

# **Psychosocial work characteristics and return to work after occupational rehabilitation**

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## **Preface and acknowledgements**

This master thesis marks the end of my two years of studying Health Science at the University of Stavanger. The thesis is an independent but integrated part of the larger Rapid-Return-to-Work study (Raskere tilbake-studien), a collaboration between the International Research Institute of Stavanger (IRIS), Oslo and Akershus University College (HiOA), and the University of Stavanger (UiS). My contribution to the project included recruitment of participants in phase II (June through August 2012), and preparation of the data before analyses (December 2012 through March 2013). Recruitment included establishing contact with the Norwegian Labour and Welfare Administration (NAV) in regard to gaining an overview of all the Rapid-RTW programs in Norway. Further recruitment included contacting each of the individual Rapid-RTW programs, and inviting them to participate in the study.

The thesis is twofold and consists of a research article (part I) and a thesis (kappe) (part II). Part II is an expansion of the article and includes a more in-depth elaboration of the background and the theoretical framework of the study, in addition to a more detailed explanation of the methods used. Because the scope of the article is quite large, the same main findings are discussed in both parts. The article is aimed at publication in the journal 'Work, a journal of Prevention, Assessment & Rehabilitation'. The Instruction to Authors is therefore included at the end of Appendix B.

Over the past four semesters I have been introduced to professors and students who have helped me broaden my horizons in the fields of health science and occupational health. When I started my studies, I came in contact with a research environment at IRIS, who was concerned with the onset of sick leave and RTW. In regard to this, I would like to express my gratitude to project manager and supervisor Randi Wågø Aas, for including me in the project, and believing in me throughout the writing of this masters thesis. In addition, I would like to thank the rest of the research group, for making the process easier. I would also like to thank my second supervisor, Brynjar Foss, for help and support throughout the process of writing this thesis. And last, but not least, I would like to thank my family and friends for love and support all the way through to the end.

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Lise Aasen Haveraaen

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## **List of abbreviations**

<b>CI:</b>	Confidence Interval
<b>DCS:</b>	Demand-control-support model
<b>HiOA:</b>	Oslo and Akershus University College
<b>ICF:</b>	WHO's International Classification of Functioning, Disability and Health
<b>IRIS:</b>	International Research Institute of Stavanger
<b>JCQ:</b>	Job Content Questionnaire
<b>NAV:</b>	the Norwegian Labour and Welfare administration
<b>NSD:</b>	the Norwegian Social Science Data Service
<b>OR:</b>	Odds Ratio
<b>Rapid-RTW:</b>	Rapid return to work
<b>REK:</b>	the Regional Committee for Medical and Health Research Ethics
<b>RTW:</b>	Return to Work
<b>WHO:</b>	World Health Organization

# **Part I**

## **Article**

## **Psychosocial work characteristics and return to work after occupational rehabilitation**

**ABSTRACT: BACKGROUND:** Long-term sickness absence is a major health and economic problem in the industrialised world. Factors that might promote return to work are therefore of great interest. Psychosocial work characteristics are known to influence health; it was therefore hypothesised that the work characteristics might also influence return to work.

**OBJECTIVE:** The aim of the study was to examine the impact of psychosocial work characteristics on return to work after occupational rehabilitation.

**METHODS:** The study was design as a deductive cohort study of 251 sick-listed employees in a Norwegian rehabilitation program recruited between November 2011 and July 2012. A Norwegian translation of the Job Content Questionnaire was used to gather information on the psychosocial work conditions. Return to work was measured at two follow-up times, at the end of rehabilitation and three months after. Logistic regression analysis was used to investigate the association between the demand-control and support dimensions and return to work.

**RESULTS:** After adjustments, skill discretion was associated with return to work at end-of-rehabilitation follow-up. At three-months follow-up, high psychological job demands, low social support and being in a high-strain job were associated with not working.

**CONCLUSION:** The purpose of the study was to give more insight to providers of rehabilitation programs, so there might be more focus on workplace issues predicting return to work in the future. The results revealed that work characteristics had an impact on return to work. Interventions aimed at returning people to work might therefore benefit from including organisational job redesign measures, secure support at the workplace or modification of job demands.

**Keywords:** sick leave, sickness absence, demand-control-support model, psychosocial work environment, job strain

## **1. Introduction**

Long-term sickness absence is a major public health and economic problem in the industrialised world (1). The sickness absence rates in Norway are considered high compared to other countries, and there is an increasing coverage and debate in the media about the high levels of absenteeism (2). Research on the onset of sickness absence has, however, revealed that a relatively small group of workers is responsible for most of the sickness absence (2-4), and that this group disproportionately contribute to the costs of sickness absence (1, 3, 5). In 2011, the expenditure of sickness benefits was estimated to approximately 36.4 billion Norwegian kroner (approximately \$6.5 billion (6)). Because of production losses and other financial costs to the government and industry, sickness absence is a topic high on the political agenda.

Besides economic consequences, long-term sickness absence can effect the worker's health, as well as inhibit recovery (7). Several types of negative consequences of prolonged sick-leave have been found, including increased risk of social isolation and inactivity, reduced well-being, depressive symptoms, impaired self image, and a tendency to become stuck in a negative sick role (7, 8). This may, in turn, reduce the probability of returning to work (7, 9). As the sick leave is prolonged, the distance to the work place can become a challenge in itself, and recovery can be even harder for the absentees (10). In general, the probability of returning to work is inversely proportional to the length of absence from work, regardless of medical conditions (5, 11). A quick return to work (RTW) may therefore often be beneficial for the sick-listed worker.

Over the last centuries, increasing attention has been placed on psychosocial factors in the workplace in the development of ill health and duration of disability, and psychological stress



has been the focus in an increasing amount of research (12-16). One of the most widely used models in the stress field of research has been the demand-control-support (DCS) model (9, 12, 14, 17, 18). The concept of demand and control was introduced by Karasek in 1979 (19), and was further developed by Johnson and Hall in 1988, by including the dimension of social support (12, 20). In the model, psychological demands refers to work pressure and work load, whilst control (called decision latitude in the model) consists of two theoretically distinct scales concerning the breadth of skills usable on the job (skill discretion) and the social authority each worker has over making decisions (decision authority). Stress is thought to be the result from “the joint effect of the demands of a job situation and the range of decision-making freedom available to the worker facing those demands (...) Job strain occurs when job demands are high and job decision latitude is low” (19, p.287). In the model, four distinctly different kinds of psychosocial work experiences are generated by the interactions of high and low levels psychological demands and decision latitude (see Fig. 1). The DCS-model and the job strain hypothesis propose that high-strain jobs, i.e. jobs with high psychological demands and low decision latitude, have adverse health effects. Social support is considered to counteract stress at the workplace and to decrease the risk of illness. On the other hand, if the challenges in the workplace are matched with the individuals control over alternatives or skill in dealing with those challenges, learning, motivation and growth are likely outcomes (the active learning hypothesis). Since the work environment has been found to play an important role in the aetiology of health and disability, it is also possible that factors in the work environment can influence RTW.

Insert Fig. 1 here

Previous studies on work characteristics and RTW have found that the work characteristics were predictive of duration until RTW. Gimeno and colleagues (21), for example, found that high levels of psychological demands and low levels of control increased the odds of long term sickness absence. A study of RTW in women in early stages of breast cancer revealed that high-demand jobs were predictive of not working ten months after primary breast cancer surgery (22). That high job demands alone might function as a barrier for RTW has also been found in previous studies (9, 18, 22). In other studies, however, the association between low control and delayed RTW has been the most clearly established determinant (9, 23, 24). Inconclusive results have also been found for social support (25). The studies on job characteristics and RTW have, however, used different specific study groups and different measures of sickness absence and RTW. The results are therefore inconsistent and hard to generalise. Strong evidence for any of the factors has therefore not been established. Longitudinal studies on RTW have also revealed a time dependent effect, where different job characteristics might have differing affects at different points in time (11, 26). Ballabeni and colleagues (18), for example found that three months after rehabilitation, no association was found for high strain, whereas 1 year after occupational rehabilitation high strain participants were more likely to have returned to work than low-strain participants. Although inconclusive findings, the research underlines the importance of considering work related psychosocial conditions in explaining a worker's return to work. The effects of work characteristics on RTW will therefore be explored in this paper.

## **2. Aim**

The aim of this study was to assess the association between the psychosocial work environment and return to work after occupational rehabilitation. The purpose was to give

more insight to providers of rehabilitation programs, so there might be more focus on workplace issues predicting RTW in the future. In this study, it was hypothesised that high psychological job demands would work as a barrier for RTW, that high control would promote RTW, and that high supervisor and co-worker support would promote RTW. In addition, based on the active learning hypothesis, it was postulated that individuals in active jobs would have the highest RTW-rates.

### **3. Methods**

#### *Research design*

The present study was conducted as a deductive cohort study of patients (n = 251) after occupational rehabilitation in a Norwegian national rehabilitation program. RTW was measured at two follow-up times; end-of-rehabilitation follow-up, and a three-month follow-up after rehabilitation.

#### *Data collection*

The present study was a part of the Norwegian Rapid-Return to work-study, an evaluation of the Norwegian national occupational rehabilitation program entitled 'raskere tilbake' or 'rapid-return-to-work (Rapid-RTW)'. The national study was based on self-report questionnaires, where both patients and their providers answered questions concerning health, functioning, socio-demographic conditions, and various aspects in the workplace. Each clinic offering a Rapid-RTW program was contacted, and asked to participate in the study. Of 210 clinics, 50 agreed to participate. Each clinic offering the program entailed a local Rapid-RTW coordinator, who further recruited the participants. The data collection period was between February and October 2012. Data on sickness absence was retrieved from the Norwegian social insurance register. The records list the beginning and end dates of each sick leave for

each patient. To identify employees who were on sick leave at the start of the rehabilitation period, sick-leave statuses at the start of the rehabilitation period for each patient was recorded. For the RTW-variables each participant was checked individually, recording the degree of sickness absence at the end of rehabilitation and 3 months after the rehabilitation period had ended.

### *Inclusion criteria*

The study population met the following inclusion criteria: (1) that the participants finished rehabilitation before or during the study period; (2) that they were on sick leave at the start of the rehabilitation period; (3) that they were in paid employment. People who were not sick listed at the start of the rehabilitation period and who were characterised as self-employed by the Norwegian social insurance registers, were excluded from the study.

### *The intervention*

The Rapid-RTW program is a program aimed at strengthening the treatment and rehabilitation for persons on sick leave. The goal of the intervention is to contribute to a faster RTW for employees on sick leave, by accomplishing more rapid clarification, medical treatment, and rehabilitation in sick leave cases, and to shorten the waiting lists to treatment for sick-listed employees. The program is for persons on sick leave, or persons who are in danger of becoming sick listed. The government finance the program, and different public and private clinics, institutions and hospitals throughout Norway offer the program. The interventions include medical and surgical treatment at clinics, rehabilitation in hospitals (somatic), psychiatric treatment and rehabilitation, occupational training and rehabilitation in

institutions, and follow-up and clarification of work abilities (27).<sup>1</sup> In administrating the programs, there have been few detailed guidelines for what the intervention should include, or how it should be organised, and the intervention has therefore differed from clinic to clinic and between patients. 60.6% (n = 152) of participants received multidisciplinary treatment, while 4.3% (n = 11) received treatment from only one profession. For the rest of the participants, no treatment was registered. Furthermore, 44.2% (n = 111) of the participants received interventions that included psychological treatment or therapy (i.e. behavioural therapy, psychotherapy or general conversational therapy), or treatment including coping and motivational exercises. Furthermore, 27% (n = 68) received some form of medical, surgical or physical treatment.

### *Study sample*

At the end of the study period, the data material consisted of 455 participants. Of these, 344 had registered the dates for their occupational rehabilitation period. At baseline, 251 participants met the inclusion criteria of being on sick leave at the start of rehabilitation. Table 1 represents baseline characteristics of the study sample. The sample consisted of 76,1% women and 23,9% men. Of the participants included, 57.4% (n = 144) had a musculoskeletal diagnosis, whereas 15.9% (n= 40) had a psychological disorder.

Insert table 1 here

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<sup>1</sup> For a more comprehensive review of the treatment offered in the Rapid-RTW-programs, see: Aas RW, Solberg A, Strupstad J. Raskere tilbake. Organisering, kompetanse, mottakere og forløp i 120 tilbud til sykemeldte. Stavanger: International Research Institute of Stavanger 2011.

## Measures

### Job characteristics

Job characteristics were measured by a Norwegian translation of the job content questionnaire (JCQ), which was included in the bigger questionnaire for the Rapid-RTW-study. The JCQ is a standardised questionnaire which measures four dimensions in the work environment, namely psychological job demands, job control (decision latitude), supervisor support and co-worker support. Psychological job demands was measured with 5 items (range 14-48, Cronbach's alpha .73). Decision latitude was measured with the scales skill discretion (range 12-48, Cronbach's alpha .64), and decision authority (range 12-48, Cronbach's alpha .60). Social support was measured by the two scales co-worker support and supervisor support. Co-worker support was measured with 4 items (range 4-16, Cronbach's alpha .81), and supervisor support was measured with 4 items (range 4-16, Cronbach's alpha .91). Items in both scales reflect socio-emotional and instrumental support. All the job characteristics items were scored on a four-point Likert scale, ranging from 1 'strongly disagree' to 4 'strongly agree'. Sum scores for each scale was calculated according to the formulas for job content instrument construction (retrieved from <http://www.jcqcenter.org> on march 27<sup>th</sup> 2013). The scores were then created by dichotomising the variables at the median, indicating high and low levels of the dimensions. Values equal to the median were classified into the less hazardous exposure level (that is, low demands, high control, or high social support). The four psychosocial work experiences (hereby referred to as the job types) were then created based on the quadrant term (28), by cross-classifying the dichotomised variables of psychological job demands and job control: high-strain jobs (high demands and low control), low-strain jobs (low demands and high control), active jobs (high demands and high control) and passive jobs (low demands and low control).

## Return to work outcomes

Return to work was measured at the end of rehabilitation and three months after the rehabilitation period ended, for each of the participants. RTW was defined as starting back at work for more than 50% (20h or more per week) (11, 29).

### *Potential confounders*

Gender, diagnose, educational level, civil status, sector, household income, branch and physical job demands were considered potential confounders, as these have been shown to affect duration of sick-leave in earlier studies (10, 30, 31). Each potential confounder was tested separately in bivariate analyses, and non-significant factors were manually eliminated until the regression model reached statistical significance for each of the predictor variables. Age and previous sickness absence-history are also known confounders (31), but data on these were not available at the time of the analyses, and were therefore not included. Selected confounders for both the follow-up times included: educational level, sector, household income, physical job demands, diagnose, gender and civil status. At the end of rehabilitation, occupational branch was also included as a confounder.

### *Statistical analysis*

SPSS version 20 was used for all the analyses. Significant results were defined as  $p < .05$ . As a first step, the dimensions of the JCQ were tested in bivariate analyses to assess the association between the dimensions and RTW. RTW (yes vs. no) was the dependent binary variable. The predictors tested were psychological job demands, decision latitude, and co-worker and supervisor support. If an association of  $p \leq .20$  was reported in the bivariate analyses, logistic regression models were calculated to further evaluate the association between the dimensions and RTW, making it possible to adjust for potential confounders.

