

Bachelor Thesis: Life or job satisfaction and self-employment  
B.Sc. Economics and Business Economics (Erasmus University)  
Erasmus School of Economics

# The consequences of stress at work, regarding employees' health status.

**Abstract:** Employees are often faced with stress at work, and several workers are absent from work because of job stress. One third of British workers absent from work are absent because of the consequences of job stress. However, what are the effects of job stress on human health status? Many studies have been done about these effects, including mental and physical health issues like coronary heart disease and depression.

This study includes a literature review of previous studies concerning the effects of job stress on health and also discusses several findings of those studies. Furthermore, it provides an empirical analysis of the association between job stress and mental health and general health status. It also compares the outcomes of this analysis with the findings of the existing literature on the subject.

Author: Victor de Lange

Student number: 355410

Supervisor: Mrs. Aysu Okbay

Date of completion: 24<sup>th</sup> of August, 2015

# Table of Contents

1. Introduction .....	2
2. Literature Review and Theory.....	4
2.1 Defining the concept of stress .....	4
2.2 Karasek’s job-strain model and Siegrist’s effort-reward imbalance model .....	5
2.3 Previous studies of the effects of job stress on health .....	7
2.3.1 Physical and mental health and job stress .....	7
2.3.2 Coronary heart disease and job stress .....	8
2.3.3 Mental health and job stress.....	8
2.3.4 Health and sleep problems caused by job stress .....	10
2.3.5 Health and job stress caused by overtime work.....	10
3. Data Source .....	12
4. Methods.....	14
5. Results .....	15
5.1 Associations with Mental Health.....	15
5.2 Associations with General Health Status.....	15
6. Conclusions and Discussion.....	17
7. Limitations .....	19
Bibliography.....	20

# **1. Introduction**

Mental health issues and stress-related illnesses were huge concerns for banks in 2014. The banks were worried about the rise of these problems in their workforce, as their employees struggled to deal with less job security and more work. The main driver of these concerns was the rising number of suicides in the banking sector. A high number of staff cutbacks the few years before had increased stress levels, which were already high.

More stress-related illnesses appeared at banks than those seen before the crisis. Before the crisis, employees wanted to work hard to earn more money, but after the crisis employees wanted to work hard to prevent being deemed unnecessary and getting fired (Schäfer, 2014).

In the same year, manufacturers found that stress and mental health disorders had increased the most when compared other reasons for long-term absence caused by sickness. Again, employees experienced the consequences of the job stress during the crisis (Groom, 2014).

Furthermore, in 2013, 35% of British employees' absence at work was caused by stress at work. The government provided a program meant to find tasks for stressed employees to do at work instead of being sent home. Therefore, employees should return to work faster to save government expenses because of employee absence. However, employees still said that they were dissatisfied at work and that there was almost no difference in the number of absent employees when compared to the situation before the new program. Apparently, there was still not enough evidence of the effect of job stress on the health status of employees to provide a program sufficiently dealing with the problem (Hope, 2013).

According Schäfer, Groom and Hope, it is clear that stress at work is a big problem nowadays. Workers that have to cope with high levels of job stress are more likely to have both mental and physical health problems. In previous studies, the effect of job stress on health has been measured in specific job sectors like hospitals (Mojoyinola, 2008), the police (Jackson and Maslach, 1982) or the British government (Bosma *et al.*, 1998).

In this study, the meaning of job stress will be defined with the support of two models: Karasek's job-strain model and Siegrist's effort-reward imbalance model. Also, different findings of previous studies are reviewed. Other studies of health problems caused by job stress often focus on one specific problematic health outcome. For example, Bosma *et al.* (1998) found that there exists a higher likelihood of coronary heart disease if the employee is stressed. Estryin-Behar *et al.* (1990) focused on the mental health effects of job stress. They

found that job stress effects mental health through fatigue, depression and sleep impairment. This study will summarize the various outcomes of existing studies on the health effects of job stress.

Furthermore, the association of job stress with mental and physical health is measured. It is important to know whether there is an association between job stress and health problems and whether those associations are significant effects because, according to Hope (2013), there is still not enough evidence to provide a solution for employees absent because of health problems. Therefore, the research question of this study is as follows:

***Research question: Is job stress associated with mental or physical health?***

In this study, we attempt to address this question using the data of “The Health and Retirement Study” (HRS). The dataset is diversified because it is a large dataset collecting data from different job sectors. Because of that the dataset’s scope, this study is not focused on only one specific job sector and has a large sample size, unlike the studies reviewed in Section 2.3. Therefore this study will give a good overall view of the consequences of working under stress, regardless of the job sector. However, this study will not research the differences between the associations within the different job sectors.

