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Work after illness: a new approach to RTW

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Summary

Abstract

The issues of this dissertation is the process of return to work (RTW) that workers have to face after a long job absence due to a severe disease. This topic is relevant both at a social level, with the higher and higher cost due to disability and retirement, and at a personal level, with the positive effect on the quality of life of a reintegration in the working place.

RTW is a multidimensional process influenced more by psychosocial determinants than traditional medical indicators. This dissertation conceives the RTW as a process that pass through several levels. From the decision to continue working during treatment to the struggles to remain employed once back at work. The studies exposed here address each of these phases considering RTW after cancer (CA) and cardiovascular diseases (CVD).

The first chapter introduces the topic and present a recent approach to RTW that highlight the similarities of the process of RTW among different diseases in contrast to a traditional approach in which the studies are disease specific with no transfer of knowledge between them. In line with this, we developed the Work After Disease (WAD) model. This model aims to represent the real experience that worker face after the upset of a disease. We developed a model in order to fill the gap between research, theory, and the concrete workers experience. This model will be used in this dissertation as a general framework and tools to interpret the result form the different studies.

The second chapter is about the RTW process after CA. This theme is explored with one longitudinal study aimed at finding the factors that influence the decision to continue working or stay at home during the cancer treatment and the factors that influence the probability and the length of the RTW after the cancer diagnosis. The first aim is scarcely analysed in the

literature and the second is to our knowledge, the first study of this type in the Italian context. The results show the importance of motivational factors in influencing the decision of continuing the work activity during the CA treatment and the RTW process.

Chapter three addresses the issue of the RTW after CVD with another longitudinal study that explored the changes in the working condition as perceived by the worker before and after the cardiac event and searched for the factors that affect the length and probability of RTW after CVD. Results show a significant decrease in the quality of the work experience after the RTW. Analysis revealed also that higher level of job strain and physical job demands before the cardiovascular event obstacle the RTW after CVD.

The last chapter deals with the issue of job retention after RTW. We developed a new construct, the Work-Health Balance (WHB) and the WHB questionnaire that assesses the key factors in the process of adjustment between health needs and work demands, process that is fundamental in the phase that follow the RTW after a disease. The instrument developed shows good psychometric properties and significant correlation with several indicators of the quality of working life.

CHAPTER I

Work After a Disease

The issues of this dissertation are the workers with a long standing health problem or disability (LSHPD) and their workplace. We specifically addressed LSHPDs that reveal themselves after a specific event as for example a diagnosis, in cancer, or a heart attack for cardiovascular diseases. These workers have to face difficulties to reintegrate themselves in the workplace after the upset of the acute phase of the disease and changes in the quality of the working life after this return to the work activities.

The reason for considering this topic is twofold, on the one hand the changes in the structure of our society force the applied research to study how to create work environment able to promote the reintegration and retention of workers with LSHPD on the other hand a reintegration in the workplace has positive effects on health and on quality of life of people with LSHPD.

Changes in society: the importance of people with LSHPD in the labour market

Our society is experiencing a radical change in its structure. The mean age of the population and the share of persons aged 65 or older in the total population is constantly increasing (UN, 2015). The improvements in the medical setting and lifestyle have raised the life expectancy, and cultural and economic changes have led to low birth rates (Grant et al., 2004). These factors are changing the shape of the age pyramid of all the continents, except Africa (UN, 2015), towards a much older population structure (see Figure 1.1) and this development is already becoming apparent in several EU states (Robustillo, 2013). In Italy, the mean life expectancy has risen steadily in the last decades (Figure 1.2) and reached 82.22 in the 2013, last date available (Istat, 2015). This brought the aging index[1] to 151.4% making Italy the second oldest country in Europe after Germany.

[1] The ageing index is a composite demographic ratio, defined as the percentage between the old age population (over 65) and the young population (under 15).

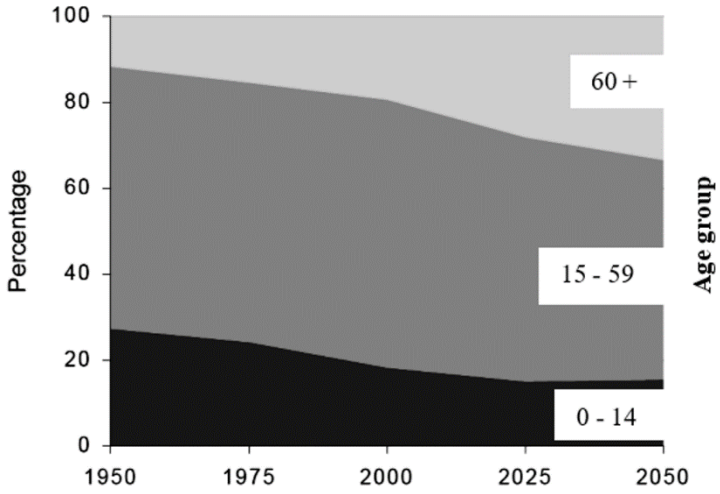


Figure 1.1. Distribution of population by age groups in the more developed regions (North America, Europe, Japan, Australia and New Zealand). Adapted from "World Population Ageing: 1950-2050" by Population Division, DESA, United Nations (2001).

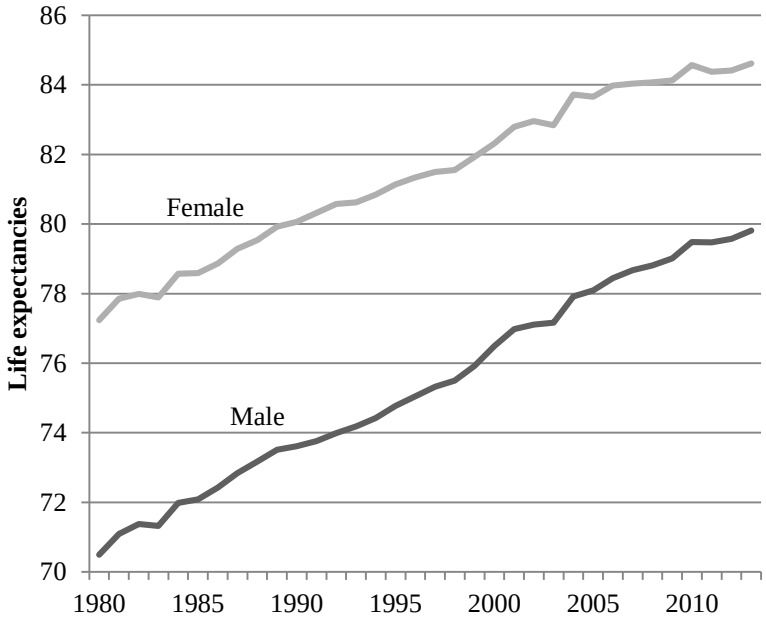


Figure 2. Life expectancies in Italy

In Europe a sharp drop in the labour force as a consequence of a constant increase in the share of the retirees and a great decline in the share of the prime-age workers is a concrete possibility (OECD, 2010). This would threat the sustainability of the economy and the welfare systems of many developed countries. In this framework the issue of disability and chronic health problem at work become important. The employment rate of people with long standing health problem or disability (LSHPD) is 44%, much lower than the 75% of the rest of the population (OECD, 2010). The workers with LSHPD are a resource for the society as they can contribute to raising the productivity of the economy and reduce the costs of the disability benefits. To substantiate the importance of this segment of population the OECD (2010) compared a scenario where the employment rate of the people with LSHPD remain stable with one where it gradually increases to reach the employment rate of the general population in 2050. The results showed that the second scenario could increase the labour force by 7% – 11% in 2050 in most European countries.

Moreover, an aging population has led many countries to increase the age of retirement and to make the access criteria for disability benefit harsher (Tiraboschi, 2015). This has enlarged the number of active elderly workers, in the OECD countries the employment rate of the age group 55 – 64 raised from 47.2% in 2003 to 54.9% in 2013 (OECD, 2014), and consequently the incidence of disability and health problems in the working population. Indeed, the likelihood of developing a chronic disease increase with age. For example, cardiovascular diseases and cancer, the two main causes of mortality and morbidity in the EU, have an incident rate significantly higher between 50 and 69 year olds than between 0 and 49. The 11% of the total cancer is diagnosed between 0 and 49 year olds while the 40 % is between 50 and 69 year olds (AIOM, AIRTUM, 2012). In the cardiovascular disease the incidence rate is three times higher between 55 and 64 year olds than between 35 and 44 year olds. (Istituto Superiore di Sanità, 2010)

Thanks to the advancement in medical treatment and the diffusion of rapid screening tests, the number of workers affected by a LSHPD is fostered also by individuals of all ages that overtake the acute phase of the chronic diseases. In the past these diseases definitely compromised work abilities but today the treatments often allow individuals to maintain a discrete amount of work ability even if with long-lasting health problems or limitations.

These two elements, an aging working population and better treatment for chronic diseases, have changed the labour market boosting the proportion of workers with a long-standing health problem or disability (LSHPD).

From the EU Statistics on Income and Living Conditions 2008 the European Network for Workplace Health Promotion (ENWHP, 2013) indicated that 19% of the employed people referred to have a LSHPD and from the Survey on Health and Ageing in Europe (SHARE) Alvina (2008) reported that among the workers aged between 50 and 64 the rate of people reporting LSHPD increase at 36.1%.

The OECD (2010) highlighted that too many workers leave the labour market permanently due to health problems or disability and too few people with reduced work capacity succeed in remain employed. In the OECD countries the unemployment rate for people with disabilities is twice as high as for those without them. In line with this, the ENWHP (2013) called for a paradigm shift in the research on workplace health promotion from attention to the current employability to a focus on a sustained and prolonged employability of workers with LSHPD.

The effects of employment on health and wellbeing

Alongside the positive implications for society of the reintegration of people with LSHPD at work, the employment has valuable effects at the personal level too.

The value of work for the individual is primarily in its economic benefits. It is worth mention that generally people that leave a situation of benefits for re-start working have an increase in the income (Dorsett 1998). Having a job mean gain sufficient economic resources, which are related with well-being and social inclusion (Coats and Max, 2005). Moreover, work is a core element of individual identity and allows the person to assume the desired social role and status (Shah & Marks 2004).

However, the person's physical and psychological health too is influenced by the employment status. For what concern the physical health several studies demonstrated that unemployment relates with higher rate of overall mortality, mortality from cardiovascular disease, suicides, worse physical health (e.g.: cardiovascular risk factors, vulnerability to respiratory infections), poorer somatic complain, long-standing illness and disability (Jin et al. 1995, Cohen, 1999, Lynge, 1997, Mathers & Scofield 1998, Lakey, 2001, Brenner 2002). Strong evidences support the hypothesis that unemployment causes most of these adverse health outcomes (Janlert, 1997, Murphy & Athanasou, 1999, Thomas, Benzeval, Stansfeld, 2005). The effect of unemployment on health is partially mediate by the socioeconomic status, poverty and financial anxiety (Saunders, 2002, Saunders & Taylor, 2002, Brenner 2002, Fryers, Melzer, and Jenkins, 2003).

Concerning the specific population of people with a LSHPD, there is a broad consensus across different disciplines and stakeholders that the return to work has positive effects on the quality of life and wellbeing (Waddel, Burton 2006).

On one hand the return to work, that is being employed, is therapeutic as promote recovery and rehabilitation leading to better health outcomes. Having a job promote a full participation in society which improve the psychological health, foster the personnel independence and reduce the risk of poverty. On the other hand, last in a situation of sickness absence has harmful physical, mental and social effects because it increases the probability of develop chronic disability, long term work inability and

persistent social exclusion which bring to a deterioration of the psychological health (Waddel, Burton 2006). Moreover, the return to work may have disease specific positive effects. As an example, the oncological patients sometime use work and the involvement in jobs activities as part of a coping strategy against the psychological negative consequences of the disease (Main et al., 2005) or it symbolise the complete recover from the disease, the regain of a "normal" life (Spelten, Sprangers, Verbeek, 2002, Verbeek & Spelten, 2007).

Work after illness: state of the art and limitations

To create the conditions of a higher inclusion of people with LSHPD in the labour market it is necessary to study all the variables and the stakeholders that influence the working choices and outcomes of the worker with LSHPD. The literature on this topic mainly focused on musculoskeletal disorder, cancer, mental illness, stroke, and cardiovascular diseases but also on rheumatoid arthritis, diabetes, arts amputation, brain damage, and spinal cord injured.

Typically, the studies concerning acquired health problems and working conditions are longitudinal and focused on factors that facilitate or hinder the return to work (RTW) after the onset of the disease (Young, 2010). This is a well-established line of research but for a long time it has been dominated by a high level of medical determinism which focused on work disability and performance deficit instead of successful and durable work resumption. The assumption was that the RTW depends linearly by the severity of the clinical status: a good recovery lead to a good work resumption (Young, 2005).

Nowadays it is recognised that the appearance and resolution of symptoms associated with the chronic condition is only lightly associated with the work trajectories of people (absence, resumption, and retention). The RTW is considered a mainly non-medical issue, it is conceived as a multidimensional

event influenced more by psychosocial determinants and macro system variables (e.g.: the medical care system) than traditional medical indicators (Krause, Frank, Dasinger, Sullivan, & Sinclair, 2001). Finally, only recently the research recognised a central role in the RTW process for the work-related psychosocial factors. For example, a literature review about the work-related psychosocial factors that affect work disability and RTW among different illness conditions (Shaw, Kristman, Vézina, 2013) founded all the relevant articles except one to be published after the 2001.The majorities of the researches paid attention to the factors able to distinguish between people working and those out of work at follow-up (Bouknight, Bradley, & Luo, 2006, Fukuoka et al. 2009). The focus has been the event of return in the workplace ignoring the several phases following a diagnosis or a disease event that occur before and after the RTW.

This focus has led an abundances of studies that investigate the relation between several psychosocial variables and the event of return to work but little development on the side of the theoretical interpretation of the events. This led some authors to write about an under-theorization in the field of the RTW after disability (Krause et al. 2001, Young et al. 2005).

For what is our knowledge up to date there exists four theorizations specifically developed or adapted for the RTW behaviour.

The first three models are adaptation of models about behaviour change, and only the fourth has been specifically developed for the RTW research field. In the first three models the RTW is considered as a complex behaviour change, an action that follows an intention. The employee is the final subject that takes the decision of RTW, and the focal point on which personal and interpersonal factors arise.

The first model developed was the Readiness to Return to Work model (RRTW; Franche & Krause, 2002). This model combined elements of the Phase model of Disability (Dasinger, Krause, Deegan, Brand, & Rudolph, 2000) with the Trahnstheoredical model (TTM, Prochaska & Diclemente, 1983). The Phase model of Disability is from the studies about low back pain

and conceive the disability as a developmental process composed of three phases distinguished by a different clinical status: acute (up to 1 month), subacute (2–3 months), and chronic (more than 3 months; Dasinger et al. 2000). The model stresses the importance of matching occupational and clinical interventions to the appropriate phase of disability, giving a temporal perspective to the disability progression. The TTM proposes that when individuals are modifying a behaviour they move through five stages (Prochaska & Diclemente, 1983). Each stage represents a different individual mindset in which the factors that have helped or hindered the progression from the phase before are not the same that foster the progression from the current phase. People can progress through the stages but can also relapse back. The RRTW model uses the Phase of Disability model as a framework in which place the worker in his path toward the RTW, but proposes a more accurate characterization of the personal situation and of the variables that can affect the RTW process based on self-assessed readiness to resume work. The RRTW distinguished the same five stages of TTM: pre-contemplation, contemplation, preparation for action, action, and maintenance, but the authors bring the application of this last phase to the RTW behaviour into question. The progression or the backing off is related with level of self-efficacy, decisional balance, and cognitive and behavioural processes of change (Franche & Krause, 2002). Up to now the RRTW model has not been extensively validate (Bültmann & Brouwer, 2013) but the RRTW scale (Franche, Corbière, Lee, Breslin, Hepburn, 2007) can be useful in a precise determination of the role of the psychosocial factors in different time after the upset of the disability.

The second model is basically an application of the Theory of Planned Behaviour (TPB; Ajzen, 1991) to the behaviour of RTW. Brouwer et al. (2009) consider the RTW behaviour as a health related behaviour and then explicable with the TPB. Hence, the RTW behaviour is mainly predicted by the intention of the subject to RTW. Accordingly to the TPB, the determinant of the intention are the positive and negative expected outcome of the RTW

that shape the attitudes toward the RTW, the subjective norms influenced by the personal beliefs about what others think of the RTW, and the perceived control over the RTW behaviour, or the self-efficacy about the RTW. Unfortunately, few studies tested the validity of this model (Brouwer et al. 2009; van Oostrom et al. 2007).

In 2011, Corbier et al. tested an extended version of the TPB model, the Theory of Planned Behaviour Extended, specifically adapted to explain competitive job acquisition of people with severe mental disorders enrolled in supported employment programs. In this model the RTW self-efficacy is influenced by the positive and negative self-esteem, the attitude toward the RTW is influenced by the length of time absent from work, which influences the intention directly too, and the severity of symptoms influences the perception of barriers to employment that in turn influences the RTW intention. The extended model explained the 26% of the variance in job search behaviours but only the 8% of variance in work outcome. These results suggested that the model could be useful in the programs supporting employment but less in the prediction of the RTW behaviour, Moreover, it has been tested only with people with severe mental disease.

These models have the value of give to the discipline some theoretical interpretation of the subject under investigation adopting a trans-pathological approach, but they maintain some limitation that need to be addressed. First of all, they need to be tested and replicated further since the studies adopting this model are rare, but this is a limit of the discipline more than of the models themselves. Secondly, they conceive the RTW as a single behaviour and this do not allow studying central issue such as the sustainability, quality and appropriateness of the RTW. Thirdly, they give a partial representation of the actual path the workers with LSHPD has to go through, reducing the RTW as a motivational matter and giving marginal importance to the other stakeholders involved in the RTW process.

The fourth model is proposed by Young et al. (2005) and adopts a different perspective to the issue. This model does not try to put together significant

predictors of the RTW event in a theoretically driven way, instead it offers a comprehensive conceptualization of the developmental and dynamic nature of the RTW. The aim of this work is to give a broader and closer to the worker's experience representation of the RTW process (Figure 1.3). The intention of the authors is to give an instrument that improves the comprehension and comparability of the RTW researches. The model identifies four phases in each of which different actions, outcomes and stakeholders are relevant. In this model the event of resuming employment is just a point in the process, work resumption is preceded and followed by other events and actions, each of which needs different outcomes assessments.

The process starts when a disabling condition prevents the work participation starting the *off-work*. A partial physical recovery is needed to move to the next phase, *work re-entry*. The work re-entry phase starts with the return to work of the worker with a LSHPD. Here starts a period of adjustment and determination of the work environment and job duties based on the worker's ability to maintain employment and perform satisfactorily. This phase ends when the employee begins working in a way that is satisfactory for all the stakeholders. Once work has been re-established succeeds the *maintenance* phase where the issue is to maintain the job in the way it has been established. This phase ended when the work retention is not anymore a concern for the worker that instead pursues carrier advancement beginning the last phase, *advancement*. The model proposes a taxonomy of the key actions and related outcomes for each of the four phases of RTW (Young et al., 2005).

This model has the limit to not be a predictive model, that is to not point the significant predictors in each phase. However, it has the great merit to give to the discipline a reference which helps to orientate and understand the dynamic process of RTW.