Separate analyses were run for each time point. First, unadjusted regression models were run separately for each of the dimensions and RTW, as well as for the job-types. Second, separate logistic regression models were calculated for each of the dimensions and for the job-types, adjusted for the confounders. In an additional step, each of the items in the scales were tested individually in bivariate analyses, so that items with the most significant contributions could be identified.

#### *Ethical considerations*

The study was approved by the Norwegian Social Science Data Service (NSD). Information letters were given to all informants beforehand, and written informed consent was collected from all the participants before the data collection started. The data was processed without name and personal identification number, or any other information that directly could be linked to any of the informants, and the questionnaires were de-identified before they were processed and analysed. The informants had the right to access the results throughout the project period.

## **4. Results**

#### *End of rehabilitation follow up*

Table 2 shows the results from the bivariate chi-square analyses at the end of rehabilitation follow up for each of the psychosocial work dimensions. At the end of rehabilitation follow-up 25,4% of the sample had returned to work. No support was found for the association between psychological job demands and RTW ( $X^2 = .073$ ,  $p = .787$ ), decision latitude and RTW ( $X^2 = .093$ ,  $p = .760$ ), co-worker support and RTW ( $X^2 = .010$ ,  $p = .992$ ), or supervisor support and RTW ( $X^2 = .130$ ,  $p = .718$ ) at this follow-up time. The sub-dimension skill discretion, however, indicated a significant relationship with RTW, reporting an Odds Ratio



(OR) of 3.160 (95% CI: 1.542-6.478,  $p = .002$ ) in the unadjusted regressing model, and an OR of 3.410 (95% CI: 1.381 – 8.420,  $p = .008$ ) after adjusting for gender civil status, education, household income, physical job demands, diagnose, sector and branch. No association was found for any of the job-types and RTW.

Insert Table 2 here

### *Three-month follow-up*

Table 3 shows the bivariate analyses at the three-month follow-up. Three months after rehabilitation 76,1% of the sample had returned to work. Those back to work were characterised by a higher number of individuals with low psychological demands, low control and high co-worker and supervisor support.

Insert table 3 here

Table 4 represents the results from the logistic regression analyses, both unadjusted and adjusted for the confounders for both the work dimensions and the job types. The unadjusted results showed an association between psychological job demands and RTW, as well as for co-worker and supervisor support and RTW. A tendency was found for job control ( $p < .10$ ), although this did not reach statistical significance (see Table 4). After adjusting for gender, civil status, educational level, sector, household income, diagnose and physical job demands, psychological job demands and co-worker and supervisor support further confirmed the association, reporting OR's of .325 (95% CI: .145 - .725) for psychological demands, OR = 3.622 for co-worker support (95% CI: 1.634-8.206) and an OR of 2.523 (95% CI: 1.220 - .5.217) for supervisor support. Not much evidence was found for a relation between decision

latitude and RTW, or for skill discretion or decision authority and RTW, three months after rehabilitation. When testing the job-types, individuals with low-strain jobs (low psychological demands and high control) seemed to have the highest RTW-rates, and 87.9% of individuals in this category had returned to work at the three-month follow-up. The unadjusted logistic regression analyses showed a statistically significant association between low-strain jobs as well as for high-strain jobs and RTW, reporting an OR of 2.662 (95% CI: 1.045-6.575) for low-strain and .425 (95% CI: .235-.869) for high-strain. After adjusting for gender, civil status, educational level, sector, household income, diagnose and physical job demands, however, only high-strain jobs showed an association with RTW, reporting an OR of .371 (95% CI: .156-.885).

Insert table 4 here

Table 5 represents the summary statistics of the association between each individual item in the JCQ and RTW at the-end-of-rehabilitation follow-up and the three-month follow-up.

Insert table 5 here

## **5. Discussion**

The aim of this thesis was to assess the association between the psychosocial work environment and RTW after occupational rehabilitation. The purpose was to give more insight to providers of rehabilitation programs, so that more focus might be put on workplace issues predicting RTW in the future. The following main findings are discussed: 1: the only association found at the end-of-rehabilitation follow-up was for the sub-dimension skill discretion; 2: at the three-month follow-up, both psychological job demands, and co-worker

and supervisor support were associated with RTW; and 3: being in a high-strain job was associated with not working three months after rehabilitation.

At the end of rehabilitation, skill discretion was the only factor associated with RTW.

Although the effect size was small, participants with high skill discretion were more likely to have returned to work than participants with low skill discretion. More specifically, the requirement of high skill levels in the job made the strongest contribution in predicting RTW, with individuals in jobs that require high skill levels having greater odds of returning to work by the end of rehabilitation (table 5). That skill discretion might be of importance in the beginning phases of the RTW-process is supported by Janssen et al. (2005), who found that high skill discretion predicted RTW after hospital discharge (9). It is possible that workers who feel that they have to use their skills and abilities also are more motivated for returning to work because they feel their competence is needed in the workplace. Motivation has been found to play an important role in RTW in previous studies (10, 31). It is, however, also possible that a requirement to use their skills might be perceived as a 'pressure to attend', as no one else can do the job for them. This might in turn make the person RTW prematurely, and impact the chances of permanently returning to work. The fact that skill discretion was the only factor with an association with RTW at this follow-up-time was surprising. Several explanations can be considered in explaining the small effect sizes at this follow-up point. As mentioned earlier, there have been few detailed guidelines for methodological approaches in administering the rapid-RTW-program. The programs have therefore been organised and administered differently, according to what the coordinators considered to be an effective and appropriate program for their patients. Due to this, there have been differences in duration and organisation depending on which program the participant participated in. Since RTW was measured the day the program ended individually for each participant, the differences in

RTW-rates may be due to differences in the organisation of the rapid-RTW-program, making other factors of less significance. It is also possible that there were few adjustment possibilities in the relation between the rehabilitation programs and the individuals' work situation (e.g. it was not possible to regulate the work time or work tasks in accordance with for example partial hospitalisation), resulting in that the patients had to be sick-listed throughout the rehabilitation period. Furthermore, the severity of the injury and the stage in the disability phase might have interfered with RTW. Krause et al (2001) found that injury severity was a more important risk factor for work disability in an acute phase of injury than in a sub-acute phase, and that RTW rates were almost 5 times higher for patients with less severe injuries in the acute phase of disability (23). The severity of the disability was not measured in this study, however, so this could not be controlled for at the time. Although both explanations are plausible for the high numbers of participants still on sick leave at the follow-up time, it partially contradicts the finding that high skill discretion did make a contribution. More research is therefore needed in order to draw a conclusion or make suggestions for future RTW-interventions at this point in time.

At the three-month follow-up, more evidence was found for the association of the psychosocial work environment on RTW. At this follow-up time, both psychological job demands and social support were associated with higher RTW-rates, whereas the control dimension had no predictive power. High psychological demands, and especially requirements of working hard in the work situation was associated with not working at the three-month follow-up. Previous research has found that high job demands in themselves are not necessarily negative (32). In a RTW situation, however, it possible that the demands are perceived as extra demanding, as the sick-listed worker might experience impaired job performance as a result of their disability (33, 34), perhaps reducing the inclination to RTW.

This explanation is supported by Krause et al (23), who found that high psychological job demands alone contributed to 20% reduction in RTW-rates. Because earlier research supports the notion that high psychological demands are associated with the development of health complaints, there is a possibility that high demands induce a fear of recurring or worsening the health complaints for which one called sick to begin with, reducing the chances of returning to work (9). In practice, modified work programs aimed at reducing workload and psychological demands might therefore be beneficial in the RTW-process. As few studies have assessed the importance of psychological job demands alone, more research is needed in order to establish more knowledge on the impact of psychological job demands on RTW.

The fact that job control had no apparent predictive power in this study was an unexpected finding, as this has been the most clearly established predictor of return to work in previous studies (9, 11, 23, 24). Although supported by a study by Ballabeni et al. (18), most of the literature on the RTW and psychosocial work environment have found that decision latitude is predictive of RTW (9, 11). Krause et al. (23) for example found that low decision latitude alone reduced the chances of returning to work with up to 30%, and Niedhammer et al. (24) found that decision latitude was the only predictor of RTW. Several explanations for why no association was found can be considered. One explanation might be the low reliability on the scales measuring the control dimension (Cronbach's alpha of .64 on the skill discretion scale and .60 on the decision authority scale). In the social and health sciences, an alpha value above .7 is considered acceptable while an value of .8 is preferable (35). Although the Cronbach's alpha is sensitive to the number of items on the scale, other research using the JCQ have found higher scores on the dimension (see for example(12, 36). This might indicate that there is low consistency between the respondents' answers in the questionnaire, and thereby eliminating the predictability of the dimension. It is also a possibility that the control

dimension is restricted to accounting for variation as a buffer for the effects of job demands (37), and that the dimension alone does not make a significant contribution on RTW when seen isolated from psychological demands. Another explanation might be Norwegian culture and legislations concerning work structure and work environment. Since the 1970's legislations around the working conditions in Norway have been concerned with the organisation and construction of the working environment. In 1977 a working environment act was established based on the results of research and development focusing on labour issues and new knowledge about the work environment's harmful effects on human health. Attention was directed at the psychosocial work environment, and greater emphasis was put on learning and development of skills on the job, as this was found to be a motivating factor, linked to job satisfaction and good health (38). As a consequence of this act, the impact of job control in the RTW process might not be as big as in other countries, as big differences between jobs are reduced. Although this may be a feasible contributory factor for why the dimension did not show an association, the explanation is paradoxical in that skill discretion did indicate an association at the end-of-rehabilitation follow-up. In addition, the possibility of making own decisions showed an association with RTW, indicating that some of the items in the dimension can affect RTW-rates at this point in time, although the impact is limited. That the possibility of making own decision made an contribution does, however, make sense, in that it might be easier for persons with high decision autonomy to regulate their work pace depending on their physical conditions, which in turn might make it easier to RTW. It is therefore possible that future workplace interventions might benefit from considering organisational redesign measures enabling the worker more control over decisions. More research is, however, needed on the topic.

Social support was found to have the strongest association to RTW. The largest affect was found for co-worker support, but supervisor support showed an additionally strong association with RTW. Relations between social support and return to work have been found in previous studies (9, 18, 21, 23, 30, 33), and the association between high social support and higher RTW-rates are fairly well established, although inconclusive findings have been reported (25). As previously outlined, social support is considered having a buffering effect on work-stress, as it potentially improves the person's resilience to the stressor. High levels of social support can improve self-confidence and optimism, as it makes the person feel valued and worthy (12, 39). This might be particularly important in a RTW-process, as the sick-listed worker may experience reduced job performance, impaired self-image and a decreased sense of self-efficacy (7, 33). When the items on the social support scales were investigated separately, the items concerning co-worker's interest, friendliness and helpfulness showed most affect. This supports the results from Lysaght and Larmour-Trode (33), who reported that moral support, assistance, interest and understanding were the most important factors for whether sick-listed employees returned to work or not. Helpful and assisting co-workers might help reduce some of the work pressure, making the process of returning to work after disease or injury easier. In addition, that co-workers show interest is an indication of emotional support, which is shown to be a buffer for psychological strain (12). When it comes to supervisor support, that supervisor was helpful and concerned about the worker had significant contributions for RTW. This is also a finding that makes sense, in that helpful supervisors might be essential for securing help from co-workers for physically demanding tasks, for appropriate work assignments, in addition to other work accommodations and adjustment possibilities (23, 33). In addition, emotional support from supervisors might make the worker feel important and appreciated, reducing the potential strain in their relationship in the re-entry process (33). Having a work-environment with a helpful and including

organizational culture and climate seems to have a positive effect on RTW, and this should therefore be considered as an important implication for future practice and promotion of RTW. In a study by Michie and co-workers (40), a theory based organisational intervention was implemented in a hospital cleaning staff, in order to reduce sickness absence rates. The intervention included attempting to increase perceptions of social support in the staff, by allowing for more social action in the workplace. The intervention proved fairly successful, and the sickness absence rates were reduced following the intervention. This suggests that including measures for heightening the levels of social support in the workplace might be beneficial in reducing sickness absence, and might also help the promotion of RTW. RTW-programs should therefore target the topic

The high-strain job was the only job-type associated with lower RTW-rates three months after rehabilitation. Accordingly, the individuals in high-strain jobs were overrepresented among the non-working employees three months after rehabilitation. This is in line with the strain hypothesis, which states that people with low levels of control combined with high levels of psychological demands are exposed to high-stress situations (12), perhaps making them less likely to RTW. These findings are supported by the studies of Fukuoka et al. (11), Lidwall and Marklund (21), and Krause et al. (23). In high-strain jobs, a worker's decision latitude is low at the same time as the demands are high, making room for few adjustment possibilities. Few adjustment possibilities have been found to correlate significantly with long-term sickness-absence (10). Kristensen (41) suggests that in high-strain jobs there are few possibilities of using different coping mechanisms when faced with stressful situations, and that remaining out of work could be viewed as a coping mechanism to avoid or reduce the stressful working conditions, as few other options are available. Interventions including modified work redesign where the employees are enabled more control over their own



decisions considering how to manage their work, as well as reducing the psychological demands may therefore be advantageous in promoting RTW. In addition, rehabilitation programs that include different stress management techniques might also be beneficial in future rehabilitation programs aimed at re-entering sick listed employees. More research is however needed on the effect of theory-based interventions in the RTW-process.

### *Methodological discussion*

Because the study was based on the DCS model, the work characteristics measured were restricted to accounting for the dimensions described in the model. Although the model has received a fair amount of recognition in the field of occupational health, it has also been criticised for its simplicity and lack of relevance facing the modern society's work challenges (42). Because the effect sizes were small across all the predictor variables, it is possible that other work characteristics, like for instance attitude towards the job, job insecurity, job satisfaction, motivation and other physical work characteristics might reveal a more complete picture of the determinants of RTW. This should therefore be taken into consideration in future research regarding RTW. Furthermore, as with all other questionnaires attempting to measure psychological work stress, the JCQ is susceptible for certain personality traits in the mapping of psychosocial working conditions (42, 43). Awareness that the person's response to a specific question is a function of both the objective presence of the factor and the subjective appraisal by the person is therefore important. Moreover, the psychosocial workplace factors in this study were assessed and analysed at the individual level, and exposure to the psychosocial factors are therefore determined by each individuals' response to the specific question (44). An additional concern might therefore also be that the perception of the work environment was based on recall. Because the study was concerned with the further development of occupational rehabilitation programs this is not necessarily considered

a weakness, however, as the perception of the work environment in itself is likely to be relevant to the subsequent RTW-process. Ballabeni et al. (18) for example, found that a remembered previous workplace environment can persist long after a rehabilitation program is terminated, making recalled perception of the workplace as important as the actual work environment. The information provided by survey studies based on the participants' subjective appraisal and recall can be valuable for providers of rehabilitation programs, as they could provide help in trying to modify the perceptions of the work environment, for example through stress management techniques or cognitive behavioural interventions.

