

Cybernetic Theory as a New Approach to Studying Workers' Well-being

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Abstract

The aim of the present research is to explain why well-being in the workplace is a theme of increasing interest and why many studies have analyzed its functioning and diffusion. From the literature on well-being it is evident that the findings of previous research are sometimes discordant and theoretical models particularly use diverse variables according to different needs and objectives. Despite the influence of a number of different factors, well-being can be studied by looking at three main aspects: physical well-being, mental health, and job satisfaction. The variables influencing it, however, are numerous and often analyzed from different perspectives. Methods of analysis vary across national and disciplinary contexts. The present work is based on a local survey of a small Italian district that investigates two hypotheses about the correlation between locus of control and variables determining work well-being (Spector et al., 2002) and the possibility of

using perceptions and desires on the variables influencing well-being as predictors of it. We use the concepts of cybernetic theory and feedback loop (Edwards, 1992). Findings of statistical correlation and hierarchic regression are discussed; limitations and suggestions for further research are presented.

Keywords: work well-being, cybernetic theory, desires and perceptions

JEL classification: L00

1 Introduction

In recent years well-being has gained growing attention from many disciplines. It is a fundamental theme in the study of health, diet, emotions, beauty, and work. This increasing attention on global well-being (especially of individuals) can be attributed to social, psychological, and health motivations that are exogenous to the organizational context. These disciplines, however, also have great influence on organizational science and condition its researches and studies. Thanks to private strategies, organizations promote and improve well-being in order to achieve goals and high performance. It is common to see different new amenities offered by corporations to their own workers in terms of services, such as laundry, baby-sitting, nursery, fitness or wellness centers: these are initiatives aimed at benefitting workers and improving their health status. It should be noted as well that strong legislation is in force to guarantee at least safety in the workplace. Both these aspects help to maintain or improve workers' health status, and to make their working conditions acceptable. The positive feedback in terms of economic results, performance, activities, communication, and teamwork shows that it is profitable for both public administration and private companies to implement corporate policies aimed at promoting organizational well-being. In Italy, as the Department of Public Functions observes, organizational well-being is part of the overall well-being of individuals and every organization must consider it (*Presidenza del Consiglio dei Ministri Dipartimento della Funzione Pubblica Direttiva*

sought from their workers or if the workers themselves do not want to answer on these issues, we should find a way to measure well-being without using questions related to mental and physical health. This is the reason behind the concept of cybernetic theory, which is based on discrepancy between perceptions and desires (Edwards, 1992).

2 Organizational Well-being Variables and Cybernetic Theory

For a more comprehensive picture of the literature on well-being we refer to the work of Danna and Griffin (1999). The term “organizational well-being” refers to a wide concept that includes different aspects of non-working life (such as satisfaction in private and social life), working life (job satisfaction regarding pay, career development, the job itself, and colleagues) and general health (this aspect is composed of two characteristics, namely mental and physical well-being). Health and well-being are influenced by three typologies of factors (or antecedents as the authors Danna and Griffin called them), and for each typology we have a series of variables. The first type concerns the work setting, that is, how the workplace is structured and organized in terms of health and safety hazards or other perils that can have negative consequences on workers' health and well-being. The second type concerns personality traits. In this case the authors consider the variables dealing with worker attitudes: Type A behavior or an internal (or external) locus of control, and other typical personality traits. Finally, the third type of factor comprises the stress categories deriving from intrinsic work characteristics, role in organization, social relationships on the job, career development, structure and organizational climate, the relation between home and work, and other stressful factors. Given these as antecedents we can analyze the consequences that the worker's well-being and health can have on the workplace. The first typologies of consequences directly concern the individual, because they deal with the implications of his/her physical, psychological, and behavioral health. The second typology mostly refers to the organizational structure, the costs that the employer should meet for health

insurance, productivity and absenteeism, legal costs, and compensation for injuries and illnesses. In the following paragraphs we explain the main aspects of some antecedents of well-being such as job demand, job control, social support, rewards (as variables regarding work characteristics), and locus of control (as personality traits). We also explain the factors that comprise organizational well-being such as job satisfaction and physical and mental health. Finally, we show the functioning of cybernetic theory.

