Chapter 4.

Coping with Stress at Work:

A Longitudinal Study on Health Outcomes and Quality of Life

4.1   Purpose of the Study

This study pursues the following aims:

First, it aims to investigate work stress and health outcomes/quality of life by addressing three central aspects: a) the role played by personal resources (self-efficacy beliefs, proactive attitude) and social support (received advice) as protective factors in the work stress-health relation; b) the role played in coping behaviors by personal resources (self-efficacy beliefs, proactive attitude) and environmental factors (work stress), by emphasizing the mediating function of coping as a path through which employees may become sick or stay well; c) the interplay between work stress, self-efficacy beliefs, coping, health outcomes, and quality of life, to be precise, relations of reciprocal influence among these constructs across the time.

With respect to personal resources, two personality factors that relate largely to major cognitions may be especially important as *protective factors* as well as *personal coping resources*, including general and specific self-efficacy beliefs (Bandura, 1977a, 1977b, 1992, 1997; Schwarzer, 1992b). In addition, proactive attitude -which is conceived to be strongly associated with self-efficacy beliefs-, is expected to function in a similar way (Schmitz & Schwarzer, 1999). Three different questions are central to this study. The first is whether self-efficacy beliefs and proactive attitude *moderate* the work stress-health relation. The second is whether the effects of personality factors and work stress on health/QoL are *mediated* by two contrasting forms of coping, namely avoidance-oriented coping, and proactive-oriented coping. The third question, as suggested above, concerns the functioning of antecedent variables, mediators, and consequences as a *dynamic system*, in which the "causes" can be also defined as the "effects".

With reference to the function of resources (internal or external), there are two different models regarding the impact of psychosocial coping resources on health and quality of life. First, the *main-effect model*, which presumes, that resources may have a favorable effect on psychological health, regardless of whether stress is present. Second, the *buffering model*, which conceives, that resources may alleviate the negative influence of stressors on health only when stress is present (see Leppin & Schwarzer, 1997; Schroeder, 1997b). Despite the amount of effort aimed at clarifying the role of resources in stress-health relationship, the controversy concerning the main vs. buffering models remains largely unresolved (Chay, 1993).

As for coping processes, there are two general models that aim at understanding the effects of antecedent variables on health consequences via coping, namely the *full mediational approach* (also known as restrictive model), in which the whole influence of personal resources and environmental factors is conceived to be indirectly transmitted through coping only, and the *partial mediational approach* (also called non restrictive model), in which personal resources and antecedents make "cooperative" contributions to health consequences, that is, by influencing directly, and indirectly (through coping) on health consequences. Examples of both can be found in Lazarus (1991b), Holahan et al. (1996), Schwarzer, Hahn, and Fuchs (1993) and Schwarzer (2001). To describe and understand the consequences of stress in the workplace, it is necessary to study coping process to generate knowledge and information about the mechanism by which individuals will tend to be more or less vulnerable to sources of stress at work. The relevance of this task consists in the possibility of developing intervention research oriented to improve the person-environment fit by enhancing coping skills, without ignoring the fact that a fit for one individual or group might not be, fit for another.

The conceptualization of relationships as a dynamic system (Lazarus, 1991b), on its side, refers not only to the study of human functioning in the context of the functional dependence (Bandura, 1997) between the person, his/her behavior, and the environment (or reciprocal determinism), but also to the analysis of the process of "stability" and "change" (Engel & Meyer, 1996).

Second, this study is to be considered as a contribution to applied health psychology because: a) It points towards the identification of personal and social resources as potential buffers of the impact of work stress on health outcomes/quality of life in working people; b) it aims at clarifying and further explaining the routes by which employees may become sick, and conversely, the paths through which employees may stay and remain well; c) it will provide an empirical basis to design and develop specific plans oriented to the prevention of illness and the improvement in health at the level of individuals and organizations.

4.2   Research Questions

Specifically, the idea is to answer to the following questions:

Do personal resources (self-efficacy beliefs and proactive attitude) and social resources (advice) moderate the effects of work stress on health outcomes, emotional experience, and quality of life, at a later point in time?

Does coping mediate the effects of personal resources (self-efficacy beliefs and proactive attitude) and work stress on health outcomes, emotional experience, and quality of life, at a later point in time?

How are work stress, self-efficacy beliefs, emotional experience, health outcomes, and quality of life interrelated? Are these constructs embedded in relations of reciprocal influence across the time?

From a more general perspective:

How do personal resources cooperate with coping in promoting health? How do employees develop a better health and higher quality of life and who suffers the least? Why do some employees become sick and why do others stay well? How do positive and negative emotions originate from certain coping strategies? Can emotions result in illness? How can work stress related-illness be prevented at the level of individuals and organizations?

Table 4. exhibits the meta-theoretical schematization of the main causal relationships and theoretical assumptions.

CAUSAL ANTECEDENTS	MEDIATING PROCESSES		
	→Time 1…T2…T3…Tn →Enc. 1…T2…T3…Tn	→IMMEDIATE EFFECTS	→LONG TERM EFFECTS
Personality Variables	*Cognitive Appraisal*	*Emotions*	*Quality of Life*
	Primary	Positive	Psychological
Self-Efficacy Proactive Attitude	Secondary	and Negative Affect	Physical
	Coping		
Environmental Variables		*Symptoms*	
	Proactive-oriented Coping		
Work Stress		Somatization	
Social Support (Advice)	Avoidance-oriented Coping	Depression Somatic Disorders	

Table 4. Theoretical Schematization of the Emotion System. Adapted from: R.S. Lazarus. Emotion and Adaptation. Oxford: Oxford University Press. 1991.

Main Theoretical assumptions of the Study:

A. Personality and environmental variables are conceived to be antecedents in the path by which employees may become sick or stay well. The influence of work stress on immediate and long term effects may be moderated by personality factors and social support. Part of the task would be to demonstrate whether there are main effects or buffer effects.

B. Coping behaviors are conceived to be an *indirect path* through which personality factors and environmental variables may influence on immediate and long term effects outcomes. Coping may fully or partially mediate the influence of antecedents on consequences. In this case, the task would be to discriminate whether or not the whole

influence of antecedents is mediated by coping, and which mechanism emerge as mal (adaptive) in facing work-related stressors.

C. Work stress, coping, self-efficacy beliefs, health outcomes, and quality of life are considered to be embedded in a system of *bi-directional* influence, in which the long term effects (let's say quality of life) can be the cause of the enhancement in personal resources (let's say self-efficacy beliefs) at a later point in time.

As can be seen, assumptions A, B, and C contemplate only part of the meta-theoretical system described in Table 4, since no concrete assumptions regarding cognitive appraisal are elaborated. In consequence, the study will consider coping behaviors as the most relevant functional aspect in terms of mediation, with the purpose of providing relevant information that may help in designing future intervention research, aiming at improving *coping skills* in employees working for manufacturing companies. Let's turn then to the hypotheses.