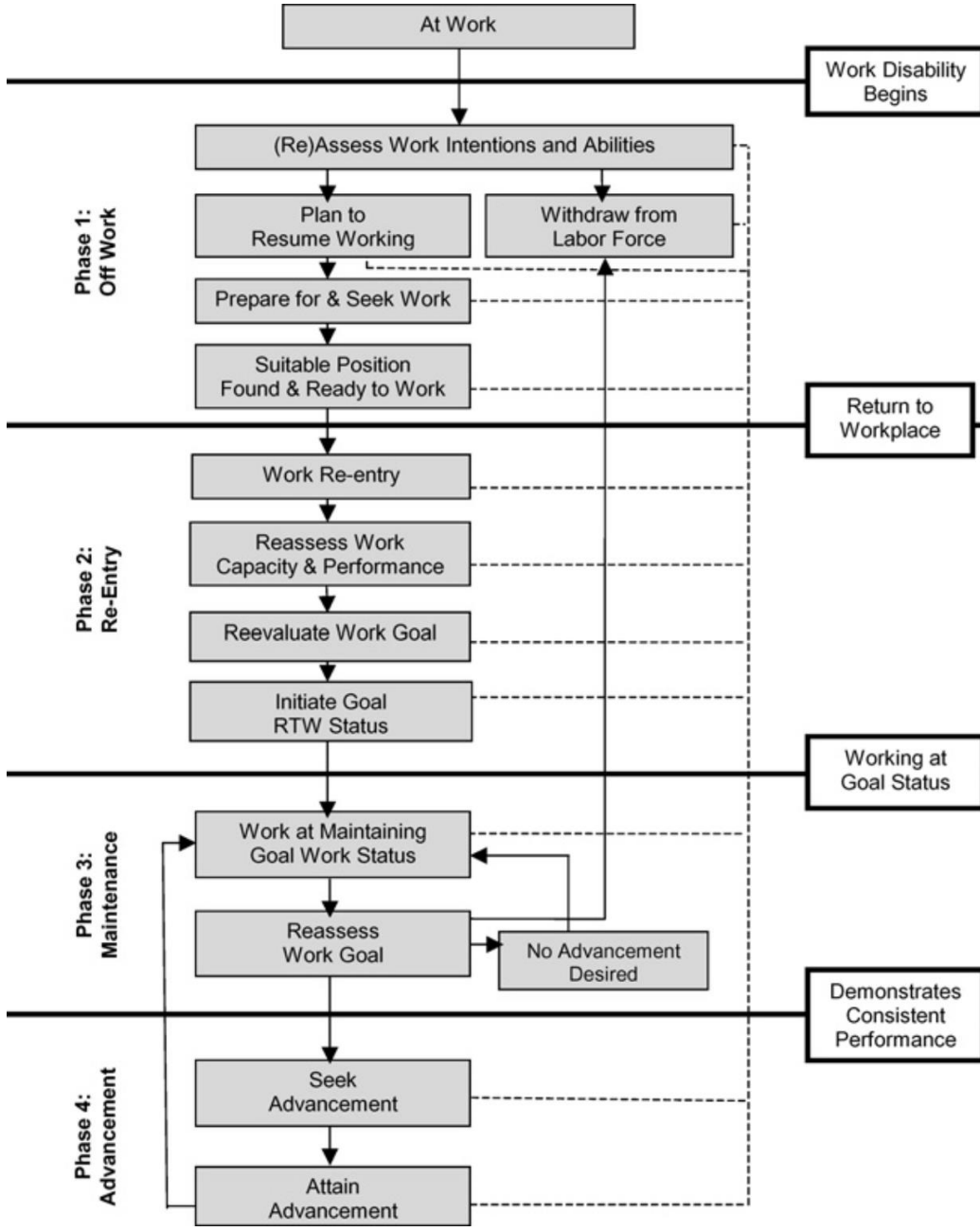


Figure 1.3. Developmental conceptualization of RTW. Adapted from Young, A. E. et al. (2005). A developmental conceptualization of return to work. *Journal of Occupational Rehabilitation*, *15*(4), 557–68.

Work after disease model

The model of Young et al. (2005) is important because it allows to have a global view of the path the worker have to go through when returning to work after work disability. Such a comprehensive vision of what happen to the worker after the disease and the work disability improves our ability to understand the real life experience of the workers. As mentioned, many of the studies about RTW focused their investigation only on the return to work event with no awareness of the other phases. The risk is to generalize the finding from these studies as knowledge valid to all the process of recovery of the work activity when this is not the case. The model of Young et al. (2005) allows to consciously study each phase separately, generating phase-specific knowledge.

However, in our opinion the model of Young et al. (2005) have some limitation that can be addressed. To do this we developed a new model of Work After Disease (WAD) represented in Figure 1.4. The Work after diseases model is based on the developmental conceptualization of return to work of Young et al. (2005) integrated with elements of the Phase model of Disability (Dasinger, Krause, Deegan, Brand, & Rudolph, 2000), the Social-Cognitive Transition model of Adjustment (Brennan, 2001), and Nicholson's Transition Cycle (1987). The WAD adopt the holistic view of the Young's model and we explicitly sustain a cross disease approach. That is, we believe that process persons face when they try to return to work after a disease is essentially the same for different type of disease (cancer, cardiovascular diseases, musculoskeletal disorders, common mental disorder, etc.). Therefore, a model describing this process has to be induced from the commonalities between the diseases. However, we are aware that each disease present specificities in terms of development in time, severity and disabilities produced that do not have to be overlooked.

In our opinion the model of Young et al (2005) seems to be incomplete if we consider what happen after the onset of diseases such as the breast cancer.

After the diagnosis of this disease and during the treatment, some patients decides to continue working during the treatment while others decide to stop the work activities (Tiedtke, de Rijk, Dierckx de Casterlé, Christiaens, & Donceel, 2010). This phase is absent in the model of Young et al. (2005) because it starts to consider the process after the work disability begins, and not after the onset of the disease that may or may not lead to work disability. In our model we propose to start the theoretical description of the process after the onset of the diseases instead that after the onset of work disability. In our perspective, it is important to study the work experience after the disease without assuming a work interruption because, for example, it is possible to stay at work after the onset of the disease and then being forced to abandon the work activity months or even years after the disease event. If the aim of the model is to give the researchers the possibility to locate the nodal point in the return to work process and to broad the field of study, neglect one phase would deliver it to oblivion. Another limit we founded in the Young's model is about the excessive linearity of the process described. The relapses and the deviations from the principal path are overlooked and they do not allow to develop specific hypotheses or line of research about them. In our model we try to represent more precisely the relapse and deviation from the principal path in order to design a model that fit different personal experiences.

Another difference of the two models is that the one of Young et al. (2005) considers a fourth phase where the worker seeks career advancement. Our model stops when the worker is in the mindset of pursuing career advancement. Indeed, we think that at that point the issues are similar to the ones of the other workers and having had a disease is just a personal characteristic as others.

As mentioned, we integrated Young's model with some element from the Phase model of Disability (Dasinger, Krause, Deegan, Brand, & Rudolph, 2000). Specifically, we coupled each phase in the WAD model with a phase of the disablement process (acute, subacute, and chronic disability).

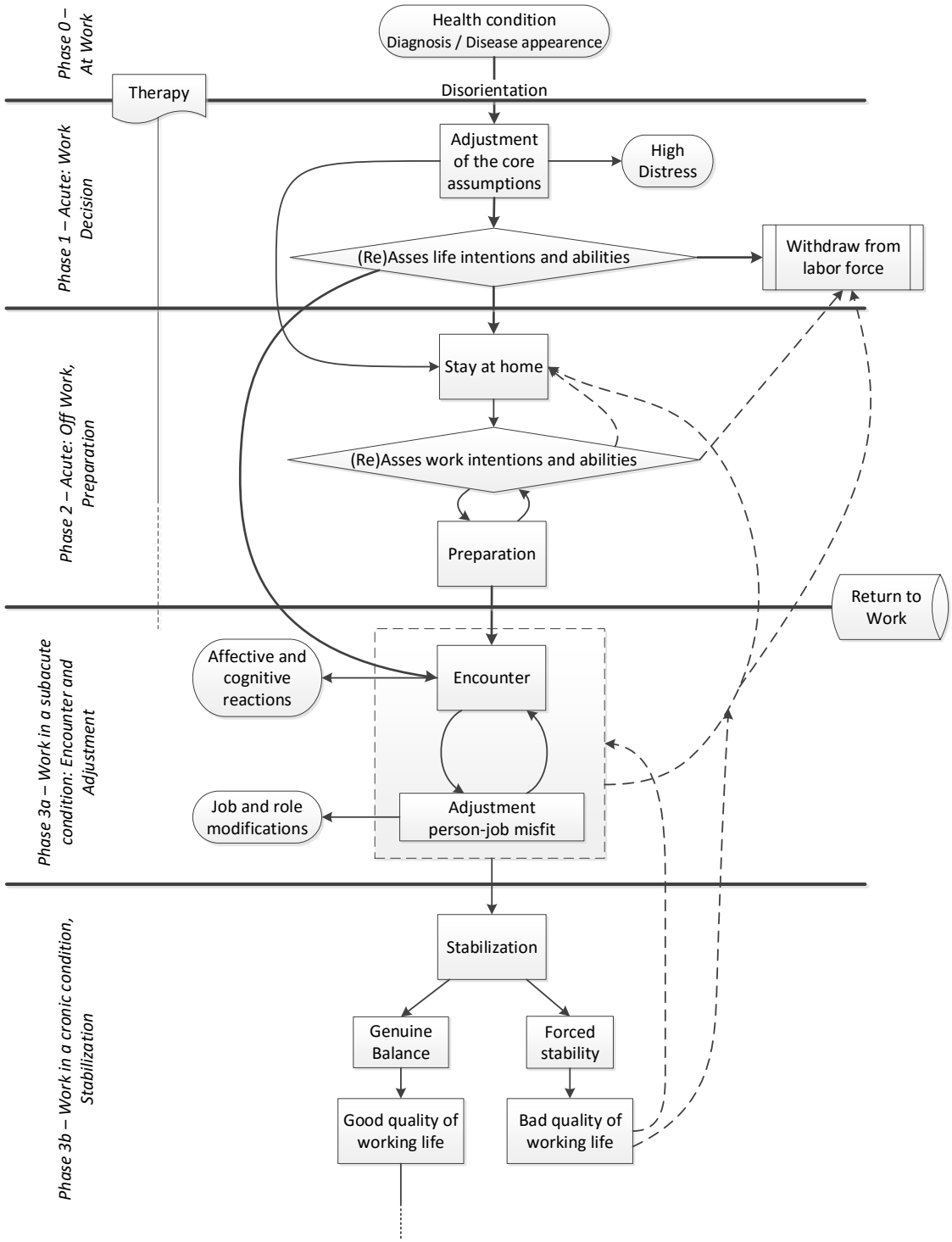


Figure 1.4. Work After Disease model.

This means that the model considers the evolution of the health situation of the worker. In the phase 1, the WAD uses elements of the Social-Cognitive Transition model (Brennan, 2001). This model helps to understand the mechanisms of psychological adjustment of the workers to the disease. Finally, the evolution of the work situation in the phases 2, 3, and 4 of the WAD can be better explained adopting the insights form the literature about career transition. The Transition Cycle (Nicholson, 1987) is useful for this scope. It examines the work transitions, defined as any change in employment status and any major change in job content. The theory pinpoints the individual and organizational factors that affect the process of transition and describe its phases. From this theory we adopted also the principle of interdependences between phases: the experiences at one stage will strongly impact the experiences at subsequent stages (Nicholson & West, 1989).

Phase 1 – Acute: Work Decision

The first phase starts after the diagnosis and correspond to the acute phase of the disease where symptoms or treatment are in their most intense phase. In this phase the worker is becoming aware of his/her medical condition, he/she is realizing the consequences and the changes in life caused by the disease. The mental model of the world, used to predict, appraise and interpret experience is disconfirmed in its core assumptions (es. assumptions about personal control and self-worth) causing *disorientation* (Brennan, 2001). The worker is in this state for days, struggling to realise and accept what has happened to him/her and his/her world. After disorientation, the worker has to *adjust* the core assumptions about the world to the new situation. In this state people react in different ways with different coping strategies (Lazarus, 1993). However, this process always involves great amounts of cognitive processing and emotional distress (Brennan, 2001). From the type of adjusting, several practical implications and decisions derive. One of this is the decision to continue or suspend the work activity. In some circumstances

this decision is forced or jumped. For example, after a myocardial infraction the worker is forced to suspend the work activity or in other situation the diagnosis follows the work disability that has stopped the work activity. However, in other cases this decision is possible. For example, after a diagnosis of breast cancer, it is not rare that woman continue working, suspending the work activity only during the days of treatment. The outcome of this phase could be work absence, continue working or withdrawal from the labour market. These outcomes should not be considered as positive or negative *a priori,* but they should be studied in relation to their consequences on the following phases of the model and in the life of the worker. To our knowledge, this phase is very little studied and mainly with qualitative studies. It should be studied to understand the factors that affect the decision to suspend or continue the work activity. In our opinion, the study of this phase would benefit from models explaining the psychological reactions to the different diseases such as the Social-Cognitive Transition model of adjustment (Brennan, 2001).

Phase 2 – Acute: Off Work, Preparation

The phase two occurs only if the worker has beforehand decided to suspend the work activity or if he/she suspends the work activity sometime during the following phases of the WAD. Here the worker is elaborating the new health condition and its consequences in life, the treatment is usually already settled and the thoughts about the future work activity become a central issue. In this phase medical, social and psychological factors affect the person and his/her decision about RTW. The worker is forming his/her cognitive and affective expectations and anticipations about a return to the work activity. Using the Nicholson's terminology, this is the stage of *Preparation* and the worker's anticipations may be congruent or different form the future reality. This is the most studied phase and the models presented above refer to it. This phase is temporary and ends up with an extension of the work suspension, a permanent withdrawal from the labour market or the return to work. Even in

this phase, the issue of what is a positive outcome has to be explored deeper. Indeed, usually a fast RTW is considered as positive but a too fast RTW may have negative consequences in the following phases. Moreover, beyond the positive effects, RTW may also be a source of stress and of threats to health (Jarvholm, 2012), and it may be linked to unhealthy behaviour (Miglioretti et al. 2014).

Phase 3 – Work in a subacute condition

This phase begins after the phase 1 if the worker has never stopped working or after phase 2 if the worker has stopped the work activity for a while. The effects of the disease and of the treatment now are known. We divided this phase in two sub-stages, *Encounter* and *Adjustment* (Nicholson, 1987), because here occurs two phenomena that are conceptually distinct but integrated, recursively influenced and sometimes time overlapped. This is a fragile phase. In fact, the subject is still under treatment, with side effect or symptoms, and sometimes he/she is still fighting against the disease. The instability derived from the disease situation can determine an instable work situation. In this phase the worker can performs attempts to return to work with uncertain ending, or can work in a reduced way, for example alternating days or weeks on and off work. The need of support from the workplace is strong because the health needs are intrusive and debilitating. The work ability is highly influenced by the disease and personal and organizational supplemental resources has to be mobilised to allow the worker to be productive at work. Also the work culture, the flexibility and directionality offered to the worker and the legal protection and aids are fundamental. Usually, in this phase it is easy to mobilise supplemental organizational resources in terms of the willingness of coworkers and supervisor to support the worker relieving his/her workload. However, it is the duration of this willingness that may be a problem. The worker needs this support for a long time while the employer and coworkers usually support him/her at the beginning of the return to work but struggle to keep this extra effort in the

long run. In Chapter four we proposed the construct of Work-Health balance that in our opinion may be a useful in conceptualise and understand this phase.

Sub-stage 3a – Encounter

In this phase the previously developed expectations Encounter the reality (Nicholson & West, 1989). The match or mismatch between expectations and reality brings affective and cognitive reaction. The individual's central task during this period is to meet the challenges of sense-making and exploration of the new work situation.

Sub-stage 3b – Adjustment

After the encounter with the reality it starts a period of Adjustment. The person-job misfit has to be reduced (Nicholson & West, 1989). This is done through a negotiation between the worker and the other stakeholders that brings to modifications of the work environment and conditions, and of the worker's self-concept and cognitions. The worker and the employee have to tune the work demands and conditions with the eventually changed work ability and needs of the employee. This is a very important phase for the long term job retention of the worker.

The phase 3 ends when an apparent balance is reached or when there are no more room for adjustments. The possible outcomes are continuation of the work activity or a new job suspension.

Phase 4 – Work in a chronic condition – Stabilization

As mentioned, this phase begins when there is a stable work and disease related situation. The work adjustment ended and the disabilities cause by the

disease are stable. This is a stable situation, but it can mask a true balance or a forced stability. If the adjustment is successful and the balance is genuine, the worker will feel able to fulfil a sought social role, and will benefit from all the positive effect job may have on health (Waddel, Burton, 2006). In these positive working condition, it is likely that the worker will experience a good quality of working life which is associated with a low turnover intention (de Jong et al. 2014). From the point of view of the employer this is a positive situation as he/she will have a productive employee with no need of hiring or training other workers to replace his/her experience. If the adjustment fails, but for different reasons (personal or contextual) a stable situation is reached, the worker will have to work in hard working condition, in a stressful situation with a low quality of the work life. This will likely lead to a deterioration of the physical and psychological health and ultimately will improve the probability of a new job suspension or of the intention to change employer.

If this phase is successful, the worker will be able to think about career advancement or at least the relapse to the previous phase of the model will not be a concern anymore.

One of the advantages of the WAD model is that it allows to conduct researches in specific phases of the return to work process without losing the entire picture. In the following chapter we conducted researches relevant for different phases of the WAD model.

CHAPTER II

Work after Cancer

In chapter two we present the first work of the thesis focusing on a specific disease. Indeed, in the research presented in this chapter we will discuss about the first two phases of the WAD model (*Work decision* and *Off work*) in a group of workers affected by cancer. Specifically, we will investigate the psychosocial factors that influence the decision to continue or stop working during cancer treatment and the factors that affect the return to work behavior. These two issues will be analyzed on the same sample of cancer patient with different methods.

Introduction

In 2012, 3.7 million EU citizens have been diagnosed with cancer and 1.9 million of people died for this disease (GLOBOCAN, 2012). The total cost of cancer in EU has been estimate as 126€ billion in 2009 (Luengo-Fernandez, Leal, Gray, & Sullivan, 2013), 16.4€ billion in Italy. This figure correspond to 1.07% of the GDP spent for cancer in EU and 4% of total EU health-care expenditure (Luengo-Fernandez et al., 2013). Cancer has direct and indirect costs. In the estimates reported the direct costs refers to primary care, emergency care, outpatient care, hospital inpatient care, and drugs excluding health promotion and prevention activities. The indirect costs refer to costs of lost production due to short-term absence from work, permanent disability and death before 65 years of age. Approximately half of the cancer survivors have less then 65 years (de Boer, Taskila, Ojajärvi, van Dijk, & Verbeek, 2009). The 60% of the economic burden of cancer in EU is attributable to indirect costs (Luengo-Fernandez et al., 2013). Most of this cost is attributable to early death but it is estimated that the share of indirect costs due to morbidity will increase and the share due to mortality will drop because early detection and improvements in cancer treatment are increasing the survival of cancer patients (Jönsson & Wilking, 2007). The highest productivity losses attributable to mortality was due to lung cancer (9.92€ billion), followed by colorectal cancer (3.77€ billion), breast cancer (3.25€

billion), and prostate cancer (0.73€ billion; Luengo-Fernandez et al., 2013). However, breast cancer was the highest for productivity losses due to morbidity, that is for short-term absence from work and permanent disability (€1.79 billion Luengo-Fernandez et al., 2013).

Because of the progressively more importance of the productivity losses due to morbidity, the relevance of the researches investigating the employment and employability of cancer survivors is intended to increase. It will be essential to develop working condition and intervention that favour the reemployment of this workers, limiting the complications to reduce the indirect costs.

Background

The cancer patients' decisions about the work sphere need a particular consideration as cancer and its treatment bring a series of essential differences if compared with other diseases studied in the field of RTW. The presence of relevant side effects, the extreme variability and length of the recovery process, and the risk of a stigma from the work environment (Tamminga, de Boer, Verbeek, & Frings-Dresen, 2012; Tiedtke, de Rijk, Dierckx de Casterlé, Christiaens, & Donceel, 2010) make RTW after cancer a problematic area of research. Several studies demonstrated the importance of work in life of cancer patients (Stergiou-Kita et al., 2014), but there are great differences between these patients for what concern the decision, the feelings and attitude toward the possibility of return working. There is the need to gain a better comprehension of what happens in the work sphere after a cancer diagnosis. Even though there exists a qualitative literature exploring many aspects of work after cancer, the quantitative studies focused mainly on the factors that influence the rate and time of the RTW (Main, Nowels, Cavender, Etschmaier, & Steiner, 2005; Mehnert, 2011). They implicitly consider the RTW as a singular event (Tamminga et al., 2012) and the quality and sustainability of the RTW are rarely studied (Main et al., 2005). Such an

approach is simplistic and does not properly represents cancer survivors' perspective (Stergiou-Kita et al., 2014). The experience of work after the diagnosis has to be investigated as a process composed by different phases (Stergiou-Kita et al., 2014). The limit of a quantitative approach that considers the study of work after cancer as the study of the factors influencing the RTW is evident when we consider that some cancer patients decide to continue working after diagnosis and during treatment (Kennedy, Haslam, Munir, & Pryce, 2007; Main et al., 2005; Moskowitz, Todd, & Feuerstein, 2012).

