Netspar THESES

Jasper Schuurman

Job Characteristics, Health and Satisfaction

Can Satisfaction with Social Life Overcome Negative Job Traits?

Job characteristics, health and satisfaction.

Can satisfaction with social life overcome negative job traits?

"I'm currently looking to hire a workaholic who feels the good job he does is compensation enough."

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Table of content

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

1) Introduction

Changes in the global economy and their consequences for society have long been a fact in human life. Due to recent trends and developments these changes are becoming increasingly common. Factors like globalization, deregulation of labor markets and increasing competition have forced many companies during the last decades to undertake restructuring activities and change the relationship they have with their employees (Emberland and Rundmo, 2010). There is growing evidence that current trends in employment conditions may be eroding levels of job satisfaction. New working practices and rapid technological advances are changing the nature of many jobs. Employees are regularly being required to work well beyond their contracted hours, often unwillingly, as organizations struggle to meet tight deadlines and targets. Work practices are becoming more automated and inflexible, leaving employees with less and less control over their workload. Many organizations are reducing their permanent workforce and are converting to a culture of short term contracts or out-sourcing, thereby increasing feelings of job insecurity (Faragher et al., 2005; Shannon et al., 2001). Although these events have a reasonable managerial rationale they have contributed to increased levels of stress among workers. Ill-health and sickness absence due to stressors in the work environment are therefore a serious and increasing problem in contemporary working life (Puosette and Hanse, 2002). Considering that restructuring activities will continue to increase if the current labor market trend continues, it is important to determine which factors may explain its detrimental effects on health (László et al., 2010).

The detrimental effects of current labor market conditions have not remain unnoticed and governments in many developed industrial countries have already drafted legislation to make organizations accept greater responsibility for the impact of their work practices on the health of their employees. Consequently, an increasing number of employers are developing formal stress intervention/management policies. Ideally, such policies should be evidence based (Faragher et al., 2005). The concept of a healthy workplace has garnered increased interest in the last few years in scientific literature as well (Shannon et al., 2001). Numerous theories now exist, developed from a wide range of perspectives, postulating a direct link between organizational/workplace stress and wellbeing. The research database is already enormous and is still growing at a considerable rate (Faragher et al., 2005).

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

In the development of theory on work and health, three major trends can be identified, even though these trends are intertwined. In the early stage, the topic received considerable attention from the psychological literature. They focused on the psychological effects that certain job characteristics have on mental well-being (especially job dissatisfaction, job strain and burnout) and possible interventions to counteract these negative outcomes (Kelloway and Barling, 1991). Most of this research is based on the Hackman and Oldham model (1976), which describe that five job characteristic (variety, identity, significance, autonomy and feedback) influence three key psychological states (experienced meaningfulness of the work, experienced responsibility for the outcomes of the work and knowledge of the results of the work activities) (Hackman and Oldham model, 1976).

In the next stage of research alternative models were developed for the Hackman and Oldham model. The most influential model is Karasek's job demand control & support model (JDCS model), also known as the job strain model (de Croon, et al., 2000). The Job Strain model assumes that strain especially results from the combination of high job demands, low decision latitude and low social support (Warren et al., 2002). An alternative theory used to describe the relationship between job characteristics and mental health is Warr's vitamin model. Essentially, the model holds that mental health is affected by job characteristics in a way that is analogous to the non-linear effects that vitamins are supposed to have on our physical health. Some job characteristics have a positive effect on mental health and beyond a certain point, there is no additional effect. While other job characteristics have a positive effect, but beyond a certain point their effect is negative (de Jonge et al., 1998). Research in this stage still focused on the psychological outcomes of work characteristics on mental well-being, but it has facilitated the development of theory for the third stage.

In the third stage, research redirected attention from psychological outcomes to health outcomes. Much of the empirical research examining these relationships has also used Karasek's job strain model and to a smaller extend Warr's vitamin model.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Research on the relationship between job characteristics and health has not remained without criticism, where critics have questioned research on methodological as well as on practical grounds. As for the methodological part, the majority of criticism has been on the way job characteristics are measured. Job characteristics are too often measured in an indirect manner, which hampers the possibility to draw solid conclusions (Karasek et al., 1988). This has resulted in a situation, where research has developed many different measures for job characteristics, even when the same theoretical framework was used. This might explain why research finds so many different strengths in relationships between the effect of job characteristics and health (Landsbergis, 1988). Andries, Kompier and Smulders, for example, found that job demands had by far the most important influence on self-rating of health. While Marmot et al. concluded that job control in the workplace accounts for much of the occupational grade difference in coronary heart disease. In general, it has been stated that job characteristics theory is oversimplified and that research fails to include all dimensions of job characteristics (Spector and Jex, 1991; Warren et al., 2002).

Despite the fact that research finds different strengths in relationships, there seems to be general agreement among researchers that job characteristics have an influence on both mental well-being and health (Vahtera et al., 2000). More troublesome is the effect possible intervention programs have, to counteract the negative influence of job characteristics on health. Some researchers find an effect of intervention programs, like autonomous work groups, use of more frequent staff meetings, job enrichment and job enlargement. Karasek summarized 19 international case studies, concluding that the stress programs were generally successful, but the criteria he used for methodological review were unstated (Shannon et al., 2001; Hackman and Oldham, 1976).

On the other hand, examples can be found of job redesign interventions in which changes in job characteristics did not result in changes in health. Something that would be predicted by job characteristics theory (Spector and Jex, 1991; Warren et al., 2002). Reviews by Polanyi et al. and Parkes and Sparkes concluded that the reported evidence that work stress can be reduced and health improved was limited at best. Even the five-year major participatory action project by Heaney et al. was unable to show benefit to workers.

The fact that different results are found could also be explained by the variety of approaches to intervention programs, in part because they are based on different models, and different outcome measures (Shannon et al., 2001). Or it just might be that the implementation of these programs has not been successful (Fried and Ferris, 1987).

Other methodological issues that research encounters between the effects of job characteristics on health are:

1) A large amount of intervening variables have been found that affect the results between job characteristics and health. Some examples of intervening variables that have been found to influence results are: socioeconomic status, perceptual and affective reactions, health behaviors (like smoking, obesity, dietary fat intake, and inactivity) and sex (Spector and Jex, 1991; Hellerstedt and Jeffery, 1997). Faragher et al. go as far to state that this can make the evidence easily appear to be both contradictory and inconclusive (Faragher et al., 2005).

2) Most occupational studies have been based on single occupations and this severely restricts job characteristics variance (Karasek et al., 1988; Pousette and Hanse, 2002).

3) Some researchers find that the link between job characteristics and health is country specific (László et al., 2010), while others do not (Karasek et al., 1988).

4) The direction of the causal relationship. For instance, do high job demands lead to health problems? Or, is strain primary such that workers with health problems are more likely to report their job demands as higher? The general view is that adverse job characteristics lead to health problems (de Jonge et al., 2001)

5) Studies for men and women have used different models. For women most studies have used a gender model that concentrates on family conditions as mediators. In contrast, studies of the effects of employment on men typically use a job model and focus on work rather than family conditions. To understand the relationships fully of employment on men and women, these models should be combined (Lennon and Rosenfield, 1992).

6) Most of the research focuses only on limited portions of the job characteristics (Hogan and Martell, 1987)

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

From a practical point of view, questions are raised as to whether the proposed interventions can be applied in business, because employee well-being and the well-being or efficiency of the organization are often in conflict. Economic theory predicts that organizations will spend on health and safety up to the point where marginal benefits equal marginal costs. So even though companies are taking more responsibility for the employee's health, they will still put their economic goals as their first priority. This might also explain why many intervention programs have not been successful. However, the alternative to continue to consider productivity as the only goal of work design is not acceptable. It places employees in the position of having to trade off their health against their economic well-being with uncertain terms of exchange.

All hopes should not be lost as there seems to be light at the end of the tunnel. Some companies are moving away from traditional programs, trying to decrease stress levels by redesigning jobs towards family-friendly policies. The term family-friendly policy includes a wide range of employer policies and accommodations such as paid leave, maternity leave, flex time, and day care. Considering that work-home conflict is apparently on the increase and a contributing factor to pressure felt in today's workplace this could be a good alternative for the traditional programs.

Surprisingly little research has been performed on work-family relations, let alone on other factors outside of the workplace. The research on work-family conflict suggests effects on mental and physical health. This has important health implications for the design and delivery of employee health intervention programs. Besides the small amount of research performed on the relationship between job characteristics, health and factors outside of the workforce, most of the research has focused on organizational responsibilities. How can organizations redesign jobs and constitute a work package that is good for employee well-being and at the same time meet company goals? Rosner takes a different perspective on the topic. He believes that stress is fundamentally an individual's problem and sees no solution other than initiatives taken by individuals on their own behalf to improve their health (Karasek et al., 1988; Shannon et al., 2001). This thesis will try to incorporate both perspectives, by focusing on employer-employee relations and factors outside of the workplace. The thesis will take a broader view on the topic by extending the topic to the social life of the individual and not solely on work-family issues.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The aim of this study is to add general knowledge to the debate on the relationship between job characteristics and health by focusing on factors outside of the workforce. In order to narrow down the focus of the research, results will be tested for the Netherlands only. Even though results might be country specific (László et al., 2010). Therefore the central question of this research is: can satisfaction with social life moderate the relationship between job characteristics and health in the Netherlands?

The scientific relevance of the research is that it focuses on a different dimension of the relationship between job characteristics and health, with a moderating variable influencing the relationship that is out of the traditional scope of research. Besides, this research will try to overcome some of the difficulties related to examining this relationship by controlling for many confounding variables, using the same model for men and women and including multiple occupations. The practical relevance of the study is that it might help governments to direct attention to the factors that are important for an employee's health and design policies in which employees can balance their work and social life. Especially, since the general view now is that balancing work and social life is a woman's issue and therefore not the problem of the organization.

In the following chapters the potential for satisfaction with social life to moderate the relationship between job characteristics and health will be examined in more detail. Chapter two is a theoretical review on the topic. It will start with a full review of the theories most often used to link job characteristics to health. This will be followed by a description of how the two models predict health outcomes and hypotheses will be formulated based on these two models. Then the construct of satisfaction with social life will be defined and describe how it could influence the relationship between job characteristics and health. The chapter ends with clearly defined hypotheses related to satisfaction with social life. Chapter three will describe the methodology used to test the different hypotheses formulated. It will start by describing the database used for the research, followed by a description of the variables used. This chapter ends with the methods of analysis used to conduct the research. Chapter four will describe the findings and test the hypotheses formulated in chapter two and ends with a discussion of the results. The final chapter summarizes the research and describes some of the limitations of this research and ends with suggestions for future research.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

2) Theory

This chapter discusses the theory on the relationship between job characteristics and health and will gradually progress to the formulation of hypotheses, in order to answer the research question. The chapter starts by defining the construct of job characteristics. Due to the ambiguities in research on job characteristics it is necessary to have a clear definition of job characteristics. This will be followed by a full review of the models used to link job characteristics to health in order to identify the relevant job characteristics and link them to health outcomes. This means a short review on Hackman and Oldham's job characteristics model, even though this model is not often used to link job characteristics to health. It does however help to get a better understanding of the two models used to evaluate health, the job demand control & support model (JDCS model) and the vitamin model. After the short review on the Hackman and Oldham model, the JDCS model and the vitamin model will be described in full length and will be linked to health. After this discussion the first two sets of hypotheses are formulated. The final part of this chapter will discuss satisfaction with social life. A clear definition will be given of what is meant with satisfaction with social life in this thesis. Followed by the potential moderating effects on the relationships between job characteristics and health and ends with the final set of hypotheses.

Defining job characteristics

The introduction described the development of theory on job characteristics and health. In the first two stages of theory development, attention has been directed to the psychological outcomes of job characteristics. Hackman and Oldham have used the following definition of job characteristics: a set of environmental variables that are widely thought to be important causes of employee affect and behavior (Hackman and Oldham, 1976). The definition used in this stage of research clearly highlights the psychological view taken on the subject. With a change of focus, health outcomes instead of psychological outcomes, a new definition is needed in order to cover the research scope. The business dictionary uses the following definition for job characteristics: Aspects specific to a job, such as knowledge and skills, mental and physical demands, and working conditions that can be recognized, defined, and assessed. (http://www.businessdictionary.com/ definition/job-factors.html).

This definition focuses on the job itself and does not include a clear outcome measure, but it provides a good basis for the definition used in this thesis. The definition of job characteristics used in this thesis will be: Aspects specific to a job, such as knowledge and skills, mental and physical demands, and working conditions that can be recognized, defined, and assessed that are important causes of employee health.

Hackman and Oldham's job characteristics model

The job characteristics model was originally developed by Turner and Lawrence and has been revised by Hackman and Lawler. The final version of the job characteristics model as used in many theoretical reviews has been developed by Hackman and Oldham. They summarized the job characteristics into five core dimensions:

1) Skill variety: the degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the person.

2) Task identity: the degree to which the job requires completion of a whole and identifiable piece of work; that is, doing a job from beginning to end with a visible outcome.

3) Task significance: the degree to which the job has a substantial impact on the lives or work of other people, whether in the immediate organization or in the external environment.

4) Autonomy: the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out.

5) Feedback: the degree to which carrying out the work activities required by the job results in the individual obtaining direct and clear information about the effectiveness of his or her performance (Sims et al., 1976; Fried and Ferris, 1987; Pounder, 1999; Hackman and Oldham, 1976; Hogan and Martell, 1987)

Hackman and Oldham state that these five core dimensions of job characteristics in turn influence the three critical psychological states:

1) Experienced meaningfulness of the work: the degree to which the individual experiences the job as one which is generally meaningful, valuable, and worthwhile.

2) Experienced responsibility for work outcomes: the degree to which the individual feels personally accountable and responsible for the results of the work he or she does.

3) Knowledge of results: the degree to which the individual knows and understands, on a continuous basis, how effectively he or she is performing the job (Pounder, 1999; Hackman and Oldham, 1976; Hogan and Martell, 1987).

According to Hackman and Oldham these three critical psychological states subsequently influence work outcomes. The Hackman and Oldham model was essentially developed to measure job satisfaction (Jansen et al., 1996), but it has been used to measure other outcomes like internal work motivation, growth satisfaction, work effectiveness, and absenteeism as well. Finally, Hackman and Oldham identified three moderating variables (knowledge and skill growth, need strength, and context satisfaction) to moderate both the relationship between job characteristics and psychological states and between the psychological states and work outcomes (Fried and Ferris, 1987; Hackman and Oldham, 1976). The full model, as described in figure 1, makes it possible to redesign jobs on the five key job characteristics in order to get more beneficial outcomes (Jansen et al., 1996).
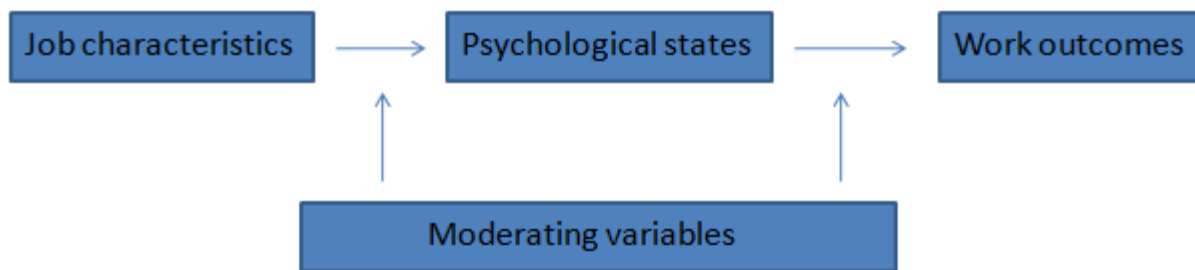
Figure 1: Hackman and Oldham full job characteristics model

Results have tended to be generally supportive of the model Hackman and Oldham model. However, a number of methodological, analytic, and substantive issues regarding the overall validity of the model can be raised. The causal core of the job characteristics model is the psychological states. Hackman and Oldham go on to argue that the work outcome should be highest when all three of the psychological states are present. The model also specifies the nature of the relationship between job characteristics and psychological states. The three job characteristics of skill variety, task identity, and task significance are hypothesized to combine additively to determine the psychological meaningfulness of the job. The job characteristic of autonomy determines the experienced responsibility, while the job characteristic of feedback is hypothesized to foster knowledge of results (Hugh and House, 1980; Hackman and Oldham, 1976; Hogan and Martell, 1987). The failure to find support for the hypothesized three-way interaction of the psychological states is of some importance, since Hackman and Oldham refer to the psychological states as the causal core of the job characteristics model, and argue strongly that all three of the psychological states are

11

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

necessary for the existence of positive work outcomes. This would mean that the model is not capable of specifying work outcomes (Kelloway and Barling, 1991). Other researchers however have relaxed the hypothesis of the three-way interaction and have showed that the existence of one psychological state is sufficient for positive work outcomes (Hogan and Martell, 1987).

A second methodological issue is the relationship between the different job characteristics. Hackman and Oldham report that the five dimensions are not empirically independent. They report a median intercorrelation of .26, where the median correlation of autonomy with the other dimensions is even .36 (Hackman and Oldham, 1976). This means that in order to determine the effect of a job characteristic on the final work outcome, one has to control for the existing intercorrelations.

The final methodological issue, which is of great importance for this research, is how the model can be used as a tool to assess health outcomes. First of all, the model is designed to measure psychological work outcomes. These psychological work outcomes will in turn have an influence on health outcomes, but this means that the model contains two mediating effects in order to determine the effect of job characteristics on health. Second of all, the model has to correct for the intercorrelation between the different job characteristics.

To conclude, the Hackman and Oldham model is too complex to measure the relationship between job characteristics and health. So we need a model where the different job characteristics are "independent" of one another. Besides, we need a model that is capable of a more direct assessment of the relationship between job characteristics and health. In the introduction we have seen that alternative models have been developed, based on the Hackman and Oldham model. These models are capable to assess the effect of job characteristics on health in a more direct manner and will be discussed in the next two sections.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Job demand control & support model

The job demand control & support model was developed by R. Karasek and his colleagues during the 1980s (Kristensen, 1995; Landsbergis, 1988) and resolved many of the difficulties associated with job stress research at the time. Interesting for this thesis are the difficulties associated with the Hackman and Oldham model and health outcomes in order to find a suitable model to test the effect of job characteristics on health. At first, Karasek's model consisted of only two components, namely demand and control (also known as the job demand & control model, JDC model), in a later stage they added the dimension of social support (also known as the job demand control & support model, JDCS model) In the JDC model, demands are defined as psychological stressors present in the work situation and control is defined as the opportunities of the employee to use and develop his or her skills and authority over decisions. These definitions show that the JDC model has been originally developed from a psychological perspective as well. According to the JDC model two basic dimensions job demands and decision latitude (control) make it possible to distinguish between four main types of jobs:

1) high strain jobs with high demands and low decision latitude, like: assemblers.

2) low strain jobs with low demands and high decision latitude, like repairmen.

3) active jobs with high demands and high decision latitude, like managers.

4) passive jobs with low demands and low decision latitude, like janitors (Karasek et al., 1998; Kristensen, 1995; Pelfrene et al., 2002).
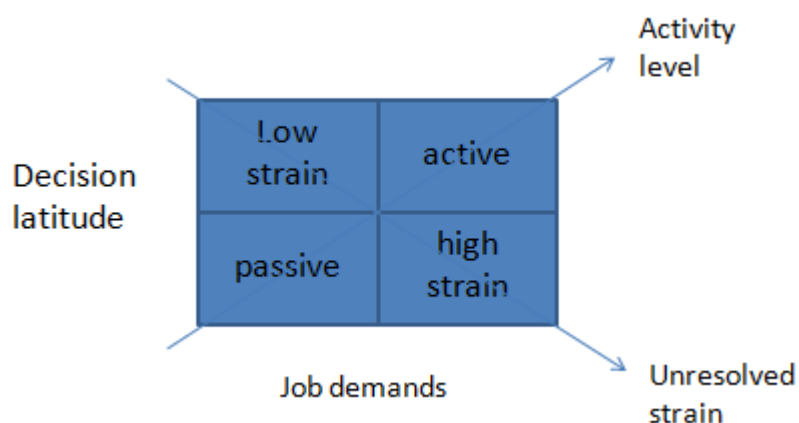

Figure 2: job demand and control model

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Figure 2 describes the job demand & control model. The model combines both dimensions in order to distinguish between jobs increasing in strain and jobs increasing in activity level. The activity level shows how jobs should ideally develop, in each dimension job demands match decision latitude. So the employee is given the right amount of decision latitude to face the demands he is given.

The strain dimensions shows how strain develops in jobs. When job demands go up and decision latitude goes down, the strain an employee experiences increases. One might assume that demands and latitude are highly correlated, that is authority proportionally grows with responsibility. However, the correlation found is lower than the correlations reported by the Hackman and Oldham model. The U.S. Quality of Employment Surveys found a correlation of 0.17 and the longitudinal Swedish Level of Living Surveys found a correlation between 0.05 and 0.26. This is one dimension on which the job demand & control model is a better tool to investigate the relationship between job characteristics and health than the Hackman and Oldham model. Besides the JDC model explicitly distinguishes control as a separate feature influencing work related outcomes. As Beehr and Newman pointed out, job stress researchers have generally ignored the decision-making or response selection process of employees.

The omission of control has led to confusion in the literature. For example, Ritti found higher intellectual demands associated with greater satisfaction among engineers. In this case, intellectual demands were not simply stressors but included the ability to use a variety of skills and perform less routine and monotonous work. This finding is in line with predictions of the Hackman and Oldham model, however, the model does not attribute the outcome to the control an employee has. According to Landsbergis this distinction is vital in order to understand the impact of job characteristics on health (Landsbergis, 1988). By means of an example this statement can be explained best. A doctor has a very responsible job and responsibility is often defined as a stressor, but the amount of stress experienced highly depends on the amount of decision-making authority the doctor has. So a concept like responsibility contains both aspects of job demands and decision-making authority.

There are several authors that have resolved this deficiency in the Hackman and Oldham model, by stating that the dimensions of autonomy and skill variety actually represent the control dimension an employee has in his job (Pousette and Hanse, 2002; Hellerstedt and Jeffery, 1997; Pelfrene et al., 2002). The dimension of job demands is, however not present in the Hackman and Oldham model and is a vital dimension to explain the development of strain.

The job demand & control model has been further developed in different directions. One important step was to include social support as a dimension of the psychosocial work environment (also known as the job demand control & support model). Various aspects of the degree to which the individual worker can get support from workmates and/or supervisors affect both how demands are handled and the ability of the individual worker to have control in his or her job (Shannon et al., 2001; Jansen et al., 1996; Höckertin and Härenstam, 2006. The social support addition acknowledges the need of any theory of job stress and behavior development to assess social relations at the workplace (Karasek et al., 1988; Pelfrene et al., 2002). These researchers do, however, not explain the fact that the correlation between social support and the other two job characteristic dimensions found is low. Opposed to their view, where the correlation between social support and the other two job characteristics dimensions is high (Landsbergis, 1988). This thesis subscribes to the low correlations found between the different job characteristics and will therefore treat social support as a distinct job characteristic that influences health. Two other job characteristics have been added to the model, physical job demands and job insecurity, but in the majority of theoretical reviews they are excluded (de Lange et al., 2003).

The theory described above has two important implications for this research. First of all, it is important to acknowledge job demands and control as distinct job characteristics to explain health outcomes. Therefore the JDCS model is superior to the Hackman and Oldham model. Second of all, the thesis tries to include as many job characteristics as possible in order to test all relevant job characteristics. In the introduction it was identified that one of the critics on job characteristics theory is that not all relevant dimensions of job characteristics are included. Since the correlation between the different job characteristics is low it assumed that investigating the relationship between all relevant job characteristics and health is feasible and that each of the different job characteristics by itself has an influence on health.