For this study, two hypotheses are tested:

*Hypothesis 1: Job stress is significantly associated with mental health in a way that job stress causes mental health problems.*

*Hypothesis 2: Job stress is significantly associated with physical health in a way that job stress causes physical health problems.*

In the next section, job stress is defined and two different job stress models are explained. Secondly, previous studies of health effects causes by job stress are reviewed. Thereafter, in Section 3, a data analysis is done with the HRS dataset. In Section 4, the results are analyzed and discussed.

## **2. Literature Review and Theory**

### **2.1 Defining the concept of stress**

Through the years, stress has been defined in many ways by different authors. The term “stress” was introduced by Hans Selye (1926). He described stress as “the nonspecific response of the body to any demand.” In contrast, Paul Rosch’s (1986) definition was based on physics. He described stress as a stimulus that produced distortion and strain, instead of a response (Everly & Lating, 2013). Another definition of stress was given by Sanders (1983). He defined stress as “a state of imbalance in the energy supply which is difficult to restore or to compensate.”

Hence, researchers did not agree about one strict definition of stress and the process that is involved with it. Commonly used definitions of stress are emotional, physical or mental strain or tension. Another frequently used definition of stress is the condition in which an individual experiences that demands exceed the personal resources an individual can deliver (Cooper, 2001).

According to Cooper, stress can be understood as response-based, as stimulus-based and as a process. The response-based model is characterized by the appearance of emotional and behavioral symptoms that react to psychosocial stress factors. Contrary to the response-based model, the stimulus-based model assumes that stress is a force that has the result of a higher demand of job tasks and therefore creates distortion. The last approach, the process approach, says that “stress must be viewed in a transactional way where the focus lies on the dynamics of the psychological mechanisms of cognitive appraisal and dealing with stressful situations, which underpins a stressful encounter” (Cooper, 2001).

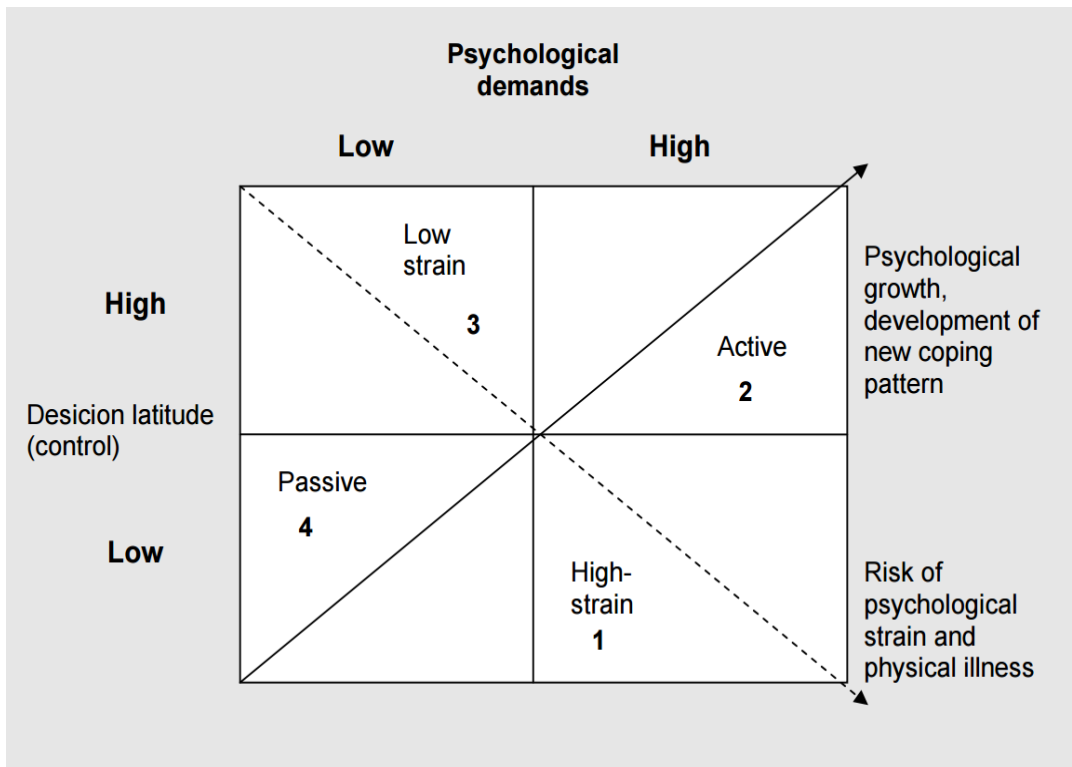
According to Cooper, stress process has three main components, namely: stressors, strain and outcomes. Stressors are the stimuli, strain is the response to stressors, and outcomes are the consequences of that strain. There exist many types of stressors, such as physical stressors (e.g. noise, danger), task-related job stressors (e.g. overload), role stressors (e.g. role conflicts), social stressors (e.g. poor relationships), work schedule-related stressors (e.g. working time), career-related stressors (e.g. job insecurity), traumatic events (e.g. major accident) and stressful change processes (e.g. downsizing).