The different patterns of employment after cancer are recognized in literature (Main et al., 2005; Moskowitz et al., 2012; Short, Vasey, & Tunceli, 2005) but the majorities of the studies focused on rate of RTW and factors affecting it. Few studies examined the continuation of the work activities shortly after cancer diagnosis and during treatment, its determinants and its implications for the long term employment. Short et al. (2005) analysed the pathways of 1433 cancer patients who were working at the time of diagnosis. They discovered that 60% of the patients were working through the cancer treatment. After four years of survivorship, 13% of the patients were not working due to cancer reasons. The 38.5% of those who quit working were patients that were working during treatment against a 23% made by patients that returned at work during the first year. The other 38.5% were composed by patients that never returned to work (Short et al., 2005). This study was conducted in the US where the welfare system is different compared with the one of many European countries. Therefore, financial concerns may push more cancer patients to continue working during treatment. In the UK, Pryce, Munir and Haslam (2007) found that 30% of 328 workers with cancer continued to work during treatment and in Spain, Molina Villaverde et al. (2008) detected that 20% of 96 workers with breast cancer continued to work. Pryce et al. (2007) discovered that working during treatment was associated with higher level of work flexibility and with disclosure with colleagues but

also with difficulties in managing fatigue and with no paid time off to attend medical appointments. In Molina Villaverde et al. (2008) work during treatment was associated with cancer stage lower than IV and with being a self-employed. More studies are needed to understand the factors that affect the decision to continue or suspend the work activity during cancer treatment and to discover the magnitude of the phenomena. Moreover, we do not know if the factors that affect the RTW after cancer are the same that affect the decision to continue working during treatment or if the two phases are different.

The first part of the present study aims to measure the rate of the people that continue working after cancer diagnosis in the Italian context. Moreover, we want to shed light on the motivations that drive patient to continue working during cancer.

Considering the complexity and diversity of the patterns of work after cancer does not reduce the importance of the study of the factors influencing the RTW and, as stated, this is the principal focus of the contemporary research about RTW. The recovery of work activity in cancer patients is particularly important. It frequently symbolizes the complete recovery from the disease (Evelien R Spelten, Sprangers, & Verbeek, 2002), the restoration of a full and normal social life (Kennedy et al., 2007) and it has positive effects on self-esteem and on the possibility to adhere to the aspired social or family role (Verbeek & Spelten, 2007). However, the healing process does not always end with the return to the workplace. Approximately the 40% of the cancer patients do not return to work in the first year after diagnosis (Mehnert, 2011). The cancer patients' chance of being unemployed is statistically higher compared with the one of cancer-free controls. Among the cancer types that leave the patient with a potential work ability, the ones with higher chance of unemployment compared to cancer-free controls are breast, gastrointestinal, prostatic and gynaecological cancer (de Boer & Frings-Dresen, 2009). It is fundamental to find the factors that influence the RTW

process in order to detect the patients that will present more difficulties. Several sociodemographic (age, female gender, low education) and medical factors (chemotherapy, invasive surgery, cancer stage) influence (obstacle) the RTW after cancer (Mehnert, 2011; Evelien R Spelten et al., 2002). However, it is not possible to understand the differences in the RTW between patients considering only these types of variables. Moreover, these variables are essentially not modifiable therefore it is very difficult to design intervention aimed to facilitate the RTW based on these factors. Previous studies have shown that beyond the medical and sociodemographic factors the psychosocial factors play a fundamental role in the RTW success (Islam et al., 2014; Mehnert, 2011). The variables of this type are essentially modifiable therefore it is possible to design RTW interventions that modify such variables (de Boer et al., 2011). However, the number of studies investigating the influence of psychosocial factors on RTW after cancer is still limited. This number is even lower if we consider only longitudinal studies, the only ones that may support inferences of cause and effect. Considering the information from longitudinal studies there are enough evidences only to say that fatigue, depression and physical job demands are predictive factors of a harder RTW process (Chow, Ting, & Su, 2014; Islam et al., 2014; Mehnert, 2011). However, many evidences from cross-sectional studies and some from longitudinal ones, suggested that work-related psychosocial factors too are important predictors of RTW. For example from the longitudinal studies, self-perceived work ability was a strong predictor of RTW after cancer in de Boer et al. (2008) as the perceived work flexibility and accommodations, and the social support from supervisor and the workplace (Bouknight, Bradley, & Luo, 2006; Mehnert & Koch, 2013). Finally, job satisfaction has been found as predictors of RTW in Johnsson et al. (2009). Several qualitative studies investigated the experience of work after cancer and suggested work related factors that should be further investigated by quantitative studies. Job insecurity and social pressure are frequently mention as factors that force people to RTW (Banning, 2011;

Grunfeld, Drudge-Coates, Rixon, Eaton, & Cooper, 2013; Kennedy et al., 2007; Main et al., 2005; Tiedtke et al., 2010). Work is sometimes part of the coping strategy and it is used by patients as a distraction from disease (Banning, 2011; Kennedy et al., 2007; Main et al., 2005; Tiedtke et al., 2010). Such a coping strategy may facilitate the RTW. The literature has extensively studied the coping strategies adopted by patients in relation to patients' wellbeing and quality of life (Browall, Kenne Sarenmalm, Persson, Wengström, & Gaston-Johansson, 2015; Hoffman, Lent, & Raque-Bogdan, 2012) but to our knowledge there are not studies investigating the effects of the coping strategies adopted to the RTW. Disclosure to coworkers seems to be a complex but relevant issue (Grunfeld et al., 2013; Nilsson, Olsson, Petersson, & Alexanderson, 2013; Tiedtke et al., 2010) and should be investigated in quantitative researches. Another recurrent theme in qualitative studies is the re-evaluation of the importance in life of work. Sometimes it is essential in the process of sense-making in life, other times it is downgraded to something with little importance compared with what really matter in patient's life (Banning, 2011; Main et al., 2005; Nilsson et al., 2013; Tiedtke et al., 2010). All this themes may affect the RTW process but to our knowledge they have never been tested in quantitative longitudinal studies.

The second part of the present study aims to measure the RTW rate in the Italian context. Moreover, the study aims to test the effects on RTW of the psychosocial factor highlighted in previous longitudinal studies and to test for the first time the predictive power of some of the many themes raised from qualitative studies.

Method

Patients and procedures

The study is a monocentric prospective cohort conducted in one cancer hospital in the north of Italy. The patients were selected to participate in the study if they were between 18 and 65 years old with a primary diagnosis of breast, gastrointestinal, prostatic or female reproductive system cancer with no metastasis. To be included in the study, the patients had to be in paid employment at the time of diagnosis with language skills sufficient to allow completion of the questionnaires.

People were excluded from the research if they had a central nervous system disease or other disabling diseases. Moreover, patients were not included if they were under treatment with psychoactive drugs.

Patients were recruited during the cancer treatment at the hospital. The consent to participate in the study was asked to the patients by the psychologists of the hospital. Once given the informed consent, demographic, occupational and psychological data together with an assessment of the psychosocial work conditions were collected with a questionnaire. Six months after patients were invited via e-mail to complete the same survey on-line.

The study was approved by the ethics committee of the hospital.

Measures

The instrument used in the study was designed to measure factors that influence the decision to continue or suspend the work activity during cancer treatment and factors that influence the RTW behaviour after a work suspension. Beside investigating the socioeconomic status, we measured medical and physical variables, work-related and non-work-related psychosocial factors (Corbière, Negrini, & Dewa, 2013).

Work-related psychosocial factors

Current *work ability* was measured with the one item version of the Work Ability Index (Ahlstrom, Grimby-Ekman, Hagberg, & Dellve, 2010). The item measures the worker's perceived capability to perform and interact within work.

Because it has been demonstrated that a cancer diagnosis may impact personal values and attitudes toward job we measured the *work disaffection* after cancer (four items, Cronbach's α = .82) using the cynicism scale of the Maslach Burnout Inventory - General Survey (MBI-GS; Schaufeli, W.B., Leiter, Maslach, & Jackson, 1996). We slightly modified the scale asking the participants about variations of the feeling after the cancer diagnosis (e.g., from "I have become more cynical about whether my work contributes anything" to "Since cancer diagnosis I have become more cynical about whether my work contributes anything").

We measured cognitive and affective *job insecurity* with the instrument developed by Pienaar, Witte, Hellgren, and Sverke (2013; eight items, Cronbach's α = .76; e.g., "I fear that I might get fired").

The overall *job satisfaction* was measured with a single item. The reliability and validity of the single item measure has been extensively supported (Dolbier, Webster, McCalister, Mallon, & Steinhardt, 2004; Wanous, Reichers, & Hudy, 1997).

The short version of the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006) measured the level of *work engagement* (nine items, Cronbach's α = .93; e.g., "I feel happy when I am working intensely").

With a short version of the *Psychosocial safety climate* scale (Dollard & Bakker, 2010) we measured the extent in which the worker perceived that policies, practices, and procedures for the protection of worker psychological health and safety were present in the workplace (four items, Cronbach's α = .88; e.g., "Participation and consultation in occupational health and safety issues occurswith employees, unions, and occupationalhealth and safety representatives").

To measure perceived *work autonomy* we used the Autonomy scale of the Work design questionnaire (Morgeson & Humphrey, 2006) that measures the work scheduling and decision–making autonomy (six items, Cronbach's α = .94; e.g., "The job allows me to make a lot of decisions on my own").

We asked to the workers if they have *disclosed cancer* to their supervisor and coworkers with two items ("Have you talked or are you going to talk in a week with your supervisor/coworkers about your new disease?").

We also measured the dissatisfaction in the management of the personal health care due to work commitments and the support for health problems perceived as available in the workplace with the *Work-Health Incompatibility* scale (six items, Cronbach's α = .81; e.g. "You find it difficult to take care of your health because you are constantly thinking about your work") and the *External Support* scale (six items, Cronbach's α = .77; e.g., "Your supervisor acknowledges that you may have specific necessity for your health status") respectively. These two scales are part of the Work-Health Balance questionnaire that is presented and validated in the chapter 4 of this dissertation.

Non-work-related psychosocial factors

The *coping strategies* adopted by the patients has been measured with the brief COPE (Carver, 1997). The instrument identifies 14 different coping strategies (self-distraction,

active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion, self-blame) using 28 items (given that each scale was made by two items we accepted Cronbach's α higher than .40; Cronbach's α between .41 and .92; except for scales Venting and Self-blame. For these two scales we used only one item each.)

To measure the *mood disturbance* or psychological distress associated with cancer we used the POMS-SF (Baker, Denniston, Zabora, Polland, & Dudley, 2002). This instrument assesses the transient mood state of the

patients along six dimensions (depression, vigor, confusion, tension, anger, fatigue) measured with 37 items (Cronbach's α between .76 and .92). It provides also a general index of total mood disturbance.

The *social pressure to work* has been measured with an instrument developed following the procedure suggested in Francis et al. (2004). The instrument measures the pressures from the partner, relatives, friends, coworkers, and the trusted doctor as an interaction between the belief about what other people think and how much important are for the respondent the thoughts of these people.

Cancer-related

Information about the type of cancer, the stage of the disease, the treatment, the date of the diagnosis and comorbidity were collected from the medical records.

Demographic characteristics

In the baseline questionnaire we asked the participant about their education, financial status, affective relationship, civil state, number of sons.

Work status

The working condition of the patient has been extensively investigated in the questionnaire. We collected information about the type of job, the work contract, the job position, the physical exertion of job, the payed days off work, the knowledge about the legal right of workers affected by cancer, the number of working hours per week before and after the diagnosis. The individual trajectory of work and work absence after the diagnosis has been investigated with four *ad hoc* questions. Among these we requested the date of the first work absence due to cancer and in the follow-up the date of RTW. To measure the *work suspension after diagnosis*, we asked the patient if they suspended the work activity for more than two consecutive weeks or three fragmented weeks in the month after cancer diagnosis. We defined the limit of two consecutive weeks because the mean time of work absence due to

chemotherapy and radiotherapy for several cancer types is 4.5 days (Curt et al., 2000) and we wanted to detect a stable job suspension, not caused by contextual factors like the cancer treatment. The limit of three fragmented weeks of work absence has been established to include the workers that did not suspend the work activity for more than two consecutive weeks in a month, but could not be considered as workers truly involved in the work activities (working 7 or less days in a month).

Analysis

The analysis is divide in two sections. The first one is dedicated to data about the continuation of the work activity after cancer diagnosis. The second one investigates the factors associated with the RTW after six months from diagnosis. All the sections were implemented with SPSS 22. In the fist section we adopted descriptive statistics followed by univariate and multivariate logistic regression analyses to determine the factor associated with working after diagnosis. All the predictors were separately entered into a univariate logistic regression analysis against the outcome variable, working after diagnosis. The factors significantly associated with the outcome with a *P*-value lower than .10 were entered in a multivariate logistic regression with backward selection to identify the most parsimonious model of the data. In our analysis, odds ratios higher than one indicate higher probabilities to interrupt the work activity in the month after diagnosis.

In the second section we performed descriptive statistics followed by univariate and multivariate Cox regression analysis to test if the variables measured predict the return-to-work in cancer patients six month later. We adopted the same procedure of selection of the variables adopted in the first section but with Cox regressions. We adopted the same *P*-value cut off and the same backward selection criteria used to identify the most parsimonious multivariate model. In this section the hazard ratios (HRs) indicate the 'risk' of returning to work with HR higher than one indicating higher probability of return to work.

Results

Participants

We contacted 187 eligible patients, 179 accepted to participate in the study. Of these, 3 did not return the filled questionnaire therefore the first section of the analysis has been conducted on a sample of 176 patients. Six months later the participants that responded to the follow-up were 107 (a 61% follow-up response) consequently the second section of the analysis has been conducted on this sample. Table 2.1 displays descriptive statistic of the two samples used for the analyses. A comparison with the Chi-square and T-test statistics revealed that there were no significant differences between the participants that answered to the follow-up and those that did not.

The 68% of the patients continued the work activity after the diagnosis. Half of the participants had all the work absence paid, 24% of the participants had no compensation for the days off work and the 19% had a

limited number of paid days off work (M = 174, SD = 73). The 63% of the participants did not know about the legal right relating to employment for workers with cancer. The majorities disclosed the cancer diagnosis with the supervisor and the coworkers, the 78% and the 86% respectively.

Table 2.1 Sample characteristics at baseline (N = 176) and at follow-up (N = 107)

		Baseline *n* (%)	**Follow-up *n* (%)**
Mean age (SD)		48 (7.6)	49 (7.3)
Gender	Female	162 (92)	96 (90)
Education level	Primary and Lower secondary school	17 (10)	10 (9)
	Upper secondary school	85 (48)	55 (51)
	University or higher	74 (42)	42 (39)
Marital status	Single	28 (16)	15 (14)
	Conjugated / Cohabiting	128 (73)	81 (76)
	Separated /Divorced	19 (11)	11(10)
	Widowed	1 (<1)	0
N of children	No children	48 (27)	27 (25)
	One	47 (27)	30 (28)
	Two	62 (35)	40 (37)
	Three	14 (8)	8 (8)
	Four	1 (<1)	0
Cancer type	Breast	138 (78)	87 (81)
	Gastrointestinal	5 (3)	3 (3)
	Gynaecologic	22 (13)	9 (8)
	Prostatic	9 (5)	7 (7)
Cancer stage	I	70 (40)	42 (40)
	II	62 (35)	38 (36)
	III	42 (24)	26 (24)
Comorbidity	Yes	39 (22)	25 (23)
Treatment	Only surgery	47 (38)	33 (31)
	Chemo and/or Radiotherapy	22 (18)	18 (17)
	Chemo / Radiotherapy + Surgery	56 (45)	51 (48)
Job position	Entrepreneur	15 (9)	5 (5)
	Manager	9 (5)	7 (7)
	Middle manager	13 (7)	9 (8)
	Office worker	71 (40)	49 (46)
	Workman	11 (6)	6 (6)
	Others	56 (32)	28 (26)
Type of work	Physical	27 (15)	12 (11)
	Intellectual	127 (72)	82 (77)
	Mixed	20 (11)	12 (11)
Type of contract	Open-ended contract	100 (57)	68 (64)
	Self-employed	56 (32)	28 (26)
	Temporary and occasional workers	20 (11)	10 (10)

Working after diagnosis

In the univariate analysis, the demographic and medical factors that reported a statistically significant relation with the decision to interrupt the work activity in the month after diagnosis were: marital status, cancer treatment and type of cancer at $p < .05$, and type of contract and cancer stage at $p < .10$. Married patients were less likely than separated/divorced patients to suspend the work activity after diagnosis (OR = .18; 95% CI = 0.06 – 0.55). The variable type of cancer was highly unbalanced with the majorities of patients affected by breast cancer and only a few by the other types of cancer. The patients with breast cancer were more likely to continue the work activity compared to gastrointestinal and gynaecological cancer, but these results are highly unreliable due to the unbalanced sample. Finally, patients treated with surgery plus chemo and/or radiotherapy were more likely to stop the work activity after diagnosis compared to the patients treated with surgery only (OR = 3.55; 95% CI = 1.45 - 8.68). The psychosocial factors statistically significant in the univariate analysis were Work engagement (OR = 1.63; 95% CI = 1.19 – 2.24), Job satisfaction (OR = 1.76; 95% CI = 1.04 – 2.98), Job autonomy (OR = 1.59; 95% CI = 1.08 – 2.36), Work-Health incompatibility (OR = .52; 95% CI = .31 - .87), Work disaffection (OR = .53; 95% CI = .34 - .82), and Social pressure (OR = 1.03; 95% CI = 1.01 - 1.05). The statistically significant variables were entered into a logistic regression with a backward selection in order to find the best model of factors associated with the interruption of the work activity in the month after diagnosis. Table 2.2 shows the staring model with all the variables entered and the final model with only the variable strongly associated with the work suspension after diagnosis. The final model ($\chi_{(3)} = 23.63$; $p < .001$) identified two significant predictors of the outcome variable. Those with a higher work disaffection were more likely to suspend work activity after diagnosis. Moreover, patients treated exclusively with surgery were less likely to suspend work activity

after diagnosis compared with patients treated with surgery plus chemo and/or radio –therapy.

Table 2.2 Multivariate logistic regression analysis on the interruption of work activity after diagnosis with backward selection method

	Initial Model Nagelkerke's R^2 = .43		Final Model Nagelkerke's R^2 = .28	
Parameter	**OR**	**95% CI**	**OR**	**95% CI**
Work Engagement	0.76	0.43, 1.36	-	-
Job Satisfaction	3.18	0.79, 12.9	-	-
Job Autonomy	0.86	0.37, 1.98	-	-
Work Health Incompatibility	1.73	0.70, 4.24	-	-
Social Pressure	0.97	0.94, 1.01	-	-
Work disaffection after cancer	2.19	0.98, 4.90	2.70**	1.48, 4.94
Treatment (vs. Surgery Chemo/Radio)				
Surgery only	0.13	0.02, 0.65	0.15**	0.05, 0.51
Chemo/Radio -therapy	0.24	0.05, 1.18	0.37	0.11, 1.27
Civil State (vs. Married)				
Single	1.88	0.36, 9.74	-	-
Partner	1.97	0.29, 13.3	-	-
Divorced	6.05	0.76, 47.9	-	-
Cancer Type (vs. Breast)				
Gastrointestinal	18.3	0.45, 753	-	-
Gynaecologic	1.50	0.24, 9.48	-	-
Prostatic	5.37	0.27, 107	-	-
Work contract (vs. open-ended contract)				
Self-employed	0.53	0.12, 2.35	-	-
Other	2.23	0.34, 14.9	-	-
Cancer Stage (vs. III)				
I	0.37	0.08, 1.67	-	-
II	0.66	0.15, 2.88	-	-

Note: ** $p < 0.01$.