Figure 3 describes all the job characteristics identified by the JDCS model and the relationship with health outcomes.
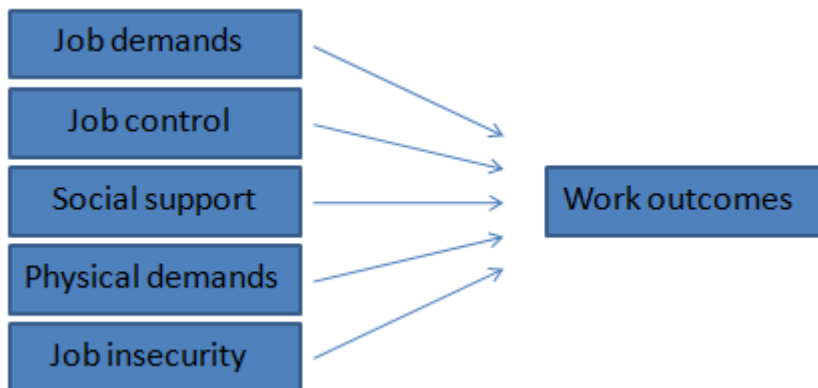
Figure 3: Full job demand control & support model

When the full job demand control & support model (figure 3) is compared with the full Hackman and Oldham model (figure 1), we can see that the JDCS model is more straightforward than the Hackman and Oldham model. Together with the reasons mentioned above, this makes the JDCS model more suited to evaluate health outcomes. Or to put it in the words of Kristensen: it is no exaggeration to say that the JDCS model has been the most influential model in the research on psychosocial work environment, stress and disease for the last 10 years. The job strain model (with or without the support dimension) has been elucidated in more than 100 studies (Kristensen, 1995). In practice, health outcomes have been assessed in two ways, directly and indirectly. In the direct manner, the job characteristics are directly related to health outcomes. In the indirect manner, job characteristics are related to stress outcomes, which subsequently influence health. The advantage of the indirect manner is that the underlying psychological mechanism by which eventually health is effected is explained.

The goal of this research is to add general knowledge to the debate of job characteristics and health with satisfaction with social life moderating the relationship. Given the goal of the research, this thesis will use the direct manner to assess the effect of job characteristics on health.

The final part of this chapter describes the hypothesis formulated and the support found for the model. Researchers have formulated several hypotheses on how the model predicts work and health outcomes. The model starts with the two basic hypotheses: the strain hypothesis and the learning hypothesis. The strain hypothesis states that the most adverse work/health outcomes are to be expected in workers having jobs characterized by the combination of high demands and low control. These workers occupy high strain jobs, in contrast to low strain jobs which combine low demands with high control (Kristensen, 1995; Pelfrene et al., 2002). The higher the demands relative to control, the higher the strain (Shannon et al., 2001). The learning hypothesis states that high job demands in combination with high job control will favor learning, motivation and development of skills, all leading to so-called active jobs. Employees in active jobs will develop better coping mechanisms to deal with stress. In contrast, jobs characterized by low demands and low control will most often discourage employees and put them or even lock them up in a passive situation. Some researchers have included the dimension of social support in the strain hypothesis as well, i.e. high demands, low control and low social support lead to high strain (Karasek et al., 1998; Pelfrene et al., 2002).

Others have formulated a separate hypothesis for the social support dimension, the buffer hypothesis. The buffer hypothesis states that support received from supervisors and colleagues often buffer the impact of job demands and control on outcome variables. The opposite of the buffer hypothesis is the hypothesis that there exists a synergic effect between the different job characteristics. It is the combination of job characteristics, which together exert a stronger effect, than each of the variables independent (de Lange et al., 2003; Sanne et al., 2005).

A large body of research has tested the strain hypothesis as opposed to the learning hypothesis. For the latter, no scientific research was found testing the hypothesis. In general support for the model has been found based on the strain hypothesis. The model's predictions of psychological strain have been supported in the longitudinal 1968-1974 Swedish study, a survey of 7000 Finnish men and women, a survey of 8700 Swedish white-collar workers, and 4503 men and women in the 1969, 1972 and 1977 U.S. Quality of Employment Surveys (QES). View researchers have, however, found mixed results (Landsbergis, 1988). For example, van der Doef and Maes's review showed that only 28 of 41 studies examining the

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

relationship between job characteristics and psychological well-being supported the strain hypothesis. It showed be noted that earlier reviews of the JDCS model suffered from several shortcomings that restrict the conclusions that can be drawn (de Lange et al., 2003). An interesting feature about research on the JDCS model is that decision latitude appears to be more consistently related to outcomes than are demands (Shannon et al., 2001). The other two hypotheses, the buffer hypothesis and the synergy hypothesis, are rejected in the majority of scientific research (Sanne et al., 2005; de Croon et al., 2000).

The JDCS model has been criticized on a number of other grounds, which show high resemblance with the general criticism mentioned in the introduction:

1) The construct of decision latitude is too broad, as it embodies skill discretion as well as decision authority (Pousette and Hanse, 2002; Kristensen, 1995; de Croon et al., 2000). Based on the fact that decision latitude is more consistently related to outcomes, questions can be raised as to whether this actually is a concern.

2) The model is too simple. More than two (or three) dimensions are needed to describe the psychosocial work environment (Johnson and Hall, 1988; Kristensen, 1995).

3) In reality, high job strain is another way to measure low social status. This would mean that social status is the mean variable explaining strain. Based on the general support for the model this view seems to simplistic.

4) The effects of job demand, control and/or social support may be curvilinear with optimal levels at the middle of the range. Like the Hackman and Oldham model, the JDCS model states that the effects of job characteristics are linear opposed to curvilinear. The general view is that the effects of the job characteristics are linear, as only a small amount of scientific reviews found curvilinear relationships (Kristensen, 1995). These reviews based their findings on the vitamin model that challenges this popular believe of linearity.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Vitamin model

Warr raised a new criticism on the Karasek model. He points out that Karasek's results suggest that the relationships between the job characteristics and strain outcomes are in fact curvilinear and not linear as assumed. Warr has challenged this popular believe with his vitamin model. Warr uses the way vitamins affect human health as a metaphor for the effect of environmental influences on mental health and well-being (Kelloway and Barling, 1991; Fletcher and Jones, 1993; Jeurissen and Nyklíček, 2001). Vitamins exert a particular influence on the human body. That is, vitamin deficiency produces bodily impairment and, consequently, may lead to physical illness. Generally, vitamin intake initially improves health and physical functioning, but beyond a particular level of intake no further improvement is observed. Warr distinguishes between two types of vitamins, vitamin C (CE) and vitamin D (AD). Job characteristics that are labeled vitamin C have a positive curvilinear effect on the individual up to a certain point, but then any added increase does not have any further effects (neither beneficial nor detrimental effects), i.e. there effect is constant. According to Warr, vitamins C and E have a suchlike effect on the human body. Therefore, the label CE (Constant Effect) is used to denote this particular relationship. Job characteristics that are labeled vitamin D have a curvilinear positive effect on well-being, but beyond a certain point there effect becomes negative. Vitamins A and D are known to be toxic, when taken in large quantities. For that reason Warr has used the label AD (Additional Decrement) to denote the inverted U-shaped curvilinear relationship (de Jonge et al., 1998; Sonnentag and Frese). Figure 4 shows Warr's vitamin model.
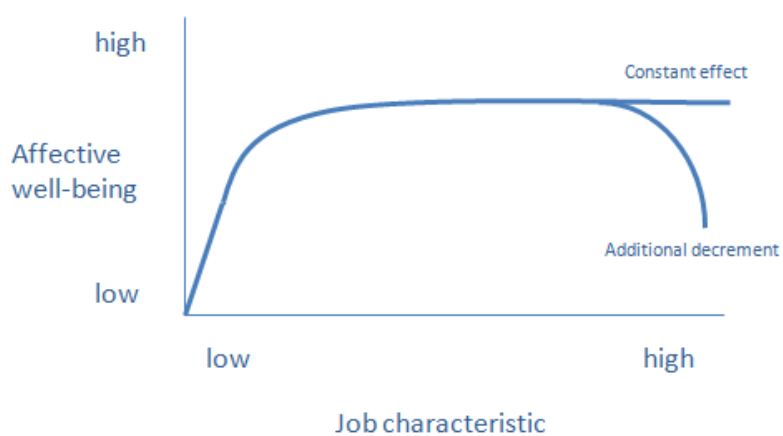
Figure 4: Warr's vitamin model

Within his two type classification, Warr identified nine different job characteristics, which are based on the job characteristic classification of the Hackman and Oldham model and the job demand control & support model. Out of the nine job characteristics, six variables have effects similar to vitamins A and D. The remaining three job characteristics are supposed to follow the CE pattern (de Jonge et al., 1998). The nine job characteristics and their effect on health are listed in table 1.

Job characteristic	Vitamin type
1 job autonomy	AD
2 job demands	AD
3 social support	AD
4 skill utilization	AD
5 skill variety	AD
6 task feedback	AD
7 salary	CE
8 safety	CE
9 task significance	CE

Table 1: Warr's classification job characteristics

When the vitamin model is evaluated on the job characteristics used, we see that the model includes more dimensions than both the Hackman and Oldham model and the JDCS model. The job characteristics salary and safety are not mentioned in either of the two other models. This might make the model more suited to evaluate health comes, then the JDCS model, which have been criticized for not including all relevant job characteristics. The model is straightforward, which makes it easier to use as opposed to the Hackman and Oldham model. The model was essentially developed to evaluate psychological work related outcomes (like affective well-being). The same mechanisms to measure health have been used as is done for the JDCS model, i.e. the direct manner (substituting affective well-being for health outcomes) or the indirect manner (affective well-being has a subsequent effect on health). Like the JDCS model, it is assumed that the job characteristics are independent of one another in explaining health outcomes (Fletcher and Jones, 1993).

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The major difference between the vitamin model in comparison with the Hackman and Oldham model and the JDCS model, as described earlier, is the assumption of curvilinear instead of linear effects. This means for example that people need the vitamin of task significance to a certain point. Therefore, people's wellbeing increases with having more task significance. But at a certain level, any additional increase in task significance will not have any further increase of people's well-being (Sonnentag and Frese).

This is not in line with the Hackman and Oldham model, i.e. more task significance is always better. An even bigger contradiction of the behavior of the vitamin model can be found for the job characteristic social support. The vitamin model predicts that social support beyond a certain point has a negative effect, while the JDCS models claims that social support always has a positive effect and the more the better (since the relationship is positive and linear). In other words, for most job characteristics there is an optimal level, while at both ends of the distribution the effects on well-being and health are hypothesized to be unfavorable (Fletcher and Jones, 1993; Jeurissen and Nyklíček, 2001).

The amount of scientific reviews on the vitamin model is limited, as opposed to the other two models. Most research has mainly focused on the job characteristics which are also present in the JDCS model. Warr originally studied among nearly 1900 employees and tested the job characteristics for job satisfaction, job-related anxiety, and job- related depression (de Jonge et al., 1998; http://www.coursework4you.co.uk/essays-and-dissertations/sample44.php). Significant curvilinear relationships were found between job demands on the one hand, and job satisfaction, job-related anxiety, and job- related depression on the other hand. Job autonomy showed curvilinear association with job satisfaction. The latter relationship was the only one found to be significant in the study of Fletcher and Jones in a large heterogeneous sample of about 1300 men. Parkes, however, did not find any curvilinear relationship in her sample of almost 600 civil servants. Contrarily, De Jonge et al. found four out of 12 curvilinear relationships in their study among about 250 health care professionals (de Jonge et al., 1998). These discrepancies are at least partly due to methodological differences between the studies, such as the participant samples and outcome variables used (Jeurissen and Nyklíček, 2001).

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The hypothesis of isolated effects of job characteristics on health has been supported to a certain extent. Although it should be mentioned that the studies testing the correlations did not take into account all nine variables simultaneously (http://www.coursework4you.co.uk/ essays-and-dissertations/sample44.php). Despite the fact that not all job characteristics were tested simultaneously it seems safe to assume that correlations are modest, since the job characteristics are derived from the Hackman and Oldham model and the JDCS model, which have modest correlations between the different job characteristics.

Both models have found some correlations between the job characteristics, where the job characteristics of the JDCS model were less correlated with one another than in the Hackman and Oldham model. To summarize the theory on the vitamin model, there is only limited support for the curvilinear relationship described by the, however, more research is needed in order to definitely reject the model. The model on the other hand has one big advantage compared to the JDCS model as it includes more job characteristics.

The theoretical models above have described the job characteristics that are used and their relationship with health. The JDCS model finds most support in the scientific literature, although it includes a limited number of job characteristics. The vitamin model, although not supported on the curvilinear behavior, includes a large number of job characteristics. By combining the JDCS model and the vitamin model the following distinct job characteristics are identified. Table 2 provides a list of all the relevant job characteristics identified so far and the model it relates to.

Job characteristic	model
1 job autonomy	VM
2 job demands	VM, JDCS
3 social support	VM, JDCS
4 skill utilization	VM
5 skill variety	VM
6 task feedback	VM
7 salary	VM
8 safety	VM
9 task significance	VM
10 job control	JDCS
11 physical demands	JDCS
12 job insecurity	JDCS

Table 2: total number of identified job characteristics in literature

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The dimension of job control in the JDCS model, corresponds to the dimensions of job autonomy and skill utilization in the vitamin model, consequently there are eleven different job characteristics. Chapter three will discuss the database and methods used to test the relationships between job characteristics and health. This chapter will show why it is not possible to test all eleven job characteristics in this thesis. The job dimensions of skill variety, task feedback, safety and task significance cannot be tested in this research the remaining job characteristics however can be tested. By testing the remaining job characteristics this thesis includes more job characteristics dimensions than most scientific reviews. For this reason, the remaining part of the research will focus on the job characteristics that are tested in chapter four.

Job characteristics and health

Up to now, the research has focused on the different models used to connect job characteristic to health and has briefly discussed how the models predict health outcomes. The research found that the JDCS model is a better tool to explain health outcomes than the Hackman and Oldham model. This is reflected in the scientific literature as well, as the majority of scientific reviews are based on the JDCS model (Landsbergis, 1988). The vitamin model, although not widely supported on the curvilinear relationships of job characteristics, identifies more job characteristics than the JDCS model and is therefore important for this thesis. Except from the curvilinear hypothesis, the vitamin model uses the same direct mechanism to connect job characteristics to health and is therefore a good model as well. This research has identified eleven different job characteristics based on the two models, from which seven will be tested. Before specifying the hypothesized relationships between these seven job characteristics and health, two final issues will be discussed that are important when testing the relationship between job characteristics and health. This means a short description of the underlying causal mechanism, even though not tested. As Kristensen notes, it is one thing to demonstrate an association between strain and unfavorable health outcomes, another to explain such an association (Kristensen, 1995). A second issue is the magnitude of effect the different job characteristics have on health outcomes. In other words, do all the different job characteristics have an equal effect on health or do some job characteristics have stronger effects than others.

The main underlying causal mechanism that connects job characteristics to health is stress (Ramirez et al., 1996; Kelloway and Barling, 1991; Spector and Jex, 1998). The stress caused by unfavorable job characteristics leads to two kind of changes in the individual, physiological changes and behavioral changes. Examples of physiological changes are changes in: blood pressure, blood sugar, pulse, stress hormones and obesity. Examples of behavioral changes are: tobacco usage, diet habits, calorie intake, exercise, alcohol, coffee and sleeping patterns (Kristensen, 1995). There is much research on physiological changes caused by the negative effect of job characteristics (job demands, decision-latitude and social support).

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The majority of scientific research has tested the relationship in an indirect manner by examining the effect of job characteristics on the probability of getting CVD (increased blood pressure is one of the main factors causing CVD). The results showed consistent relationships between job characteristics and CVD (Vahtera et al., 2000).

The amount of research that shows behavioral changes is less exhaustive, but the research available has shown such changes exist. Higher job demands were found to be associated with increased smoking intensity and higher BMI due to increased fat intake. High decision latitude (control) was associated with exercising on a regular basis (Hellerstedt and Jeffery, 1997) and less alcohol consumption. And increased social support has been found to be associated with less smoking and lower BMI (Pelfrene et al., 2002). The results of the research studying physiological changes and behavioral changes should however be interpreted with caution. It is extremely complicated to study the causal networks empirically, because many of the mechanisms may be working simultaneously and are also influenced by factors outside the work environment such as heredity (Kristensen, 1995).

The second issue, which of the job characteristics has the biggest effect on health is still a matter of debate. In prior research on work characteristics, job control has been shown to be the strongest psychosocial predictors of sickness absence, morbidity and mortality (Vahtera et al., 2000). These researchers state that employees that have more control over their work feel that they have the situation under control and can control the duration and frequency of the workload (Pousette and Hanse, 2002).

Others, however, found that job demands have a stronger influence on health (Hellerstedt and Jeffery, 1997; Inoue et al., 2010). It should be mentioned that part of the different results can be explained by different outcome measures used. Landsbergis (1988) for example found that workload demands were more strongly related to exhaustion, and decision latitude was more strongly related to depression and job dissatisfaction. The research on which of the job characteristics has the most impact on health is therefore inclusive. This thesis will for this reason make no assumptions on which of the job characteristics has a bigger effect on health.

At this point the relevant theories have been discussed in order to connect job characteristics to health. Eleven different job characteristics have been identified based on the JDCS model and the vitamin model, as these models serve the research goals in this thesis. Out of the eleven job characteristics, seven can be tested in chapter four: job autonomy, job demands, social support, skill utilization, salary, physical demands and job insecurity. Based on the low correlations found in previous research between job characteristics and health, it is assumed that each of the seven job characteristics in itself has an influence on health. Especially since the buffer hypothesis and the synergy hypothesis, which claim that the job characteristics need to be tested simultaneously in order to assess the effect on health, is rejected in the majority of scientific reviews.

A final issue is the strain hypothesis, which states that it is especially the combination of high job demands, low control and low social support which leads to the biggest adverse health effects. This hypothesis, however, does not imply that each of the job characteristics individually have adverse health effects. Therefore the assumption that each of the different job characteristics has an effect on health still holds. Out of the seven job characteristics, three have been extensively discussed in the literature by means of the JDCS model and the vitamin model: job demands, job control and social support. It has been found that high job demands have negative effects on health. Increasing amounts of job control are related with better health and high social support has also been associated with being in better health. The other four job characteristics have received less attention in the scientific literature.

The JDCS model, see table 2, identifies physical demands and job insecurity as two other job characteristics that influence health. Even though this thesis found no research linking these job characteristics to health, it is hypothesized that increased amounts of physical demands have adverse health effects and that increasing amounts of job insecurity lead to adverse health effects. The vitamin model identifies the final two job characteristics: salary and skill utilization, see table 2 as well. Again, this thesis did not find any articles relating these two job characteristics to health. It seems, however, save to assume that increasing amounts of skill utilization has positive effects on health and that increasing amounts of salaries has a positive influence on health.

The following hypotheses are formulated based on the scientific review:

H1a: increasing amounts of job autonomy has a positive effect on health.

H2a: increasing amounts of job demands has a negative effect on health.

H3a: increasing amounts of social support has a positive effect on health.

H4a: increasing amounts of skill utilization has a positive effect on health.

H5a: increasing amounts of salary has a positive effect on health.

H6a: increasing amounts of physical demands has a negative effect on health.

H7a: increasing amounts of job insecurity has a negative effect on health.

Out of the seven hypotheses formulated, three relate to both the JDCS model and the vitamin model, two relate only to the JDCS model and two only to the vitamin model. The question can be raised as to whether the job characteristics will follow the linear pattern as described by the JDCS model or the curvilinear pattern (see figure 4) as described by the vitamin model. The JDCS model has received more support than the vitamin model in the scientific literature, therefore the five job characteristics related to the JDCS model are hypothesized to behave linear. The job characteristics salary and skill utilization, even though only related to the vitamin model, are also hypothesized to have linear effects. The amount of literature supporting curvilinear behavior of job characteristics is small and it would therefore seem odd if the two job characteristics related to the vitamin model would behave curvilinear. The following hypotheses are formulated based on the linear expectation of the job characteristics:

H1b: job autonomy has a linear effect on health.

H2b: job demands has a linear effect on health.

H3b: social support has a linear effect on health.

H4b: skill utilization has a linear effect on health.

H5b: salary has a linear effect on health.

H6b: physical demands has a linear effect on health.

H7b: job insecurity has a linear effect on health.

Satisfaction with social life

To the knowledge of this thesis, no research has been performed on the relationship between job characteristics and health with satisfaction with social life as a moderating effect. The first step is to define the construct of satisfaction with social life used for this research. Felce and Perry (1995) in their study on quality of life identified five dimensions: physical wellbeing, material wellbeing, social wellbeing, emotional wellbeing, and development and activity. Other researchers have used similar constructs that cover the full range of an individual´s life (i.e. including factors relating to work satisfaction) (Neugarten et al., 1996). Buetell defines life satisfaction as an overall assessment of feelings and attitudes about one's life at a particular point in time ranging from negative to positive (Buetell, 2006). This definition includes attitudes related to work as well, but provides a solid basis for the definition used in this research. Satisfaction with social life in this research is defined as: an overall assessment of feelings and attitudes about one's life other than feeling and attitudes related to work at a particular point in time ranging from negative to positive.

The construct of satisfaction with social life shows great resemblance to the job characteristic construct of social support. That is, social support measures the support received from co-workers, while satisfaction with social life measures the support received from friends and family. There is reason to assume that satisfaction with social life has an influence on health and could therefore moderate relationship between job characteristics and health. A number of prospective studies have found an association between general social network interaction and total mortality incidence (Johnson et al., 1998). The underlying causal mechanisms by which social network interaction influences total mortality incidence was not specified in this research, and for this it is beyond the scope as well to demonstrate how satisfaction with social life can moderate the relationship between satisfaction and health. It, however, seems fair to assume that satisfaction with social life will have an effect on the stress experienced by an employee, the coping mechanism by which stress is dealt with and the behavior changes associated with stress. Therefore, this thesis assumes that satisfaction with social life has an influence on the relationship between job characteristics and health. The assumption made is that the effect of the job characteristic will extend itself. This means for example that the negative influence of high job demands has a bigger effect on individuals not satisfied with

their social life in comparison with individuals that are satisfied with their social life and vice versa. The following hypotheses are formulated for the effects of satisfaction with social life:

H1c: employees who are more satisfied with their social life experience bigger health benefits from having more job autonomy, than individuals that are not satisfied with their social life.

H2c: employees who are more satisfied with their social life experience less adverse health effects from having more job demands, than individuals that are not satisfied with their social life.

H3c: employees who are more satisfied with their social life experience bigger health benefits from having more social support, than individuals that are not satisfied with their social life.

H4c: employees who are more satisfied with their social life experience bigger health benefits from having more skill utilization, than individuals that are not satisfied with their social life.

H5c: employees who are more satisfied with their social life experience bigger health benefits from having more salary, than individuals that are not satisfied with their social life.

H6c: employees who are more satisfied with their social life experience less adverse health effects from having more physical demands, than individuals that are not satisfied with their social life.

H7c: employees who are more satisfied with their social life experience less adverse health effects from having more job insecurity, than individuals that are not satisfied with their social life.

