Research Report

Psychosocial Risk Factors and their Influence on Occupational Health and Well-being

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Abstract:

The structure and nature of the labor market have changed dramatically in recent years and with it workplace characteristics, for which the need to improve working conditions is a collective concern, prompted by both humanitarian and economic reasons. Many studies have demostrated associations between work-related risk factors and occupational health and well-being using Karasek's stress model. Following this model, the aim of this study was to investigate the effects of work demands and work control (predictors) on occupational health and well-being, and whether interpersonal relationships and equity can moderate the effects of the predictors on occupational health and well-being outcomes. The hypotheses of study state (1) work demands and work control have a significant effect on occupational health and well-being, and (2) interpersonal relationships and equity moderate or 'buffer' these relations. The random sample was composed by 865 teachers and administrative staff from Italian school organizations. The data was tested with questionnaire of 'Rilevazione del Benessere Organizzativo nel Contesto Scolastico'. Hierarchical regression analyses was used to evaluate the effects and moderations, the results supported the direct influence of work demands on psychosomatic disorders, and the direct influence of work control on the three outcomes of occupational health and well-being. The hypothesis of moderator role of interpersonal relationships and equity was rejected, only coworker relationships weakly moderated the relationship between work demands and psychological symptoms. Furthermore, the analysis showed that the interaction demands x control as is proposed by Karasek, only exerted a significant effect on indicators of malaise. In conclusion, work control, interpersonal relationships and equity were good predictos of malaise, well-being and psychosomatic disorders (occupational health and well-being outcomes), and moderating effects were not supported.

Keywords: *Psychosocial risk factors, work demands, work control, occupational health, interpersonal relationships, organizational equity, occupational well-being.*

Introduction

The structure and nature of the labour market have changed dramatically in recent years. In comparison with manufacturing jobs, the service sector is growing and the nature of work itself is changing from manual to mental skills' demands increasing psychosocial workload, which is supported in a study about the European workforce (Paoli, 1996). These rapid changes combined with others factors are likely provoking occupational stress-related mental and psychosomatic complaints in many members states of EU.

The need to improve working conditions is a collective concern, prompted by both humanitarian and economic considerations. The main aim that the EU set at the European Council in Lisbon (March, 2000) and in Nice (December, 2000) is to create more jobs and of better quality. A safe and healthy work environment is an essential element of the quality of work. The Agency for Health and Safety at Work of EU represents one of the most important commissions that is worried about fields of the social policy with regard to information, guidance and promotion of a healthy work environment. Recently, European Commission

Foundation have focused its studies on four key dimensions of quality of work and employment, one of them is related to maintaining of the health and well-being of workers.

The concept of occupational health and well-being has been changing over the years, moving from a passive concept that simply considered health as sickness absence towards a more active concept that suggests people a prevention idea and active maintaining of health. Occupational health is defined as set of cultural cores, processes and organizational practices that encourages the coexistence on workplace promoting, supporting and improving physical, psychological and social health of working community (Avallone & Paplomatas, 2005). And the concept of well-being at work can be defined as the organization's capacity of promoting and maintaining the highest degree of physical, psychological and social well-being of workers in every kind of occupation (Cantieri Program). In the Fourth European Working Conditions Survey (2005), with regard to maintaining of health and well-being of workers, a declining proportion (35%) of European workers who consider their health and safety at risk because of their work has been reported.

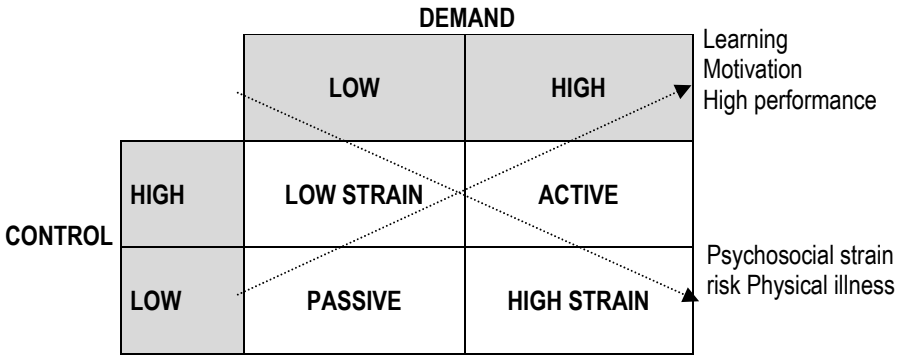
In work environment, both physical risk factors such as repetitive movements or bad posture which can be harmful to the people and develop musculoskeletal disorders, and psychosocial risk factors are present, which are having a strong attention focus nowadays. Psychosocial risk factors such as high work demands or lack of job control are aspects that may affect workers' psychosocial responses to the work and workplace conditions (Karasek, 1979, 1990). So, psychosocial risk factors can also affect physical health and psychological health in direct and indirect way through stress experience.

Research on the relationship between psychosocial factors at work and employee health has been dominated by the demand-control model of Karasek (1979). This model has inspired a substantial amount of research in the past two decades. Since 1979, when Karasek introduced his "job demand-control model" it has become one of the most widely tested models concerning the psychosocial work environment and its relations to. The original model formulated by Karasek (1979) combines two dimensions of the work environment: work demands and work control. The model predicts, first, stress-related illness risk, and, secondly, active/passive behavioural correlates of jobs. This theoretical model has mainly been used in epidemiological studies of chronic disease, such as coronary heart disease (Karasek, 1990). But also has been used in psychosocial studies, this model clearly demostrates that psychosocial characteristics of work not only to lead to physical hazards, it also affects mental health and well-being (Cox & Griffiths, 1996). This model demostrates the possibility of both "positive stress" and "negative stress" which can be explained in terms of combinations of demands and control.

Work Demands and Work Control

The dimension of work demands is defined as the task requirements in work environment and work control dimension refers to the person's ability to control his or her work activities including two aspects: skills used by the employee at work (skill discretion), and the employees authority to make decisions at work (decision authority). According to Karasek's model having control over the work process will reduce worker's stress and will increase learning, while work demands will both increase learning and increase stress. An alternative perspective on the demand-control model has led to a different formulation of the first hypothesis with regard to health outcomes. It implies that control can buffer the potentially negative effects of high demands on health and well-being. Therefore, high demands and low control at work generate psychological strain (fatigue, anxiety, depression and physical illness), and when demands and control are high, a model's active learning aimed to a high work performance is generated.

Thus, in work environment in which prevails tension, individuals seem to be more rigid and less flexible with a low moral and more oriented to the malaise and discomfort; in such circumstances, productivity is also affected. Contrarily, in an active work environment, individuals have more opportunities to test their skills, to learn new abilities and perform them and it also leads to increase satisfaction feelings and improving health and well-being. Therefore, according to Karasek and Theorell (1990) job design concept could be one of the fundamental elements in order to achieve a more healthy organization.



This Karasek's model has been extended by Johnson (1989) and Johnson et al. (1991) through adding a third dimension: Social Support, which refers to each levels of social relationships from supervisors and colleagues. Recently, much interest has been shown in the ability of social support to 'moderate' or 'buffer' the impact of work-related stress on physical and mental health.

The goal of the "demand-control model" has been to integrate understanding of the social situation with evidence of emotional response, psychosomatic illness symptoms and active behaviour development in major spheres of adult life activity, particularly in the highly socially structured work situation.

The demand-control model has been applied in epidemiological studies and advanced systematic research into psychosocial workplace factors and physical health (cardiovascular disease, musculoskeletal disorders, illnesses, so forth). Falk, Hanson, Isacsson & Ostergren (1992) found that exposure to job strain influences on the risk of mortality after retirement, above all for cardiovascular disease (Johnson, Stewart, Hall, Tredlund & Theorell, 1996).

The musculoskeletal disorders have also been studied, the findings led to support that little influence on own work situation (Eriksen, Natvig, Knardahl & Bruusgaard, 1999), the influence of high demands and low control independently (Kushnir & Melamed, 1991; Pelfrene, Vlerick, Kittel, Mak, Kornitzer, De Backer, 2002; Kopec & Sayre, 2004) or the influence of the interaction of demands and control (Rugulies & Krause, 2005) predict risk of *chronic pains* conditions such as neck and back injuries. In the same way, these mentioned predictors influenced on *work satisfaction* and *behavioural outcomes* of health such as levels of tardiness and sick days (Dwyer & Ganster, 1991).

In opposite, others studies have not supported associations between psychosocial work environment (demands and control) neither with the *coronary risk* (Pelfrene, Leynen, Mak, De Bacquer, Kornitzer & De Backer, 2003), nor with *long-term sickness absence* to individual level (Labriola, Christensen, Lund, Lindhardt & Diderichsen, 2006).

Recent studies in this research line have reported that *sleeping problems* such as insomnia can be also predicted by low influence over decisions and high demands at work (Jansson, & Linton, 2006).

Other research line about this subject has been oriented to study the influence of these psychosocial risk factors on stress experience (Payne & Fletcher, 1983), and mental health outcomes (Cox & Griffiths, 1996). For example, studies based on Karasek's stress model found that work control and others job stressors were associated with job satisfaction (Spector, 1987; Terry & Jimmieson, 1999), quality of life (Lerner, Levine, Malspeis & D'Agostino, 1994), and burnout in which Landsbergis (1988) reported that job strain and burnout, specially emotional exhaustion dimension (Bourbonnais, Comeau & Vèzina, 1999) were significantly higher in jobs that combined high work demands with low work control. Different indicators of well-being (Parker, Chmiel & Wall, 1997; Sprigg, Smith & Jackson, 2003; Grebner, Semmer, Lo Faso, Gut, Kalin & Elfe-ring, 2003) and safe workplace (Parker, Axtell & Turner, 2001) were also studied as consequences of levels of demands and control at work.

More recent studies continued demostrating a consistent and robust effect of job strain (high demands and low control) on burnout (Santavirta, Solovieva & Theorell, 2007), and on depressive and anxiety disorders (Virtanen, Honkonen, Kivimaki, Ahola, Vahtera, Aromaa & Lonnqvist, 2007). Likewise, the associations of these psychosocial stressors: work demand and work control with cognitive aspects related to indicators of malaise have started to be explored. Thus, Elovainio, Forma, Kivimaki, Sinervo, Sutinen, Laine & Marjukka's study (2005) suggested that work demands and work control independently predicted early retirement thoughts, and also the interaction of these two stressors was supported.