Return to work

Sixty-three patients (59%) did return to work after six months from diagnosis and among these, there was not a significant difference in the mean working hours per week before (M = 38.2, SD = 11.5) and after (M = 34.1, SD = 10.7) cancer diagnosis; $t_{(86)}$=1.91, p = .059. The 58% of the patients that returned to work reported that the disease had no effect on their work activities, the 28% had to reduce the working hours. The 4.5% of the patients back at work reported to have lost many clients due to the disease. Finally, two patients (2.3%) were demoted and other two had to change job after cancer.

Table 2.3 shows the univariate cox regression of the factors associated with the "risk" of RTW with a *P*-value lower than 0.10 and the multivariate final model. The univariate analysis revealed that among the sociodemographic and medical variables the "risk" or RTW in six months after cancer diagnosis was significantly ($P < 0.05$) related only with the *type of work contract*. Specifically, temporary and occasional workers were 2.16 times more likely to RTW than patients with an open-ended contract. Moreover, the "risk" of RTW were not statistically different between patients with an open-ended contract and self-employed patients. Among the psychosocial factors the "risk" of RTW increased significantly ($P < 0.05$) with the increase in the level of *work engagement*, *behavioral disengagement*, *psychosocial safety climate*, and *perceived general work ability* and decreased significantly ($P < 0.05$) with the increase in the level of *work-health incompatibility* and *work disaffection*.

Table 2.3 Cox regression analysis on return to work

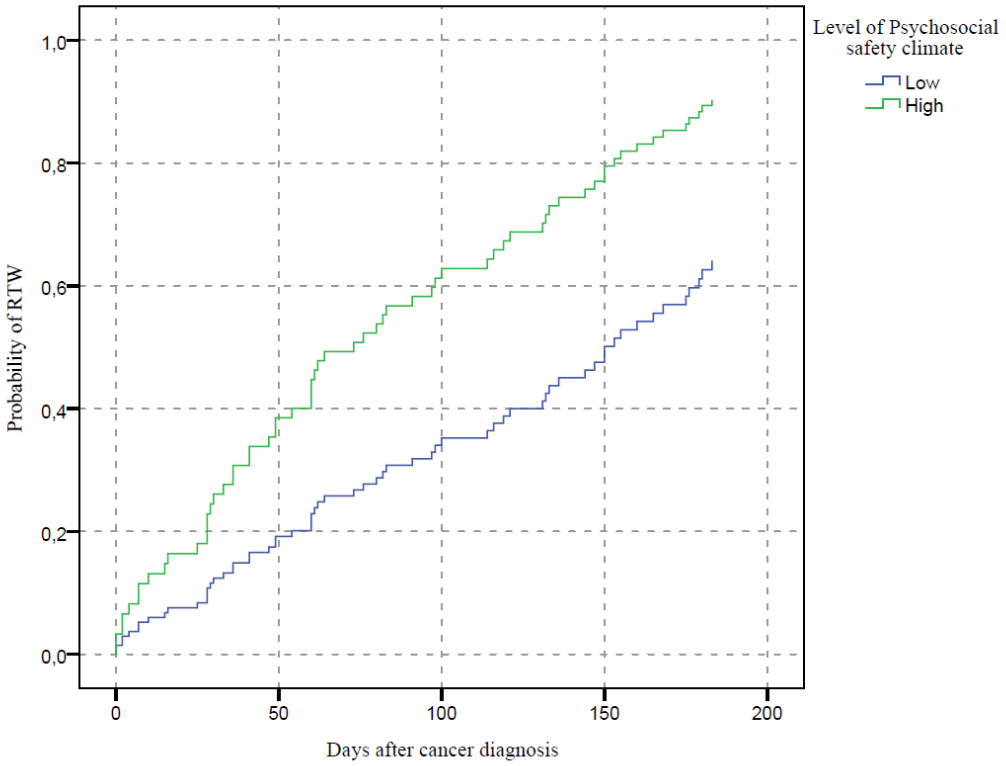
	Univariate		Multivariate (Final model)	
Parameter	**HR**	**95% CI**	**HR**	**95% CI**
Work contract (vs. Open-ended contract)				
Self-employed	0.82	0.45, 1.51	-	-
Temporary / occasional workers	2.16*	1.04, 4.50	-	-
Aware of cancer patients' legal right	0.63†	0.36, 1.08	-	-
Depression	1.38†	0.97, 1.95	-	-
Behavioral disengagement	1.15*	1.02, 1.29	1.18*	1.01, 1.38
Substance use	1.26†	0.99, 1.59	-	-
Acceptance	0.87†	0.74, 1.02	0.81*	0.66, 0.99
Planning	0.89†	0.78, 1.02	-	-
Active cope	0.89†	0.77, 1.02	-	-
Social pressure	1.01†	0.99, 1.03	-	-
Work disaffection	0.66*	0.48, 0.91	-	-
Work Engagement	1.42*	1.03, 1.95	-	-
Job satisfaction	1.47†	0.97, 2.23	-	-
Job autonomy	1.29†	0.95, 1.77	-	-
Perceived general work ability	1.20**	1.07, 1.35	1.16*	1.02, 1.38
Psychosocial safety climate	1.51**	1.14, 2.01	1.88**	1.31, 2.69
Work-health incompatibility	0.57**	0.38, 0.86	-	-

Note: $^{\dagger}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$.

After a backward elimination, the final multivariate model retained four psychosocial variables and none medical or sociodemographic. Higher level of *psychosocial safety climate* and of *perceived general work ability* at the baseline determined a higher probability of RTW. Moreover, two coping strategies adopted at the baseline influenced the RTW. Cope to the cancer diagnosis with behavioral disengagement increased the "risk" of RTW whereas cope with acceptance decreased the "risk" of RTW.

Figure 2.1 displayed how perceiving a high or low level of psychosocial safety climate (median split) influences the probability of RTW controlling for general work ability and the two coping strategies. The probability of RTW of the group of patients with a low psychosocial safety climate is the 52% lower than the probability of the group with a high psychosocial safety climate (HR = 0.475; 95% CI: 0.264 - 0.857).

Figure 2.1. Effect of psychosocial safety climate on RTW controlling for work ability, behavioral disengagement and acceptance



Discussion

The first aims of this study were to measure the rate and the motivations of people that continue working after cancer diagnosis. We measured that the 68% of patients continued working after diagnosis. Such a high rate testifies that the behaviour of work continuation after cancer diagnosis is well spread. This topic is almost completely neglected by research that seems interested only in the return to work of people that have been off work after cancer. Moreover, studies investigating the factors affecting the RTW that do not distinguish between patients that stopped the work activity and patients that continued it, may lead to biased results. Models, such as the WAD model (Chapter 1), that helps to distinguish between paths of work after cancer may be very useful in this sense. Given the limited number of researches about this topic it is still to be established if the work continuation after cancer diagnosis is a positive strategy or if it is counterproductive in the long term. The results from Short et al. (2005) indicate that the group of people that abandoned job in four years after diagnosis for cancer related reason was made up more by the one that continued working (38.5%) than the one that suspended the work activity for a while (23%).

Compared with previous European studies (Molina Villaverde et al., 2008; Pryce et al., 2007) our rate of work continuation is considerably higher, more in line with the result from the US study (Short et al., 2005) with a rate equal to 60%. Our result makes the explanation that tied the work continuation rate with the welfare system unlikely. Indeed, Italian welfare system is closer to the Spanish one than to the one in the US, but the work continuation rate is closer between the studies from Italy and US (Short et al., 2005) than between the studies from Italy and Spain (Molina Villaverde et al., 2008). However, this discussion has to consider that the measurement of work continuation after cancer diagnosis is not uniform between studies. There is not a standardised definition of work suspension or continuation after diagnosis

and this may lead to very different percentages. In this study, we proposed a clear definition and a simple measurement of it. We defined the work suspension after cancer diagnosis as a suspension of the work activity for more than two consecutive weeks or three fragmented weeks in the month after cancer diagnosis. As time frame we considered the month after the diagnosis because it is an enough extended period to distinguish between stable and occasional work absences. At the same time, it is an enough limited period to not be overlap with the work absences normally measured in the studies of return to work after cancer.

From the study of Pryce et al. (2007) the decision to suspend work after cancer diagnosis seems to be driven by practical factors related to the work environment. Differently, our analysis revealed that work suspension after diagnosis is associated with work disaffection. In our opinion, it is appropriate to interpret this result focusing more on the sphere of personal value and interest than on practical work possibilities. A cancer diagnosis is a very stressful event that questions patients about the meaning of their life. This gives start to a process of sense making which is often associate with a reevaluation of what is important in life. Work disaffection measures the detachment and indifference towards work and it is significantly influenced by personal values (Leiter & Maslach, 2009). In a process of sense making may be that when work is a sense-making element it will be included in the coping strategy bringing the patient to continue working. Conversely, when job is only a source of livelihood it will be put aside to be recovered after, allowing the patient to focus on what is personally important and sense-making. Briefly, the patients will tend to continue working after cancer diagnosis if work is functional to a coping reaction that includes it in a process sensemaking.

The medical sphere too has an effect on the work continuation after diagnosis. Indeed, our final model included beside the work disaffection, the type of treatment. Molina Villaverde et al. (2008) found that the cancer stage

influenced the decision to suspend the work activity. In our analysis for patients seems to be more important the type of treatment and presumably its side effects and practical consequences related with work than the clinical information of the stage of the cancer.

Our analysis revealed that 63% of the patients were not informed about their legal rights as cancer patients. This is a relevant information because it is possible that the work continuation rate is high due to a disinformation of patients about their legal right. Italian hospitals should dedicate more attention to this issue, providing patients with some information about it.

The level of disclosure with coworkers in our sample was in line with the 92% found by Pryce et al. (2007) and higher than the 51% found by Stewart et al. (2001). On the contrary our level of disclosure with supervisor (78%) is considerably higher compared to the 60% and the 41% of Pryce et al. (2007) and Stewart et al. (2001). However, 22% of the patients did not disclose their health situation to their supervisor and the 14% did not disclose to coworkers. This testifies that for workers affected by cancer persist social problem in the workplace. They still have to fight against (real or supposed) embarrassing and upset reactions, gossip and stigma, devaluation of current and potential personal work abilities and career opportunities (Stergiou-Kita et al., 2014; Tiedtke et al., 2010). It is also possible to interpret the result from univariate analysis that shows how married patients tend to continue working more than divorced ones as a concern of not upsetting the significant other.

The inconsistencies of our results with the few previous studies investigating the decision to continue work activity after cancer diagnosis and the almost unknown effects of the work continuation during treatment on the long term work employment make essential to further investigate this issue.

The second aims of the present study were to calculate the RTW in the Italian context and to test the effects of the psychosocial factor highlighted in previous longitudinal and qualitative studies.

A review found an average RTW rate six months after cancer diagnosis of 40%, with a range between 24% and 72% (Mehnert, 2011). Our RTW rate of 59% was higher, but well within the range reported. Therefore, we can consider this figure as in line with the ones found in the studies of other countries.

From this study emerged the absence of a statistically significant effect of the medical and sociodemographic variables on the probability of RTW in favor of a significant influence of the psychosocial factors. Indeed, with the exception of the type of cancer that were not tested due to highly unbalanced group, the other medical variables did not influence the probability of RTW. Among the sociodemographic factor the only one with an effect on the RTW was the type of contract. This variable was significantly related to RTW but only in the univariate analyses. Previous studies found that self-employed patients did less absences and RTW earlier than other patients (Drolet et al., 2005; Molina Villaverde et al., 2008). We did not find any differences between patients self-employed and employed with an open-ended contract but we found that temporary and occasional workers were more likely to RTW than the other two groups of patients. These type of workers in Italy are far less legally protected and they may suffer a contractual weakness that force them to RTW to not lose the job. However, this interpretation should be taken with caution because only the 10% of the patients were temporary or occasional workers.

Considering the psychosocial factors, we found a statistically significant effect of many work-related psychosocial factors. We replicated the effect of the perceived general work ability found in de Boer et al. (2008), higher level of work ability at the baseline facilitate a faster RTW. Moreover, work ability was retained in the final multivariate model. The same is true for the psychosocial safety climate (PSC). Higher level of PSC at baseline favored a faster RTW. The PSC is a component of the general organizational climate related with the policies, practices, and procedures for the protections of

worker psychological health and safety (Dollard & Kang, 2007). It has never been studied in relation to the RTW after disease but it was the most important predictors in our pool of factors. Our results and the theoretical basis of the construct suggest to further investigate it in studies about RTW after disease. Indeed, PSC has been indicated as one of the causes of many important work characteristics such as job demand and resources, and psychological health at work and work engagement (Dollard & Bakker, 2010). This may explain why work engagement and work-health incompatibility have a statistically significant association with RTW in our univariate analyses but not in the multivariate model. PSC should share considerable variance with work engagement (Dollard & Bakker, 2010) and in our opinion with work-health incompatibility too.

Among the issues raised by qualitative studies that we tested, we found a significant effect for work disaffection and for some coping strategies. Higher level of work disaffection after cancer diagnosis determine a slower RTW. This may be interpreted in the same way we interpreted the result of the section one of this research about the decision to continue working after diagnosis. However, work disaffection after cancer was not retained in the final multivariate model. On the contrary, two factors from the Brief COPE (Carver, 1997) were in the final model, behavioural disengagement and acceptance. The patients that adopted behavioral disengagement had a higher probability to RTW faster. Inversely, the patients that use acceptance to cope returned to work more slowly. This patterns seems counterintuitive but it is strengthened by the same trend found in the univariate analyses. Here, acceptance, planning, and active cope were all associated ($p < .10$) with a slower RTW. Instead, behavioural disengagement ($p < .05$) and substance use ($p < .10$) were associated with a faster RTW. The coping strategies that involve the approach of the problem seems to lead patients to take more time to face cancer healing. Conversely, coping strategies involving the avoidance of the problem bring the patients to distract themselves with work.

Specifically, acceptance involves accept reality as it is, the stressors is accommodated and recognized in its gravity so that the patient postpones the RTW. Behavior disengagement involves not taking care of the cancer, giving up to facing it or at least "let the doctors do the job", consequently the patient does not think to need time to cope with cancer. To our knowledge this is the first study that shows how the coping strategies may impact the RTW process. Moreover, these data call into question the notion that a faster RTW is a better RTW in favor of a more careful interpretation of the personal trajectories of work after cancer.

We did not replicate the effects found in other studies of fatigue (Balak, Roelen, Koopmans, Ten Berge, & Groothoff, 2008; Lilliehorn, Hamberg, Kero, & Salander, 2013; Molina Villaverde et al., 2008; Spelten et al., 2003) and depression (Carlsen, Dalton, Diderichsen, & Johansen, 2008; Spelten et al., 2003). This may be due to the instrument and the procedure we used to measure these variables. Indeed, we used the Profile of Mood State – Short Form (Baker et al., 2002). This instrument measures the mood of the week before the interview and could be easily influenced by contextual factor. Moreover, we administered the baseline questionnaire to the patients in different moments of their healing process. Someone was at the hospital waiting for a surgery, someone after the surgery, and someone else for chemotherapy. This likely influenced the answers given to the POMS-SF.

Concluding, in the first section this study focused on one aspect that has been mainly ignored in previous studies, that is the decision to continue the work activity after cancer diagnosis. Giving the first information about the determinants of this decision the research showed the importance of the patient's attitude toward job. In the second section the study highlighted the importance in predicting the RTW of two factors never used in quantitative researches about RTW after cancer, the psychosocial safety climate and the coping strategies. Moreover, it confirmed the importance of the perceived work ability. The common theme is the importance of the psychosocial work-

related factors in the process of work after cancer and the reduced importance of the medical and sociodemographic variables.

CHAPTER III

Work after a Cardiovascular Disease

In Chapter 2 we dedicated our attention to the phase one - *work decision* - and two – *off work and preparation* – of the WAD model after a cancer diagnosis. In this chapter we will focus on cardiovascular diseases (CVDs). In our exposition, with CVDs we will specifically refer to coronary artery diseases (CAD, that include: stable angina, unstable angina, myocardial infarction, and sudden coronary death), valvular heart diseases, congenital heart defects, and other hearth diseases as arrhythmias, bradycardia, pericarditis, and endocarditis.

We will investigate the psychosocial factors affecting the event of RTW (phase two, *off work and preparation*) and the differences in the quality of working life and perceived working conditions before and after the onset of the disease (phase three, *encounter, adjustment* and *stabilization*). These two issues will be analyzed in the same sample with different methods.

Introduction

Nowadays, the CVDs are one of the leading causes of death and disability in the world especially in the developed countries. In 2008 more than 17 million of people died because of CVDs, of these more than 3 million were under the age of 60 (WHO, 2011). In the European Union CVD causes 1.9 million deaths, the 40% of all deaths in the EU. The economic cost of CVD in the EU is estimated about €196 billion a year. Of this, around 54% is due to health care costs, 24% due to productivity losses and 22% due to the informal care of people with CVD (Nichols, Townsend, Scarborough, & Rayner, 2012).

In the last twenty years the mortality of these diseases gradually declined due to the diffusion of primary and secondary prevention programs, and due to the progress made in the medical and surgical treatments (Griffo et al., 2008). Many of the people affected by CVDs are in a working age (Brink, Brandstrom, Cliffordsson *et al*., 2008) and the progress in cardiovascular

therapy mean that the cardiovascular function of many patients is restored to such an extent that returning to work is possible. The RTW of people affected by CVD is beneficial both for the individual and for the society. As shown in chapter one, the recovery of the working activity has economical, physical and psychological positive effect on the person. At the society level, in the six major EU economies (France, Germany, Italy, Spain, Sweden and the UK) the work disability and the prolonged work absences caused by CVDs produce an estimate loss of 1.4 billion of euro a year (CEBER, 2014). Furthermore, the RTW after an acute coronary syndrome is considered one of the main indexes of functional recovery (Bhattacharyya, Perkins-Porras, Whitehead *et al.*, 2007) ad of efficacy of the health and rehabilitation services (Hämäläinen, Mäki, Virta et al., 2004).

Background

The probability to RTW is inversely related with the length of the work absence independently from the medical conditions. It has been calculated that the probability of RTW drops of the 50% after the 12th week of work absence (Christian, Martin, Brown et al. 2006). Moreover, the RTW interventions are rarely effective if the patients have been absent from work for a long time (Fukuoka et al., 2009). The RTW rate of patients with CVD is very variable. An approximate synthesis of the findings of seven studies involving about 1200 workers under the age of 65 led to a RTW rate between 50% and 80% at 12 months after the discharge from the rehabilitation clinic (Bhattacharyya et al. 2007; Brink et al. 2008; Farkaš et al., 2008; Herlitz et al. 1994; Mittag, Kolenda, Nordman, Bernien, Maurischat, 2001; Soderman, Lisspers & Sundin, 2003; Worecester et al. 2014). Bhattacharyya et al. (2007) founded that in patients hospitalized for an acute coronary syndrome the mean time between the discharge from the rehabilitation clinic and the RTW was three months and Yonezawa et al. (2009) for MI patients founded a mean time of one month. In a Swedish national study, based on the analysis

on 51068 worker patients Voss et al. (2012) founded that the RTW rate 12 months after the intervention was 66% for women and 76% for men in the CABG group, and 76% for women and 85% for men among the PCI patients. They founded also that the median number of sick-leave days after CABG was 253 in women and 151 in men, and after PCI was 71 in women and 47 in men (Voss et al. 2012). However, Sweden has sick-leave spells after coronary revascularisation 2-5 times longer than other countries (Voss et al. 2012).

Given the great variability between workers and the significant portion of them that do not RTW after one year from the intervention, it is a crucial issue to understand why some patient RTW and others do not, and why someone needs more time than others.

