomy and potency changed over time in these natural industrial work groups was also studied in Study III.

**METHODOLOGY**

**Participants**
The studies were conducted in four similar organizations to be comparable in determinants for group work. The organizations were chosen from the criteria that the production, production technology, and production planning had to be similar, as well as the fact that all companies had existing work groups on the shop floor. The companies were in the domain of manufacturing with assembly and production as work tasks. The selection criteria also included that the participating work groups had worked together for at least a year and had the same work task instructions. After working together a year the group supposedly has reached the stage of performing the work tasks competently, and has passed the early stages of group formation with those particular related processes. The worker also has to be experienced in performing the work tasks before it is even possible to scrutinize habitual routines, etc. The work tasks and outcomes varied between the groups, but all groups had to carry out specific and previously stipulated tasks with defined outcomes (e.g. assembly fitting pre-manufactured parts to a final product). Most of the groups had assembly or production as their main work task, although some groups had different work tasks, e.g. maintenance or quality control. Production planning had to be close to and in cooperation with employees on the shop floor. Similar organizational support was given in the form of opportunities for training and competence development.

The groups had to be at least semi-autonomous, since collective reflection, group initiative and self-organizational activities presuppose a certain degree of autonomy (West et al., 2004). The range restriction in autonomy could be a problem if the relations between job design, and group initiative, and self-organization differed in the lower compared to the upper range. In previous research on the relations between autonomy, complexity, and personal initiative (Frese et al., 2007) the relations in the lower and upper range of autonomy were in the same direction. This was taken as assurance that the range restriction was not problematic. The groups had autonomy in choosing the means, but not the goals, and the range covered a span of autonomy.
All groups had regular meetings at least once a week with opportunities for spontaneous discussion of issues chosen by the group members. The group members could decide what work routines would be the most effective, and were allowed to organize the group’s daily work. The work groups practiced work task rotation, and different responsibilities (such as work group leadership) were rotated between group members. All group members worked day time/day shifts and had the same principal work task.

The study group comprised 40 groups (out of a total of 43) at the first data collection (T1) for Study I. The overall participation rate was 90 percent. There had to be a minimum of three respondents in each group for the work group to be included in the analysis. By the time of the second data collection (T2), 12-18 months later than T1, one of the companies had reorganized their groups. The other three companies had kept their groups intact, with rare exceptions where only a few employees had changed groups. The drop-out between T1 and T2 was due to changes in the work force because of sick-leave, education, turnover or retirement. 239 employees answered the questionnaire at T2, but 77 of these individuals were excluded due to not reaching the inclusion criteria (due to recent employments or the fact that fewer than three group members participated). Study III comprised the participants attending both data collections. The third study included 20 more participants than Study II, which was explained by the fact that employees did not have to be connected to the group level for analyses (as in Study I and Study II). See Table 1 for background information.
Table 1
Background information

<table>
<thead>
<tr>
<th></th>
<th>Study I T1 (n=297)</th>
<th>Study II T2 (n=162)</th>
<th>Study III T1 &amp; T2 (n=182)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 25 years</td>
<td>3 %</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>25-49 years</td>
<td>73 %</td>
<td>74%</td>
<td>72%</td>
</tr>
<tr>
<td>≥ 50 years</td>
<td>24 %</td>
<td>24%</td>
<td>26%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>20 %</td>
<td>17 %</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (≤ 9 years)</td>
<td>39 %</td>
<td>40%</td>
<td>42%</td>
</tr>
<tr>
<td>Middle (=10-12 years)</td>
<td>54 %</td>
<td>52%</td>
<td>50%</td>
</tr>
<tr>
<td>High (≥ 12 years)</td>
<td>7 %</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Company tenure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2 years</td>
<td>32 %</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>2-10 years</td>
<td>34 %</td>
<td>31%</td>
<td>30%</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>34%</td>
<td>41%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Groups</strong></td>
<td>40</td>
<td>31</td>
<td>-</td>
</tr>
<tr>
<td><strong>Mean group size</strong></td>
<td>7</td>
<td>5</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: *Participation at both data collections. **Age ranged from 20 – 65 years.

Measures
In the present thesis several measures were used in the included three studies. Some of the measures were used in two studies, whereas others were used in one study only (see Table 2). Below follows a presentation of all measures.
Table 2
Variables in the empirical studies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study 1</th>
<th>Study 2</th>
<th>Study 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Design</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Reflexivity and Learning Processes / Reflexivity</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Work routines / Cooperation</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Social Routines / Social support</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Group Initiative</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Self-Organizational Activities</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Perceived Autonomy</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Support from Leader</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Potency</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Work task analysis

The observational instrument REBA is based on action regulation theory and comprises five dimensions of job design (Richter et al., 1999) that together meet the definition of a complete job. Sequential and hierarchical completeness are used to capture a complete job, and indirectly affect the demand on cooperation, responsibility and learning. To capture these latter aspects directly, the REBA-instrument include five dimensions: the organizational prerequisites for sequential completeness, demand on cooperation, demand on responsibility, cognitive demand (hierarchical completeness), and learning opportunities in 22 variables (see Table 3).
Table 3
REBA items and scales