The impact, prevalence and the nature of stressors on mental health have been analyzed extensively. It was found that stress reactions like strain can have different forms and be active at different levels: individual, organizational or non-professional. Individual stress reactions can be physical, behavioral and affective. At the organizational level, stress reactions can also have consequences; for example, interpersonal conflicts may lead to greater turnover. Lastly, stress reactions can also have consequences outside of professional circumstances, for example in the private life. Long-term consequences of stress reactions on an individual's life can be chronic physical illness and diminished personal well-being (Sonnentag & Frese, 2003).

## **2.2 Karasek's job-strain model and Siegrist's effort-reward imbalance model**

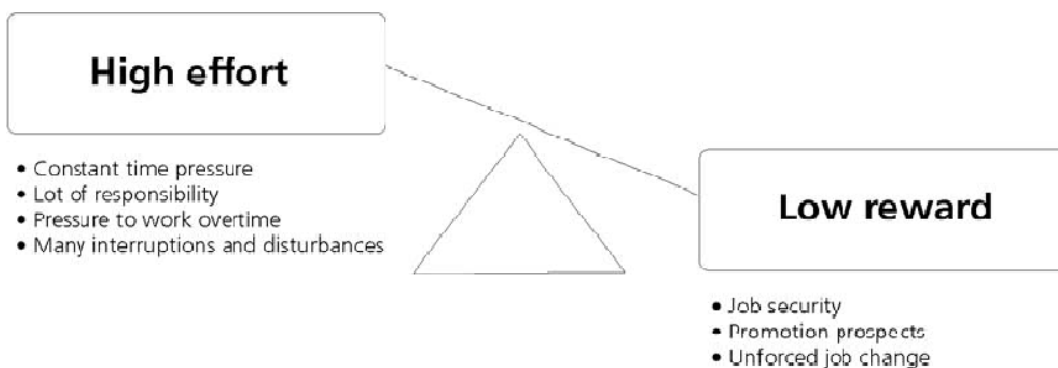
Karasek's job-strain model and Siegrist's effort-reward imbalance model look in more detail at the factors that lead to job stress. The job strain model analyses situational characteristics (extrinsic). The effort-reward model focuses on the separate personal characteristics (intrinsic) in addition to the situational model of Karasek (Peter, 2002).

Karasek's job-strain model hypothesizes that job demands and work control have an impact on an employee's level of well-being and the quality of his or her working life. The model presumes that strain is the result of the interactive effect of the two variables and is not the result of one of the variables alone (Sargent & Terry, 2000). The combinations of the two variables and the results are shown in Figure 1.



**Figure 1:** Four quadrants of the job-strain model with the likelihood of the consequence on health (Theorell, 1998).

Siegrist’s effort-reward imbalance model is based on the idea of equilibrium. It is about the balance between effort and reward. In short, this model assumes that strain is caused by the missing of reciprocity between the two variables effort and reward. Examples of efforts are time pressure, responsibility, pressure to work overtime and disturbance during work. Examples of rewards are job security, promotions and salary. If these variables are not in balance, job-stress is the consequence. A schematic view of Siegrist’s effort-reward model is shown in Figure 2 (Siegrist, 1996).



**Figure 2:** The effort-reward imbalance model by Siegrist.

## **2.3 Previous studies of the effects of job stress on health**

### **2.3.1 Physical and mental health and job stress**

This section discusses the outcomes of other studies already done about the effects of job stress on mental and physical health. Past studies often concentrated on health problems in specific job sectors, like the concerns about the welfare policy of the Nigerian government together with the management boards of Nigerian hospitals. Therefore, a study was done to investigate the effects of job stress on the physical and mental health of Nigerian nurses in the public hospitals of Ibadan Metropolis in 2008. The focal point of this research was the question of how the government and the hospital management board could effectively manage, diminish and prevent work stress to increase the health level of the nurses. This study concluded that there was an association between job stress and increased symptoms of decreased health. The amount of stress the nurses experienced was combined with physical and mental health complaints, so they assumed that their state of health was becoming worse because of the amount of stress at work. The effects of job stress on the physical health of the nurses were manifested in form of headache, back or neck pain, muscular aches and high blood pressure. Worry, lack of concentration or attention, mental chatter and difficulty in making decisions were the effects on mental health that were found (Mojoyinola, 2008).

Another study addressing job stress in the health sector was done in New Jersey. A survey derived from Karasek's model was applied for several health care workers in New Jersey hospitals. Landsbergis (1988) concluded job strain and burnouts are more likely when a job has high workload demands and low decision attitude. These nurses were emotionally exhausted and dissatisfied in their job. Physical health complaints were manifest in the form of high blood pressure and serum cholesterol. Those two factors increased the likelihood of getting a coronary heart disease (CHD) (Landsbergis, 1988). Coronary heart disease is a class of diseases that involve the heart or blood vessels and is also an effect of job stress that will be discussed more extensively later in this section (Johnsen *et al.*, 1989).