In the research about RTW after CVDs work-related psychosocial factors have recently gained more attention. For example, in the last fifteen years, studies highlighted the effects on RTW after CVDs of social support at work (O'Hagan, Thomas 2011; Kushnir, Luria, 2002), job satisfaction (Fiabane et al., 2013, Mittag et al. 2001; Worecester et al., 2014), and decision latitude (Drory, Kravetz, Koren-Morag, and Goldbourt, 2005). Few studies investigated the role of job strain (Fukuoka et al., 2009; Sykes, Hanley, Boyle, and Higginson, 2000, Du, Cheng, Hwang, Chen, and Su, 2013) explicitly referring to established theories such as the Job Demand Control model (JDC, Karasek, 1979). Job strain has been extensively studied as a risk factor for CVDs and hypertension with results that generally seems to confirm the hypothesized relation (Belkic, Landsbergis, Schnall, and Baker, 2004; Kivimaki et al., 2006). The most used conceptual framework in these studies is the JDC model which has been widely used to evaluate the effect of the psychosocial factor in the work environment on cardiovascular health (Terrill & Garofalo, 2012). The JDC model posits that high psychological strain levels derived from a combination of high psychological job demands and mental workload, and low job control or decision latitude (skill discretion

and decision authority) and causes several unhealthy consequences. On the contrary, low job demands and high job control determine low levels of strain (Karasek, 1979). High levels of psychological job demands are not always negative because if they are paired with a high job control they result in a challenging working condition stimulating growth. Similarly, low job demands levels are not always positive because if paired with low job control lead to a passive working condition that is dissatisfying with low level of work motivation (Karasek, 1979). The model maintains that physical job demands affect the worker through different mechanisms even if it can be important in the genesis of psychological strain especially for blue collar workers (Karasek, 1979). In 1988, Johnson and Hall in a study concerning CVD added to the JDC model the effect of social support at work as another determinant of psychological strain. Basically, social support enhances the beneficial effect of decision latitude and buffers the negative effect of psychological job demands. This version of the model is called Job Demand-Control-Support (JDCS) model.

Given the diffusion of the JDC model in the field of CVDs, it is strange that not many researchers applied the JDC model to study the RTW after CVDs. Moreover, the JDC model could be very useful in a research field characterised on one hand by the shortage of theoretical models and on the other hand by a recognised importance of psychosocial factors on RTW (Fukuoka et al., 2009). The few existing researches adopting the JDC model showed mixed results. Du et al. (2013) founded that the odds of not being RTW at 12 months following the onset of CVD for workers with a high job strain was 2.91 times larger than the odds for the others group of workers (active, passive and low strain) controlling for medical and sociodemographic variables. However, this relation became statistically non-significant when workplace justice was introduced in the model. Sykes et al. (2000) observed that a greater decision latitude at the baseline predicted a higher probability of being RTW at 12 months post-discharge after

controlling for depression, medical and sociodemographic variables. Conversely, job strain, defined as the interaction between decision latitude and job demands, did not predict the probability of being RTW after 12 months. Fukuoka et al. (2009), using a multivariate Cox regression analysis, reported that the group of workers with a high job strain had a probability of RTW 47% (HR = 0.53) lower than the one of the others job situations (active, passive, and low strain) during a time period of 6 months from hospital admission controlling for depression, medical and sociodemographic variables. Though, coworkers and supervisor support were not significantly related to the probability of RTW. The use of the JDC model and its components (job demand, job control, strain and support in the workplace) in the prediction of the RTW after CVDs needs to be further examined as the first results are promising but still mixed. Another important work-related psychosocial factors that has been little studied in the RTW after CVD literature is Job satisfaction. Job satisfaction is a central dimension in Organizational Psychology and it is linked with many important work-related behaviour such as turnover, productivity and stress (van Saane, Sluiter, Verbeek, & Frings-Dresen, 2003). However, as mentioned, only three studies investigated the effect of job satisfaction on RTW (Fiabane et al., 2013, Mittag et al. 2001; Worecester et al., 2014). They have shown that job satisfaction is a facilitator of the RTW but additional confirms are needed.

The first part of the present study aims to describe the rate and the characteristics of the RTW in an Italian context and to contribute filling the gap described above. Specifically, we will explore the role of the work-related psychosocial factors in the prediction of the RTW after CVDs using the components of the JDCS model and job satisfaction. To evaluate the actual effect of the components of the JDCS model and of job satisfaction we will control for the effects of other relevant medical, demographic and psychosocial factors. Specifically, for the psychosocial factors we will consider anxiety and depression that are well-known barriers to the RTW

after CVDs, and perceived illness severity that a recent review has indicated as an important factor influencing RTW after CVDs (Fiabane, Omodeo, Argentero, Candura, & Giorgi, 2014).

As it is shown in the WAD model (Chapter 1), after the RTW there starts a phase of adjustment in the workplace. However, few researchers analysed the patients' adjustment to their work environment after a cardiac disease and few focused on the quality of work life of cardiovascular patients after their RTW. The studies documented a decreases in self-reported work involvement in terms of hours (Soderman, Lisspers, Sundin, 2003), in self report of responsibility, effort and involvement (Abbott, Berry, 1991), and the change of the job tasks or the employer (Varaillac et al., 1996). O'Hagan, Coutu, Thomas and Mertens (2011), in their qualitative study, underlined the role of medical reassurance in the worker's decision to stay on the job after RTW. Wazkovska and Szymczak (2009) highlighted how the level of re-adaptation to work was not homogenous. It included both the subjects who had no problems satisfying job demands and felt satisfaction from their work after RTW and the persons who found it difficult to perform work tasks and who assessed their workload as very high. The last often had also more mood disturbances. Conversely, Fiabane et al. (2014) had more positive results. In their group of cardiac patients, the job satisfaction decreased during the first 6 months of work reintegration, but all others variables measured (stress perception, workload, relationships with others, career, achievement) showed positive or no change over time. In their opinion the decrease of job satisfaction was related to the difficult process of work readjustment after illness, while the more positive results could be explained with a change in the way patients perceived and dealt with stressors and work demands. Previous studies (O'Hagan et al., 2011; Wazkovska & Szymczak, 2009; Fiabane et al., 2014) agree in suggesting to analyse the patients' perspective and experience of RTW and work adjustment after RTW. This would lead

important insights for improving rehabilitative practices of cardiac patients and their work reintegration.

Hence, the second part of this study have two main aims. First, test the differences in the quality of working life between before and after the cardiovascular illness, measured in terms of job satisfaction, job involvement and working hours. Second, discover the determinants of Job involvement, Job satisfaction, and Working hours, and specifically to pinpoint the causes of changes in time between before and after cardiovascular illness, adopting an individual approach. We are interested to identify what could explain the difference in time at level of single patient.

Method

Patients and procedures

The study is a monocentric prospective cohort conducted in one cardiovascular rehabilitation clinic in the north of Italy. The patients were selected to participate in the study if, between one to eight weeks before the recruitment they have had an Acute myocardial infarction (AMI), or if they undergone a Percutaneous transluminal coronary angioplasty (PTCA), a Coronary Artery Bypass Graft (CABG) surgery, or a valve replacement. Moreover, the patients had to be employed for a wage prior to the admission to the rehabilitation clinic with language skills sufficient to allow completion of the questionnaires. People were excluded from the research if they were planning for retirement in the year after the recruitment and if they have had a life-threatening disease or psychiatric illness in the past.

Patients were recruited after the admission to the clinic. The consent to participate in the study was asked to the patients during the ordinary assessment conducted by the psychologists of the hospital. Once given the informed consent, demographic, occupational and psychological data together with a retrospective assessment of the psychosocial work conditions

were collected with a questionnaire. Six months after the discharge from the clinic, patients were invited via e-mail to complete the same survey on-line.

Measures

The survey was designed to measure variables useful for the two part of the research project. For the first part, we measured *work* and *non-work* related psychosocial factors that were supposed to influence the RTW process. For the second part of the research, we included measures that give an indication of the working conditions and the quality of the working life of the participants before and after the job suspension due to CVD.

The sociodemographic dimensions (sex, age, education level, marital status, type of job, working in the public / private sector, nightly work shift, and Sunday work) and the dimensions related to the physical health (type of cardiac disease, health problem after discharge from the rehabilitation institute, self-rated health status at follow-up) were measured once during the baseline assessment, except for self-rated health status that was measured at follow-up.

The psychosocial variables were time varying hence were measured both at the baseline and at the follow-up. Specifically, we measured:

Work-related psychosocial factors – Using the Job Content Questionnaire (Karasek, 1985; Italian version: Cenni and Barbieri, 1997) we measured five psychosocial work characteristics. *Psychological Job Demands* (seven items, Cronbach's α = .71), *Decision Latitude* (seven items, Cronbach's α = .66), *Physical Job Demands* (three items, Cronbach's α = .88), and *Supervisor and Coworkers support* (four items each one, Cronbach's α = .89 and .81 respectively). *Job Strain* derives by a combination of Psychological job demands with Decision latitude and it is possible to obtain a continuous version of the index or a categorical one. Subtracting Decision latitude to Psychological job demands gives the continuous version of Job strain with

higher levels indicating a higher strain. The categorical version of the index derives by a combination of Psychological job demands and Decision latitude that have been previously dichotomised on the basis of their mean value. The categorical job strain identifies four groups (R. Karasek et al., 1998): high strain (high demands and low latitude), low strain (low demands and high latitude), active (high demands and latitude), and passive (low demands and latitude).

Psychosocial factors related with the quality of working life - With the Job Involvement Questionnaire (Kanungo, 1982) we measured *Job involvement*, the cognitive or belief state of psychological identification with the job (10 items, Cronbach's α = .74). Finally, we measured *Job satisfaction* with four items (Cronbach's α = .87).

Non-work related psychosocial factors – Anxiety and Depression were measured with the Hospital Anxiety and Depression Scale (Zigmond, Snaith, 1983; Italian version: Costantini et al. 1999). This instrument has been specifically developed to assess *Anxiety* (seven items, Cronbach's α = .86) and *Depression* (seven items, Cronbach's α = .74), in patients with a physical illness.

The *Patient's perception of the disease* was measured with of the Brief-Illness Perception Questionnaire (Broadbent 2006; Italian version: Pain, Angelino, Miglioretti 2006). The overall score asses the severity of the diseases as perceived by the patient and it is composed by eight items (Cronbach's α = .67).

We measured *Self-efficacy in the management of stressing situation* (three items, Cronbach's α = .65), *Self-efficacy in adherence to medical prescription* (four items, Cronbach's α = .73), and *Social support received for the management of the disease* (one item) with the Adherence Schedule in Heart Disease (Majani, Pierobon, Giardini & Callegari, 2007).

Outcome variables – The outcome of interest in this study was the return to work of the CVD patients. During the follow-up, we asked if and when (exact date) the patients returned to work. The outcome variables used were the time and rate of RTW as it was 8 months after the surgical intervention or the cardiac event that interrupted the work activity. We also asked if the workers returned to work with the same employer and with the same task.

Analysis

The analysis is divide in two sections. The first one investigates the factors associated with the RTW after CVD. The second one is dedicated to the investigation of the differences in the quality of working life before and after the CVD. Descriptive statistics were used to characterize the study sample at baseline, used for the first section, and the sample of patients that did RTW, used for the second section.

In the first section we used survival analysis methods with Cox regression to analyze the effect of psychosocial work related variable on the RTW behavior. Specifically, we were interested in determining the effects of the components of the JCD-S on RTW, controlling for other potentially confounding variables. To do this we adopted a two-step procedure (Altman, 1991) implemented with SPSS 22. First, we conducted univariate analysis for the relationships between days taken to return to work at 8 months after the work interruption and each of the predictive sociodemographic, psychosocial, and medical variables. Then, the variables that revealed a likelihood ratio test with a *P*-value lower than .10 were entered in a multivariate Cox regression with backward selection. In our analysis the hazard ratios (HRs) indicate the 'risk' of returning to work with HR higher than one indicating higher probability of return to work. Potential predictors identified with the multivariate model will be categorized to allow e graphical depiction of their effect on the RTW.

In the second section of the research we tested the differences in the quality of working life between before and after the CVD. In order to do this we conducted a series of paired sample t-test with SPSS. As effect size we provided the Hedges's g_{av} and the Common Language effect size (Lakens, 2013). We aimed also at discovering the determinant of the change in time of the quality of working life (Job involvement, Job satisfaction, and Working hours). To do this, we performed a series of linear mixed models (LMM) using the lme4 (Bates, Maechler, Bolker & Walker, 2014) and lmerTest packages for R (R Core Team, 2013). We chose this technique because in our data the unit of analysis, the subject, is nested within a cluster unit, the type of occupation, and because the mixed models allow to perform the "within-subject centering" procedure (de Pol and Wright, 2009). This simple procedure allows to distinguish the within subject effect with the between subjects effect of the covariates and this permit to discover which variables actually cause the change in time – within subject – of the DV.The random part of the model was formed by the subject nested in the type of occupation. The fixed part of the models was selected with a top-down strategy as proposed by West, Welch and Galecki (2014) with a backward elimination. In the first step we added as fixed effect to each model all the variables that did not vary over time. These variables were of two types: socio-demographic - sex, age, education level, working in the public / private sector, marital status, nightly work shift, Sunday work –, and related to the physical health - Type of Cardiac disease, health problem after discharge from the cardiac rehabilitation institute, self-rated health status at follow-up. Then, for each model we performed again a backward deletion starting with the most complex model formed by the significant variables from the first step plus all the other variables of the study: Job involvement, Job satisfaction, and Working hours in turn, and Psychological job demand, Decision latitude, Physical exertion, Coworkes support, Depression, Anxiety and Illness representation. The *p-values* for the fixed effects were calculated from F test based on Sattethwaite's approximation (Kuznetsova, Brockhoff,

Christensen, 2013). The estimation method used for the final models was the restricted maximum likelihood (REML). For each model we calculated also the $R^2_{GLMM(m)}$ and $R^2_{GLMM(c)}$, indicating the variance explained by the fixed part of the model and the one explained by the full model - fixed and random part - respectively (Nakagawa, Schielzeth, 2013).

Results

Participant

During the admission to the clinic we contacted 253 workers. Of these, 199 given their consent in participating to the research but, at follow-up, 32 (16%) did not give the information about their RTW and five (2.5%) gave wrong information about the date of RTW (e.g., RTW date preceding the upset of the disease). Hence, a sample of 162 workers was used for the first part of this study. Eight months after the work interruption, 26 patients (16%) did not return to work. Consequently, in the second part of this study a sample of 136 patients that did RTW was used. Table 3.1 displays descriptive statistic of the sample. Of the people that RTW, 17 (13%) changed the job function and only three (2%) changed the employer. Chi-square tests and t-tests revealed no significance difference between the group that answer to the follow up and the one that did not.

Table 3.1 Sociodemographic and disease-related characteristics at baseline (n =162) and of the workers that di RTW (n = 136)

		Baseline sample	**RTW workers**
Mean age (SD)		52 (8.5)	51.9 (8.1)
Gender	Male	136 (84%)	117 (86%)
Education level	Primary and Lower secondary school	32 (20%)	24 (18%)
	Upper secondary school	84 (52%)	71 (52%)
	University or higher	46 (28%)	41 (30%)
Relationship	Conjugated / Cohabiting	112 (69%)	95 (70%)
	Single	28 (17%)	22 (16%)
	Separated /Divorced	21 (13%)	18 (13%)
	Widowed	1 (1%)	1 (1%)
Job type	Office worker	56 (35%)	49 (36%)
	Manager / Supervisor	31 (19%)	26 (19%)
	Consultant / Self-employed	15 (9%)	14 (10%)
	Blue-collar worker	14 (9%)	14 (10%)
	Health professions	11 (7%)	4 (3%)
	Teacher	10 (6%)	7 (5%)
	Entrepreneur	7 (4%)	7 (5%)
	Manual self-employed / Construction worker	7 (4%)	3 (2%)
	Low enforcement	4 (2%)	3 (2%)
	Others	7 (4%)	12 (8%)
Working hours (SD)		42 (13.2)	42.6 (12.8)
Type of employer: public (vs. private)		48 (30%)	
Therapy	Angioplasty / Bypass	68 (42%)	46
	Valve replacement / Repair	62 (38%)	38
	Other	29 (18%)	16
Health problem after discharge from RC		32 (21%)	21
Need another hospitalization after discharge from RC		17 (13%)	10

Determinants of return to work

The univariate analysis revealed that the time taken to RTW at eight months after work interruption was related with the levels at baseline of Strain, Decision latitude, Physical job demands, and Type of employer ($p \leq .05$) and with Sunday work ($p \leq .10$). These variables were entered in a Cox regression with a backward selection in order to find the best model predicting the RTW identifiable with the variables under investigation. Table 3.2 shows the staring model with all the variables entered and the final model with the best predictors of the RTW.

Table 3.2 Cox regression analysis on RTW with backward selection method

	Initial model		Final model	
Parameter	**HR**	**95% CI**	**HR**	**95% CI**
Physical job demands	0.908**	0.847, 0.973	0.913**	0.853, 0.977
Strain	0.786	0.559, 1.106	0.716*	0.550, 0.932
Decision latitude	1.102	0.680, 1.788	-	-
Working in the public sector	0.593*	0.394, 0.893	0.587**	0.393, 0.878
Saturday work	1.298*	.854, 1.974	-	-

Note: * $p < .05$; ** $p < 0.01$

In order to give a graphic representation of the effect of the two components of the JDC-S we run other two versions of the final model. The first with a dichotomous version of the Physical job demands (high / low), the second with the Strain categorized in: high strain, low strain, active, and passive. Figure 3.1 and 3.2 shows the effect of Strain (categorical) on RTW controlling for Physical job demands and Type of employer and the effect of Physical job demands (high / low) on RTW controlling for Strain and Type of employer, respectively. To quantify the size of these effects it is worth report that workers in the group with low physical job demands are 67% (HR = 1.67; 95% CI: 1.14 – 2.45) more likely than the group with high physical job demands to RTW. The group of workers with a low strain are 85% (HR = 1.85; 95% CI: 1.13 – 3.03) more likely than the group with high strain to RTW.

Figure 3.1. Effect of physical job demands on RTW controlling for strain and type of employer

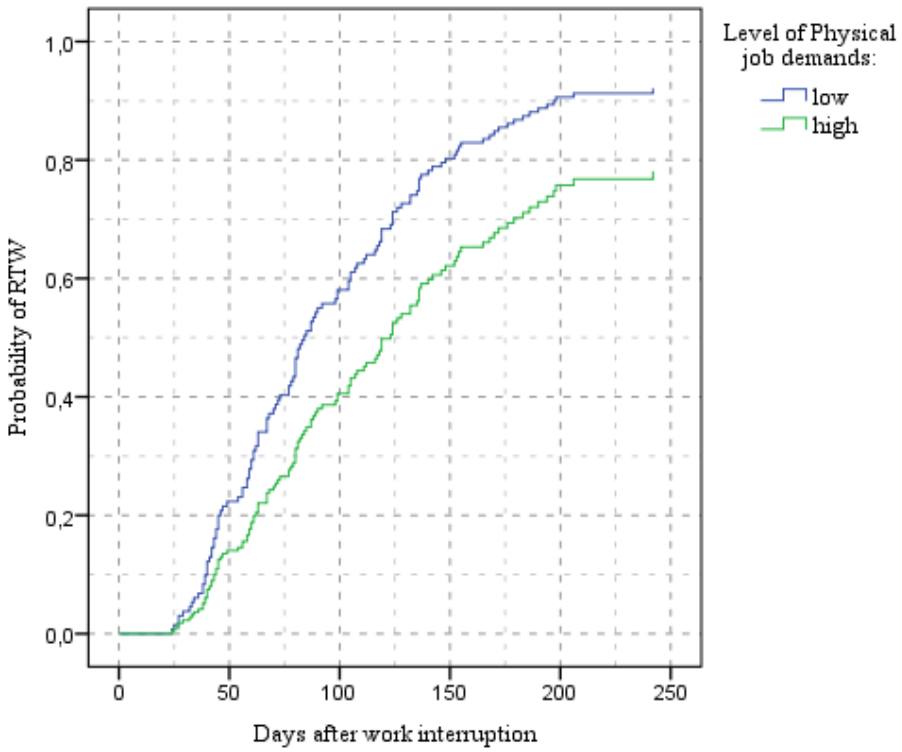
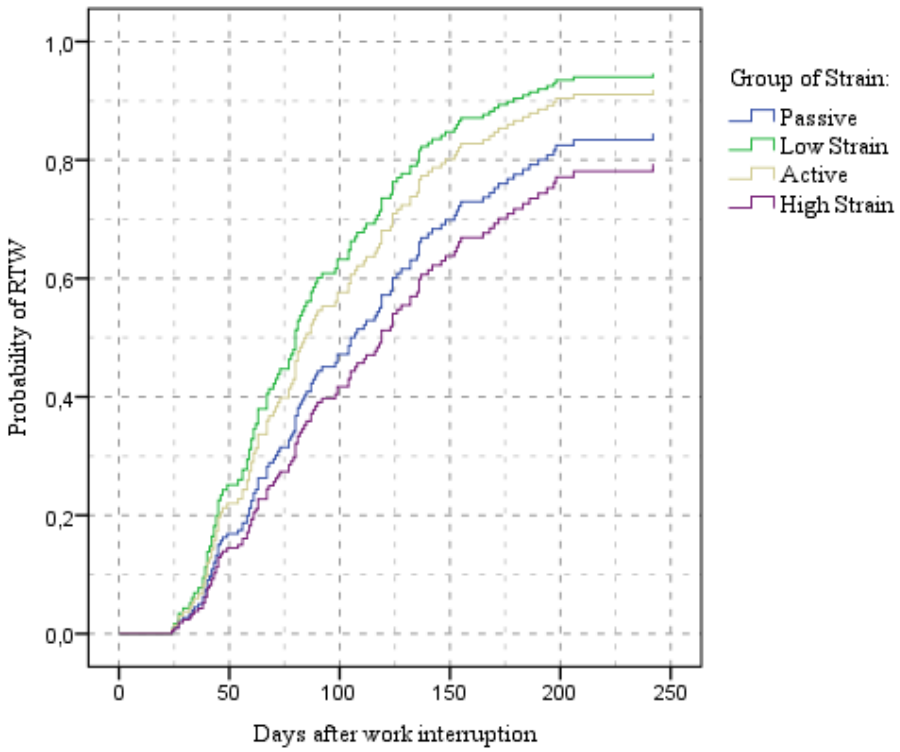


Figure 3.2. Effect of Strain on RTW controlling for physical job demands and type of employer



Changes in time of the quality of working life

Table 3.3 reports the paired sample t-tests with the effect sizes used to analyze the differences in the psychosocial variables between before and after the surgical intervention and rehabilitation. All the variables related to the quality of the RTW, Job Involvement, Job Satisfaction, and Working Ours showed a statistically significant decrease in time. Furthermore, some of the variables assessing the perception of the working conditions changed over time. Specifically, Decision latitude, Psychological and Physical Job demands, and Coworker Support decreased. We also detected sizeable decrease in time of the Illness perception index, of Self-efficacy in adherence

to medical prescription, and of Self-efficacy in the management of stressing situation.