<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational prerequisites for sequential completeness</strong></td>
<td></td>
</tr>
<tr>
<td>1. Number of different subtasks</td>
<td>1-4</td>
</tr>
<tr>
<td>2. Sequential completeness in overall task</td>
<td>1-4</td>
</tr>
<tr>
<td>3. Organizing functions</td>
<td>1-5</td>
</tr>
<tr>
<td>4. Cycle length</td>
<td>1-7</td>
</tr>
<tr>
<td>5. Information about organization</td>
<td>1-3</td>
</tr>
<tr>
<td>6. Information about results</td>
<td>1-3</td>
</tr>
<tr>
<td>7. Feedback</td>
<td>1-5</td>
</tr>
<tr>
<td>8. Predictability</td>
<td>1-4</td>
</tr>
<tr>
<td>9. Temporal degrees of freedom</td>
<td>1-5</td>
</tr>
<tr>
<td>10. Procedural degrees of freedom</td>
<td>1-6</td>
</tr>
<tr>
<td>11. Decision demands</td>
<td>1-5</td>
</tr>
<tr>
<td>12. Variety of movements</td>
<td>1-4</td>
</tr>
<tr>
<td>13. Conflict quality/quantity</td>
<td>1-3</td>
</tr>
<tr>
<td><strong>Demand on cooperation</strong></td>
<td></td>
</tr>
<tr>
<td>14. Amount of cooperation</td>
<td>1-5</td>
</tr>
<tr>
<td>15. Forms of cooperation</td>
<td>1-9</td>
</tr>
<tr>
<td>16. Contents of communication</td>
<td>1-6</td>
</tr>
<tr>
<td><strong>Demand on responsibility</strong></td>
<td></td>
</tr>
<tr>
<td>17. Content of responsibility</td>
<td>1-5</td>
</tr>
<tr>
<td>18. Group responsibility</td>
<td>1-4</td>
</tr>
<tr>
<td><strong>Cognitive demand</strong></td>
<td></td>
</tr>
<tr>
<td>19. Degree of participation in operational planning</td>
<td>1-7</td>
</tr>
<tr>
<td>20. Level of mental demands</td>
<td>1-9</td>
</tr>
<tr>
<td><strong>Learning opportunities</strong></td>
<td></td>
</tr>
<tr>
<td>21. Use of qualifications</td>
<td>1-5</td>
</tr>
<tr>
<td>22. Learning potential</td>
<td>1-4</td>
</tr>
</tbody>
</table>

The dimension *organizational prerequisites for sequential completeness* is measured in a number of different subtasks, sequential completeness, organizing functions, cycle length, information about organization and results, feedback, predictability, temporal and procedural degrees of freedom, decision demands, variety of work task and conflict quality/quantity. As an example from this dimension, item 11 from table above 2 above, decision demand (possible or required decision-making), describes the impact of the decisions on the achievement of the assignment from (1) = no decision possible, to (5) = decisions
are required; the alternatives differ from each other with regard to their effectiveness and the consequences are not obvious but require deductions and calculations.

Demand on cooperation consists of evaluation of amount, forms and contents of cooperation. Item 15, forms of cooperation, describes types of required cooperation/communication from (1) = isolated individual work without cooperation or communication, to (9) = self-organized group work with regard to the schedule, methods of work, division of work, and an agreement on the task and the goals.

Demand on responsibility includes content of responsibility as well as group responsibility. Group responsibility, item 18, describes joint responsibility for performance outcome from (1) = the responsibility for performance is solely individually based, to (4) = the attribution of responsibilities takes place through a collective appraisal of the individual contributions to the group’s performance; the group as a whole is completely responsible for the result.

Cognitive demand describes to what extent the tasks demand cognitive activities and captures hierarchical completeness. Item 20, level of mental demands (required cognitive performance), as an example, is assessed from (1) = task requires only sensory motor regulation, to (9) = creative thinking process.

Finally learning opportunities considers use of qualifications and learning potential in performing the work tasks. Learning potential, item 22, refers to frequency and content of job-related learning demands from (1) = after acquiring the expected qualification, there are no permanent learning demands, to (4) = the activity requires a continuous enhancement of abilities and skills. For further information of the content of items in REBA, see Study I. In Study I all of the five dimensions were used in the analyses, while in Study II, REBA was treated as one measurement, as the dimensions were highly inter-correlated.

Questionnaires
The questionnaires included items for two input variables, perceived autonomy and support from leader, and all the group processes and outcome measures. All responses for the items in the questionnaires were given on a seven-point Likert-type scale, ranging from 1 = do not agree at all to 7 = agree entirely. All items in the questionnaires are presented in Appendix.

Perceived autonomy. Two different measures of autonomy were used in the empirical studies. First, autonomy was included in the observations as a job
design dimension, in the organizational prerequisites for sequential completeness, (see the description of the REBA instrument above). Secondly, the employees’ individual perception of autonomy was measured in Study III. The measure perceived autonomy was implemented from the empirical studies of Campion et al. (1993) and consisted of the mean value of the employee assessments of three items.

**Support from leader.** Support from leader was measured for Study III and included items of emotional, informative, realistic and instrumental support. The eight items in this measure were implemented from Lantz and Laflamme (1996) and slightly modified for individual assessment of leader support to the group. Examples from each of the four support dimensions were included. The measure consisted of the mean value of the employee assessments of the eight items.

**Work routines and cooperation.** In Study I the measure work routines consisted of the mean value of twelve items, implemented from previous studies (Campion et al., 1993; Lantz & Laflamme, 1996; Matsson, 2001). All items were formulated as assessments of group functioning. For Study II these items were reduced to six for the measure cooperation, all of which were included in the work routine measure. The reduction was a result of confirmatory factor analysis. The measure cooperation consisted of the mean value of the employee assessments of the six items. See Study I and Study II respectively for the origin of each item.

**Social routines and social support.** In Study I social routines was measured by the mean of eight items, which in Study II were reduced with three to five items for the measure social support. The reduction was a result of confirmatory factor analysis. The items were developed and tested earlier by Campion et al. (1993), Edmondson (1999) or Lantz and Laflamme (1996). The measure social routines consisted of the mean value of the employee assessments of the five items. See Study I and Study II respectively for the origin of each item.