2.1 Demand Control Model

In the study of organizational well-being we cannot leave the Karasek model (1979) aside. It is important to understand particular aspects of this model because the present research follows it closely. In previous years it has been shown that organizational and personal tensions increase in situations in which workers with a high workload are heavily supervised. In his first work, Karasek takes into consideration two independent variables on the orthogonal axes: job demand and decision latitude. The first refers to the job efforts required in terms of hours worked, incongruent requests, or the binding nature of organizations. We can also define job demand as the sum of psychological stressors (where a stressor is the stressful stimulus that changes the individual's balance and conditions him/her to give an answer as a reaction) deriving from requests to work fast and hard, and to carry out numerous tasks without sufficient time. The second (decision latitude or control) is composed of two parts: *skill discretion*, i.e., the possibility to acquire new competences, routine tasks, repetitiveness, and learning new things, and *decision authority* that refers to the possibility of organizing and programming own work with complete autonomy. If we match high job demands and low decision latitude, we have a "high strain" job, with fatigue, depression, exhaustion, anxiety, and then absence owing to illness. If both job demands and decision latitude are high, the job is "active", i.e., a job with low level of stress, learning, growth, and increasing motivation to develop own work. Conversely, when job demands are low and decision latitude is high, the job is "low strain" because of the individual's

perception of a low level of demand and high level of control of his/her own work. Finally, if both job demand and decision latitude are low, the job is “passive” and workers may not have any stimulus, they may be dissatisfied, and they may not be solution-oriented (Fox, Dwyer and Ganster, 1993).

2.2 Social Support

Karasek's demand-control model was completed by a third dimension, or independent variable, social support. This element was then analyzed and discussed in several following studies. Social support is represented by the feeling of belonging to a real net of affective links that ensures reciprocal aid among colleagues and supervisors. According to Karasek and Theorell (1990), the different combinations of the three variables create two distinct hypotheses. If individuals are simultaneously subjected to a high level of demand and a low level of control, and are socially isolated, these individuals will show adverse reactions to stress, such as anxiety, depression, and psychosomatic pathology symptoms (iso-strain hypothesis). On the other hand, if individuals are subjected to high levels of demand but at the same time they have a high level of control in carrying out their tasks and their environment gives them support, they will show satisfaction and a high level of motivation (active learning hypothesis).

A more recent trend of studies (McIntosh, 1991) highlights that social support is composed of two different dimensions well identified and determined: the source of sustenance (that is, someone who gives support) and the type of sustenance (functional or emotional) (Cohen and Wills, 1985). In this respect, McIntosh identifies three main theoretical reviews, each of them taking into consideration further aspects of the variable. Thoits (1982) suggests that social support can be operative if it is used despite its structure or function; Cohen and Wills (1985) conclude that measures of social support typically evaluate both social relationship structure and function of social support. Even if the terminology used in the different reviews is often similar, definition of structure, network, and function is

on being realized. If there is a negative condition that is unfavorable and difficult to manage, the confident subject attributes to him/herself the responsibility for failure. This model identifying two types of subjects based on where control is located was introduced by Rotter (1966). He highlights that if a subject has a lot of trust in his/her ability to control fate, it could be the case that s/he will pay attention to every aspect of the environment in order to capture useful information to form his/her future behavior. Furthermore, this subject will try to improve the conditions of his/her environment, s/he will aim to reinforce his/her capabilities, examining his/her abilities and shortcomings, and s/he will resist external factors that could condition him/her. Research shows that not only is perception of control important but also what individuals think about control. Some authors suggest that an internal locus of control is an important component of emotional adjustment and ability to manage stressful states in private life as well (Kobasa, Maddi and Kahn, 1982), whereas locus of control in the workplace (if the subject is able to achieve control) is strongly linked to workers' well-being (Spector and O'Connell, 1994). Looking at these studies, it seems to us that there is a positive relation between internal locus of control and well-being.

There are many scales for measuring this characteristic: Kirscht (1972) developed a scale for perceived control regarding own health state; Reid and Ware (1974) developed a scale composed of three subscales for fatalism, socio-political influence, and self-control; Levenson (1973) proposed a scale composed of 24 items subdivided into a further three scales. More recently, Henry (1997) developed a scale with three subscales for internal control, external control, and control by other authoritative subjects, and using Structural Analysis of Social Behavior (SASB). Broadly speaking, there are a good number of studies that suggest that well-being and job satisfaction are influenced by control. Ganster and Fusilier (1989) observe that control is an essential element of well-being. Finally, managerial practices that give more control to workers are defined as humane and effective (Lawler, Mohrman and Ledford, 1995). On the basis of this, we develop our first hypothesis

aimed at verifying if locus of control as a variable for personality traits is correlated with well-being (Spector et al., 2002).

H1: There is a correlation among locus of control (the variable for personality traits of interviewees), job satisfaction, and physical and mental well-being (variables which measure workers' well-being).

2.5 Organizational Well-being

Well-being is composed of different aspects. It is influenced by numerous variables that also vary across countries (Spector et al., 2002), owing to different cultures, different ways of considering work activity, different ways of living. In many studies we find the use of constructs related to job satisfaction, and physical and mental well-being in order to measure the level of workers' well-being. For this reason researchers often investigate the absence or presence of stressful factors at a physical or mental level. They also use different scales to measure job satisfaction, a very well-known theme. Job satisfaction, defined formally as "emotional or affective response of a person to various different aspects of his/her work" (Kreitner and Kinicki, 2004: 184), means thinking about how a subject considers his/her own work. Furthermore, considerable differences owing to workers' nationality may mean students of organizational behavior spend a lot of energy trying to understand the functioning of job satisfaction.