Table 3.3
Results of paired sample t-test and Descriptive Statistics for changes before and after the surgical intervention and rehabilitation

	Time				95% CI for				
	Before		After		Mean	t	df	g_{av}	CL ES
	M	SD	M	SD	Difference				
Job Involvement	3.09	0.81	2.87	0.83	0.11, 0.33	4.14***	129	0.27	0.64
Job Satisfaction	3.92	1.07	3.71	1.06	0.05, 0.37	2.56*	134	0.20	0.59
Illness perception	3.85	0.56	3.53	0.57	0.23, 0.41	7.27***	151	0.57	0.72
Anxiety	5.45	3.85	5.38	3.33	-0.54, 0.67	0.22	148	0.02	0.51
Depression	3.97	3.26	3.64	3.03	-0.15, 0.82	1.35	150	0.11	0.54
Decision Latitude	3.28	0.48	3.14	0.49	0.06, 0.22	3.13***	129	0.29	0.61
Psychological Job Demands	2.77	0.55	2.66	0.43	0.03, 0.19	2.63*	133	0.23	0.59
Physical Job Demands	5.23	2.41	4.87	1.97	0.01, 0.71	2.06*	134	0.16	0.57
Supervisor Support	11.68	3.05	11.64	2.87	-0.58, 0.66	0.14	93	0.01	0.51
Coworker Support	12.23	2.32	11.5	1.88	0.39, 1.08	4.19*	132	0.35	0.64
Working Ours	42.4	12.8	40.1	10.4	0.10, 4.63	2.07*	132	0.20	0.57
Strain	-0.5	0.63	-0.47	0.56	-0.08, 0.13	0.49	127	0.04	0.52
SE stress management	3.54	0.71	3.24	0.67	0.17, 0.42	4.71***	151	0.43	0.65
SE medical prescription adherence	4.16	0.63	3.82	0.65	0.25, 0.44	7.36***	151	0.53	0.72

Note: * $p < .05$; *** $p < 0.001$; CL ES = Common Language Effect Size

Determinant of differences

The left part of Table 3.4 shows the models with only the constant in time variables. These model resulted from the backward deletion of the socio-demographic and related to the physical health variables. The model of Job Satisfaction retained the variables Health problem after discharge from the cardiac rehabilitation institute, and Self-rated health status at follow-up, with better health condition associated with a greater Job satisfaction. The model of Working ours revealed that the amount of hours dedicated to the job decrease with the age of the worker, with sex (for female workers), and with

the absence of Sunday work. Whereas, the model of Job Involvement did not retain any socio-demographic or related to physical health variables.

As described, to understand the causes of the decrease in time of job satisfaction, job involvement and working ours we used the "within-subject centering" procedure with linear mixed models. The right part of Table 4 reports the final models resulted from the backward deletion of the time-varying variables plus the significant socio-demographic and related to the physical health variables.

The differences in the level of Job satisfaction between subjects were associated with Job involvement, Coworker support, and Depression. However, it was the change within subject, over time, of Decision latitude and Psychological job demand which was positively and negatively related with the change over time of Job satisfaction, respectively. In this model the two variables related to the physical health are not statistically significant any more.

The difference between subject of the Job involvement is associated with the differences in the levels of Job satisfaction, Anxiety, Decision latitude and Self-efficacy in stress management. Though, only the change in time of Physical job demands is associated with the change in time, within subject of Job involvement so that the decrease in the level of Physical job demands is associated with the decrease in Job involvement.

At last, in the final model the differences in working hours between subjects are related with age, sex, the presence of Sunday work, and positively with Decision latitude. Yet, the decrease within subject of the working hours is connected with a decrease in the Psychological job demand and of Job satisfaction but with an increase in the Physical job demands.

Table 3.4
Random intercept linear mixed models with subjects nested in type of job

	Outcome variable: Job Satisfaction							
	Model with only the constant in time variables				**Full Model** R^2GLMM$_{(m)}$ = 0.40, R^2GLMM$_{(c)}$ = 0.63			
Parameter	**Estimate**	**SE**	***t*(*df*)**	**95% CI**	**Estimate**	**SE**	***t*(*df*)**	**95% CI**
Intercept	2.265	0.308	7.349***(124.67)	1.67, 2.86	0.153	0.607	0.252(105.11)	-1.01, 1.42
Self-rated health at fw	0.357	0.095	3.760***(134.46)	0.16, 0.54	0.135	0.092	1.469(112.72)	-0.05, 0.31
(No) Health problem after discharge	0.426	0.202	2.099* (133.18)	0.03, 0.83	0.263	0.184	1.429(112.86)	-0.09, 0.61
Job involvement *bw*	-	-	-	-	0.425	0.093	4.532***(58.41)	0.22, 0.61
Coworker support *bw*	-	-	-	-	0.169	0.038	4.418***(112.25)	0.09, 0.24
Depression *bw*	-	-	-	-	-0.083	0.032	-2.629**(113.07)	-0.15, -0.02
Psy. Job demands *wi*	-	-	-	-	-0.586	0.187	-3.141**(116.78)	-0.95, -0.22
Decision Latitude *wi*	-	-	-	-	0.505	0.179	2.825**(116.43)	0.15, 0.85

	Outcome variable: Job involvement							
	Model with only the constant in time variables				**Full Model** R^2GLMM$_{(m)}$ = 0.27, R^2GLMM$_{(c)}$ = 0.67			
Parameter	**Estimate**	**SE**	***t*(*df*)**	**95% CI**	***β***	**SE**	***t*(*df*)**	**95% CI**
Intercept	-	-	-	-	0.760	0.538	1.413(116.61)	-0.31, 1.8
Job satisfaction *bw*	-	-	-	-	0.343	0.061	5.654***(116.22)	0.22, 0.46
Anxiety *bw*	-	-	-	-	0.061	0.02	3.077**(116.06)	0.02, 0.1
Decision latitude *bw*	-	-	-	-	0.447	0.145	3.082**(116.39)	0.16, 0.75
Self-efficacy stress managment *bw*	-	-	-	-	-0.221	0.099	-2.228*(115.14)	-0.42, -0.03
Phy. job demands *wi*	-	-	-	-	0.063	0.029	2.157*(117.19)	0.01, 0.12

Table 3.4 (*continued*)

Random intercept linear mixed models with subjects nested in type of job

	Outcome variable: Working hours							
	Model with only the constant in time variables				**Full Model** R^2GLMM$_{(m)}$ = 0.17, R^2GLMM$_{(c)}$ = 0.52			
Parameter	**Estimate**	**SE**	***t*(*df*)**	**95% CI**	***β***	**SE**	***t*(*df*)**	**95% CI**
Intercept	46.764	2.000	23.38***(31.58)	42.82, 50.68	39.177	7.701	5.088***(118.53)	24.22, 54.09
(female) Sex	-6.751	1.967	-3.432***(123.35)	-10.6, -2.92	-6.309	2.031	-3.106**(104.91)	-10.26, -2.37
(no) Sunday work	-5.489	1.48	-3.709***(184.26)	-8.39, -2.61	-4.641	1.501	-3.093**(178.37)	-7.56, -1.74
Age (mean-centered)	-0.211	0.084	-2.514*(125.08)	-0.37, -0.05	-0.219	0.082	-2.657**(108.19)	-0.38, -0.06
Decision latitude *bw*	-	-	-	-	5.590	1.761	3.175**(112.19)	2.17, 9.00
Psy. Job demand *wi*	-	-	-	-	5.107	2.312	2.209*(112.12)	0.61, 9.62
Job satisfaction *wi*	-	-	-	-	2.489	1.099	2.265*(112.92)	0.35, 4.64
Phy. job demands *wi*	-	-	-	-	-1.314	0.544	-2.416*(112.07)	-2.37, -0.25

Note: * $p < .05$; ** $p < 0.01$; *** $p < 0.001$;

wi = within subject effect; *bw* = between subject effect; Psy. = Psychological; Phy. = Physical.

Discussion

The part one of the study aimed to describe the rate and the characteristics of the RTW in an Italian context and to explore the role of the work related psychosocial factors in the prediction of the RTW after CVDs with an explicit reference to the JDCS model.

The RTW rate in this study is slightly higher compared to the one of other researches (Bhattacharyya et al. 2007; Brink et al. 2008; Farkaš et al., 2008; Herlitz et al. 1994; Mittag, Kolenda, Nordman, Bernien, Maurischat, 2001; Soderman, Lisspers & Sundin, 2003; Voss et al. 2012; Worecester et al. 2014). However, this result could be explained by the great variability among studies of this statistic and by the exclusion criteria we have adopted: the patients that have already planned the retirement in the year after the cardiac event were excluded. This may have omitted a portion of the workers that in other researches enlarges the group of the people that do not RTW due to retirement. A similar selection may be occurred in a study of Boudrez and De Baker (2000). The authors found a RTW rate at one year of 82,4%, similar to the one we found. They enrolled only workers under the age of 60, five years under the retirement age in the country of the study at the time it was carried out. Moreover, also the sample characteristics may explain the high RTW rate: our sample was mainly composed by males that usually have a better RTW rate and more than half of the worker were employed in office jobs that usually have a low level of physical work load, an established predictor of RTW.

The best model to predict RTW after CVD included, strain, physical job demands and type of employer as predictors. The most important result is the effect of job strain. Our results support the hypothesis that high levels of job strain before the CVD are a barrier to RTW. In our data the group of worker with a low job strain is 85% more likely to RTW compared to the group with a high job strain, an effect consistent with the one of 47% founded by

Fukuoka et al (2009). These results go in the direction to support the usefulness of the JDC model in understanding part of the RTW process. The JDC model could be used to design work environment that facilitate the RTW of workers after a CVD.

A physically demanding job confirms to be a hindrance to the RTW after CVD as observed in other studies (Boudrez, De Backer, 2000; Worecester et al., 2014). A high level of physical work demands may affect the RTW process in two ways. Firstly, physicians may suggest longer sick leave for medical reasons. Secondly, the patients may delay the RTW as they perceive the physically demanding job as too dangerous. In fact, sometime CVD patients perceived their body as more vulnerable. The size of the effect of physical job demand is considerable as can be noted graphically in Figure 1 but the confidence interval is quite wide.

In univariate analysis decision latitude was identified as a significant predictor of RTW. A high level of decision latitude supports the RTW, as found in Drory et al. (2005) and Sykes et al. (2000). A higher decision latitude may be positive for the RTW as it allows the worker to better adapt the working tasks and environment to the new health needs. However, in our analysis decision latitude became a non-significant predictor in multivariate analysis. In our opinion this can be explain because in the multivariate model decision latitude and strain are tested at the same time. Given that job strain is calculated from decision latitude and psychological job demand the two factors share a relevant portion of variance.

Contrary to our hypothesis, we did not find a significant effect of *Job satisfaction* and *Supervisor* and *Coworkers support*. This does not replicate the results from Fiabane et al. (2013) and Worcester et al. (2014) that found job satisfaction to be a predictor of the RTW and of the Time to RTW respectively. More studies need to investigate the role of job satisfaction in the RTW process, but a possible interpretation of these results may be derived

from the study of Mittag et al. (2001). Mittag et al. (2001) too found that job satisfaction was not a predictor of the RTW, but they discovered that it influenced the patient's level of motivation to RTW that in turn affected the RTW. Therefore, job satisfaction may be an indirect predictor that acts on RTW through the motivational path. Regarding social support, in a cross-sectional study O'Hagan et al. (2011) found a significant association of supervisor support with RTW. However, we did not replicate the same effect in our study. Our study design is longitudinal and this should be considered when comparing the divergent results. The role of supervisor is generally considered as central in the RTW process after CVD by professionals and researchers (Dekkers-Sànchez, Wind, Sluiter, Frings-Dresen, 2011; Kushnir, Luria, 2002). However, except (O'Hagan et al., 2011), we were not able to find studies confirming this effect. More studies are needed to understand which behavior of the supervisor is positive and which one is negative for the RTW. Based on this knowledge it will be possible to develop specific instrument measuring the supervisor's positive for RTW behaviors, abandoning general measure of supervisor support that may be the cause of inconsistent findings. Chapter four concern also this issue.

The part two of the study aimed to test the differences in working life between before and after the cardiovascular illness. The 13% of the patients had to change the job duties and the 2% changed the employer. Our analyses revealed a generalized deterioration of the working conditions. All the variable measuring the quality of the working life, job involvement, job satisfaction and working hours, showed a significant decrease. Job involvement decreased in the 64% of the patients after the cardiovascular disease. Job satisfaction and working hours decreased in the 59% and 57% of the patients respectively. This results may be better interpreted in conjunction with the registered deterioration of the perceived working condition. We measured a statistically significant decrease in the level of decision latitude and coworker support but also in the level of psychological

and physical job demands. This may suggest that the deterioration of the quality of the working life after disease in many patients is not due to a simple worsening of the work experience but rather to a detachment from work, a reduction of the efforts and expectations in the work sphere of life. It is worth noting that 72% of the patients had a decrease on the level of the self-efficacy in adherence to medical prescription that may indicate difficulties in the integration of the medical prescription with the work activity. Moreover, the recovery of the work activity leads many patient (65%) to decrease the level of self-efficacy in the management of stressing situation.

Our analyses revealed that the deterioration of the quality of working life may be related to different changes of the working situation. Job involvement decreased in the patients that perceived a decrease of the physical demands. A decrease of the physical demands may derive from a change of the requests from the work environment. This may relegate the patients to the periphery of the productive process reducing the patient's job involvement. The decrease in time of job satisfaction was associate with an increase in the perceived psychological demands and a decrease in the perceived decision latitude. Citing the Job Demand-Resources model, the patients that decreased the level of satisfaction were the ones that perceived the working situation as more stressing than before the disease. Finally, the working hours decreased in the patients that received less request and satisfaction from work than before and among those that perceived more physical demands. The interpretation of this may be twofold. The patients that after the disease find an easier and less fulfilling job may react decreasing the commitment and hence the working hours. Differently, the patients that perceived more physical demands from work, may reduce the number of working hours to protect themselves.

Our results demonstrate that even the workers that did RTW have to face difficulties once back at work. This substantiates the conception of the RTW as an event in a larger process like in the WAD model (Chapter 1). The phases

that follow the recovery of the work activity has to be monitored and studied with the same attention dedicated to the RTW event.

CHAPTER IV

Work-Health Balance

Introduction

In the developed countries we have witnessed two developments that have highly influenced the labour market. On the one hand, an increased age of retirement has enlarged the number of active elderly workers that have a high incidence of disability and health problems (EUROSTAT, 2011). On the other hand, the improvement of medical treatment has increased the number of workers that overtake the acute phase of severe diseases such as cancer or cardiovascular diseases that in the past definitely compromised work abilities. These two elements have changed the labour market, boosting the proportion of workers with a long-standing health problem or disability (LSHPD). In EU approximately 10% of the employed people have a LSHPD and the incidence of disability among elderly workers, in the age between 55 and 64 is about 20% (EUROSTAT, 2011). The OECD (2010) highlighted that too many workers leave the labour market permanently due to health problems or disability and too few people with reduced work capacity succeed in remain employed. In the OECD countries the unemployment rate for people with disabilities is twice as high as for those without them. In line with this, the ENWHP (2013) called for a paradigm shift in the research on workplace health promotion from attention to the current employability to a focus on a sustained and prolonged employability of workers with LSHPD.

For these workers the challenge is to maintain their work activity, preserve it in a good quality, and take care of their health (Saskia et al. 2014; Young et al. 2005). For a worker with LSHPD, health becomes a necessary issue in life and the way in which it is matched with the working life impacts several outcomes related to quality of life and work. Indeed, beyond the positive effects which having a job may have on the quality of life and social well-being, it may also be a source of stress and of threats to health (Jarvholm, 2012), and it may be linked to unhealthy behaviour (Miglioretti et al. 2014). Traditionally, the studies concerning acquired health problems and working conditions focused on factors that facilitate or hinder the return to work (RTW) after the onset of the disease (Young, 2010). However, there exists a less established literature focusing on the topic of job retention of workers with LSHPD (De Jong, de

Boer, Tamminga, and Frings-Dresen, 2014; Saskia, 2014 et al.; Young, 2010). This literature gives the basis to understand what is important after the RTW, and what brings to the long term job retention or the premature job loss. Up to now, no efforts have been made to interpret these knowledge within a theory and to provide a specifically designed tool. As a first attempt in this direction, interpreting the existing knowledge within the work-life balance theory (Kalliath & Brough, 2008) we propose the new construct of Work-Health Balance (WHB). The Work-Health Balance considers the personal process of management of health at work as a balancing between the life domain of work and the one of health. The Work-Health Balance Questionnaire (WHBq) was developed to assess factors that play a key role in the process of adjustment between the management of health needs, and work demands and conditions.

From Work-Life Balance to Work-Health Balance

There are several definitions of work-life balance in the literature and Kalliath and Brough (2008) tried to synthesize them and defined work-life balance as "[…] the individual perception that work and non-work activities are compatible and promote growth in accordance with an individual's current life priorities." Three aspects are fundamental in this definition: compatibility, growth, and current life priorities.

The concept of compatibility between the life domains is clear if we consider the absence of it, incompatibility. Incompatibility between life domains induces a situation of stress, and prevents the person to achieve satisfying experiences in the incompatible life domains. Growth is a personal development and enhancement that can be reached if one can give enough efforts and attention to all the personally relevant domains. Current life priority is important because it implies that the difference of importance of the several life domains can be not only different from person to person but also from life time to life time in the same person. Keeney, Boyd, Sinha, Westring, and Ryan (2013) identified eight life domains that interact with the work domain and contribute to set up the person's identity. One of these life domains is health (Keeney et al., 2013) which in some life circumstances (e.g., workers with

LSHPD or elderly workers) becomes central. In these life circumstances, the worker may experience incompatibility between the work demands and the health needs, hence preventing from a good and durable working experience and ultimately growth. A valuable contribution to understand these dynamics of balancing between work and non-work domain comes from the Boundary Theory (Clark, 2000; Ashforth, Kreiner, and Fugate, 2000). Its principles can be used to interpret the match between health and work in the employee with LSHPD. This theory mantains that work and other life areas are different domains where the subject has different roles with *different purposes* and cultures. People are border-crossers who daily transit between these areas. Individuals try to *attain a desired balance* between the life areas shaping the boundaries around these areas, *boudaries that vary in strength and flexibility* (Clark, 2000). A worker with LSHPD has tasks at work that may (not) be compatible with the purposes related to health – *different purposes*. This worker can try to bring the health issues into the work life or can struggle to not overlap health and work matters – *attain a desired balance*. The strength and flexibility of the work boundaries of this worker are defined by contextual factors, mainly the policies at work and the behavior of the supervisor - *boudaries that vary in strength and flexibility*.