** Reflexivity and learning processes.** The measure of reflexivity and learning processes was also based on previous research (Edmondson, 1999; Matsson, 2001). This measure used in Study I comprised the mean value of eight items which was refined to four items as a result of confirmatory factor analysis capturing solely reflexivity for Study II. The measure used in Study II, reflexivity, consisted of the mean value of the employee assessments of the four items. See Study I and Study II respectively for origin of each item.
Potency. This measure of three items was used by Campion et al., 1993. The statements were for the employees to assess if they believed in the group’s capacity and if they thought their group could take on nearly any task and complete it. The generalized statements regarding confidence, team spirit and the belief that the group could take on nearly any task and complete it, are what differentiate this concept from the definition of the similar concept collective efficacy (where the focus is on the belief of competence related to specific tasks). The measure consisted of the mean value of the employee assessments of the three items.

Group initiative. Group initiative was defined as a group’s proactive approach to work linked to work activities that go beyond the stipulated work in order to achieve meaningful change. The measure group initiative consisted of the mean value of the employee assessments of six items, and was measured by questionnaires. The concepts of e.g. personal initiative, role-breadth self-efficacy and other related concepts (see above) are theoretically and empirically similar or partly overlapping and most of them are also measured by survey methods (Lantz, 2008; Rousseau et al., 2006). The concept of group initiative was transformed from individual to group level in accordance with the concept of personal initiative (Fay & Frese, 2001).

Self-organizational activities. Self-organization, as defined above, refers to a general competence in self-starting and proactively organizing and carrying out work activities, the results of which cannot be predicted due to uncertainty and complexity in the prerequisites, the situation or in the surrounding system. For measuring self-organizational activities, (i.e. proactively creating conditions and organizing work so that the groups can handle and master new and unexpected situations) the items had to be constructed for Study II. These items referred to actual activities that have been successful in initiating and developing new work tasks and routines, doing more than what is expected and prescribed by management. The measure consisted of the mean value of the employee assessments of four items.

Procedure
The work structure and workflow of each work task performed in the groups were studied. The instructions in REBA described a three-step methodology; preparation, realisation, and analysing stage. The realisation stage consisted of analysis of the conditions followed by the actual observations. Background
information such as technical documents, descriptions, and interviews with leaders of what tasks to be accomplished and in what order, were gathered before the observations. Data on work characteristics were based on observations of every group with employees carrying out each specific task. Complementary interview questions during observations were necessary when direct observations were not sufficient to assess the specific item, e.g. work task conflict (item 13 in Table 2). The scale for work task conflict refers to the potential for conflicts between work task demands (e.g. quality, quantity). All observations and eventual complementary interview questions were performed by the researcher/researchers. To attain observer reliability an independent observer was engaged in several observations and analyses. The second observer participated at one of the four companies. The initial inter-rater agreement was 91 percent. When discrepancies were found these tasks were discussed with a more experienced researcher followed by new assessments to reach absolute agreement. Before the observations started a guide handbook for REBA task analysis was studied. Training procedures supervised by the more experienced researcher, who had previously been working with the instrument, were conducted.

Each task performed in the group was assessed according to respective scales in REBA. Some tasks are evaluated with regard to the overall task, and others are evaluated per each respective subtask. The observation of e.g. procedural degrees of freedom (to what extent the employee modified the procedures to achieve the task according to the demands) was assessed from the lowest demand (of no procedural degrees of freedom except the decision between adopting or refusing the assignment) to the highest demand, implicating degrees of freedom with respect to sequence of sub-activities, methods, tools, features or the result, and for independent finding of tasks. After assessment of all tasks the group’s work received a profile for their job as a whole, based on the mean value of the standardized scales for all items. See Table 3 for a complete list of items and scales in REBA. For a description of content of each scale see Appendix A in Study I.

Each work task in the group performed by one of the employees was observed. Depending on how many tasks the groups had, time for observations differed. In one of the larger organizations two or three work groups had the same main work tasks. This organizational solution to handle group size resulted in shorter time spent in the following groups compared to the observation of the first group with
the same main work tasks. Time duration for the observations varied between one full work day observing the tasks performed in one group, to approximately two or three hours observing work in the other groups with the same work tasks. When work tasks were performed and the observer did not understand what or why (neither of the observers were technical experts) interview questions were asked.

Whenever possible the observations were planned and situated in connection to occasions for the supplementary data collection by questionnaires for each of the four organizations. All four organizations made premises available for the employees to respond to the questionnaires on company time. Participation was voluntary and each individual employee answered the items individually, but all members in the same group, if possible, attended on the same occasion. In case of absence at the planned meeting, the employee had several possibilities to attend at other data collection times together with members from other work groups than their own. Follow up-meetings were also arranged to offer opportunities to all employees in the groups to participate. The researcher participated on all occasions, gave introductory information, sat in the room during the meetings, and collected the surveys after all respondents had finished the questionnaires. Only the researcher had access to the surveys at any time during the research process and employees were assured confidentiality.

All participants received a letter describing the study and ethical aspects. Further information was given when the questionnaires were administered, as well as at the occasions for observations. All participants were also invited to group meetings where the results from each company were presented by the researcher. Each company received a written report with results for their own groups and whole organization, in comparison with the total result for all the organizations.

**Analyses**

The observations in the work task analysis were evaluated for all five dimensions in the first empirical study, Study I. The different work tasks within each job were weighted according to the time it took to carry out that specific work task in relation to the total work time. Each job received an overall profile of the 22 variables, based on the weighted work task profile. The scales were standardized, and each job received a mean value for the respective dimension, and an overall mean value. The results were based on the mean values of the jobs carried out in
each work group, i.e. all employees in one work group had the same score on the job design measure. All values of internal consistency, means, standard deviations, correlations, etc., for the items and dimensions in REBA were reported in Study I. The internal consistency (Cronbach’s alpha’s) for demand on responsibility and learning opportunities were not quite satisfactory, but the total REBA measure reached .90.

