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## STRESS AT WORK: RISK EVALUATION AND PREVENTION

### LE STRESS AU TRAVAIL : ÉVALUATION DU RISQUE

### ET PRÉVENTION

### LO STRESS NEL LAVORO: VALUTAZIONE DEL RISCHIO

### E PREVENZIONE

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#### *Abstract*

The “psychological” definition of *stress*, in which cognitive evaluation is the triggering element, and the “psychoneuroendocrine” definition (by Hans Selye) in which the triggering element is made up of complex biochemical and humoral events, among which the cognitive component, are compared to each other.

The references to Selye's studies, the definition of health as a *perfectible process of physical, mental and social well being*, and the analysis of work processes according to the Theory of Organizational Action, allow a complete *risk evaluation* and the *primary prevention* of work stress. Many of the studies of the Organization and Well-being Programme, conducted in the manufacturing, artisanal, tertiary services, hospital and local health care sectors, before the EU norms and the 2004 European Agreements on stress were implemented, make this point clear.

#### *Keywords*

Stress, Primary prevention, Occupational health, Organizational action, Organisational analysis.

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## **Stress at work: risk evaluation and prevention**

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The term *stress*, commonly used, assumes different meanings based upon the disciplinary context in which it is used and according to the objectives of those using it. There exist significant differences, for example in the use of the term in the medical (which include physiology, occupational medicine, pharmacology, neurology, biochemistry, endocrinology, etc.), psychological, law and social disciplinary fields.

Within the *European agreement on stress in the work place*, signed October 8<sup>th</sup> 2004 by organizations of employers and workers, the adopted definition of stress was: *“Stress is a state, which is accompanied by physical, psychological or social complaints or dysfunctions and which results from individuals feeling unable to bridge a gap with the requirements or expectations planned on them. The individual is well adapted to cope with short-term exposure to pressure, which can be considered as positive, but has greater difficulty in coping with prolonged exposure to intensive pressure. Moreover, different individuals can react differently to similar situations and the same individual can react differently to similar situations at different times of his/her life”*

Among the possible definitions, this is the so called “psychological” one, where *stress* is interpreted as a particular *relation between the individual and the environment, which is evaluated by the individual as an interaction that tests or sometimes exceeds his resources, putting his well-being in jeopardy. The fact that a particular relation between the individual and the environment is stressful or not depends on a cognitive evaluation* (Lazarus, 1966; Lazarus, Folkman, 1984).

Many commonly used guidelines follow this definition with significant consequences for prevention ( INRS, 2006; European Agency for Safety and Health at Work, 2009; ISPESL, 2010; Comitato Tecnico Interregionale della

Prevenzione nei Luoghi di Lavoro, 2010). Possible measures to prevent, eliminate or reduce stress seem confused in the European agreement of 2004 (“specific measures for each stress factor... anti-stress policy... training and information...”). This again demonstrates how the term *stress* is used like an “all encompassing” word with wide ranging ideas on unspecific psychophysical uneasiness. The consequent guidelines for evaluation and prevention fragment and overlap content, context, changes, “organizational and psychosocial factors” and individual characteristics. At the same time they propose “objective” indicators of stress and ways of evaluating subjectivity (usually questionnaires) arriving at suggesting ways to manage stress individually.

Essentially there are two serious weaknesses that we can identify with this approach. The first weakness is the one that distinguishes and extrapolates some “organizational factors” that, in reality, are only inherent to the management of time, relations and hierarchical communication. This does not take into consideration the more complex synergy of choices, decisions and actions (even institutional and technical ones) that in the work process involve the management of the company and its workers in any hierarchical level. A “healthy” organization, from the view point of possible stress, would be able to, in simple terms, operate information and training and pin point various “company strategies”, including the reduction of time pressures (shifts, work rhythms, etc.) the acknowledgement of psychological violence (mobbing, gender bias), the diffusion of the idea of “work responsibility” and a generic social “support” (“climate”?). The second weakness is to attribute to the individual cognitive evaluation, conscious or not, a sort of “responsibility” to possibly activate the stress “mechanism”. On one hand, this is a way to sustain and promote the innate or acquirable strategies of coping, which is the positive cognitive elaboration of *stressors* (increasing the limit of tolerance). On the other hand, using both the evaluation of subjectivity and the identification of the “psychological and social” signs and symptoms of stress (symptoms that are unspecific and that seldom show themselves at an early stage), we allow for a