One of the strengths of this study has been the focus on workers sick listed due to any cause. Contrary to previous studies on RTW, this study was therefore not limited to a specific diagnose, making it possible to generalise the results across the different diagnosis. In addition, the study is not limited to one branch or one occupational sector, making it further possible to generalise across different occupations. But what seems like a strength on the one hand, can also be considered a limitation on the other. Because the study was concerned with the opportunity to generalise across occupation and diagnose, the differences from previous studies has made comparisons to other research difficult, and no comprehensive conclusion can be drawn at this point in time. A further limitation of the study is that RTW was only measured at short-term follow-up, and furthermore that RTW only was measured at two given time points. Due to time limits it was not possible to use later RTW data in this paper. In order to get a more clear understanding of how the work environment can impact the RTW-process, future research should be aimed at measuring RTW at later stages in the process. In addition, the dichotomised outcome measure of RTW (returned yes/no) at a certain follow up point ignores any information of when the person has returned, and information about subsequent recurrences, limiting the information provided (29). Moreover, the potential

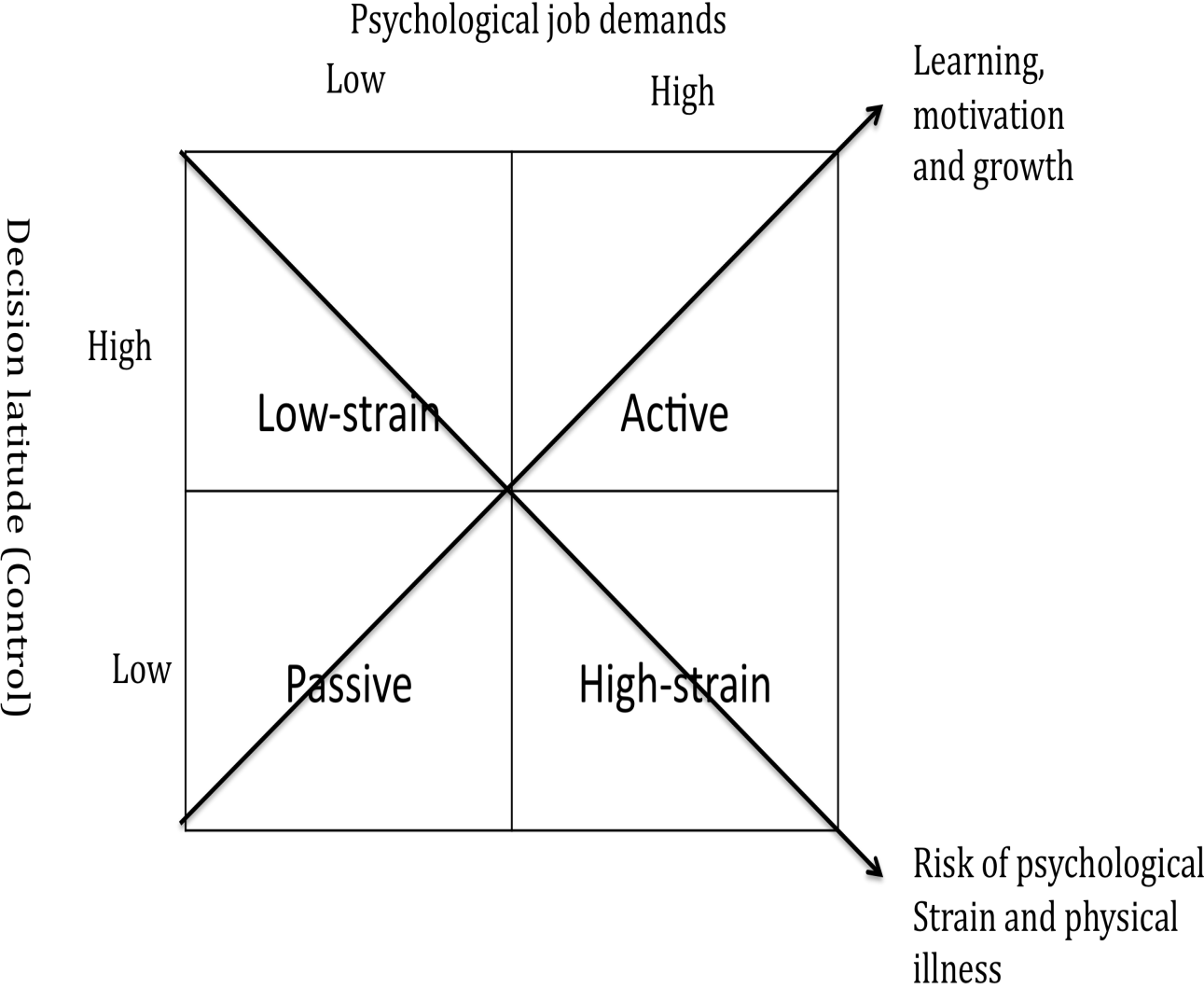
confounders controlled for in this study were chosen based on prior literature knowledge, and not all known confounders were available at the time of the analyses. Questions about age and previous history of disease and sickness absence were not included in the questionnaire and there might therefore be some degree of uncontrolled confounding bias in the results.

## **6. Summary and conclusion**

The results from the study indicated that there was a relation between the psychosocial work environment, as measured by the demand-control-support model, and return-to-work-outcome. Even though effect sizes were small, the results none the less suggest that the work environment is associated with return to work-outcome, even after adjusting for gender, civil status, educational level, occupational sector, household income, physical job demands, diagnose, and occupational branch. At the end of rehabilitation, the worker's control over making their own decisions (decision authority) seemed especially important for the possibility of returning to work, whereas three months after rehabilitation high psychological job demands and low co-worker and supervisor support at work seemed to work as independent barriers in the return to work-process. The results further suggest that programs and interventions may benefit from including organizational job redesign measures, secure support at the workplace and modification of psychological job demands. The research on how job characteristics might impact the RTW-process is scarce and has been fairly inconclusive, more research is therefore needed in order to establish which job-related factors are the most important for return to work-outcome.

Appendix

Fig. 1 The demand-control model. Based on the model by Karasek (1979)



**Table 1** Distribution of participants on baseline characteristics

Characteristics	Category	n	%
Gender	Male	60	23.9
	Female	191	76.1
Educational level	Very low (elementary school, up to 9 years of schooling)	26	10.4
	Low (Upper secondary school, ca 12 years of schooling)	107	42.6
	High (Undergraduate university degree, up to 4 years)	79	31.5
	Very high (More than 4 years of university education)	34	13.5
Diagnose	Musculoskeletal	144	57.4
	Psychological	40	15.9
	Other	62	24.7
Civil status	Not registered	4	1.6
	Unmarried	46	18.3
	Cohabiting	52	20.7
	Married/registered partner	117	46.6
	Separated	3	1.2
	Divorced	31	12.4
Occupational sector	Widowed	2	.8
	Private	114	45.4
	Governmental	33	13.1
	Public	85	33.9
	Private sector/public enterprise	11	4.4
	Self-employment	3	1.2

**Table 2** The distribution of participants on psychological job demands, decision latitude, co-worker support and supervisor support, and their association with RTW at the end of rehabilitation

Category	n <sup>a</sup> total	Not-RTW		RTW		X <sup>2</sup>	phi	p
		n	(%)	n	(%)			
Psychological job demands	227	167	(73.6)	60	(26.4)	.073	-.028	.787
<i>High</i>	112	81	(35.7)	31	(13.7)	-	-	-
<i>Low</i>	115	86	(37.9)	29	(12.8)	-	-	-
Decision latitude	230	173	(75.3)	57	(24.7)	.093	-.030	.760
<i>High</i>	115	85	(37.0)	30	(13.0)	-	-	-
<i>Low</i>	115	88	(38.3)	27	(11.7)	-	-	-
Co-worker support	243	181	(74.5)	62	(25.5)	.010	-.018	.992
<i>High</i>	189	140	(57.6)	49	(20.2)	-	-	-
<i>Low</i>	54	41	(16.9)	13	(5.3)	-	-	-
Supervisor support	228	169	(74.1)	59	(25.9)	.130	.034	.718
<i>High</i>	134	101	(44.3)	33	(14.5)	-	-	-
<i>Low</i>	94	68	(29.8)	26	(11.4)	-	-	-

Note: Degrees of freedom for all the dimensions = 1. X<sup>2</sup> represents the Chi-square

<sup>a</sup> all predictors could not be assessed for every subject due to missing values

**Table 3** The distribution of participants on psychological job demands, decision latitude, co-worker support and supervisor support, and their association with RTW at three-month follow-up

Dimension	N <sup>a</sup> total	Not-RTW		RTW		X <sup>2</sup>	phi	p
		n	(%)	n	(%)			
Psychological job demands	227	49	(21.6)	178	(78.4)	7.215	-.189	.007
<i>High</i>	115	33	(14.5)	79	(34.8)	-	-	-
<i>Low</i>	112	16	(7.0)	99	(43.6)	-	-	-
Decision latitude	230	56	(24.3)	174	(75.7)	1.912	.101	.167
<i>High</i>	115	23	(10.0)	92	(40.0)	-	-	-
<i>Low</i>	115	33	(14.3)	82	(35.7)	-	-	-
Co-worker support	243	56	(23.0)	187	(77.0)	11.009	.225	.001
<i>High</i>	189	34	(14.0)	155	(63.8)	-	-	-
<i>Low</i>	54	22	(9.1)	32	(13.2)	-	-	-
Supervisor support	228	51	22.4	117	(77.6)	7.485	.192	.006
<i>High</i>	134	21	9.2	113	49.6	-	-	-
<i>Low</i>	94	30	13.2	64	28.1	-	-	-

Note: Degrees of freedom for all the dimensions = 1. X<sup>2</sup> represents the Chi-square  
<sup>a</sup> all predictors could not be assessed for every subject due to missing values

**Table 4** Unadjusted and adjusted regression models measuring the association between the demands-control-support dimensions and RTW, and the job-types and RTW at three-month follow-up

Variable	n <sup>b</sup>	Unadjusted			Adjusted <sup>a</sup>			
		OR	95% CI	p	n <sup>b</sup>	OR	95% CI	p
Psychological								
job demands	227	.387	[.199 – .753]	.005	211	.319	[.147 - .688]	.004
Decision latitude	230	1.610	[.875 – 2.962]	.126	214	1.716	[.824 – 3.574]	.149
<i>Skill discretion</i>	239	1.479	[.804-2.731]	.209	219	1.452	[.698 – 3.017]	.318
<i>Decision authority</i>	238	1.721	[.945 – 3.135]	.076	215	1.930	[.954 – 3.902]	.067
Co-worker support	243	3.134	[1.624 – 6.049]	.001	228	3.773	[1.723 – 8.263]	.001
Supervisor support	228	2.522	[1.335 – 4.766]	.004	218	2.485	[1.216 – 5.077]	.013
High strain jobs	61	.425	[.235 - .869]	.017	203	.371	[.156 – .885]	.025
Low strain jobs	58	2.622	[1.045 – 6.578]	.040	203	2.437	[.951 – 6.247]	.065
Active jobs	48	.780	[.349 – 1.744]	.545	203	.671	[.277 – 1.624]	.376
Passive jobs	50	1.515	[.700 – 3.279]	.292	203	1.713	[.671 – 4.373]	.261

Note: OR = Odds ratio; CI = Confidence interval

<sup>a</sup> Adjusted for gender, civil status, education, income, physical job demands, diagnose and sector <sup>b</sup> all predictors could not be assessed for every subject due to missing values



**Table 5** The association between the items in the job dimension scales at the end of rehabilitation, and the three-month follow-up

Dimension	Item	End of rehabilitation				3-month follow-up		
		n <sup>a</sup>	Fisher	Cramers V	p	Fisher	Cramers V	p
Skill discretion	Learn new things	247	6.881	.162	.064	1.871	.086	.627
	Repetitive work	245	.340	.039	.963	.846	.056	.844
	Require creativity	246	4.861	.144	.179	4.776	.142	.185
	High skill level	249	7.724	.163	<b>.042</b>	1.347	.058	.714
	Variety	247	4.178	.130	.228	2.942	.110	.384
	Develop own abilities	247	7.504	.181	.055	.900	.061	.839
Decision authority	Allows own decisions	244	.629	.053	.895	11.305	.212	<b>.009</b>
	Little decision freedom	242	1.603	.087	.667	2.065	.092	.564
	Lot of say	242	6.468	.161	.085	1.252	.071	.765
Psychological job demands	Work fast	248	.724	.056	.901	6.560	.094	.074
	Work hard	245	.650	.051	.902	9.057	.194	<b>.022</b>
	Excessive work	244	3.793	.132	.265	5.968	.168	.100
	Enough time	242	4.173	.130	.238	2.397	.097	.501
	Conflicting demands	233	1.276	.068	.758	4.060	.126	.234
Co-worker support	Co-worker's competent	245	.755	.070	.905	3.422	.112	.318
	Co-worker's interested in me	244	2.464	.105	.488	18.030	.290	<b>.000</b>
	Friendly co-workers	244	.490	.057	.977	7.683	.194	<b>.035</b>
	Co-worker's helpful	244	5.916	.166	.099	13.292	.242	<b>.003</b>
Supervisor support	Supervisor is concerned	240	4.743	.146	.188	8.509	.192	<b>.033</b>
	Supervisor pays attention	237	2.959	.111	.404	5.921	.156	.110
	Helpful supervisor	235	4.350	.142	.230	9.733	.207	<b>.018</b>
	Supervisor good organiser	235	2.999	.110	.392	2.408	.101	.503

Note: the items with a significant association is highlighted in bold case

<sup>a</sup> all predictors could not be assessed for every subject due to missing values

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# **PART II**

Thesis

## **ABSTRACT**

**BACKGROUND:** Long-term sickness absence is a major health and economic problem in the industrialised world. Factors that might have an impact on return to work are therefore of great interest. The most used model in the work-health tradition is the demands-control-support model. Psychosocial work characteristics are known to influence health, but little research is done on psychosocial work characteristics' impact on return to work.

**OBJECTIVE:** the aim of the study was to examine the impact of psychosocial work characteristics on return to work after occupational rehabilitation.

**METHODS:** The study was design as a deductive cohort study of 251 sick-listed employees in a Norwegian rehabilitation program recruited between November 2011 and July 2012. A Norwegian translation of the Job Content Questionnaire was filled out by the participants in the program. Return to work was measured at two follow-up times, end of rehabilitation and three months after. Data on sickness absence was retrieved from the Norwegian social insurance register. Logistic regression analysis was used to investigate the association between the demand-control and support dimensions and return to work.

**RESULTS:** After adjustments, skill discretion was associated with return to work at end-of-rehabilitation follow-up. At three-month follow-up, high psychological job demands, low social support and being in high-strain jobs were associated with not working.

**CONCLUSION:** The purpose of the thesis was to give more insight to providers of rehabilitation programs, so there might be more focus on workplace issues predicting RTW in the future. The results from the study revealed that work characteristics had an impact on return to work. The results therefore suggest that interventions aimed at returning people to work might benefit from including organisational job redesign measures, secure support at the workplace or modification of job demands.

## 1.0 Introduction

### 1.1 Background

Long-term sickness absence is a major public health and economic problem in the industrialised world (Vlasveld et al., 2012). In Norway, there is an ongoing debate about the high sickness absence rates, and the costs sickness absence brings with it for the government and industry. Research on the onset of sickness absence has revealed that a relatively small group of workers are responsible for most of the sickness absence, and that this group disproportionately contribute to the costs of sickness absence (Einarsen, Øverland, & Schulze, 2011; Henderson, Glozier, & Elliot, 2005; Krause, Dasinger, & Neuhauser, 1998; Vlasveld et al., 2012). In their study on sickness absence, Tveito and colleagues (2002) found that 10% of employees accounted for 82% of the sickness absence (Tveito, Halvorsen, Lauvålien, & Eriksen, 2002). In 2011 government expenses on sickness and unemployment benefits were estimated to 36,4 billion Norwegian Kroner (approximately \$6.5 billion) (Hystad, Eid, & Brevik, 2011). Because of production losses and other financial costs to the industry, as well as the government's expenditures, sickness absence is a topic high on the political agenda.