Study II comprised four dimensions of job design from REBA: the organizational prerequisites for sequential completeness, demand on cooperation, cognitive demand and learning opportunities. Demand on responsibility was excluded as that dimension was not relevant for reflexivity and learning processes in Study I and in Study II reflexivity was hypothesized to mediate the relations between job design and self-organizational activities. Work group, and mean REBA-values for the jobs performed in each group are presented in Study II, as well as alpha values and correlations.

In Study I and Study II the measures in the questionnaires were based on mean values of the group members’ responses. To verify if group members agreed to a substantial extent on the measures that were aggregated (in Study I and Study II), several indicators of within group consensus were examined; the $r_{wg(j)}$-index of within-group agreement (James, Demaree, & Wolf, 1984, 1993), the intra-class correlation coefficients ICC1 (Bliese, 2000) and ICC2 (Bliese, 2000). All scales had sufficient (above .70) consistency (see Bliese, 2000; Richter et al., 2005) to be analyzed at group level. The intra-class coefficients ICC1 and ICC2 were computed by one-way ANOVAS (Bliese, 2000). ICC1 showed significant F-ratios over 1, and significant F-ratios had previously been used to justify aggregation. ICC2 were sufficient for the measure self-organizational activities. The $r_{wg(j)}$-values for the measures varied between .76 and .91 and indicated substantial agreement among group members. Cronbach’s alpha values, means and standard deviations for all measures used in each study, are reported in the respective studies. In Study III the measures were not aggregated to be analysed at group level.

Analyses of correlations, T-tests, and regressions were conducted in SPSS (Norušis, 2006)) for the empirical studies. Confirmatory factor analyses were performed in AMOS (Arbuckle, 2005). Structural equation modeling (SEM) was conducted in LISREL (Jöreskog & Sörbom, 1993) and AMOS. The hypothesized model for Study I was tested using LISREL 8.3, employing maximum likelihood estimation on the covariance matrix, and showed a very good fit to the data. Root
Mean Square Error of Approximation (RMSEA) $\leq .05$ indicates good fit (Parker, 2003; Shumacker & Lomax, 2004), and for Comparative Fit Index (CFI) $\geq .90$ (Medsker, Williams & Holahan, 1994) is considered indicative of good fit. In Study II the hypothesized path model was tested using AMOS 6, employing maximum likelihood estimation on the covariance matrix, and total model fit showed RMSEA = .04 and CFI = 1.0.

In Study III, CFA in AMOS, employing maximum likelihood estimation, were estimated for T1 and T2. Correlation coefficients were calculated by Pearson’s formula, a paired sample T-test, and hierarchical regression analyses were also performed, using SPSS. Group size and group stability were controlled for in the first steps of the regression analyses. Group status was divided in two parts, depending on whether the individual employee worked in a group that had been changed, or whether their group was stable (the same) from the first data collection. Age and tenure had no significant relations with the main variables and was not included as control variables in any further analyses. In the previous empirical studies the analyses were based on group mean values and to extend these investigations the individual level was chosen for analyses in this study. For more information and further details regarding analyses see each study respectively.

**EMPIRICAL STUDIES**

**Study I**
The aim of this study was to contribute to group research by testing a theoretical model of relations between job design on the one hand, and reflexivity and learning processes on the other hand. The hypotheses anticipated that the five job design dimensions: (organizational prerequisites for sequential completeness, demand on cooperation, demand on responsibility, cognitive demand and learning opportunities (see description above)) would be positively related to reflexivity and learning processes. Work routines and social routines were also anticipated to be positively related to reflexivity and learning processes.
Most of the results were in line with expectations. Job design (organizational prerequisites of sequential completeness, demand on cooperation, cognitive demand and learning opportunities), i.e. four of the five studied dimensions of job design significantly impacted on reflexivity and learning processes. Job design (in 14 out of the 22 REBA items, as well as the four dimensions and the total REBA measure), and work routines showed strong positive effects on reflexivity and learning processes.

Job design also correlated with social routines, but not with work routines. Another finding was that social routines showed significant correlation with work routines. The correlation analysis showed the largest correlation coefficient for the relation between the observed dimension learning opportunities and the questionnaire measure reflexivity and learning processes ($r = .50, \ p = \leq 0.01$). The correlations between organizational prerequisites of sequential completeness, demand on cooperation and cognitive demand to reflexivity and learning processes were almost equal in magnitude ($r = .45, .44, .43$ respectively, $p = \leq 0.01$). The job design dimension demand on responsibility was not related to reflexivity and learning processes, but was however correlated with social routines. There was no significant relation found between group composition in terms of work experience, or company tenure, and reflexivity and learning.
processes. The hypothesized model was tested using LISREL 8.30 (Jöreskog & Sörbom, 1993) and showed a very good fit to the data.

**Study II**

The aim of this study was to extend previous research on job design (with the dimensions organizational prerequisites for sequential completeness, demand on cooperation, cognitive demand, and demand on learning), and its relations to group processes and outcomes as group initiative and self-organizational activities. A model in the form of input-process-output was tested for the relationships where group processes mediate the relation between dimensions of job design and group initiative and self-organizational activities.

![Theoretical model Study II](image)

**Figure 3 Theoretical model Study II**

The hypotheses were:

- Job design, cooperation and social support will be positively associated with reflexivity.
- Cooperation, social support and reflexivity will be positively associated with group initiative.
- Reflexivity and group initiative will be positively associated with self-organizational activities.
Figure 4. Result indicated as supported hypotheses in Study II.