Moreover, the analyses of the effects of these job characteristics on adverse health behavioural outcomes such as drinking, smoking, and obesity were also investigated. Kouvonen, Kivimiki, Vaananen, Heponiemi, Elovainio, Ala-Mursula, Virtanen, Pentti, Linna & Vahtera (2007) showed that high job strain (high demands and low control) and passive jobs (low demands and low control) were associated with higher odds of having adverse health behaviours (lifestyle).

Given this situation, shown above, research effort has aimed to determinate the influences of work risk factors such as work demands and work control on the physical health (muscoloskeletal disorders, cardiovascular problems, total mortality, alcohol-related diseases, sleeping problems, depression, so forth), mental health and well-being outcomes (stress, burnout, job satisfaction, attitudes at work, quality of life, so forth), and health-related behavioural outcomes (adverse health behaviours, sick days, tardiness, so forth). In these reviews, the studies supported the existence of direct effects of work demands and control on health outcomes and the interaction effect of these stressors on health and well-being, but also some of them rejected these hypotheses. Therefore, this research hypothesizes direct and interaction effect of work demands and control on occupational health and well-being.

Interpersonal Relationships and Equity as moderating variables

When social support was initially examined during the mid-1970s to early 1980s, the concept was used in concrete terms, referring to an interaction, person or relationship (Veiel & Baumann, 1992). However in the past 15 years, the term has become more and more abstract encompassing anticipation, perceptions, quality of support, quality of supportive interactions and other facets. Social support is defined as a positive interaction or helpful behaviour provided to a person in need or support (Rook & Dooley, 1985), or as information leading a person to believe that he/she is cared for and loved, esteemed and valued, and/or that he/she belongs to a network of communication and mutual obligation. According to it, social support can have an emotional, esteem and informational dimension (Cobb, 1976).

Interpersonal relationships at work appeared to protect people in crisis from a wide variety of pathological states (arthritis, tuberculosis, depression, alcoholism) to the reduction

of the amount of medication required (Cobb, 1976); and have been considered as significant antecedents of anxiety and stress levels (Japanese Work Department, 1987). From Karasek'studies (1982), the social support has been introduced as a buffering factor of the effects of work demands on depression and job satisfaction. Likewise, Johnson (1989) also argued that social support may function as a moderator of psychological demands, extending the demand-control model by Karasek. According to Johnson, social relationships are hypothesized to expand or contract the individual's capacity for managing stress, individuals who are socially integrated link together their capacities for accommodating stress, and that a lack of social support would lead to high levels of stress (Jones, 1998). This research line has been supporting the idea of a moderating role of interpersonal relationships in the associations between stressors and physical health outcomes.

Research effort has also been driven to demostrate the moderating role of social support on stressors-mental health outcomes relation. Buck (1972) evidenced that an attentive behaviour from supervisors appeared to attenuate the negative feeling of workers in comparisons of work pressure. Winnubst, Marcelissen & Kleber (1982) found that social support buffered the impact of work-related stressors on psychological and behavioural strains but not on health strains. Daniels & Guppy (1994) studied complex interactions between stressors, locus of control, social support and job control in predicting psychological well-being, these interactions revealed that both social support and job control synergistically buffered the effects of stressors on well-being. Lu (1995) found that social support had protective effects for subjective well-being, and that high level of hostility related to lower perceived supportive collegiality at work, and low perceived availability of social support was related to greater job dissatisfaction (McCann, Russo & Andrew, 1997). Bellman, Foster, Still & Cooper (2003) also found that social support moderated the effects of stressors on energy levels, job satisfaction, organizational security and organizational commitment.

Contrarily, in an experimental study to test the effects of workload on stress and performance and the moderating role of social support, it was found that there was an indirect relation between workload and performance with stress as an intervening variable, and that in early stages of the experiment, high social support led to higher (rather than lower) stress, but this reverse buffering effect did not occur in later stages of the experiment; one of the explanations includes the possibility that stress leads to social support seeking behaviour (Glaser, Tatum, Nebeker, Sorenson & Aiello, 1999). Bourbonnais, Comeau & Vèzina (1999) wanted to analyze the potential moderating role of social support in the relationship between job strain and psychological problems, the results of this study did not support the hypothesis of moderating effect. Chappell & Novak (1992) and Lee & Ashforth (1993) found a direct effect of social support on physcological symptoms.

More recent research continued reporting the moderating role of interpersonal relationships. Byrne & Hochwarter (2006) found that higher levels of chronic pain were associated with lower levels of performance outcomes (effectiveness, work intensity, citizenship behavior, and task performance) when coupled with low support, it meant that the increases in pain are not always associated with lower levels of performance, above all wherther it coupled to good relationships between workers and managers that promoted support and help at work.

The direct effects of social support also continued being supported nowadays. Thus, Halbesleben (2006) found that work-related sources of social support were more closely associated with emotional exhaustion dimension than with the others burnout dimensions (despersonalization and personal accomplishment). Andrè-Petersson, Engstrom, Hedblad, Janzon & Rosvall (2007) showed that social support at work was an independent predictor of future cardiovascular disease, and that low levels of social support at work together with a passive work situation indicated an increased risk of a future cardiovascular outcome.

This previous research has demonstrated both the existence of direct effects of interpersonal relationships and its moderating effect on stress experience, burnout, and physical and mental health outcomes. This study pretends to analyze interpersonal relationships at work only as a buffering variable in the relationship between work-related risk factors (work demands and work control) and occupational health and well-being.

The other moderating variable analysed in this study is equity. This variable has progressed steadily since Adams (1965) who introduced the concept of inequity in distributive situations. His work led to a period of research focusing on the fairness of pay or outcomes in work settings, which is commonly referred to a distributive justice (Deutsch, 1985). Since then, research effort has recognized the need to consider other aspects of workplace justice, such as the fairness of formal policies or procedures used for decision making named procedural equity (Folger & Greenberg, 1985; and Lind & Tyler, 1988), and justice referred to the intepersonal treatment with politeness and consideration of workers (Greenberg, 1990), named relational equity (Tyler & Bies, 1990).

Studies in this research line started to focus on the direct effects of organizational equity and the interaction among its three types on behavioural outcomes. Skarlicki & Folger, (1997) found that the interaction among distributive, procedural, and interactional equity predicted organizational retaliation; it meant that when supervisors displayed adequate sensitivity and concern toward their subordinates, the employees in question seemed to tolerate the mix of an unfair pay distribution and unfair processes.

Likewise, health outcomes were predicted by procedural and interactional equity. Elovianio, Kivimaki & Vahtera (2002) showed that the odds rates of poor self-related health, minor psychiatric disorders and sickness absence were associated with low levels of perceived justice, demostrating that unfair procedures and treatment are a risk for the health of workers, for example, it could explain a high risk of depression (Ylipaavalniemi, Kivimaki, Elovainio, Virtanen, Keltikangas-Jarvinen & Vahtera, 2005). Avallone & Bonaretti (2003) also considered that equity is an issue that may influence on organizational well-being, people can perceive a unfair rapport between that they give and they receive from organizations.

However, the idea of a moderator role of organizational equity has been also applied. Thus, Elovainio, Helkama & Kivimaki (2001) designed a study in order to explore how organizational justice evaluations affect the occupational stress process; they hypothesized the mediating and moderating role of justice evaluations in the relationship between job control and strain; their results only supported the mediating role of organizational equity, so job control affects strain through justice evaluations, evidencing that perceptions of the organization are potencial factors contributing to employees health. More recently, Moliner, Martìnez-Tur, Peirò & Cropanzano (2005) found that justice climate strength moderates the predictability of the level of burnout, supporting the moderating role of equity.

On the basis of these findings, in which, the direct effects of organizational equity on different health-related and behavioral outcomes have been mainly studied; the evidence of a moderating role of this variable have been also presented. Therefore, this study hypothesizes that the relationships between psychosocial risk factors (work demands and work control) and occupational health can be moderated by equity, for example, high job control may be connected with low strain more strongly when people feel that they are treated fairly than when perceive a lack of equity.

In sum, reviewed literature allows us to hypothesize that demands and control at work affect occupational health and well-being outcomes, being these relationships moderated by others work-related risk factors such as interpersonal relationships and equity. Therefore, this study pretend to analyze the effects of work demands and work control on occupational health and well-being, and also to analize the moderating effect of interpersonal relationship

and equity on these relationships. To such purpose, we conduct this study to test of the following specific hypotheses:

Hypothesis 1 (H1): Work demands positively affect indicators of malaise(H1A) and psychosomatic disorders (H1B), and negatively affect indicators of well-being (H1C).

Hypothesis 2 (H2): Work control negatively affect indicators of malaise (H2A) and psychosomatic disorders (H2B), and positively affect indicators of well-being (H2C).

Hypothesis 3 (H3): Supervisor relationships moderate work demands - indicators of malaise relation (H3A), work demands - indicators of well-being relation (H3B) and work demands - psychosomatic disorders relation (H3C).

Hypothesis 4 (H4): Supervisor relationships moderate work control - indicators of malaise relation (H4A), work control - indicators of well-being relation (H4B) and work control - psychosomatic disorders relation (H4C).

Hypothesis 5 (H5): Coworker relationships moderate work demands - indicators of malaise relation (H5A), work demands - indicators of well-being relation (H5B) and work demands - psychosomatic disorders relation (H5C).

Hypothesis 6 (H6): Coworker relationships moderate work control - indicators of malaise relation (H6A), work control - indicators of well-being relation (H6B) and work control - psychosomatic disorders relation (H6C).

Hypothesis 7 (H7): Equity moderates work demands - indicators of malaise relation (H7A), work demands - indicators of well-being relation (H7B) and work demands - psychosomatic disorders relation (H7C).

Hypothesis 8 (H8): Equity moderates work control - indicators of malaise relation (H8A), work control - indicators of well-being relation (H8B) and work control - psychosomatic disorders relation (H8C).

Hypothesis 9 (H9): The interaction between work demands and work control significantly affect indicators of malaise (H9A), indicators of well-being (H9B) and psychosomatic disorders (H9C).

Method

Participants

The total sample was composed by 865 participants, from them, teachers were predominately (87%). The greater range age was from 41 to 50 years old (38%), and the greater range job tenure was from 21 to 30 years (30.7%). About 80% of the sample were women and only the 21% had a temporal job position. Data came from a random sample of 17 school organizations from Bologna, Italy. The questionnarie was tested to all teachers and administrative staff who participated voluntarily.

