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RESEARCH ARTICLE

Analysis of a New Work-Related Stress Assessment Tool

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Abstract:

Background:

Work-related stress is a relevant phenomenon in terms of health and safety at work, as occupational distress has a negative impact on individual and organisational well-being. It is a complex and multifactorial phenomenon, whose evaluation must be carried out through a specific and adequate methodology.

Objective:

This work aims to identify versatile tools that can quickly provide reliable measures of work distress. It analyzes the proposal elaborated by the “Comitato Unico di Garanzia per le Pari Opportunità, la Valorizzazione del Benessere di chi lavora e contro le Discriminazioni” of Rome, *i.e.* the tool “Valutazione è prevenzione, Sicurezza è partecipazione”.

Methods:

A study was carried out on a sample of 474 employees of the Neapolitan Judicial Offices, who were given a standardized questionnaire to investigate the stress, associated with the proposal of the Comitato Unico di Garanzia.

Results:

From the elaboration of the results, it emerges that the conditions of working wellbeing are linked to two main factors related to the perception of workers both of physical-environmental and organisational-relational aspects. In particular, it emerged that the new assessment tool, consisting of a small number of items, contributes to the detection of work stress, so it is necessary to deepen through future research the contribution that this tool can offer to the survey on work-related stress.

Conclusion:

Having highlighted two factors that significantly saturate the presence of a working discomfort, through an agile tool, allows us to plan a new research path, which can approach the complexity of the phenomenon through the methods of deep learning.

Keywords: Work-related stress, Health, Work psychology, Organizational psychology, Deep learning, Court, Perception, Worker.

Article History

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1. INTRODUCTION

1.1. Background

The work-related stress has gained the attention of many researchers over the years; it is considered a pervasive problem

with significant implications for health and safety at work [1 - 3] because, if prolonged over time, it can have negative consequences both physically and mentally [4 - 6]. Stress can generate negative short and long term effects on the physiological, psychological and behavioural level of the

worker and can also affect the entire organisational system, in terms of reduced company productivity, absenteeism, increased accidents [7, 8]. The scholar Selye stated that stress is not a process in itself harmful, but if prolonged in time and under certain circumstances, it can have mild to serious consequences for the individual; he distinguished, moreover, the positive stress, “Eustress”, from the harmful one, “Distress”, in relation to the different consequences found [9, 10]. The Eustress, being a condition of momentary stress, has positive effects because it is a stimulant stress that produces an improvement in the ability to respond to external stimuli [11 - 13]; the Distress, on the opposite, is a harmful stress that limits the ability to respond, creating malaise, poor performance and negative consequences on the psychophysical level. The effects that stress can generate may depend on the duration and intensity of the stressor and the perception of the stress load [14 - 17]. This perception is variable from individual to individual, for the meaning attributed to it, for the way it is tackled and for the cognitive and emotional evaluation that the person has of the situation and of his/her own resources [18 - 20]. In this regard, there is scientific evidence showing that exposure to stress and the consequent perception of self-efficacy in its management have positive effects: greater efficiency at work and satisfaction in life in general [18, 19]. On the opposite, more the person assesses himself incapable of dealing with the situation, more the event will be perceived as stressful and, consequently, the intense and prolonged stress will become chronic [21, 22] according to Mackay and Cox, who already in 1978, with the Transactional Process, classified stress as an individual phenomenon, claiming that it arises when the situation is perceived as threatening [23].

Selye, in 1956 [24], defines as “General Adaptation Syndrome” that response that the body puts into action when it is subject to the prolonged effects of various types of stressors, such as physical (e.g. fatigue), mental (e.g. work commitment), social or environmental stimuli (e.g. obligations or demands of the social environment). Deepening the stress reaction, the authors Cooper and Marshall [25], Sutherland and Cooper [26], define environmental, psychosocial factors and different personality dimensions as the elements at the origin of occupational stress. Karasek [27] with the Demand Control Model adds that two main factors give the work-related stress reaction: demand, understood as the psychological or physical load required, and control, *i.e.* the ability and discretion in performing the specific task. Also Christina Maslach [28], in relation to her studies on Burnout syndrome [29, 30], understood as the extreme phase of stress [31], dwells both on the characteristics of the subjects, which she describes as vulnerable, submissive, passively resigned to the demands of work [32] and on the organizational scope of the syndrome, listing its objective causes in six classes: workload, decision-making autonomy, gratification, sense of belonging, equity, values [33].

Work behaviour is, in fact, a particular class of complex multi-determined behaviour, which derives from the interaction between external factors (of a technical, cultural, economic,

social, organisational nature) and internal factors (such as the person's expectations, desires, aims, motivations, physical states, etc.); these factors act as facilitating or hindering optimal work behaviour [8, 34 - 36]. It is clear that stress is not identifiable through the analysis of partial elements but is the result of a continuous process of exchange and interaction between the individual and the environment [37, 38].