4.3   Hypotheses

4.3.1   Hypotheses about the role played by self-efficacy beliefs, proactive attitude, and informational support in the work stress-health outcomes, emotions, and QoL relation

Assumptions regarding potential effects of personal and social resources in the stress-health relation take origin, principally, from the *main-effect model* and the *buffering-effect model* of health (Leppin & Schwarzer, 1997). The *direct-effect model* (e.g., Broadhead et al., 1983) hypothesizes that resources have a beneficial effect on health, regardless of whether stress is present; and the *buffering model* (e.g., Cohen & Wills, 1985) sustains that resources are of benefit mostly when an interaction taxes or exceeds employees capabilities, that is, *under stress* only. Nevertheless, despite of significant efforts that aimed at clarifying the role of resources in the stress-health relationship, the

controversy regarding main vs. buffering models is still open and unsolved (see Chapter 2, section 2.6 for more details).

Hypothesis 1

Self efficacy beliefs (SEB) and *proactive attitude* (PROA) should function as protective factors in the work stress-health outcomes, emotions, and quality of life relation. The long term effects of SEB and PROA can be general (through main effects) or interactive (through buffer effects). In the former case, it would be expected that SEB and PROA protect individuals both when work stress is high and when work stress is low. Alternatively, in the presence of buffer effects, it would be expected that SEB and PROA act in favor of health only when work stress is high. In either case, both SEB and PROA should influence coherently, *in favor* of the improvement in health outcomes/quality of life in working people.

Hypothesis 1a

Social support (in concrete, received advice) should play a leading role as a health protective factor when crisis arises, that is, it may "buffer" the long term effects of work stress on negative health outcomes at a later point in time. In consequence, the benefits of *received advice* should not be present when work stress is experienced as a routine, but when employees face highly stressful transactions at work.

4.3.2 On the role played by COPING as *potential mediator* of the influence of work stress and personal resources on health outcomes, emotional states, and quality of life at a later point in time

To develop concrete hypotheses in terms of *antecedent variables* (personal resources, work stress), *mediating processes* (coping), and the resulting *outcomes* (short- and long-term effects), *selected* meta-theoretical principles of the cognitive-transactional theory of stress (Lazarus & Folkman, 1984), the conceptual framework of Holahan et al. (1996), and Lazarus' theory of Emotions (Lazarus, 1991b) were used (see Chapter 3, Section 3.2). In order to define the hypotheses concerning the questions of how and why do employees tend to become sick, and conversely, what is the route through which working people stay well, the frameworks mentioned above were integrated to the self-efficacy theory of Bandura (2001), the self-regulatory-behavioral approach of Carver and Scheier (1998), and the proactive models on coping (Schwarzer, 2000, 2001; Schwarzer & Taubert, 2002; Aspinwall & Taylor, 1997) (see Chapter 3, Sections 3.3, 3.4, and 3.5). Two facets of coping were identified as influencing factors on human functioning at work: First, *avoidance-oriented coping*, which was hypothesized as an anti-goal mechanism conducing to disease (see Chapter 3, section 3.2.1). Second, *proactive-oriented coping*, representing a positive, non reactive facet of human adaptation to work stressors, which was hypothesized to be the route conducing to better health, a more pleasurable emotional life, and higher quality of life (see Chapter 3, section 3.5). Given that proactive coping theories are also compatible with the principles of the conservation of resources theory (Hobfoll, 1998; 2001), hypotheses were also delineated to consider the role of resources and coping in potential loss vs. gain cycles (see Chapter 3, Section 3.2.3).

4.3.2.1 On the role played by AVOIDANCE COPING as potential mediator of the long term effects of work stress and *self-efficacy beliefs* on negative health outcomes and negative affect

Hypothesis 2

Avoidance-oriented coping should be a path through which employees become sick. Specifically, the use of avoidance, denial and behavioral disengagement at Time 1 (T1) should conduce to higher levels of depression, somatization, and physical illness at Time 2 (T2). The adverse effects of avoidance-oriented coping on later consequences in negative health outcomes should be exacerbated (directly and indirectly) by work stress. Self-efficacy beliefs –on the contrary- should reduce the use of avoidance coping, and they should –indirectly and directly- promote the improvement in health outcomes.

Hypothesis 2a

Avoidance-oriented coping should be a route through which employees develop unpleasurable affect. Particularly, the use of avoidance, denial and behavioral disengagement at T1 should lead to higher levels of distress, anger, fear, guilt, and jitters at T2. Work stress should exacerbate (directly and indirectly) negative affect, whereas self-efficacy beliefs should improve (directly and indirectly) emotional experience.

4.3.2.2 On the role played by PROACTIVE COPING as potential mediator of the long term effects of work stress and *self-efficacy beliefs* on quality of life and positive affect

Hypothesis 3

Proactive coping should be a path through which working people remain healthy and stay well. The use of proactive coping at T1 should lead to higher psychological and physical quality of life at T2. Particularly, work specific-efficacy beliefs should motivate the use

of proactive coping strategies, and in turn promote (directly and indirectly) higher levels of quality of life. Work stress should increase the use of proactive coping; nevertheless, T2 quality of life should be negatively (directly) affected by T1 levels of work stress. The indirect effect of work stress (via proactive coping) on quality of life might be weaker than the indirect effect of work specific-efficacy beliefs. The former assumption has to do with the question of whether proactive coping mediates better the effects of work stressors or the effects of the self-system.

Hypothesis 3a

Proactive coping should be a route through which employees may experience a pleasurable emotional life. The use of proactive coping at T1 should conduce to higher positive affect at T2. Positive affect reflects the extent to which a person feels enthusiastic, active, and alert; high positive affect is a state in which individuals experience high energy, full concentration, and pleasurable engagement. Self-efficacy beliefs (generalized and work specific) should positively influence positive affect at a later point in time; and this influence may be direct or indirect (through proactive coping). On the contrary, positive affect at T2 should be negatively influenced by T1 level of work stress. The indirect effect of work stress (via proactive coping) on positive affect might be weaker than the indirect effects of self-efficacy beliefs on positive emotional experience.

4.3.2.3 On the role played by AVOIDANCE COPING as potential mediator of the long term effects of work stress and *proactive attitude* on negative health outcomes and negative affect

NOTE: The following four hypotheses (4, 4A, and 5) are practically identical to the ones defined before. The difference consists in the use of **proactive attitude** instead of self-efficacy beliefs as the central *personal resource* in the "prediction" of mediators (coping) and outcomes (negative health outcomes and quality of life). Therefore, the effects of

proactive attitude on mediators and outcomes criterion are expected to be, on the whole, quite consistent with the already hypothesized effects of the self-efficacy beliefs on mediators and outcomes.