Variable	N	%
Gender		
Male	173	20
Female	692	80
Age (years old)		
20 – 30	41	4.7
31 – 40	182	21
41 – 50	335	38.8
51 – 60	285	32.9
more than 60	22	2.6
Job Tenure		
0 – 5	127	14.7
6 – 10	144	16.6
11 – 20	210	24.3
21 – 30	266	30.7
more then 30	118	13.7
Job Role		
Teachers	702	83
Administrative Staff	163	17

Measures

Work Demands and Work Control

These variables were studied as predictors. To test work demands and work control, the third area of questionnaire *Rilevazione del Benessere Organizzativo nel Contesto Scolastico* was employed. It was mainly elaborated from *occupational health multidimensional questionnarie* by Avallone & Paplomatas (2005) and Agervold & Mikkelsen's study (2004) named *relationship between bullying, psychosocial work environment and individual stress reactions.*

Work demands makes reference to psychosocial stressors in workplace, while work control makes reference to the potential control that individuals have to making decisions on own work and behaviour. Both work demands and work control were measured by a 5-item, 4-point Likert-type scale (1=never to 4=always), in which the higher scores indicated higher levels of demands and control at work.

Factorial analysis through principal axis factoring method (to explain common variance) and orthogonal varimax rotation were used to test the 5-item work demands scale which produced only one-factor solution and had a Cronbach alpha of 0.76 and these items accounted for 41.6 percent of the variance. The 5-item work control scale also produced one-factor solution and had a Cronbach alpha of 0.69 and its items accounted for 32.2 percent of the variance.

Interpersonal Relationships

This variable was studied as moderator. To test interpersonal relationships, the second area of questionnaire *Rilevazione del Benessere Organizzativo nel Contesto Scolastico* was employed. Interpersonal relationships makes reference to social support from coworkers and supervisors, and it was measured by a 14-item, 4-point Likert-type scale (1= never to 4= frequently), in which the higher scores indicated good interpersonal relationships at work.

Factor analysis through principal axis factoring method (to explain common variance) and orthogonal varimax rotation were used to test the 14-item, 4-points Likert-type scale which produced a two-factor solution. Items that loaded strongly on the first dimension represented the help and support provided by coworkers, this 8-item scale named 'coworker

relationships' had a Cronbach alpha of 0.89 and its items accounted for 40.8 percent of the variance. The second factor, named 'supervisor relationships' represented the help or support provided by superiors, this 6-item scale had a Cronbach alpha of 0.91 and accounted for an additional 16.9 percent of the variance.

Equity

This variable was studied as moderator. To test equity, the second area of questionnaire *Rilevazione del Benessere Organizzativo nel Contesto Scolastico* was employed. Equity makes reference to perception of fairness in work settings regarding payment and personal treatment, and it was mesaured by a 5-item, 4-point Likert-type scale (1= never to 4= frequently), in which the higher scores indicated perception of unfair payment and treatment at work.

Factor analysis through principal axis factoring method (to explain common variance) and orthogonal varimax rotation were used to test this 5-item, 4-points Likert-type scale which produced only one-factor solution and had a Cronbach alpha of 0.84 and these items accounted for 53.2 percent of the variance.

Occupational Health and Well-being

For this research, occupational health and well-being was studied as dependent variable and was defined in terms of indicators of malaise, indicators of well-being and psychosomatic disorders. In order to test these outcomes variables, the fourth area of questionnaire '*Rilevazione del Benessere Organizzativo nel Contesto Scolastico'* was employed.

First, indicators of malaise makes reference to sensations, feelings of discomfort with organizational procedures and negative behaviours at workplace such as unhabitual agressiveness, lack of involvement, resentment to the organization, lack of acknowledgment and worthlessness feelings. It was measured by a 7-items, 4-points Likert-type scale ((1= never to 4= frequently) in which the higher scores showed high level of discomfort feelings. Its factorial validity through principal axis factoring method and orthogonal varimax rotation produced a two-factor solution. Items that loaded strongly on factor I represented the sensation of malaise at workplace and organization, this 4-item scale accounted for 36.2 percent of the variance. Factor II represented negative behaviours of workers due to perception of malaise in organization, this 3-item scale accounted for an additional 8.1 percent of the variance. The Cronbach alpha for indicators of malaise scale was 0.79.

Secondly, indicators of well-being makes reference to satisfaction feelings and positive attitudes at work and organizational settings such as job satisfaction, perception of organization's success, desire of engaging themselves, desire of going to work, satisfaction of relationships, trust in leader and change hope. It was measured by a 7-item, 4-points Likert-type scale (1= never to 4= frequently) in which the higher scores showed high level of satisfaction and positive attitudes to organization. Its factorial validity through principal axis factoring and orthogonal varimax rotation produced only one-factor solution and had a Cronbach alpha of 0.83 and these items accounted for 42.9 percent of the variance.

Finally, psychosomatic disorders refers to psychological and physical symptoms related to health such as nervousness, irritability, symptoms of depression, stomachaches, beatings, absent-minded and restless. It was measured by a 8-items and dichotomous scale belonging to '*The Psychosocial Work Environment and Stress Questionnaire'* which has undergone tests of reliability and validity using the Rasch item analysis model and data from previous company-level studies, the scale meet requirements for validity and reliability, as documented elsewhere (Agervold, 1998a). This scale has two dimension, the first is a 5-item

subscale named psychological symptoms and the second is a 3-item subscale named physical symptoms, high scores in this scale indicated the presence of health-related physical and psychological problems.

Results

Work Demands and Control

To test Hypotheses 1 and 2 that indicate the prediction of the occupational health and well-being outcomes, we performed hierarchical regression analyses. The results related to these hypotheses are displayed in Table 1. With regard to predictors variables, work demands did not report a significant effect neither on indicators of malaise (H1A), nor on indicators of well-being (H1C), whereas psychological symptoms (B=.234, p=.002) and physical symptoms (B=.081, p=.043) were positively affected by demands at work (H1B); in other words, these findings partially supported Hypothesis 1.

With regard to work control, it was negatively associated with indicators of malaise (H2A) (B=-.090, p=.000), psychological symptoms (B=-.204, p=.002) and physical symptoms (H2B) (B=-.071, p=.045); and positively associated with indicators of well-being (H2C) (B=.066, p=.000), these results fully supported Hypothesis 2.

TABLE 1: Ustandardized beta coefficients from multiple regressions predicting occupational health and well-being outcomes

Predictors	Indicators of Malaise		Indicators of Well-being		Psychosomatic Disorders *Psyc. Symp.*		*Physic.Symp.*	
	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Step 3								
Age	,008	,806	,013	,592	-,122	,210	,042	,440
Job tenure	,004	,868	-,017	,343	,052	,460	-,010	,800
Demands	-,041	,081	,000	,994	,284	,000	,081*	,043
Control	-,090**	,000	,066**	,000	-,219	,001	-,071*	,045
Supervisor relationships	-,138**	,000	,271**	,000	-,152	,027	-,007	,855
Coworker relationships	-,151**	,000	,176**	,000	-,240	,001	-,044	,242
Equity	,194**	,000	-,075**	,000	,239	,000	,090*	,017
Step 4								
Age	,008	,795	,013	,599	-,115	,238	,044	,423
Job tenure	,002	,918	-,015	,393	,035	,620	-,012	,759
Demands	-,044	,074	-,001	,941	,234*	,002	,072	,091
Control	-,085	,000	,062	,000	-,204*	,002	-,065	,072
Supervisor relationships	-,135	,000	,269	,000	-,170*	,015	,000	,997
Coworker relationships	-,148	,000	,172	,000	-,213*	,002	-,042	,273
Equity	,195	,000	-,075	,000	,250**	,000	,093	,014
Demands x supervisor relationships	-,026	,230	,010	,544	,073	,296	,050	,204
Demands x coworker relationships	,032	,155	-,018	,308	-,169*	,013	-,039	,304
Demands x equity	,044	,031	-,028	,070	,104	,098	,014	,695
Control x supevisor relationships	-,022	,309	,014	,420	,014	,828	,058	,094
Control x coworker relationships	,014	,490	-,023	,133	,122	,079	-,034	,368
Control x equity	,007	,700	-,006	,675	,086	,139	,003	,925

Note. B coefficients are the unstandardized regression coefficients from the significant final stage of the regression analysis.

***p < .05 **p < .01**

Interpersonal Relationships and Equity

Hypotheses 3, 4, 5, 6, 7 and 8 indicated that interpersonal relationships with supervisors and coworkers, and equity moderate the relationships between work demands /

work control and occupational health and well-being. The results of the hierarchical regression analyses shown in Table 2, 3 and 4, did not support the hypotheses of the moderating effects of interpersonal relationships (supervisors and coworkers) and equity on the relationships between work demands/work control and each occupational health and well-being outcomes (indicators of malaise, indicators of well-being and psychosomatic disorders concerning physical symptoms). Only the relationship between work demands and psychological symptoms was moderated by coworker relationships (H5C), it means that H5 is partially accepted.

TABLE 2: Hierarchical Regressions for the Prediction of the Indicators of Malaise

Predictors	Dependent Variable: Indicators of Malaise			
	Adjusted R Square	R Square Change	F Change	Sig. F Change
Step 1 Age, job tenure	.005	.008	2.499	.083
Step 2 Demands Control	.051	.049	16.174	.000**
Step 3 Supervisor relationships Coworker relationships Equity	.334	.284	89.185	.000**
Step 4 demand x superv.relation, demand x cowork.relation, demand x equity, control x supev.relation, control x cowork.relation, control x equity	.334	.007	1.077	.375

**p <.05 **p <.01*

Note: The residual are normally distributed and its mean=0, it means the error variance is constant for all levels of the dependent variable.

On the other hand, in Table 2 is shown that after adjusting age and job tenure; work demands, work control, supervisor relationships, coworker relationships and equity were retained as independent variables in regression models (step 3) predicting indicators of malaise (health–related outcome), all of them accounted for 33.4 percent of the variance. And in Table 1 is shown that supervisor relationships (B.=-.138, p=.000) and coworker relationships (B.=-.151, p=.000) had a significantly negative effect on indicators of malaise. Moreover, equity had a significantly positive effect on indicators of malaise (B.=.194, p=.000). In others words, when interpersonal relationships (supervisor and coworkers) and equity variables entered to model, the increase of variance was relevant and significant.