Many studies use psychosomatic symptoms of workers to analyze health status at a physical level. For instance, Logan and Ganster (2005) in their study on job stress use a scale of seventeen items; they ask about the frequency (from 1=never to 4=very often in last month) of symptoms such as headache, gastrointestinal problems, sleeplessness, palpitations, or dizziness. They found that these symptoms are caused by stressful work situations; the worker somatizes these negativities and s/he displays some difficulties (through a tangible and evident reaction). In the Cantieri Program the scale used to measure physical health investigates eight different psychosomatic symptoms (it asks about frequency in the last six months:

never, seldom, sometimes, often). The Cantieri Program is run by an Italian laboratory which studies well-being in public administration in collaboration with the Department of Public Functions and the Faculty of Psychology of the University La Sapienza (Avallone and Bonaretti, 2003).

If physical well-being is measured through real psychosomatic symptoms and problems, mental well-being is strictly connected with how an individual feels about his/her general health status. This aspect of well-being refers to the emotional sphere of the worker, and the tension or anxiety caused by his/her work (Spector et al., 2002) and all the other stressful factors that put pressure on the individual and make him/her react positively or negatively depending on the situation. In many studies when authors deal with mental well-being they often use terms such as “emotional exhaustion” caused by burnout and therefore measured through stress index or job strain index (De Jonge and Schaufeli, 1998) such as the Maslach Burnout Inventory (MBI-NL); sometimes mental well-being is measured through many dimensions, as in the study of Ouchi and Johnson (1978) that uses six scales corresponding to different dependent variables: positive affect, negative affect, hostility, anomie, perceived efficacy, and anxiety. Loscocco and Spitze (1990) use a single item: they ask the interviewee directly how s/he generally feels and how happy s/he is.

2.6 Cybernetic Theory

Crucial to the study of organizational well-being is the cybernetic theory of stress that analyzes the functioning of self-regulating systems. The main construct of this theory is a negative feedback loop which acts to minimize the discrepancies between environmental characteristics and relevant reference criteria (Edwards, 1992). We can find many studies in the literature on cybernetics, for example Kahn et al. (1964), focusing on the role of expectations and coping mechanisms. Beehr and Newman (1978) estimated psychological and physical processes which filter personal and environmental characteristics. According to Cummings and Cooper

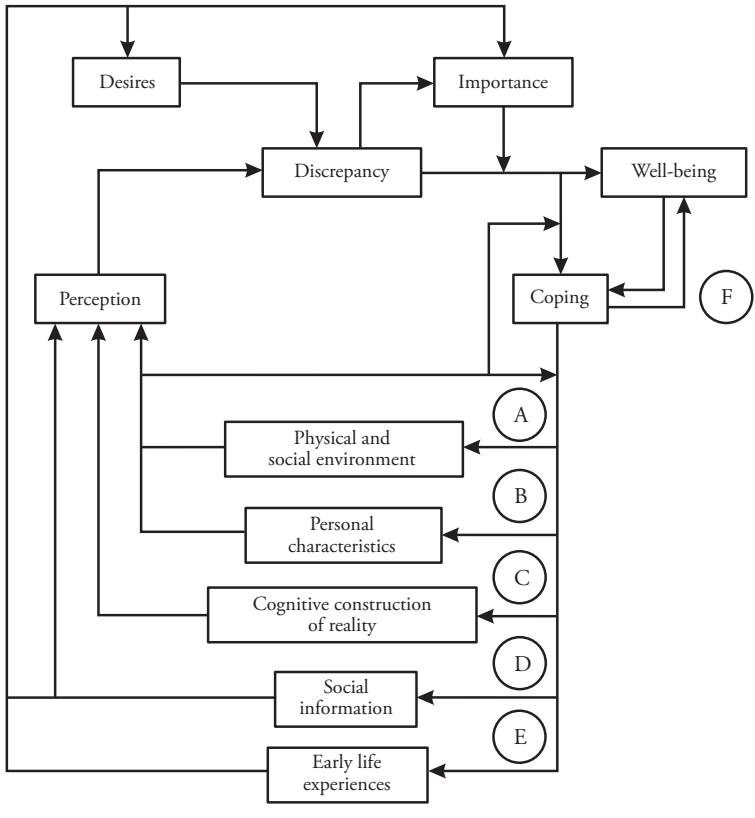
(1979), discrepancies between actual and desired states lead to the implementation of a change situation. French, Caplan and Van Harrison (1982) explained that the worker's perceptions of discrepancies derive from his/her personal characteristics; they cause illness and disturbance and s/he will need to counter them with defense mechanisms. The transactional model of Lazarus and Folkman (1984) states that if an individual evaluates his/her environment as dangerous, s/he will cope. If s/he achieves positive results, s/he will not cope any longer, otherwise s/he will show somatic disturbance. All these models have in common the feedback mechanism and feedback loop concept, but they are different in terms of consideration of stressful factors and their moderator mechanism or the type of illness included in the model.