Hypothesis 4

In this hypothesis, avoidance-oriented coping is also conceptualized as a path through which employees become sick; it is expected, that the use of avoidance, denial and behavioral disengagement at T1 will lead to higher levels of depression, somatization, and physical illness at T2. Work stress should also exacerbate (directly and indirectly) the adverse effects of avoidance-oriented coping on later consequences in negative health outcomes. **Proactive attitude**, on its side, should diminish the use of avoidance-oriented coping, and its indirect and direct impact (through avoidance) on adverse health outcomes should be benign. As in self-efficacy beliefs, a similar pattern of influence should emerge from analyses.

Hypothesis 4a

T2 negative affect should be positively influenced by the use of avoidance, denial and behavioral disengagement coping at T1. **Proactive attitude**, on the contrary, should conduce to less use of avoidance and, in turn, to less negative affect at a later point in time. In other words, **Proactive attitude** should directly and indirectly conduce to lower levels of negative affect (i.e., distressed, angry, fearful, guilty, and jittery), whereas work stress should promote (directly, and indirectly through avoidance-oriented coping) a more unpleasurable emotional experience at a later point in time.

4.3.2.4 On the role played by PROACTIVE COPING as potential mediator of the long term effects of **work stress** *and* proactive attitude *on* **positive affect and quality of life**

Hypothesis 5

The use of proactive coping at T1 should promote a healthier emotional experience (higher positive affect) at T2. **Proactive attitude** should emerge as an important coping resource for proactive coping, and the direct influence of proactive attitude on positive affect should be significant and positive. Work stress, on its side, should directly conduce to lower levels of positive affect at T2, and its indirect effects (through proactive coping) are expected to be weaker. Conversely, the indirect effects of proactive attitude on positive affect might be stronger, given that, proactive coping, is expected to be a better mediator of the influence of proactive attitude on positive affectivity. The former assumption also deals with the question of whether proactive coping is able to "reverse" the negative influence of work stressors into a positive one.

4.3.3 Hypotheses on the interplay between self-efficacy beliefs, work stress, coping, and positive vs. negative health outcomes across the time

The following hypotheses (6 to 9) were built around two principles that take origin from theoretical-related approaches on human functioning, namely the principle of human agency in triadic reciprocal causation (see Bandura, 1997, p. 6), and the principle of stress and emotions as a system of interdependent variables and processes (see Lazarus, 1991b, p. 203). Both assumptions and research results of other investigators presented in preceding chapters were used to delineate further hypotheses that concern the issue of *stability and change, and the reciprocal influence* among work stress, personal resources, coping, and outcomes criterion.

4.3.3.1 On the interplay between work stress, negative affect and physical illness

Hypothesis 6

This hypothesis emphasizes on the pathogenic viewpoint on health, and it approaches the question of how are work stress, negative affect, and physical illness interrelated across the time. Research suggests that the relationship is *bi-directional*. Particularly, negative emotions may take origin from perceived stress and there might be unhealthy emotional states that can conduce to subsequent stress and distress. In addition, perceived severity and frequency of work stress should augment negative emotions and physical illness at a later point in time. Negative emotions, on their side, should increase stress experience as well as the occurrence of physical illness. Becoming sick should also have a positive effect on work stress and negative affect.

4.3.3.2 On the interplay between self-efficacy beliefs, negative affect and physical illness

Hypothesis 7

This hypothesis has to do with the question whether self-efficacy beliefs predict the *change* in negative affect and somatic disorders, and whether there is a reciprocal influence among mentioned constructs across the time. The hypothesis is based on theoretical assumptions about the *sources of self-efficacy* and what Bandura calls *efficacy activated process*, that is, the influence of *self-efficacy* on human functioning and health outcomes. In terms of the sources of self-efficacy beliefs, it is hypothesized that the perception of one's *physiological state (e.g., physical illness)* is an important source of people's beliefs of performance efficacy and the own general capabilities. With respect to emotional experience, the theory sustains that "Mood" also affects people's judgments of their personal efficacy. Positive mood enhances perceived self-efficacy, despondent mood diminishes it. In other words, a strong sense of self-efficacy may conduce to the

reduction in negative affect, and negative affect may conduce to a reduction in perceived self-efficacy beliefs. Stress reactions can alter self-efficacy beliefs in a negative way; negative emotional proclivity and misinterpretations of the own physical state may contribute with this. The second part of the hypothesis concerns how self-efficacy beliefs influence health. In concrete, self-efficacy beliefs are conceived to explain the reduction in physical illness and negative affect, whereas the former should predict the augment in later physical illness. As can be seen, the question of the reciprocal influence is also relevant here.

4.3.3.3 On the interplay between self-efficacy beliefs, positive affect and quality of life

Hypothesis 8

Self-efficacy beliefs should function as a general stability factor leading to a better emotional experience and higher levels of psychological and physical quality of life. Alternatively, positive affect and quality of life may also enhance one's perception of self-efficacy, as result of a feedback effect proper of the self-system and its regulatory principles. For example, a rich life in terms of good health and the experience of positive emotions should also be a good source of information that gives individuals the sense of being capable to deal with a wide variety of stressors, including the work-related ones. With regard to the relationship between positive affect and quality of life, it is expected that a pleasurable emotional life generates a higher quality of life, and a strong quality of life should conduce to more positive affect.

4.3.3.4 On the interplay between proactive coping, positive affect and quality of life

Hypothesis 9

Proactive coping should conduce to a better physical and psychological quality of life; besides, physical and psychological quality of life may enhance the use of proactive coping. As for positive emotional experience, it is hypothesized that proactive coping should be associated with the occurrence of positive affect, and positive affect, on its

side, may also lead to more proactive efforts towards the accumulation and maintenance of resources. This hypothesis also sustains that the relations of reciprocal influence between proactive coping, positive emotions, and quality of life are a sort of *gain cycle* through which persons acquire resources (i.e., a better quality of life), which in turn will also promote further proactive coping efforts to remain engaged in goal-oriented actions.

4.4   Method

4.4.1   Overview

This research took place among the employees of two different multinational manufacturing companies with regional operations in San Jose, and Cartago, Costa Rica. The study assumed a prospective, longitudinal design and it required repeated measurements over time. Measures of independent variables (personal, social resources, work stress), mediating variables (coping process), and dependent variables (health outcomes, quality of life) were obtained at two points in time, specifically, Wave 1 from 01.06.2001 to 30.06.2001, and Wave 2 from 01.01.2002 to 30.01.2002.