paradoxical and hidden search into “healthy and robust cognitive constitution”. This, in spite of the fact that, after decades of debate in Italy, in the 90s we succeeded in ridding of these concepts and the related health certification of “healthy and robust physical constitutions”<sup>1</sup>.

When we speak of *stress* I sustain that it is necessary to refer to the original work of Hans Selye. This physician and pharmacologist who was also for many years director of the International Institute of Stress at the University of Montreal first started his research in the 1930s and published his first original research on stress in 1936 (Selye, 1936). But the most complete study on the subject was in the 1256 pages of his most famous book, *Stress in Health and Disease*, which came 40 years later (Selye, 1976a). Also in 1976 he wrote an important paper, a sort of theoretical synthesis, in order to clear up various misunderstandings and inappropriate uses of his concept (Selye, 1976b). In this paper Selye identifies 10 main problems that, at that time and even today, emerge within the clinical application and in the use of the concept of *stress*. These problems are: the different definitions of stress; the specificity and non-specificity of stimuli and responses; the direct and indirect pathogenesis; the diseases related to adaptation; the influence of genetic and environmental elements and the “active” control of stress; the relations between the General Adaptation Syndrome and the Local Adaptation Syndrome; the biohumoral mechanisms and the role of the “primary mediator”; the prevention and pharmaceutical and behavioural treatments of *stress*. Selye also wrote, just before his death in 1982 and then published 5 years later, an article in which, while compiling 11 years of work, he had to again clear up especially what stress is not (nervous tension, hormonal depletion, a deviation from homoeostasis, alarm reaction, etc.) (Selye, 1982).

With the term *stress*, indicative of neuroendocrine activation both

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<sup>1</sup> The article 22, Law February 5th 1992 n° 104, “Law for the assistance, the social integration and the rights of people with disabilities” established that “for the employment in public and private work the certification of healthy and robust physical constitution is not required”.

complex and *unspecific* ("specific" stress does not exist), the aspects of solicitation (*stressors*) and the aspects of a "stereotyped" response are studied in relation to one another in the *General Syndrome of Adaptation* or *Syndrome of Biological Stress* within. With this syndrome we recognize an alarm reaction, a resistance phase (adaptation) and an exhaustion phase, with related biochemical alterations (e.g. hormonal, focused on the release of corticosteroid and catecholamines), morphological alterations (e.g. in the glandes) and functional alterations (e.g. neurological and cardiovascular). Once the homeostatic capacity is exhausted, the organism can manifest the aforementioned *diseases of adaptation*, that is, the inability to adapt to stress. This is a list that can include shock, gastrointestinal illnesses (like peptic ulcers, colitis, etc.), cardiovascular illnesses (hypertension, etc.) hormonal disturbances (diabetes mellitus), changes in the immune system (immunodepression, autoimmune diseases, etc.), "psychosomatic" illnesses (allergies, asthma, dermatitis, etc.), and even organic psychosis and, lastly, neoplasms (Selye, 1976: 725-896).