Regarding the findings of previous studies, two Japanese authors, Kawakami and Haratani (1999), reviewed current findings about the relationship between job stress and mental and physical health among Japanese women and men. The existing literature concerning the mental health effects of job stress suggests that highly strained workers are often associated with anxiety, depression and fatigue. Furthermore, previous findings have shown that workers



who experience job stress at work are more likely to be faced with problems of alcohol consumption. Looking at the existing literature concerning the physical health effects of job stress, Kawakami and Haratani found that 66% of the victims who died from heart attacks experienced job stress and work overload during their last months at work before their death. In addition, work overload and job stress were associated with a higher risk of coronary heart disease. Moreover, the likelihood of having increased blood pressure and higher cholesterol was found to be higher among highly strained workers (Kawakami & Haratani, 1999).

### **2.3.2 Coronary heart disease and job stress**

Research specific to the risk of coronary heart disease was done by Bosma *et al.* (1998). Civil participants working at the British government were tested for CHD using the models of both Karasek and Siegrist. With Siegrist's model, Bosma *et al.* (1998) found that the imbalance between personal efforts or work-related over commitment and rewards lead to a higher risk of coronary heart disease. Contrary to the previous findings, with the support of Karasek's model they found that job-strain and high job-demands were not associated with coronary heart disease. In short, they concluded that the imbalance between efforts and gains plus low job control influenced the development of heart disease among men and women working in the British government (Bosma *et al.*, 1998).

Regarding CHD, Swedish male workers were the subjects for research on that specific class of diseases. This study researched the mortality effects of the CHD. According to the outcomes of this study, highly strained workers had a higher cardiovascular disease morbidity rates and mortality rates than workers working under less straining conditions. These workers also have a higher chance of dying at younger age as a result of CHD than less strained workers. Within this group, blue-collar workers showed the greatest risk of CHD morbidity and mortality (Johnsen *et al.*, 1989).

### **2.3.3 Mental health and job stress**

Stress at work can produce negative effects on the mental health status of workers. The association between job stress, mental load and strain with mental health status among female hospital employees was investigated by Estryn-Behar *et al.* (1990). Data was collected about

the health of the 1500 female health care workers who participated the study, and this data formed a general health questionnaire. The subjects had to report about five health indicators used to research the mental health status of the female health care workers. These indicators are: fatigue, sleep impairment, use of antidepressants, sleeping pills or sedatives, and a high GHQ score. A higher GHQ is the equivalent of a worse mental health status. The consequences of poor mental health status caused by job stress are that employees leave work because of health problems. The study found the five most important health problems that cause absence at work among participants. Mental health problems and sleep problems caused 3.080 of days being sick at home among a total of 25.433 days measured among all the participants together. Moreover, it is the third most common cause absence from work. Frequent mental health problems are fatigue and sleep impairment. Furthermore, all other indicators increased with the level of job stress, mental load and strain (Estryn-Behar *et al.*, 1990).

Another research study on the relationship between job stress and mental health was done by Shigemi *et al.* (1997). This study also used a general health questionnaire to collect data. Furthermore, subjects had to respond to questions about job stress conditions to compare answers with the GHQ score of the subjects. All subjects worked for of a Japanese company on the market of electronics. Shigemi *et al.* (1997) found that an average of 37.8% of the total sample size had to cope with problematic mental health status. Out of the male respondents, 41.7% coped with problematic mental health status, compared to the 34.3% of the female respondents. Hence, they found a difference between female and male respondents regarding to the association between mental health status and job stress. The main causes of depressive symptoms among the Japanese employees were that they were not allowed to make mistakes, had too much responsibility, had too much trouble at work, could not cope with the new technology and had bad relationships with their executives. Shigemi *et al.* (1997) reported that the consequences of the depressive symptoms are psychiatric and somatic diseases. However, they did not mention specific diseases (Shigemi *et al.*, 1997).

Job stress has also negative effects on mental health related to family circumstances. This relation was researched by Jackson and Maslach (1982). The subject of their study was the effect of job stress on family life. The respondents of the survey study were 142 police officers and their wives. These couples had troubles with interactions within their families. The outcomes of the study supported the conclusion that officers who had experienced much stress during their work experienced more anger, did not spend much time concerned with

family matters and were not satisfied with their marriages. Hence, work stress had effects on the mental health of the police officers. Moreover, even the families of the respondents felt the consequences of the job stress experienced at the police officer's work (Jackson & Maslach, 1982).