Besides economic consequences, long-term sickness absence can affect the worker's health, as well as inhibit recovery (Floderus, Göransson, Alexanderson, & Aronsson, 2005). Several types of negative consequences of prolonged sick leave have been found, including increased risk of social isolation and inactivity, pain, reduced well-being, and impaired self image (Floderus et al., 2005; Ockander & Timpka, 2001; Post, Krol, & Groothoff, 2005). Ockander and Timpka (2001) for example, found that being on sick leave generated new problems in addition to the original health problems, such as inactivity and isolation, which in turn resulted in greater pain, restlessness, stress, depressed mood and a tendency to become trapped in a negative sick role (Ockander & Timpka, 2001). This may, in turn, reduce the probability of returning to work (Floderus et al., 2005; Janssen et al., 2003). As the sick leave is prolonged, the distance to the work place can become a challenge in itself, and recovery can be even harder for the absentees (Aas, 2009). In general, the probability of returning to work is inversely proportional to the length of absence from work, regardless of medical conditions (Fukuoka et al., 2009; Krause et al., 1998). A quick return to work (RTW) may therefore often be beneficial for the sick-listed worker.

Increasing emphasis has been put on occupational rehabilitation when it comes to reintroducing sick or injured people to a job. Occupational rehabilitation concerns the

provision of services for persons in employment to enable them to re-enter the work market after or during illness or injury (Aas, 2009; Selander, Marnetoft, Bergroth, & Ekholm, 2002). Most of the occupational rehabilitation programs aimed at returning people to work have mainly considered medical conditions, and have almost exclusively been dealt with by the health care service. The programs have not always been proven successful (Aas, 2009, 2011). Recent research has found that RTW is not only influenced by medical factors, but also by personal and job-related factors (Post et al., 2005; Selander et al., 2002; Vlasveld et al., 2012). In order to get a better understanding of RTW, identifying the factors influencing RTW after rehabilitation is important, and can help establish strategies to reduce sick leave that go beyond rehabilitation alone (Anema et al., 2004; Ballabeni, Burrus, Luthi, Gobelet, & Dériaz, 2010; Vlasveld et al., 2012).

In order to design workplace interventions, knowledge about the full range of factors involved in the aetiology of disease and health is important. Today there is a wide range of meanings attached to the concept of health. Since the decline in infectious diseases in the 19<sup>th</sup> and early 20<sup>th</sup> centuries, researchers have sought to identify the modern society's determinants of health and ill health (Naidoo & Wills, 2009). Today growing emphasis is placed on the importance of social and personal factors in the construction and meaning of health. In the International Classification of Functioning, Disability and Health (ICF), for example, disability and functioning are viewed as outcomes of interactions between health conditions and contextual factors, including personal and environmental factors (Vlasveld et al., 2012; Üstün, 2002). In accordance with this understanding of health and disability, there has been a growing interest in how work and the work environment can affect the worker's health (Naidoo & Wills, 2009). Considerable research has been done concerning the psychosocial work environment and its relevance for various health-related outcomes (Eatough, Way, & Chang, 2012; Karasek & Theorell, 1990). In a report from the Oslo Health Study, for example, the researchers found that nearly 60% of common health problems in the Oslo population were attributed to working conditions (Mehlum, Kjuus, Veiersted, & Wergeland, 2006). According to numbers from Levekårsundersøkelsen in 2006, almost 40% of employees sick-listed for 14 days or more reported that their absenteeism was connected to work related health complaints (Ose, 2010). Factors such as job dissatisfaction, lack of autonomy, high job demands and workload, low social support and job strain have been related to increased risk for work-related musculoskeletal disorders, mental health problems (like depression and anxiety), cardiovascular disease and even some forms of cancer (Bosma et al., 1997; Eatough et al., 2012; McShane & Glinow, 2010; Sanne, Mykletun, Dahl, Moen, & Tell, 2005;



Stansfeld & Candy, 2006). One of the most widely used models in the research field concerning the psychosocial work environment and health-related outcomes has been the demand-control-support (DCS) model (Aas, 2011; Ballabeni et al., 2010; Eatough et al., 2012; Janssen et al., 2003). The concept of demand and control was introduced by Karasek in 1979 (Karasek, 1979), and was further developed by Johnson and Hall in 1988, by including the dimension of social support (Johnson & Hall, 1988; Karasek & Theorell, 1990). The demand-control model and the job strain hypothesis propose that high-strain jobs, i.e. jobs with high psychological demands and low decision latitude, have adverse health effects. Social support is considered to counteract stress at the workplace and to decrease the risk of illness. Because RTW can be considered a measure of recovery from health complaints (Janssen et al., 2003), it is possible that work characteristics might also predict recovery as measured by RTW. Because this category of determinants has not been given much attention in regard to RTW (Aas, 2011; Janssen et al., 2003), the effects of work characteristics on RTW will be explored in this thesis. The DCS model will be used as a starting point. The overarching research question for this thesis is:

*To what extent can the dimensions in the demand-control-support model predict return to work after occupational rehabilitation?*

## **1.2 Previous research**

Several studies have identified physical and organizational job characteristics that might constitute significant barriers for RTW (Krause & Lund, 2004). Most of the studies have however placed emphasis on physical accommodations, evaluating the physical capacities of the person and physical demands of the job, hardly ever considering other work conditions (Gimeno, III, Habeck, & Katz, 2005). Studies considering the psychosocial work environment are few, but the evidence supporting a relationship is growing.

Although the demand-control model was not originally developed to predict recovery of illness, the lack of a comprehensive theoretical model that applies to the predictors of RTW has prompted researchers to investigate whether job strain predicts the rate of RTW (Janssen et al., 2003; Lidwall & Marklund, 2006). The studies done to this day have, however, used different specific study groups and different measures of RTW, and the results are fairly inconclusive. This has made the results hard to generalise, and strong evidence for any of the factors has not been established. In general, however, there seems to be an association between high job demands and delayed RTW (Ballabeni et al., 2010; Fukuoka et al., 2009;

Janssen et al., 2003; Johnsson et al., 2009; Krause, Dasinger, Deegan, Rudolph, & J.Brand, 2001; Krause, Frank, Dasinger, Sullivan, & Sinclair, 2001), and between low job control and high rates of sickness absence (Lidwall & Marklund, 2006). Job demands are often defined as demands placed on the employee by the job (Spector, 1997). Control is referred to as the freedom that employees are given to make decisions about their work (Spector, 1997). High strain-jobs (jobs with high demands and low control) has in addition been found to be an independent predictor of delay in return to work (Fukuoka et al., 2009), and individuals with high-strain jobs have been found to be overrepresented among long-term sick-listed employees (Lidwall & Marklund, 2006). In addition, social support has been found to have a buffering affect in the RTW process (Ballabeni et al., 2010; Janssen et al., 2003; Krause, Dasinger, et al., 2001), although inconsistent findings are reported (Krause & Lund, 2004). In addition to inconclusive findings across groups of research samples, it seems like the dimensions might have differing effects on RTW, depending on the time frame used. Ballabeni et al. (2011), for example measured RTW at three time points; at three months, 1 year and 2 years after rehabilitation. At three months, support was found for the effect of psychological job demands and social support, indicating that the chances of working at three months increased with increasing social support, but decreased with increasing psychological demands. Not much evidence was found for an effect of job control or job strain (Ballabeni et al., 2010). At 1 year, however, high job strain subjects were more likely to have returned to work than low strain subjects, whereas 2 years after rehabilitation, no apparent effect for any of the work characteristics were found (Ballabeni et al., 2010).

Findings from previous research underline the importance of considering work related psychosocial conditions in explaining a worker's RTW. Because the studies show differing results the researchers suggest that more research is needed on the role of job characteristics in the RTW process (Gimeno et al., 2005; Janssen et al., 2003; Johnsson et al., 2009; Nielsen et al., 2006). The researchers further suggest that the findings that the work environment might affect duration of sick leave and RTW, should have implications for further work on rehabilitation, prevention of sickness absence and promotion of RTW in the workplace (Gimeno et al., 2005; North, Syme, Feeney, Shipley, & Marmot, 1996; Vlasveld et al., 2012).

## **1.4 Theoretical framework**

### **Definition and measurement of Return to Work outcome**

While the term 'return to work' is commonly used, a clear, consensual and operational definition of the term is lacking (Biering, Hjöllund, & Lund, 2012). The term refers to a

variety of related concepts and definitions of occupational outcomes after disabling injury or illness, and is used to describe the duration or extent of an inability to work due to impaired health or functional limitations (Krause, Frank, et al., 2001; Krause & Lund, 2004). A literature study done by Aas (2011) reveals that the term is used in at least four disparate ways to describe: 1. a point in time; 2. a type of work status; 3. a personal process or a rehabilitation process; 4. a type of intervention or a program (Aas, 2011). The duration of work disability can be defined cumulatively, as the duration of all dates lost from work beginning with the date of injury, categorically (e.g. working at time X yes/no), or continuously, as time-to-RTW (e.g. calendar time from date of injury to date of first RTW) (Krause, Frank, et al., 2001). In this thesis, RTW is measured as a categorical outcome at a given time point.

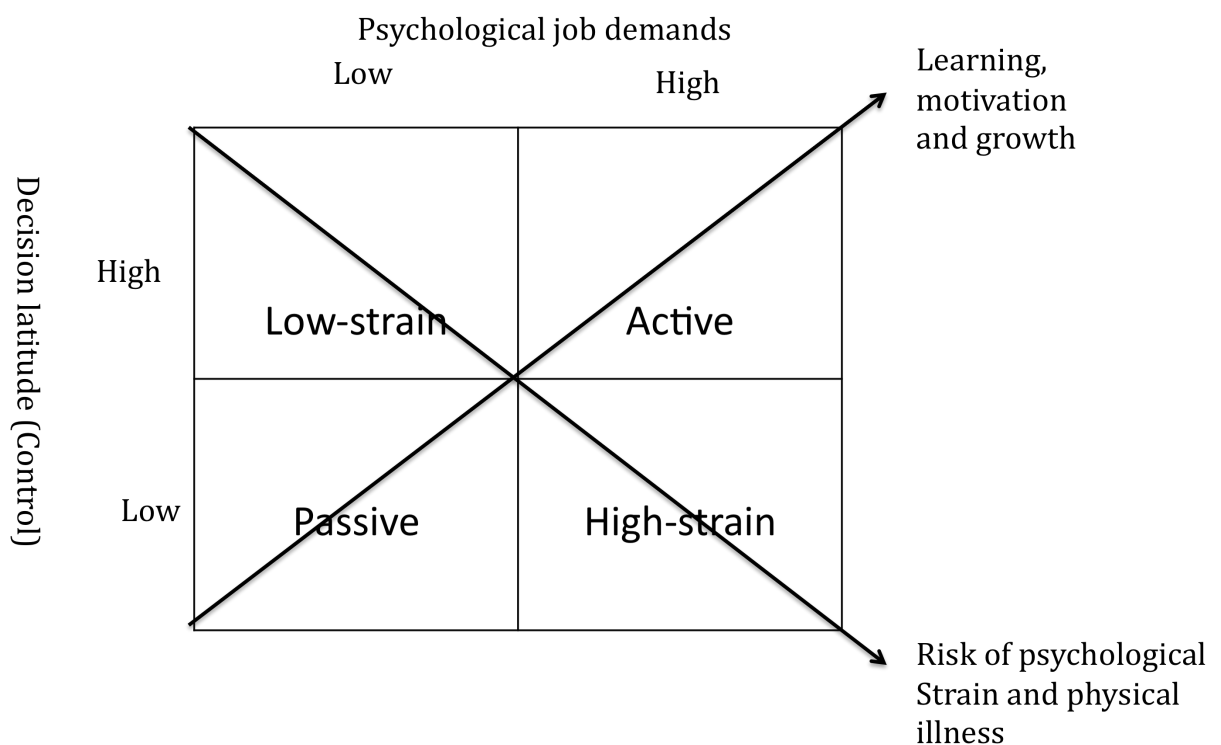
### **The demands-control-support model**

This study was based on the job DCS model developed by Karasek and Theorell (1990), one of the most used theories in the job strain research tradition. In the model, two key dimensions of the psychosocial work environment are described – psychological job demands and decision latitude (control). Psychological work demands is a measure of work pressure and workload, and is described as “the amount of disorganisation in the work task that the worker is required to place in an organised state” (Karasek & Theorell, 1990, p. 64). Decision latitude is made up of two theoretically distinct scales measuring the breadth of skills usable on the job (skill discretion) and social authority over making decisions (decision authority). Although these are theoretically distinct, they are considered mutually reinforcing aspects, because a high level of skill gives the worker control over which specific skills to use to accomplish the tasks. The model was later extended to include social support at the workplace (Johnson & Hall, 1988). Social support at work refers to overall levels of helpful social interaction available on the job from both supervisors and co-workers, both measuring socio-emotional and instrumental support in the workplace. To measure the different dimensions in the model, the job content questionnaire (JCQ) was developed (Karasek et al., 1998).

Karasek and Theorell (1990) have demonstrated how the model can predict a broad range of health and behavioural consequences of the structure of work, by combining different levels of the three dimensions. They postulate four distinctly different kinds of psychosocial work experiences generated by the interactions of high and low levels of psychological demand and decision latitude (Fig. 1): high-strain jobs, active jobs, low-strain jobs and passive jobs. *High-strain jobs* are characterised by high psychological demands and

low decision latitude. The most adverse reactions of psychological strain (fatigue, anxiety, depression and physical illness) are predicted for this type of job. Jobs in which control is high and psychological demands are correspondingly high, are called *active jobs*. Though intensively demanding, the work situation involves workers in activities in which they feel a large measure of control and the freedom to use all available skills. Research has found this group of workers to be the most active in leisure and popular activities outside of work, in spite of heavy work demands. The active jobs are predicted to have an optimistic set of psychological outcomes, including learning, motivation and growth. *Low strain jobs* are characterised by low levels of psychological demands in combination with low decision latitude. For this group of workers it has been postulated lower than average levels of psychological strain and risk of illness, because low decision latitude allows the individual to respond to each challenge optimally, and because there are relatively few challenges to begin with. These people are actually made both happier and healthier than average by work. *Passive jobs* are represented by low demands and low control. In these situations, a gradual atrophying of learned skills and abilities may occur. The passive job setting is the second major psychological work problem described in the model.