Edwards says that the distance between perceived and desired states causes stress for workers; each employee attributes a subjective weight to this distance, also called discrepancy or difference. According to Edwards, "perceptions are defined as the non-evaluative subjective representation of any situation, condition, or event" (1992: 247). This means that perceptions are a personal representation of how an individual sees something. This also indicates that it is not important what variables are included in the model, but what counts in the analysis is the use of factors that are important for the employee. Desires are contrapuntal to perceptions; they refer to any state or condition to which a worker aspires.

Desires can include optimal pay for example (or a range of acceptability) and they belong to the same concept of goals, values, and interest: they are considered as a consciously desired state. As we see in Figure 1, perceptions derive from four types of factor: physical and social environment, personal characteristics, cognitive construction of reality, and social information (A, B, C, D). Desires are influenced by social information, individual early life experiences, coping (D, E, F), and the hierarchical arrangement of multiple feedback loops (maintained by the worker). Thus, the stressful situation (deriving from discrepancy between perceptions and desires) may act directly on worker well-being, influencing the physical and

psychological states of the worker. It can also act indirectly in activating the coping mechanism.

Figure 1: *Cybernetic Model of Stress, Coping and Well-being in Organizations*



Source: Adapted from Edwards (1992).

In other words, the worker can reduce the discrepancy in his/her perceptions and desires or reduce the importance of the discrepancy. Discrepancy theory is largely used to compare desired states and perceived states. For example, Boyd et al. (2007) say the difference between perceptions and desires leads one to expect that satisfaction is highest when performance matches expectations. Coetzer and Bushe

(2006) examine the degree of similarity between perceptions of what currently exists (knowledge) and what is preferred (belief), so they find that evaluative cognitive structures have the potential to evoke effect, influence motivation, and impact outcomes. Brown et al. (2009) base their study of discrepancy theory on the existing traits, status, or possessions of individuals. After analysis of variables for well-being and cybernetic theory, we can produce a second hypothesis:

H2: Gaps between perceptions and desires in variables which influence organizational well-being are better predictors of it than the perceptions of interviewees. Gaps can be directly used as a variable for well-being without the need to ask specific questions about mental and physical health.

3 Method

3.1 Research Context and Sample

The empirical analysis is drawn from the administration of a specially structured questionnaire issued to eight different companies located in a small Italian region. The district is Campobasso in the Molise region. All eight companies participated in the study and every employee was recruited: only two employees did not answer the questionnaire. The companies that gave their consent to participation in the survey also requested us to take some privacy measures to ensure their anonymity. This is an important indicator of how organizational well-being, despite gaining credibility in recent years in companies, firms, and other business organizations, is still a thorny subject. In addition, sometimes companies do not give permission to share their data and information, so the questionnaire obviously protects the anonymity of the employees themselves. The companies were intentionally chosen in different sectors, and therefore they perform different activities: torrefaction, dairy products, distributive trades, hotel services, health services, building, services for tires. The questionnaire was given to 200 employees. Among them we have not considered the ones with a rate of response lower than 95 percent; other questionnaires sufficiently completed have been included in the analysis

because it was possible to correct missing responses with further investigations. The questionnaires included in the empirical research total 191. We have collected data through two interviewers who asked every single employee to answer questions. The interviewers then sent us the completed questionnaires.

3.2 Data Collection

From the analysis of literature and scales used in previous researches it was possible to develop a specifically structured questionnaire aimed at investigating organizational well-being. The uniqueness of this tool derives from the attempt to combine the use of some main variables which influence well-being and the double concept of perception and desire introduced by Edwards (1992). The selection of independent variables included in the questionnaire derives from the need to consider economic and organizational measures. More specifically, the developed questionnaire is composed of seven sections: the first includes individual characteristics of interviewees; the second section investigates aspects of environmental comfort and safety; the third section is based on Karasek's model about job demand, job control and social support; the fourth section analyzes intrinsic and extrinsic rewards that the workers receive thanks to their work activity; the fifth section is quite specific because it refers only to the quality of leadership; the sixth section has been included in order to identify the interviewees' locus of control; and the last section observes organizational well-being as the dependent variable. Each scale has been translated (if it was not available in the Italian language) and readapted to the specific aim of the present research.