Therefore, with the term *stress* both causal aspects and the effect emerge; the effect can even manifest itself independently of the cognitive intervention, contrary to what has been affirmed by theories that are in direct conflict to Selye (as in Lazarus and Folkman), and also by theories that, while declaring their reference to Selye's theories, in reality they actually "appropriate and force" them. Selye doesn't negate the importance of the cognitive aspects, and affirms the following: "*Undoubtedly, in man, with his highly developed central nervous system (CNS), emotional arousal is one of the most frequent activators. Yet it cannot be regarded as the only factor, since typical stress reactions can occur in patients exposed to muscle fatigue, trauma, hemorrhage, etc. while under deep anesthesia*"(Selye, 1982). The fact that the psycho-neuro-endocrine immune activation of stress is a complex event, and not a "serial" one, is also demonstrated by unspecific neuro-hormonal manifestations, even after the surgical removal of the afferences to hypothalamus or under general anaesthesia. At the same time, as

stated by Selye, *stress* is neither synonymous with “emotional stimulation-excitement” or “nervous tension”, nor it has a negative significance. “*the act of being alive requires energy ... complete freedom from stress can only be possible after death*” (this is how the concept of *eustress* is introduced, distinguishable from *distress*).

On the contrary, it is true that a stimulus can be both a *stressor* and an activator of specific effects. Further conditioning elements, whether they be endogenous or exogenous, can determine the reaction of the “exposed” organism.

The fundamental difference between the concept of stress by H. Selye (which, it could be argued, provides a “psychoneuroendocrine” definition), and stress according to the “psychological” definition, I believe is in the different answer to the questions: “What is the stimulus that alerts the organism about a certain danger, or about an increase of requirements?” and “What is the mediator that, arising even from extremely different stimuli, leads to the same message the centres that supervise the stereotypical response to the General Syndrome of Adaptation?”.

In the “psychological” definition, the first passage, which is independent from the subsequent involvement of substances or neuronal transmissions, is the cognitive evaluation.

In the “psychoneuroendocrine” definition, the first passage coincides with the so-called *first mediator* intervention, that we thought-wanted to be a well defined substance, initially identified with histamine. This is an hypothesis that proved to be experimentally insufficient at explaining the numerous alternatives and exceptions. Today, after almost a century of research, I believe it is better to talk about a *first mediation*, that is, an articulated “cascade-possibility” of biochemical and humoral complex events (excess or insufficiency of chemical substances, nervous stimuli, etc.) implying multiple well known stereotypical responses (endocrine, neurological, immune ones) with variable intensity prevailing effects on organs and systems. The cognitive component

can be thusly considered, as I argued Hans Selye himself never denied, an important but not an exclusive “endogenous determinant” of the reaction of the exposed organism.

The fundamental consequence of this distinction is that the “combined whole of psychoneuroendocrine stress” is much more widespread than the “combined whole of psychological stress”. An approach to human work that is limited to considering as *stress* what is “evaluated” from a cognitive point of view doesn’t allow to acknowledge many possible harmful stimuli inducing stress (for example physical-chemical ones). On the other hand it doesn't allow any possible *primary* preventive actions, which are meant to prevent the conditions and stimuli with potential unspecific harm from happening.

For that which concerns the prospective of *primary prevention of stress*, Selye does not reference scientific work that has systematically faced the question nor does he hypothesis convincing paths of research. Again, in the 1976 and 1982 contributions, he expresses ideas that range from a certain “philosophical common sense” (“the best way to avoid harmful stress is to choose appropriate environments ... to find gratifying activities ... and in this way we can live wisely in harmony with the laws of nature”), all the way to a recall of the “altruistic egoism” acknowledged by biology, psychology and epistemology of science<sup>2</sup>, in a way, however, that could be understood as a sort of *captatio benevolentiae*. Not even the international literature on this argument, today numbered in the 200,000 articles written (just in the CMA Journal alone, where Selye published in 1976 his famous article that cleared up his concept, there have been 500 articles published citing stress in more than 30 years) has revealed a concrete approach to primary prevention.

For the *primary prevention of discomfort and suffering at work* it is crucial to understand what are the possible dimensions of analysis and interpretation of work situations that would be more useful in terms of choices with the most

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<sup>2</sup>Among many possible references: H. Maturana e F. Varela, *Autopoiesis and Cognition. The Realization of the Living*, Reidel Publishing Company, Dordrecht, 1980 and the following *El árbol del conocimiento: las bases biológicas del entendimiento humano*, Lumen, Buenos Aires, 1984.



consistency between production goals and the well being of workers.