4.4.2   Participants

The sample comprised Costa Rican working adults, who voluntarily agreed to participate in the present study. The resulting sample size at the first measurement point (W1), was n=902 (n=681, n=221 from Bali Company and Bridgestone, respectively). Approximately six months after Wave 1, participants were contacted to fill out the questionnaire for the second measurement point (W2). The sample size at the second wave was reduced to n=535 (n=380, n=155 from Bali Company and Bridgestone, respectively). The drop-out rate was 40.68% (n=367) due to the yearly turnover rate in both companies, which rounded 20% (n=73), and due to not returning the questionnaire after received it (n=294).
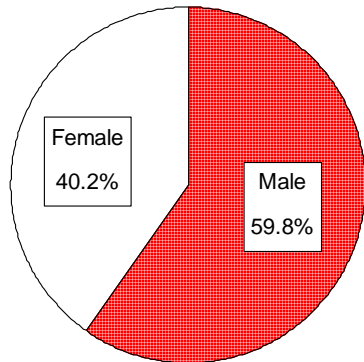
4.4.2.1 Socio-demographic characteristics

Age and Sex: at W1, 515 respondents (57%) were male with a mean age of 30.88 years, ranging from 19 to 69 years, and 387 respondents (43%) were female with an average age of 30.55 years, ranging from 19 to 56 years. At W2, 320 participants were male (60%) with a mean age of 32.37 years, ranging from 20 to 70 years, and 215 participants were

Figure 13. Sample by Gender, n=535

women (40%) with an average age of 30.94 years, ranging from 20 to 57 years. At W2,

men participants were slightly older than women (F (1,533) = 4.71, p < .05), whereas no difference in age at W1 was found. The sample is a relatively young group with greater part of ages under 40 years and around 30 years.

Marital Status: at W1, 419 (47%) participants were unmarried, 437 (48%) married and only 46 (5%) divorced or widowed. At W2, 228 (43%) participants were married, 277 (52%) were unmarried and 30 (6%) were divorced or widowed.

Job Category: at W1, the majority of the participants (n=637, 71%) were labor operators, 161 (18%) did clerical work, 39 of them were supervisors (4%), 34 participants (4%) had a job classified as professional, and 31 participants (3%) were managers. Meanwhile at W2, there were 372 labor operators (70%), 97 clerical workers (18%), 19 supervisors (4%), 24 professionals (4%) and 23 managers (4%), which fairly replicate the percentages of job categories at W1.
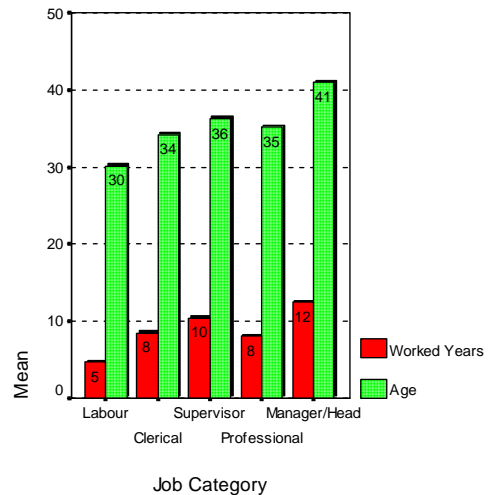
Figure 14. Worked Years and Age by Job Category, n=535

Worked Years: the mean in worked-years was 5 years at W1 and 6 years at W2, ranging from 1 to 34 years, and from 2 to 35 years, at W1 and W2, respectively.   No significant gender differences were found regarding mean in worked-years (W1: mean=5.12/4.93, m/f, $F (1,900) = .36$, $p=.55$; W2: mean = 6.42/5.57, m/f, $F (1,533) = 3.55$, $p=.06$). On the contrary, significant differences in the average of worked-years were found according to job categories at both measurement points; explicitly, labor employees were statistically different from the rest. At W1, the mean ranged from labors = 4 to managers = 11 ($F (1,897) = 35.5$, $p<.001$), whereas at W2, the mean ranged from labors = 4.7 to managers = 12 ($F (4,530) = 31.3$, $p<.001$).

Education: five categories of education were defined, namely: a) none education at all; b) elementary/junior; c) Secondary/high school; d) Technical /Specialization; and e) College/University (For details, see Figure 15). Frequency distribution and percentages can be found in Table 5, which offers an overview of socio-demographic characteristics of the sample.
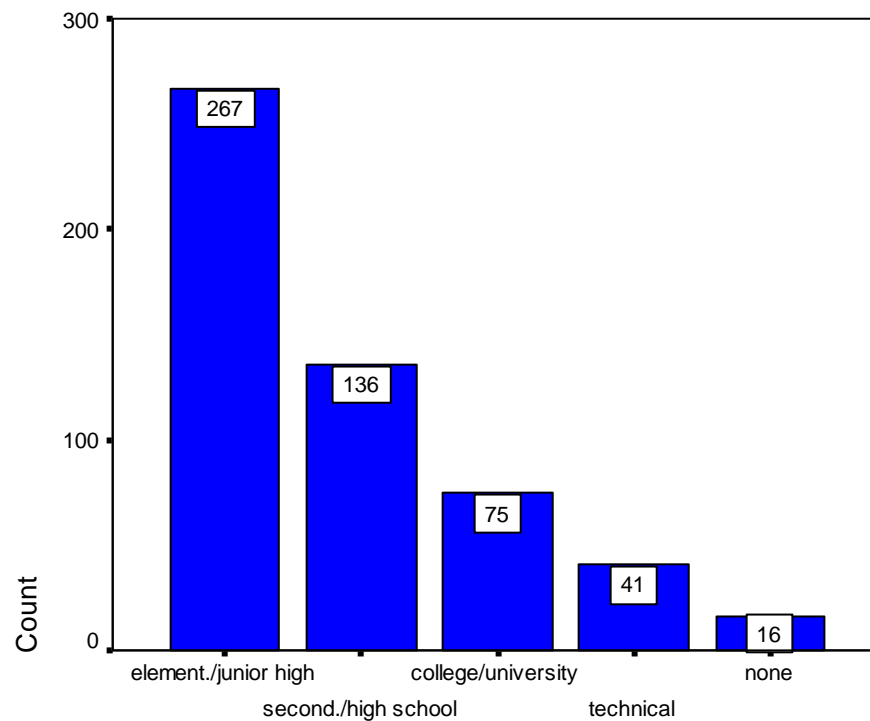

Figure 15. Sample by Educational Level, n=535

	Wave 1	Wave 2
N	902	535
Company		
Bali Company	681 (76%)	380 (71%)
Bridgestone	221 (24%)	155 (29%)
Gender		
Male	515 (57%)	320 (60%)
Female	387 (43%)	215 (40%)
Age	2001-birth	2002-birth
Mean	30.7	31,7
Min-Max	19-69	19-69
Birth Year	1932-1982	1932-1982
Marital Status		
Unmarried	419 (47%)	228 (43%)
Married	437 (48%)	277 (52%)
Divorced/Widowed	46 (5%)	30 (6%)
Job Category		
Labor	637 (71%)	372 (70%)
Clerical	161 (18%)	97 (18%)
Supervisor	39 (4 %)	19 (4%)
Professional	34 (4 %)	24 (4%)
Manager/Head	31 (3 %)	23 (4%)
Education		
None	28 (3 %)	16 (3%)
Elementary/junior high	441 (49 %)	267 (50%)
Secondary/high school	261 (29%)	136 (25%)
Technical Specialization	62 (7%)	41 (8%)
College/University	110 (12%)	75 (14%)
Worked	2001-work	2002-work
Mean	5	6
Min-Max	1-34	2-35
Work since (work)	1967-2000	1967-2000