3.3 Independent Variable: Measures

3.3.1 Demand Control Support Model

As noted above, Karasek's model is composed of three scales which evaluate social support, job demand, and job control. In this analysis, social support is measured

through six items that are used to investigate the relationships with colleagues and supervisors, for example: "There is a quiet and pleasant atmosphere at my place of work." The second scale refers to job demand, as in the following example: "I do not have sufficient time to do all my tasks"; for this scale there are five items. The third scale measures job control and it is composed of six items regarding creativity, opportunity to learn new things, and chance to decide how to carry out own work. An example is: "I have the possibility to decide for myself how to carry out my work." The propositions are formulated as statements, and respondents must indicate how much they are true in the present and how much they would like them to be true in the future (the response can vary in a range of four modalities, one to four). All the three scales were translated and adapted from the shorter original version of Karasek's model used by Sanne et al. (2005). Another measure used to complete this model is the number of overtime hours per month which we called "work overtime" (Loscocco and Spitze, 1990).

3.3.2 Rewards

In the questionnaire we have also introduced a section which allows us to evaluate the rewards that a worker receives, and as already noted we refer to both intrinsic and extrinsic rewards. Also, in this case the items are statements; the interviewee must indicate how much s/he thinks the statement is true in a range from one to four. There are six items regarding *intrinsic rewards*, which ask the interviewee if his/her work is interesting, and if s/he exploits his/her abilities and competencies. For instance: "My job is interesting to do." Items related to *extrinsic rewards* total four and they are about career development, promotion, and prestige: "In my job the chances for advancement and promotion are good." Both scales were translated and adapted from a version used by Marini et al. (1996).

3.3.3 Leadership

A section of the questionnaire focuses exclusively on leadership; the responses vary from one to five, and there are eight items which evaluate the supervisors' abilities to plan or resolve conflict situations and his/her communication capabilities: "My superior is good at solving conflicts." The scale measures the qualities of leaders with respect to their relationships with their colleagues. This scale is a translation and readjustment of the second edition of the Copenhagen Psychosocial Questionnaire (COPSOQ) (2003).

3.3.4 Environmental Comfort and Safety

As regards the working environment we used two scales: the first considers if the workplace is comfortable and it asks the interviewee to evaluate aspects of the physical work setting; the scale is composed of four modalities, with regard to both the present and the future. The first represents the lowest score, the fourth the highest. There are eight items regarding cleanliness, lighting, temperature, and noise: "How do you evaluate the comfort of your workplace with respect to noise today?" The second scale asks the interviewee about perceptions and desires regarding physical safety of the workplace: for this scale there are also four modalities but seven items with regard to electrical systems, dust, smoking, and video terminals. A sample item is: "How do you evaluate the safety of your workplace compared with the overall electrical system today?" These scales were based on the questionnaire used in the Cantieri Program.

3.3.5 Personality

The section which evaluates the personality of the interviewee has the aim of finding the locus of control, and whether it is internal or external. In a sequence of seven items we ask the respondent to indicate how much s/he agrees or disagrees with the proposed statements, in a range from zero to five. With this scale we can

3.4.3 Job Satisfaction

The scale which measures job satisfaction is composed of eight items. The interviewee must indicate in a range from one to five (very dissatisfied to very satisfied) how satisfied s/he is regarding certain aspects of his/her job, such as career prospects, colleagues, or work conditions. The items are taken from COPSOQ (2003), and have been translated and adapted to the specific needs of the present research. An example is: "How satisfied are you with the way your department is run?"

3.4.4 Control Variables

Control variables included in the present research are age and gender of interviewees.

3.4.5 Cronbach's Alpha

We calculated Cronbach's alpha index (Table 1) for scales which measure perceptions and desires. Although the scales used were already validated in previous studies and researches, we considered it appropriate to verify the reliability of each series of items because we had translated and adjusted the scale. The test we conducted to verify the reliability uses Cronbach's alpha as acceptability parameter. Generally practitioners agree to accept alpha values higher than 0.6 as a minimum acceptable level of internal coherence and adequacy of the elaborated test (Likert, 1932). Although we found a relatively low index for these scales, very near to the acceptability level, each scale results coherent and higher than 0.6.

Table 1: *Cronbach's Alpha*

	Expectations	Perceptions
Environmental comfort	0.930	0.881
Environmental safety	0.862	0.641
Social support	0.909	0.892
Job demand	0.670	0.939
Job control	0.695	0.716
Intrinsic rewards	0.871	0.807
Extrinsic rewards	0.720	0.666
Leadership	0.955	0.938
Personality	0.856	
Physical well-being	0.797	
Job satisfaction	0.899	

Source: Authors' calculations.

3.4.6 GAP Variables

The gap between perceptions and desires has been calculated as follows:

$$GAP = \sum_{i=1}^n Di - \sum_{i=1}^n Pi$$

where "n" indicates the number of items for the used scales (*D*=desires, *P*=perceptions).