Some attempts to hypothesize prevention initiatives pay for the lack of a systematic approach, which needs the knowledge of possible theories and the available operative tools to make an analysis of work aimed at *primary prevention*. Even in all the numerous articles on *mobbing*, one finds varied proposals for intervention at the different levels of prevention. Among these are: better information and training (bringing awareness and acknowledgement to the phenomena), improving the skills of occupational physicians on the subject (but also family physicians, psychologists and psychiatrists), establishing protocols for behaviours in order to protect the rights and dignity of workers (even inserting clauses in work contracts), stimulating a cultural change that stigmatizes harassment, changing the leadership style, confronting “bad” work organization or the “organizational dysfunctions”, improving the company communication, creating a relational work “climate” by managing conflict with negotiation, promote total quality management etc.<sup>3</sup>

The proposals for preventative strategies formulated up until now do not appear to be comprehensive in relation to the whole problem of *(un)specific psychological and social discomfort in the work place*.

The “rediscovering” or addition of a descriptive clinical picture of the discomfort at work and the (re)classification of “professional illnesses”, more or less reduced to list with mere legal and insurance related value, are positioned too “downstream” in relation to the critical issues within the work place to be faced and solved. The analysis of work that relies on this approach is not only unsatisfactory but even counterproductive if the goal is primary prevention, and it can be criticized from the biomedical point of view, as I previously researched and stated in the 1990s (Rulli, 1996). The national norms that

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<sup>3</sup> See the critical essay on the definitions of stress, burn-out, mobbing and their consequences in Rulli, 2006.

followed the 2004 European Agreement, including the 2008/2009 Italian one<sup>4</sup>, do nothing but sustain this fragmentation. They both foresee a specific evaluation for stress related risks (almost as if beforehand it was not possible to spot this risk based on the interdisciplinary knowledge available) as well as indicate ways they can evaluate with *ad hoc* guidelines (as if ways to analyse work didn't exist in order to allow every possible risk to emerge). Specific evaluation and ways to evaluate are also based on the assumption that the risk of stress depends on “organizational factors” separated from choices that affect the environment, materials, techniques, etc. According to Bruno Maggi “The use of expressions like “organizational factors”(…) is a clear indicator of an uncertain and inadequate reading of the reality in the work place (…) every configuration of the work process is the result of choices of human action, *choices that organize*, in one way or another, those processes. The etiopathogenesis of the work situation is necessarily organisational” (Maggi, 2006).

The choice of a comprehensive approach to the knowledge of the work place exists, and it is needed to avoid fragmented solutions to the problems posed by the numerous risks to well being in the work environment, not only in the psychological and social realms.

As I sustained some years ago, in a biomedical contribution to the juridical discussion on suffering in the workplaces, it is important to recognize and to denounce the problem of injustice, of discomfort, of the “silent” psychical and social suffering at work, and to operate choices oriented to contrast this “barbarization” (Dejours, 2009), but it is also needed to affirm that a deep organizational knowledge of work itself is necessary to recognize the

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<sup>4</sup> The D. Lgs. April 9th 2008, n. 81, modified by the D.Lgs. August 3rd 2009, n. 106, stated in art. 28 “Object of risk evaluation” that evaluation “... must concern all risks (...) including those related to group of workers exposed to particular risks, such as the ones connected to work-related stress, according to the European agreement of October 8<sup>th</sup> 2004 (...). The evaluation of work-related stress is performed according to the guidelines of art. 6 “ (which states that the Consulting Permanent Commission for Health and Safety in the work place, constituted at the Ministry of Labor and Social Security has also the responsibility to “define the necessary indications for the evaluation of risk concerning work-related stress”).

reasons of the rising of multiple possible risks in the workplace and it's necessary in order to "*recognize the different dimensions of origin of discomfort (in such way going upstream towards the sources of suffering)*" (Rulli, 2006).