The correlation analysis showed that the four dimensions of job design, as well as the whole index, were related to reflexivity and self-organizational activities. The hypothesized path model was tested using AMOS 6 (Arbuckle, 2005) and the model fit was evaluated. The final model was obtained by omitting the insignificant path between cooperation and reflexivity and rerunning the model. The final model provided substantial, but not complete, support for the theoretical model. The different thickness of arrows in Figure 4 above indicates different significant levels. The strongest relation is pictured with the thickest arrow. Job design was significantly positively related with reflexivity. Cooperation, social support was positively related to group initiative, and reflexivity was positively associated with self-organizational activities. There were also tendencies (pictured as dotted lines); social support was related to reflexivity ($p = .06$) and group initiative to self-organizational activities ($p = .09$). Reflexivity displayed the largest effect on self-organizational activities, and the effects of job design, social support and group initiative for self-organizational activities were equal in magnitude.

**Study III**

In this study the importance of support from leader, along with perceived autonomy and potency, were measured on two different occasions, T1 and T2.
The impact of support from leader, perceived autonomy and potency on group initiative was examined. Background variables were group size and group status.

The research question was: How do perceived autonomy and potency, compared to support from leader, contribute to group initiative-taking? It was also examined if the dimensions of leader support, perceived autonomy and potency had changed between the two data collections.

Results from Study III were interpreted from the correlation analysis, paired sample T-test, and hierarchical regression analyses that were conducted in SPSS. For the items in support from leader, perceived autonomy and potency confirmatory factor analyses in AMOS (Arbuckle, 2005) were conducted for T1 and T2 measures. The main finding showed that potency was the best predictor of group initiative out of the dimensions examined. Support from leader and perceived autonomy also made significant contributions to explain the variance in group initiative, although they did not reach the level and magnitude that potency itself explained. Group size was negatively related to both perceived autonomy and potency. There were no significant relations between group initiative and the background variables (group size and group stability). 50 percent of the groups that the participating employees belonged to were changed or reorganized between data collections. Group initiative was positively related to support from leader and potency at both times, and had also a positive relation to perceived autonomy at T2. Potency and perceived autonomy had not changed significantly, as support from leader, when comparing the two data collections. Support from leader was significantly lower at T2 than at T1.

DISCUSSION

Main findings

From the perspective of the enterprise, the issue of which organizational solutions will benefit productivity, efficiency and the innovation process is central. There is substantial evidence that work groups can be an effective means (West et al., 2004). From a psychological viewpoint, interest is directed towards work conditions, since they not only provide more or less beneficial prerequisites for workers’ present life circumstances – they also influence their future development potential to a considerable degree (Kohn & Schooler, 1982). From the perspective of job design and in a work group context, it becomes essential to investigate further how work conditions impact on the group’s redefining
stipulated tasks to include taking initiative to implement meaningful change. Further, to identify those group processes that enhance the group’s going beyond the stipulated tasks. The overall aim of the thesis was to investigate determinants for group work that result in the group’s taking a proactive approach to work and going beyond what is explicitly formulated and expected by management. It is advocated that proactivity and self-organizational activities are essential for ongoing change and developmental activities and for innovation, and has an inherent potential for learning and the possibility to make use of one’s resources.

The empirical studies elucidated how job design, perceived leader support and group processes impact on group outcomes, in the form of group initiative and self-organizational activities. In Study I a model was proposed that hypothesized that job design, work routines and social routines would be positively related to reflexivity and learning processes. Most of the results in Study I were in line with expectations, and are also supported by previous research. Work task complexity, skill variety and challenge, autonomy, interdependence and intra-team coordination are examples of other dimensions previously studied in relation to group processes and performance outputs (Kozlowski & Bell, 2003; Stewart, 2006; West et al., 2004). A number of these dimensions (differently labeled) are included in the three REBA dimensions organizational prerequisites of sequential completeness, cognitive demand and demand on cooperation. The main results from Study I showed that job design and work routines showed strong effects on reflexivity and learning processes. That there was no significant relation found between group composition and reflexivity and learning processes might be interpreted as support for the hypothesis that job design (work tasks) affects reflexivity and learning. The importance of and mediating role of reflexivity on work prerequisites for outcomes are documented in extensive research (Daudelin Woods, 1996; Morrison et al., 2005; Schippers et al., 2003; Tjosvold et al., 2004; West et al. 2004).

This model was extended in Study II to include group initiative and self-organizational activities as outcomes in the theoretical model. Due to result stemming from the first study the REBA dimension demand on responsibility was excluded in Study II (demand on responsibility was not related to reflexivity and learning processes), as reflexivity was hypothesized to mediate the relation between job design and self-organizational activities. The assumption was that designing effective and humane work characterized by hierarchical and sequential completeness, cooperation, social support and reflexivity would affect
both the stipulated work and whether the group expanded its role to go beyond the formal requirement. The main results were that job design was significantly positively related with reflexivity and that reflexivity was positively associated with self-organizational activities. These results can be related to previous research (see e.g. Antoni, 2004; West et al., 2004) and to van Mierlo et al (2007) who propose that increased autonomy at the group level incites curiosity and encourages group members to adapt to active attitudes and keep up with developments.

The assumption that cooperation would directly impact on reflexivity, was not supported. The latter is not in line with previous research (Lantz & Brav, 2007; Tjosvold, et al, 2004; West et al., 2004). Cooperation and social support impact on group initiative, which is in line with previous research on personal initiative (Frese et al., 2007). A generally positive climate and good cooperation impact on reflexivity, innovative work and innovation shown by Antoni (2004) and West et al. (2004). Our measure of cooperation does not include items on how task-related conflicts are dealt with, which might have affected the results (de Dreu & West, 2001).