Table 5. Socio-Demographic Sample Characteristics

4.4.3   Procedure

In June 2001, a letter inviting to participate in the current study, conducted by the Freie Universität Berlin, was distributed among the employees of both companies. Subsequently, several sessions were conducted at the workplace to deliver questionnaires to respondents (W1). In the case of Bridgestone, sessions were typically carried out in groups of varying sizes from 25 to 80 employees and lasted about 15 minutes. Respondents were encouraged to carefully read the instructions and were informed that their responses would be confidential and would contribute to the development of a company stress management program. In Bali Company, participants completed the questionnaire during the sessions, with an average completion time of 45 minutes. In some cases, the participants brought questionnaires home on Friday and returned it back on Monday. Approximately 1500 questionnaires were distributed at Wave 1, obtaining an answering rate of 60% (n=902).

The procedure mentioned above was replicated six months later during a second wave of measurements in January 2002, and questionnaires were delivered only to those employees who had already completed questionnaire at W1. Finally, a certificate of participation was delivered to all contestants as gratification for their collaboration in the study.

4.5   Measures

This section describes the measures that were assessed by questionnaire across two points in time in Costa Rica. The measures consist of several psychometric scales that were divided into a 4-section instrument, namely work stress (section a), appraisal, emotions, and coping (section b), personal and social resources (section c), health outcomes, quality of life, and demographics (section d), The complete Spanish version can be found in Appendix B.

4.5.1   Measurement of Work Stress

4.5.1.1 The Job Stress Survey

The main precursor variable of this study, Job Stress, was measured by the Job Stress Survey (JSS), which is a 30-item scale developed by Spielberger and Reheiser (1995). This research used the JSS in a Spanish translation adapted by Gutiérrez-Doña (2000) at the Freie Universität Berlin. This psychometric instrument was designed to assess the perceived intensity (severity) and frequency of occurrence of working conditions that are likely to adversely affect the psychological well-being of employees who are exposed to them (Spielberger & Reheiser, 1995).   In order to fill out the scale, subjects first rated, on a 9-point scale, the relative amount (severity) of stress that they perceived to be associated with each of the 30 JSS job stressors (e.g., "excessive paperwork", "working overtime"). In addition to rating the perceived severity, the JSS takes into account how frequently each stressor event was encountered. Respondents were asked to report, the number of days on which each workplace stressor was experienced during the preceding six months. Adding the ratings for each individual JSS item yields overall severity (JSS-S) and frequency (JSS-F) scores based on all 30 items, and an overall job stress index (JSS-X), which is based on the sum of the cross-products of the severity and frequency scores. The development of the JSS was based on Lazarus' conception of stress in the workplace, in which stress is defined "as essentially an individual phenomenon in which the effects of work-related stressors events on emotions and behavior are mediated by an employee's perceptions and appraisals of particular stressors and her/his coping skills for dealing with them." (Spielberger & Reheiser, 1995, p. 55). These authors reported an internal consistency ranging from .89 to .93 and from .89 to .92 for JSS-S and JSS-F respectively. In the Costa Rican sample, the JSS-S exhibited a high internal consistency of $\alpha= 0.93$ at Wave 1 and $\alpha= 0.92$ at Wave 2; and the JSS-F also showed an excellent internal consistency of $\alpha= 0.92$ at Wave 1 and $\alpha= 0.92$ at Wave 2. The Test-Retest reliability coefficient between wave 1 and wave 2 was $r_{tt}= 0.50$ for JSS-S and 0.44 for JSS-F. Additionally, the Job Stress Survey embraces two subscales, namely, the Job Pressure subscale, measuring Job Pressure severity (JP-S) and Job Pressure frequency (JP-F); and the Lack of Support subscale, assessing both Lack of Support severity and

Lack of Support frequency. The Job Pressure Subscale consists of 10 items, specifically items 4, 7, 9, 11, 16, 23, 24, 25, 26 and 27 (see Appendix A). The JP-S showed a Cronbach's alpha of 0.83 at Wave 1 and 0.82 at Wave 2, whereas the JP-F obtained a Cronbach's alpha of 0.83 and 0.82 at W1 and W2, in that order. The test-retest reliability coefficient for the six months interval between wave 1 and 2 of JP-S was r_{tt}=0.46 and the one of JP-F was r_{tt}=0.41. Item content, item statistics and scale information are printed in Appendix A, Table 1 and Table 13. A JSS score report can be found at the following Internet address: http://www.parinc.com/samprpts/JSS.htm

4.5.2   Measurement of Personal Resources

A general instruction was given to participants in order to fill out personality instruments: "The following items concern how you see life in general. For each item indicate whether you agree or disagree. There are no "correct" or incorrect" answers, we only want to know your opinion." Below there is a description of each of them.

4.5.2.1 General Self-Efficacy

General Self-Efficacy, the central personality construct of this research, was assessed by the Generalized Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1995). This 10-item scale has been used in numerous research projects, translated into 27 different languages, and applied in more than 25 countries around the World. Its World-wide internal consistency grows up to an α= 0.86, and in Spanish speaking countries such as Spain, Costa Rica and Perú, the GSE has shown, respectively, high internal consistencies of α= 0.84, α= 0.81 and α= 0.80. Cronbach's alpha for the present sample was 0.85 at Wave 1 and 0.86 at Wave 2. This research used a Spanish version that was originally applied in Costa Rica to a sample of university students by Bässler and Schwarzer (1996). Spanish sample items are: "Gracias a mis cualidades y recursos puedo superar situaciones imprevistas" and "Puedo resolver problemas difíciles si me esfuerzo lo necesario". Responses format was made on a 4-point scale, ranging from 1 ("not at all") to 4 ("very much"), to evaluate the extent to which respondents agreed or disagreed with each

statement. LISREL confirmatory factor analyses carried out by Scholz, Gutiérrez-Doña, Sud, and Schwarzer (2002) have suggested that the GSE fits well with a single factor solution when using the world-wide data base (N = 19120). The GSE is based on Bandura's conception of Self-Efficacy expectancies that is defined as: "perceiving one's competence to perform a specific action required to attain a desired outcome" (Schwarzer, 1992b, p. 218). In the present study, the GSE had a test-retest reliability coefficient of r_{t1t2}=0.58 over a six-month interval. The GSE-Spanish can be downloaded from the following internet address: http://userpage.fu-berlin.de/~health/selfscal.htm Details of item content, item statistics and scale information can be found in Appendix A, Table 2 and Table 13.