### **2.3.4 Health and sleep problems caused by job stress**

A study on the association between job stress and sleep problems was done by Knudsen *et al.* (2007). They reviewed existing literature about the relationship between job stress and sleep-related health problems. Knudsen *et al.* (2007) found that physical and mental health problems are often related to sleep problems, which are regarded as a response to job stress. Coronary heart disease and myocardial infarction are regarded as physical health consequences of poor sleep quality (Schwartz *et al.*, 1999). In addition, sleep problems also increase the chance of getting diabetes and hypertension (Spiegel *et al.*, 1995), and create other physical health problems like muscle pain, headaches and gastrointestinal problems (Kupperman *et al.*, 1995). Mental health is also effected by sleep disorders, in the form of depression (Breslau *et al.*, 1997). To summarize, Knudsen *et al.* (1997) concluded that sleep problems are associated with work overload and have several negative outcomes on mental and physical health (Knudsen *et al.*, 1997).

### **2.3.5 Health and job stress caused by overtime work**

As mentioned before in Section 2.1, overtime work causes job stress. However, less information exists about the effects of overtime on health. Spurgeon *et al.* (1997) tried to collect more information on this relationship. Their paper reviewed established evidence of the association between the potential effects on health and overtime work. The authors' biggest concern was that the effects of overtime work have been seriously neglected in the past. Therefore, it is difficult to form a conclusion about the effects of overtime work on health. Furthermore, with the data currently available, it was difficult to assume the maximum amount of hours people should work to remain healthy. However, they did conclude that many of the health problems associated with job stress can also be associated with overtime work. These health problems are gastrointestinal disorders, musculoskeletal disorders,

problems with the immune system and psychological complaints. A gastrointestinal disorder involves a disease in the digestive system, like a stomach disease. The result of another study reviewed by Spurgeon *et al.* (1997) was that the rate of abortion was increased among women who worked in overtime (Spurgeon *et al.*, 1997).

Another review of existing literature about work overtime and health was done by Sparks *et al.* (1997). Their analysis aimed to support the association between work overtime and health problems. Just as Spurgeon *et al.* (1997) found, they found that the effects of long work hours on human health status is concerning. However, in contrast to Spurgeon *et al.* (1997), they did not have the opinion that these problems were neglected. They manifested results proving that there is a positive significant correlation between the number of hours worked and physical and mental health problems. The reviewed studies from Barton and Folkard (1993) and Buell and Breslow (1960) proved that there existed greater health problems for employees who worked at least 48 hours per week as compared to employees who did not. Barton and Folkard found that workers who worked more than 48 hours a week had a higher chance of suffering mental and physical health problems. These health problems were manifested in a form of anxiety, coronary heart diseases, digestive problems and neuroticism. Buell and Breslow found that the chance of dying from CHD was positively correlated with the hours worked by the employee. In fact, for employees working more than 48 hours a week, the chance of dying from CHD is twice as big compared to employees who worked less (Sparks *et al.*, 1997).

### **3. Data Source**

For this research data was collected by the RAND Center for the Study of Aging. This organization formed “The Health and Retirement Study” (HRS) (2013). The HRS is a long-term household survey data set for the study of retirement and health among the elderly in the United States.

The HRS is a national panel survey of American individuals and their spouses. The respondents were all 50 years and older but, their spouses were interviewed regardless what their age was. The panel had to respond to a survey that collects information about demographics, income, assets, health, cognition, family structure and connections, health care utilization and costs, housing, job status and history, expectations and insurance. The respondents were interviewed over ten waves. For this study, wave one is used because this wave had the biggest sample size. The variables used in the empirical section of this study are job stress, mental health, self-reported health, age, gender and individual earnings.

Mental health was derived from a CESD score. The CESD is the Center for Epidemiologic Studies Depression. The CESD score is the sum of five negative indicators minus two positive indicators. Negative indicators are “depression,” “restless sleep,” “felt sad,” “everything felt like an effort,” “felt alone” and “could not get going.” Contrary to negative indicators, the positive indicators measure whether the respondent felt happy and enjoyed life and whether this was always or most of the time. The CESD score of a respondent can vary between the minimum of 0 and the maximum of 8. A higher CESD score corresponds with worse mental health.

Self-reported health is the variable for the respondent’s self-reported general health status and is used for testing the association between physical health and job stress. The respondents could report their health in five categories: (1) Excellent, (2) Very good, (3) Good, (4) Fair and (5) Poor. Therefore, if the self-reported health score gets higher, the general health status becomes poorer.

The variable “job stress” measures to what extent respondents agree with the statement that their job is stressful. The respondents had to choose between four different options: (1) strongly agree, (2) agree, (3) disagree and (4) strongly disagree. Therefore, again, if the job stress score is higher, the job will involve less stress.

The variable of individual earnings is described as the sum of the respondents' salary and all other incomes measured in US dollars during the year of the wave. Wave one concerned the year 1993. Age is measured in years at the beginning of the interview and the variable "gender" has the values one for male and two for female.