To explore the importance of leadership support and potency longitudinally for group initiative in Study III, two data collections were included. Kozlowski and Bell (2003) explicitly recommended researchers to address the implications of time in group research when designing research, for example the effects of leadership, as many group phenomena are established early and unfold quickly. The main finding showed that potency was the best predictor of group initiative in comparison with support from leader and perceived autonomy. Significant contributions to explain the variance in group initiative also came from support from leader and perceived autonomy. Potency is generated in the respective group and may be reinforced by the organizational context and other groups, inside or outside the company. When the employees have confidence in their own group capacity this will probably enhance both performance and wellbeing. The interpretation of the result that group stability was not related to group initiative was that it did not seem to matter that 50 percent of the participants were members in groups that had been changed or reorganized between the two data collections. A possible explanation for the finding that support from leader was significantly lower at T2 than at T1, could be that when groups work together for a long time they may become more autonomous and need less support from the organization and their leaders. The cautionary remark by van
Mierlo et al. (2006) that group members in highly autonomous groups may also feel restricted by high levels of leader support rather than encouraged is also worth considering, although the groups in these empirical studies can hardly be described as highly autonomous. Group work in general seems to decrease employees’ need for support (Griffin, Patterson & West, 2001).

Previous research has suggested that group coaching may be overrated (Spreitzer, Cohen & Ledford, 1999). But there are other researchers who argue that even a small increase in effectiveness or group learning related to support from leader can be meaningful (Burke et al., 2006). Hackman and Wageman (2007) claim, that leader’s actions and behaviour may be the difference between failure and success, although they reject the phenomenon of regarding the leader as the main cause of collective performance. If leaders were to provide space and a climate that support reflexivity and learning, this would probably also enhance both performance and wellbeing.

To summarize, job design strongly impacts on reflexivity, and reflexivity directly impacts on self-organizational activities in the empirical studies in this thesis. Support from leader, reflexivity, and potency as well as cooperation and social support are also important for the outcomes of work groups if the organization want the group to make it possible for employees to take initiative, and to go beyond the stipulated tasks in order to implement meaningful change. Dimensions of job design (organizational prerequisites of sequential completeness, demand on cooperation, cognitive demand, and learning opportunities) show that they in combination with support from the leader, mediated by group processes, lead to outcomes such as group initiative and/or self-organizational activities. The outcomes group initiative and self-organizational activities expand the picture of the effects of group work to include aspects other than the more commonly studied outcomes as e.g. effectiveness, productivity and job satisfaction. The difference between more commonly studied outcomes and the outcomes in the thesis is the focus on the competence to handle and master uncertainty, unexpected situations and proactively create conditions that may lead to increase effectiveness or productivity. Our theoretical model presupposed that a complete work (in the meaning of action regulation theory) will stimulate reflexivity, and that reflexivity is necessary for the development of group initiative and self-organizational activities. Thereby supposedly the normally studied outcomes such as productivity and effectiveness will be enhanced as well.
Strengths and limitations

In contrast to a vast amount of experimental group studies in psychology, conducted with students as participants, I have studied existing work groups performing their work tasks in industrial work places. This has the advantage of giving a picture of a “real world” situation, and the studies can be said to have ecological validity. The study of existing work groups entails the obvious circumstance that groups cannot be composed, or even influenced to be the ultimate or most adequate for the purpose of the study. The initial rationale when composing the groups in the respective organizations was not fully known.

To the strengths of the study can be added the extensive data by work task analysis through observations. The observations of the work in 22 aspects in the job design measure contribute with an external assessment of the actual demands and opportunities which are inherent in the work tasks. Compared to the predominantly used measures of job design variables of self-reported data, observations based on the comprehensive action regulation theory made by trained researchers might be more adequate than subjective assessments. To observe and assess work tasks demands knowledge in the domain of work and organizational psychology, and action regulation theory as well as general knowledge in psychology and research methods. Task analysis by experts is regarded as a more valid tool than to solely depend on subjective measurements as it is advantageous to have the theoretical and methodological knowledge mentioned above, when assessing work tasks. To rely only on survey methods has been criticized due to spurious co-variation among responses (Morgeson & Campion, 2003) or social desirableness. Some job design variables cannot be captured with interviews or questionnaires, as the respondent might not be able to grasp e.g. the completeness, or cognitive demands inherent in the work tasks, although interviews and questionnaires are the predominant methods used for group studies (Frese & Zapf, 1994; Hacker, 2001, 2003; Richter et al., 1999; Ulich & Weber, 1996; Volpert et al., 1983). Frese et al. (2007) regret that they did not have objective measures of control and complexity in their study of work characteristics and personal initiative.

The REBA dimension organizational prerequisites of sequential completeness is not synonymous with the measure of autonomy. This completeness dimension includes aspects that form the core of autonomy, but is extended to include even more aspects. Hierarchical (in the REBA dimension cognitive demand) and
sequential completeness (organizational prerequisites of sequential completeness) is a more differentiated way to study autonomy than the measure usually used in research. Complexity and autonomy are usually most studied as subjective measures, and complexity is not usually studied as a cognitive demand (Kozlowski & Bell, 2003; Stewart, 2006; West et al, 2004). Complexity is illustrated in the varied cognitive demands the work tasks may put on the employees. When work is complete, in terms of sequential and hierarchical completeness, it can incorporate developmental, innovative work, learning opportunities, and learning processes. Frese et al. (2007) argue that in work complexity and control (having influence) often are combined into one factor.

All research methods are naturally afflicted with measurement errors. Structural equation modelling techniques explicitly take measurement error into account when statistically analyzing data (Schumacker & Lomax, 2004) and SEM was chosen for testing the theoretical models in Study I and II. Sample size was sufficient regarding the individual participants, but the small number of observations (i.e. groups) has had an impact on the results. A use of mean values aggregated to group level, restricts the variance. Sample sizes in Study I (40 groups) and Study II (31 groups) are obviously a limitation as having only a few groups affects the reliability of the path analysis as well as the possibility to draw general conclusions.

Our measures in the questionnaires might be further developed and extended with more items. Some of the measures used in the studies try to capture complex dimensions with a small number of items. Priming might also inflect the assessments of variables e.g. between self-reported perceived autonomy, cooperation and learning. The scale for self-organizational activities was used for the first time in Study II therefore there is no previous data on reliability for this measure.