Data and methods

The primary hypothesis is that satisfaction with social life can moderate the relationship between job characteristics and health. In addition to testing the hypothesized relationship, this research will try to control for confounding variables that have been found to influence the hypothesized relationship. Hence, a database is needed that cover a wide range of job characteristics, confounding variables and variables that relate to satisfaction with social life. The European Community Household Panel (ECHP) perfectly matched these requirements. The ECHP is a survey based on a standardized questionnaire that involves annual interviewing of a representative panel of households and individuals in each country, covering a wide range of topics: income, health, education, housing, demographics and employment characteristic, etc. The total duration of the ECHP was 8 years, running from 1994 to 2001. (http://circa.europa.eu/irc/dsis/echpanel/info/data/information.html).

The total database contained 1121044 observations. In order to obtain the information needed for this thesis a first shift was made by selecting all respondents from the Netherlands, which left 72141 observations. The next step taken was the selection of the working population based on the main activity status (normally working, unemployed or inactive. People normally working were selected from these three categories), leaving a final database of 37928 (15387 women and 22541 men) observations. The database is longitudinal in nature and all years are used for the analysis. Possible correlations between the different years are taken into account and the analyses will therefore control for the fact that the database is longitudinal in nature by correcting for the autocorrelation of the error term. In the next stage questions were identified that cover the job characteristics. Since the European household Panel is not primarily designed to measure job characteristics, proxies were used to cover the job characteristics. The following job characteristics were identified from the database: job autonomy, job demands, social support, skill utilization, salary, physical demands, job insecurity, see table 2 for all the job characteristics identified in this thesis. So the database provides the possibility to measure seven out of the eleven job characteristics identified in this thesis.

All the job characteristics of the JDCS model are covered, the vitamin model identifies more job characteristics and it is therefore harder to obtain all of the variables from a standardized database. The following step was to identify questions that relate to satisfaction with social life based on the definition provided in chapter two, five questions were identified.

Finally, confounding variables were identified that are generally described as having an influence on the relationship between job characteristics and health. This research will control for the following variables: age, sex, marital status, full time versus part time work, occupational status, type of industry the employee works in, private versus public sector, education, health expense and social economic status. It was not possible to control for health behaviors, since the variables smoking, alcohol consumption and BMI, although a standard question in the European Household Panel, were not present for the Dutch respondents.

The total number of variables included for analyses is twenty-two: one dependent variable, ten independent variables, ten confounding variables and one moderating variable. Due to the fact that the European Household Panel was not primarily designed to measure job characteristics, the measures were compared with the questions of the JCQ, which is a questionnaire especially designed to measure job characteristics (Karasek et al., 1998; de Jonge et al., 1998).

Dependent variable
Self assessed health

Self assessed health is measured by a single item (i.e. How is your health in general?) that was scored on a 5-point rating scale, ranging from 1 very good to 5 very bad. It has been shown that a global rating of self assessed health is an inclusive measure of the general health of an individual (de Jonge et al., 1998).

Independent variables
Job autonomy

Job autonomy (in the analyses referred to as job level) is assessed by a single item scale (i.e. what is your current position in your job?). Respondents were able to select either supervisory, intermediate or non-supervisory. The job position an employee has determines the amount of job autonomy he has, where a supervisor has most authority and a non-supervisor least authority.

Job demands

Job demands was measured by means of three variables. The first variable was labeled job difficulty. Job difficulty was measured on a 2 item scale (do you feel that you have skills or qualifications to do a more demanding job than the one you have now?). Respondents were able to answer yes or no to the question. If people feel that they can do a more demanding job it indicates that they perceive their job as not demanding.

The second variable was labeled satisfaction with the amount of working hours (how satisfied are you with your present job in term of number of working hours?). The variable was scored on a 6-point rating scale, ranging from 1 not satisfied to 6 fully satisfied. The amount of working hours is an indication of how demanding the employee feels his job is, if people are fully satisfied they will perceive their job as not being that demanding.

The final variable that was used to measure job demands was the actual amount of working hours an employee makes on a weekly basis (how many hours do you work on a weekly basis) and was measured on a continuous scale. This variable will be referred to as hours work in the analyses.

Social support

Social support is measured by a single question (how satisfied are you with your present job in term of working conditions/environment?). Social support was measured on a six point scale, ranging from not satisfied to fully satisfied. It is assumed that people that are not satisfied with their working environment receive little social support from their coworkers. This variable will be referred to as satisfaction working conditions in the analyses.

Skill utilization

Skill utilization was assessed by the amount of training an employee can put into practice (referred to as value training in the analyses). If an employee receives training, but is not able to put this into practice he will perceive that he or she is not using all the skills he or she has. The following question was asked to measure the value of the training: how much has the training or education contributed to your present work? This was measured on a 4 point scale; A lot, a fair amount, not very much and not at all.

Wage

The variable wage measured the net monthly salary in euro's (i.e. what is your net monthly salary?). The variable was measured on a continuous scale.

Physical demands

Physical demands was measured by the satisfaction level employees have with their working shifts (referred to as satisfaction shifts in the analyses). If people have demanding working shift or they at least experience their shifts to be demanding, it is assumed that these people experience their job to be physically more demanding. Satisfaction with shift was measured on 6 item scale (i.e. how satisfied are you with your present job in terms of working times? (day time, night time, shifts)). The range of the scale was from 1 not satisfied to 6 fully satisfied).

Job insecurity

Job insecurity was measured by means of two variables. The variable satisfaction with job security was measured by the question: how satisfied are you with your present job in term of job security? Again the scale ranged from 1 not satisfied to 6 fully satisfied (referred to as satisfaction job security in the analyses). The second variable measured the type of contract an employee has (i.e. what type of employment contract do you have in your main job?). This variable is referred to as contract type in the analyses. Respondents were able to choose between one of the following contract types: permanent employment, fixed-term contract or short-term contract, casual work with no contract, some other working arrangement. It was assumed that the other working arrangement provided less security then the casual work with no contract.

Moderating variable

Satisfaction with social life

The questions related to the construct of social life were chosen in a way that they covered different aspect of social life related to the definition in chapter two. Five questions were identified from the European Household Panel to fit this construct: 1) Are you a member of any club, such as a sport or entertainment club, a local or neighborhood group, a party, etc.? Respondents were able to answer yes or no to this question. 2) How often do you talk to any of your neighbors? The scale consisted of four response categories: On most days, once or twice a week, once or twice a month, less than once a month and never. 3) How often do you meet friends or relatives not living with you, whether here at home or elsewhere? Again this scale consisted of four response categories: On most days, once or twice a week, once or

twice a month, less than once a month and never. 4) How satisfied are you with your current housing situation? This question was scored on a 6-point rating scale, ranging from 1 not satisfied to 6 fully satisfied. 5) How satisfied are you with your current amount of leisure time? This scale consisted of 6 points as well, 1 not satisfied to 6 fully satisfied.

The direction of the scales is different, that is, questions 1 to 3 were in a positive direction, while question 4 and 5 were in a negative direction. Therefore the first three scales were converted, so that they have the same direction as the last to scale. The second step was to adjust the range of the scales, so that each scale has the same starting point and the same end. For example, if a respondent is a club member the score was adjusted to 6 and if they were not a club member the score was adjusted to 1. The same was done for question two and three. The next step was to add the scores, so the scale ranged from 5 (scoring lowest on all items) to 30 (scoring highest on all items). Finally, for the purpose of this study, respondents were divided into three groups. The first group, the people least satisfied with their social life, consisted of the first 25 percent of respondents that had the lowest score, which came down to a score below 18.75. The second group (50 percent) was the group intermediately satisfied with their social life, with a score between 18.75 and 24.5. The final 25 percent was the group of people most satisfied with their social life; these respondents had a score above 24.5.

Control variables

This research controlled for the following variables, where a + indicates that dummy categories were merged: age (continuous scale), sex (male, female), marital status (Being married, separated, divorced + widowed and never married), fulltime versus part-time work, job type (see appendix A), industry type (agriculture, industry, services), sector (private, public), education (recognized third level education, second stage of secondary level education and less than second stage of secondary education), expenditure health insurance (continuous scale) and equivalent household income (household income divided by the square root of household size). The variable equivalent household income will be used as a proxy for social economic status.

Method of analysis

In the first stage of analyses, the model is tested in the light of the research objectives. This means a report on the missing values and a test of the model including all ten confounding variables. Due to the large amount of variables included in the model and possible missing values, there is a risk of losing many observations and subsequently a loss of significance levels of the independent variables. In the analysis the test of this model will be referred to as testing the full model. The test will be performed by means of an ordered logit regression as the outcome variable health is a fixed response variable. The equation that will be tested is $y_i^* = x_i\beta + \varepsilon_i$, where y_i^* represents the latent variable, x_i the independent variable and ε_i the error term. All the ordered logit regressions will control for the autocorrelation of the error term, as the data is longitudinal in nature. Because data is obtained from the same individuals over a period of 8 years, there is a possibility that the error term correlates from one year to another and therefore has to be taken into account. An examination of the full model will result in the specification of the final model used for analyses. Based on this final model, analyses will be performed for four different samples. Sample 1 is the sample including all the observations, sample 2 is the sample of respondents least satisfied with their social life, sample 3 is the sample of respondents intermediately satisfied with their social life and sample 4 is the sample of respondents most satisfied with their social life. In the second stage of analyses, ordered logit regressions will be run for the four different samples and descriptive statistics will be discussed which entails:

1) description of the means of the variables, in order to get a first idea of what to expect in further analyses. The tables are reported in appendix D

2) correlations between the different independent variables by means of Pearson's correlation coefficient in order to control for possible collinearity between the different job characteristics. Correlations found in previous research were between the range of 0.05 and 0.26 (Landsbergis, 1988). The tables are reported in appendix E

3) description of significance levels and joint significance levels (by means of the Wald test for joint significance) for all the variables.

4) an interpretation of the sign of the variables in the ordered logit regressions. This means that the variables will be discussed in terms of having a positive or negative effect on the probability of being in very good health.

In the third stage of analyses, hypotheses 1a till 7a (how job characteristics influence health) and 1c till 7c (if satisfaction with social life moderates the relationship specified in hypotheses 1a till 7a) will be tested. In order to test whether a job characteristic has a positive or negative effect on health and whether this is dependent on the satisfaction level with social life, marginal effects will be determined for the job characteristics. All of the marginal effects will be performed for the probability of being in very good health. This means testing the probability that the latent variable y_i^* equals 1, i.e. $P(y_i = 1| x_i) = P(y_i^* < \tau_1| x_i) = F(\tau_1 - x_i\beta)$. τ_1 is the threshold where, if exceeded, we can no longer believe that the latent variable equals 1. Two kinds of analyses will be performed in order to assess the marginal effect. For the variables that are measured on a continuous scale (wage and hours work), we use the formula: $(\partial P(y_1 i = j|(x_{1i})) / \partial x_{1i}$ to measure the marginal effect for the four different samples. The increase of x_1 (the independent variable) is associated with an increase or decrease in the probability of being in very good health, $y_i^* = 1$, where a positive β is associated with a increased probability of being in very good health and a negative β with a decreased probability of being in very good health.

For the job characteristics that are measured on a fixed response scale it is not possible to measure the marginal effect. In order to test whether a job characteristic has a positive or negative influence on health, the effect will be computed of ∂y of a change from not having the characteristic to having the characteristic, i.e. $P(y_i=j| x_{1i}=2, x_2, etc) – P(y_i=j| x_{1i}=1, x_2, etc)$. By means of an example for the variable satisfaction with working conditions the method can be explained best. The changed probability of being in very good health will be determined for respondents that are fully dissatisfied with their working conditions (response item 1), but would "actually" be dissatisfied with their working conditions (response item 2). The same will be done for the other scales: respondents scored 2 but "actually" scored 3 (i.e. $P(y_i=j| x_{1i}=3, x_2, etc) – P(y_i=j| x_{1i}=2, x_2, etc)$, respondents scored 3 but "actually" scored 4 (i.e. $P(y_i=j| x_{1i}=4, x_2, etc) – P(y_i=j| x_{1i}=3, x_2, etc)$, respondents scored 4 but "actually" scored 5 (i.e. $P(y_i=j| x_{1i}=5, x_2, etc) – P(y_i=j| x_{1i}=4, x_2, etc)$, respondents scored 5 but "actually" scored 6 (i.e. $P(y_i=j| x_{1i}=6, x_2, etc) – P(y_i=j| x_{1i}=5, x_2, etc)$ measuring the effect if respondents would actually be happier with their working conditions.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

In addition the effect will be measured if respondents that are fully dissatisfied with their working conditions (response item 1) would actually be fully satisfied (response item 6), i.e. $P(y_i=j| x_{1i}=6, x_2, etc) - P(y_i=j| x_{1i}=1, x_2, etc)$. For simplicity, the thesis will also refer to this test as testing marginal effects. The marginal effects will be calculated for the probability of being in very good health (scale item one of the variable health, $y_i^*=1$). The marginal effect of the ten independent variables will be determined for all of the four different samples in order to test hypotheses 1a till 7a and 1c till 7c.

In the final stage of analyses, hypotheses 1b till 7b will be tested, which is the test for linearity. Two different measurement techniques will be used, depending on whether the job characteristic is measured on a continuous scale or on a fixed item scale. The variables measured on a continuous scale will be tested by means of the Wald test. This means that the variable squared will be added to the equation and tested whether the effect is significant. The linear or non linear effect of the fixed response variables will be demonstrated by plotting the point estimates of the marginal effects in a graph, except for the variable job level as there is only one point estimate. The lack of standard errors prevents to test whether the linearity or non linearity is statistically significant for this measuring technique. If all the point estimates in the graph are on the same line, for example all point estimates are 4 percent, it means that the effect of the job characteristic is linear. Since the shape of the curve (a four percent increase), if plotted, is the same throughout the entire range of the job characteristic. If the graph would show a linear increase of for example 2 percent going from one point estimate to another, it means the effect is not linear, as the point estimates are not the same in this case throughout the entire range of the job characteristic. After the tests after performed, the results will be compared with the hypotheses and formally accepted or rejected. Chapter 4 ends with a discussion of the results.

Results

In appendix B the missing values are reported. The variable health expense had by far the most missing values, 27398 values were missing. Due to the large amount of missing values, the full model (i.e. the model including the 10 control variables) was run to see what the effect will be for further analyses. The results of the ordered logit regression based on the full model are reported in appendix C. The number of observations used for the full model was 5077, which means a loss of 37928-5077 = 32851 observations (that is 86% of all observations). The fact that the full model is estimated on only 14% of the sample is caused by these missing values. Out of the 31 independent variables (the 31 variables are the dummy variables included in the model and the continuous variables), 22 variables were insignificant at the 5% significance level. The AIC statistic for the full model was 9478.421. In terms of testing the subsamples this means that the subsamples of respondents most satisfied with their social life and the respondents least satisfied with their social life would contain 1269 observations. The significance levels of the independent variables in the subsamples had worse scores in comparison to the full sample. Hence, it was considered that the full model including all the control variables was not an appropriate model in the light of the research objectives. Due to the large loss of observations and the high amount of insignificant independent variables in the full model, several models were run including different sets of control variables in order to get to the final model used for analyses.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The final model on which subsequent analyses will be based included four out of the ten control variables (age, sex, ses and sector) and is specified as follow:

Health = βdjob_level1 + βdjob_level2 +βdjob_difficulty1 +βdsatisfaction_workinghours1 + βdsatisfaction_workinghours2 + βdsatisfaction_workinghours3 + βdsatisfaction_workinghours4 + βdsatisfaction_workinghours5 + βhours_work + βdsatisfaction_workcondition1 + βdsatisfaction_workcondition2 + βdsatisfaction_workcondition3 + βdsatisfaction_workcondition4 + βdsatisfaction_workcondition5 + βdvalue_training1 + βdvalue_training2 + βdvalue_training3 + βwage3 + βdsatisfaction_shifts1 + βdsatisfaction_shifts2 + βdsatisfaction_shifts3 + βdsatisfaction_shifts4 + βdsatisfaction_shifts5 + βdsatisfaction_jobsecurity1 + βdsatisfaction_jobsecurity2 + βdsatisfaction_jobsecurity3 + βdsatisfaction_jobsecurity4 + βdsatisfaction_jobsecurity5 + βdcontract_type1 + βdcontract_type2 + βdcontract_type3 + βage + βdsex1 + βses +βdsector1

The next section will discuss the empirical results of the final model (sample 1) and the three different subsamples: respondents least satisfied with their social life (sample 2), respondents intermediately satisfied with their social life (sample 3) and respondents most satisfied with their social life (sample 4).

Empirical results

Descriptive statistics

The means and correlations are tested for the four different samples. The results of the different means are mentioned in appendix D, and the correlations in appendix E. Sample 1 is the full sample based on the final model for analyses. This is the model which has been derived from the previous section. Samples 2, 3 and 4 are subsamples based on sample 1. Sample 2 is the subsample of respondents least satisfied with their social life. Sample 3 is the subsample of respondents intermediately satisfied with their social life and sample 4 is the subsample of respondents most satisfied with their social life. Sample 1 consists of 29552 observations (77% of all observations), with an AIC statistic of 55493.99. Compared to the original full model with all ten confounding variables (5077 observations) this is an improvement of 63% of observations. Sample 2, 3 and 4 respectively contain 7237, 15930 and 6385 observations. Despite the fact that the AIC statistic lowered in the final model, the model provides a better fit in terms of the research objectives of this thesis, as the significance levels of the independent variables have better scores. The significance levels of the independent variables will be discussed at the end of this section.

The distribution of the mean of the variables is the same in all the 4 different samples for the variables job difficulty, age, sex, sector and contract type. The proportion men to women is 59-41% in all samples. Respondents are on average 39 years old. 72 % of the people in the 4 samples are employed in the private sector. 40% of the people felt that they have the skills to do a more demanding job, in terms of this thesis that means that 60% of the respondents view their job as being demanding. 90% of the respondents in all four samples were in permanent employment, 3% has a fixed term contract, 1% has casual work with no contract and the remaining respondents have some other working arrangement.

For the variables job level, satisfaction with working hours, hours work, satisfaction with working conditions, value of training, wage, satisfaction with shifts, satisfaction job security and social economic status the distribution of the mean of the variables differed from one sample to another. Respondents in sample 1 and 3 on average work 36 hours a week, while respondents least satisfied with their social life (sample 2) work 38 hours a week and people most satisfied with their social life (sample 4) work 35 hours a week. The respondents working most hours in sample 2 are also least satisfied with the amount of working hours (8 % scored fully unsatisfied or unsatisfied as opposed to 2% for the respondents working 35 hours a week). Respondents least satisfied with their social life have more supervisory jobs (14% is in supervisory jobs, as opposed to 11% for the people most satisfied with their social life and 13% for the full sample). Similar results are found for the variables satisfaction working conditions (10 % is fully unsatisfied or unsatisfied with the working conditions in sample 2 as opposed to 5% in sample 4), satisfaction shifts (6 % is fully unsatisfied or unsatisfied with their working shifts in sample 2 as opposed to 2% in sample 4) and satisfaction job security (10 % is fully unsatisfied or unsatisfied with their job security in sample 2 as opposed to 5% in sample 4). Respondents in sample 1 and 3 felt that they were able to put the skills of training into practice (65% answered that the training received contributed a lot to their work). In sample 2 this amount was slightly lower 62% and in sample and in sample 4 slightly higher 67%. The social economic status of respondents in sample 1 is 2848, 24. The social economic status of people least satisfied with their social life is lower 2770,396 and for the people most satisfied with their social life higher 2870, 845.

Correlations between the different job characteristics were low in general and comparable across the different samples. The highest correlation found was 0.5114, which was between people highly unsatisfied with their working hours and people that were highly unsatisfied with their shifts in sample 4. The correlations are comparable to those found in previous research (Landsbergis, 1988).

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Now that the different samples are described and the correlations are tested, we can run the ordered logit regressions for the four different samples. The results of the different ordered logit regressions are mentioned in appendix F. Out of the 31 independent variables in sample 1, 11 variables were insignificant at the 5% significance level, from which 8 were related to the variables satisfaction with shifts (5 dummy categories included in the sample) and contract type (three dummy categories included in the sample). The other three variables that were insignificant are job level2 (respondents with intermediate jobs), satisfaction working hours1 (respondents fully dissatisfied with the amount of working hours) and value training3 (respondents that feel the training did not contributed a lot to their work). These variables remained insignificant in sample 2, 3 and 4, except for the variable contract type2 (respondents with fixed term contracts), which became significant at the 5% significance level for the respondents most satisfied with their social life.

In sample 2, the respondents least satisfied with their social life, the variables job difficulty, satisfaction working hours5 (respondents highly satisfied with their working hours), satisfaction job security2 (respondents highly dissatisfied with their job security) and satisfaction job security5 (respondents highly satisfied with their job security) became insignificant. In sample 3, the respondents intermediately satisfied with their social life, the variables satisfaction working hours2 (respondents highly dissatisfied with their working conditions), satisfaction working conditions5 (respondents highly satisfied with their working conditions) and value training2 (respondents that feel the training contributed a fair amount to their work) became insignificant. Finally, in sample 4, the respondents most satisfied with their social life, the variables satisfaction working hours 2, 3, 4 and 5, satisfaction working conditions 5, wage and satisfaction job security 4 became insignificant.

From the ordered logit regression, the magnitude of the effect cannot be derived, however the sign can be interpreted, which provides a first idea of how the variables impact on health. In sample 1 the probability of being in very good health increases when respondents are male, when respondents are in supervisory positions, people feel their job is demanding, when respondents are working more hours, when the training received contributed a lot or a fair amount, when their wage goes up, when they are in fixed term contracts or casual contracts, when their social economic status goes up and when they work in the private sector. In all the other occasions the probability of being in very good health decreased.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

For the other samples, results will be discussed when the effect is different in comparison to sample 1. For the respondents least satisfied with their social life (sample 2), the probability of being in very good health increased when the value of training did not contributed very much, when they were really dissatisfied with the shifts they are working and when they are satisfied with the shifts they are working. The probability of being in very good health, however, decreased when working in the private sector. For the respondents intermediately satisfied with their social life (sample 3), the probability of being in very good health only changed for having a fixed term contract (it decreases the probability of being in very good health instead of increases in comparison to sample 1). For the respondents most satisfied with their social life, the probability of being in very good health increases when people are in intermediate jobs and when respondents are in fixed term contracts.