**Fig. 1** The demand-control model. Based on the model as described by Karasek (1979)

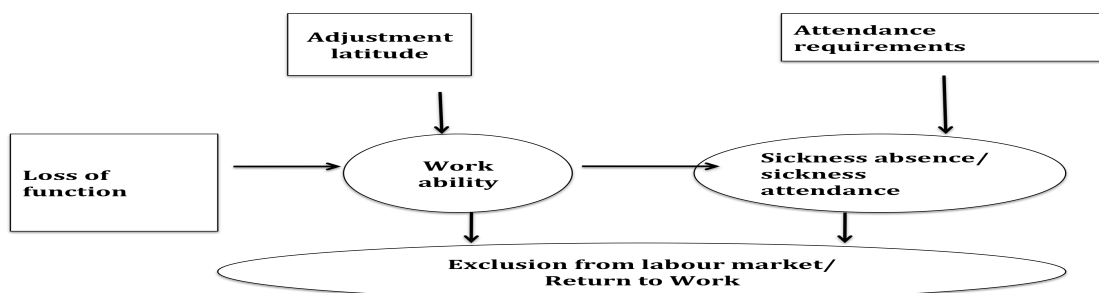


In addition to the job-types, two hypotheses are stated in the model: The *strain hypothesis* postulates that high demands and low control predicts psychological and physiological stress and possible disease. Low social support at work further increases the risk. The *active learning hypothesis* postulates that learning occurs in situations where the challenges are matched by the individual's control over alternatives or skill in dealing with those challenges.

### The illness flexibility model

The illness flexibility model was developed by Johansson and Lundberg (2005), and has been the focus of an increasing number of studies on RTW and sickness absence. According to the model whether a person is sick-listed or not, is a function of the persons decision to go to work (Johansson & Lundberg, 2004). When the person makes the decision to be absent or stay at work despite the disability, the disability is only one factor in the decision-making process (Aas, 2009; Johansson & Lundberg, 2004, 2005). The choice is affected by a function of different factors outside the individual. These factors include the adjustment possibilities available in the job (adjustment latitude), the health situation itself (work ability), incentives of staying at work or at home (sickness attendance or absence), as well as absence requirements in the job, referring to the negative consequences of staying at work while ill (Johansson & Lundberg, 2005). The illness flexibility model can be seen in connection with the DSC-model, as the levels of work flexibility can be viewed as a opportunity for increased control (Aas, 2009). In other words, more opportunities for adjustments can increase the decision latitude for the sick-listed employee.

**Fig. 1** The model of illness flexibility. Based on the model of Johansson and Lundberg (2005)



## **1.4 Context – evaluation of the ‘Rapid-Return-to-Work-program**

This thesis is an integrated but independent contribution to a large national research project in Norway – the ‘Rapid-return-to-work’ study. The project is an evaluation of the national occupational rehabilitation program entitled “raskere tilbake” or “rapid return-to-work” (Rapid-RTW). The Rapid-RTW-program is to this day the largest effort to promote RTW in Norway. The program was established in 2007, after being suggested by the Stoltenberg’s Sickness Absence Committee in 2006, and is aimed at strengthening the treatment and rehabilitation for persons on sick leave. The goal of the intervention is to accomplish more rapid clarification, medical treatment, and rehabilitation in sick leave cases, and to contribute to a faster return to work for employees on sick leave (Aas, 2011; Aas, Solberg, & Strupstad, 2011). The purpose is to provide more occupational rehabilitation, in addition to reducing the duration of sick leave, and thereby also reducing the financial costs of paid sick leave (Aas et al., 2011). The government finance the program, and different public and private clinics, institutions and hospitals throughout Norway offer the program. The interventions include medical and surgical treatment at clinics, rehabilitation in hospitals (somatic), psychiatric treatment and rehabilitation, occupational training and rehabilitation in institutions, and follow-up and clarification of work abilities (Aas et al., 2011). In administrating the programs, there have been few detailed guidelines for what the intervention should include, or how it should be organised, and the intervention has therefore differed from clinic to clinic. In 2011 the Norwegian Ministry of Labour decided to evaluate the program in order to improve the intervention. The aim of the evaluation has been to see what the program should contain and how it should be organised in order to help employees on sick leave to RTW. To do the evaluation, the Ministry of Labour started collaboration with PreSenter at the International Research Institute of Stavanger (IRIS), Oslo and Akershus University College (HiOA) and the University of Stavanger (UiS).

## **1.5 aim of the study**

The aim of the study was to assess the association between the psychosocial work environment, as measured by the dimensions in the DCS-model, and RTW after occupational rehabilitation. The purpose was to give more insight to providers of rehabilitation programs, so there might be more focus on workplace issues predicting RTW in the future.

## **Research questions and hypotheses**

Based on the theory of demands, control and support, two research problems were postulated:

1. Is there a relation between job demands, job control, or social support, and return to work?
2. Can any of the job-types postulated by Karasek and Theorell (1990) predict return to work outcomes?

In light of the research questions outlined above, four hypotheses were stated. The hypotheses revolved around the different aspects of the work environment, as measured by the dimensions in the model, and its relation to RTW-outcomes. The hypotheses were as follows:

H0: There is no relation between job demands, job control, or social support, and return to work, or any of the job-types and return to work

H1: High job demands will prevent return to work

H2: High control will promote return to work

H3: High social support will promote return to work

H4: Individuals with active jobs will return to work more often than individuals in high strain jobs, low-strain jobs or passive jobs

## **2.0 Methods**

### **2.1 Research design**

This study was conducted as a deductive cohort study of RTW in patients (n=251) after occupational rehabilitation. RTW was measured at two follow-up times; end-of-rehabilitation follow-up, and a three-month follow-up after rehabilitation.

### **2.2 Data collection**

The study population was recruited through the national occupational rehabilitation program 'Rapid-RTW'. The recruitment strategy followed the following steps: Firstly, coordinators in the health authorities and the Norwegian Labour and Welfare Administration (NAV) were contacted in order to provide lists of institutions offering the Rapid-RTW-

program, as these are the governmental coordinators of the program. Then, all leaders or coordinators in the institutions offering a Rapid-RTW-program were contacted by mail from the researchers, inviting the institution to participate in the study. Of a total of 210 clinics, 50 agreed to participate. The Rapid-RTW-clinics who agreed to participate were asked to pick a local study coordinator who was appointed the local responsible for the study in each clinic. Agreeing to participate entailed them to recruit patients, and their providers, for a minimum of two months. Institutions that had not responded after 8-10 days were contacted again with a reminder mail. The institutions that accepted the offer were sent a package with information about the study, posters, consent forms, questionnaires, reply envelopes and letterboxes, within a week after acceptance. All the local administrators who accepted the invitation were contacted 10-12 days after acceptance, to check whether the packages were received, and to see whether they had any questions about the study. The research group was then available for questions the whole recruitment period. The recruitment process was conducted at two different points in time, November through December 2011, and June through August 2012. This was done because of lack of attendance in the first recruitment round. The data collection period was between February and October 2012.

### **Inclusion criteria**

The inclusion criteria for this master thesis were: (1) that the participants had finished rehabilitation before or during the study period; (2) that they were on sick leave at the start of the rehabilitation period; (3) that they were in paid employment. People who were not sick listed at the start of the rehabilitation period and who were characterised as self-employed, were excluded from the study.

### **2.3 Study sample**

The data material available for the master student consisted of 455 participants. Of these, 344 had registered the dates for their occupational rehabilitation period. At baseline, 251 participants met the inclusion criteria of being on sick leave at the start of rehabilitation. Table 1 shows baseline characteristics of the study sample. Figure 2 shows the distribution of participants in occupational branch. The sample consisted of 76,1% women and 23,9% men. Of the participants included, 57.4% had a musculoskeletal diagnosis, while 15.9% had a psychological disorder. 60.6% (n = 152) of participants received multidisciplinary treatment, while 4.3% (n=11) received treatment from only one profession. For the remainder of the participants, no treatment was registered. 44.2% (n = 111) of the participants received

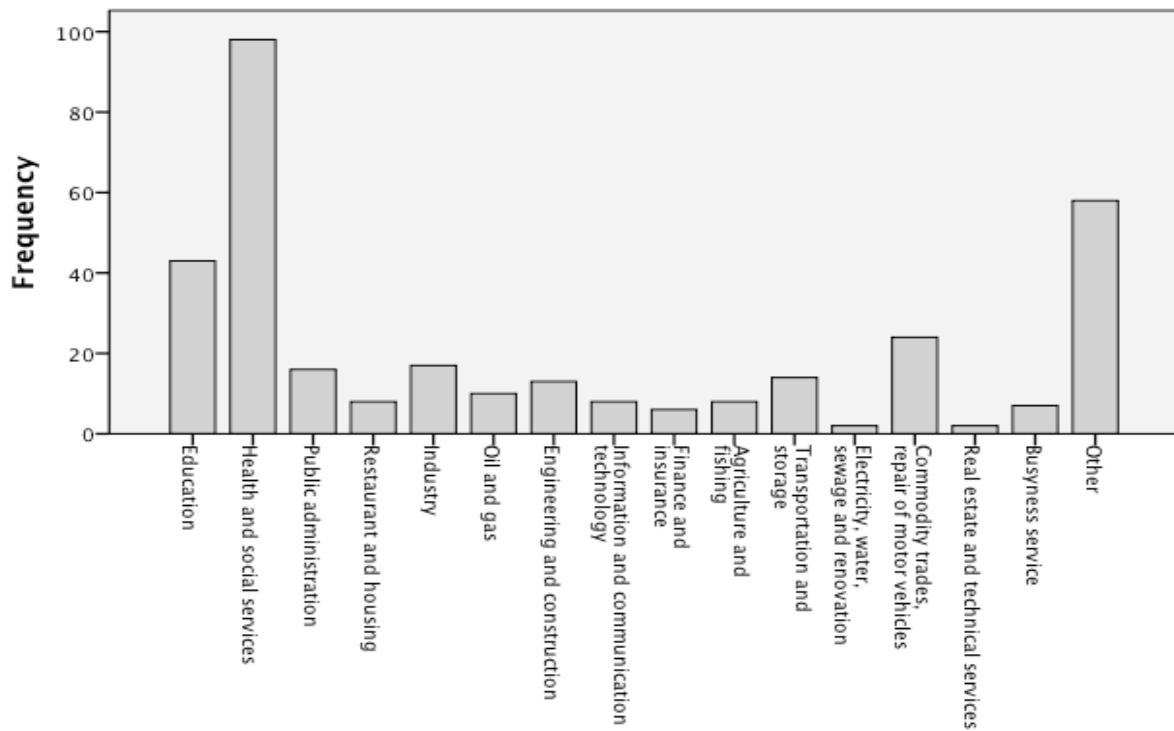


interventions that included psychological treatment or therapy (i.e. behavioural therapy, psychotherapy or general conversational therapy), or treatment including coping and motivational exercises. Furthermore, 27% (n = 68) received some form of medical or physical treatment.

**Table 1** Distribution of participants on baseline characteristics

Characteristics	Category	n	%
Gender	Male	60	23.9
	Female	191	76.1
Educational level	Very low (elementary school, up to 9 years of schooling)	26	10.4
	Low (Upper secondary school, ca 12 years of schooling)	107	42.6
	High (Undergraduate university degree, up to 4 years)	79	31.5
	Very high (Postgraduate university, more than 4 years of university education)	34	13.5
Diagnose	Musculoskeletal	144	57.4
	Psychological	40	15.9
	Other	62	24.7
	Not registered	4	1.6
Civil status	Unmarried	46	18.3
	Cohabiting	52	20.7
	Married/registered partner	117	46.6
	Separated	3	1.2
	Divorced	31	12.4
	Widowed	2	.8
Occupational sector	Private	114	45.4
	Governmental	33	13.1
	Public	85	33.9
	Private sector/public enterprise	11	4.4
	Self-employment	3	1.2

**Fig. 2** Distribution of participants in occupational branch



## 2.4 Measures

### Job characteristics and the job quadrants

Job characteristics were measured by a Norwegian translation of the job content questionnaire (JCQ), which was included in the bigger questionnaire by PreSenter at IRIS for evaluating the Rapid-RTW-program (the larger questionnaire can be retrieved from PreSenter's website at: <http://www.presenter.no/raskeretilbake/index.html> pr. may 2<sup>nd</sup> 2013). The JCQ is a standardised questionnaire which measures three dimensions in the work environment, namely psychological job demands, control (decision latitude) and social support. The JCQ as a measure of job strain is recognised as having high validity and reliability. Numerous studies have confirmed the reliability of the scales, and there are found substantial similarities in means, standard deviations and correlations among the scales across studies conducted in USA, Europe and Japan (Rober Karasek et al., 1998). The reliability of a scale can, however, vary depending on the sample used (Pallant, 2007), and the internal reliability (measured with the Cronbach's alpha) was therefore also checked in this sample. For a comparison of Cronbach's alpha values in Karasak's study compared to the values from this study, see Table 1 in appendix A.

Psychological job demands was measured with 5 items, and the possible scores on the scale ranged from 14-48, with a Cronbach's alpha of .73. Decision latitude consists of the two theoretically distinct scales skill discretion and decision authority. The skill discretion scale (range 12-48, Cronbach's alpha .64) was measured using 6 items. Decision authority (range 12-48, Cronbach's alpha .60) was measured with 3 items. Social support was measured by the two scales co-worker support and supervisor support. Co-worker support was measured with 4 items, with scores ranging from 4-16, and a Cronbach's alpha of .81, and supervisor support was measured with 4 items, possible range 4-16 and Cronbach's alpha .91. Items in both scales reflect socio-emotional and instrumental support. All the job characteristics items were scored on a four-point Likert scale, ranging from 1 'strongly disagree' to 4 'strongly agree'. Sum scores for each scale was calculated according to the formulas for job content instrument construction (retrieved from <http://www.jcqcenter.org> march 27<sup>th</sup> 2013). The scores were created by dichotomising the variables at the median, indicating high and low levels of the dimensions. Values equal to the median were classified into the less hazardous exposure level (that is, low demands, high control, or high social support). The four job types were then created based on the quadrant term (Landsbergis, Schnall, Warren, Pickering, & Schwartz, 1994), by cross-classifying the dichotomised variables of psychological job demands and job control: high strain jobs (high demands and low control), low strain jobs (low demands and high control), active jobs (high demands and high control) and passive jobs (low demands and low control). An extraction of the questionnaire is attached in Appendix B, and includes the questions used from the JCQ.

### **Return to work outcomes**

RTW was measured at the end of rehabilitation and three months after the rehabilitation period ended, for each of the participants. Records of sickness absence for each of the patients were collected from the database FD trygd, a database provided by the Norwegian social insurance register which provides statistics concerning social security benefits and other related statistical data. The records list the beginning and end dates of each sick leave for each patient. To identify employees who were on sick leave at the start of the rehabilitation period, sick-leave statuses at the start of the rehabilitation period for each patient was recorded. For the RTW-variables each participant was checked individually, recording the degree of sickness absence at the end of rehabilitation and 3 months after the rehabilitation period had ended. Based on measures from previous RTW-studies (Biering et

al., 2012; Fukuoka et al., 2009), RTW was defined as starting back at work for more than 50% (20h or more per week).

## **2.5 Potential confounders**

Gender, diagnose, educational level, civil status, sector, household income, branch and physical job demands were considered potential confounders, as these have been shown to affect duration of sick-leave in earlier studies (Aas, 2009; Post et al., 2005; Selander et al., 2002). Age and previous sickness absence-history are also known confounders (Selander et al., 2002), but data on these were not available at the time of the analyses, and were therefore not controlled for. Each potential confounder was tested separately in bivariate analyses, and non-significant factors were manually eliminated until the regression model reached statistical significance for each of the predictor variables. Selected confounders for both of the follow-up times included: educational level, sector, household income, physical job demands, diagnose, gender and civil status. At the end of rehabilitation, occupational branch was also included as a confounder.