4.5.2.2 Work-specific Self-Efficacy

Work-specific self efficacy (WSE) was assessed by using a Spanish adaptation (Gutiérrez-Doña, 2000) of selected items pertaining to two different scales developed by Schwarzer and Schmitz (1999), and by Jerusalem and Satow (1999). The Spanish scale is designed to evaluate employee's perceived efficacy to cope with job stressors. Responses format was made on a 4-point scale, ranging from 1 ("not at all") to 4 ("very much"), to evaluate the extent to which respondents agreed or disagreed with each statement. In the present sample, the 6-item WSE scale showed internal consistencies of α= 0.76 at Wave 1 and α= 0.78 at Wave 2; and a test-retest reliability coefficient of r_{tt}=0.48. Details of item content, item statistics and scale information can be found in Appendix A, Tables 3 and Table 13.

4.5.2.3 Proactive Attitude

The Proactive Attitude Scale consists of 8 items which assess attributes such as resourcefulness, responsibility, values and vision. Proactive Attitude (PROA) is a personality characteristic which has implications for motivation and action. It is a belief

in the rich potential of changes that can be made to improve oneself and one's environment. The Spanish Proactive Attitude Scale (SPROA) takes origin from the German "Proaktive Einstellung von Lehrern" developed by Schmitz and Schwarzer (1999). Responses format was made on a 4-point scale, ranging from 1 ("not at all") to 4 ("very much"), to evaluate the extent to which respondents agreed or disagreed with each statement. In the present sample, the SPAT exhibited internal consistencies of α= 0.64 at Wave 1 and α= 0.57 at Wave 2. The test-retest reliability coefficient was r_{t1t2}=0.51.   The SPROA scale can be downloaded from the following website: http://www.fu-berlin.de/gesund/skalen/Proaktive_Einstellung/proaktive_einstellung.htm Details of item content, item statistics and scale information can be found in Appendix A, Tables 4 and 13.

4.5.3   Measurement of Coping

4.5.3.1 Proactive Coping

Proactive Coping was quantified by the German "Skala zur Proaktives Coping" (GPC) (Greenglass, Schwarzer, & Taubert, 1999; Schwarzer, 1999), in its Spanish version (SPC) translated and adapted by Gutiérrez-Doña, Schwarzer, and Greenglass, (1999) at the Freie Universität Berlin. The GPC is a 17-item scale that takes origin from the proactive coping inventory (PCI), which consists of 18 sub-scales and 136 items, describing various dimensions of behavior and cognition that are important for proactive coping (Greenglass, 1998). The PCI was condensed into 7 sub-scales that describe proactive coping, reflective coping, strategic planning, preventive coping, avoidance coping, emotional support seeking and instrumental support seeking. Items examples in Spanish are: "Una vez alcanzada una meta fui en busca de retos más grandes" and "Viví pensando en las cosas que podía mejorar". This scale is answered on a 4-point scale ranging from 1 ("No, I did not") to 4 ("Yes, I did that a lot"). Taubert (1999) analyzed a brief English version of the Proactive Coping Subscale consisting of 14 items, which displayed internal consistencies of α=0.85 in a sample of 252 Canadians, and α = 0.80 in a sample of 114 Polish Canadian from Toronto. In addition, when it was applied to a sample of 285

citizens of Berlin, the Proactive Coping Subscale yielded an internal consistency of $\alpha =$ 0.85. Schwarzer (1999) assures that proactive coping is driven, among others, by proactive attitude, which has been conceived as beliefs in the rich potential of changes that can be made to improve oneself and one's environment. Thus, proactive coping process may involve goal management, priority management, proactive attitude, challenge and goal-setting self-efficacy. This study used the complete Proactive Coping Inventory in its Spanish version, which can be downloaded from the following web-site: http://userpage.fu-berlin.de/~health/procoping.htm The instruction given to participants to complete questionnaire concerning PCI was: "People use several strategies to cope with stress at work. Please think about your work situation and the most typical work stressors that you confronted during the last half year, and how you reacted to them. Then indicate the extent to which you did whatever each following statement says." Cronbach's alphas of the complete 7-subscale PCI ranged from 0.60 (avoidance) to 0.86 (instrumental support seeking and reflective coping) at Wave 1, and from 0.65 (avoidance) to 0.88 (instrumental support seeking and reflective coping) at Wave 2. Additionally, the test-retest reliability coefficient ranged from r_{t1t2}=0.32 (avoidance) to r_{t1t2}=0.54 (instrumental support seeking). Details of item content, item statistics and scale information of the Proactive Coping and the Avoidance Coping Subscales can be found at Appendix A, Table 5 and Table 13. Further details regarding factorial structure and scale validity were included into Appendix A, Tables 14 to 18 and Figures 1 and 2.

4.5.3.2 Coping Strategies

Coping strategies were also assessed by the Brief COPE-Spanish (BCI-S), which is an abbreviated version of the COPE Inventory of Carver, Scheier and Weintraub (1989, p. 273), incorporating the transactional research approach on coping of Lazarus and his colleagues (Lazarus & Folkman, 1984, 1987). In general, internal consistencies of the 14 subscales of the complete COPE Inventory are acceptably high (e.g., planning, $\alpha = 0.92$), with only one sub-scale falling bellow $\alpha = 0.60$ (mental disengagement, $\alpha = 0.45$), (Carver et al., 1989, p. 273). The BCI-S was translated and adapted into Spanish by

Perczek, Carver, Price and Pozo-Kaderman (2000), and it is a multidimensional coping inventory designed to assess the different ways in which people respond to stress. Two scales measure conceptually distinct aspects of problem-focused coping (active coping and planning); six scales measure aspects of what may be viewed as emotion-focused coping (seeking of emotional support, positive reinterpretation/re-framing, acceptance, denial, turning to religion and humor); three scales measure coping responses that are arguably less useful (focus on venting and venting of emotions, behavioral disengagement and mental-disengagement/self-distraction); and one scale evaluates alcohol-drug disengagement/substance-use. The BCI-S is a 24-item inventory answered on a 4-point scale ranging from 1 ("No, I did not") to 4 ("Yes, I did that a lot"). Example items of the BCI-S are: "Yo hice bromas acerca de esto" and "Yo expresé mis sentimientos negativos". We may say, that the central difference between the COPE and the Lazarus Ways of Coping Questionnaire consists, in a more detailed specification and differentiation of problem focused-coping, which is divided by Carver et al. (1989) into several strategies involving differentiable activities, such as: planning, taking direct action, seeking assistance, screening out other activities, and sometimes even forcing one-self to wait before acting. In the present sample, the Spanish BCI showed Cronbach's alpha for the 12 subscales ranging from 0.48 (behavioral disengagement) to 0.77 (seeking emotional support) at Wave 1, and from 0.39 (positive reframing) to 0.78 (seeking emotional support) at Wave 2. The average alpha across the 12 subscales was 0.60 at Wave 1 and 0.59 at Wave 2. Additionally, the test-retest reliability coefficient ranged from r_{t1t2}=0.20 (alcohol and drug disengagement) to r_{t1t2}=0.54 (religion). The BCI-Spanish is downloadable from the next internet address: http://www.psy.miami.edu/faculty/ccarver/sclspan.html   Details of item content, item statistics and scale information can be found in Appendix A, Tables 6 and 13.