Before we can proceed towards testing the marginal effects for the different sample, we need to run one more final test. For the continuous variables and the fixed response variables measured on a 2 point scale the significance levels can be derived from the ordered logit regression. For the fixed response variables measured on more than a 2 point scale, joint significance tests are needed in order to determine whether the variable is jointly significant or not. Hence, before testing the marginal effects of the variables, the fixed response variables measured on a 3 point scale or more are tested for joint significance. The following variables are tested for joint significance: job-level, satisfaction with working hours, satisfaction with working conditions, value training, satisfaction job security, satisfaction-shifts and contract-type. The variable satisfaction with shifts was jointly insignificant in all four samples. The variable contract type was insignificant in three out of the four samples. The variables value training, job level and satisfaction working hours was insignificant in 1 out of the 4 different samples.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

satisfaction with working conditions	prob>chi2	value training	prob>chi2
sample 1	0.0000	sample 1	0.0000
sample 2	0.0000	sample 2	0.0717
sample 3	0.0000	sample 3	0.0003
sample 4	0.0001	sample 4	0.0223
satisfaction job security	prob>chi2	contract type	prob>chi2
sample 1	0.0000	sample 1	0.1427
sample 2	0.0351	sample 2	0.9304
sample 3	0.0000	sample 3	0.4148
sample 4	0.0002	sample 4	0.0331
job level	prob>chi2	satisfaction with shifts	prob>chi2
sample 1	0.0025	sample 1	0.2567
sample 2	0.0257	sample 2	0.4308
sample 3	0.0755	sample 3	0.5210
sample 4	0.1416	sample 4	0.6384
satisfaction with working hours	prob>chi2		
sample 1	0.0000		
sample 2	0.0050		
sample 3	0.0301		
sample 4	0.5962		

Table 3: test for joint significance

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Marginal effects

The hypotheses 1a till 7a (the effect of the 7 job characteristics on health) are tested by means of the marginal effect of the independent variables as the outcome variable health is a fixed response variable. The results are reported under sample 1, which is the full sample. The hypotheses 1c till 7c are tested by means of the marginal effects as well, but for the different subsamples (respondents least satisfied with their social life: sample 2, respondents intermediately satisfied with their social life: sample 3 and respondents most satisfied with their social life: sample 4) in order to measure whether satisfaction with social life positively contributes to the effect of job characteristics. The acceptance or rejection of the hypotheses will be discussed in the section hypotheses testing, based on the results in this section. The marginal effects (the effect of a one unit increase) can be determined for the continuous variables, they can however not be determined for the fixed response variables. For the fixed response variables we can determine the changed probability if a respondent would be in another category than he actually is. In this thesis we refer to this test as marginal effects as well, when we talk about these changed probabilities. The results of the marginal effects are reported in table 4, table 5 and table 6. Table 4 reports the marginal effect for the variable job level. Table 5 reports the marginal effects of the remaining fixed response variables and table 6 reports the marginal effects of the continuous variables.

job_level	Supervisory -> intermediate	intermediate->non supervisory	Supervisory -> non supervisory
Sample 1	-3,19	0,15	-3,05
Sample 2	-4,11	0,64	-3,47
Sample 3	-2,64	0,21	-2,43
Sample 4	-3,36	0,73	-4,09

Table 4: marginal effects job level

Table 4 is to be read as follow: the reported value under 1->2 in sample 1 (the full sample) for the variable job level (-3,19), means that if a respondent that has a supervisory job would be in an intermediate job he has a decreased probability of 3,19% of being in very good health. The same line of reasoning applies for the value 0,15 reported under 2->3 in sample 1. If a respondent that has an intermediate job, would have a non-supervisory job he would have an increased probability of being in very good health of 0,15%.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

If a respondent that has a supervisory job would actually have a non-supervisory job he has a decreased probability of 3,05% to be in very good health. Sample 2 estimates the same probabilities as sample 1, but sample 2 estimates the marginal effects for the subsample of respondents least satisfied with their social life. Sample 3 estimates the probabilities for the people intermediately satisfied with their social life and sample 4 estimates the probabilities for the respondents most satisfied with their social life. In all the different samples if respondents that have supervisory jobs would have intermediate jobs or non-supervisory jobs, respondents have a decreased probability of being in very good health. The probability of being in very good health increases if respondents that have intermediate jobs would actually have non-supervisory jobs, except for the respondents most satisfied with their social life, who experience a decreased probability of being in very good health. The effect is strongest for respondents most satisfied with their social life and lowest for the respondents intermediately satisfied with their social life.

Job difficulty	Qualifications to do more demanding job -> no qualifications to do more demanding job			
Sample 1	-2,27			
Sample 2	-1,11			
Sample 3	-2,37			
Sample 4	-3,26			
Value training	a lot -> fair amount	fair amount-> not very much	not very much-> not at all	a lot-> not at all
Sample 1	-1,67	-2,07	0,29	-3,45
Sample 2	-0,45	-1,44	-1,08	-2,96
Sample 3	-2,38	-1,48	0,50	-3,36
Sample 4	-1,64	-4,19	1,93	-3,90
Contract type	permanent employment -> fixed term	fixed term-> casual work	casual work-> other type	permanent employment-> other type
Sample 1	1,72	3,83	-4,61	0,93
Sample 2	0,95	1,32	-1,73	0,54
Sample 3	0,44	3,65	-2,34	1,75
Sample 4	7,04	6,41	13,50	-0,05

satisfaction jobsecurity	fully unsatisfied - >unsatisfied	unsatisfied -> slightly satisfied	slightly satisfied -> satisfied	satisfied -> highly satisfied	highly satisfied - > fully satisfied	not satisfied ->fully satisfied
Sample 1	2,78	0,59	0,55	1,41	2,84	8,18
Sample 2	3,69	-0,99	1,27	0,51	2,05	6,52
Sample 3	1,47	1,51	-1,20	2,21	2,78	6,77
Sample 4	3,87	0,56	4,81	-0,37	3,24	12,11
satisfaction working hours	fully unsatisfied - >unsatisfied	unsatisfied -> slightly satisfied	slightly satisfied -> satisfied	satisfied -> highly satisfied	highly satisfied - > fully satisfied	not satisfied ->fully satisfied
sample 1	-0,70	0,93	1,26	1,49	1,91	4,88
sample 2	-3,02	2,09	0,82	2,69	0,59	3,17
sample 3	1,52	-0,71	1,02	0,42	2,60	4,84
sample 4	3,42	2,82	0,80	1,01	0,79	8,82
satisfaction working shifts	fully unsatisfied - >unsatisfied	unsatisfied -> slightly satisfied	slightly satisfied -> satisfied	satisfied -> highly satisfied	highly satisfied - > fully satisfied	not satisfied ->fully satisfied
Sample 1	0,97	1,15	0,75	0,02	1,07	3,98
Sample 2	-2,88	0,44	2,40	-1,32	0,52	-0,84
Sample 3	3,75	0,84	-0,86	0,82	0,85	5,40
Sample 4	5,35	1,99	1,37	-0,29	1,50	9,92
satisfaction working conditions	fully unsatisfied - >unsatisfied	unsatisfied -> slightly satisfied	slightly satisfied -> satisfied	satisfied -> highly satisfied	highly satisfied - > fully satisfied	not satisfied ->fully satisfied
Sample 1	2,10	2,39	2,02	3,02	2,58	12,12
Sample 2	2,10	0,95	2,75	1,09	4,19	11,09
Sample 3	2,18	2,98	1,40	3,75	1,86	12,16
Sample 4	2,20	2,85	1,88	3,24	2,29	12,46

Table 5: marginal effects fixed response variables

For the variable job difficulty all respondents experience a decreased probability of being in very good health if people that do not have demanding jobs would actually have demanding jobs, this is not dependent on whether people are more or less satisfied with their social life. The percentage increased probability however does change, depending on the satisfaction level with social life. People most satisfied with their social life experience the highest decreased probability of being in very good health, while respondents least satisfied with their social life the lowest decrease.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

As can be observed from table 5, many times the direction of the probabilities are in the same direction in all the different samples, the magnitude of the effect is however different among the samples. If respondents that feel that their training has positively contributed to their work would actually feel that the training had less contribution to their work, they have decreased probabilities of being in very good health in general. In the situation where respondents feel that the training did not contributed very much to their work, would actually feel that the training did not contributed at all; respondents would have an increased probability of being in very good health. Except for the people least satisfied with their social life, they would experience a decreased probability of being in very good health. The effect is again strongest for the people most satisfied with their social life.

People in a permanent employment would experience an increased probability of being in very good health if they would be in fixed term contracts and respondents with fixed term contracts would experience a increasing probability of being in very good health if they would have causal contracts. This sign of the effect is not contingent on the satisfaction level with social life of the respondents. The magnitude of the effect is strongest among the people that are most satisfied with their social life and smallest for the respondents least satisfied with their social life. People that are in casual contracts experience a decreased probability of being in very good health if they would be in another type of contract, the effect is again strongest for the people most satisfied with their social life.

Respondents that are dissatisfied with their job security would experience an increased probability of being in very good health if they would actually be more satisfied with the amount of job security they experience. This effect is strongest for the people most satisfied with their social life. The sample of respondents that are most satisfied with their social life and who are fully dissatisfied with the amount of job security would even experience a increased probability of 12% of being in very good health if they would be fully satisfied with the amount of job security offered. Only in two occasions could respondents experience a decreased probability of being in very good health, depending on the satisfaction level with social life.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

For the satisfaction with the amount of working hours, satisfaction with shifts and satisfaction with work conditions, a similar pattern can be observed. If respondents would be happier with their working hours, shifts or working conditions, they would have an increased probability of being in very good health. Depending on the satisfaction level with social life of the respondent the effect can be stronger (the effect is strongest for people most satisfied with their social life). The respondents least satisfied with their social life, however, would experience a decreased probability of being in very good health when they are fully dissatisfied with the amount of working hours or shifts and actually would be dissatisfied with the amount of working hours.

hours work	effect	p value
sample 1	0,1500	0,000
sample 2	0,1391	0,000
sample 3	0,1800	0,000
sample 4	0,2000	0,000
wage		
sample 1	0,000392	0,000
sample 2	0,000305	0,000
sample 3	0,000450	0,000
sample 4	0,000410	0,000

Table 6: marginal effects continuous variables

For the variable hours work, an increasing probability of being in very good health is observed as respondents work more hours and this is not dependent on whether people are more or less satisfied with their social life. The effect is, however, stronger for respondents most satisfied with their social life. People, most satisfied with their social life, have an increased probability of 0,2% of being in very good health when they work an additional hour as opposed to 0,14% for the respondents least satisfied with their social life. The effect is smallest for the respondents least satisfied with their social life.

Respondents experience increasing probabilities of being in very good as they their wage goes up. The effect is strongest for the respondents intermediately satisfied with their social life, these people have an increased probability of being in very good health of 0,000450% when they earn an additional euro. Again the effect is smallest for the respondents least satisfied with their social life.

Test for linearity

The main difference between the JDCS model and the vitamin model is the linear behavior of the job characteristics. The JDCS model assumes linear effects of the job characteristics, while the vitamin model does not. This section tests hypotheses 1b till 7b, whether the effect of the job characteristics is linear or curvilinear. The acceptance or rejection of the hypotheses will be discussed in the next section, based on the results in this section. The linearity of the fixed response variables is demonstrated by means of a graph and the linearity of the continuous variables will be tested by means of the Wald test. A job characteristic with fixed response items is supposed to have a linear effect on health when all the point estimates of the marginal effects (tested in the previous section) are on the same line, which means that the effect is constant throughout the entire scale, for example all point estimates are 4 percent. The graphs for the variables job-level and satisfaction with working hours are reported in this section, while the remaining graphs for the other fixed response variables can be found in appendix G.
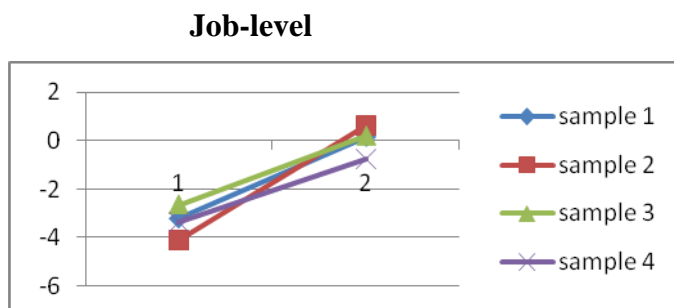
Job-level

Figure 5: test for linearity job level

For the variable job level, three marginal effects were estimated, from which two are relevant for testing the effect of linearity. The first marginal effect (under point 1 on the x-axis) is the changed probability of being in very good health of an individual that has a supervisory job and would actually have an intermediate job. The second marginal effect (under point 2 on the x-axis) is the changed probability of being in very good health of an individual that has an intermediate job and would actually have a non supervisory job. The third marginal effect, the changed probability of being in very good health of respondents that have supervisory jobs and would actually have non-supervisory jobs, is not taken as a point estimate in this graph.

The "step" from supervisory job to an intermediate job is not the same as the "step" from a supervisory job to a non-supervisory job.

The point estimates of the marginal effects are not on a straight line. So the changed probability of being in very good health for respondents that are in supervisory jobs and would actually be in intermediate jobs is not the same as the changed probability for respondents that are in intermediate jobs and would have actually been in non-supervisory jobs. Therefore the effect of job level is not linear and this does not depend on the satisfaction level with social life of the respondents. The shape of the curve, however, does depend on whether respondents are more or less satisfied with their social life, as the line of the four different samples differs from one sample to another.
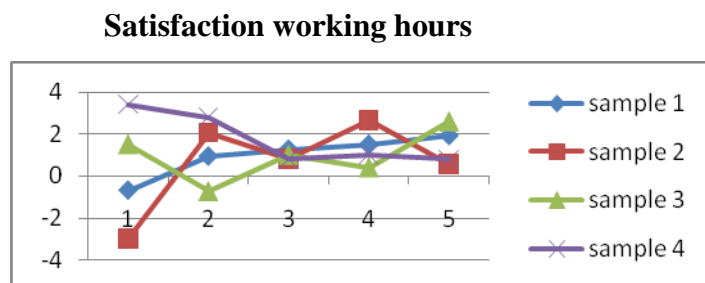
Figure 6: test for linearity satisfaction working hours

The effect of satisfaction with working hours is not linear either. Respondents least satisfied with their social life experience a decreased probability of being in very good health if they are fully dissatisfied with their working hours and would actually be dissatisfied with their working hours. After this point as these respondents would have actually been more satisfied with their working hours than they are, they have increasing probabilities of being in very good health. However the effect is not constant throughout the entire scale. For the other samples (the full sample, the sample of respondents intermediately satisfied with social life and most satisfied with social life), the effect of being happier with working hours does not have a constant effect on the probability of being in very good health. The effect for the respondents most satisfied with their social life, for example, is stronger at beginning than at the end. This means that if these respondents who are fully dissatisfied with the amount of working hours would become a little happier with the amount of working hours, they would experience a strong increasing probability of being in very good health. As these respondents would become more satisfied with the amount of working hours they would still have an

52

increased probability of being in very good health, the probability however will be lower. Therefore the effect of satisfaction with working conditions is not linear.

For the remaining fixed response variables no signs of linearity were found (value training, contract type, satisfaction job security, satisfaction shifts and satisfaction working conditions). Whether respondents are more or less satisfied with their social life does not make the job characteristic linear. The shape of the curve, however, does depend on the satisfaction level with social life.

To test the linearity of the continuous variables, the variable squared was added to the equation and tested whether the effect is significant. If the effect is significant it means that the variable is not linear. Table 7 provides the results for the test of linearity for the variables wage and working hours for the different subsamples.

hours work	chi2(2)	prob>chi2
sample 1	20,92	0,0000
sample 2	9,51	0,0086
sample 3	19,25	0,0001
sample 4	9,09	0,0106
wage	chi2(2)	prob>chi2
sample 1	26,25	0,0000
sample 2	8,81	0,0030
sample 3	9,61	0,0019
sample 4	15,74	0,0001

Table 7: test for linearity continuous variables

In none of the samples were the variables hours work and wage linear.

Hypotheses testing

This section formally tests the hypotheses formulated in chapter 2, based on the outcomes in the previous two sections. The first set of hypotheses, 1a till 7a, covered the effects of the job characteristics on health and the results were reported under sample 1 in tables 4 till 7.

It was hypothesized that increasing amounts of job autonomy has a positive influence on health. Job autonomy, measured by the variable job level, had a positive effect on health at first. If respondents with supervisory jobs, would actually have intermediate jobs (a decrease in job autonomy), they have a decreased probability of being in very good health. The effect of job autonomy later on became negative. That is, if respondents with intermediate jobs, would actually have non supervisory jobs (a decrease in job autonomy), they have an increased probability of being in very good health. The effect of job autonomy is however not solely positive, therefore hypothesis 1a is partially rejected. The next section will go into more depth on this result.

The job characteristic job demands was measured by means of three different variables: job difficulty, satisfaction with working hours and hours work. It was hypothesized that increasing amounts of job demands had a negative effect on health. Respondents had a decreased probability of being in very good health, when they did not feel they could do a more demanding job (i.e. job demands are high), when they work more hours (i.e. job demands are high) and when they were more satisfied with their job demands (i.e. job demands are high). Therefore, hypothesis 2a is accepted. The fact that hours work was not in the hypothesized direction will be discussed in the next section and does not change the acceptance of the hypothesis.

Social support, measured by the variable satisfaction working conditions, had a positive effect on health. As respondents would become more satisfied with their working conditions than they actually are they had an increased probability of being in very good health. We accept hypothesis 3a, that increasing amounts of social support has a positive influence on health.

The job characteristic skill utilization, measured by the variable value training, had a positive effect on health. As respondents felt that their training contributed less to their work, they had decreased probabilities of being in very good health. Therefore hypothesis 4a is accepted.

Salary, measured by the variable wage, was in the hypothesized direction. As the wage of the respondents increases, they have increasing probabilities of being in very good health. Hypothesis 5a is therefore accepted.

The job characteristic physical demands, measured by the variable satisfaction shifts, had a positive effect on health. As respondents would become more satisfied with their shifts, they experience increasing probabilities of being in very good health. Hypothesis 6a is therefore accepted, that increasing amounts of physical demands have detrimental effects on health.

Job insecurity was measured by means of two variables: contract type and satisfaction working conditions. It was hypothesized that increasing amounts of job insecurity have detrimental effects on health. The results found were mixed. The variable contract type showed an increasing probability of being in very good health as the job security increases. Except for the response category other contract type. It cannot, however, be ruled out that the other contract type provides more job security than casual work with no contract and that the assumption made before has been incorrect. The variable satisfaction job security was in the hypothesized direction. As respondents would become more satisfied with the amount of job security offered they would have increasing probabilities of being in very good health. Hypothesis 7a is therefore accepted. In the next section the variable contract type will be discussed and it will be shown why the hypothesis is accepted.

The second set of hypotheses, 1b till 7b, was related to the linear or curvilinear effect of the job characteristic on health. It was hypothesized that all of the 7 job characteristics have a linear effect on health. Out of the ten variables tested, the variable satisfaction with working conditions (social support) was the only variable that showed signs of linearity. Therefore hypotheses 3b is accepted, the remaining hypotheses 1b, 2b and 4b till 7b are rejected. The job characteristics that were not linearly related to health, however, did not follow the pattern described by the vitamin model either (see figures 5, 6 and appendix G). The biggest effects of the job characteristics were not always observed at the beginning of the scale, as predicted by the vitamin model.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The final set of hypotheses was related to the moderating effect of satisfaction with social life between the relationship of job characteristics and health. It was hypothesized that employees who are more satisfied with their social life experience bigger health benefits from having more job autonomy, social support, skill utilization and salary, than individuals that are not satisfied with their social life. And it was hypothesized that employees who are more satisfied with their social life experience less adverse health effects from having more job demands, more physical demands and more job insecurity, than individuals that are not satisfied with their social life. Hypotheses 1c, 3c and 4c are accepted, increasing amounts of job autonomy, social support and skill utilization have the most beneficial effects on people that are more satisfied with their social life. Hypothesis 5c is rejected, increasing amounts of salary have the most beneficial effects on people intermediately satisfied with their social life. Hypotheses 2c, 6c and 7c were rejected. Increasing amounts of job demands, physical demands and job insecurity had the most detrimental effects on respondents most satisfied with their social life, as can be observed from the fact that these respondents had the highest probability of being in very good health as the amount of job demands, physical demands and job insecurity decreases. It seems that the effect of the job characteristic is strongest for the respondents most satisfied with their social life and weakest for the respondents least satisfied with their social life. This means that if a job characteristic has a negative influence on health, the effect was most negative for the respondents most satisfied with their social life and vice versa.

Discussion of the results

This section will discuss the analyses performed in this thesis and identify several methodological issues related to the analyses performed. The second part of this section will discuss several unexplored theoretical issues, which have been found to be important in studying the relationship between job characteristics and health.

Before testing the effect of the job characteristics on health, correlations between the different job characteristics were tested. The results showed that none of the different job characteristics showed high correlations with one another. The results of the regression analyses provided results that in general were highly significant. However, not all the job characteristics were significant in all samples. In sample 1 only two out of the ten variables were not significant: satisfaction with shifts and contract type. In sample two, the subsample of individuals least satisfied with their social life, three out the ten job characteristics were insignificantly related to health: job difficulty, satisfaction with shifts and contract type. Sample 3, the subsample of people intermediately satisfied with their social life, found the same variables to be insignificant as sample 1. Sample 4, the subsample of people most satisfied with their social life, obtained most insignificant effects of the different job characteristics on health. Four out of the ten job characteristics were insignificantly related to health: wage, job-level, satisfaction working hours and satisfaction with shifts.

In the next stage the effects of the job characteristics on health were tested. For the fixed response variables, this meant testing the increased or decreased probability of being in very good health as a person that is in one response category would have actually been in another.

For the continuous variables this meant testing the marginal effect on health. The results obtained for the different variables were mainly in the hypothesized direction for the first set of hypotheses, 1a till 7a. Only hypothesis 1 a was partially rejected. Decreasing amounts of job autonomy, at first, led to decreasing probabilities of being in very good health. Later on, decreasing amounts of job autonomy led to increasing probabilities of being in very good health. This result could be the consequence of the way the variable was measured. It can very well be that respondents in intermediate jobs have less autonomy in comparison to the decisions they have to make than people in non supervisory jobs. The remaining hypotheses 2a till 7a were all accepted, even though not all variables in hypotheses 2a and 7a obtained results that were not in line with the hypothesized relationship.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Hypothesis 2a measured the effect of job demands on health. The variables job difficulty and satisfaction working hours were in the hypothesized relationship, while hours work was not. Increasing amounts of working hours led to increased probabilities of being in very good health, as opposed to what was hypothesized. It could be that not the actual amount of working hours is a source of strain, but the satisfaction level with the amount of working hours is a source of strain. Some people might enjoy working long hours, while others do not and this is not measured by a construct like hours work as opposed to satisfaction working hours which captures this dimension. In hypothesis 7a, the variable contract type was not in the hypothesized direction, while the variable satisfaction job security was. The variable contract type was insignificant in 3 out of the 4 samples, besides it could be that the variable contract type does not measure the real job security provided to the employee. Again it is the perceived job security that causes strain and subsequent bad health effects, something captured by the variable satisfaction job security. More research is needed to distinguish between the effect of "objective" job characteristics measures and the effect on health and "subjective" measures and the effect on health.

The second set of hypotheses measured the linear or non linear behavior of job characteristics on health. All hypotheses were rejected, accept for hypothesis 3b, the effect of social support which has a linear effect on health. The remaining variables did not follow the pattern described by the vitamin model either. It could be the case that underlying causal mechanisms have caused these results. Factors like time span (the time it takes before adverse health effects caused by job characteristics become visible) and individual differences (differences in health behaviors and physical changes caused by strain) could affect the relationship and when controlling for such factors the relationship could be become linear as described by the JDCS model or non linear as described by the vitamin model. More research is needed in order to conclude whether the effect of job characteristics on health is linear or curvilinear.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The final set of hypotheses described the effect of satisfaction with social life on relationship between job characteristics and health, which is the central research question of this thesis. It was found that satisfaction with social had an influence on the relationship between job characteristics and health, but not as was hypothesized in hypotheses 1c till 7c. It was hypothesized that employees most satisfied with their social life will have bigger health benefits from having more job autonomy, social support, skill utilization and wage, and experience less adverse health effects from having more job demands, physical demands and job insecurity. It was found that employees most satisfied with their social life react stronger on all job characteristic dimension, than employees least satisfied with their social life, except for the job characteristic wage. At this stage, we can only speculate as to why employees most satisfied with their social life show stronger responses on changes in the working environment. It could be the case that these employees experience bigger changes in their lives, when job characteristics change in favorable or unfavorable ways as opposed to employees least satisfied with their social lives. Another explanation could be that employees least satisfied with their social lives in general are more apathetic and for this reason show less reaction to changes in their working environment. More research is needed in order to explain, why respondents most satisfied with their social lives react stronger to changes in the working environment.