## **2.6 Statistical analysis**

### **Data preparation and preliminary analyses**

SPSS version 20 was used for all the analyses. To ensure that the questionnaires were reported correctly, all the data files were reviewed and corrected by at least two individuals from the research group before the analyses were conducted. Although preliminary measures were taken in order to avoid registration errors, one case (ID 984) was identified with an error on one of the items used, making the reliability of the scale very low (Cronbach's alpha .243 on the decision authority scale). Because the original completed questionnaire was not available for the students, the case was excluded from the analyses. Further preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. All the assumptions were met.

### **Testing of the hypotheses**

For the hypothesis testing, the significance level for the tests were set at  $p \leq .05$ . The strategy for testing the first three hypotheses included 3 steps. First, chi-square tests of independence were conducted for each of the job dimensions and RTW at the two time points. The chi-square test of independence compares the frequencies of cases that occur in each

category, with the values that would be expected if there were no association between the two variables being measured. The test is based on a cross tabulation table, and evaluates the relationship between the variables by testing whether there are significant differences between the groups (Pallant, 2007). Because the variables in the analyses were based on 2 by 2 tables, the Yates' Correction for Continuity was used. The Continuity Correction compensates for the overestimation of the chi-square value when used within a 2 by 2 table (Pallant, 2007). The effect size, as measured by the phi coefficient, was recorded for significant associations. The phi coefficient is a correlation coefficient, which ranges from 0 to 1, with higher values indicating a stronger association between the variables. Using Cohens Criteria an effect size of .10 is considered small, .30 a medium effect and .50 a large effect (Pallant, 2007). Before the chi-square tests were performed, the assumption about 'minimum expected cell frequency' was checked. All the cells had an expected frequency of 5 and greater, and the assumption was not violated for any of the covariates. As a second step, separate logistic regression models were calculated for each of the scales with an association to the outcome measures, with p-value  $p \leq .20$ . A logistic regression analyses allows you to test models to predict categorical outcomes with two or more categories (Pallant, 2007) – in this case, the likelihood that there is an association between the JCQ dimensions and RTW at the two follow-up times. In a logistic regression, Odds Ratio's (OR) are calculated for each of the predictor variables. The OR represents the change in odds of being in one of the outcome categories when in the different groups of the independent variable (Pallant, 2007). This was done to measure the strength and direction of the association, as this is not given in a chi-square test. As a third step, separate regression models were calculated for each dimension at the two time-points, adjusted for the confounders. This was done to see if the associations between the variables were due to the scales alone, or whether any of the potential confounders affected the relationship. Where the chi-square tests of independence showed a p-value of  $p \leq .20$ , only the results from the logistic regression were reported. As an additional test, Fisher's exact probability test of independence was conducted for the association between each of the JCQ items and RTW at the two follow-up points, so that items with the most significant contributions could be identified. Fisher's exact probability test was used instead of a chi-square test of independence because the lowest expected frequency was lower than 5 in most of the cells. When the distribution of cases is skewed, the chi-square test of independence does not provide a correct answer. The Fisher test, however, can calculate the exact significance of the deviation from a null hypothesis, rather than relying

on approximation that becomes exact in the limit as the sample size grows, as it does in a chi-square test (Bjørndal & Hofoss, 2010; Pallant, 2007).

The fourth hypothesis (H4) was firstly tested with a cross-tabulation to establish which of the job-types had the highest RTW-rates. In addition, a chi square test of independence was conducted to see if the distribution was due to chance (H0). If the chi-square test indicated an association of  $p < .20$ , regression models were calculated separately for each of the job types and RTW, both unadjusted and adjusted for potential confounders. This was done to evaluate the predictive value for each of the job-types in the RTW-process.

## **2.7 Ethical considerations**

The Norwegian Social Science Data Service (NSD) approved the project, and included approval from the Norwegian Data Protection Authority. The regional Committees for Medical and Health Research Ethics (REK) reviewed the plan for the study, and deemed that the investigation did not have to be submitted for ethical approval. The project, and this thesis, follows further standard ethical guidelines for the health sciences. The data was processed without name and personal identification number, or any other information that directly could be linked to any of the informants. All the questionnaires were de-identified by the research manager, and only this person had access to the identification key linking the new ID number to the informant. Before data collection, all the informants were given a letter of consent, which they were to sign if they wanted to participate in the study. Information letters were also given to all informants and potential informants, stating that participation in the study was based on free will, and that they could withdraw their consent without further consequences at any time. If this was the case, all the data the informant contributed with was deleted if desired. The informants also had the right to access the results throughout the project period. The information letter and the consent forms are attached in Appendix B.

## **3.0 Results**

The results are divided into two different follow-up times: end of rehabilitation follow-up, and 3-month follow-up after rehabilitation. For a complete overview of the summary statistics for each JCQ item, see Table 2 in appendix A. The items are not presented separately in the results section, but are further discussed in the discussion.

### 3.1 End of rehabilitation results

#### The DCS dimensions and RTW at the end of rehabilitation

Table 2 represents summary statistics for the distribution of participants in the job dimensions, as well as the results from the chi-square test of independence for each of the dimensions. By the end of rehabilitation, 25.4% of the sample had returned to work. None of the dimensions reached statistical significance at this follow-up time (table 2). When the sub-dimensions decision authority and skill discretion were tested separately, no association was found between decision authority and RTW ( $n=238$ ),  $X^2 = .027$ ,  $p = .870$ ,  $\phi = .020$ . Skill discretion, however, showed a significant relationship with RTW ( $n = 239$ ),  $X^2 = 9.540$ ,  $p = .002$ ,  $\phi = .210$ . After calculating the unadjusted regression model, the relationship was confirmed, with skill discretion reporting an OR of 3.160 (95% CI: 1.542-6.478)  $p = .002$ . The model was statistically significant at  $p = .001$ -level, and explained between 4.6% and 6.8% of the variance, as recorded by Cox & Snell R square and Nagelkerke R Square. The adjusted model further confirmed the association, with skill discretion reporting an OR of 3.410 (95% CI: 1.381 – 8.420),  $p = .008$ , with the model being statistically significant at the  $p < .05$ . The adjusted model explained between 22.4% and 32.2% of the variance in RTW. Although skill discretion did show an association with RTW, the control dimension did not reach statistical significance. The null hypothesis, which states that there is no relation between the dimensions and RTW, was therefore retained.

**Table 2** The distribution of participants on psychological job demands, decision latitude, co-worker support and supervisor support, and their association with RTW at the end of rehabilitation

Category	n <sup>a</sup> total	Not-RTW		RTW		X <sup>2</sup>	phi	p
		n	(%)	n	(%)			
Psychological job demands	227	167	(73.6)	60	(26.4)	.073	-.028	.787
<i>High</i>	112	81	(35.7)	31	(13.7)	-	-	-
<i>Low</i>	115	86	(37.9)	29	(12.8)	-	-	-
Decision latitude	230	173	(75.3)	57	(24.7)	.093	-.030	.760
<i>High</i>	115	85	(37.0)	30	(13.0)	-	-	-
<i>Low</i>	115	88	(38.3)	27	(11.7)	-	-	-
Co-worker support	243	181	(74.5)	62	(25.5)	.010	-.018	.992
<i>High</i>	189	140	(57.6)	49	(20.2)	-	-	-
<i>Low</i>	54	41	(16.9)	13	(5.3)	-	-	-

Supervisor support	228	169	(74.1)	59	(25.9)	.130	.034	.718
<i>High</i>	134	101	(44.3)	33	(14.5)	-	-	-
<i>Low</i>	94	68	(29.8)	26	(11.4)	-	-	-

Note: Degrees of freedom for all the dimensions = 1.  $X^2$  represents the Chi-square.

<sup>a</sup> all predictors could not be assessed for every subject due to missing values

### The job-types and RTW at the end of rehabilitation

Table 3 represents the distribution of participants in the job-types at the end of rehabilitation. The association between the job-types and RTW was investigated using the chi-square test of independence. No association was found between the job types and RTW at the end of rehabilitation, ( $n = 217$ )  $X^2 = 1.214$ ,  $p = .752$ ,  $\phi = .075$ . The null hypothesis was therefore retained at this follow-up time.

**Table 3** Cross-tabulation showing the distribution of participants in the job types at the end of rehabilitation

Job types	Not RTW			RTW		
	n	% of total <sup>a</sup>	% within job types <sup>b</sup>	n	% of total <sup>a</sup>	% within job types <sup>b</sup>
Passive	38	17.5	76.0	12	5.5	24.0
Active	33	15.2	68.8	15	6.9	31.2
Low-strain	45	20.7	77.6	13	6.0	22.4
High-strain	46	21.2	75.4	15	6.9	24.6

<sup>a</sup> percentage of participants in this category compared to the total amount of participants

<sup>b</sup> percentage of participants who had RTW or not in the different job categories

### 3.2 Three-month follow-up results

Table 4 represents summary statistics from the chi-square tests of independence, and descriptive statistics for distribution of the participants on the job dimensions. Three months after rehabilitation 76,1% ( $n = 191$ ) of the sample had returned to work. The working group was characterised as having more individuals with low psychological job demands, and high co-worker and supervisor support. Because all the JCQ dimensions indicated an association with the outcome variable with a p-value  $p \leq .20$ , only the results from the logistic regression analyses are presented in detail below, individually for each dimension. The results are presented in table 5.



**Table 4** Distribution of participants on psychological job demands, decision latitude, co-worker support and supervisor support, and their association with RTW at three-month follow-up

Dimension	N <sup>a</sup> total	Not-RTW		RTW		X <sup>2</sup>	phi	p
		n	(%)	n	(%)			
Psychological job demands	227	49	(21.6)	178	(78.4)	7.215	-.189	.007
<i>High</i>	115	33	(14.5)	79	(34.8)	-	-	-
<i>Low</i>	112	16	(7.0)	99	(43.6)	-	-	-
Decision latitude	230	56	(24.3)	174	(75.7)	1.912	.101	.167
<i>High</i>	115	23	(10.0)	92	(40.0)	-	-	-
<i>Low</i>	115	33	(14.3)	82	(35.7)	-	-	-
Co-worker support	243	56	(23.0)	187	(77.0)	11.009	.225	.001
<i>High</i>	189	34	(14.0)	155	(63.8)	-	-	-
<i>Low</i>	54	22	(9.1)	32	(13.2)	-	-	-
Supervisor support	228	51	22.4	117	(77.6)	7.485	.192	.006
<i>High</i>	134	21	9.2	113	49.6	-	-	-
<i>Low</i>	94	30	13.2	64	28.1	-	-	-

Note: Degrees of freedom for all the dimensions = 1. X<sup>2</sup> represents the Chi-square

<sup>a</sup> all predictors could not be assessed for every subject due to missing values

### **The DCS dimensions and RTW at three-month follow-up**

#### *Psychological job demands and RTW*

The unadjusted regression model investigating RTW and psychological job demands was statistically significant at the  $p < .05$ -level, explaining between 3.6% (Cox & Snell R Square) and 5.5% (Nagelkerke R Square) of the variance in RTW. After adjusting for the confounders, the regression model was statistically significant at the  $p < .05$  level. The model as a whole explained between 15,4% (Cox & Snell R Square) and 23,6% (Nagelkerke R Square) of the variance in RTW three months after rehabilitation. Psychological job demands made a unique significant contribution to the model, recording an OR of .319. Because this is a value less than 1, a high score on psychological job demands will decrease the chances of returning to work. Based on the results from the regression, people with high psychological demands are less likely to have returned to work three months after rehabilitation, even after adjusting for confounders. The null hypothesis was therefore rejected.

#### *Decision latitude and RTW*

The unadjusted regression model investigating the association between decision latitude and RTW did not reach statistical significance ( $p = .124$ ), indicating that it was not able to distinguish between the participants on the decision latitude dimension. After adjusting for the confounders, the model in itself reached statistical significance ( $p = .035$ ), however, decision latitude did not show an independent contribution to the model ( $p = .181$ ). When skill discretion and decision authority was tested separately, no association was found between skill discretion and RTW ( $n = 239$ ),  $X^2 = 1.215$ ,  $p = .270$ ,  $\phi = .082$ . Decision authority did show a tendency ( $p < .10$ ) in the bivariate analyses. Regression models were therefore calculated for the sub-dimension. The unadjusted regression model did not reach statistical significance ( $p = .075$ ). The adjusted regression model reached statistical significance ( $p < .05$ ), but decision authority did not make a unique significant contribution ( $p = .054$ ). The tendency does not the less indicate that high levels of decision authority might have a positive impact on RTW, reporting an OR of 2.073 (95% CI: .988 – 4.347). However, since none of the dimensions reached statistical significance, the null hypothesis was retained for the control dimension.

#### *Social support and RTW*

The relation between social support and RTW was tested with two separate logistic regression models, one for supervisor support and one for co-worker support, both unadjusted and adjusted for the confounders. For supervisor support, the unadjusted regression model reached statistical significance at the  $p < .01$ -level, reporting an OR of 2.522. The model explained between 3.6% (Cox & Snell R Square) and 5.5% (Nagelkerke R Square) of the variance in RTW. After adjusting for the confounders, the regression model as a whole was statistically significant at the  $p < .05$  level, explaining between 14,1% (Cox & Snell R Square) and 21,3% (Nagelkerke R Square) of the variance in RTW three months after rehabilitation, recording an OR of 2.485.

For co-worker support, the unadjusted regression model reached statistical significance at the  $p < .001$ -level, reporting an OR of 3.134. The model explained between 4.5% (Cox & Snell R Square) and 6.8% (Nagelkerke R Square) of the variance in RTW. After adjusting for the confounders, the regression model as a whole was statistically significant at the  $p < .001$ -level, reporting an OR of 3.773. The model explained between 17% (Cox & Snell R Square) and 25,6% (Nagelkerke R Square) of the variance in RTW at the time point. Based on the results from the regression, people with high co-worker support and people with high supervisor support were more likely to have returned to work three months after

rehabilitation, even after adjusting for confounders. The null hypothesis was therefore rejected.