In short, the variables "mental health," "self-reported health," "job stress," "age," "gender" and "individual earnings" were used in the empirical analyses. The descriptive statistics of the variables used for the regressions are summarized in Table 1.

Variable	Observations	Mean	S.D.	Min	Max
CESD score	7793	.0269473	.3709727	0	8
Self-reported health	7793	2.292442	1.036335	1	5
Job stress	7793	2.215578	.8107521	1	4
Age	7793	54.45541	5.157762	25	78
Gender	7793	1.499423	.5000317	1	2
Individual earnings	7793	28648.78	31211.67	50	600000

**Table 1:** Descriptive statistics

## **4. Methods**

At first, to test the association between job stress and health, a cross-sectional analysis was performed and two simple linear regressions were conducted. Wave 1 was used because this wave had the largest sample size of 7793. The models are as follows:

$$\text{Model 1: } Y(rlcesd) = B_0 + B_1(rwjstres) + B_2(rlagey\_b) + B_3(ragender) + B_4(rliearn) + \mathcal{E}$$

And

$$\text{Model 2: } Y(rlshlt) = B_0 + B_1(rljstres) + B_2(rlagey\_b) + B_3(ragender) + B_4(rliearn) + \mathcal{E}$$

Secondly, the observations of the individual earnings were dropped if earnings were equal to zero, because persons who have no individual earnings are not in the labor force, so they cannot have any job stress. Therefore those values of individual earnings are irrelevant and can be dropped.

Among the respondents, there were some individuals that had such exceptionally high individual earnings that they would bias the outcomes of the regression if they were kept in the data set. In wave one there was an outlier for individual earnings. The value of individual earnings of 1,250,000 was the outlier. The outlier would bias the outcomes because the outlier would be so high that the mean of the total individual earnings would be higher, because only one person had exceptional high individual earnings. Therefore the outlier in wave one was dropped.

Eventually the regression was run with the respondents' response to the wave one interview, with the sample size of 7793, to test the association between mental health and job stress and between self-reported health and job stress. The outcomes of both regressions are described in the results section.

## **5. Results**

### **5.1 Associations with Mental Health**

In Model 1, job stress had a coefficient of 0.0020824 which was not significant, with a P-value of 0.693 at the 5% significance level. Hence Hypothesis 1 could not be confirmed. The other associations between mental health and the dependent variables “age” and “individual earnings” were also not significant. Hence, nothing can be concluded about the associations with these results. The model’s goodness of fit (R-squared) is low, at 0.02%.

According to the results, the coefficient from the variable “gender” had the value of -0.0180932. Knowing that the numerical value of a male respondent is 1 and that of a female respondent is 2, it is possible to conclude that the CESD score of a woman will be lower than the score of a male. Therefore, female respondents have a better mental health than male respondents. This coefficient was barely significant, with a significance level of 5% ( $P=0.046$ ), therefore it is sensible to be careful in making conclusions.

### **5.2 Associations with General Health Status**

Focusing on the second model, the regression coefficients of job stress and the other variables in the model with self-reported health will be analyzed. First of all, the coefficient of job stress was significant ( $P=0.000$ ), at a 1% significance level. The coefficient of job stress had the value of -0.0590944. The size of the coefficient meant that the health status of the employee would decrease when the amount of experienced job stress by the employee increased. An increase of one unit of job stress would decrease the self-reported health score by 0.0590944. As mentioned before in section 3, less units of job stress means more stress at work and thus worse health. Therefore, we can conclude that there exists a negative association between job stress and general health status. However, causality was not tested for, thus we do not know the direction of the association. Hence, we cannot accept Hypothesis 2 with certainty. The model’s goodness of fit is higher compared to Model 1, with 3.39%.

Also in this regression, the coefficient of age was positive. The coefficient of age had the value of 0.015002. This means that the general health status would decrease when the respondent is older. If age increases by one unit (year), self-reported health would increase by



0.015002. This means a decrease in general health status. This result was also significant (P=0.000).

Again there is a difference between the outcomes of female respondents and male respondents in this regression. The coefficient's value of the variable gender is -0.1177684, meaning that women had a better general health status when compared to men. Furthermore, this result was also significant (P=0.000).

Individual earnings had a significant (P=0.000) association with the variable self-reported health. The value of self-reported health would decrease with -0.00568 for each 1000 USD an individual earns. If individual earnings increased by 1000 USD, the general health status of that individual would increase by 0.00568. Therefore, the general health status of the respondent would be better if the individual earnings were higher. The output of the two conducted linear regressions are summarized in Table 2.

Variables	Mental health	Self-reported health
Job stress	0.0020824 (0.005269)	-0.0590944** (0.0144722)
Age	0.0001943 (0.0008513)	0.015002** (0.0023383)
Gender	-0.0180932* (0.0090854)	-0.1177684** (0.0249545)
Individual earnings	-1.47e-07 (1.41e-07)	-5.68e-06** (3.88e-07)
R <sup>2</sup>	0.0002	0.0339

**Table 2:** Linear regression output (Hypotheses 1 and 2).

Notes: N= 7793.