Likewise, in Table 3 is shown that after adjusting age and job tenure, work demands, work control, supervisor relationships, coworker relationships and equity were retained as independent variables in regression models (step 3) predicting indicators of well-being (health–related outcome), all of them accounted for 52.9 percent of the variance. And in Table 1 is shown that supervisor relationships (B.=.271, p=.000) and coworker relationships (B=.176, p=.000) had a significantly positive effect on indicators of well-being. Moreover, equity had a significantly significantly negative effect on indicators of well-being (B.=-.075, p=.000). The presence of interpersonal relationships (supervisor and coworkers) and equity variables in the model increased the variance considerabily and significantly.

TABLE 3: Hierarchical Regressions for the Prediction of the Indicators of Well-being

Predictors	Dependent Variable: Indicators of Well-being			
	Adjusted R Square	R Square Change	F Change	Sig. F Change
Step 1 Age, job tenure	.005	.008	2.702	.068
Step 2 Demands Control	.043	.041	13.582	.000
Step 3 Supervisor relationships Coworker relationships Equity	.529	.484	217.057	.000
Step 4 demand x superv.relation, demand x cowork.relation, demand x equity, control x supev.relation, control x cowork.relation, control x equity	.529	.005	1.089	.367

**p <.05 **p <.01*

Note: The residual are normally distributed and its mean=0, it means the error variance is constant for all levels of the dependent variable.

In Table 4 is shown that after adjusting age and job tenure; work demands, work control, supervisor relationships, coworker relationships and equity were retained as independent variables in regression model (step 3) predicting psychosomatic disorders concerning physical symptoms, all of them accounted for 2.8 percent of the variance, it meant that all of these predictors were significant but not relevant. Contrarily, in the case of psychological symptoms, the regression model retained predictors and moderators (step 4), accounting for 13.2 percent of the variance. The buffer effect came from coworker relationships variable which moderated the work demands – psychological symptoms relation.

TABLE 4: Hierarchical Regressions for the Prediction of the Psychosomatic Disorders

Predictors	Dependent Variable: Psychosomatic Disorders							
	Psychological Symptoms				Physical Symptoms			
	Adjus. R2	R2 Chang	F Chang	Sig. F Chang	Adjus. R2	R 2 Chang	F Chang	Sig. F Chang
Step 1 Age, job tenure	.000	.003	.944	.390	.000	.004	1.143	.319
Step 2 Demands Control	.057	.060	19.858	.000	.019	.021	6.831	.001
Step 3 Supervisor relationships Coworker relationships Equity	.120	.066	15.620	.000	.028	.014	2.939	.033
Step 4 demand x superv.relation, demand x cowork.relation, demand x equity, control x supev.relation, control x cowork.relation, control x equity	.132	.021	2.485	.022	.025	.006	.672	.672

**p < .05 **p < .01*

Note: The residual are normally distributed and its mean=0, it means the error variance is constant for all levels of the dependent variable.

Moreover, in Table 1 is shown that supervisor relationships and coworker relationships had no effect on psychosomatic disorders regarding physical symptoms; and equity had a significantly positive effect on psychosomatic disorders regarding psychological symptoms (B=.250, p=.000) and physical symptoms (B=.090, p=.017).

TABLE 5: Interaction Demand x Control on Indicators of Malaise and Well-being

Predictors	Indicators of Malaise				Indicators of Well-being			
	Adjus. R2	R2 Chang	F Chang	Sig. F Chang	Adjus. R2	R 2 Chang	F Chang	Sig. F Chang
Step 1 Age, Job Tenure	.005	.007	2.629	.073	.005	.008	2.732	.066
Step 2 Demands	.003	.000	.152	.697	.004	.001	.611	.435
Step 3 Control	.042	.040	29.596	.000	.039	.036	26.397	.000
Step 4 Demand x control	.050	.009	6.833	.000	.040	.002	1.293	.256

Interaction effects of work demand and control

Further analysis was performed in order to test the Hypothesis 9 that indicated the effect of the interaction demand – control on the three outcomes of occupational health and well-being. After controlling age and job tenure; the results shown in Table 5 and 6 only offered support to the interaction effect of work demands and work control on indicators of malaise (F=6.833, p=.000). The others outcomes of occupational health and well-being (indicators of well-being and psychosomatic disorders) were not influenced by demand-control interaction.

TABLE 6: Interaction Demand x Control on Psychosomatic Disorders

Predictors	Psychosomatic Disorders							
	Psychological Symptoms				Physical Symptoms			
	Adjus. R2	R2 Chang	F Chang	Sig. F Chang	Adjus. R2	R 2 Chang	F Chang	Sig. F Chang
Step 1 Age, Job Tenure	.003	.006	1.958	.142	.002	.004	1.556	2.12
Step 2 Demands	.030	.029	20.477	.000	.010	.010	7.192	.007
Step 3 Control	.053	.024	17.664	.000	.015	.006	4.224	.040
Step 4 Demand x control	.052	.000	.094	.760	.013	.000	.030	.862

Discussion

Our findings provide evidence to partially accept hypothesis 1 and fully Hypothesis 2 which indicated significant associations of work demands and work control with the three outcomes of occupational health and well-being. It means that high levels of work demands only could increase psychosomatic disorders (physical and psychological symptoms), and exerted no effect on the others two outcomes of occupational health and well-being

(indicators of malaise, and well-being). Likewise, high level of control at work could reduce sensations and feelings of discomfort (indicators of malaise), and psychological and physical symptoms (psychosomatic disorders), and could increase satisfaction feelings and positive attitudes (indicators of well-being) at work and organizational settings.

These findings demostrate that work demands are more associated to physical health outcomes (Falk, Hanson, Isacsson & Ostergren, 1992; Johnson, Stewart, Hall, Tredlund & Theorell, 1996; Eriksen, Natvig, Knardahl & Bruusgaard, 1999) specially psychosomatic symptoms (Kushnir & Melamed, 1991; Parkes et al., 1994) and musculoskeletal complaints (Houtman, Bongers, Smulders, & Kompier, 1994) than subjective outcomes of health; and that work control is a strong predictor of physical and mental health (Karasek, 1990; Eriksen, Natvig, Knardahl & Bruusgaard, 1999). Another assumption to explain this fact that work control had associations with more health-related outcomes than work demands could lie on the job nature of the sample; teachers tend to manage themselves and take decisions about the design of their own classes, contents and methods of teaching; their bosses can take decisions regarding particular projects or meetings, but not about their own activity with pupils.

Interpersonal relationships with supervisors and coworkers had a significant direct effect on indicators of malaise and indicators of well-being, and no effect on psychosomatic disorders regarding physical symptoms. Likewise, it did not moderate the effects of work demands and work control on the three outcomes of occupational health and well-being, only coworker relationships appeared to weakly moderate the demands-psychological symptoms relation. In others words, the high level of support and help provided by supervisors and coworkers could reduce the degree of discomfort and malaise with the organization, and improve the levels of satisfaction at work and increase the positive attitudes towards organization. And support from coworker could buffer the negative effects of work demands on psychological symptoms.

Similar findings concerning interpersonal relationships are also evidenced in the studies of Chappell & Novak (1992), Lee & Ashforth (1993), Lu (1995), De Jonge et al. (1996), McCann, Russo & Andrew, (1997), and Bourbonnais, Cameau & Vezina (1999), who found direct effects of interpersonal relationships (social support) and did not report any buffering effect in the negative effects of stressors on the health outcomes. As suggested Kinicki & McKee (1996), inconsistent results on the moderating role of interpersonal relationships in the stressors-outcomes association may be due to different operationalizations of interpersonal relationships. Cohen and Wills (1985) concluded that it is necessary to use a functional rather than global measure of social support to adequately test the buffer model. Likewise, McIntosh (1991) supported the value of examining the amount of support one receives, the adequacy of support received, and the number of providers, Harlow and Cantor's (1995) results supported this proposition. So, for example, it may be expected that support or help to teachers and administrative staff might come from other non-work sources of social support such as family and friends (Ray & Miller, 1994; Halbesleben, 2006), which were not assessed in this study.

With regard to organizational equity, it also had a significant direct effect on indicators of malaise, indicators of well-being and psychosomatic disorders, but no moderating effect was supported. Thus, the perceptions on a unfair treatment and payment of the employees could increase the degree of discomfort and malaise perceived in the organization, and psychological and physical symptoms; and could decrease the levels of satisfaction at work and the positive attitudes of employees to organization. These findings were also found in the studies of Elovainio, Kivimaki & Vahtera (2002). Furthermore, despite that equity had significant associations with the three outcomes of occupational health and well-being, it appeared to be a more relevant and stronger predictor for indicators of well-being than for indicators of malaise and psychosomatic disorders.

Further analyses about interaction effect of work demands and work control on occupational health and well-being outcomes evidenced that demands and control at work only had an interacttion effect on indicators of malaise (discomfort feeling with organization) (Dwyer & Ganster, 1991; Rugulies & Krause, 2005), and had an independent effect on indicators of well-being (satisfaction feelings with organization) and psychosomatic disorders (psychological and physical symptoms). These last findings were also found in the studies of Kushnir & Melamed (1991), Elovainio & Kivimaki (1996) and Kopec & Sayre (2004), who demostrated the independent effects of work demands and work control on strain symptoms. Likewise, Pelfrene, Vlerick, Kittel, Mak, Kornitzer, De Backer (2002) did not find evidence that job control scales buffer the effects of high psychological job demands on indicators of psychological well-being.

In conclusion, although the study was aimed to analyze the effects of work demands and control on occupational health and well-being, and the buffering role of the interpersonal relationships and equity, it provided support for determining that the levels of work control affected occupational health and well-being outcomes, and that interpersonal relationships and equity behave themselves as good predictors of occupational health and well-being outcomes, rather than as moderators. The study only registered that employees with high levels of work demands would not have strong psychological symptoms in the presence of a support or help from coworkers. Furthermore, the interaction effect of demands and control supported by Karasek's model was only found for indicators of malaise.

Limitations and Further Research

Several limitations of the present study should be noted. First, this is a relational study with a cross-sectional design. When all of the measures are taken at the same time, causal inferences become more tenuous. Therefore, future research involving longitudinal and/or experimental research would more clearly establish the matter of causation for the relationships between work-related risk factors and physical and mental health outcomes. This point is especially critical with regard to the gradual development of health-related problems.