The participants in these studies consisted exclusively of groups in industry, where the majority of the respondents were men. Results should therefore not automatically be generalized to other organizational settings. Lantz (2008) has tested the theoretical model in Study II (Figure 3) in a second industrial setting, a large secondary school, in homes for elderly with psychiatric or dementia diagnosis, and in a nuclear plant. The model seems to be applicable in settings where it is desirable for there to be group initiative and self-organizational activities. The model is however meaningless in settings or circumstances where neither initiative nor self-organization is wanted, as in the nuclear plant. Initiative
is beneficial for employees in jobs where innovative behaviour is appreciated (Frese et al., 2007).

The large gender imbalance did not encourage analyzing eventual gender differences in the studies. A comparative study (Lantz, 2008) using the theoretical model, indicates that gender does not impact on results. The model still needs further testing, but the results of Lantz’s study suggest that the model may be generalized to settings other than solely industrial work, where men are employed to a larger degree than women.

The findings in the empirical studies are possibly to some extent of such universal character that similar processes and results could be generalized to other industrial work groups, or to work groups in general. When any work group has organizational prerequisites of sequential completeness, demand on cooperation, cognitive demand, and learning opportunities built into their work, this will probably enhance group processes as well as outcomes, and thereby contribute to productivity, satisfaction and wellbeing.

**Practical and theoretical implications**

Managers and decision-makers should be aware of the importance of job design for reaching intended goals as early as during the planning processes. The results from the studies suggest that management should consider supporting group initiative and self-organizational activities if it is to result in groups going beyond the stipulated work. This involves all functions in planning processes and production technique. As mentioned earlier, in most companies managers are responsible for the work related decisions that will restrict against or open up for such activities. Organizations need to balance eventual short-term and long-term conflict goals, and conflicts between demand on productivity and change- and developmental activities. If organizations allow the groups to participate in contributing to create new conditions and prerequisites, and support the groups in managing the uncertainty of not knowing what the future might bring about, the groups may take initiative and engage in self-organizational activities. This competence is necessary for the innovation process, but perhaps not in the meaning that the groups necessarily are supposed to generate the innovational ideas. Rather such employee and group competences are necessary in order to implement the eventual innovations or development in a cost-effective way. If work is designed like this it will be beneficial for the organization, the group and the individual employee as it includes opportunities for learning and handling the
constant changes in contemporary working life. The use of work task analysis (such as REBA) is to our knowledge not widespread in Sweden, which may depend on the requested time spent on observations, or the demand on theoretical knowledge required for the observations. Most of the research is also published in German which might contribute to its limited use.

Many companies have based their organizations on group work, as group work commonly has been regarded as a base for development and learning processes as well as for productivity and good work environment. It is supported by previous research that if groups are to participate in development and innovation processes, they will need support in order to fulfill these overall goals (Hacker, 2003). Work task analyses can be a useful tool in the planning process to ensure that the job design provides the work groups with the prerequisites for reflexivity, initiative-taking and going beyond the stipulated tasks. Reflexivity and learning are important prerequisites for innovative groups and for groups going beyond what is formally required of them (North et al., 2005; West et al., 2004).

The recommendation for practitioners will be to create an organizational context where reflexivity, learning and potency can emerge, develop, and grow. It is important to support the group’s sense of competence and belief in their ability to perform (potency) if groups are to perform well and go beyond the expected. According to Stürmer, Simon and Loewy (2008) employees need to be assured that their performance is valued and recognized, to engage in behavior that benefits the organization.

The theoretical implication would be that the results show, although not yet complete, support for a new tested theoretical model. The contributions to research by these studies are 1) that the methodology of detailed work task analysis is worthwhile (but time-consuming) as it provides data that cannot be captured with questionnaires or interviews exclusively, 2) work task analyses give input to model building in group research as aspects of job design, e.g. sequential and hierarchical completeness, previously not studied in relation to group processes contribute to reflexivity and learning processes, and 3) knowledge on how work groups on the shop floor can be involved in continuous developmental work activities. This involvement and participation in learning and developmental activities at work are of importance for the organization as well as for the individuals’ opportunities to develop and learn.
Future directions
What should be expected from group work at the shop-floor level? Although there are thousands of studies published on work groups there are still many questions to be answered (Sundstrom et al., 2000). Profitability for the organizations is one example (not included in the empirical studies). As group work is established in industry there is however a tendency to reorganize into conventional line-production. The forthcoming research can be divided into separate lines of theoretical and methodological issues. The theoretical issues might consider whether initiative taking is a group process or an effect of group work. Another possible research question would be to study if group initiative and/or self-organizational activities are changing the prerequisites. This could be conducted in a longitudinal design in line with what Frese and coworkers (2007) conducted for personal initiative. There are several concepts and measures of proactive behavior (personal initiative, proactive personality, role breadth self-efficacy etc.) and it would be intriguing to study whether they could merge into one concept. As a consequence of such a study there will be methodological issues to consider, such as reliability and validity of different methods related to authentic observed behavior. In forthcoming research there will probably also be more studies integrating group and individual level perspectives by using multilevel analyses as studies with multi-level models are relatively uncommon so far in organizational psychology (van Mierlo et al. 2007). Comparing the perceptions of the individuals with group levels of e.g. potency might be a research issue to scrutinize in multilevel analyses.