4 Results and Discussion

Table 2 shows descriptive statistics related to variables used for 191 interviewees. We have verified the first research hypothesis based on the consideration that locus of control is a universal component of well-being through statistical correlations between the variables of interest (locus of control, job satisfaction, and mental and physical well-being) as Spector et al. (2002) described (Table 3). In their study, they wanted to verify if locus of control influenced workers' health independently of their nationality. This debate has expanded because it is assumed that, depending on

nationality, people tend to be individualist or collectivist and so this further factor can buffer the effect of locus of control on well-being. The study was conducted on 24 geopolitical units which included a wide sample of managers; Italian managers were not, however, included. This present research does not pretend to the same universalistic scope because of its much more limited boundaries and it cannot verify the different effect of locus of control among different countries (the reference sample belongs to a small geographic area). Furthermore, even if the variables used measure common aspects, we have used different scales; so we have to verify our first hypothesis with a correlation matrix.

Spector et al. (2002) show a significant correlation for most variables and almost all the countries included in the research. The correlation that is most consistent with our expectation is the one between locus of control and job satisfaction. In their study every sample shows a significant and negative correlation except for France, but it has a smaller sample in respect to the others. Furthermore, correlation between locus of control and mental well-being shows a slight dispersion; three samples have no significant correlation and four samples have a significantly weaker correlation with respect to the United States. Conversely, regarding physical well-being only seven correlations do not result as significant and ten are less significant than those of the United States.

This present study seems to be quite in line in terms of findings with those obtained by Spector et al. (2002) because the highest correlation among locus of control and other variables which measure well-being is the one between locus of control and job satisfaction.

Table 2: Descriptive Statistics

	Mean	Std. Dev.
Gender	0.22	0.415
Age	37.66	9.994
Level of study	2.83	0.728
Work overtime	1.63	0.908
Environmental comfort	2.54	0.875
GAP	1.47	0.857
Environmental safety	2.71	0.812
GAP	1.14	0.799
Social support	2.77	0.781
GAP	1.01	0.818
Job demand	2.39	0.578
GAP	0.43	1.112
Job control	2.53	0.694
GAP	0.16	0.379
Intrinsic rewards	2.93	0.817
GAP	0.65	0.825
Extrinsic rewards	2.2	0.755
GAP	1.48	0.839
Leadership	2.58	1.023
GAP	2.08	1.18
Personality	3.06	0.89
Physical well-being	2.16	0.68
Job satisfaction	2.82	0.788
Overall well-being	3.14	0.693

Source: Authors' calculations.

Table 3: Statistical Correlations of Locus of Control

	Physical Health	Job Satisfaction	Overall Well-being
Locus of control	-0.113	0.509**	0.396**
Physical health		-0.106	-0.275**
Job satisfaction			0.678**

Note: ** denotes significance at 0.1 percent.
 Source: Authors' calculations.

According to the scale used by Spector et al. (2002), the correlation is indirect, which means that higher job satisfaction is linked to an internal locus of control. Conversely, in the case of the present research the correlation is direct, but it has the same meaning because the scale we used to measure the locus of control associates a high score with an internal locus of control. Also, general well-being is significantly correlated with the studied variable, but the result is not the same for physical well-being. We can hypothesize that our sample is equivalent to the seven of Spector's study with the same result. Also, other studies show the same result. Kulshrestha and Sen (2006) find significant negative correlation between subjective well-being and locus of control. This means that internals have significantly better subjective well-being than externals. Other researchers suggest that having a coherent sense of one's personality and acting in accordance with that personality is positively related to well-being (Sheldon et al., 1997). Daniels and Guppy (1994) found that an internal locus of control can buffer the effects of stressors upon well-being.

We have verified the second hypothesis through hierarchic regression. This type of statistical analysis is most commonly used in studying the relation between well-being variables (Janssen, 2001; Tuomi et al., 2004) and it is also our preferred choice. We made two types of regression; one uses perception variables, the other one uses gaps. For each type we found nine models because we replicated three models (to use the different formed blocks) for each dependent variable measuring well-being. The first type (the first series) considers variables related to the perceptions of physical and mental well-being and job satisfaction (Table 4). The second model (the second series, Table 5) considers instead the variables constructed through the GAPs (these variables measure the distance between desires and perceptions as a difference). Generally these results are positive because desires are almost always higher than perceptions.