Second, the amount of variance accounted for by predictors in the regression model was relatively low, above all with regard to psychosomatic disorders, suggesting that future research should continue identifying others psychosocial risk factors which may be more strongly associated with occupational health and well-being outcomes taking into account the characteristics of the tested sample (education service).

Third, the questionnaires employed in this study were self-reports. This may have caused underestimated or overestimated responses from teachers and administrative staff, due to that these type of measures are subjective. As well as data was obtained from the Italian school organizations, as a result, we should not assume that the observed findings can be generalized to other organizational settings. Of course, this is not to say that the present findings are unimportant, school organizations are important for its own nature (services) and for thousands of workers employed, and these results could be prudently extented to services organizations.

Fourth, we did not control for the effects of individual differences such as negative affectivity (NA). Such individual variable might have acted as a hidden variable affecting relationships between our predictors and health outcomes.

Finally, some methodological limitations could present in this study. Firtly, due to the limited categories of the studied variables which were 4-points Likert-type scales, this could have led to not detect moderating effects. In order to improve it, methodological literature advises that the number of cathegories of dependent variable has to be major or equals to the

product of the number of categories of independent variables for the number of categories of moderating variables. Secondly, in this study, the predictor variables were measured unidimensionally, a further examination of the effects of these predictors to a multidimensional level would be advisable as Kivimaki & Lindstrom's (1995) study presented, they stated that in much of the research done on the model demand and control a very general measure of control is used, which might not represent the control applicable over the stressor. At last the issue of linearity of the variables might be taken into account, the possibility of other kinds of effects such as non-linear or curvilinear could been suggested (Warr, 1990; Landsbergis et al., 1992).

In despite of these limitations, the results of this study encourage further replications with prospective data and with other kinds of organizations and occupational groups that allow us to assess the causality and generalizability of the associations and interactions among these studied variables. Likewise, it encourages practical implications, for example, creating more favourable working conditions in service organizations, in which it is probable that factors such as interpersonal relationships with coworkers and supervisors, ability to take decisions on own job, and perception of a fair work environment might be more relevant in comparison of other factors, and be considerated in organizational intervention processes.

References

Andrè-Petersson, L. Engstrom, G., Hedblad, B. Janzon, L, & Rosvall, M. (2007). *Social Support at Work and the Risk of Myocardial Infaction and Stroke in Women and Men*. Journal of Social Science and Medicine, Vol. 64, Iss. 4.

Avallone, F. & Bonaretti, M. (2003). *Benessere Organizzativo. Per migliorare la qualità del lavoro nelle amministrazione pubbliche*. Dipartamento delle Funsione Pubblica. Rubbettino Editore SRL.

Bellman, S., Foster, N., Still, L., & Cooper, C.L. (2003). Gender Differences in the use of Social Support as a moderator of Occupational Stress. Stress and Health, 19:45-58. Published on line in www.interScience.wiley.com

Benavides, F.G., Benach, J., & Montaner, C. (2007). *Psychosocial Risk Factors at the Workplace: is there enough evidence to establish reference values?*. Downloaded from www.jech.com.

Berkowitz, L., Cochran, S., Fraser, C., & Treasure, P. (1987). *Pay Equity, Job Gratifications and Comparisons in Pay Satisfaction*. Journal of Applied Psychology, Vol. 72, N. 4.

Black, S.J. (1990). *Locus of Control, Social Support, Stress, and Adjustment in International Transfers*. Asia Pacific Journal Management, Vol. 7, N. 1.

Bliese, P.D. & Castro, C.A. (2000). *Role Clarity, Work Overload and Organizational Support: multilevel evidence of the eimportance of support*. Work & Stress, Vol. 14, N. 1, 65–73.

Boles, M. Pellieter, B. & Lynch, W. (2004). *The Relationship between Health Risks and Work Productivity*. Journal of Occupational and Environmental Medicine (JOEM), Vol. 46, N. 7.

Bond, F. W., & Bunce, D. (2003). *The Role of Acceptance and Job Control in Mental Health, Job Satisfaction, and Work Performance*. Journal of Applied Psychology, Vol. 88, N. 6.

Bourbonnais, R., Comeau, M. & Vezina, M. (1999). *Job Strain and Evolution of Mental Health among Nurses*. Journal of Occupational Health Psychology, Vol. 4, N. 2, 95-107.

Cobb, S. (1976). *Social Support as a moderator of Life Stress*. Psychosomatic Medicine, Vol. 38, N. 5.

Cox, T., Griffiths, A. & Rial-Gonzales, E. (2000). *Ricerca sullo Stress correlato al Lavoro*. Agenzia Europea per la Sicurezza e la Salute sul Lavoro.

Chapell, N. L., & Novak, M. (1992). *The Role of Support in Alleviating Stress Among Nursing Assistants*. The Gerontologist, Vol. 32, N. 3, 351.

Daniels, K. & Guppy, A. (1994). *Occupational Stress, Social support, Job Control, and Psychological Well-being*. Human Relations, Vol. 47, N. 12, 1523-1544.

Dwyer, D. J. & Ganster, D. C. (1991). *The effects of Job Demands and Control on Employee Attendance and Satisfaction*. Journal of Organizational Behavior, Vol. 12, 595-608

Elovainio, M. & Kivimaki, M. (1996). *Occupational stresses, goal clarity, control, and strain among nurses in the Finnish health care system*. Research in Nursing and Health, Vol 19(6), 517-524.

Elovainio, M., Helkama, K., & Kivimaki, M. (2001). *Organizational Justice Evaluations, Jod Control and Occupational Strain*. Journal of Applied Psychology, Vol. 86, N. 3.

Elovainio, M. Kivimaki, M, & Vahtera, J. (2002). *Organizational Justice: Evidence for a new psychosocial predictor of health*. American Journal of Public Health, Vol. 92, 1.

Elovainio, M., Forma, P., Kivimaki, M., Sinervo, T., Sutinen, R. & Laine, M. (2005). *Job Demands and Job Control as Correlates of Early Retirement Thoughts in Finnish Social and Health Care Employees*. Work & Stress, Vol. 19, N. 1, 84-92

Eriksen, W., Natvig, B., Knardahl, S., & Bruusgaard, D (1999). *Job Characteristics as Predictors of Neck Pain: A 4-Year Prospective Study.* Institute of General Practice and Community Medicine, University of Oslo, Vol. 41, N.10

Falk, A., Hanson, B. S., Isacsson, S.O. & Ostergren, P. O. (1992). *Job Strain and Mortality in Elderly Men: social network, support and influence as buffers*. American Journal of Public Health, Vol. 82, N. 8, 1136-1130.

Frazier, P., Barron, K. E. & Tix, A. P. (2004). *Testing Moderator and Mediator effects in Counseling Psychology Research*. Journal of Counseling Psychology, Vol. 51, N. 1, 115-134.

Glaser, D. N., Tatum, B. C., Nebeker, D.m., Sorenson, R.C., & Aiello, J.R. (1999). *Workload and Social Support: Effects on Performance and Stress*. Human Performance, Vol. 12 (2), 155-176.

Grebner, S. Semmer, N.K., Lo Faso, L., Gut, S., Kalin, W., & Elfe-ring, A. (2003). *Working Conditions, Well-being, and Job-related Attitudes among call centre agents*. European Journal of Work and Organizational Psychology, Vol. 12, N. 4.

Halbesleben, J.R.B. (2006). *Sources of Social Support and Burnout: A Meta-Analytic Test of the Conservation of Resources Model*. Journal of Applied Psychology, Vol. 91, N. 5.

Jansson, M. & Linton, S.J. (2006). *Psychological Work Stressors in the Development and Maintenance of Insomnia: a prospective study*. Journal of Occupational Health Psychology, Vol. 11, N. 3, 241-248

Johnson, J., Stewart, W., Hall, E. M., Tredlund, P. & Theorell, T. (1996). *Long-term Psychosocial Work Environment and Cardiovascular Mortality among Swedish Men*. American Journal of Public Health, 86, 3.

Karasek, R., Triantis, K. P. & Chaundhry, S. S. (1982). *Coworker and Supervisor Support as a Moderators of Associations between Task Characteristics and Mental Strain*. Journal of Occupational Behaviour, Vol. 3, N. 2, 181-200.

Karasek, R. (1990). *Lower Health Risk with Increased Job Control among White Collar Workers*. Journal Of Organziational Behavior, Vol. 11, N. 3, 171-185

Kinicki, A. J. & McKee, F. M. (1996). *Annual Review, 1991 – 1995: Occupational Health*. Journal of Vocational Behavior 49, 190-220

Kivimaki, M. & Lindstrom, K. (1995). *Effects of Private Self-Consciousness and Control on The Occupational Stress – Strain Relationship*. Stress Medicine, Vol. 11, 7-16.

Kopec, J. A. & Sayre, E. C. (2004). *Work-Related Psychosocial Factors and Chronic pain: a prospective cohort study in Canadian Workers*. Journal Occupational and Environmental Medicine, Vol. 46, N. 12, 1263-1271.

Kouvonen, A., Kivimaki, M., Vaananen, A., Heponiemi, T., Elovainio, M., Ala-Mursula, L., Virtanen, M. Pentti, J. Linna, A. & Vahtera, J. (2007). *Job Strain and Adverse Health Behaviours: The Finnish Public Sector Study*. Journal of Occupational and Environmental Medicine, Vol. 49, N. 1, 68-74.

Kushnir, T. & Melamed, S. (1991). *Work-Load, Perceived Control and Psychological Distress in Type A/B Industrial Workers***.** Journal of Organizational Behavior, Vol. 12, No. 2, 155-168.

Labriola, M., Christensen, K., Lund, T., Lindhardt, M. & Diderichsen, F. (2006). *Multilevel Analysis of Workplace and Individual Risk Factors for long-term Sickness Absence*. Journal of Occupational and Environmental Medicine (JOEM), Vol. 48, N. 4.

Landsbergis, P. A., Schnall, P. L., Deitz, D. & Friedman, R. (1992). *The Patterning of psychological Attributes and Distress by "Job Strain" and Social Support in a Sample of Working Men*. Journal of Behavioral Medicine, Vol. 15, 379-405.

Landsbergis, P. A. (1998). *Occupational Stress among Health Care workers: a test of the job demands-control model*. Journal of organizational Behavior, Vol. 9, N. 3, 217-239.