**Table 5** Unadjusted and adjusted regression models measuring the association between the demands-control-support dimensions and RTW, and the job-types and RTW at three-month follow-up

Variable	n <sup>b</sup>	Unadjusted			Adjusted <sup>a</sup>			
		OR	95% CI	p	n <sup>b</sup>	OR	95% CI	p
Psychological job demands	227	.387	[.199 – .753]	.005	211	.319	[.147 – .688]	.004
Decision latitude	230	1.610	[.875 – 2.962]	.126	214	1.716	[.824 – 3.574]	.149
<i>Skill discretion</i>	239	1.479	[.804-2.731]	.209	219	1.452	[.698 – 3.017]	.318
<i>Decision authority</i>	238	1.721	[.945 – 3.135]	.076	215	1.930	[.954 – 3.902]	.067
Co-worker support	243	3.134	[1.624 – 6.049]	.001	228	3.773	[1.723 – 8.263]	.001
Supervisor support	228	2.522	[1.335 – 4.766]	.004	218	2.485	[1.216 – 5.077]	.013
High strain jobs	61	.425	[.235 – .869]	.017	203	.371	[.156 – .885]	.025
Low strain jobs	58	2.622	[1.045 – 6.578]	.040	203	2.437	[.951 – 6.247]	.065
Active jobs	48	.780	[.349 – 1.744]	.545	203	.671	[.277 – 1.624]	.376
Passive jobs	50	1.515	[.700 – 3.279]	.292	203	1.713	[.671 – 4.373]	.261

Note: OR = Odds ratio; CI = Confidence interval

<sup>a</sup> Adjusted for gender, civil status, education, income, physical job demands, diagnose and sector <sup>b</sup> all predictors could not be assessed for every subject due to missing values

### The job-types and RTW at three-month follow-up

Table 6 represents the distribution of participants in the job types at the three-month follow-up. Three months after rehabilitation, individuals with low-strain jobs seemed to have the highest RTW-rates, with 87.9% of all the RTW-individuals being in this category. The chi-square test of independence indicated a significant association between the job-types and RTW three months after rehabilitation (3, n=217),  $X^2 = 8,46$ ,  $p = .037$ ,  $\phi = .197$ , demonstrating an association between the job-types and RTW at this point in time. The unadjusted logistic regression analyses indicated a significant association between low-strain jobs as well as for high-strain jobs and RTW, reporting ORs of 2.662 (95% CI: 1.045-6.575) for low-strain jobs and .425 (95% CI: .235-.869) for high-strain jobs. This indicates that individuals in low-strain jobs were more likely to have returned, whereas individuals in high-strain job were less likely to have returned to work at the three-month follow-up. However, after adjusting for the confounders, only high-strain jobs showed an association with RTW,

reporting an OR of .371 (95% CI: .156-.885). Because a significant association was found at the  $p < .05$  level,  $H_0$  is rejected. However, since the alternative hypothesis  $H_4$  stated that individuals in active jobs would RTW more often than the other job-types, this hypothesis was also rejected, as it was the low-strain jobs who had the highest RTW rates.

**Table 6** Cross-tabulation showing the distribution of participants in the job types at three-month follow-up

Job types	Not RTW			RTW		
	n	% of total <sup>a</sup>	% within job types <sup>b</sup>	n	% of total <sup>a</sup>	% within job types <sup>b</sup>
Passive	9	4.1	18.0	41	18.9	82.0
Active	12	5.5	25.0	36	16.6	75.0
Low-strain	7	3.2	12.1	51	23.5	87.9
High-strain	21	9.7	34.4	40	18.4	65.6

<sup>a</sup> percentage of participants in each category compared to the total amount of participants

<sup>b</sup> percentage of participants who have RTW or not in the different categories

#### 4.0 Discussion

The aim of this thesis was to assess the association between the psychosocial work environment and return to work after occupational rehabilitation. The focus was on the potential value of the dimensions in the demands-control-support model in predicting RTW after occupational rehabilitation. The purpose was to give more insight to providers of rehabilitation programs, so there might be more focus on workplace issues predicting RTW in the future. The research problems considered whether there was a relation between the job scales and RTW, and whether any of the job types from the demand-control-support model could predict RTW. Specifically, the hypotheses that were tested included  $H_1$  that high job demands would prevent return to work;  $H_2$  that high control would promote RTW;  $H_3$  that social support would promote RTW; and  $H_4$  that individuals with active jobs would return to work more often than individuals in high-strain jobs, low-strain jobs and passive jobs.

The following main findings will be discussed: 1. the only association found at the end-of-rehabilitation follow-up was for the sub-dimension skill discretion, none of the dimensions or the job-types were predictive of RTW at the end of rehabilitation; 2. at the three-month follow-up, psychological demands and social support were associated with RTW, whereas control had no predictive power; and 3. although low-strain individuals had the highest RTW-rates, high-strain jobs was the only job-type associated with RTW-outcome, with individuals in high strain jobs being less likely to have returned to work. The results

remained after adjusting for gender, civil status, education, income, physical job demands, diagnose, sector and branch.

#### **4.1 Discussion of main findings**

The *first finding* in this study was that at the end of rehabilitation, the only dimension predicting RTW was the sub-dimension skill discretion. Although the effect size was small, participants with high skill discretion were more likely to have returned to work than participants with low skill discretion. More specifically, the requirement of high skill levels in the job made the strongest contribution in predicting RTW (table 2 in appendix A). The results indicated that for individuals in jobs that required high skill levels, the odds of having returned at the end of rehabilitation were increased compared to individuals with a low score on the item. That skill discretion might be of importance in the beginning phases of the RTW-process is supported by Janssen et al. (2005), who found that high skill discretion predicted RTW after hospital discharge (Janssen et al., 2003). It is possible that workers who feel that they have to use their skills and abilities also are more motivated for returning to work because they feel their competence is needed in the workplace. Motivation has been found to play an important role in RTW in previous studies (Aas, 2009; Selander et al., 2002). It is, however, also possible that a requirement to use their skills might be perceived as a ‘pressure to attend’, as no one else can do the job for them. This might in turn make the person RTW prematurely, and thereby impact the chances of permanently returning to work. The fact that skill discretion was the only contributor to RTW at this follow-up-time was surprising, but several explanations for the small effect sizes can be considered. As mentioned earlier, there have been few detailed guidelines for methodological approaches in administrating the rapid-RTW-program, and the programs have therefore been organised and administered differently, according to what the coordinators considered to be an effective and appropriate program for their patients. Due to this, there have been differences in duration and organisation depending on which program the participant participated in. Since RTW was measured the day the program ended individually for each participant, the differences in RTW-rates may be due to differences in the organisation of the rapid-RTW-program, making other factors of less significance. It is also possible that there were few adjustment possibilities in the relation between the rehabilitation programs and the individuals’ work situation (e.g. it was not possible to regulate the work time or work tasks in accordance with for example partial hospitalisation), resulting in that the patients had to be sick-listed throughout the rehabilitation period. Furthermore, the severity of the injury and the stage in the disability phase might have

interfered with RTW. Krause et al (2001) found that injury severity was a more important risk factor for work disability in an acute phase of injury than in a sub-acute phase, and that RTW rates were almost 5 times higher for patients with less severe injuries in the acute phase of disability (Krause, Dasinger, et al., 2001). The severity of the disability was not measured in this thesis, however, so this could not be controlled for at the time. Although both explanations are plausible for the high numbers of participants still on sick leave at the follow-up time, it partially contradicts the finding that high skill discretion did make a contribution. Although skill discretion made a unique significant contribution, more research is needed in order to draw a conclusion or make suggestions for future RTW-interventions at this point in time. The short-term effects of rehabilitation is important, as a quick RTW often is beneficial in the long-run, but up until today, there has been little research on determinants of RTW at this stage in the RTW-process.

The *second finding* in this study was that two of the three dimensions in the DCS model were associated with RTW three months after rehabilitation. Both psychological job demands and social support were associated with RTW, whereas the control dimension had no predictive power. High psychological demands, and especially requirements of working hard were associated with not working at the three-month follow-up. Previous research has found that high job demands in themselves are not necessarily perceived as negative (Knardahl, 1998), and in fact, most of the time high demands are associated with positive outcomes. However, the positive effects of job demands only occur as long as the demands are mastered in a satisfactory manner (Knardahl, 1998). In a RTW-situation, it is possible that the demands are perceived as extra demanding, as the sick-listed worker might experience comprised job performance as a result of their disability (Friesena, Yassia, & Cooperb, 2001; Lysaght & Larmour-Trode, 2008). This in turn might reduce the chances of returning to work. This explanation is supported by Krause et al (Krause, Dasinger, et al., 2001), who found that high psychological job demands alone contributed to 20% reduction in RTW-rates. Because earlier research supports the notion that high psychological demands are associated with the development of health complaints, there is a possibility that high demands induce a fear of recurring or worsening the health complaints for which one called sick to begin with, reducing the chances of returning to work (Janssen et al., 2003). In practice, modified work programs aimed at reducing workload and psychological demands might therefore be beneficial in the RTW-process. As few studies have assessed the importance of psychological job demands alone, more research is needed in order to establish more knowledge on the impact of psychological job demands and RTW.

The fact that job control had no apparent association with RTW-outcome in this study was an unexpected finding. Although the finding is supported in a study done by Ballabeni et al. (2010), it contradicts much of the literature on the RTW process. Krause et al. (2001) for example found that low decision latitude alone reduced the chances of returning to work with up to 30% (Krause, Dasinger, et al., 2001), and in a study by Niedhammer et al (1998), control was the only predictor of RTW (Niedhammer, Bugel, Goldberg, Leclerc, & Guéguen, 1998). In addition, both Fukuoka et al. (2009) and Janssen found that high job control is one of the most important contributors in the RTW process (Fukuoka et al., 2009; Janssen et al., 2003; Krause, Dasinger, et al., 2001). Earlier research on job control and health have shown the importance of control over own work-schedule on health, and the control dimension has been the best documented dimension in the development of health problems (Karasek & Theorell, 1990). Although the finding is unexpected, several explanations are possible. One explanation might be the low reliability on the scales (Cronbach's alpha of .64 and .60). In the social and health sciences, an alpha value above .7 is considered acceptable while an value of .8 is preferable (Pallant, 2007). Although the Cronbach's alpha is sensitive to the number of items on the scale, other research using the JCQ have found higher scores on the dimension (see for example: Karasek & Theorell, 1990). This might indicate that there is low consistency between the respondents' answers in the questionnaire, possibly eliminating the predictability of the dimension. It is also a possibility that the control dimension is restricted to accounting for variation as a buffer for the effects of job demands (Spector, 1997), and that the dimension alone does not make a significant contribution on RTW when seen isolated from psychological demands. Another explanation might be Norwegian culture and legislations concerning work structure and work environment. Since the 1970's legislations around the working conditions in Norway have been concerned with the organisation and construction of the working environment. In 1977 a working environment act was established based on the results of research and development focusing on labour issues and new knowledge about the work environment's harmful effects on human health. Attention was directed at the psychosocial work environment, and greater emphasis was put on learning and development of skills on the job, as this was found to be a motivating factor, linked to job satisfaction and good health (Thorsrud & Emery, 1970). Although this may be a feasible contributory factor for why the dimension did not show an association, the explanation is paradoxical in that skill discretion did indicate an association at the end of rehabilitation follow-up. In addition, the possibility of making own decisions showed an association with RTW at three-month follow-up, indicating that some of the items in the dimension can affect

RTW-rates at this point in time, although the impact is limited. That the possibility of making own decision made an contribution does, however, make sense, in that it might be easier for persons with high decision autonomy to regulate their work pace depending on their physical conditions, which in turn might make it easier to RTW. Johnsson and Lunberg (2003 in Aas 2009) found that the amount of adjustment possibilities in the job had a strong association with whether the individuals were sick-listed or not. In an occupational rehabilitation setting, it is therefore possible that interventions that consider organisational redesign measures, enabling for more adjustment possibilities and for the worker to exert more decision control, might be beneficial in promoting early RTW. More research is, however needed in order to make a definite conclusion.

Social support was the dimension with the strongest association in regard to RTW. Co-worker support was found to have the strongest association, but supervisor support also showed a substantial relation. A relation between social support and RTW have been found in previous studies (Ballabeni et al., 2010; Janssen et al., 2003; Krause, Dasinger, et al., 2001; Lidwall & Marklund, 2006; Lysaght & Larmour-Trode, 2008; Post et al., 2005). As previously outlined, social support is considered having a buffering effect on work-stress, as it potentially improves the person's resilience to the stressor. Furthermore, high levels of social support can improve self-confidence and optimism, as it makes the person feel valued and worthy (Karasek & Theorell, 1990; McShane & Glinow, 2010). This might be particularly important in a RTW-process, as the sick-listed worker may experience diminished job performance, impaired self-image and a reduced sense of self-efficacy (Floderus et al., 2005; Lysaght & Larmour-Trode, 2008). In this study, the items considering co-worker's interest, helpfulness and friendliness had the greatest associations. This supports the findings of Lysaght and Larmour-Trode (2008), who reported that moral support, assistance, interest and understanding were the most important factors for whether sick-listed employees returned to work or not (Lysaght & Larmour-Trode, 2008). Helpful and assisting co-workers might help reduce some of the work pressure, making the process of returning to work after disability easier. In addition, co-workers showing interest is an indication of emotional support, which is shown to be a buffer for psychological strain (Karasek & Theorell, 1990). When it comes to supervisor support, that supervisors were perceived as helpful and concerned about the worker made significant contributions to RTW. This is also a finding that makes sense, in that helpful supervisors might be essential for securing help from co-workers for physically demanding tasks, for appropriate work assignments, in addition to other work accommodations and adjustment possibilities (Johnsson & Lundberg, 2003 in Aas 2011;



Krause, Dasinger, et al., 2001). In addition, emotional support from supervisors might make the worker feel important and appreciated, factors which have been found to reduce the potential strain in the relationship between employer and employee in the re-entry process (Lysaght & Larmour-Trode, 2008). Having a work-environment with a helpful and including organizational culture and climate seems to have a positive effect on RTW, and this should therefore be considered as an important implication for future practice and promotion of RTW. In a study by Michie and co-workers (Michie, Wren, & Williams, 2004), a theory based organisational intervention was implemented in a hospital cleaning staff, in order to reduce sickness absence rates. The intervention included attempting to increase perceptions of social support in the staff, by allowing for more social action in the workplace. The intervention proved fairly successful, and the sickness absence rates were reduced following the intervention. This suggests that including measures for heightening the levels of social support in the workplace might be beneficial in reducing sickness absence, and might also help the promotion of RTW. RTW-programs should therefore target this topic.

The *third main finding* in this study was that high-strain jobs were associated with not being back to work at three-month follow-up. Although most of the individuals in the sample had returned to work 3 months after rehabilitation, significant differences were found between the sick-listed employees and the individuals who had returned to work. According to the hypothesis in this thesis, individuals in active jobs would return to work more often than individuals in the other job types. This hypotheses was based on the active learning hypothesis (Karasek & Theorell, 1990) which states that high psychological demands combined with high levels of control will promote growth and learning (Karasek & Theorell, 1990). Accordingly it was hypothesised that active jobs would function as a motivator for RTW (Janssen et al., 2003). It was not, however, individuals in active jobs who returned to work more often than the other job types, but individuals in low-strain jobs, characterised by low psychological demands and high levels of control, with over 80% of individuals in this category working at the three-month follow-up. Even though these findings were unexpected, it is supported by some of the literature on job characteristics and RTW (Gimeno et al., 2005). Low strain jobs are associated with lower levels of stress and risk for psychological illness, as well as to heightened feelings of relaxation (Karasek & Theorell, 1990). This might make the process of returning to work easier in itself because it allows the employee to regulate their own work pace depending on their physical condition (Fukuoka et al., 2009), making it possible to modify the working conditions according to the individual's needs. Although there were significant differences between the job-types, being in a high-strain job was the only

independent contributor in the regression model after adjusting for the confounders. This indicates that job strain is an independent predictor of delay in the RTW-process. Accordingly, the individuals in high-strain jobs were overrepresented among the non-working employees three months after rehabilitation, with 34,4% in this category not working at the time. These findings are supported by the studies of Fukuoka et al. (2009), Krause et al. (2001), and Lidwall and Marklund (2006). The finding is also in line with the high-strain hypothesis, which states that people with low levels of control combined with high levels of psychological demands are exposed to high-stress situations (Karasek & Theorell, 1990), and might therefore also be less likely to RTW. Furthermore, in high-strain jobs the adjustment possibilities are limited, as the worker's decision latitude is low. Few adjustment possibilities have been found to correlate significantly with long-term sickness-absence (Johansson & Lundberg, 2003 in Aas, 2009) Kristensen (1991) suggests that remaining out of work could be viewed as a coping mechanism to avoid or reduce stressful working conditions, as high-strain jobs seldom make it possible to use other coping strategies in the working situation (Kristensen, 1991). The strategy of avoidance, or restraint, is often overlooked as a potential coping strategy, as it involves restraint from the stressor and is therefore not considered a good solution. However, in some situations it can be perceived as a necessary and functional response to stress. Although not a solution in the long run, removing oneself from the stressor might restrain the individual from acting prematurely and RTW before one is ready. However, for long-term sick-listed employees, more time away from work is seldom a good strategy. Interventions focusing on developing other more favourable coping strategies in stressful situations might therefore be an important implication for future interventions. Interventions including modified work redesign where the employees are enabled more control over their own decisions considering how to manage their work, as well as reducing the psychological demands may therefore be advantageous in promoting RTW. In addition, rehabilitation programs that include different stress management techniques, or interventions focused on changing the stress perception, might also be beneficial in future rehabilitation programs aimed at re-entering sick listed employees. The results further suggest that involving workplace stakeholders in the process could be of further importance. More research is, however, needed on the effect of theory-based interventions in the RTW-process.