Data Source: The Health Retirement Study published in 2013 by the RAND Center for the Study of Aging.

\*Significant at 5% significance level ( $0.05 > p \geq 0.01$ ).

\*\*Significant at 1% significance level ( $p \leq 0.01$ ).

## **6. Conclusions and Discussion**

This study generates a review of previous studies about the association between job stress and human health. Two models were manifested to test two hypotheses. Hypothesis 1 was meant to test whether there is a significant association between job stress and mental health and the direction of that association. Hypothesis 2 was meant to test whether there is a significant association between job stress and general health status and also the direction of that association.

At first, the hypothesis that supposes that job stress has a significant association with mental health in a way that job stress has an effect on mental health is rejected. The outcomes of the regression lead to the conclusion that there is no significant association between job stress and mental health. However, previous studies on the effect of job stress on health found that there is an effect on mental health caused by job stress. Estryn-Behar *et al.* (1990) argued that job stress causes mental health problems such as fatigue and sleep impairment. Furthermore Shigemi *et al.* (1997) reported psychiatric and somatic diseases as a consequence of job stress and Jackson and Maslach (1982) found that family relationship suffered because of a decrease in mental health caused by job stress.

Furthermore, there is no significant association with mental health for the variables of gender and individual earnings. However, a significant association between age and mental health does exist. Hence, it can be concluded that as employees get older, mental health becomes worse.

Secondly, it was hypothesized that there exists an association between job stress and physical health in a way that job stress has an effect on physical health. From the results of the empirical analysis the conclusion can be taken that the hypothesis cannot be accepted with certainty. In short, this means that there exists an association between job stress and physical health. However, causality was not tested for. Hence, the direction of the effect is not clear. Previous studies on the effect of job stress on overall health support the conclusion that there is an association between job stress and physical health and prove that job stress has an effect on physical health. Bosma *et al.* (1998) and Johnsen *et al.* (1989) found that job stress increases the likelihood of getting a coronary heart disease. In extent to that, Mojinyinola's (2008) findings reported that physical health complaints such as headache, back or neck pain,

muscular aches and high blood pressure are caused by job stress. Next to that, Landsbergis' (1988) study results presumes that high serum cholesterol is an effect of job stress.

Furthermore, age, gender and individual earnings also have significant associations with general health status. Older people have a low general health status, women have a higher general health status and if an employee has higher individual earnings, the general health status will be better.

To summarize, the empirical analysis proves that there is an association between physical health and job stress but it does not prove whether there is an association between job stress and mental health. However, causality was not tested for. Hence, the direction of the association between job stress and physical health status is not clear. Therefore two alternatives are possible. The first alternative is that job stress among employees effects physical health which is suggested in Hypothesis 1. The second alternative is that job stress is caused by poor physical health status among employees. Therefore, with the support of the empirical analysis, it cannot be assumed with certainty that job stress has a significant effect on general health. Previous findings reviewed in this study, support the conclusion which reported that there exists an association between job stress and physical health and also clarify the direction of this association. These findings prove that there is an association between job stress and physical health in a way that job stress has an effect on physical health. Previous studies also found that job stress has an effect on mental health. These findings contradict the outcomes of the empirical analysis.

## **7. Limitations**

In this section, the limitations of this study will be mentioned. First of all, the several studies which are reviewed in the literature review are selected and collected by the author to what he thought was relevant for this study. Therefore, it is possible that not all outcomes of job stress on health were summarized.

Secondly, there are more models than used in section 2.2 to define stress. However, the models were frequently used and mentioned in other studies on the effect of job stress on health.

The empirical analysis includes a model with only four independent variables. Therefore, the regression was kept simple which resulted in a low goodness of fit. However, low goodness of fit is not unusual for studies on the subject of human health.

Furthermore, for physical health the variable self-report health is used. This variable includes participants' physical health status but it is the general health status of participants in the dataset. This variable has been chosen because of the fact that it was the most appropriate value to use for physical health, to the best of the authors knowledge.