Lee, R. T. & Ashforth, B. (1993). *A Further Examination of Managerial Burout: Toward an Integrated Model*. Journal of Organizational Behavior, Vol. 14, 3-20.

Leka, S., Griffiths, A, & Cox, T. (2004). *Work Organization & Stress*. Institute of Work, Health & Organizations. World Health Organization.

Lerner, D., Levine, S., Malspeis, S. & D'Agostino, R. B. (1994). *Job Strain and Health-Realted Quality of Life in a National Sample*. American Journal of Public Health, Vol. 84, N. 10, 1580.

Lu, L. (1995). *The Relationship between Subjective Well-being and Psychosocial Variables in Taiwan*. The Journal of Social Psychology, Vol. 135, Iss. 3

McCann, B., Russo, J. & G. Andrew H. Benjamin (1997). *Hostility, Social Support, and Perceptions of Work*. Journal of Occupational Health Psychology, Vol. 2, No. 2, 175-185.

Melamed, S., Ben-Avi, I., Luz, J., & Green, M. (1995). *Objective and Subjective Work Monotony: effects on job satisfaction, psychological distress, and absenteeism in blue-collar workers*. Journal of Applied Psychology, Vol. 80, N. 1.

Moliner, C., Martìnez-Tur, V., Peirò, J.M. & Cropanzano, R. (2005). *Relationships between Organizational Justice and Burnout at The work-unit level*. International Journal of Stress Management, Vol. 12, N. 2, 99-116.

Parent-Thirion, A. Fernàndez, E., Hurley, J., & Vermeylen, G. (2007). *Fourth European Working Conditions Survey*. European Foundation for the Inmprovement of Living and Working Conditions.

Parker, S., Axtell, C., & Turner, N. (2001). *Designing a Safer Workplace: Importance of Job Autonomy, Communication Quality, and Supportive Supervisors*. Journal of Occupational Health Psychology, Vol. 6, N. 3.

Parker, S.K., Chmiel, N. & Wall, T.D. (1997). *Work Charcateristics and Employee Well-being within a Context of Strategic Downsizing*. Journal of Occupational Health Psychology, Vol. 2, N. 4, 289-303.

Payne, R. & Fletcher, B. (1983). *Job Demands, Supports, and Constraints as Predictors of Psychological Strain among School Teachers*. Journal of Vocational behavior, Vol. 22, Iss. 2, 136-147.

Pelfrene, E., Leynen, F., Mak, R., De Bacquer, D., Kornitzer, M. & De Backer, G. (2003). *Relationship of perceived job stress to total coronary risk in a cohort of working men and women in Belgium*. European Journal of Cardiovascular Prevention and Rehabilitation, Vol. 10, 345–354.

Pelfrene, E., Vlerick, P. Kittel, F., Mak, R. P., Kornitzer, M. & De Backer, G. (2002). *Psychosocial work environment and psychological well-being: assessment of the buffering*

effects in the job demand– control (–support) model in BELSTRESS. Stress and Health 18: 43–56.

Rau, R., Georgiades, A., Fredikson, M., Lemne, C. & De Faire, V. (2001). *Psychosocial Work Characteristics and Perceived Control in relation to Cardiovascular Rewind at Night*. Journal of Occupational Health Psychology, Vol. 6, N. 3, 171-181.

Rau, R. (2004). *Job Strain or Healthy Work: A Question of Task Design*. Journal of Occupational Health Psychology, Vol. 9, N. 4.

Rugulies, R. & Krause, N. (2005). *Job Strain, Iso-Strain, and The Incidence of Low Back and Neck Injuries: A 7.5-year prospective study of San Francisco Transit Operators*. Social Science & Medicine, Vol. 61, 27-39.

Santavirta, N., Solovieva, S. & Theorell, T. (2007). *The Association between Job Strain and Emotional Exhaustion in a cohort of 1028 Finnish Teachers*. British Journal of Educational Psychology, Vol. 77, 213-228.

Spector, P. (1987). *Interactive Effects of Perceived Control and Job Stressors on Affective Reactions and Health Outcomes for Clerical Workers*. Work & stress, Vol. 1, N. 2, 155-162.

Sprigg, C.A., Smith, P., & Jackson, P.R. (2003). *Psychosocial Risk Factors in Call Centres: An Evaluation of Work Design and Well-being*. Prepared by The University of Shieffield, for The Health and Safety Executive.

Virtanen, M., Honkonen, T., Kivimaki, M., Ahola, K., Vahtera, J., Aromaa, A. & Lonnqvist, J. (2007). *Work Stress, Mental Health and Antidespressant Medication Findings from The Health 2000 Study*. Journal os Affective Disorders, 98, 189-197.

Van Der Doef, M. & Maes, S. (1998). *The Job Demand-Control (-Support) Model and Psysical Health Outcomes: a review of the Strain and Buffer Hypotheses*. Psychology and Health, Vol. 13, 909-936.

Warr, P. B. (1990). *Decision Latitude, Job Demands, and Employee Wellbeing*. Work and Stress, Vol. 4, 285-294.

Winnubst, J., Marcelissen, F. & Kleber, R. (1982). *Effects of Social Support in the Stressor-Strain Relationship: A Dutch Sample*. Social Science and Medicine, Vol. 16 (4), 475-482.

Ylipaavalniemi, J., Kivimaki, M., Elovainio, M., Virtanen, M. Keltikangas-Jarvinen, L. & Vahtera, J. (2005). *Psychosocial Work Characteristics and Evidence of Newly Diagnosed Depression: aprospective cohort study of three different models*. Social Science & Medicine, Vol. 61, Iss. 1, 111-122.

http://ec.europa.eu/employment_social/health_safety/index_en.htm

http://www.workhealth.org/news/tokyo.html

www. cantieripa.it

ANEXOS

Figures of relationships between studied variables

Figure 1: The relation between Work Control and Indicators of Malaise

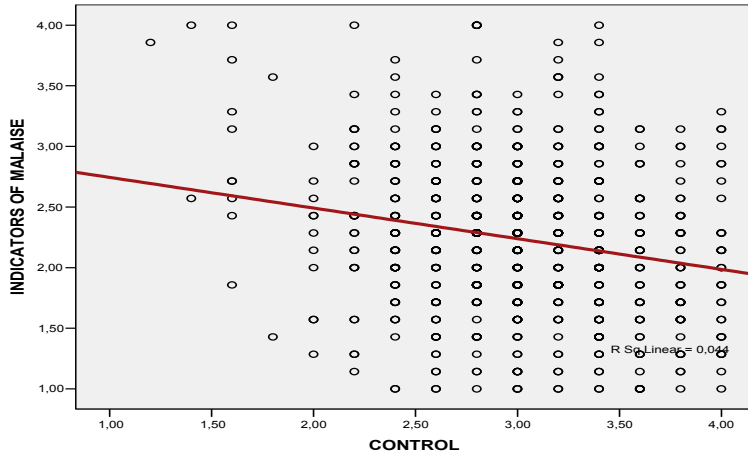


Figure 2: The relation between Coworker Relationships and Indicators of Malaise



Figure 3: The relation between Supervisor Relationships and Indicators of Malaise

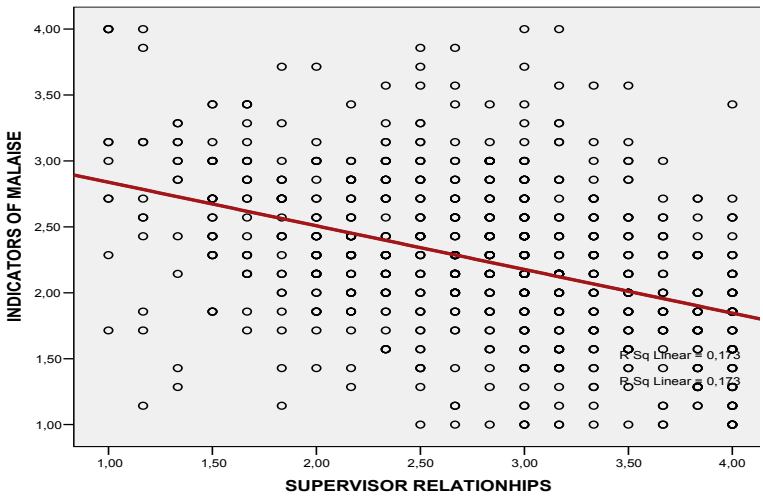


Figure 4: The relation between Equity and Indicators of Malaise

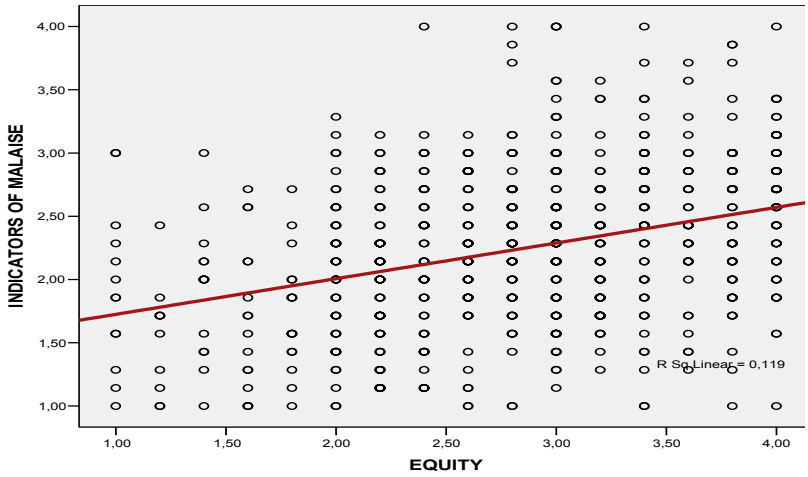


Figure 5: The relation between Work Control and Indicators of Well-being

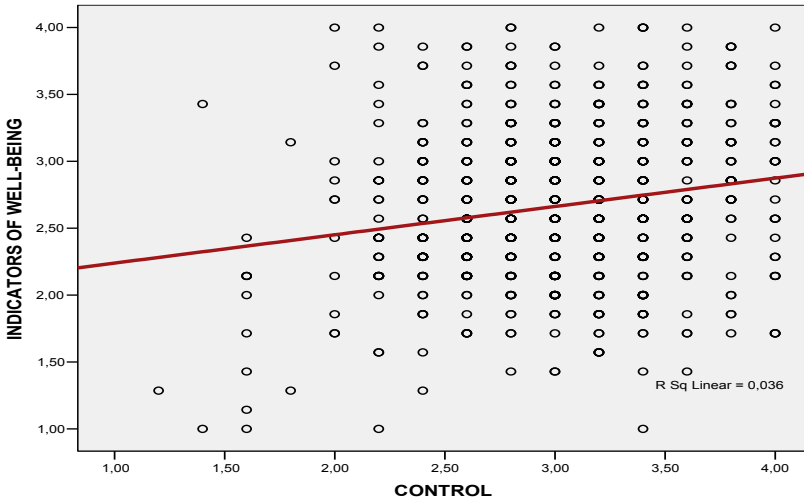


Figure 6: The relation between Coworker Relationships and Indicators of Well-being