#### **4.2 Methodological discussion**

Because the study was based on the DCS model, the work characteristics measured were restricted to accounting for the dimensions described in the model. Although the model

has received a fair amount of recognition in the field of occupational health, it has also been criticised for its simplicity and lack of relevance facing the modern society's work challenges (Jonge & Kompier, 1997). Because the effect sizes were small across all the predictor variables, it is possible that other work characteristics, like for instance attitude towards the job, job insecurity, job satisfaction, motivation and other physical work characteristics might reveal a more complete picture of the determinants of RTW. This should therefore be taken into consideration in future research regarding RTW. Furthermore, as with all other questionnaires attempting to measure psychological work stress, the JCQ is susceptible for certain personality traits in the mapping of psychosocial working conditions (Jonge & Kompier, 1997; Knardahl, 2011). The psychosocial workplace factors in this study were assessed and analysed at the individual level, and exposure to the psychosocial factors are therefore determined by each individuals' response to the specific question (Christensen, Nielsen, Rugulies, Smith-Hansen, & Christensen, 2005). Awareness that the person's response to a specific question is a function of both the objective presence of the factor and the subjective appraisal by the person is therefore important. An additional concern might therefore also be that the perception of the work environment was based on recall. Because the study was concerned with the further development of occupational rehabilitation programs this is not necessarily considered a weakness, however, as the perception of the work environment in itself is likely to be relevant to the subsequent RTW-process. Ballabeni et al. (2010) for example, found that a remembered previous workplace environment can persist long after a rehabilitation program is terminated, making recalled perception of the workplace as important as the actual work environment. The information provided by survey studies based on the participants' subjective appraisal and recall can be valuable for providers of rehabilitation programs, as they could provide help in trying to modify the perceptions of the work environment, for example through stress management techniques or cognitive behavioural interventions. Some of the interventions did include stress management techniques, but separate analyses for the different interventions or between treatments was not possible to conduct, as number of participants in each Rapid RTW intervention was too small.

One of the strengths of this study has been the focus on workers sick listed due to any cause. Contrary to previous studies on RTW, this study was therefore not limited to a specific diagnose, making it possible to generalise the results across the different diagnosis. In addition, the study is not limited to one branch or one occupational sector, making it further possible to generalise across different occupations. But what seems like a strength on the one hand, can also be considered a limitation on the other. Because the study was concerned with

the opportunity to generalise across occupation and diagnose, the differences from previous studies has made comparisons to other research difficult, and no comprehensive conclusion can be drawn at this point in time. A limitation of the study is that RTW was only measured at short-term follow-up, and furthermore that RTW only was measured at two given time points. Due to time limits it was not possible to use later RTW data in this thesis. In order to get a more clear understanding of how the work environment can impact the RTW-process, future research should be aimed at measuring RTW at later stages in the process. In addition, the dichotomised outcome measure of RTW (returned yes/no) at a certain follow up point ignores any information of when the person has returned, and information about subsequent recurrences, limiting the information provided (Biering et al., 2012). Furthermore, the potential confounders controlled for in this study were chosen based on prior literature knowledge, and not all known confounders were available at the point of the analyses. Questions about age and previous history of disease and sickness absence were not included in the questionnaire and there might therefore be some degree of uncontrolled confounding bias in the results.

## **5.0 Summary and conclusion**

As hypothesised, the results from the study indicated that there was a relation between the psychosocial work environment, and return-to-work-outcome. Although the predictability of the demands-control-support model was limited, the results none the less suggested that there was an association between the dimensions in the model and return to work. The findings remained even after adjusting for gender, civil status, educational level, occupational sector, household income, physical job demands, diagnose, and occupational branch. At the end of rehabilitation, the possibility of using own skills (skill discretion) seemed especially important for the possibility of returning to work, whereas three months after rehabilitation high psychological job demands and low co-worker and supervisor support seemed to work as independent barriers in the return to work-process. Furthermore, being in a high-strain job was associated with not working at the three-month follow-up. Although the effect sizes were relatively small, the results further suggest that programs and interventions may benefit from including organizational job redesign measures, secure support at the workplace and modification of psychological job demands. The research on how job characteristics might impact the return-to-work-process is scarce and has been fairly inconclusive. More research is therefore needed in order to establish which job-related factors are the most important for return to work-outcomes.

## 6.0 Appendix A

**Table 1** Cronbach's alpha values in Karasek et al.'s study (1998) compared to the Cronbach's alpha values in the present study

	(Rober Karasek et al., 1998)	The present study
Psychological demands	.63	.73
Skill discretion	.73	.64
Decision authority	.68	.60
Supervisor support	.84	.91
Co-worker support	.75	.81

**Table 2** Summary table for association between the items in the job dimension scales at the end of rehabilitation, and the three-month follow-up

Dimension	Item	End of rehabilitation				3-month follow-up		
		n <sup>a</sup>	Fisher	Cramers V	p	Fisher	Cramers V	p
Skill discretion	Learn new things	247	6.881	.162	.064	1.871	.086	.627
	Repetitive work	245	.340	.039	.963	.846	.056	.844
	Require creativity	246	4.861	.144	.179	4.776	.142	.185
	High skill level	249	7.724	.163	<b>.042</b>	1.347	.058	.714
	Variety	247	4.178	.130	.228	2.942	.110	.384
	Develop own abilities	247	7.504	.181	.055	.900	.061	.839
Decision authority	Allows own decisions	244	.629	.053	.895	11.305	.212	<b>.009</b>
	Little decision freedom	242	1.603	.087	.667	2.065	.092	.564
	Lot of say	242	6.468	.161	.085	1.252	.071	.765
Psychological job demands	Work fast	248	.724	.056	.901	6.560	.094	.074
	Work hard	245	.650	.051	.902	9.057	.194	<b>.022</b>
	Excessive work	244	3.793	.132	.265	5.968	.168	.100
	Enough time	242	4.173	.130	.238	2.397	.097	.501
	Conflicting demands	233	1.276	.068	.758	4.060	.126	.234
Co-worker support	Co-worker's competent	245	.755	.070	.905	3.422	.112	.318
	Co-worker's interested in me	244	2.464	.105	.488	18.030	.290	<b>.000</b>
	Friendly co-workers	244	.490	.057	.977	7.683	.194	<b>.035</b>
	Co-worker's helpful	244	5.916	.166	.099	13.292	.242	<b>.003</b>
Supervisor support	Supervisor is concerned	240	4.743	.146	.188	8.509	.192	<b>.033</b>
	Supervisor pays attention	237	2.959	.111	.404	5.921	.156	.110
	Helpful supervisor	235	4.350	.142	.230	9.733	.207	<b>.018</b>
	Supervisor good organiser	235	2.999	.110	.392	2.408	.101	.503

Note: the items with a significant association is highlighted in bold case

<sup>a</sup> all predictors could not be assessed for every subject due to missing values

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## Appendix B

### Invitation letter

Mailhode: INVITASJON. Evaluering av Raskere tilbake for Arbeidsdepartementet

Mailkropp:

Kjære [navn på person/tittel] [navn på tilbud]

Deres raskere tilbake-tilbud inviteres herved til å delta i raskere-tilbake evalueringens *delstudie II- Individstudien*. Vedlagt ligger et invitasjonsbrev med informasjon om studien og et enkelt svarskjema. Hvis dere ønsker å delta håper vi at dere kan fylle ut skjemaet om hvem som skal være deres lokalt studieansvarlige under studien, og returnere det til oss så raskt som mulig, til:[mailadresse]

Hvis du har spørsmål er det bare å ringe til Lise Haveraaen [telefonnummer].

Hvis dere allerede deltar i delstudie II, kan dere bare se bort fra denne meldingen.

Vi ser frem til å samarbeide med dere og til sammen å bidra til ny forskningsbasert kunnskap om tilbudet til sykmeldte.

Vennlig hilsen  
for prosjektgruppen  
Randi Wågø Aas  
prosjektleder

PS! Alle som returnerer vedlagte skjema innen 25.06.2012 vil få rapporten fra delstudie I sendt per e-post. Rapporten heter: Aas RW, Solberg A, Strupstad J (2011) Raskere tilbake. Organisering, kompetanse, mottakere og forløp i 120 tilbud til sykmeldte. Rapport IRIS-2011/125.

## Information letter

### Invitasjon til deltakelse i forskningsstudien **Evaluering av Raskere tilbake** på oppdrag fra Arbeidsdepartementet

**Bakgrunn og hensikt:** Dette er en invitasjon til å delta i en forskningsstudie som evaluerer ordningen "Raskere tilbake". Som mottaker ved ett av Raskere tilbake-tilbudene fyller du kriteriene for deltakelse i denne studien. Formålet med studien er å se hva Raskere tilbake-tilbudene må inneholde og hvordan de må være koordinert og organisert for at de skal kunne bidra til tilbakeføring til arbeidslivet. Studiens resultater brukes av myndighetene og fagmiljøene for å videreutvikle tilbudet til sykemeldte i Norge. Forskningscenteret PreSenter står som ansvarlig for gjennomføringen av studien. Arbeidsdepartementet finansierer studien, og er oppdragsgiver.

**Hva innebærer det å delta:** Studien innebærer å fylle ut et enkelt spørreskjema ved avslutning av tilbudet du har mottatt (se vedlagt spørreskjema). Din deltagelse vil til sammen ta maks 20 minutter. Vi vil i tillegg innhente data fra basen FD-trygd og informasjon om tilbudet du har fått fra Norsk Pasientregister. De som har vært ansvarlig for tilbudet du har fått her, vil også fylle ut opplysninger om deg og tilbudet du har fått, gjennom et spørreskjema som ligner på det som du selv fyller ut.

**Mulige fordeler og ulemper:** All informasjon som registreres om deg skal kun brukes som beskrevet over. Alle opplysninger vil behandles uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En ID knytter deg og dine opplysninger til en liste med navn og personnummer (avidentifisering). Det er kun en oppnevnt prosjektsekretær som har adgang til listen og som kan finne tilbake til den enkelte. Alle som jobber med prosjektet har taushetsplikt. Det vil altså ikke være mulig å identifisere enkeltpersoner, hva de svarte eller hvilket tilbud de deltok i gjennom resultatene i studien, når disse publiseres. Det åpnes for publiseringsaktiviteter og oppfølging av den enkelte i inntil 20 år, inkludert bruk av registerdata. I denne perioden vil dataene være avidentifisert. Etter dette tidspunktet vil alle dataene bli anonymisert.

**Frivillig deltagelse og rett til innsyn:** Det er frivillig å delta i studien. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til å delta. Dette vil ikke få noen konsekvenser for din videre behandling. Dersom du ønsker å delta, signerer du samtykkeerklæringen på arket som ligger vedlagt. Hvis du trekker deg fra studien, kan du kreve å få slettet innsamlede opplysninger, med mindre opplysningene allerede er inngått i analyser eller brukt i rapporter eller vitenskapelige artikler. Du har som deltaker også rett til å få innsyn i resultatene fra studien. Du kan få dette ved henvendelse til kontaktpersonene som er nevnt under, når resultatene foreligger.

Ta gjerne kontakt med oss dersom du har spørsmål om studien og din deltagelse.

Med vennlig hilsen

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## Consent forms

### Samtykke til deltakelse i studien

Jeg ønsker å **delta** i studien

.....  
Ditt navn (med blokkbokstaver)

.....  
Din signatur

Dato

Kontaktopplysninger:

Mobil

Fasttelefon

E-post

Adresse

Født: dd/mm/åååå

Dette arket fylles ut, legges i vedlagte konvolutter som det står "samtykkeskjema" på, og legges i forskningsstudiens postkasse. Hvis du ikke vet hvor den er, spør den som gav deg invitasjonsbrevet eller noen andre av de ansatte.

**Du kan nå fylle ut det vedlagte spørreskjemaet.**

## Extract from the Questionnaire

Ta stilling til følgende utsagn: Jobben min....(sett ett kryss per linje):

	Svært uenig	Uenig	Enig	Svært enig
Krever at jeg lærer meg nye ting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innebærer at jeg må gjenta arbeidsoperasjoner med få minutters mellomrom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiller høye krav til kreativitet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stiller høye krav til ferdigheter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innebærer varierte arbeidsoppgaver	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gir gode muligheter for å utvikle egne spesifikke evner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gir gode muligheter for å ta egne valg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gir begrenset frihet til å ta egne valg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Er slik at det er mye jeg skulle ha sagt om det som skjer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Er slik at det kreves at jeg jobber veldig fort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Er slik at det kreves at jeg jobber hardt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innebærer en urimelig stor arbeidsmengde	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Er slik at jeg har tilstrekkelig tid til å få arbeidet gjort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Er fri fra krav som står i motsetning til hverandre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Ta stilling til følgende utsagn: (sett ett kryss per linje)

	Svært uenig	Uenig	Enig	Svært enig
De jeg jobber med er kompetente i jobben sin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De jeg jobber med er interesserte i meg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De jeg jobber med er vennlige ovenfor meg	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
De jeg jobber med er hjelpsomme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Min leder er interessert i de han/hun leder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Min leder er oppmerksom overfor det jeg formidler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Min leder er hjelpsom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Min leder er en god organisator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Instructions to Authors

# WORK

A Journal of Prevention, Assessment & Rehabilitation

## Instructions to Authors

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Title page

- Introduction
- Body of text (divided by subheadings)
- Conclusion
- Acknowledgements
- References
- Tables
- Figure captions
- Figures

### **5. Headings**

Headings and subheadings should be numbered and typed on a separate line, without indentation. SI units should be used, i.e., the units based on the metre, kilogramme, second, etc.

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The title page should provide the following information:

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- Keywords (3-5 words not in your title)

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The abstract should be clear, descriptive, self-explanatory and not longer than 200 words, it should also be suitable for publication in abstracting services. The abstract for research papers should follow the “structured abstract” format. Section labels should be in bold uppercase letters followed by a colon, and each section will begin on a new line.

**BACKGROUND:OBJECTIVE:METHODS:RESULTS:CONCLUSIONS:**

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