## **Bibliography**

- Barton, J., & Folkard, S. (1993). Advancing versus delaying shift systems. *Ergonomics*, 59-64.
- Bosma, H., Peter, R., Siegrits, J., & Marmot, M. (1998). Two Alternative Job Stress Models and the Risk of Coronary Heart Disease. *American Journal of Public Health*, 68-74.
- Breslau, N., Roth, T., Rosenthal, L., & Andrenski, P. (1997). Daytime Sleepiness: An epidemiological study of young adults. *American Journal of Public Health*, 1649-1653.
- Buell, P., & Breslow, L. (1960). Mortality from coronary heart disease in California men who work long hours. *Journal of Chronic Diseases*, 615-626.
- Chien, S., Campbell, N., Hayden, O., Hurd, M., Main, R., Mallett, J., . . . St. Clair, P. (2013). *RAND HRS Data Documentation*. RAND Center for the Study of Aging.
- Cooper, C., Dewe, P., & O'Driscoll, M. (2001). *Organisational stress: A review and critique of theory, research and applications*. California: Thousand Oaks.
- Estryn-Behar, M., Kaminski, M., Peigne, E., Bonnet, N., Vaichere, E., Gozlan, C., . . . Giorgi, M. (1990). Stress at work and mental health status among female hospital workers. *British Journal of Industrial Medicine*, 20-28.
- Everly Jr. , G., & Lating, J. (2013). *A Clinical Guide to the Treatment of the Human Stress Response, 3rd Edition*. New York: Springer.
- Groom, B. (2014, June 15). Mental illness is industry's biggest long-term health issue. *Financial Times*.
- Hope, C. (2013, June 26). One in three absences at work due to anxiety and stress, official Government survey finds. *The Telegraph*.
- Jackson, S., & Maslach, C. (1982). After-effects of job-related stress: Families as victims. *Journal of Organizational Behaviour*, 63-77.
- Johnsen, J., Hall, E., & Theorell, T. (1989). Combined effects of job strain and asocial isolation on cardiovascular disease morbidity and mortality in a random sample of the

- Swedish male working population. *Scandinavian Journal of Work, Environment & Health*, 271-279.
- Kawakami, N., & Haratani, T. (1999). Epidemiology of Job Stress and Health in Japan: Review of Current Evidence and Future Direction. *Industrial Health*, 174-186.
- Knudsen, H., Ducharme, L., & Roman, P. (2007). Job Stress and poor sleep quality: Data from an American sample of full-time workers. *Social Science & Medicine*, 1997-2007.
- Kuppermann, M., Lubeck, D., Mazonson, P., Patrick, D., Stewart, A., Buesching, D., & Fifer, S. (1995). Sleep problems and their correlates in a working population. *Journal of General Internal Medicine*, 25-32.
- Landsbergis, P. (1988). Occupational stress among health care workers: A test of the job demands-control model. *Journal of Organizational Behavior*, 217-239.
- Mojoyinola, J. (2008). Effects of Job Stress on Health, Personal and Work Behaviour of Nurses in Public Hospitals in Ibadan Metropolis, Nigeria. *Ethno-Med*, 143-148.
- Peter, R., Siegrist, J., Hallqvist, J., Reuterwall, C., & Theorell, T. (2002). Psychosocial work environment and myocardial infarction: improving risk estimation by combining two complementary job stress models in the SHEEP Study. *J Epidemiol Community Health*, 294-300.
- Sanders, A. (1982). Towards a Model of Stress and Human Performance. *Acta Psychologica*, 61-97.
- Sargent, L., & Terry, D. (2000). The moderating role of social support in Karasek's Job. *Work & Stress: An international Journal of Work, Health & Organisations*, 245-261.
- Schäfer, D. (2014, april 20). Banks fear effects of stress on workforce. *Financial Times*.
- Schwartz, S., Anderson, W., Cole, S., Cornoni-Huntley, J., Hayes, J., & Blazer, D. (1999). Insomnia and heart disease: A review of epidemiologic studies. *Journal of Psychomatic Research*, 313-333.
- Shigemi, J., Mino, Y., Tsuda, T., Babazono, A., & Aoyama, H. (1997). The Relationship between Job Stress and Mental Health at Work. *Industrial Health*, 29-35.

- Siegrist, J. (1996). Adverse health effects of high effort/low reward conditions. *Journal of Occupational Health psychology* 1, 27-41.
- Siegrist, J., Siegrist, K., & Weber, L. (1986). Sociological concepts in the etiology of chronic disease: Prospective evidence from the blue-collar men. *Social Science and Medicine* 31, 1129-1136.
- Sonnetag, S., & Frese, M. (2003). Stress in organizations. In W. Borman, D. Ilgen, & R. Klimoski, *Handbook of Psychology* (pp. 453-491). New York: Wiley.
- Sparks, K., Cooper, C., Fried, Y., & Shirom, A. (1997). The effects of hours of work on health: A meta-analytic review. *Journal of Occupational and Organizational Psychology*, 391-408.
- Spiegel, K., Leproult, R., & Van Cauter, E. (1999). Impact of sleep debt on metabolic and endocrine function. *Lancet*, 1435-1439.
- Spurgeon, A., Malcolm Harrington, J., & Cooper, C. (1997). Health and safety problems associated with long working hours: a review of the current position. *Environmental Medicine* , 367-375.
- Theorell, T. (1998). Job characteristics in a theoretical and practical health context. In C. Cooper, *Theories of organizational stress* (pp. 205-219). New York: Oxford University Press.