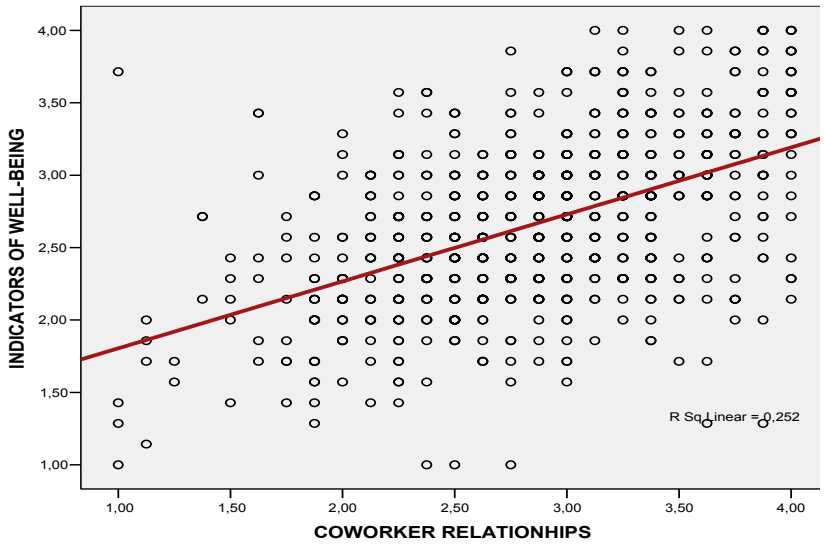


Figure 7: The relation between Supervisor Relationships and Indicators of Well-being

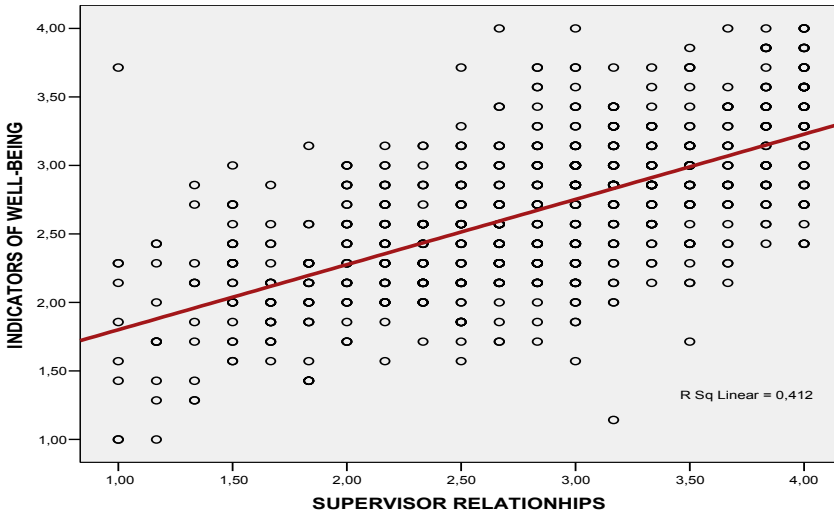


Figure 8: The relation between Equity and Indicators of Well-being

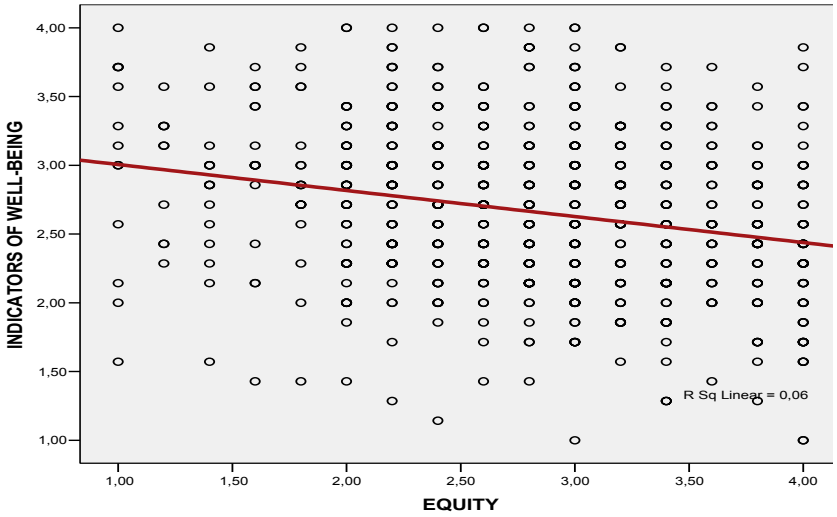


Figure 10: The relation between Control and Psychological Symptoms

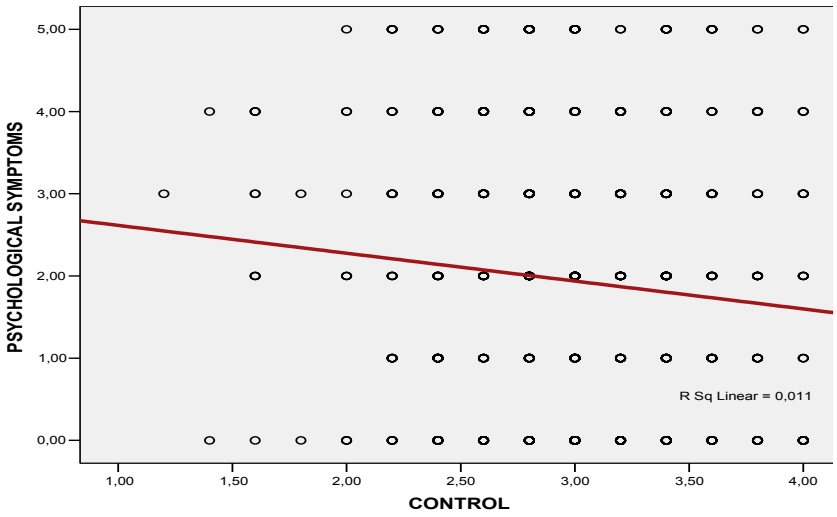


Figure 11: The relation between Coworker Relationships and Psychological Symptoms

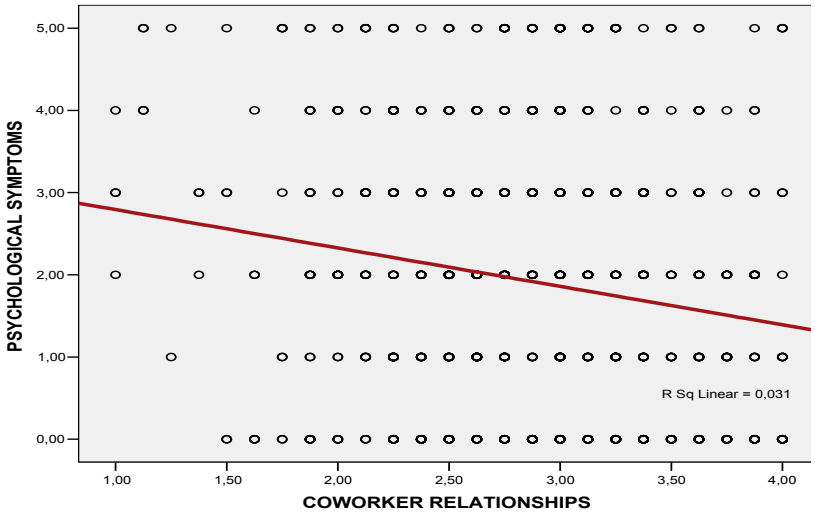


Figure 12: The relation between Supervisor Relationships and Psychological Symptoms