These arguments are in line with findings in the literature about job retention (Habeck, Yasuda, Rachel, and Kregel, 2008) and about quality of working life (De Jong et al., 2014) of the workers with LSHPD. From these fields of research, management's attention to the employees' health (e.g., policies, work climate, flexibility, supervisor support) appears as a central factor in a successful reintegration of workers with LSHPD.

From this literature we define Work-Health Balance as:

> *A state in which the worker feels to be able to effectively balance health and work needs, considering the management attention to the employees' health and the perception of compatibility between the personal health situation and the job characteristics.*

WHB is a personal dimension considering several elements that shape the worker representation of the situation, of the personal possibilities, of how the things are

going, and how they can evolve. This balance can be measured considering many of the factors highlighted in the literature about job retention of workers with LSHPD (De Jong et al., 2014; Habeck et al. 2008; Young, 2010) combined coherently to the work-life balance perspective. Hence, the Work-Health balance derives by two kinds of dimensions:

a) Perception of compatibility between work and health. This perception becomes relevant when the health domain gains importance and it is a consequence of the evaluation of the personal abilities to manage the situation, of the present work situation, and of the health requests;

b) Perception of how much the working environment is favourably disposed toward the personal health needs, of how much effort the working environment is disposed to do to accomplish the worker's health needs. It is constituted by the perception of the work flexibility that may eventually be used for adjustment, of the support from the direct supervisor, and of the evaluation of the degree of attention to the employees' health on behalf of management.

The purpose of this paper is to provide information on the development and validation of the WHB questionnaire (WHBq) and of a general index of WHB. We expect the factorial structure of the questionnaire to be congruent with the theoretical division between the perception of compatibility between work and health, and the perception of goodwill of the working environment towards health needs (*Hypothesis 1*). Moreover, to ensure a high quality measurement instrument, we hypothesize each factor to fit a Rasch model (*Hypothesis 2*). Finally, we illustrate also the relationship between the WHBq and other measures assessing psychological and emotional well-being in the workplace, dysfunctional behaviours at work, and general psychological health. Specifically, following the established relation between work-life balance and well-being, we expect high levels of the WHB general index to be positively related to job satisfaction and work engagement and negatively related to emotional exhaustion, psychological distress, presenteeism, and workaholism (*Hypothesis 3.*)

Method

Participants and Procedure

Because no instrument to measure the WHB existed, the first stage of the research consisted in the questionnaire development, whereas the second stage aimed at testing the research hypotheses. For this purpose, we administered a survey measuring the WHB, job satisfaction, work engagement, emotional exhaustion, psychological distress, presenteeism, and workhaolism. The data were obtained through the Internet. Criteria for participants' inclusion were: being at least 18 years of age or older; being employed at the time of the recruitment; providing informed consent; and being able to read and understand Italian language. To distribute the survey, we advertised it on Facebook. To reach also workers who had had a severe disease, we promoted the survey in the Facebook pages and groups of patients' associations of severe disease, mainly oncological disease but also neurological, rheumatic and cardiovascular disease. We choose this type of internet recruitment because it increases the probability to intercept workers with a LSHPD compeared with a recruitment directly in companies. Moreover, it permits a greater heterogeneity in the type of jobs included in the study.

We collected 397 questionnaires from April to May 2014. During the data analysis 62 questionnaire were excluded: 29 because they were filled by non-working people and 42 because they were substantially incomplete, that is with more than 40% of the items without an answer. Table 4.1 presents detailed descriptive statistics of the sample.

Table 4.1. Descriptive statistic of the sample N = 326

Mean age (SD)		45 (11)
Gender	Female	55%
Education level	Primary and Lower secondary school	12%
	Upper secondary school	53%
	University or higher	35%
Number of children	None	31%
	One	23%
	Two	40%
	Three or more	6%
Job role	Entrepreneur / Manager/Supervisor	17%
	White-collar	54%
	Blue-collar	19%
	Others	10%
Working hours	Full-time	80%
Type of contract	Open-ended contract	76%
	Self employed	10%
	Fixed term contract	9%
	Others	5%
Main work activities	Physical	33%
	Intellectual	67%
Have suffered from serious diseases / major injures		31%
Type of disease	Oncological	49%
	Rheumatic	8%
	Neurological	7%
	Cardiovascular	7%
	Injury	16%
	Others	13%

Questionnaire development

The process of development of the questionnaire followed a four step procedure (DeVellis, 1991). The first step consisted in the definition of the components to be measured. In line with our definition of the WHB, we specified the WHBq as composed by 1) *Work-Health Incompatibility*: an evaluation of how much the work activities are currently hampering the handling of one's personal health needs; 2) *Health climate*: the perception of the management's attention to the employees' health; 3) *Work flexibility for health reasons*: the cognitive appraisal of how much the job characteristics permit borders modification and integration in favor of the health

domain; 4) *Supervisor support to health*: how much the supervisor is perceived as supportive and responsive to the employee's health needs.

In the second step, item generation, we searched in the literature for instruments measuring constructs as close as possible to the one of our interest and we ended with a list of 117 items (Van Veldhoven and Broersen, 2003; Clark, 2001; Carlson, Kacmar, and Williams, 2000; Begall and Melinda, 2011; Hill, Hawkins, Ferris, and Weitzman 2001; Idaszak and Drasgow, 1987; Morgeson and Humphrey, 2006; Zimet, Dahlem, Zimet, and Farley, 1988; Keeney, Boyd, Sinha, Westring, and Ryan, 2013; Geurts et al., 2005; Karasek et al., 1998). In the third step four researches with years of experience into quality of working life and health in organizations independently evaluated the items based on the following criteria: 1) they should be consistent or easily adaptable to the definition of one of the components of WHB; 2) they should have a content and a meaning comprehensible in the Italian culture; 3) they should apply to all workers (following the theoretical idea that WHB became more relevant with aging and with severe disease, but it is a dynamic existing in all workers); 4) they should be distinguished from presumably related to WHB constructs, such as Job Satisfaction or Work-Family Balance. In the fourth step (selection and development of items) the evaluations about the items of each researcher were brought together and an item was selected if, after discussion, was agreed on its pertinence. At the end, we chose 34 items from other scales and developed four new items. The selected preexisting items were then adapted being partly rewritten for the new scales. The adaptation was based on the criteria that the item has to be focused on health issues and fit our definitions of the subscales (eg., "You find it difficult to fulfil your domestic obligations because you are constantly thinking about your work?" became "You find it difficult to take care of your health because you are constantly thinking about your work"; "My supervisor acknowledges that I have obligations as a family member" became "Your supervisor acknowledges that you may have specific necessity for your health status"; "Senior management considers employee psychological health to be as important as productivity" became "Senior management considers employee health to be as important as productivity"; "It is O.K. with my employer if I work at home" became "It is O.K. with your employer if you work at

home for health reasons"). Response categories are 1 = "Strongly disagree" (SD), 2 = "Disagree" (D), 3 = "Neither agree nor disagree" (NAND), 4 = "Agree" (A), and 5 = "Strongly agree" (SA).

Other Variables

Psychological well-being at work

Job satisfaction - Job satisfaction was measured with a single item asking respondents to rate satisfaction with their job over-all on a 5-point scale (1 - 5) with greater value indicating higher satisfaction. The convenience, reliability and validity of the single item measure to assess job satisfaction has been extensively supported (Dolbier, Webster, McCalister, Mallon, and Steinhardt, 2004).

Work engagement - The short version of the Utrecht Work Engagement Scale (UWES-9, Schaufeli, Bakker, and Salanova, 2006; Italian version: Balducci, Fraccaroli, and Schaufeli, 2010) measured job engagement in our sample. Responses to items are given on a frequency scale varying from "Never" (1) to "Every day" (7). A general index of job engagement is calculated summing all the items of the UWES-9 and greater values correspond to a greater work engagement.

Emotional well-being at work

Emotional exhaustion - Emotional exhaustion was measured with the emotional exhaustion scale of the Maslach Burnout Inventory General Survey (MBI-GS, Schaufeli, 1996; Italian version: Borgogni, Galati, Petitta, and Centro Schweitzer, 2005) that measures feelings of being emotionally strained and tired by one's work. The scale consisted of five items with a 7-point response scale (0 – 6) with higher values corresponding to a higher emotional exhaustion.

Dysfunctional behaviour at work

Presenteeism - Presenteeism occurred when a worker is in the workplace, but function at less than full productivity because health problems. It was measured with a single item (Aronsson, Gustafsson, and Dallner, 2000.) The

respondents had to use a four point scale, with higher values corresponding to a higher presenteeism.

Workaholism - Workaholism has been defined as the compulsion or the uncontrollable need to work incessantly and is considered a negative state. We measured it with the two scales of the Dutch Work Addiction Scales (DUWAS, Schaufeli, Taris, and Bakker, 2006; Italian version: Balducci, Avanzi, Consiglio, Fraccaroli, and Schaufeli, in press) namely, Working excessively (WkE), five items and Working compulsively (WkC), five items. The items had a 4-point response scale (1 – 4) with greater values indicating greater workaholism.

General psychological health

General Health Questionnaire - The GHQ-12 (Goldberg et al., 1997; Italian version: Fraccaroli, Schadee, 1993) measures the severity of psychological distress experienced within the last two weeks. The respondents answered 12 items on a four point scale, from "more than usual" to "much less than usual" for the first six "positive" items and from "No" to "Much more than usual" for the last six "negative" items. We used a modified scoring method, called Goodchild and Duncan-Jones's method (CGHQ), (Whaley, Morrison, Payne, Fritschi, and Wall, 2005). Higher values correspond to a higher psychological distress.

Statistical analysis

Firstly, we analysed the items of WHBq to test for the presence of problems in the items distribution. To test *Hypothesis 1*, we performed an exploratory factor analysis with principal components as extraction method and Promax as rotation performed with SPSS 20. To decide the number of factors to extract we did a parallel analysis with "rawpar" (O'Connor, 2000). This technique outperforms the other methods commonly used to determine the number of factors as the scree test or the eigenvalue greater than 1, in terms of accuracy, precision, and bias (Ruscio & Roche, 2012). In

our analysis, we used as threshold the eigenvalue corresponding to the 95th percentile of the distribution of eigenvalues derived from the random data. Pursuing a simple and parsimonious structure for the WHBq scales we retained only the items that clearly loaded only on a single appropriate factor. To decide which item to remove we followed two criteria: firstly, we deleted the item with a primary factor loading lower than .40 (Stevens, 2009); and secondly, we deleted the items with a ratio between primary and secondary factor loadings lower than two (Hinkin, 1998). We iteratively deleted one item at a time each time re-executing the EFA until the two criteria could not be applied anymore. In order to increase the overall reliability and the construct validity of the WHBq scales (*Hypothesis 2*), and to obtain measures of four to six items (Hinkin, 1998) we performed a Rasch analysis (Rasch, 1960) for polytomous items, specifically the partial credit model (Masters, 1982), on each scale identified by the EFA using the eRm package (Mair and Hatzinger, 2007) for R (R Core Team, 2013). The Rasch analysis is a specific type of item response theory in which it is evaluated the fit of the data to a theoretical model, the Rasch model that has specific desirable characteristics. A possible misfit permits to identify, study, and correct measurement anomalies of the instrument. The Rasch model takes into account several measurement properties not considered in the classical test theory (CTT), giving more information about the items and scale's performance (Tennant, McKenna, and Hagell, 2004). We used Rasch analysis to evaluate problems in the response scales, to establish unidimensionality in each subscale of the WHBq, to delete redundant or uninformative items, to remove items to which people with the same level of the latent trait, but in different subgroups of the sample, respond differently (differential item functioning, DIF), and to assess the reliability of the scale. A prerequisite to continue with the Rasch analysis is the good functioning of the response scale. In a good response scale the respondents use the answer categories as theoretically supposed. This means that respondents that answer 2 instead of 1 have a higher level of the latent trait of the respondents answering 1, and this has to be true for each step of the response scale. Response scales are problematic if they have categories with less than 10 answers, since this does not provide stable estimate thresholds, and if the estimated thresholds do not increase monotonically across the

rating scale (Linacre, 2002). If this is the case, the problematic categories have to be collapsed with the next category when this is meaning consistent. If this is not possible, as in the case of the neutral category (*Neither agree nor disagree*), the problematic category has to be deleted and treated as missing value.

In order to be unidimensional with informative and non redundant items, the scales have to fit the Rasch model. To evaluate this we used the infit and outfit mean square statistics (MNSQ). Based on Smith, Schumacker, and Bush (1998) we deleted the underfitting items, *Infit MNSQ* $> 1 + (2/\sqrt{n})$ or *Outfit MNSQ* $> 1 + (6/\sqrt{n})$; the overfitting items, *Infit MNSQ* $< 1 - (2/\sqrt{n})$ or *Outfit MNSQ* $< 1 - (6/\sqrt{n})$; and the overlapping items on the Item-Persons map.

Each scale was examined for DIF across two factors: sex (ie, male / female) and whether a severe disease or injuries occurred in the past (ie, yes / no). DIF was tested globally, that is for all the items of the scale simultaneously, with the Andersen's likelihood ratio test (Andersen, 1973) and individually, on item-level, with the Wald test. In both tests a *p value* lower than .05 indicated a different item functioning between the two subsamples.

In the Rasch model the internal consistency of a scale can be measured by the person reliability index (PRI). The PRI is similar to Cronbach's α and is related to strata, that is the number of groups of respondents the set of items is able to statistically differentiate. The minimum required for an instrument is to differentiate at least two groups that corresponds to a PRI of .61. A more restrictive approach suggests that a PRI of .70 is required for group use and .85 for individual use (Tennant and Conaghan, 2007). To test the relation of WHB and WHB subscales with the variables indicating the quality of working life (*Hypothesis 3*) partial correlations were calculated (controlling for the effects of gender, and the working hours). In case a correlation of a WHBq scale with an external variable might be spurious due to their common variance with another WHBq scale, additional partial correlations were calculated controlling for the effect of the others WHBq scales that showed a correlation with the external variable under investigation. This permits to establish if the variance shared with the external variable by each subscale is unique, giving support to its usefulness.

Results

No items presented an absolute kurtosis and skewenss value higher than two and hence distribution problems were considered negligible (Bandalos and Finney, 2010).

Explorative Factorial Analysis

The parallel analysis identified four factors in our sample, hence the first efa was performed with four factors. Yet, after the deletion of eight items, only one item had a factor loading higher than .40 on the fourth factor. Moreover, at that point, a new parallel analysis clearly indicated a three factor structure. Therefore, we continued the analysis adopting a three factor structure. Ten items were removed because of a primary factor loading lower than .40 or a ratio between primary and secondary factor loadings lower than two. We obtained a three factor structure with 28 items and 56% of the variance explained. Hypothesis 1 was supported as the efa detected one factor pertaining to the perceived compatibility between work and health and two pertaining the perceived helpfulness of the working environment. Table 4.2 reports the resulting factorial structure.

Rasch Analysis

Health climate. The response scale of this measure did not present particular problems. Only the item 19 had less than 10 answers in the *SA* category, consequently *SA* category was merged with *A* category. As in this analysis the sample size was 307, we considered a good fit of the item to the model if the Infit MSQ were between 0.88 and 1.12, and the Outfit MSQ were between 0.65 and 1.34. We remove item 19 for misfit and items 13 and 14 for overfit. To avoid overlapping items we removed items 18 and 11. The PRI of this scale was equal to .90. Figures 1 shows the distribution of the items in the scale and the test information curve for the HC scale. DIF analysis provided no evidence of DIF in any of the items neither for gender nor for the presence in the past of a severe disease / injuries. The Wald-test was always non significant and the Andersen's Likelihood ratio test was $LR_{(19)} = 19.12$, $p = .45$ for gender, and $LR_{(19)} = 12.35$, $p = .87$ for the presence in the past of a severe disease / injuries.

Table 4.2. Factorial structure of the WHBq after deletion of ten items (N = 321)

Scales and constituent items	Mean (SD)	Item-total correlation	Factors		
			1	2	3
Work-Health incompatibility (WHI)					
1. If you really want to take care of your health, you have to neglect your job	2.8 (1.05)	.52		.552	
2. Your job is an hindrance to your health *	2.5 (0.97)	.69		.701	
3. You can not adequately take care of your health for the time you have to dedicate to the job *	2.6 (1.01)	.72		.827	
4. Sometimes it happens that you have to miss work activities or that you can not complete all the job tasks due to the time you have to spend for your health	2.7 (1.03)	.38		.510	
5. Your job lets you take care of your health *	3.5 (0.88)	.67		-.688	
6. It is quite easy for you to balance work commitments with your health need *	3.4 (0.93)	.70		-.744	
7. You find it difficult to take care of your health because you are constantly thinking about your work *	2.3 (0.88)	.50		.684	
8. You do not have the energy to take care of your health because of your job	2.5 (0.93)	.69		.798	
9. Your work obligations make it difficult for you to take care of your health problem	2.4 (0.82)	.70		.781	
10. Your work takes up time that you would have liked to spend for your health *	2.6 (1.05)	.66		.764	
Health climate (HC)					
11. In your workplace management acts quickly to correct problems/issues that may interfere with employees' health	3.1 (1.12)	.81	.864		
12. Senior management acts decisively when concerns about health emerge between employees *	3.1 (1.1)	.83	.858		
13. The health of staff is a priority for the organization	3.1 (1.13)	.85	.871		
14. Senior management clearly considers the health of employees to be of great importance	3.2 (1.07)	.85	.858		
15. Senior management considers employee health to be as important as productivity *	3.0 (1.05)	.76	.862		
16. In my organization, the health prevention involves all levels of the organization *	3.1 (1.09)	.80	.945		
17. Employees are encouraged to become involved in safety and health matters *	3.1 (1.05)	.78	.871		

18. Employees contributions to resolving occupational health and safety concerns in the organization are listened to	3.1 (1.1)	.84	.852	
19. In your organization it is usual to consult unions and workers' representatives	2.7 (1.11)	.44	.587	
20. Information about health prevention is always brought to your attention by your manager/supervisor *	3.0 (1.12)	.80	.816	
External support (ES)				
21 ...he / she can determine where to put his /her time and energies at work *	2.7 (1.05)	.49		.560
22. Your supervisor permits you to arrive and depart from work when you want for health reasons *	3.4 (1.13)	.55		.818
23. You are free to work the hours when you feel better *	2.4 (1.06)	.62		.848
24. There is no flexibility in your schedule, neither for health issues	2.4 (1.00)	.26		-.535
25. It is O.K. with your employer if you work at home for health reasons *	2.3 (1.13)	.45		.645
26. Your supervisor understands your health needs	3.6 (1.01)	.62		.658
27. Your supervisor listens when you talk about your health *	3.6 (1.01)	.75		.522
28. Your supervisor acknowledges that you may have specific necessity for your health status *	3.6 (1.02)	.68		.635

Note: * = item retained after the Rasch analysis.