Table 4: Hierarchic Regressions with Perception Variables

	Physical Well-being			Overall Well-being			Job Satisfaction		
	Beta			Beta			Beta		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
(Constant B)	11.913	11.614	9.899	1.749	1.422	1.532	8.881	2.066	1.386
Company	-0.100	-0.147	-0.156	0.006	0.134	0.140	-0.107	0.105	0.093
Age	0.258***	0.238***	0.259***	-0.044	-0.022	-0.033	-0.077	-0.068	-0.054
Work overtime	0.080**	0.185*	0.290	0.399	0.161	0.110	0.442**	0.075***	0.044***
Social support	0.122	0.134	0.130**	-0.026***	-0.024	-0.025	-0.040***	-0.008	-0.020
Job demand	-0.112	0.076	0.072	0.175	-0.122	-0.116	0.316	-0.019	-0.031
Job control	-0.199	-0.181	-0.169	0.077*	0.072	0.070	0.155***	0.156	0.157
Environmental comfort		-0.148	-0.199		0.287**	0.305**		0.252***	0.244***
Environmental safety		0.187	0.192		-0.145	-0.145		0.114	0.122
Intrinsic rewards		-0.181	-0.135		0.204	0.192		0.108	0.111
Extrinsic rewards		-0.089	-0.085		0.161	0.159		0.234***	0.243***
Leadership		-0.110	-0.041		0.235*	0.202		0.384***	0.356***
Gender			0.107			-0.017			-0.001
Education			0.113			-0.061			0.018
Personality			-0.228**			0.105			0.079
R ² adj.	0.0979	0.111	0.144	0.23722	0.32039	0.31786	0.490707	0.708278	0.70736
F	4.4377***	3.1576**	3.282***	10.8482***	9.14308***	7.32393***	31.51101***	42.93687***	33.80447***

Note: ***, **, and * denote significance at 0.1, 1 and 5 percent.
 Source: Authors' calculations.

Table 5: Hierarchic Regressions with GAP Variables

	Physical Well-being			Overall Well-being			Job Satisfaction		
	Beta			Beta			Beta		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
(Constant B)	14.208	13.985	16.189	3.806	4.023	3.524	31.279	34.322	27.507
Company	-0.064	-0.137	-0.171	-0.108	-0.020	-0.008	-0.286***	-0.069	-0.085
Age	0.246***	0.265***	0.280***	-0.045	-0.067	-0.059	-0.082	-0.117**	-0.075
Work overtime	-0.210**	-0.205*	-0.177*	0.100	0.100	0.089	0.190**	0.211***	0.207***
Social support	-0.025	-0.142	-0.239*	-0.412***	-0.259**	-0.172	-0.386***	-0.072	0.013
Job demand	0.024	0.059	0.040	-0.067	-0.132*	-0.118	-0.028	-0.131**	-0.122**
Job control	-0.022	-0.197	-0.168	-0.038	0.130	0.110	-0.225***	0.077	0.076
Environmental comfort		0.224	0.259*		-0.284*	-0.291**		-0.278**	-0.258**
Environmental safety		-0.239*	-0.245*		0.204	0.198		-0.078	-0.098
Intrinsic rewards		0.190	0.101		-0.057	-0.010		-0.110	-0.094
Extrinsic rewards		0.065	0.091		-0.228**	-0.248***		-0.286***	-0.303***
Leadership		0.126	0.061		-0.119	-0.064		-0.281***	-0.234**
Gender			0.148*			-0.052			-0.014
Education			0.115			-0.052			0.049
Personality			-0.226**			0.204**			0.205***
R ² adj.	0.079	0.111	0.155	0.187	0.259	0.276	0.393	0.634	0.660
F	3.730**	3.148**	3.493***	8.284***	7.040***	6.166**	21.502***	30.931***	27.353***

Note: ***, ** and * denote significance at 0.1, 1 and 5 percent.
 Source: Authors' calculations.

5 Conclusions

The present research is based on an analysis of literature on organizational well-being. It is quite specific and its consideration of both private and public practices derives from the importance of obtaining high performance and protecting public health. It is a very complex construct because it is measurable through a series of variables and it is conditioned by numerous factors. This research tests two hypotheses. The first concerns the universal effect of locus of control as a personality trait on three variables measuring well-being. We verify this hypothesis with the correlation among four variables: locus of control, job satisfaction, and physical and mental well-being, as Spector et al. proceeded (2002). The result of correlation shows effects not far from that reached by Spector. The results detect a strong correlation between locus of control with both job satisfaction and overall well-being. They demonstrate that those who tend to have an internal locus of control also have a higher level of mental well-being and satisfaction. Physical well-being is not correlated with locus of control, as shown by Spector et al. (2002) for seven of 24 samples analyzed (for another ten samples they found a weak correlation).

The second hypothesis concerns the effectiveness of GAP variables in measuring well-being in respect of perception variables only. We tested this hypothesis with regression analysis. The aim of this test is to verify if GAPs are better predictors than perceptions, and analyses show that for the regression model with GAPs the number of variables which in turn influence the three components of well-being increases from seven (if we consider only perceptions) to ten. Therefore, if in the first series of regressions the significant variables are age, overtime, social support, environmental comfort, extrinsic rewards, leadership, and personality, in the second series of regressions job demand, environmental safety, and gender are also important for workers' well-being and health status.