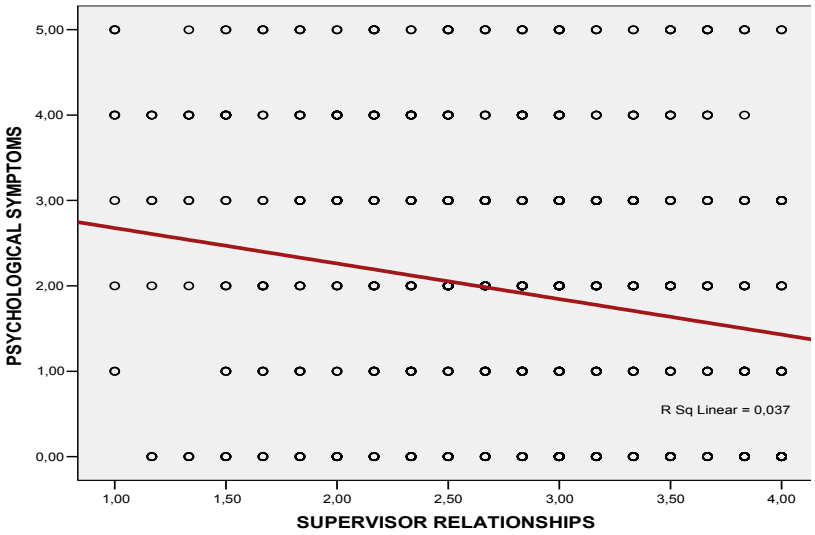


Figure 13: The relation between Equity and Psychological Symptoms

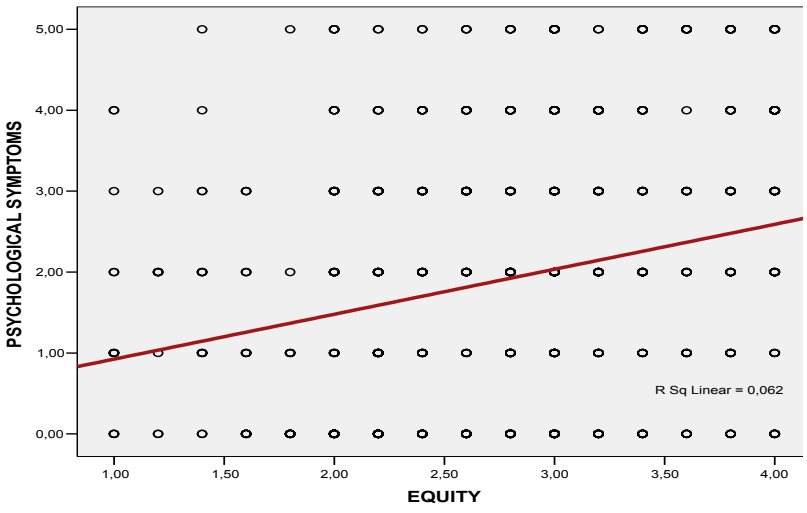


Figure 15: The relation between Control and Physical Symptoms

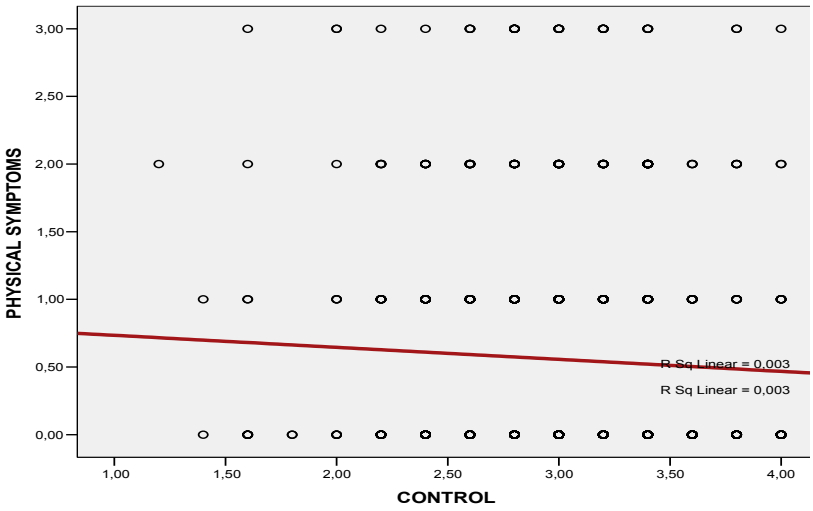


Figure 16: The relation between Coworker Relationships and Physical Symptoms

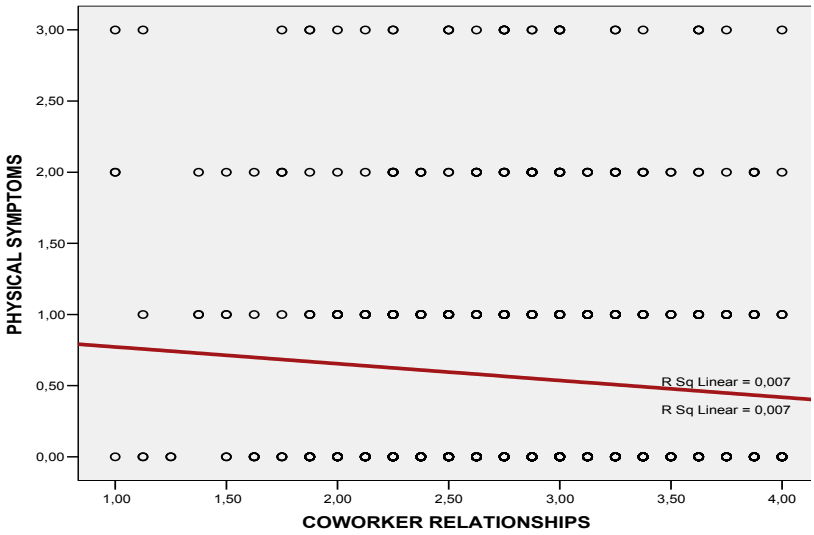


Figure 17: The relation between Supervisor Relationships and Physical Symptoms

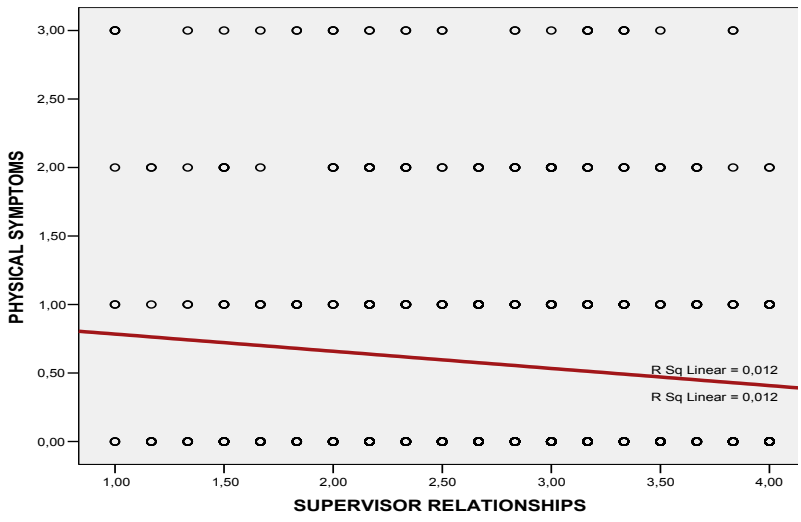
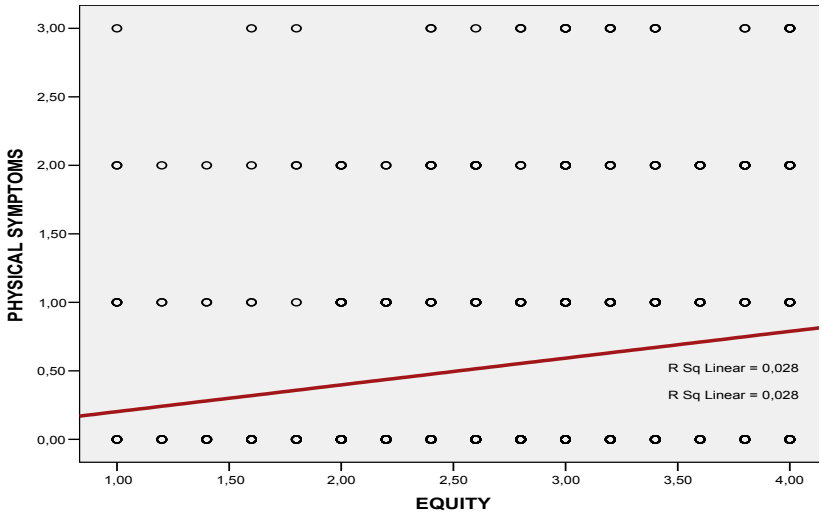


Figure 18: The relation between Equity and Physical Symptoms



Questionnarie of "Rilevazione del Benessere Organizzativo nel Contesto Scolastico"

Work Demands	1) Mi capita spesso di avere così tanto lavoro da doverlo portare a casa 2) Sono spesso pieno di lavoro 3) Il mio lavoro richiede molta concentrazione 4) Il mio lavoro mi richiede di ricordare molte cose 5) I miei compiti lavorativi sono spesso difficili e pesanti
Work Control	1) Ho molta influenza sulla mia situazione lavorativa quotidiana 2) Controllo da solo i ritmi del mio lavoro 3) Il mio lavoro di solito mi comporta decisioni e valutazioni autonome 4) Il mio lavoro mi dà la libertà di pianificarlo 5) Il mio lavoro mi dà una responsabilità adeguata a ciò che devo fare

Coworker Support	1) Anche tra colleghi ci si ascolta e si cerca di venire incontro alle reciproche esigenze 2) Esiste collaborazione con i colleghi 3) Nel gruppo di lavoro tutti si impegnano per raggiungere i risultati 4) Nel gruppo di lavoro si trovano soluzioni adeguate ai problemi che si presentano 5) Nel mio gruppo di lavoro chi ha un'informazione la mette a disposizione di tutti 6) Con i colleghi ci teniamo regolarmente in contatto l'un l'altro 7) I membri del mio gruppo di lavoro si incontrano spesso per parlare sia formalmente che informalmente 8) Con i colleghi interagiamo frequentemente
Supervisor Support	1) Chi avanza richieste o formula proposte e suggerimenti viene ascoltato dal DS/DSGA 2) Il DS/DSGA coinvolge i dipendenti nelle decisioni che riguardano il loro lavoro 3) Il DS/DSGA aiuta a lavorare nel modo migliore 4) Il comportamento del DS/DSGA è coerente con gli obiettivi dichiarati 5) Il DS/DSGA desidera essere informato sui problemi e le difficoltà che si incontrano nel lavoro. 6) Il DS/DSGA tratta i dipendenti in maniera equa

Equity	1) Investo nel mio lavoro più di quanto ricevo in cambio 2) Le ricompense che ricevo non sono proporzionali al mio investimento 3) Considerando quanto ricevo, lavoro troppo 4) La gran quantità di tempo e attenzione che spendo per l'organizzazione non viene apprezzata 5) Metto più energia nel mio lavoro di quanto ne valga la pena

Indicators of Malaise	1) sensazione di fare cose inutili 2) sensazione di contare poco nell'organizzazione 3) sensazione di non essere valutato adeguatamente 4) sensazione di lavorare meccanicamente, senza coinvolgimento 5) Aggressività e nervosismo 6) Poca chiarezza su cosa bisogna fare e chi lo deve fare 7) Mancanza di idee e assenza di iniziativa
Indicators of Well-being	1) soddisfazione per l'organizzazione 2) voglia di andare al lavoro 3) soddisfazione per le relazioni personali costruite sul lavoro 4) fiducia nelle capacità professionali e gestionali della dirigenza 5) condivisione dell'operato e dei valori dell'organizzazione 6) percezione che il lavoro dell'organizzazione sia apprezzato all'esterno 7) Fiducia che le condizioni negative attuali potranno cambiare
Psychosomatic Disorders	1) Avere la sensazione di non andare da nessuna parte 2) Sentirsi non sereno 3) Avere la sensazione di essere irrequieto 4) Sentirsi irritabile 5) Avere la sensazione di essere depresso senza ragioni 6) Aver sofferto di vertigini 7) Aver sofferto di mal di stomaco 8) Aver sofferto di palpitazioni