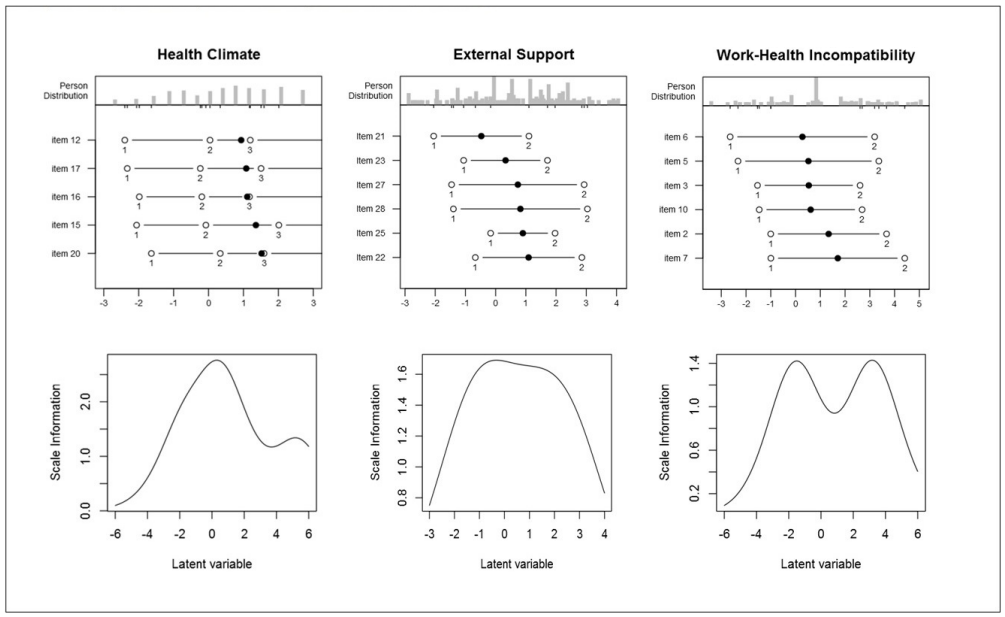
The initial number of items were 38. In the *Work-Health Incompatibility* scale three items were adapted from Carlson et al. (2000), one from Hill et al. (2001), seven from Geurts et al. (2005), and four were newly developed; in the *Health climate* scale all the 10 items were adapted from Hall et al. (2010); and in the *External support* scale all the 13 items were adapted from Clark (2001).

External support. In this scale, the *SA* answer category of items 21, 23, 24, and 25 received less than 10 answers. Therefore, *SA* category in those items was merged with the *A* answer category. All the items in this scale presented a rating scale that did not increase monotonically with category number, that is disordered thresholds. This was due to the neutral category *NAND* that was never modal. We therefore treated the *NAND* answers as missing values. After removing the *NAND* answers, items 22, 26, 27 and 28 presented the *D* answer category that was never modal. Thus, in those items we merged the *D* answer category with *SD*. In this analysis, we considered an item as having a good fit to the model if the Infit MSQ was between 0.88 and 1.12, and an Outfit MSQ was between 0.63 and 1.36 as we had a sample size of 276. We removed

item 24 for misfit and items 23 and 26 for overfit. The PRI of this scale was equal to .72. Figures 1 shows the distribution of the items in the scale and the test information curve for the ES scale. Also in this scale DIF analysis provided no evidence of DIF in any of the items neither for gender nor for the presence in the past of a severe disease / injuries. The Wald-test was always non significant and the Andersen's Likelihood ratio test was $LR_{(11)} = 10.09$, $p = .52$ for gender, and $LR_{(11)} = 9.79$, $p = .55$ for the presence in the past of a severe disease / injuries. Figures 1 shows the distribution of the items in the scale and the test information curve.

Work-Health incompatibility. In this scale, in all the items, the *SA* response category received less than 10 answers. Consequently, *SA* answer category was merged with the *A* category. The items presented also disordered thresholds. Again, the reason was the neutral category *NAND* that was never modal. We therefore treated the *NAND* answers as missing values. Because the sample size for this scale was 302 we considered as thresholds for a good fit of the item to the Rasch model an Infit MSQ between 0.88 and 1.12, and an Outfit MSQ between 0.65 and 1.34. We removed items 1 and 4 for misfit and item 10 and 11 for overfit. The PRI of this scale was equal to .79.

Figure 4.1. Item person map and Test information curve for each scale of the WHBq



Figures 4.1 shows the distribution of the items in the scale and the test information curve for the WHI scale. DIF analysis produced no evidence of a differential item functioning, neither for gender nor for the presence in the past of a severe disease / injuries. The Wald-test was always non-significant and the Andersen's Likelihood ratio test was $LR_{(11)} = 15$, $p = .18$ for gender, and $LR_{(11)} = 7.22$, $p = .78$ for the presence in the past of a severe disease / injuries.

From these analyses emerged as hypothesis 2 was supported with a fit of the three scales to the Rasch model, but only after a refinement of each scale.

Table 4.3 presents the partial correlations of the three scales of the WHBq with the other variables included in the questionnaire. The correlations were partialised to control for the effects of sex and of the working hours, and to test if each scale explains genuine unique variance or if the variance explained was common with the other scales. It shows also the correlation of a proposed index of WHB with the other variables, and it was used to test the third Hypothesis. The WHB index has been calculated as the mean between ES and HC minus WHI, after the conversion of the scale scores in T-scores. The subtraction was preferred to a division as the quotient term is non linear, giving more weight to the denominator (Landsbergis, Schnall, Warren, Pickering, and Schwartz, 1994.)

The third hypothesis was supported as the Work-Health balance (WHB) index was significantly related ($p < .001$) to higher psychological well-being at work and in life, with greater emotional well-being at work and to less dysfunctional working behaviours. Except for the workaholism, the WHB index increased the strength of the correlations with the other variables if compared with the WHBq scales. As an example, WHI shared with EE the 19% of the variance, instead WHB shared the 24% of the variability of EE.

Table 4.3. Partial Correlation of the WHBq scales and the WHB index, with the other variables

Measure	P	JS	WE	EE	WkE	WkC	GHQ
WHI							
II order partial r[a]	.36***	-.37***	-.30***	.43***	.43***	.41***	.39***
III/IV order partial r[b]	.23***	-.24***	-.17**	.28***	-	.38***	.29***
ES							
II order partial r[a]	-.28***	.34***	.25***	-.36***	-.12	.-12	-.25***
III/IV order partial r[b]	-.10*	.12*	.05	-.13	-	-	-.07
HC							
II order partial r[a]	-.31***	.44***	.38***	-.35***	-.07	-.17*	-.32***
III/IV order partial r[b]	-.16**	.24***	.23***	-.18*	-	-.01	-.14*
WHB							
II order partial r[a]	-.42***	.48***	.39***	-.49***	-.32***	-.37***	-.43***

Note. * $p < .05$, ** $p < .01$, and *** $p < .001$

WHI = Work-Health incompatibility; ES = External support; HC = Health climate;

P = Presenteeism; JS = Job satisfaction; WE = Work engagement; EE = Emotional exhaustion; WkE = Working excessively; WkC = Working compulsively; GHQ = General health questionnaire.

[a]Correlation controlled for the effect of Sex and Working hours; [b]Correlation controlled for the effect of Sex, Working hours, and the others WHBq scales that showed a correlation with the external variable under investigation.

Discussion

The aim of the research was to develop a questionnaire to assess the factors that play a key role in the process of adjustment between the management of health needs, and work demands and conditions. The results of the analysis in this article provided evidence of validity and reliability of the developed questionnaire. Our analyses supported the general internal structure we hypothesized, with one factor related to the perceived compatibility between work and health and two factors pertaining the perceived helpfulness of the working environment. All the scales were characterised by unidimensionality, good adherence to the Rasch measurement specifications, and an acceptable level of person reliability index and items distribution. All the items did not function differently between male and female responders, and between workers who had a severe disease or injuries and those who had not. This information supported the validity and reliability of the instrument, showing that the WHBq measures three theoretically and empirically distinct but related constructs, the Work-Health Incompatibility, the Health Climate, and the External Support. Moreover, throughout the analytical process we reduced the number of the items to 16, obtaining an easily administrable questionnaire.

The Work-Health Incompatibility dimension measures the dissatisfaction in the management of health due to work commitments and it had a significant relation with all the variables assessed in this study. An increase in Work-Health Incompatibility was related with a deterioration of psychological, emotional and behavioural conditions at work and in life. Considering the importance given to the concept of compatibility in the definition of Work-Life balance of Kalliath and Brough (2008), the Work-Health Incompatibility can be considered as the core dimension of the Work-Health Balance. This was supported by the fact that Work-Health Incompatibility is the only dimension of the WHB with significant correlation with the two dimensions of workaholism (working excessively and compulsively) and because even when controlling for the other two dimensions of the WHB, Work-Health Incompatibility maintained to show significant correlations with all the variables. The Work-Health Incompatibility had moderate correlations with the

workaholism and the psychological distress scales that are higher than the correlation of the other two factors of the WHBq with the same variables. The workaholism and the psychological distress can be considered as essentially individual characteristics and this suggests that the Work-Health Incompatibility is essentially an individual dimension, a perception of a specific part of the inner state.

The two dimensions measuring the perception of helpfulness of the working environment were Health Climate and External Support. These two indexes presented positive correlations with psychological, emotional and behavioural well-being at work and in life, but no significant or relevant correlation with the two components of workaholism. The Health Climate dimension measures how much the worker perceived the management as interested in the employees' health. Controlling for the other dimensions of the WHB, Health Climate revealed to explain unique variance of Job satisfaction and Work engagement and, in a lower degree, of Presenteeism, Emotional exhaustion, and General health. In our initial formulation of the questionnaire, we selected the items thinking about two distinct dimensions, supervisor support and work flexibility. The analyses revealed that these dimensions actually formed one factor, namely External Support, representing the perception of the level of help for health problems available in the workplace. This result is understandable if we consider that ultimately it is the supervisor who manages and allows the work flexibility of the subordinates. When controlling for the other dimension of the WHB, External Support showed to explain negligible or nonsignificant unique variance of all the external variables in the study. In our opinion, this substantiates the conception of Health Climate and External Support as strictly related dimensions. Furthermore, External Support represents the help perceived as potentially available in the workplace and not the one used. Hence, this variable may be more relevant for the recently returned to work employees, which need to use more help in the workplace than in the recent past, and in longitudinal studies investigating the future trajectories of these workers (e.g.: job retention or turn over). Otherwise, with workers in a "stationary" work situation and with variables assessing the current situation, External Support and Health Climate tend to overlap.

We also propose a general index for the WHB and the results support its superiority compared to the single dimensions of the WHBq. The WHB index combines individual variables with more organizational ones having a lower or similar correlation than Work-Health Incompatibility with the individual variables, but a higher one with the variables influenced also by organizational characteristics (i.e.: job satisfaction, work engagement, emotional exhaustion and presenteeism). The good correlation of the WHB index with the job satisfaction substantiates the idea that WHB relate to job retention in the long term being the job satisfaction a good predictor of turnover intention (Griffeth, Hom, and Gaertner, 2000; Tett and Meyer, 1993). However, more studies are necessary to confirm the usefulness of a single index of WHB.

The study presents some limitations that need to be taken into consideration. The Rasch analysis revealed an issue of the instrument that needs a revision. The response scale in the items of the Work-Health Incompatibility and External Support were not used by the respondent as expected. Specifically, the neutral category "Neither agree nor disagree", shifting along the level of the latent dimension, almost never emerged as a more probable answer category. The use of the neutral category is a controversial issue (Bradley, Cunningham, Akers, and Knutson, 2011; Garland, 1991; Linacre, 2002) but in our data it is clear that it did not work well. The respondents did not choose the neutral category because they had an intermediate level of the latent variable, but for other unknown reasons. For example, the misuse of the neutral category may be caused by too wide answer choices, because it was actually impossible to have a neutral attitude toward the items, or because the labels of the answer categories were incongruent with the item formulation. The alternatives that should be taken into consideration are to just remove the neutral category, obtaining a 4-step Likert scale, or maintain the 5-step Likert scale changing the labels of the categories. Future research should indicate which one is the best alternative bearing in mind that a Likert scale with less than 5-step can hardly be treated as continuous in structural equation modelling (Rhemtulla et al. 2012). It is worth mentioning the distribution of the items in the Work-Health Incompatibility scale and the PRI in the External Support scale that were sufficient but not optimal. We think this depends on

the problems presented by the rating scale and that once solved the rating scale problem the distribution of the items and the PRI of the Work-Health Incompatibility and External Support scales will improve. The sample was highly heterogeneous and this brought to the presence in the same sample of very different type of jobs and of workers that have had a disease and workers who had not. Moreover, among the first group there were several types of pathologies and that occurred in different periods in the past. This made impossible to test more precise hypothesis than the ones tested. Yet, this is also a positive element as now we are confident that the questionnaire is suitable for very different types of workers. Finally, the number of outcomes variable included in the study were limited and did not cover all the possible dimensions related with the WHB. Important variables such as turnover intention or absenteeism were not considered in this research.

A value of the WHBq and of the underlying theory is that it recalls elements that emerged as relevant also in other approaches to the study of job retention of workers with LSHPD. Habeck et al. (2008) conducted an extensive literature review about the job retention of workers with LSHPD from an organizational perspective. They founded that a people-oriented culture, flextime and work redesign, and a supportive and responsive direct supervisor fosters a greater likelihood of retention. The authors of this review concluded stating that the employer practices resulting in job retention are the one targeted to meet the needs of employees with LSHPD. De Jong et al. (2014) dealt with the issue of work continuation of employees with LSHPD with another perspective. They reviewed the articles examining the subjective work experiences of workers with LSHPD to find the issues that contribute to a high quality of working life (QWL) which is associated with a lower level of turnover intentions. In our opinion a good WHB is a prerequisite to develop a high QWL in workers with LSHPD therefore there will be common features between a high QWL and a good WHB. The review (de Jong et al. 2014) identified as crucial in determining a good QWL, among others, moderated job demands, job flexibility, the supervisor support, and clear and health friendly policies and procedures.

In closing, we developed a questionnaire that showed good psychometric characteristics with strong and theoretically consistent relations with important and

well-known dimensions. Moreover, we used a mix of the classic test theory with item response theory that ensure a deep level of analyses of the questionnaire. With the WHBq we offer a tool to test the theory of the Work Health Balance and an instrument that may be useful also for the health professional and the Human Resource Management staff members that are involved in the work continuation of employees returned at work with LSHPD. The association we founded in our mixed sample - workers with LSHPD and "healthy" workers - between WHB and work wellbeing strengthen the hypothesis that WHB is a relevant dimension for all the workers. WHB may be tested in longitudinal studies as a predictor of general and work specific well-being.

General discussion

The present dissertation investigates the psychosocial factors influencing the process and the different phases of the working life after a serious illness. This line of research is relatively new because the factors that have been firstly investigated were the medical one (Young, 2010). The introduction of a psychological approach allowed to understand the complexity of the phenomena of the recovery of the work activity after disease and the importance of the work-related psychosocial factors. The dominant line of research at the moment is focused on the study of the factors that support a faster return to work after a suspension due to a serious disease that usually leave the workers with a chronic condition. The studies presented can be included in this line of research but all the dissertation is driven by a critical approach. We try to find the limit of the dominant approach to improve the comprehension of the phenomena. The experience developed in contact with the workers-patients let us understand that something important were missed in the dominant research. Specifically, the study of the RTW event as the only relevant issue in the process of work after a disease contradicted the individual experiences we observed. The process that follows a disease that create serious problem to the work activity is characterized by a great variety of cases and experiences that cannot be understood studying only the single event of return to work. For example, a fast return to work can be positive for a patient with certain desire, health conditions, and work characteristic and negative for another one with different desire, health and work conditions. From these consideration, in Chapter one we proposed a new model, the Work After Disease model. On the basis of the few theories available in this research field and on our experiences and background, we try to develop a model able to fill the gap between research, theory, and the concrete workers experience. In the WAD model we adopted a holistic and cross-disease approach. Holistic in the sense that we look at the phenomenon in its entirety. The event of RTW is just a single episode in a longer and more complex process that see the workers approaching the job in a renovated way. Cross-disease because we believe that many of the psychosocial process and difficulties involved in the recovery of the work activity are in common among many of the more relevant diseases. In the other Chapters we studied different phases of the WAD model. With these studies we demonstrated the importance and complexity of each phase.

In Chapter two, following the WAD model, we investigated an aspect that is relatively little investigated, that is the decision to continue or suspend the work activity after the cancer diagnosis. The data available in the literature recognized the relevance of this phase but little is known about its determinants. Our study contributed to better comprehend the motivation under this decision. Moreover, with the second section of the Chapter two we highlighted the central role played by work-related psychosocial factors in the recovery of the work activity. It is worth noting that the factors that was important in the decision about the continuation of the work activity were not the same important for the recovery of the work activity, supporting the idea of two distinct phases.

Chapter three introduced the job demand control theory (R. A. Karasek, 1979) in the field of research about the RTW of cardiovascular patients. This is a relevant introduction and it has been used in the same field just once (Fukuoka et al., 2009). If result like ours are replicated it will be possible to extend the JDC theory in the study of the determinants of the RTW. Chapter three deal also with the quality of the working life after the disease. In this chapter we adopted a statistical technique that allows to understand which variables determine the changes in the quality of working life within workers discerning it from the effects between workers. This technique has never been used in this research field but it has the potentiality to improve the comprehension of the real causes of the changes in the working conditions. Moreover, in our study this technique highlighted different pattern of change among workers.

Chapter fours focused on another aspect that is neglected by research but that has a great impact on the real life and on the long term consequences of the RTW. This is the phase 3 of the WAD model. Adjustment and stabilization of the working situation of the patient that return to work after a disease are fundamental steps that determine the long term job retention, productivity and quality of working life of the worker. Few studies investigated this issue (de Jong, de Boer, Tamminga, & Frings-Dresen, 2014) and there is the need of new instruments and constructs specifically designed for this scope that would help to understand this phase. In Chapter four try to answer that need proposing the Work-Health Balance and validating the questionnaire to

measure it. Further researches are needed to understand the predictive power of the instrument however, this is one of the few attempt to understand and give a theoretical explanation of a very important phase in the process of work after disease.

All the chapters in this dissertation highlighted the limits of the present research about the recovery of the work activity after a serious disease. The quantitative research is not yet equipped with the tools needed to really understand the process of work after disease having a partial vision of the problem. Our model does not furnish the answer to these shortages. We rather hope it will help to address the research so that these deficiencies will be addressed.

There are some limitations of the presented studies that should be mentioned. First of all, we recognize that the WAD is an ambitus model that need to be exposed to the critics of the scientific community in order to gain value. This is especially true because it is a descriptive model and some parts of it are hard to be tested, strictly speaking. Its value will be mainly judge in the contribution it will give to the discipline. A second limit of the studies is that even if we refer to a cross-disease approach, al the studies, except the one in Chapter four investigate a single disease at time. This is due to two reasons. First, saying that we believe in a cross-disease approach does not means that we deny the major differences between different diseases. The second reason is a practical one. The recruitment of participant occurred in hospitals and it is very difficult to coordinate the same research in different hospitals with different type of patients. Another limit is related with the outcome used in Chapter two and three. When referred to the probability of RTW we adopted an approach and a measure that is unable to distinguish between a good and a bad RTW. As it is shown in Chapter two a faster RTW may derived from an avoidance coping strategies toward cancer. In this case it is hard to define the RTW as an unequivocally positive event.

There are also some technical limits in the studies presented. First of all, the samples used, especially in Chapter two, were relatively small. Bigger sample would give more robust results. However, the number of participants were enough for stable estimates.

Secondly, the collection of data was made only with self-reported instrument that are susceptible to common method bias. The use of only one method of assessment is frequent in Applied and Occupational Health Psychology (Sinclair, Wang, & Tetrick, 2012). However, the longitudinal design adopted in chapter two and three reduced the probability of common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Future research should test further the role of work-related psychosocial factors and of the coping strategies in the RTW process that emerged as important factors in our studies. In our opinion research in this field would benefit from a mixed use of quantitative and qualitative method. The complexities and the differences in the personal experiences can be better understood, at least in a first phase, using in deep method like the qualitative one. A central issue that has to be addressed in future researches is the clarification of what is a good RTW. Nowadays, it is common practice to measure the number of absence days and use them as dependent variables to study the RTW. This give no information about how good is the RTW of the patients and what will be the long term consequences. In the same way we do not know if continue to work after the cancer diagnosis is positive or negative. Essentially, we are unaware of the consequences of the event that happens in the different phases of the WAD model and that we try to predict with complex statistical models.

The research about the work after disease has many important challenges in the next future. However, due to the social impact of the issue investigated it is likely that more resources will be allocated for studying this issue. This will hopefully accelerate the development of a full comprehension of the phenomena involved.

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