There are several theoretical issues, which have not been discussed up to this point, but are important when studying the relationship between job characteristics and health. The first issue is the strain hypothesis put forward by the JDCS model. The JDCS model predicts that it is especially the combination of high job demands, low control and low support that leads to bad health outcomes. Therefore it was tested what the changed probability is if individuals that have high job demands, low control and low support would have actually had low job demands, high control and high social support for all different samples. Respondents in the sample 1 in this case would have a increased probability of 18% to be in very good health, 16% for sample 2, 17 % for sample 3 and 20 % for sample 4. These scores are considerably higher than the scores found in this research. Future should therefore continue to focus on the strain hypothesis, when examining the relationship between job characteristics and health.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

A second issue of studying the effect of job characteristics on health is the time span it takes before the adverse health effects become visible. Scientific literature seems to support cross lagged effects of job characteristics on health. Theorell et al. focused on changes in the psychosocial work environment by comparing the levels of job characteristics ten years before and one year before the first myocardial infarction in a case referent study. A decrease in job control during the 10 years preceding the infarction was associated with increased risk. Corresponding results were not obtained in relation to job demands (Vahtera et al., 2000). LaCroix (1984) in his research, however, did found effects for job demands. De Jonge et al. (2001) found that time one job characteristics (job demands, control and social support) influence time two psychological well-being. It could be possible that the respondents in this study have experienced different time spans in which they are exposed to the positive or negative effect of the job characteristics. This could explain why the relationship between job characteristics and health did not follow the pattern described by either the JDCS model or the vitamin model.

The final issue is whether there are individual differences for the relationship between job characteristics and health. Several researchers have demonstrated differences among individuals with regard to health behaviors resulting from increased stress experienced by negative job characteristics. Men are more likely to increase their smoking patterns, even though this result is not found by al studies, while women seem to `relief` stress by increased fat intake (Hellerstedt and Jeffery, 1997). In addition to differences in sex, personality traits have been found to be related to increased risks of burnout. The study of Boyle et al. among critical care nurses showed that personality hardiness and ways of coping were related to burnout. Hardy persons have a higher sense of commitment to work and self and feel a greater sense of control over their lives, viewing stressors as potential opportunities for change (Jansen et al., 1996). Future research could try to find out to what extend these individual differences affect the relationships found in this research.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

To summarize, this research has shown that the satisfaction level with social life moderates the relationship between job characteristics and health. This section has, however also shown that there are many factors which should be taken into account when studying the complex relationship between job characteristics and health. It seems that the results of this thesis will make the debate of the effect of job characteristics on health more complex than it already was.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Conclusion & limitations

The aim of this research was to test the moderating effect of satisfaction with social life on the relationship between job characteristics and health. In recent years there has been a change in the relationship between organizations and their employees. Traditional job redesign programs have yet not been able to counteract the effect of increased stress levels employees' experience. Besides, research has not universally demonstrated that such policies are indeed successful. Due to the increased demands of working life and stress, employees are experiencing difficulty in balancing their social life with their working life. Even though new initiatives are developed by companies (partially inspired by legislation), to get to more family friendly policies, balancing social life and working life in general is still seen as the major responsibility of the employee and not of the organization. If research would indicate that employees that are more satisfied with their social life are healthier, than organizations can no longer ignore employee needs to balance their working and social life.

Review of the theory on the relationship between job characteristics and health identified two models capable of explaining such relationships, the job demand control & support model and the vitamin model. Both models have their origin in the Hackman and Oldham model. The models postulate that certain job characteristics can have detrimental effects on health, where the JDCS model assumes this relationship is linear and the vitamin model assumes a curvilinear relationship. Both models also differ on the amount of job characteristics included in the model and the mechanism by which strain is caused. The models were combined for the identification of the job characteristics and out of the eleven job characteristics, seven were tested in chapter four. Increasing amounts of job autonomy, social support, skill utilization and salary were hypothesized to have positive effects on health. While increasing amounts of job demands, physical demands and job insecurity were hypothesized to have a detrimental effect on health. The amount of satisfaction with social life was hypothesized to influence the relationship between job characteristics and health.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

The results of the analyses supported the hypothesized relationships of job characteristics on health, they are however not linear. More important for this research is that the satisfaction level with social life moderates this relationship. Therefore the answer to the central research question of this thesis: can satisfaction with social life moderate the relationship between job characteristics and health in the Netherlands?, is yes. Employees most satisfied with their social life react stronger to changes in the job characteristics than respondents least satisfied with their social life. This would mean that companies implementing programs that are beneficial for employee health, should make room for the need of employees to balance their social life with their working life in order to obtain the best results of such programs.

There are several limitations in this research, which should be taken into account in drawing solid conclusions from this thesis. One of the major limitations of this research was that proxies were used to measure job characteristics. Future research should therefore use the questions formulated by the JCQ, which is especially designed to measure job characteristics and has proven to be both valid and reliable. Moreover, research should try to identify the difference between the effect of objective measures of job characteristics on health and subjective measures.

A second limitation was that the underlying construct by which job characteristics cause adverse health effects was not tested. Previous research has demonstrated that the resulting strain from negative scores on the job characteristics causes behavioral changes and physiological changes. More research is needed on this topic, in order to identify possible confounding variables, when the effect of the relationship between job characteristics and health with a moderating variable is tested. The same line of reasoning applies for personality traits. It can be speculated that employees with a high need for autonomy, for example, are likely to be less affected by high levels of job autonomy than those lacking this need. Controlling for these confounding variables could affect the shape of the curve of the effect of job characteristics on health, which in this research did not follow the pattern described by the JDCS model or the vitamin model.

A third limitation is that the research did not test cross lagged effects or individual fixed effects. Research has demonstrated that cross-lagged effects exist with regard to the effect of job characteristics and health. In terms of behavioral changes and physiological changes it seems possible that it takes some time before adverse health effects become visible. Future research should try to use longitudinal design when testing the relationship between job characteristics and health and test for cross-lagged effects and individual fixed effects.

The final recommendation for future that comes forward from this research is that research should try to use the same outcome measures for health to make the results of the different studies comparable. Previous research has shown that different outcome measures are related to different aspects of job characteristics.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Reference

1) Buetell, N. *Life satisfaction, a Sloan Work and Family Encyclopedia entry.* 2006.

2) de Croon, E.M. van der Beek, A.J., Blonk, R.W.B. and Monique H.W.Frings-Dresen. Job Stress and Psychosomatic Health Complaints Among Dutch Truck Drivers: A Re-evaluation of Karasek's Interactive Job Demand-Control Model. 2000. Stress Medicine. Vol 16, 101-107

3) Emberland, J.S. and T. Rundmo. Implications of Job Insecurity Perceptions and Job Insecurity Responses for Psychological Well-being, Turnover Intentions and Reported Risk Behavior. 2010. Safety Science. Vol 48, 452-459

4) Faragher, E.B., Cass, M. and C.L. Cooper. The Relationship Between Job Satisfaction and Health. A Meta-Analysis. 2005. occupational Environmental Medicine. Vol 62, 105-112

5) Felce, D. and Jonathan Perry. Quality of Life: Its Definition and Measurement. 1995. Research in Development Disabilities. Vol 16, No 1, 51-74.

6) Fletcher B.C., and Fiona Jones. A Refutation of Karasek's Demand-Discretion Model of Occupational Stress With a Range of Dependent Measures. 1993. Journal of Organizational Behavior. Vol 14, 319-330

7) Fried, Y. and Gerald R. Ferris. The Validity of the Job Characteristics Model: A Review and Meta-Analysis. 1987. Personnel Psychology. Vol 40, 287-322

8) Hackman, J.R. and Oldham, G.R. Motivation Through the Design of Work: Test of a Theory. 1976. Organizational Behavior and Human Performance. Vol 16, 250-279

9) Hellerstedt, W.L. and Robert W. Jeffery. The Association of Job Strain and Health Behaviors in Men and Women. 1997. International Journal of Epidemiology. Vol 26, No 3, 575-583

10) Höckertin, C. and Annika Härenstam. The Impact of Ownership on Psychosocial Working Conditions: A Multilevel Analysis of 60 Workplaces. 2006. Economic and Industrial Democracy. Vol 27, 245-284.

11) Hogan, E.A. and Daniel A. Martell. A Confirmatory Structural Equations Analysis of the Job Characteristics Model. 1987. Organizational Behavior and Human Decision Processes. Vol 39, 242-263

12) Hugh, H.J. and Robert J. House. Methodological and Substantive Extensions to the Job Characteristics Model of Motivation. 1980. Organizational Behavior and Human Performance. Vol 25, 161-183

13) Inoue, A., Kawakami, N., Haratani, T., Kobayashi, F., Ishizaki, M., Hayashi, T., Fujita, O., Aizawa, Y., Miyazaki, S., Hisanori, H., Masumoto, T., Hashimoto, S. and Shunichi Araki. Job Stressors and Long-term Sick Leave Due to Depressive Disorders Among Japanese Male Employees: Findings From the Japan Work Stress and Health Cohort Study. 2010. Journal of epidemiological Community Health. Vol 64, 229-235.

14) Jansen, P.G.M., Kerkstra, A., Abu-Saad, H.H. and Jouke van der Zee. The Effects of Job Characteristics and Individual Characteristics on Job Satisfaction and Burnout in Community Nursing. 1996. International Journal Nurse Study. Vol 33, No 4, 407- 421

15) Jeurissen, T. and Ivan Nyklíček. Testing the Vitamin Model of Job Stress in Dutch Health Care Workers. 2001. Work & Stress. Vol 15, No 3, 254-264.

16) johnson, J.V. and Ellen M. Hall. Job Strain, Work Place Social Support, and Cardiovascular Disease: A Cross- Sectional Study of a Random Sample of the Swedish Working Population. 1988. American Journal of Public Health. Vol 78, No 10, 1336-1342

17) de Jonge, J., Dormann, C., Janssen, P.P.M., Dollard, M.F., Landeweerd, J.A. and Frans J. N. Nijhuis. Testing Reciprocal Relationships Between Job Characteristics and Psychological Well-being: A Cross-lagged Structural Equation Model. 2001. Journal of Occupational and Organizational Psychology. Vol 74, 29-46

18) de Jonge, J. and Wilmar B. Schaufeli. Job Characteristics and Employee Well-being: A Test of Warr's Vitamin Model in Health Care Workers Using Structural Equation Modelling.1998. Journal of Organizational Behavior. Vol 19, 387-407.

19) Karasek, R., Brisson, C., kawakami, N., Houtman, I., Bongers, P and Benjamin Amick. The Job Content Questionnaire (JCQ): An Instrument for Internationally Comparative Assessment of Psychosocial Job Characteristics. 1998. Journal of Occupational Health Psychology. Vol 3, No 4, 322-355

20) Karasek, R.A., Theorell, T., Schwartz, J.E., Schnall, P.L., Pieper, C.F. and John L Michela. Job Characteristics in Relation to the Prevalence of Myocardial Infarction in the US Health Examination Survey (HES) and the Health and Nutrition Examination Survey (HANES).1988. American Journal of Public Health. Vol 78, No8, 910-918

21) Kelloway, K.E. and Julian Barling. Job Characteristics, Role Stress and Mental Health. 1991. Journal of Occupational Psychology. Vol 64, 291-304

22) Kristensen, Tage S. The Demand-Control-Support Model: Methodological Challenges for Future Research. 1995. Stress Medicine. Vol 11, 17-26.

23) LaCroix A: Occupational Exposure to High Demand/Low Control Work and CHD in the Framingham Cohort. 1984.

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

24) Landsbergis, Paul A. Occupational Stress Among Health Care Workers: A Test of the Job Demands-Control Model. 1988. Journal of Organizational Behavior. Vol 9, 217-239.

25) de Lange, A.H. Taris, T.W., Kompier, M.A.J., Houtman, I.L.D. and Paulien M. Bongers. "The Very Best of the Millennium" : Longitudinal Research and the Demand-Control-(Support) Model. 2003. Journal of Occupational Health Psychology. Vol 8, No4, 282-305

26) László, K.D., Pikhart, H., Kopp, M.S., bobak, M., Pajak, A., Malyutina, S., Salavecz, G. and Michael Marmot. Job Insecurity and Health: A Study of 16 European Countries. 2010. Social Science & Medicine. Vol 70, 867-874.

27) Lennon, M.C. and Sarah Rosenfield. Women and Mental Health: The Interaction of Job and Family Conditions. 1992. Journal of Health and Social Behavior. Vol 33, No 4, 316-327

28) Neugarten, B.L., Havighurst, R.J. and Sheldon S. Tobin. The measurement of Life Satisfaction. 1996.

29) Pelfrene, E., Vlerick, P., Kittel, F., Mak, R.P., Kornitzer, M. and Guy de Backer. Psychosocial Work Environment and Well-being: Assessment of the Buffering Effects in the Job Demand-Control(-Support) Model in BELSTRESS. 2002. Stress and Health. Vol 18, 43-56

30) Pounder, D.G. Teacher Teams: Exploring Job Characteristics and Work-Related Outcomes of Work Group Enhancement. 1999. Educational Administration Quaterly. Vol 35, No 3, 317-348

31) Pousette, A. and Jan J. Hanse. Job Characteristics as Predictors of Ill-Health and Sickness Absenteeism in Different Occupational Types: A Multigroup Structural Equation Modelling Approach. 2002. Vol 16, No 3, 229-250

32) Ramirez, A.J., Graham, J., Richards, M.A., Cull, A. and W.M. Gregory. Mental Health of Hospital Consultants: the Effects of Stress and Satisfaction at Work.1996. Lancet. Vol 347, 724-728.

33) Sanne, B., Mykletun, A., Dahl, A.A., Moen, B.E., and Grethe S. Tell. Testing the Job Demand-Control-Support Model With Anxiety and Depression as Outcomes: The Hordaland Health Study. 2005. Occupational Medicine. Vol 55, 463-473.

34) Shannon, H.S., Robson, L.S. and Joanna E.M. Sale. Creating Safer and Healthier Workplaces: Role of Organizational Factors and Job Characteristics. 2001. American Journal of Industrial Medicine. Vol 40, 319-334.

35) Sims, H.P., Szilagyi, A.D. abd Robert T. Keller. The measurement of Job Characteristics. 1976. The Academy of Management Journal. Vol 19, No 2, 195-212.

36) Sonnentag, Sabine and Micheal Frese. Stress in Organizations.

37) Spector, P.E., Dwyer, D.J. and Steve M. Jex. Relation of Job Stressors to Affective, Health, and Performance Outcomes: A Comparison of Multiple Data Sources. 1988. Vol 73, No1, 11-19

38) Spector, P.E. and Steve M. Jex. Relations of Job Characteristics From Multiple Data Sources With Employee Affect, Absence, Turnover Intentions, and Health. 1991. Journal of Applied Psychology. Vol 76, No 1, 46-53

39) Vahtera, J., Kivimäki, M., Pentti, J. and Töres Theorell. Effect of Change in the Psychosocial Work Environment on Sickness Absence: A Seven Year Follow up of Initially Healthy Employees. 2000. Journal of epidemiological Community Health. Vol 54, 484-493.

40) Warren, J.R., Carayon, P., Hoonakker, P. and Naomi Swanson. Job Characteristics as Mediators in SES-Health Relationships. 2002

41) http://www.coursework4you.co.uk/essays-and-dissertations/sample44.php

42) http://www.businessdictionary.com/ definition/job-factors.html

43) http://circa.europa.eu/irc/dsis/echpanel/info/data/information.html

Appendix A: variable job type

1 legislators, senior officials + corporate managers
2 managers of small enterprises
3 physical, mathematical and engineering science professionals + life science and health professionals
4 teaching professionals
5 other professionals
6 physical and engineering science professionals + life science and health associate professionals
7 teaching associate professionals+ other associate professionals
8 office clerks +customer service clerks
9 personal and protective service workers
10 models, salespersons and demonstrators
11 skilled agricultural and fishery workers
12 extraction and building trades workers + other craft and related trades workers
13 metal, machinery and related trades workers + precision, handicraft, printing and related trades workers
14 stationary-plant and related operators +drivers and mobile-plant operators
15 machine operators and assemblers
16 miscellaneous
17 sales and service elementary occupations
18 agriculture, fishery and related labourers
19 laboureres in mining, construction, manufacturing and transport
20 miscellaneous

The following professions were merged:

Categories 11+18+19

Categories 10+17

Categories 14+ 15

Appendix B: missing values

variable	missing values
1 health	2
2 job level	3805
3 job difficulty	836
4 satisfaction working hours	126
5 hours work	21
6 satisfaction working conditions	161
7 value training	1069
8 wage	0
9 satisfaction shifts	125
10 contract type	7586
11 satisfaction job security	215
12 satisfaction social life	34
13 age	0
14 sex	0
15 married	0
16 full time parttime work	671
17 job type	2000
18 industry	3969
19 sector	714
20 education	354
21 health expense	27398
22 social economic status	0

Appendix C: full ordered logit regression model

Ordered logistic regression		Number of obs	=	5077		
		Wald chi2(56)	=	318.49		
		Prob > chi2	=	0.0000		
Log pseudolikelihood = -4679.2104		Pseudo R2	=	0.0443		
(Std.		Err. adjusted for 3015 clusters in pid)				

Robust							
health1	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
djob_level1	-.0816759	.1276275	-0.64	0.522	-.3318211	.1684694
djob_level2	.0129764	.0893838	0.15	0.885	-.1622126	.1881653
djob_difficulty1	-.0591202	.0667298	-0.89	0.376	-.1899082	.0716678
dsatisfaction working hours1	.0650913	.2857466	0.23	0.820	-.4949618	.6251444
dsatisfaction working hours2	.1530042	.1842882	0.83	0.406	-.208194	.5142025
dsatisfaction working hours3	.1941959	.1299444	1.49	0.135	-.0604904	.4488822
dsatisfaction working hours4	.2283252	.1065873	2.14	0.032	.019418	.4372324
dsatisfaction working hours5	.0049893	.0935683	0.05	0.957	-.1784011	.1883798
hours_work	-.010156	.0047987	-2.12	0.034	-.0195613	-.0007507
dsatisfaction working condition1	.742637	.2850774	2.61	0.009	.1838955	1.301.378
dsatisfaction working condition2	.6684683	.1778317	3.76	0.000	.3199245	1.017.012
dsatisfaction working condition3	.4685968	.1278784	3.66	0.000	.2179597	.7192338
dsatisfaction working condition4	.3280808	.1109293	2.96	0.003	.1106634	.5454983
dsatisfaction working condition5	.1290362	.1021121	1.26	0.206	-.0710999	.3291723
dvalue_training1	-.024442	.1021688	-0.24	0.811	-.2246891	.1758051
dvalue_training2	.1339885	.1195093	1.12	0.262	-.1002455	.3682225
dvalue_training3	.1361524	.1709029	0.80	0.426	-.1988112	.471116
wage	-.0000157	.0000104	-1.51	0.132	-.0000361	4.72e-06
dsatisfaction shifts1	.520641	.3873052	1.34	0.179	-.2384632	1.279.745
dsatisfaction shifts2	-.0122726	.2144688	-0.06	0.954	-.4326237	.4080785
dsatisfaction shifts3	.2405901	.14378	1.67	0.094	-.0412136	.5223937
dsatisfaction shifts4	.0229753	.105649	0.22	0.828	-.184093	.2300435
dsatisfaction shifts5	-.0112184	.0876222	-0.13	0.898	-.1829547	.160518
dsatisfaction job security1	.6052661	.1921238	3.15	0.002	.2287104	.9818218
dsatisfaction job security2	.2990033	.1628604	1.84	0.066	-.0201971	.6182038
dsatisfaction job security3	.2692144	.1226042	2.20	0.028	.0289146	.5095141
dsatisfaction job security4	.2052908	.098282	2.09	0.037	.0126616	.3979199
dsatisfaction job security5	.08762	.080119	1.09	0.274	-.0694103	.2446504
dcontract_type1	.1159964	.1309331	0.89	0.376	-.1406278	.3726206
dcontract_type2	-.1330642	.2106964	-0.63	0.528	-.5460215	.2798931
dcontract_type3	.0149576	.4302517	0.03	0.972	-.8283202	.8582353

age	.036071	.0047492	7.60	0.000	.0267628	.0453793
dsex (men)	-.4823603	.0963266	-5.01	0.000	-.6711569	-.2935637
ses	-.000067	.0000341	-1.97	0.049	-.0001338	-1.84e-07
dsector (private)	-.3146458	.0899022	-3.50	0.000	-.4908509	-.1384408
dmaried1	-.1526682	.1535513	-0.99	0.320	-.4536232	.1482869
dmaried4	-.0818308	.1668522	-0.49	0.624	-.4088551	.2451935
dfulltime	-.044119	.1265182	-0.35	0.727	-.2920902	.2038521
djob_type1	-.2576718	.2029233	-1.27	0.204	-.6553942	.1400506
djob_type2	.1284881	.2354886	0.55	0.585	-.333061	.5900372
djob_type3	-.2996943	.2108866	-1.42	0.155	-.7130245	.1136358
djob_type4	-.0468663	.2345255	-0.20	0.842	-.5065279	.4127953
djob_type5	-.0059185	.2032216	-0.03	0.977	-.4042254	.3923885
djob_type6	-.2227513	.1836532	-1.21	0.225	-.582705	.1372024
djob_type7	-.0807995	.1805507	-0.45	0.655	-.4346724	.2730735
djob_type8	-.2943891	.1737276	-1.69	0.090	-.634889	.0461107
djob_type9	-.1813613	.2078142	-0.87	0.383	-.5886697	.2259471
djob_type12	.4785119	.207373	2.31	0.021	.0720682	.8849555
djob_type13	.3177138	.1961542	1.62	0.105	-.0667414	.702169
djob type11+17+18	.2366586	.2028353	1.17	0.243	-.1608913	.6342085
djob_type10+16	.1462271	.2061457	0.71	0.478	-.257811	.5502652
dindustry1 (agriculture)	.0957099	.2612052	0.37	0.714	-.4162429	.6076628
dindustry2 (industry)	.2411824	.0900497	2.68	0.007	.0646881	.4176766
deducation1 (third level)	-.2565195	.1321194	-1.94	0.052	-.5154688	.0024298
deducation2 (second level)	-.0670854	.0945708	-0.71	0.478	-.2524407	.1182699
health_expense	.0005977	.0003459	1.73	0.084	-.0000803	.0012756

Table 8: full ordered logit regression model

Appendix D: means of 4 samples used for analyses

Variable	Obs	Mean	Std. Dev.
djob_level1	29552	3737	.3323671
djob_level2	29552	4750	.3672913
djob_level3	29552	21065	.452458
djob_difficulty1	29552	11845	.4900727
djob_difficulty2	29552	17707	.4900727
dsatisfaction working hours1	29552	303	.1007389
dsatisfaction working hours2	29552	1070	.1868089
dsatisfaction working hours3	29552	3006	.3022835
dsatisfaction working hours4	29552	7124	.4277379
dsatisfaction working hours5	29552	11405	.4868224
dsatisfaction working hours6	29552	6644	.4174735
hours_work	29552	36	1.021.454
dsatisfaction working condition1	29552	564	.1368262
dsatisfaction working condition2	29552	1652	.2297352
dsatisfaction working condition3	29552	3961	.3406956
dsatisfaction working condition4	29552	8459	.4520112
dsatisfaction working condition5	29552	10808	.4816419
dsatisfaction working condition6	29552	4108	.345962
dvalue_training1	29552	19230	.4767515
dvalue_training2	29552	4460	.3579773
dvalue_training3	29552	1200	.1973799
dvalue_training4	29552	4662	.3645181
wage	29552	2946	2.533.204
dsatisfaction shifts1	29552	285	.0977309
dsatisfaction shifts2	29552	768	.1591024
dsatisfaction shifts3	29552	2121	.258114
dsatisfaction shifts4	29552	5538	.3902377
dsatisfaction shifts5	29552	12249	.4926421
dsatisfaction shifts6	29552	8591	.4540967
dsatisfaction job security1	29552	934	.1749498
dsatisfaction job security2	29552	1247	.2010413
dsatisfaction job security3	29552	2443	.2753842
dsatisfaction job security4	29552	5024	.3756439
dsatisfaction job security5	29552	10946	.4829195
dsatisfaction job security6	29552	8958	.4596173
dcontract_type1	29552	26492	.3046762
dcontract_type2	29552	946	.1760332
dcontract_type3	29552	207	.0834013
dcontract_type4	29552	1907	.2456994
age	29552	39	1.011.414