4.5.4   Measurement of Social Resources

4.5.4.1 Social Support (The UCLA-SSI)

Social support was assessed by an abbreviated version of the UCLA Social Support Inventory (UCLA-SSI) developed by Schwarzer, Dunkel-Schetter and Kemeny (1994), which takes origin from the work of Dunkel-Schetter, Feinstein, and Call (1986). This study used a Spanish version (UCLA-SSI-S), adjusted and translated by Gutiérrez-Doña (2000) at the Freie Universität Berlin. This 24-item scale evaluates three types of received support, namely informational, tangible, and emotional support as reflected in four items referring to advice, assistance, reassurance and listening. 16 items are answered for four sources of support separately, that is, friends, relatives, partners, and groups (or organizations). The 16 items constitute a 4x4 matrix that represents the core of the instrument. Each of the 16 items asks for the quantity (or frequency) of supportive acts and four additional items ask for the quality of support (or satisfaction). In the current study, the level of satisfaction with support was measured with a 7-point scale ranging from 1 ("very dissatisfied") to 9 ("very satisfied"). The frequency of support is evaluated as 5-point scale ranging from 1 ("never") to 5 ("always"). At the end, support reciprocity is assessed with four additional items by asking how often the subject had given support in return to each of the four providers. Analyses conducted by Schwarzer et al. (1994, p. 328-329) showed that the UCLA-SSI has moderate to excellent internal consistencies, respectively, advice ($\alpha = 0.62$) and reciprocity ($\alpha = 0.62$) to partner ($\alpha = 0.94$) and groups ($\alpha = 0.95$). On the other hand, test-retest correlations from wave 1 to wave 2 ranged from 0.39 to 0.59, reflecting that the coefficients can be seen as moderators and behaviorally based. In the Costa Rican sample the UCLA Spanish exhibited internal consistencies ranging from $\alpha = 0.54$ (reassurance) to $\alpha = 0.92$ (partner) at Wave 1, and from $\alpha = 0.54$ (reassurance) to $\alpha = 0.94$ (partner) at Wave 2. The average alpha across the 10 scales was 0.75 at Wave 1 and 0.75 at wave 2. The test-retest reliability coefficient ranged from $r_{t1t2}=0.41$ (group/organizations support) to $r_{t1t2}=0.57$ (partner support).   Details of item content, item statistics and scale information can be found in Appendix A, Tables 7, 8 and 13.

4.5.5   Measurement of Emotional Experience

4.5.5.1 Positive and Negative Affect (The PANAS)

Positive affect (PA) and negative affect (NA) were quantified by using the PANAS Scale, which is an instrument developed by Watson, Clark, and Tellegen (1988). This study used the PANAS-Spanish, which was translated and adapted by Gutiérrez-Doña (2000) at the Freie Universität Berlin. When completing the scale, respondents are asked to rate on a 4-point scale the extent to which they had experienced each of 20 mood states during the last moth. The four points of the scale range from 1 ("very slightly or not at all") to 4 ("very much"). Items examples in Spanish are: "Fuerte" and "Activo (a)". To evaluate test-retest reliability of the original version (Watson et al., 1988) mood ratings were collected at weekly intervals from weeks 1 to 7 and re-administered from weeks 9 to 15 with a 1-week break between. The NA and PA stability values were first compared at each rated time frame and no significant differences were found (p> 0.05, 2-tailed t test). In addition, multiple comparisons were then made across the time frames and for each affect separately (p>0.002, Bonferroni corrected for 21 comparisons). As a result, the retest stability tended to increase as the rated time frame lengthens (the PANAS can be rated in different time frames, namely, at the present moment, today, during the past few days, during the past week, during the past few weeks, during the past year, and how the respondent feels on the average) (Watson et al., 1988). In the Costa Rican sample, high internal consistencies for the Spanish PANAS both at Wave 1 (average alpha = 0.85) and Wave 2 (average alpha = 0.87) were identified. Additionally, the test-retest reliability coefficients were r_{t1t2}=0.48 (positive affect) and r_{t1t2}=0.56 (negative affect). Details of item content, item statistics and scale information can be found at Appendix A, Tables 9 and 13.

4.5.6   Measurement of Outcomes

4.5.6.1 Quality of Life (The WHOQOL-BREF)

Quality of Life was measured by the WHOQOL-BREF (2000), which is a 26-item scale developed by the "Program on Mental Health" of the World Health Organization (WHO), and it takes origin from the work developed by Power, Bullinger, Harper and WHOQOL-group (1999). This study made use of a Spanish translation of the WHOQOL-BREF that was adapted by Gutiérrez-Doña (2000) at the Freie Universität Berlin. The concept of health-related quality of life is a patient-perceived multidimensional construct that encompasses an evaluation of at least three basic aspects of quality of life, namely, emotional well-being, physical state and social functioning. Following this idea, the WHO has developed a 100-item questionnaire (WHOQOL-100) that measures four global domains, namely, physical health, psychological health, social relationships, and environment (Power et al., 1999). The WHOQOL-100 was developed simultaneously across 15 countries around the World and applied to a total sample of 4,802 respondents. The psychometric analysis of the WHOQOL-100 showed Cronbach's alphas ranging from 0.60 (for physical environment facet) to 0.90 (for the work capacity facet). Test-retest reliability is still unpublished. The WHOQOL-BREF contains two items from the Overall Quality of Life and General Health, and one item from each of the 24 facets included in The WHOQOL-100. Recent analysis of The WHOQOL-100 structure has suggested the possibility of merging domains 1 and 3, and also merging domains 2 and 6, thereby creating four domains of quality of life. In the WHO current approach to scoring the WHOQOL-BREF, these domains have been merged therefore and four major domains are assessed: physical, psychological, social relationships and environment. The WHOQOL-BREF is currently being field tested.   In the Costa Rican sample, the WHOQOL-BREF had Cronbach's alphas ranging from 0.67 (social) to 0.82 (psychological) at Wave 1, and from 0.70 (social) to 0.79 (psychological) at Wave 2; in addition, the test-retest reliability coefficient for the six months interval between wave 1 and 2 ranged from r_{t1t2}=0.45 (social) to r_{t1t2}=0.63 (physical).   Details of item content, item statistics and scale information can be found at Appendix A, Tables 10 and 13.