This "potentiality" for discomfort is recognizable with an analytical evaluation of the risk in the work process which utilizes *criteria* (instruments and methods that the theory offers to analyse reality) that are suitable for prevention.

An analysis of the work processes according to the *Theory of Organizational Action* offers a response to the need for *risk evaluation*, even within the meaning considered by the D.Lgs 626/1994, later reconsidered by the D.Lgs 81/2008. According to this Theory, the work place is pre-ordered through choices, decisions and actions (which are human, hence imperfect, incomplete, each with possible alternatives). These actions are continually being transformed and reformulated according to a "principle", not necessarily a perfect one, of congruency in relation to the goals. Therefore the work process can be evaluated not only in terms of efficiency and effectiveness for production (of goods or services) but in terms of relative congruency among its components, inseparable from the acting subjects. In this way, the evaluation extends itself to well being, as a crucial part of the "condition" of human beings in the work place. In this theoretical construction the concept of *organizational constraint*<sup>5</sup> provides a type of categorical "bridge" between the interdisciplinary knowledge of work and the specific knowledge in the biomedical field on illness. This concept was defined by Bruno Maggi in the beginning of the 1980s as a *reduction in the freedom of choice by the acting subject in the process of actions and decisions*, which represented the escapable element of pre-ordination ("organizing" choices in human action). The benefit of organization carry with it the "cost" of constraint that, while far from being a "harmful agent", represent the limitation for the sensory, motor and cognitive

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<sup>5</sup> The concept of *organizational constraint* was introduced by B. Maggi for the first time to the biomedic discipline at the 46° Congress of the Italian Society of Work Medicine and Industrial Hygiene, held in Catania in 1983.

abilities for the human being in organized work, that is, the potentially pathogenetic character of organization (Maggi, 2006)<sup>6</sup>.

The organizational analysis of concrete work processes (not generic or typological ones) oriented towards goals of primary prevention, appears to be the only possible path to a description and an interpretation of the work place as a setting where well being is at risk. Any form of mono-disciplinary evaluation shows obvious limits of perspective in the choice of alternatives addressed at well being, and appears to reintroduce critical points only apparently resolved by very specific interventions based on simple cause-effect relationships. The interdisciplinary approach is the only one which allows the overall consideration of only apparently un-reconcilable perspectives on efficiency, effectiveness, quality and protection of well being at work. As a result such an approach is indispensable for the biomedical disciplines aiming to achieve goals of *primary prevention* (Maggi, 1984/1990; Maggi, 1990).

Over time the notions of primary prevention, secondary prevention and tertiary prevention became widely accepted, not only because of epidemiological reasons and evidence. *Primary prevention* is focused on reducing the diffusion of diseases by intervening on risk “factors”, on “pathogenic causes”, before they can lead to the manifestation of their effects. *Secondary prevention* consists of early diagnosis and therapy. *Tertiary prevention* is focused on preventing disabling outcomes and death. Today this distinction displays a rigidity that, on one hand, tends to segment the possible interventions and, on the other hand, restricts the sphere of interest and interventions of the relevant biomedical disciplines (hygiene and prevention, diagnostics and therapy, rehabilitation). In a similar way the distinction – which is present in the vocabulary of prevention in the work place - between (primary)

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<sup>6</sup>The definition contained in the communication n. 71 (December, 17<sup>th</sup> 2003) of INAIL, entitled “Psychological disturbances from organizational constraint ...” and in its annex n° 1 “Report of the Scientific Committee” does not correspond to this original and stipulative (non descriptive) meaning of *organizational constraint*. Even more so, it is not possible to talk about “lists of constraints”.

*prevention, protection* (from risk) and *precaution* (based on the hypothesis of risk) seems artificial as well. Obviously a real “primary” prevention should be based on a principle of precaution, addressed to all possible hypothesis of risk and extended to the “protection” when harmful agents have been admitted to the work place (something that shouldn't occur) or when work conditions imply a certain unspecific risk, like in the example of *stress*.