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

dsex (men)	29552	17419	.4919446
dsex (women)	29552	12133	.4919446
ses	29552	2848	1.039.449
dsector (private)	29552	21268	.4491629
dsector (public)	29552	8284	.4491629

Table 9: Descriptive statistics sample 1

Variable	Obs	Mean	Std. Dev.
djob_level1	7237	1016	.3474149
djob_level2	7237	1199	.3718156
djob_level3	7237	5022	.4608893
djob_difficulty1	7237	2951	.4914531
djob_difficulty2	7237	4286	.4914531
dsatisfaction working hours1	7237	146	.1406053
dsatisfaction working hours2	7237	439	.238723
dsatisfaction working hours3	7237	1118	.361437
dsatisfaction working hours4	7237	2045	.4502829
dsatisfaction working hours5	7237	2346	.4680953
dsatisfaction working hours6	7237	1143	.3647084
hours_work	7237	38	1.079.875
dsatisfaction working condition1	7237	195,9997	.1623367
dsatisfaction working condition2	7237	534,0001	.2614428
dsatisfaction working condition3	7237	1151	.3657422
dsatisfaction working condition4	7237	2085	.4529105
dsatisfaction working condition5	7237	2448	.4731508
dsatisfaction working condition6	7237	823,0003	.3174942
dvalue_training1	7237	4554	.4830346
dvalue_training2	7237	1100	.3590425
dvalue_training3	7237	333,9999	.2098281
dvalue_training4	7237	1249	.3779145
wage	7237	3008,16	2766.64
dsatisfaction shifts1	7237	125,0004	.1302934
dsatisfaction shifts2	7237	318,0003	.2049777
dsatisfaction shifts3	7237	757,0003	.3060602
dsatisfaction shifts4	7237	1569	.4120955
dsatisfaction shifts5	7237	2840	.4883249
dsatisfaction shifts6	7237	1628	.4175816
dsatisfaction job security1	7237	317,0001	.20467
dsatisfaction job security2	7237	363	.2182878
dsatisfaction job security3	7237	741	.3031821
dsatisfaction job security4	7237	1395	.394493
dsatisfaction job security5	7237	2575	.4787912
dsatisfaction job security6	7237	1846	.4359352

Variable		Obs	Mean	Std. Dev.
dcontract_type1		7237	6372	.3244273
dcontract_type2		7237	285,0003	.1945131
dcontract_type3		7237	44,99967	.0786145
dcontract_type4		7237	535,0003	.261668
age		7237	39	9.862.515
dsex (men)		7237	4279	.4916337
dsex (women)		7237	2958	.4916337
ses		7237	2.770	1.054.349
dsector (private)		7237	5346	.4393713
dsector (public)		7237	1891	.4393713

Table 10: Descriptive statistics sample 2

Variable	Obs	Mean	Std. Dev.
djob_level1	15930	2032	0,3336075
djob_level2	15930	2523	0,3651088
djob_level3	15930	11375	0,4518744
djob_difficulty1	15930	6305	0,4890359
djob_difficulty2	15930	9625	0,4890359
dsatisfaction working hours1	15930	125	0,0882369
dsatisfaction working hours2	15930	517	0,1772094
dsatisfaction working hours3	15930	1546	0,2960346
dsatisfaction working hours4	15930	3903	0,4301063
dsatisfaction working hours5	15930	6390	0,4901426
dsatisfaction working hours6	15930	3449	0,4118785
hours_work	15930	36	100,00587
dsatisfaction working condition1	15930	275	0,1302539
dsatisfaction working condition2	15930	860	0,2259975
dsatisfaction working condition3	15930	2129	0,3402836
dsatisfaction working condition4	15930	4675	0,4553669
dsatisfaction working condition5	15930	5894	0,4828178
dsatisfaction working condition6	15930	2097	0,3381079
dvalue_training1	15930	10420	0,4756719
dvalue_training2	15930	2451	0,3608264
dvalue_training3	15930	628	0,194604
dvalue_training4	15930	2431	0,3596178
wage	15930	2964	24930,586
dsatisfaction shifts1	15930	125	0,0882369
dsatisfaction shifts2	15930	366	0,1498301
dsatisfaction shifts3	15930	1063	0,2495607
dsatisfaction shifts4	15930	3040	0,3929715
dsatisfaction shifts5	15930	6863	0,4952069
dsatisfaction shifts6	15930	4473	0,4493997
dsatisfaction job security1	15930	463	0,1679931
dsatisfaction job security2	15930	651	0,1979866

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

dsatisfaction job security3	15930	1273	0,2711656
dsatisfaction job security4	15930	2706	0,3755287
dsatisfaction job security5	15930	6081	0,4858268
dsatisfaction job security6	15930	4756	0,4576391
dcontract_type1	15930	14354	0,2985812
dcontract_type2	15930	466	0,1685201
dcontract_type3	15930	120	0,0864678
dcontract_type4	15930	990	0,2414297
age	15930	39	100,09127
dsex (men)	15930	9378	0,4920848
dsex (women)	15930	6552	0,4920848
ses	15930	2875	10500,798
dsector (private)	15930	11345	0,4527618
dsector (public)	15930	4585	0,4527618

Table 11: Descriptive statistics sample 3

Variable	Obs	Mean	Std. Dev.
djob_level1	6385	689	.31029
djob_level2	6385	1028	.3675619
djob_level3	6385	4668	.4434286
djob_difficulty1	6385	2589	.4910235
djob_difficulty2	6385	3796	.4910235
dsatisfaction working hours1	6385	32	.0706216
dsatisfaction working hours2	6385	114	.1324323
dsatisfaction working hours3	6385	342	.225171
dsatisfaction working hours4	6385	1176	.3876626
dsatisfaction working hours5	6385	2669	.4932706
dsatisfaction working hours6	6385	2052	.4670422
hours_work	6385	35	977.655
dsatisfaction working condition1	6385	93	.1198144
dsatisfaction working condition2	6385	258	.1969277
dsatisfaction working condition3	6385	681	.3086999
dsatisfaction working condition4	6385	1699	.4419478
dsatisfaction working condition5	6385	2466	.4869196
dsatisfaction working condition6	6385	1188	.3891864
dvalue_training1	6385	4256	.4714783
dvalue_training2	6385	909	.3494514
dvalue_training3	6385	238	.1894494
dvalue_training4	6385	982	.3607832
wage	6385	2833	2.344.314
dsatisfaction shifts1	6385	35	.0738404
dsatisfaction shifts2	6385	84	.1139508
dsatisfaction shifts3	6385	301	.2119586
dsatisfaction shifts4	6385	929	.3526291

dsatisfaction shifts5	6385	2546	.4896789
dsatisfaction shifts6	6385	2490	.4877828
dsatisfaction job security1	6385	154	.1534307
dsatisfaction job security2	6385	233	.187525
dsatisfaction job security3	6385	429	.2503682
dsatisfaction job security4	6385	923	.3516817
dsatisfaction job security5	6385	2290	.4796427
dsatisfaction job security6	6385	2356	.482569
dcontract_type1	6385	5766	.2959074
dcontract_type2	6385	195	.1720821
dcontract_type3	6385	42	.0808435
dcontract_type4	6385	382	.237186
age	6385	39	1.043.847
dsex (men)	6385	3762	.4920187
dsex (women)	6385	2623	.4920187
ses	6385	2871	9.885.006
dsector (private)	6385	4577	.4505705
dsector (public)	6385	1808	.4505705

Table 12: Descriptive statistics model 3

Appendix E: correlations coefficients of 4 samples used for analyses

model 1

	djob_l~1	djob_l~2	djob_l~3	djob_d~1	djob_d~2	dsat~rs1	dsat~rs2	dsat~rs3	dsat~rs4	dsat~rs5	dsat~rs6	hours_~k	d~ition1	d~ition2
djob_level1	1.000													
djob_level2	-0.1665	1.000												
djob_level3	-0.5994	-0.6895	1.000											
djob_diffi~1	0.0171	0.0220	-0.0304	1.000										
djob_diffi~2	-0.0171	-0.0220	0.0304	-1.000	1.000									
dsatisfa~rs1	0.0037	0.0195	-0.0185	0.0299	-0.0299	1.000								
dsatisfa~rs2	0.0451	0.0222	-0.0511	0.0337	-0.0337	-0.0197	1.000							
dsatisfa~rs3	0.0576	0.0115	-0.0516	0.0284	-0.0284	-0.0343	-0.0652	1.000						
dsatisfa~rs4	0.0488	0.0090	-0.0432	-0.0041	0.0041	-0.0574	-0.192	-0.1897	1.000					
dsatisfa~rs5	-0.0318	-0.0082	0.0300	-0.0128	0.0128	-0.0807	-0.1537	-0.2668	-0.4468	1.000				
dsatisfa~rs6	-0.0756	-0.0227	0.0740	-0.0237	0.0237	-0.0548	-0.144	-0.1812	-0.3035	-0.4269	1.000			
hours_work	0.2876	0.0897	-0.2841	-0.0120	0.0120	0.0442	0.0817	0.1122	0.1160	-0.0563	-0.1816	1.000		
dsati~ition1	-0.0255	0.0049	0.0147	0.0373	-0.0373	0.1282	0.0789	0.0332	-0.0115	-0.0522	-0.0177	0.0027	1.000	
dsati~ition2	-0.0292	-0.0018	0.0229	0.0384	-0.0384	0.0527	0.0751	0.0692	0.0068	-0.0437	-0.0524	-0.0167	-0.0339	1.000
dsati~ition3	-0.0239	0.0079	0.0111	0.0315	-0.0315	0.0171	0.0482	0.0605	0.0462	-0.0381	-0.0725	-0.0071	-0.0549	-0.0957
dsatisfac~n4	-0.0040	0.0168	-0.017	-0.0050	0.0050	-0.0214	-0.0169	0.0239	0.0393	0.0213	-0.0697	-0.0042	-0.0883	-0.1541
dsatisfac~n5	0.0292	-0.0083	-0.0148	-0.0288	0.0288	-0.041	-0.0494	-0.0561	-0.0025	0.0928	-0.0330	0.0190	-0.159	-0.1848
dsatisfac~n6	0.0175	-0.0190	0.0025	-0.0247	0.0247	-0.0176	-0.0376	-0.0718	-0.0934	-0.0698	0.2501	-0.0039	-0.0560	-0.0978
dvalue_tra~1	0.0370	0.0242	-0.0468	-0.0550	0.0550	-0.0170	-0.0313	-0.0249	-0.0076	0.0150	0.0265	0.0334	-0.0399	-0.0504
dvalue_tra~2	0.0048	-0.0038	-0.0004	0.0462	-0.0462	-0.0063	0.0175	0.0211	0.021	-0.0020	-0.0407	-0.0044	-0.0028	0.0254
dvalue_tra~3	-0.0081	-0.0004	0.0063	0.0360	-0.0360	0.0284	0.0207	0.0136	-0.0089	-0.0092	-0.0061	0.0032	0.0365	0.0246
dvalue_tra~4	-0.0487	-0.0276	0.0582	0.0071	-0.0071	0.0131	0.0125	0.0045	-0.0058	-0.0126	0.0086	-0.0411	0.0353	0.0276
wage3	0.2666	0.0387	-0.2273	-0.0023	0.0023	-0.0115	0.0173	0.0409	0.0525	-0.0113	-0.0752	0.3072	-0.0083	-0.0180
dsatisfa~ts1	-0.0032	0.0077	-0.0039	0.0253	-0.0253	0.2993	0.0828	0.0195	-0.0313	-0.0519	-0.0308	0.0359	0.1254	0.0604
dsatisfa~ts2	0.0063	0.0084	-0.0115	0.0265	-0.0265	0.0594	0.2234	0.0632	-0.0140	-0.0705	-0.0635	0.0474	0.0814	0.0825
dsatisfa~ts3	-0.0068	0.0057	0.0003	0.0227	-0.0227	0.0159	0.071	0.2217	0.0174	-0.0923	-0.164	0.0411	0.0369	0.0676
dsatisfa~ts4	0.0028	0.0087	-0.0091	-0.0090	0.0090	-0.0015	0.0049	0.0886	0.2431	-0.1306	-0.1627	0.0608	0.0021	0.0251
dsatisfa~ts5	0.0159	0.0071	-0.0175	-0.0113	0.0113	-0.0563	-0.0616	-0.0750	-0.0017	0.3059	-0.2595	0.0042	-0.0456	-0.0409
dsatisfa~ts6	-0.0173	-0.0231	0.0315	-0.0077	0.0077	-0.0319	-0.0738	-0.1471	-0.2052	-0.1313	0.516	-0.145	-0.0288	-0.0575
dsatisfac~y1	-0.0303	-0.0296	0.0463	0.0231	-0.0231	0.0757	0.0323	0.0128	-0.0204	-0.0224	0.0051	-0.0237	0.1572	0.0596
dsatisfac~y2	-0.0226	-0.0259	0.0376	0.0196	-0.0196	0.0154	0.0341	0.0251	0.0045	-0.0139	-0.0255	-0.0256	0.0531	0.0698
dsatisfac~y3	-0.0155	-0.0283	0.0344	0.0037	-0.0037	0.0256	0.0332	0.0335	0.0213	-0.0143	-0.0504	-0.0096	0.0084	0.0607
dsatisfac~y4	-0.0066	-0.0198	0.0209	0.0017	-0.0017	-0.0139	0.0049	0.0501	0.0436	-0.0066	-0.0720	0.0115	-0.0249	0.0052
dsatisfac~y5	0.0154	0.0158	-0.0241	-0.0121	0.0121	-0.0273	-0.0256	-0.0142	0.0446	0.0742	-0.139	0.018	-0.0435	-0.0405
dsatisfac~y6	0.0200	0.0391	-0.0464	-0.0083	0.0083	-0.019	-0.0242	-0.0619	-0.0894	-0.0493	0.2074	0.0052	-0.0220	-0.0512
dcontract_~1	0.0992	0.071	-0.1305	-0.0507	0.0507	-0.0205	-0.0114	0.0170	0.0215	-0.0043	-0.0192	0.0851	-0.0086	0.0126
dcontract_~2	-0.0634	-0.0503	0.0874	0.0446	-0.0446	0.0006	0.0090	-0.011	-0.0095	0.0051	0.0075	-0.0763	0.0041	-0.0024
dcontract_~3	-0.0320	-0.0235	0.0425	0.0224	-0.0224	0.0277	0.0098	0.0066	-0.0084	0.0001	-0.0073	-0.0824	-0.0028	-0.0063
dcontract_~4	-0.0668	-0.0441	0.0848	0.0232	-0.0232	0.0157	0.0044	-0.0155	-0.0170	0.0017	0.0209	-0.0229	0.0087	-0.0118

	dvalue_tra~1	dvalue~2	dvalue~3	dvalue~4	wage3	dsat~ts1	dsat~ts2	dsat~ts3	dsat~ts4	dsat~ts5	dsat~ts6	dsati~y1	dsati~y2	dsati~y3	dsati~y4	dsati~y5
dvalue_tra~2	1.000															
dvalue_tra~3	-0.0867	1.000														
dvalue_tra~4	-0.1825	-0.0890	1.000													
wage3	0.0030	-0.0130	-0.0836	1.000												
dsatisfa~ts1	-0.0019	0.0113	0.0295	-0.0079	1.000											
dsatisfa~ts2	0.0048	0.0149	0.0326	-0.0066	-0.0161	1.000										
dsatisfa~ts3	0.0084	0.0159	0.0307	-0.0017	-0.0274	-0.0454	1.000									
dsatisfa~ts4	0.0250	0.0023	0.0022	-0.0022	-0.0474	-0.0784	-0.1335	1.000								
dsatisfa~ts5	0.0099	-0.0085	-0.0248	0.0327	-0.0830	-0.1374	-0.2340	-0.4040	1.000							
dsatisfa~ts6	-0.0382	-0.0094	-0.013	-0.0286	-0.0632	-0.146	-0.1780	-0.3074	-0.5386	1.000						
dsatisfac~y1	0.0011	0.0305	0.0417	-0.0404	0.0554	0.0216	0.0165	-0.0040	-0.0303	0.0074	1.000					
dsatisfac~y2	0.0211	0.0199	0.0204	-0.0218	0.0172	0.0218	0.0245	0.015	-0.0071	-0.0265	-0.0379	1.000				
dsatisfac~y3	0.0300	0.0080	0.0258	-0.0203	0.016	0.0344	0.0403	0.0303	-0.0079	-0.0547	-0.0542	-0.0630	1.000			
dsatisfac~y4	0.0196	0.0023	-0.0026	-0.0015	-0.0133	0.0161	0.0350	0.0562	-0.0034	-0.0674	-0.0818	-0.0950	-0.1359	1.000		
dsatisfac~y5	0.014	-0.0169	-0.0298	0.0279	-0.0226	-0.0183	-0.0129	0.021	0.198	-0.1185	-0.1386	-0.161	-0.2303	-0.3471	1.00	
dsatisfac~y6	-0.0545	-0.0092	-0.0069	0.0090	-0.0003	-0.0323	-0.0562	-0.0892	-0.0933	0.2211	-0.1191	-0.1384	-0.1980	-0.2985	-0.505	
dcontract_~1	-0.0134	-0.0280	-0.0958	0.1271	-0.0017	-0.0066	-0.0019	0.0004	0.0242	-0.0229	-0.2313	-0.1712	-0.165	-0.0192	0.15	
dcontract_~2	0.0076	0.0200	0.0864	-0.0908	-0.0042	0.0029	0.0001	-0.0016	-0.0114	0.0135	0.1660	0.1139	0.0711	0.0037	-0.071	
dcontract_~3	0.0031	0.0074	0.0349	-0.0529	-0.0083	0.0092	0.0049	0.0096	-0.0072	-0.0046	0.1124	0.0651	0.0293	-0.0099	-0.036	
dcontract_~4	0.011	0.0178	0.0450	-0.0746	0.0079	0.0030	0.0006	-0.0026	-0.0194	0.0202	0.1297	0.186	0.0712	0.0245	-0.066	

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

model 2

	djob_l~1	djob_l~2	djob_l~3	djob_d~1	djob_d~2	dsat~rs1	dsat~rs2	dsat~rs3	dsat~rs4	dsat~rs5	dsat~rs6	hours_~k	d~ition1	d~ition2
djob_level1	1.000													
djob_level2	-0.1801	1.000												
djob_level3	-0.6085	-0.671	1.000											
djob_diffi~1	0.0265	0.0250	-0.0401	1.000										
djob_diffi~2	-0.0265	-0.0250	0.0401	-1.000	1.000									
dsatisfa~rs1	0.0184	0.0259	-0.0348	0.0469	-0.0469	1.000								
dsatisfa~rs2	0.0639	0.0331	-0.0749	0.0389	-0.0389	-0.0365	1.000							
dsatisfa~rs3	0.0463	0.0080	-0.0413	0.0149	-0.0149	-0.0613	-0.186	1.000						
dsatisfa~rs4	0.0432	0.0134	-0.0433	-0.0249	0.0249	-0.0901	-0.1595	-0.2683	1.000					
dsatisfa~rs5	-0.0632	-0.0259	0.0686	-0.0046	0.0046	-0.0994	-0.1760	-0.2960	-0.4347	1.000				
dsatisfa~rs6	-0.0670	-0.0228	0.0689	-0.0216	0.0216	-0.0621	-0.111	-0.1851	-0.2718	-0.2999	1.000			
hours_work	0.2804	0.0887	-0.2829	-0.0132	0.0132	0.103	0.118	0.198	0.0848	-0.1327	-0.1545	1.000		
dsati~ition1	-0.0380	-0.0080	0.0351	0.0400	-0.0400	0.0850	0.0967	0.0300	-0.0348	-0.0519	-0.0162	0.0013	1.000	
dsati~ition2	-0.0349	0.0064	0.0211	0.0282	-0.0282	0.0798	0.0766	0.0534	-0.0175	-0.0464	-0.0527	-0.0255	-0.0471	1.000
dsati~ition3	-0.0093	-0.0048	0.019	0.0459	-0.0459	0.0290	0.0588	0.0577	0.0325	-0.0566	-0.0744	-0.0060	-0.0726	-0.1227
dsatisfac~n4	-0.0085	-0.0020	0.0080	-0.0218	0.0218	-0.0305	-0.0249	0.0202	0.0263	0.0261	-0.0580	-0.0096	-0.161	-0.1796
dsatisfac~n5	0.0423	0.0098	-0.0398	-0.0328	0.0328	-0.061	-0.0642	-0.0567	0.0281	0.0845	-0.0213	0.0309	-0.1193	-0.2018
dsatisfac~n6	0.0081	-0.0074	-0.0001	-0.0165	0.0165	-0.0081	-0.0491	-0.0700	-0.0846	-0.0333	0.2518	-0.0050	-0.0598	-0.111
dvalue_tra~1	0.0458	0.0173	-0.0485	-0.0588	0.0588	0.0023	-0.0207	-0.0202	0.0077	0.0029	0.0194	0.0376	-0.0429	-0.0526
dvalue_tra~2	0.016	0.0018	-0.0095	0.0481	-0.0481	-0.0060	0.0182	0.0139	0.0078	0.0012	-0.0345	0.0075	-0.0066	0.0248
dvalue_tra~3	-0.0150	-0.0077	0.0175	0.0332	-0.0332	0.0293	0.0269	0.0080	-0.0035	-0.0215	-0.0050	-0.0056	0.0444	0.0160
dvalue_tra~4	-0.0604	-0.0196	0.0613	0.019	-0.019	-0.0135	-0.0058	0.0081	-0.0154	0.0071	0.018	-0.0520	0.0364	0.0347
wage3	0.2832	0.0316	-0.2390	0.0192	-0.0192	-0.0076	0.0317	0.0350	0.0587	-0.0386	-0.0754	0.2587	-0.0250	-0.0217
dsatisfa~ts1	0.0014	0.0179	-0.0155	0.0411	-0.0411	0.3732	0.0818	0.0079	-0.0620	-0.0669	-0.0429	0.0879	0.186	0.0559
dsatisfa~ts2	0.014	0.0096	-0.0156	0.0197	-0.0197	0.0843	0.2364	0.0539	-0.0402	-0.0995	-0.0633	0.0774	0.113	0.0891
dsatisfa~ts3	-0.0082	0.0007	0.0056	0.0251	-0.0251	-0.0009	0.0720	0.2349	-0.0190	-0.121	-0.11	0.0452	0.0292	0.0762
dsatisfa~ts4	0.014	0.0028	-0.010	-0.0060	0.0060	-0.0230	-0.0213	0.0600	0.2209	-0.1294	-0.1433	0.0753	-0.0052	-0.001
dsatisfa~ts5	0.0116	0.0019	-0.013	-0.0127	0.0127	-0.0871	-0.0750	-0.0969	0.0097	0.2959	-0.2130	-0.0486	-0.0574	-0.0666
dsatisfa~ts6	-0.0234	-0.0158	0.0304	-0.0201	0.0201	-0.0326	-0.0856	-0.1470	-0.1764	-0.0599	0.5090	-0.1160	-0.0328	-0.0381
dsatisfac~y1	-0.0457	-0.0354	0.0630	0.0148	-0.0148	0.0797	0.0078	0.0113	-0.0384	-0.0069	0.0091	-0.0446	0.1681	0.0661
dsatisfac~y2	-0.0382	-0.0309	0.0537	0.0064	-0.0064	0.0166	0.0291	0.0121	0.0020	-0.0171	-0.0179	-0.0301	0.0631	0.0586
dsatisfac~y3	-0.0302	-0.0291	0.0463	-0.013	0.013	0.0261	0.0287	0.0196	0.0148	-0.0177	-0.0438	-0.0180	0.0054	0.0808
dsatisfac~y4	-0.0099	-0.0142	0.0190	0.0065	-0.0065	-0.0228	0.0167	0.0499	0.0240	-0.0024	-0.0781	0.0078	-0.0362	-0.0093
dsatisfac~y5	0.0403	0.0259	-0.0513	-0.0070	0.0070	-0.0286	-0.0341	-0.0174	0.0419	0.0507	-0.0662	0.0055	-0.0547	-0.0541
dsatisfac~y6	0.0263	0.0368	-0.0495	-0.0011	0.0011	-0.0118	-0.0159	-0.051	-0.061	-0.0294	0.1786	0.0355	-0.0215	-0.0488
dcontract_~1	0.1133	0.0645	-0.1375	-0.0314	0.0314	-0.0138	0.0098	0.0231	0.0335	-0.0206	-0.0390	0.0831	-0.0146	0.0144
dcontract_~2	-0.0757	-0.0539	0.106	0.0301	-0.0301	-0.0139	-0.0068	-0.0217	-0.0150	0.0374	0.0019	-0.0831	0.0012	0.0081
dcontract_~3	-0.0320	-0.0163	0.0373	-0.0012	0.0012	0.0387	-0.0127	0.0197	-0.0184	-0.0135	0.0139	-0.0789	-0.0024	-0.0089
dcontract_~4	-0.0747	-0.0350	0.0845	0.0170	-0.0170	0.0158	-0.0032	-0.0185	-0.0248	0.0018	0.0427	-0.0176	0.0179	-0.0212