4.5.6.2 Self-Report of Symptoms (The HSCL)

Intensity of distress and prevalence of symptoms were assessed by using the Hopkins Symptoms Checklist (HSCL), which is designed –between other things- to assess stress related symptoms (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). These authors reported coefficients alpha (based on n=1435 Americans) that were uniformly high, ranging from α= 0.84 to α= 0.87. Item-total correlation was also calculated for the items contributing substantially to each dimension, with all of them above 0.50 and most at about 0.70, which indicates substantial shared common variance among the items. (Derogatis et al., 1974). The HSCL-Spanish showed an excellent internal consistency of α= 0.97 in earlier studies developed by Gutiérrez-Doña (1992) in a sample of 207 Costa Rican men. The complete HSCL comprises 58 items, which are representative of the symptom configurations commonly observed among outpatients. In the present study, respondents were instructed to rate themselves on each symptom using a 4-point scale ranging from 1 ("not at all") to 4 ("very much"). In addition, a temporal referent was provided in terms of "How did you feel during the last month including today?" The complete HSCL is scored on a five underlying symptom dimensions –somatization, obsessive-compulsive, interpersonal sensitivity, anxiety and depression- which have been identified in repeated factor analyses. Somatization reflects distress arising from perceptions of bodily dysfunction. Obsessive-compulsive reflects symptoms that are closely identified with the clinical syndrome identified with this name. Interpersonal-sensitivity focuses on feelings of personal inadequacy and inferiority, particularly in comparison to other persons. Depression reflects a broad range of the concomitants of a clinical depressive syndrome. Anxiety is comprised of a set of symptoms and behaviors associated clinically with high manifest anxiety (Derogatis et al., 1974). Results in the current sample also exhibited coefficients alpha that were uniformly high as follows: Somatization (alpha = 0.88 at W1, and alpha = 0.88 at W2), Depression (alpha = 0.86 at W1, and alpha = 0.87 at W2), Anxiety (alpha = 0.83 at W1, and alpha = 0.83 at W2). Test-retest reliability coefficients were 0.62, 0.68 and 0.59 for somatization, depression and anxiety, respectively. Further details of item content, item statistics and scale information can be found in Appendix A, Tables 11 and 13.

4.5.6.3 Self-report of Physical Illness

Prevalence of physical illness was assessed by questionnaire making use of a modified version of the WHO-QOL-Somatic Disorders Checklist (Power, et al., 1999). Respondents were asked to report all health problems they had during the last month, by checking Yes (1) or No (0) on each of 18 somatic disorders. In the study developed here, analyses were conducted on four types of somatic disorders, which have been associated with stress experience in the work stress literature, namely viral respiratory infections, musculoskeletal pain, gastrointestinal disorders, and skin disorders. An index of physical illness was created, which is the result of the sum of responses to the mentioned four somatic disorders. Table 12 (Appendix A) contains the complete list of physical illness, including those that were considered in this study.

4.5.7   Overview of the Measures

Table 6 gives an overview of the measures that were used during this study. All scales have been adapted and translated into the Spanish language. Only original sources were included into the table.

Variables	Instruments	Source of Scale	W1	W2
Work Stress				
Work Stress Severity Work Stress Frequency	The Job Stress Survey	Spielberger and Reheiser (1995)	X	X
Personal Resources				
General Self-Efficacy	The General Self-Efficacy Scale	Bässler and Schwarzer (1996)	X	X
Work-specific Self-Efficacy	Work Self-Efficacy Scale	Gutiérrez-Doña (2000)	X	X
Proactive Attitude	"Skala zur Proaktive Einstellung"	Schmitz and Schwarzer (1999)	X	X
Social Resources				
Social Support	UCLA-SSI	Schwarzer, Dunkel-Schetter, and Kemeny (1994)	X	X
Coping				
Coping Strategies	The Brief COPE	Carver, Scheier, and Weintraub (1989)	X	X
Proactive Coping	The Proactive Coping Inventory	Greenglass, Schwarzer, and Taubert (1999)	X	X
Outcomes				
Quality of Life	The WHOQOL-BREF	Power, Bullinger, Harper, and WHOQOL-group (1999)	X	X
Emotional Experience	The PANAS Scale	Watson, Clark, and Tellegen (1988)	X	X
Symptoms	The Hopkins Symptoms Checklist	Derogatis, Lipman, Rickels, Uhlenhuth, and Covi (1974).	X	X
Physical Illness	The WHOQOL-Somatic Disorders Checklist	Power, Bullinger, Harper, and WHOQOL-group (1999)	X	X

Table 6. Overview of the Measures

4.6   Data Screening

4.6.1   Statistical Software Packages

Statistical analyses were conducted by using the Statistical Package for Social Sciences, known as SPSS for Windows release 11.0.1 (SPSS, 2001a), and structural equation modeling procedures were implemented with the help of LISREL 8.12i and PRELIS 2.12i for Windows (Jöreskog & Sörbom, 1993).

4.6.2   Missing Values

Missing value analyses (MVA) were performed with SSPS to address incomplete data problem. Fortunately, such analyses brought in less than 5% of missing values among the whole scales; this low rate was achieved due to an immediately control carried out when questionnaires were returned. The idea was to verify as much as possible that all responses were completed. The MVA was done in a scale by scale modality: for each item of a scale, it was calculated the number of nonmissing values, the mean, the standard deviation, and the number and percentage of missing values, then an imputation method of missing values estimation was preferred in order to generate an SPSS data file, with missing values replaced by values estimated by the regression method (SPSS, 2001b).

4.6.3   Normal Distribution and Outliers

Since many statistical procedures to be used during this study assume that data are normally distributed, for instance, GLM (Multivariate), among others, and following recommendations of Tabachnick and Fidell (2001), prior to proceed with the analyses strictly associated to this study, an exhaustive review of all variables was conducted in order to examine departures from normality and to check the existence of univariate outliers.

With respect to normal distribution, a Kolmogorov-Smirnoff Test was first applied to all variables at both measurement points. If K-S test yielded a significance greater or equal to 0.05, then the variable was not transformed given its normal distribution; otherwise transformations to achieve normality according to Tabachnick and Fidell (2001, see Table 4.3, p. 83) were performed (either square root, logarithmic or inverse transformations) depending on the severity of deviation. To choose the best transformed variable, two criteria were used: 1) approximation to normality as indicated by the Kolmogorov-Smirnoff Test; 2) reduction in skewness and/or kurtosis, such as the significance[1] of skewness and/or kurtosis being less than 2. When transformations turned out no significant improvement, the original variable was kept.

Regarding to outliers, which are "data points that split off or are very different from the rest of the data" (Stevens, 1992), and because outliers pull the mean in their direction, they should always be carefully examine (SPSS, 2001b). As first step, outliers were identified and then they were recoded to the closest nonoutlying value in the data distribution, following Tabachnick and Fidell (2001) instructions. Second, the Kolmogorov-Test was calculated again, and if the recoded variable appeared to be better than the original, then the variable containing recoded outliers was preferred; otherwise the original variable with outliers was taken. In other words, I preferred to delete no outlier cases, in order to avoid sample size reduction. In the case of multivariate outliers, they were also treated – when needed – by using Tabachnick and Fidell (2001) recommendations.

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[1] z=(skewness / skewness standard error) or z=(kurtosis / kurtosis standard error)