In conclusion it is possible to argue that the analysis of work, according to precise descriptive and interpretive categories that allow a concrete evaluation of the consequences of *organizational constraint*, offers a prospective of a real “primary” prevention, a perspective that works on the design of work before risk presents itself, allowing a return to the roots of possible harmful agents (specific and unspecific, chemical, physical or psychological) and to all possible combination of these agents. This kind of analysis is the aim of the *Interdisciplinary Programme of Research on the relation between organized work and health, Organization and Well-being* (O&W), coordinated by Bruno Maggi, Full Professor of Organization Theory in the Faculty of Economics at the University of Bologna and in the Faculty of Law at the University of Milan. Based on the Theory of Organizational Action (TAO) and formally instituted in the 1980s, after more than a decade of interdisciplinary research on work and health, the Programme aims to identify the links between choices (made and designed) in organizational processes of work and the health of people involved, defined in the O&W Programme and also expressed in the OMS principles as a *perfectible process of physical, mental and social well-being*. “Health is therefore perceived as a resource for everyday life and not like an end goal. The identification of health needs is not absolute but relative to the needs expressed by the person and to the shared societal norms regarding matters of priority. The definition of health shared by the O&W Programme is one of a *perfectible process of well-being*, an approach consistent to the evaluation of relations between organized work and health which analyses work as an organizational process” (Rulli, 1996: 35-36). The variety of disciplinary knowledge required by this object of study,

biomedical, social, economic, psychological and poly-technical, is integrated in the utilization of the *Method of Organizational Congruencies* (OC) (Maggi, 1984/1990), derived from the Theory of Organizational Action. It should be recalled that a scientific “method” has to be understood as an orderly process of investigations and a set of criteria that the Theory offers to describe and interpret reality. The evaluation of congruency, the identification according to the *OC Method* of “conditions” that allow risk to take form and become real, can be logically located on a higher level when compared to forms of analysis, unfortunately widespread and prevalent, that declare to be oriented towards (primary) prevention. Often, however, these forms of analysis are not able to emancipate themselves from both a supposed technical predetermination, and also from an uncritical use of the definitions of work organization that are purely managerial, created in settings that most definitely are not oriented towards objectives of prevention.

The interdisciplinary Research Programme O&W promotes the analysis of work situations, ergonomic design, training and education. The research results are published and discussed in seminars, every 6 months. The first of these seminars occurred in 1989.

Since the mid 1980's until now, well before the most important law on prevention at work of the EU were emanated and before the European Agreement on stress of 2004, the O&W Research Programme has analysed many work processes and uncovered the risk of stress within, among others, the manufacturing and the artisanal sector, the tertiary services, the hospital and local health care sector. In each of these work situations the risk of stress became evident in relation to un-congruencies in communication, in the coordinating of individuals and activities, in the conditions of uncertainty and psychological burden, as well as in relation to the risk conditions from exposure to physical chemical agents and accidents. This way it was possible to demonstrate, consistently with the “psychoneuroendocrine” definition of Hans Selye, not only the potential stress and psycho-physical unspecific discomfort,

connected with stimuli of a psychological nature (e.g., in the in-congruencies related to coordination and control and communication) (Cavallo, Mussano, 1990; De Filippi *et al.*, 1990; Rulli, D'Orso, 1994/2010; Maggi, 2008), but also the proven possibility of stress in relation to exposure to harmful chemical/physical agents (Maggi, 1986; Salerno, Guglielmino, 1990) or to situations of risk for workers' safety (Festa *et al.*, 1997; De la Garza *et al.*, 1998) as well as a wide range of analysis cases in the field of health care (Maggi *et al.*, 1990; Rulli *et al.*, 1990; Cristofolini *et al.*, 1991; Rulli, D'Orso, 1994/2010; Rulli *et al.*, 1995; Rulli *et al.*, 2000; Maggi, Rulli, 2006).

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