	dvalue_tra~1	dvalue~2	dvalue~3	dvalue~4	wage3	dsat~ts1	dsat~ts2	dsat~ts3	dsat~ts4	dsat~ts5	dsat~ts6	dsati~y1	dsati~y2	dsati~y3	dsati~y4	dsati~y
dvalue_tra~2	1.000															
dvalue_tra~3	-0.0931	1.000														
dvalue_tra~4	-0.1934	-0.105	1.000													
wage3	0.0095	-0.0343	-0.0785	1.000												
dsatisfa~ts1	-0.0030	-0.0039	0.0237	-0.0144	1.000											
dsatisfa~ts2	0.0031	0.0139	0.0234	-0.0041	-0.0284	1.000										
dsatisfa~ts3	0.0050	0.0130	0.0231	-0.0024	-0.0453	-0.0733	1.000									
dsatisfa~ts4	0.0285	0.0121	-0.0060	0.0085	-0.0698	-0.1128	-0.1798	1.000								
dsatisfa~ts5	0.0042	-0.0055	-0.0316	0.0211	-0.165	-0.1723	-0.2747	-0.4228	1.000							
dsatisfa~ts6	-0.0373	-0.0207	0.0070	-0.0248	-0.0714	-0.1155	-0.1841	-0.2835	-0.4330	1.000						
dsatisfac~y1	0.0015	0.0302	0.0434	-0.0504	0.0545	0.0266	0.0085	-0.0290	-0.0130	0.0076	1.000					
dsatisfac~y2	0.0244	0.0188	0.0173	-0.0196	0.0035	0.0063	0.0270	0.0066	-0.0058	-0.0237	-0.0492	1.000				
dsatisfac~y3	0.0208	0.014	0.0411	-0.0246	0.0182	0.0321	0.0231	0.0225	-0.0194	-0.0379	-0.0723	-0.0776	1.000			
dsatisfac~y4	0.0370	-0.0273	-0.0090	0.0122	-0.0137	0.0200	0.0367	0.0591	-0.0226	-0.0644	-0.146	-0.1123	-0.1650	1.000		
dsatisfac~y5	0.0021	0.0057	-0.0316	0.0198	-0.0343	-0.0213	-0.0258	0.0229	0.0990	-0.0983	-0.1591	-0.1708	-0.251	-0.3632	1.00	
dsatisfac~y6	-0.0632	-0.0124	-0.0148	0.0178	0.010	-0.0327	-0.0384	-0.0840	-0.0658	0.201	-0.1252	-0.1345	-0.1976	-0.2859	-0.434	
dcontract_~1	-0.0208	-0.0123	-0.0763	0.1222	0.0063	0.0000	0.0048	0.0171	0.010	-0.0341	-0.2625	-0.1612	-0.0990	0.0062	0.122	
dcontract_~2	0.0291	0.0096	0.0617	-0.0862	-0.015	-0.0053	-0.0088	-0.0117	0.014	0.0117	0.1823	0.0869	0.0746	-0.0179	-0.076	
dcontract_~3	-0.0139	-0.0006	0.0197	-0.0472	-0.015	0.0088	0.0017	-0.0032	-0.0024	0.0037	0.1291	0.0704	-0.0093	-0.0119	-0.033	
dcontract_~4	0.0084	0.0083	0.0429	-0.0732	0.0031	0.0013	0.0001	-0.0115	-0.0194	0.0324	0.1511	0.1141	0.0701	0.0092	-0.085	

79

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

model 3

	djob_l~1	djob_l~2	djob_l~3	djob_d~1	djob_d~2	dsat~rs1	dsat~rs2	dsat~rs3	dsat~rs4	dsat~rs5	dsat~rs6	hours_~k	d~ition1	d~ition2
djob_level1	1.000													
djob_level2	-0.1659	1.000												
djob_level3	-0.6043	-0.6855	1.000											
djob_diffi~1	0.0145	0.0167	-0.0242	1.000										
djob_diffi~2	-0.0145	-0.0167	0.0242	-1.000	1.000									
dsatisfa~rs1	-0.0020	0.0199	-0.0146	0.0270	-0.0270	1.000								
dsatisfa~rs2	0.0489	0.0118	-0.0456	0.0336	-0.0336	-0.0163	1.000							
dsatisfa~rs3	0.0679	0.0071	-0.0558	0.0347	-0.0347	-0.0292	-0.0600	1.000						
dsatisfa~rs4	0.0513	0.0035	-0.0407	-0.0023	0.0023	-0.0507	-0.143	-0.1868	1.000					
dsatisfa~rs5	-0.0284	0.0024	0.0190	-0.0186	0.0186	-0.0728	-0.1499	-0.2683	-0.4662	1.000				
dsatisfa~rs6	-0.0891	-0.021	0.0827	-0.0206	0.0206	-0.0467	-0.0963	-0.1723	-0.2995	-0.4302	1.000			
hours_work	0.2938	0.0813	-0.2826	-0.0065	0.0065	0.0136	0.0701	0.189	0.1215	-0.0481	-0.181	1.000		
dsati~ition1	-0.0175	0.0085	0.0060	0.0396	-0.0396	0.1575	0.0600	0.0331	-0.0049	-0.0514	-0.0170	0.0003	1.000	
dsati~ition2	-0.0306	-0.0062	0.0276	0.0469	-0.0469	0.0386	0.0738	0.0596	0.0066	-0.0408	-0.0413	-0.0194	-0.0317	1.000
dsatisfac~n3	-0.0313	0.0141	0.0117	0.0235	-0.0235	0.0090	0.0374	0.0482	0.0495	-0.0327	-0.0654	-0.0177	-0.0521	-0.0938
dsatisfac~n4	0.0007	0.0187	-0.0156	-0.0012	0.0012	-0.0167	-0.0161	0.0262	0.0383	0.0193	-0.0714	-0.0079	-0.0854	-0.1540
dsatisfac~n5	0.0348	-0.0134	-0.0149	-0.0303	0.0303	-0.0343	-0.0398	-0.0518	-0.019	0.0830	-0.0256	0.0269	-0.116	-0.1831
dsatisfac~n6	0.0081	-0.0194	0.0097	-0.0254	0.0254	-0.0241	-0.0315	-0.0624	-0.0884	-0.0645	0.2326	0.0029	-0.0516	-0.0930
dvalue_tra~1	0.0332	0.0255	-0.0451	-0.0486	0.0486	-0.0251	-0.0322	-0.0188	-0.0031	0.0189	0.0134	0.0325	-0.0364	-0.0470
dvalue_tra~2	0.0091	-0.0049	-0.0028	0.0423	-0.0423	-0.0083	0.0181	0.0242	0.0269	-0.0079	-0.0421	0.0002	-0.0031	0.0221
dvalue_tra~3	-0.0059	0.0049	0.0004	0.0399	-0.0399	0.0332	0.012	0.0077	-0.0149	0.0034	-0.0055	-0.001	0.0375	0.0330
dvalue_tra~4	-0.0498	-0.0316	0.0622	0.0003	-0.0003	0.0236	0.0188	-0.0035	-0.0149	-0.0189	0.0274	-0.0426	0.0309	0.0222
wage3	0.2623	0.0345	-0.2215	-0.0067	0.0067	-0.0130	0.0143	0.0476	0.0496	-0.0094	-0.0782	0.3199	0.001	-0.0169
dsatisfa~ts1	-0.0041	0.0004	0.0027	0.0197	-0.0197	0.2501	0.0680	0.0165	-0.0225	-0.0408	-0.0226	0.0054	0.1302	0.0606
dsatisfa~ts2	0.0054	0.014	-0.0124	0.0267	-0.0267	0.0338	0.2155	0.0601	-0.0162	-0.0571	-0.0582	0.0237	0.0762	0.0783
dsatisfa~ts3	-0.0020	0.0060	-0.0034	0.0197	-0.0197	0.0133	0.0674	0.2072	0.0185	-0.0880	-0.0954	0.0409	0.0437	0.0508
dsatisfa~ts4	0.0001	0.0042	-0.0034	-0.0177	0.0177	0.0039	0.0021	0.0879	0.2511	-0.1400	-0.1606	0.0540	-0.0067	0.0296
dsatisfa~ts5	0.0283	0.0059	-0.0257	-0.0076	0.0076	-0.0415	-0.0578	-0.0711	-0.0190	0.3003	-0.2527	0.0141	-0.0433	-0.0379
dsatisfa~ts6	-0.0312	-0.0170	0.0368	0.0002	-0.0002	-0.0255	-0.0608	-0.1369	-0.1991	-0.1326	0.4957	-0.0944	-0.0217	-0.0504
dsatisfac~y1	-0.0337	-0.0229	0.0433	0.0273	-0.0273	0.0736	0.0442	0.0077	-0.0195	-0.0196	0.0034	-0.0199	0.1492	0.0628
dsatisfac~y2	-0.0162	-0.0261	0.0331	0.0255	-0.0255	0.0176	0.0320	0.0255	0.0063	-0.0156	-0.0238	-0.0259	0.0603	0.0770
dsatisfac~y3	-0.0079	-0.0270	0.0277	0.010	-0.010	0.0289	0.0296	0.0309	0.0151	-0.0097	-0.0453	-0.0119	0.0036	0.0505
dsatisfac~y4	-0.0051	-0.0236	0.0228	-0.0099	0.0099	-0.0156	-0.0045	0.0409	0.0435	0.0002	-0.0698	0.0089	-0.0253	0.0036
dsatisfac~y5	0.0086	0.0145	-0.0181	-0.0129	0.0129	-0.0318	-0.0207	-0.0127	0.0430	0.0690	-0.122	0.0154	-0.0416	-0.0413
dsatisfac~y6	0.0191	0.0397	-0.0462	-0.0052	0.0052	-0.0052	-0.0219	-0.0522	-0.0859	-0.0537	0.2016	0.0019	-0.0180	-0.0454
dcontract_~1	0.115	0.0735	-0.1343	-0.0573	0.0573	-0.0253	-0.0152	0.0227	0.0235	0.0031	-0.0326	0.0892	-0.0077	0.0122
dcontract_~2	-0.0630	-0.0498	0.0868	0.0446	-0.0446	0.0099	0.0124	-0.014	-0.0114	-0.0030	0.0155	-0.0800	0.0027	-0.0085
dcontract_~3	-0.0333	-0.0259	0.0455	0.0349	-0.0349	0.0169	0.0250	0.0009	-0.0057	-0.0046	-0.0035	-0.0862	-0.0060	-0.0080
dcontract_~4	-0.0696	-0.0469	0.0892	0.0272	-0.0272	0.0184	0.0013	-0.0212	-0.0191	-0.0001	0.0307	-0.0235	0.0098	-0.0063

	dvalue_tra~1	dvalue~2	dvalue~3	dvalue~4	wage3	dsat~ts1	dsat~ts2	dsat~ts3	dsat~ts4	dsat~ts5	dsat~ts6	dsati~y1	dsati~y2	dsati~y3	dsati~y4	dsati~y
dvalue_tra~2	1.000															
dvalue_tra~3	-0.0864	1.000														
dvalue_tra~4	-0.181	-0.0860	1.000													
wage3	0.015	-0.0042	-0.0904	1.000												
dsatisfa~ts1	-0.0024	0.0185	0.0275	-0.0122	1.000											
dsatisfa~ts2	0.0089	0.0185	0.0398	-0.0083	-0.0136	1.000										
dsatisfa~ts3	0.0087	0.0118	0.0362	-0.0004	-0.0238	-0.041	1.000									
dsatisfa~ts4	0.0271	-0.0015	0.0014	-0.0036	-0.0432	-0.0745	-0.1299	1.000								
dsatisfa~ts5	0.0074	-0.0069	-0.0325	0.0397	-0.0774	-0.1334	-0.2326	-0.4225	1.000							
dsatisfa~ts6	-0.0392	-0.0074	-0.0041	-0.0353	-0.0556	-0.0958	-0.1671	-0.3034	-0.5436	1.000						
dsatisfac~y1	0.0039	0.0322	0.0346	-0.0421	0.0439	0.0134	0.0211	0.0035	-0.0388	0.0150	1.000					
dsatisfac~y2	0.0218	0.0315	0.0182	-0.0200	0.0284	0.0234	0.021	0.0119	-0.0099	-0.0246	-0.0357	1.000				
dsatisfac~y3	0.0341	0.0081	0.0256	-0.0212	0.0027	0.0305	0.0483	0.0248	-0.0044	-0.0543	-0.051	-0.0608	1.000			
dsatisfac~y4	0.0096	0.0192	-0.0032	-0.0057	-0.0156	0.0076	0.0311	0.0500	0.0038	-0.0647	-0.0783	-0.0934	-0.1333	1.000		
dsatisfac~y5	0.012	-0.0297	-0.0359	0.0321	-0.0201	-0.0144	-0.0154	0.0189	0.181	-0.1183	-0.1359	-0.1622	-0.2316	-0.3554	1.00	
dsatisfac~y6	-0.0497	-0.0144	0.0050	0.0073	0.0042	-0.0241	-0.0546	-0.0822	-0.0967	0.2160	-0.1129	-0.1347	-0.1923	-0.2951	-0.512	
dcontract_~1	-0.0160	-0.0355	-0.0956	0.1288	-0.0039	-0.0025	-0.0032	0.0058	0.0314	-0.0362	-0.2280	-0.165	-0.170	-0.0209	0.16	
dcontract_~2	0.0003	0.0203	0.091	-0.0914	-0.0028	0.0082	0.0073	-0.0056	-0.0156	0.0159	0.1496	0.1128	0.0684	0.0088	-0.066	
dcontract_~3	0.0111	0.0159	0.0418	-0.0567	-0.0077	0.0060	0.0116	0.0131	-0.0172	0.0005	0.113	0.0737	0.0466	-0.0143	-0.043	
dcontract_~4	0.0156	0.0240	0.0397	-0.0752	0.0095	-0.0048	-0.0053	-0.0079	-0.0218	0.0336	0.1381	0.145	0.0680	0.0248	-0.069	

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

model 4

	djob_l~1	djob_l~2	djob_l~3	djob_d~1	djob_d~2	dsat~rs1	dsat~rs2	dsat~rs3	dsat~rs4	dsat~rs5	dsat~rs6	hours_~k	d~ition1	d~ition2
djob_level1	1.000													
djob_level2	-0.1524	1.000												
djob_level3	-0.5735	-0.7223	1.000											
djob_diffi~1	0.0119	0.0314	-0.0344	1.000										
djob_diffi~2	-0.0119	-0.0314	0.0344	-1.000	1.000									
dsatisfa~rs1	-0.0247	0.0051	0.0130	0.0046	-0.0046	1.000								
dsatisfa~rs2	-0.0240	0.0343	-0.0116	0.0260	-0.0260	-0.0096	1.000							
dsatisfa~rs3	0.0249	0.0302	-0.0424	0.0330	-0.0330	-0.0169	-0.0321	1.000						
dsatisfa~rs4	0.0366	0.0172	-0.0399	0.0182	-0.0182	-0.0337	-0.0641	-0.1130	1.000					
dsatisfa~rs5	0.0061	-0.0127	0.0062	-0.0053	0.0053	-0.0601	-0.1143	-0.2016	-0.4027	1.000				
dsatisfa~rs6	-0.0383	-0.0259	0.0483	-0.0335	0.0335	-0.0488	-0.0928	-0.1637	-0.3270	-0.5832	1.000			
hours_work	0.2724	0.1127	-0.2840	-0.0260	0.0260	-0.0267	0.017	0.0638	0.176	0.0449	-0.1664	1.000		
dsati~ition1	-0.0339	0.0143	0.0118	0.0274	-0.0274	0.1580	0.0823	0.0175	-0.0038	-0.0447	-0.0053	-0.0067	1.000	
dsati~ition2	-0.0252	-0.0033	0.0204	0.0298	-0.0298	0.0080	0.0504	0.166	0.0277	-0.0320	-0.0561	-0.0246	-0.0249	1.000
dsati~ition3	-0.0335	0.0074	0.0173	0.0340	-0.0340	-0.0030	0.0377	0.0755	0.0361	-0.0130	-0.0629	-0.0083	-0.0420	-0.0709
dsatisfac~n4	-0.0141	0.0342	-0.0185	0.0058	-0.0058	-0.0227	-0.0116	0.0157	0.0531	0.0236	-0.0698	0.0042	-0.0732	-0.1236
dsatisfac~n5	0.0040	-0.0149	0.0095	-0.0203	0.0203	-0.0153	-0.0414	-0.0516	-0.0060	0.1156	-0.0782	0.0024	-0.0964	-0.1628
dsatisfac~n6	0.0607	-0.0288	-0.0186	-0.0317	0.0317	-0.0054	-0.0158	-0.0726	-0.0943	-0.131	0.2570	0.0134	-0.0581	-0.0981
dvalue_tra~1	0.0404	0.0296	-0.0528	-0.0661	0.0661	-0.0298	-0.0401	-0.0368	-0.0307	0.0094	0.0492	0.0451	-0.0416	-0.0506
dvalue_tra~2	-0.0160	-0.0077	0.0176	0.0542	-0.0542	-0.0035	0.0128	0.0205	0.0180	0.019	-0.0395	-0.0362	0.0028	0.0348
dvalue_tra~3	-0.0071	-0.0052	0.0093	0.0295	-0.0295	0.0095	0.0359	0.0340	-0.0060	-0.0209	-0.0009	0.0184	0.0175	0.010
dvalue_tra~4	-0.0335	-0.0285	0.0471	0.0184	-0.0184	0.0374	0.0212	0.014	0.0259	-0.0119	-0.0257	-0.0336	0.0424	0.0272
wage3	0.2514	0.0595	-0.2253	-0.0189	0.0189	-0.0260	-0.0167	0.0163	0.0420	0.0243	-0.0598	0.3414	-0.0085	-0.0214
dsatisfa~ts1	-0.0190	0.0079	0.0068	0.0121	-0.0121	0.1750	0.1181	0.0294	-0.0134	-0.0457	-0.0148	-0.0096	0.1503	0.0602
dsatisfa~ts2	-0.0136	-0.0020	0.0111	0.0418	-0.0418	0.0307	0.1713	0.0458	0.0196	-0.0393	-0.0500	0.0188	0.0319	0.0601
dsatisfa~ts3	-0.0345	0.0111	0.0149	0.0270	-0.0270	0.0470	0.0370	0.1932	0.0487	-0.0372	-0.1119	-0.013	0.0161	0.0820
dsatisfa~ts4	-0.0118	0.0283	-0.0152	0.0111	-0.0111	0.0147	0.0450	0.1129	0.2313	-0.0922	-0.1641	0.0266	0.0314	0.0394
dsatisfa~ts5	-0.0121	0.0175	-0.0060	-0.0172	0.0172	-0.0397	-0.0494	-0.0503	0.0314	0.3286	-0.3289	0.0481	-0.0323	-0.0095
dsatisfa~ts6	0.0417	-0.0436	0.0069	-0.0142	0.0142	-0.0249	-0.0569	-0.1303	-0.2225	-0.231	0.5114	-0.0660	-0.0275	-0.0776
dsatisfac~y1	-0.0020	-0.0411	0.0355	0.0240	-0.0240	0.0611	0.0328	0.0034	-0.0089	-0.0380	0.0273	-0.0231	0.1513	0.0248
dsatisfac~y2	-0.0219	-0.0193	0.0314	0.0213	-0.0213	-0.0020	0.0431	0.0353	-0.0063	0.0027	-0.0266	-0.0317	0.0112	0.0619
dsatisfac~y3	-0.0228	-0.0325	0.0428	0.0052	-0.0052	-0.0013	0.0347	0.0417	0.0323	-0.0068	-0.0494	-0.0154	0.0196	0.0434
dsatisfac~y4	-0.0138	-0.0177	0.0243	0.0261	-0.0261	-0.0039	-0.0117	0.0545	0.0552	-0.0161	-0.0511	0.0006	-0.0128	0.0219
dsatisfac~y5	0.0020	0.0083	-0.0082	-0.0143	0.0143	-0.0115	-0.0244	-0.0111	0.0533	0.191	-0.1454	0.0076	-0.0309	-0.0175
dsatisfac~y6	0.0290	0.0421	-0.0552	-0.0233	0.0233	-0.0037	-0.0124	-0.0652	-0.146	-0.0821	0.2091	0.0197	-0.0225	-0.0531
dcontract_~1	0.0781	0.0744	-0.1163	-0.0571	0.0571	-0.0142	-0.0318	0.0074	0.0082	-0.0142	0.0158	0.0934	0.0045	0.0188
dcontract_~2	-0.0500	-0.0480	0.0748	0.0629	-0.0629	0.0003	0.0242	-0.0058	-0.0021	-0.0065	0.0045	-0.0688	0.0088	-0.0087
dcontract_~3	-0.0283	-0.0251	0.0406	0.0157	-0.0157	0.0491	0.0037	0.0065	-0.0037	0.0253	-0.0353	-0.0785	0.0063	0.0030
dcontract_~4	-0.0516	-0.0494	0.0770	0.0203	-0.0203	0.0008	0.0208	-0.0072	-0.0074	0.0138	-0.011	-0.0398	-0.0141	-0.0182

	dvalue_tra~1	dvalue~2	dvalue~3	dvalue~4	wage3	dsat~ts1	dsat~ts2	dsat~ts3	dsat~ts4	dsat~ts5	dsat~ts6	dsati~y1	dsati~y2	dsati~y3	dsati~y4	dsati~y
dvalue_tra~2	1.000															
dvalue_tra~3	-0.0802	1.000														
dvalue_tra~4	-0.1737	-0.0839	1.000													
wage3	-0.0278	-0.0070	-0.0749	1.000												
dsatisfa~ts1	0.0001	0.0190	0.0448	0.0148	1.000											
dsatisfa~ts2	-0.0077	-0.001	0.0232	-0.0174	-0.0086	1.000										
dsatisfa~ts3	0.019	0.0264	0.0199	-0.0141	-0.0165	-0.0257	1.000									
dsatisfa~ts4	0.0111	-0.0062	0.0112	-0.0235	-0.0306	-0.0476	-0.0918	1.000								
dsatisfa~ts5	0.0215	-0.0150	0.0057	0.0292	-0.0605	-0.0940	-0.1811	-0.3360	1.000							
dsatisfa~ts6	-0.0326	0.0054	-0.0347	-0.0044	-0.0594	-0.0923	-0.1778	-0.3299	-0.6511	1.000						
dsatisfac~y1	-0.0085	0.0230	0.0547	-0.0227	0.0851	0.0177	-0.0013	0.0046	-0.0300	0.013	1.000					
dsatisfac~y2	0.0139	-0.0118	0.0282	-0.0329	0.0082	0.0435	0.0198	0.0050	0.0002	-0.0237	-0.0306	1.000				
dsatisfac~y3	0.0303	0.0000	0.0000	-0.0163	0.0055	0.0349	0.0289	0.0454	0.0012	-0.0555	-0.0422	-0.0522	1.000			
dsatisfac~y4	0.0224	-0.0057	0.0038	-0.0155	-0.0185	0.0190	0.0262	0.0565	0.0027	-0.0566	-0.0646	-0.0800	-0.113	1.000		
dsatisfac~y5	0.0196	-0.011	-0.011	0.0272	-0.0069	-0.0233	0.0186	0.0239	0.1226	-0.1420	-0.1176	-0.1455	-0.2007	-0.3074	1.00	
dsatisfac~y6	-0.0543	0.0123	-0.021	0.0126	-0.0128	-0.0313	-0.0598	-0.0919	-0.1150	0.2171	-0.1202	-0.1488	-0.2052	-0.3144	-0.571	
dcontract_~1	0.0032	-0.0277	-0.1186	0.1329	-0.0044	-0.0226	0.0029	-0.0314	0.0203	0.0069	-0.1866	-0.1875	-0.118	-0.0444	0.080	
dcontract_~2	-0.0020	0.0323	0.160	-0.0980	-0.0008	-0.0045	-0.0137	0.0197	-0.0256	0.0186	0.1797	0.1548	0.0687	0.0176	-0.077	
dcontract_~3	0.0001	-0.0058	0.0351	-0.0505	-0.0060	0.0246	-0.0090	0.0159	0.0129	-0.0253	0.109	0.0358	0.0323	0.0051	-0.024	
dcontract_~4	-0.0026	0.0131	0.0590	-0.0774	0.0081	0.0230	0.0093	0.0195	-0.0112	-0.0135	0.0680	0.194	0.0774	0.0409	-0.035	