Final remarks
In action regulation theory the incorporated aim is to focus work conditions that support human well-being and efficiency development (Hacker, 2003). The results from the studies confirm that the prerequisites for meaningful humane work are very important if it is supposed to result in the groups going beyond the stipulated tasks and engaging proactively and/or in self-organizational activities. If the organizational goal is to create humane work conditions during the production process it is worthwhile to design the work tasks to include a completeness/wholeness in work, as in the dimensions of prerequisites of sequential completeness, demand on cooperation, cognitive demand and learning opportunities. There is a long tradition in referring to the concepts completeness
and wholeness, and there is enormous knowledge on the importance of them for the individual employee and for the group. Despite all this theoretical knowledge it seems that it is not used enough in creating good workplaces. Possibly organizations do not want highly autonomous groups which may lead to management losing control. Group processes are of vital importance for the outcomes of group initiative and self-organizational activities. The group process variables, e.g. reflexivity and potency, are important, as they can generate motivational force for groups that might determine whether groups will go beyond the stipulated tasks and take initiative or not.

Knowledge and theories from social sciences are being successively tested in the real world (House, 1981). The importance of job design cannot be overrated if the organization’s goal is to improve and flourish - and simultaneously contribute to the employees’ health and wellbeing. Contemporary work groups need long term perspectives and conditions that will generate preparedness for the future, not yet known, work experiences.

So, when is it worthwhile to invest in group work? The research suggests the answer to be a) if it is supposed to result in change- and developmental work, b) if the purpose is to encourage group initiative to go beyond the prescribed work, c) if the organizations manage to balance the autonomy of group with the management demand of control, d) if it is possible to change work content and job design, and e) if it is possible to support reflexivity as in “stop working and think”. This thesis will hopefully contribute with new knowledge to the tradition of interest for work conditions for groups in the domain of work and organizational psychology.
REFERENCES


APPENDIX

Variables and items in the questionnaires

Perceived autonomy

1. The members of my group are responsible for determining the methods, procedures, and schedules with which the work gets done.
2. My group rather than my manager decides who does what tasks within the group.
3. Most work-related decisions are made by the members of my group rather than by my manager.

Support from leader

4. My work group has the opportunity to talk about difficulties in our work with our immediate superior.
5. My work group gets the encouragement and support we need from our immediate superior.
6. Our immediate superior provides us with the information on conditions at the workplace we need to carry out our work.
7. Our immediate superior usually informs us about changes which may be of importance for our work.
8. Our immediate superior shares our own view of where our skills lie.
9. Our immediate superior gives us the feedback we need to know whether we are doing a good job.
10. Our immediate superior is an asset for our work group in critical situations.
11. Our immediate superior provides good conditions for our work group’s development at work.

Work routines

12. It is clear what our group is supposed to accomplish.
13. Our group spends time making sure every group member understands the team objectives.
14. Our group has invested plenty of time in clarifying our goals.
15. In our group we inform each other about tasks in order to achieve a higher quality of work.
16. We continuously share information with other groups.
17. Everyone in our group does his/her fair share of the work.
18. Nearly all the members in our group contribute equally to the work.
19. Members of our group are very willing to share information with other group members about our work.
20. Our group enhances communication among people working on the same product.
21. Members of our group cooperate to get the work done.
22. My fellow workers inform me of conditions that may be of importance for my work.
23. Group members go out and obtain all the information they possibly can from others – such as customers, or other parts of the organization.

**Cooperation**
24. Everyone in our group does his/her fair share of the work.
25. Nearly all the members in our group contribute equally to the work.
26. Members of our group are very willing to share information with other group members about our work.
27. Our group enhances communication among people working on the same product.
28. Members of our group cooperate to get the work done.
29. My fellow workers inform me of conditions that may be of importance for my work.

**Social routines**
30. Being in my group gives me the opportunity to work in a group and provide support to other group members.
31. I have the opportunity to talk about difficulties in my work with my fellow workers.
32. My fellow workers give me the encouragement and support that I need.
33. If you make a mistake in our group, it is often held against you.
34. Members of our group are able to bring up problems and tough issues.
35. It is safe to take a risk in our group.
36. No one in our group would deliberately act in a way that undermines my efforts.
37. Working with members of our group, my unique skills and talents are valued and utilized.

**Social support**
38. Being in my group gives me the opportunity to work in a group and provide support to other group members.
39. I have the opportunity to talk about difficulties in my work with my fellow
workers.
40. My fellow workers give me the encouragement and support that I need.
41. If you make a mistake in our group, it is often held against you.
42. Members of our group are able to bring up problems and tough issues.

**Reflexivity and learning processes**
43. In our group we arrange meetings to develop new ideas together.
44. Our group frequently seeks new information that leads us to make important changes.
45. In our group, someone always makes sure that we stop to reflect on the team’s work process.
46. People in our group often speak up to test assumptions about issues under discussion.
47. We invite people from outside the group to present information and to have discussions about improvements.
48. I often discuss experiences from work with the members of our group.
49. The members of our group discuss how important it is to gain new knowledge.
50. Our group often arranges meetings to have discussions with other work groups.

**Reflexivity**
51. People in our work group often speak up to test assumptions about issues under discussion.
52. We invite people from outside the group to present information and to have discussions with us.
53. I often discuss experiences from work with the members of our group.
54. The members of our group discuss the importance of new knowledge about how to carry out the work.

**Potency**
55. Members of my group have great confidence that the group can perform effectively.
56. My group can take on nearly any task and complete it.
57. My group has a lot of team spirit.

**Group initiative**
58. We deal actively with problems in our work group.
59. We search for a solution immediately when something goes wrong.
60. Whenever there is a chance to get actively involved, we take it.
61. Our work group takes the initiative immediately even when other groups do not.
62. Our work group uses opportunities quickly in order to attain our goals.
63. We are particularly good at realizing ideas.

**Self-organizational activities**

64. In our work group we have initiated and developed new work tasks and routines, and we do more than what is expected and prescribed by management.
65. In our work group we have initiated change of the framework and prerequisites (conditions) for our work in order to work in the most efficient way.
66. Our work group has created more autonomy, and widened our responsibilities so that we can take an active part in change- and developmental activities.
67. Our work group is engaged in tasks that are more complex and different to the usual tasks that are given to us.
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