Limitations of the study exist with regard to the variability of workers' well-being in relation to the company they belong to. Results may be disrupted by this variable, but it is also true that the same factors can influence well-being in one organization

but not in others, so it depends on context. This result suggests that future research should explore the organizational context to identify its characteristics because some factors must be included in one context but excluded in others. Furthermore, a subsequent phase of qualitative analysis should identify the specific needs and exigencies of the particular organization, so different aspects which were not considered in the past can emerge. Another important fact emerging in this research concerns the diffusion of a well-being culture in a local area: organizations are as yet quite closed regarding this practice; they do not promote it and they do not implement well-being practices.

The present research does not explain how effectively well-being acts on individual behavior and organizational performance, because these data are not recorded. Finally, the time variable is not considered: an optimal analysis must be repeated in subsequent cycles in order to compare data, and especially to verify the feedback loop of well-being. Nor does this research consider non-working life satisfaction as Danna and Griffin (1999) suggest, because it is a more specific social aspect of life.

Appendix

Table A1: *Statistic Correlations (Perception Variables)*

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)
1) Company																
2) Gender	0.018															
3) Age	0.121	-0.082														
4) Education	0.221	0.210	-0.283													
5) Overtime	0.580	-0.134	0.176	0.057												
6) Environmental comfort	-0.514	0.065	-0.061	0.028	-0.384											
7) Environmental safety	-0.514	-0.002	-0.020	-0.050	-0.326	0.831**										
8) Social support	-0.471	-0.088	-0.108	-0.092	-0.257	0.507	0.460									
9) Job demand	0.260	0.091	0.053	0.173	0.169	-0.190	-0.210	-0.180								
10) Job control	-0.255	-0.230	0.038	0.032	-0.045	0.363	0.320	0.556	-0.035							
11) Intrinsic rewards	-0.423	-0.286	-0.051	-0.092	-0.136	0.353	0.346	0.595	-0.053	0.768**						
12) Extrinsic rewards	-0.274	-0.186	-0.019	-0.086	0.019	0.375	0.296	0.510	-0.002	0.615**	0.656**					
13) Leadership	-0.474	-0.104	-0.095	-0.061	-0.252	0.537	0.494	0.771**	-0.226	0.622**	0.603**	0.618**				
14) Locus of control	-0.227	0.020	-0.161	0.082	-0.135	0.304	0.246	0.621**	-0.007	0.438	0.411	0.363	0.592			
15) Physical health	-0.162	0.140	0.205	0.005	-0.206	0.078	0.132	0.066	0.065	-0.027	-0.058	-0.103	-0.009	-0.113		
16) Job satisfaction	-0.325	-0.107	-0.101	0.008	-0.055	0.601**	0.546	0.643**	-0.136	0.580	0.590	0.672**	0.751**	0.509**	-0.106	
17) Overall well-being	-0.193	-0.103	-0.067	-0.058	-0.042	0.372	0.276	0.482	-0.092	0.390	0.441	0.477	0.515	0.396**	-0.275**	0.678**

Note: ** denotes significance at 0.1 percent.
 Source: Authors' calculations.

Table A2: Statistical Correlations (GAP Variables)

	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)
1) Company																
2) Gender	0.018															
3) Age	0.121	-0.082														
4) Education	0.221	0.210	-0.283													
5) Work overtime	0.580	-0.134	0.176	0.057												
6) Environmental comfort	0.440	-0.003	0.009	-0.001	0.354											
7) Environmental safety	0.392	0.036	0.028	0.053	0.282	0.805**										
8) Social support	0.303	0.123	0.041	0.068	0.163	0.480	0.406									
9) Job demand	0.151	-0.011	0.156	0.057	0.056	-0.145	-0.067	-0.157								
10) Job control	0.082	0.209	-0.009	-0.038	0.002	0.376	0.308	0.561	-0.159							
11) Intrinsic rewards	0.258	0.275	-0.035	0.135	0.065	0.366	0.328	0.579	-0.098	0.730**						
12) Extrinsic rewards	0.129	0.152	-0.062	0.044	-0.020	0.454	0.320	0.499	-0.226	0.534	0.657**					
13) Leadership	0.393	0.122	0.020	0.125	0.227	0.503	0.464	0.697	-0.179	0.536	0.597	0.535				
14) Locus of control	-0.227	0.020	-0.161	0.082	-0.135	-0.281	-0.235	-0.567	0.027	-0.332	-0.380	-0.275	-0.506			
15) Physical health	-0.162	0.140	0.205	0.005	-0.206	-0.087	-0.143	-0.084	0.049	-0.047	0.023	0.064	-0.033	-0.113		
16) Job satisfaction	-0.325	-0.107	-0.101	0.008	-0.055	-0.596	-0.528	-0.567	0.023	-0.459	-0.565	-0.631**	-0.643**	0.509**	-0.106	
17) Overall well-being	-0.193	-0.103	-0.067	-0.058	-0.042	-0.334	-0.209	-0.441	-0.014	-0.267	-0.354	-0.423	-0.397**	0.396**	-0.275**	0.678**

Note: ** denotes significance at 0.1 percent.
 Source: Authors' calculations.

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