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Appendix F: ordered logit regression of 4 samples used for analyses

Ordered logistic regression	Number of obs = 29552					
	Wald chi2(35) = 866.39					
	Prob > chi2 = 0.0000					
Log pseudolikelihood = -27707.996	Pseudo R2 = 0.0321					
(Std.	Err. adjusted for 7670 clusters in pid)					
Robust						
health1	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
djob_level1	-.1791232	.0545683	-3.28	0.001	-.2860751	-.0721712
djob_level2	.0089886	.044293	0.20	0.839	-.0778241	.0958013
djob_difficulty1	-.1370112	.0324398	-4.22	0.000	-.2005921	-.0734303
dsatisfaction working hours1	.2985189	.162965	1.83	0.067	-.0208867	.6179245
dsatisfaction working hours2	.3456088	.0858862	4.02	0.000	.1772751	.5139426
dsatisfaction working hours3	.283506	.0592554	4.78	0.000	.1673675	.3996445
dsatisfaction working hours4	.2026933	.0476159	4.26	0.000	.1093678	.2960187
dsatisfaction working hours5	.1113133	.0400384	2.78	0.005	.0328394	.1897872
hours_work	-.0091633	.0020866	-4.39	0.000	-.013253	-.0050736
dsatisfaction working condition1	.7954621	.1201653	6.62	0.000	.5599425	1.030.982
dsatisfaction working condition2	.6278232	.0792986	7.92	0.000	.4724008	.7832456
dsatisfaction working condition3	.4570004	.0588023	7.77	0.000	.34175	.5722508
dsatisfaction working condition4	.3246216	.0510379	6.36	0.000	.2245892	.424654
dsatisfaction working condition5	.1431016	.0458656	3.12	0.002	.0532067	.2329965
dvalue_training1	-.2151203	.0467577	-4.60	0.000	-.3067637	-.1234769
dvalue_training2	-.1141556	.0532953	-2.14	0.032	-.2186124	-.0096988
dvalue_training3	.0194521	.0771456	0.25	0.801	-.1317504	.1706546
wage	-.0000238	5.62e-06	-4.24	0.000	-.0000349	-.0000128
dsatisfaction shifts1	.251177	.1780089	1.41	0.158	-.0977141	.600068
dsatisfaction shifts2	.1863711	.0988224	1.89	0.059	-.0073173	.3800596
dsatisfaction shifts3	.1125287	.0620331	1.81	0.070	-.009054	.2341113
dsatisfaction shifts4	.0658916	.0475047	1.39	0.165	-.0272159	.1589991
dsatisfaction shifts5	.0645307	.0377836	1.71	0.088	-.0095237	.1385852
dsatisfaction job security1	.5254113	.0909507	5.78	0.000	.3471513	.7036713
dsatisfaction job security2	.3288919	.0789486	4.17	0.000	.1741556	.4836283
dsatisfaction job security3	.2898938	.0575435	5.04	0.000	.1771107	.4026769
dsatisfaction job security4	.2542566	.0453622	5.61	0.000	.1653484	.3431648
dsatisfaction job security5	.1660532	.0352072	4.72	0.000	.0970483	.2350581
dcontract_type1	.0560762	.0596398	0.94	0.347	-.0608156	.172968
dcontract_type2	-.0461695	.0927619	-0.50	0.619	-.2279795	.1356405

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
dcontract_type3	-.2576757	.1611552	-1.60	0.110	-.5735341	.0581827
age	.0348948	.002037	17.13	0.000	.0309024	.0388871
dsex (men)	-.2236392	.0463378	-4.83	0.000	-.3144597	-.1328188
ses	-.0000734	.0000159	-4.61	0.000	-.0001046	-.0000422
dsector (private)	-.034732	.0421497	-0.82	0.410	-.1173439	.0478799

Table 13: Results of the ordered logit regression of sample 1

Ordered logistic regression		Number of obs = 7237				
		Wald chi2(35) = 340.25				
		Prob > chi2 = 0.0000				
Log pseudolikelihood = -6859.688		Pseudo R2 = 0.0376				
(Std.		Err. adjusted for 3417 clusters in pid)				
Robust						
health1	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
djob_level1	-.2290568	.0957524	-2.39	0.017	-.4167281	-.0413854
djob_level2	.0459571	.0788905	0.58	0.560	-.1086654	.2005796
djob_difficulty1	-.0765327	.05871	-1.30	0.192	-.1916022	.0385368
dsatisfaction working hours1	.2143668	.2407984	0.89	0.373	-.2575894	.686323
dsatisfaction working hours2	.4478508	.1442238	3.11	0.002	.1651773	.7305242
dsatisfaction working hours3	.2826778	.1110961	2.54	0.011	.0649336	.5004221
dsatisfaction working hours4	.2221439	.0985753	2.25	0.024	.0289399	.415348
dsatisfaction working hours5	.0379244	.0898743	0.42	0.673	-.1382261	.2140749
hours_work	-.009654	.0033242	-2.90	0.004	-.0161693	-.0031388
dsatisfaction working condition1	.7984649	.2026544	3.94	0.000	.4012696	119.566
dsatisfaction working condition2	.61312	.1471535	4.17	0.000	.3247044	.9015356
dsatisfaction working condition3	.5365994	.1159703	4.63	0.000	.3093019	.7638969
dsatisfaction working condition4	.3338122	.1036333	3.22	0.001	.1306946	.5369298
dsatisfaction working condition5	.2594852	.0973215	2.67	0.008	.0687386	.4502318
dvalue_training1	-.2129197	.0818643	-2.60	0.009	-.3733708	-.0524686
dvalue_training2	-.1823039	.0978272	-1.86	0.062	-.3740417	.009434
dvalue_training3	-.0806499	.1532126	-0.53	0.599	-.3809411	.2196412
wage	-.0000211	8.71e-06	-2.43	0.015	-.0000382	-4.06e-06
dsatisfaction shifts1	-.0569144	.2510493	-0.23	0.821	-.5489619	.435133
dsatisfaction shifts2	.1457552	.150821	0.97	0.334	-.1498487	.441359
dsatisfaction shifts3	.113264	.1164619	0.97	0.331	-.1149971	.3415251
dsatisfaction shifts4	-.0544733	.091779	-0.59	0.553	-.2343568	.1254101
dsatisfaction shifts5	.0359898	.0812843	0.44	0.658	-.1233246	.1953041
dsatisfaction job security1	.4806015	.1544289	3.11	0.002	.1779263	.7832766
dsatisfaction job security2	.1919484	.1394774	1.38	0.169	-.0814223	.4653192
dsatisfaction job security3	.2643362	.109907	2.41	0.016	.0489226	.4797499

	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
dsatisfaction job security4	.1720504	.0871046	1.98	0.048	.0013286	.3427722
dsatisfaction job security5	.136539	.0706651	1.93	0.053	-.001962	.2750401
dcontract_type1	.0374996	.1149836	0.33	0.744	-.1878641	.2628632
dcontract_type2	-.027429	.1843081	-0.15	0.882	-.3886663	.3338083
dcontract_type3	-.1140335	.3091779	-0.37	0.712	-.720011	.4919439
age	.0392419	.0034969	11.22	0.000	.0323882	.0460957
dsex (men)	-.3497736	.0785674	-4.45	0.000	-.5037629	-.1957843
ses	-.0000981	.0000294	-3.33	0.001	-.0001557	-.0000404
dsector (private)	.0076917	.0737025	0.10	0.917	-.1367624	.1521459

Table 14: Results of the ordered logit regression of sample 2

Ordered logistic regression	Number of obs = 15930
	Wald chi2(35) = 571.28
	Prob > chi2 = 0.0000
Log pseudolikelihood = -14883.547	Pseudo R2 = 0.0313
(Std.	Err. adjusted for 6086 clusters in pid)

Robust						
health1	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
djob_level1	-.1435379	.0670939	-2.14	0.032	-.2750396	-.0120362
djob_level2	.0128005	.0566646	0.23	0.821	-.0982601	.123861
djob_difficulty1	-.1423271	.0409335	-3.48	0.001	-.2225552	-.062099
dsatisfaction working hours1	.2953034	.2515371	1.17	0.240	-.1977002	.7883071
dsatisfaction working hours2	.1976086	.1203671	1.64	0.101	-.0383066	.4335238
dsatisfaction working hours3	.2428623	.0791578	3.07	0.002	.0877159	.3980086
dsatisfaction working hours4	.1784586	.0625037	2.86	0.004	.0559535	.3009636
dsatisfaction working hours5	.1527941	.0524922	2.91	0.004	.0499113	.2556769
hours_work	-.0109965	.0026275	-4.19	0.000	-.0161463	-.0058467
dsatisfaction working condition1	.8069345	.1698955	4.75	0.000	.4739454	1.139.924
dsatisfaction working condition2	.6309575	.104924	6.01	0.000	.4253102	.8366047
dsatisfaction working condition3	.4182266	.0756925	5.53	0.000	.2698721	.5665811
dsatisfaction working condition4	.3268076	.0652012	5.01	0.000	.1990155	.4545996
dsatisfaction working condition5	.1024613	.0595589	1.72	0.085	-.0142721	.2191947
dvalue_training1	-.2084477	.0599494	-3.48	0.001	-.3259465	-.0909489
dvalue_training2	-.0632553	.0694408	-0.91	0.362	-.1993568	.0728462
dvalue_training3	.0330415	.1014383	0.33	0.745	-.165774	.231857
wage	-.0000273	7.33e-06	-3.72	0.000	-.0000416	-.0000129
dsatisfaction shifts1	.3499521	.2510327	1.39	0.163	-.142063	.8419673
dsatisfaction shifts2	.100117	.1504542	0.67	0.506	-.1947677	.3950018
dsatisfaction shifts3	.0487037	.0814253	0.60	0.550	-.1108869	.2082943
dsatisfaction shifts4	.101797	.0623133	1.63	0.102	-.0203349	.2239288

	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
dsatisfaction shifts5	.0511698	.0493693	1.04	0.300	-.0455924	.1479319
dsatisfaction job security1	.4222299	.1253504	3.37	0.001	.1765476	.6679122
dsatisfaction job security2	.3221424	.1097972	2.93	0.003	.1069439	.5373409
dsatisfaction job security3	.2245016	.0746112	3.01	0.003	.0782663	.3707369
dsatisfaction job security4	.3017726	.0568898	5.30	0.000	.1902707	.4132746
dsatisfaction job security5	.1623883	.044858	3.62	0.000	.0744681	.2503084
dcontract_type1	.1035655	.0772148	1.34	0.180	-.0477727	.2549037
dcontract_type2	.0771101	.1233598	0.63	0.532	-.1646706	.3188909
dcontract_type3	-.1314165	.2166556	-0.61	0.544	-.5560537	.2932207
age	.0344044	.0024548	14.02	0.000	.0295931	.0392158
dsex (men)	-.2012567	.0555974	-3.62	0.000	-.3102255	-.0922879
ses	-.0000592	.0000192	-3.09	0.002	-.0000968	-.0000217
dsector (private)	-.0628049	.0503051	-1.25	0.212	-.1614011	.0357912

Table 15: Results of the ordered logit regression of sample 3

Ordered logistic regression	Number of obs = 6385					
	Wald chi2(35) = 203.67					
	Prob > chi2 = 0.0000					
Log pseudolikelihood = -5881.6389	Pseudo R2 = 0.0277					
(Std.	Err. adjusted for 3065 clusters in pid)					
Robust						
health1	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
djob_level1	-.2143136	.108395	-1.98	0.048	-.426764	-.0018632
djob_level2	-.0398561	.0819063	-0.49	0.627	-.2003895	.1206773
djob_difficulty1	-.1756323	.0597266	-2.94	0.003	-.2926942	-.0585703
dsatisfaction working hours1	.5313566	.3702418	1.44	0.151	-.194304	1.257.017
dsatisfaction working hours2	.3076596	.226546	1.36	0.174	-.1363625	.7516816
dsatisfaction working hours3	.141784	.150444	0.94	0.346	-.1530807	.4366488
dsatisfaction working hours4	.0972547	.0933303	1.04	0.297	-.0856693	.2801786
dsatisfaction working hours5	.0421969	.0744773	0.57	0.571	-.1037759	.1881698
hours_work	-.010873	.004571	-2.38	0.017	-.0198321	-.001914
dsatisfaction working condition1	.7321474	.2463609	2.97	0.003	.2492888	1.215.006
dsatisfaction working condition2	.5801431	.1733097	3.35	0.001	.2404624	.9198238
dsatisfaction working condition3	.4013176	.1183343	3.39	0.001	.1693867	.6332485
dsatisfaction working condition4	.2922719	.0969376	3.02	0.003	.1022777	.4822661
dsatisfaction working condition5	.1166479	.0871348	1.34	0.181	-.0541332	.2874289
dvalue_training1	-.2163262	.0871206	-2.48	0.013	-.3870794	-.045573
dvalue_training2	-.1280203	.1036425	-1.24	0.217	-.3311559	.0751154
dvalue_training3	.1164876	.1547311	0.75	0.452	-.1867799	.4197551
wage	-.0000223	.0000163	-1.37	0.171	-.0000542	9.64e-06

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

dsatisfaction shifts1	.608761	.4808968	1.27	0.206	-.3337794	1.551.301
dsatisfaction shifts2	.2566994	.2370945	1.08	0.279	-.2079972	.721396
dsatisfaction shifts3	.1411187	.1480537	0.95	0.341	-.1490613	.4312986
dsatisfaction shifts4	.0653432	.0991772	0.66	0.510	-.1290405	.2597269
dsatisfaction shifts5	.0809746	.0725012	1.12	0.264	-.0611251	.2230744
dsatisfaction job security1	.7314164	.2122262	3.45	0.001	.3154607	1.147.372
dsatisfaction job security2	.4652966	.1580443	2.94	0.003	.1555354	.7750578
dsatisfaction job security3	.4299607	.1157234	3.72	0.000	.203147	.6567744
dsatisfaction job security4	.1508675	.0937459	1.61	0.108	-.0328711	.3346061
dsatisfaction job security5	.1710468	.067356	2.54	0.011	.0390314	.3030622
dcontract_type1	-.002615	.125435	-0.02	0.983	-.2484632	.2432331
dcontract_type2	-.3594588	.174427	-2.06	0.039	-.7013294	-.0175882
dcontract_type3	-.6520461	.337824	-1.93	0.054	-1.314.169	.0100768
age	.0302342	.0037917	7.97	0.000	.0228026	.0376658

Table 16: Results of the ordered logit regression of sample 4

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Appendix G: test for linearity
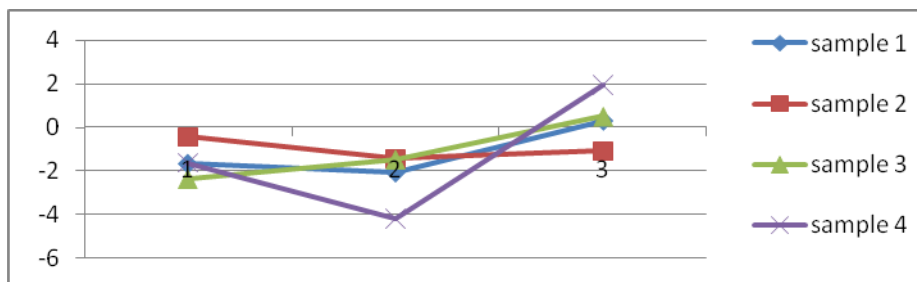
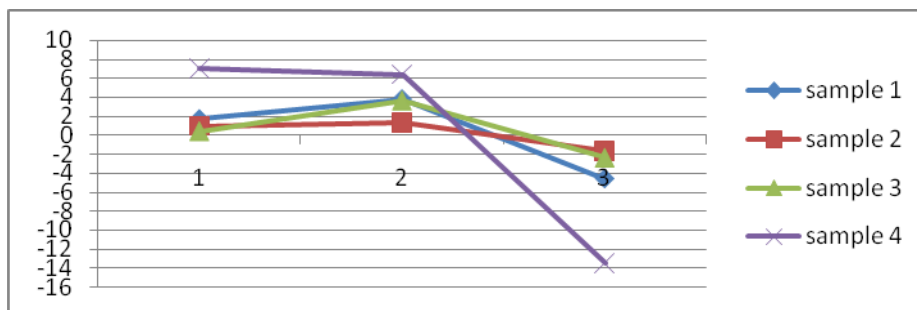Value-training

Figure 7: test for linearity value-training

Contract-type

Figure 8: test for linearity contract-type
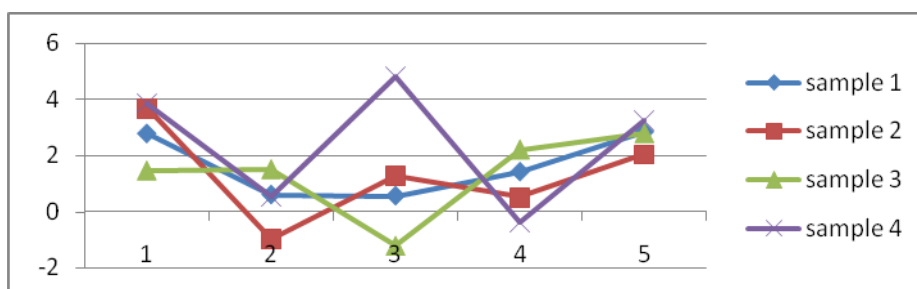
Satisfaction job-security

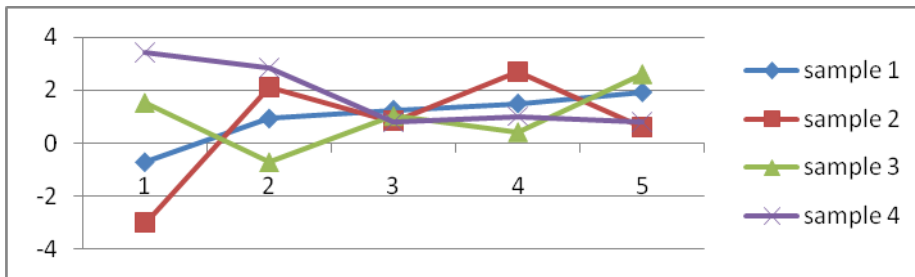Figure 9: test for linearity satisfaction job-security

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011

Satisfaction working hours

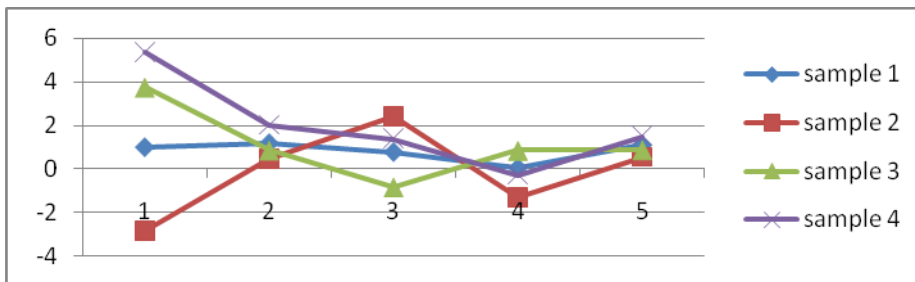Figure 10: test for linearity satisfaction working hours

Satisfaction shifts

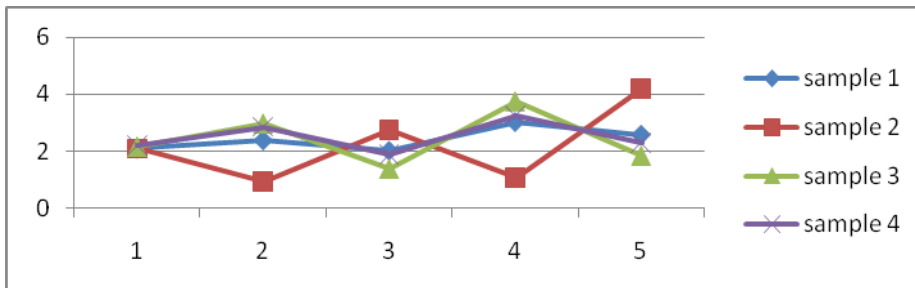Figure 11: test for linearity satisfaction shifts

Satisfaction working conditions

Figure 12: test for linearity satisfaction working conditions

Jasper Schuurman, 195367
Erasmus University, Rotterdam
Health Economics, 2011