In fact, scientific research on occupational stress focuses both on physical stressors, which can affect people's well-being and productivity (such as excessive noise levels, unsustainable temperatures, poor lighting or exposure to high vibrations) and on work-related stressors (such as organisational roles, interpersonal relationships, career development, the relationship between work and extra-work life), showing how the latter also have an impact on workers' health [39 - 43]. The scientific literature shows the importance not only of the physical environment but also of the role played by interpersonal relationships in the onset of work-related stress [44 - 46]. In this regard, reference is made to those pressing and demanding relationships that generate in the worker an attitude of emotional and cognitive detachment [47 - 49]. If on one hand, interpersonal relationships in the workplace are a source of social support [50 - 52], on the other hand, they can cause discomfort and psycho-physical stress [53 - 56].

The scientific literature on the subject highlights how wellbeing in the company and at work includes the promotion and maintenance of the overall wellbeing of employees, but also the quality of relations between people and the work context in general [57, 58]. The scientific focus has focused on the system-organization conceived in its entirety rather than on the characteristics of the individual subject or on the state of individual health, in order to understand “*the way in which the organization as a whole works, its meaning for those who work there and to what extent it allows the individual and groups to exercise their responsibility for their own well-being*” [59, 60].

An important contribution to health and well-being at work is also made by the ergonomic approach [61, 62]. It is an interdisciplinary applied science that deals with the interaction between man and his environment, the design of spaces, tools and production processes according to the specific skills of workers, in order to: optimize the interaction between man, machine and environment; intervene on the organization, rationalizing processes and space; improve the postural system [63, 64], reducing the conditions of psycho-physical [65 - 70] and psychosomatic stress of workers [71 - 75]. Some scholars have made regression analyses showed an impact of job demands and control on Sunday cortisol levels, and this effect was fully mediated by after work fatigue [76 - 78].

In particular, the evaluation of work-related stress is a fundamental activity to prevent the development of discomfort and to improve the health of workers, with consequent benefits for businesses and society as a whole; just consider that it must be assessed by law in every workplace [79 - 81]. As part of the studies conducted in Italy, an interesting research on work-related stress is the study carried out by the CUG of Rome, namely the “Comitato Unico di Garanzia per le Pari Opportunità, la Valorizzazione del Benessere di chi lavora e contro le Discriminazioni” of the Administrative Personnel of

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the Roman Judicial Offices [82]. Specifically, between 2014 and 2015 the CUG carried out a pilot study to assess the perceived stress, the quality of health and the working problems of a sample of employees of the Roman Judicial Offices, using a new anonymous questionnaire developed by the President Dr. S. Robiati, together with the CUG working group, called “Valutazione è prevenzione, Sicurezza è partecipazione”. The objective of the research was to assess how workers perceive their work environment on a daily basis in order to implement targeted interventions for the management of the concrete discomfort experienced by the employees of the Judicial Offices. From the study carried out it emerges that the CUG's methodological proposal contributes to detect the factors that determine work distress, confirming the problems that emerged from the results of other tools used to assess the discomfort of employees, such as the questionnaire “Valutazione Rapidadello Stress -VRS” [83], “Questionario sullo Stato di Salute SF-12 (Short Form)” [84], “Questionario Strumento-Indicatore” proposed by the Italian institute INAIL- Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro, which represents the Italian version of the Management standard indicator tool developed by the British organism HSE- Health and Safety Executive [85]. This first study conducted by the CUG has, therefore, highlighted that the new questionnaire “Valutazione è prevenzione, Sicurezza è partecipazione” can help to detect the critical issues perceived by workers, with regard to the environmental and organizational aspects of their work reality, thus paving the way for further studies aimed at verifying the usefulness of this new survey tool.

Therefore, the present work aims to analyze the new methodological proposal developed by the CUG of Rome in the study of work-related stress, considering it appropriate to highlight how the evaluation tools used so far to investigate the distress of employees, required in practice long time and average complex grindings. Specifically, the article aims to make this activity explicit with a more versatile tool, which can quickly provide measures as reliable as the levels of stress and, at the same time, is able to analyze the complexity and multifactorial nature of the phenomenon.

1.2. Objectives of the Study

The aim of this paper is to assess the factors that generate work-related stress with agile and flexible survey tools that can help to save resources, time and costs. With this perspective, the work aims to examine the contribution made to the study of work-related stress by the new tool developed by “Comitato Unico di Garanzia per le Pari Opportunità, la Valorizzazione del Benessere di chi lavora e contro le Discriminazioni” (CUG) of Rome, “Valutazione è prevenzione Sicurezza è partecipazione” [82]. The need to analyse this tool stems from the fact that it is oriented towards the ergonomic model, as it evaluates the work experience from the point of view of the subjective perception of the worker, investigating the working reality experienced daily by employees.

2. MATERIALS AND METHODS

2.1. Materials

A study was conducted on a sample of employees of the

Court of Naples, who were given two tools to investigate work-related stress: “Valutazione è prevenzione, Sicurezza è partecipazione” was administered in association with the “Questionario sullo Stato di Salute SF-12 (Short Form)”, in order to compare the results obtained with standardised measurements of workers' health status.

“Questionario sullo stato di salute Short Form -12 (SF-12)” is a tool composed of 12 items, which measures the state of physical and mental health [86]; it was developed in the United States to provide a short version of the questionnaire SF-36 [87] and was then adapted to the Italian context [84]. The SF-12 includes 8 scales: four assess physical functioning, role and physical health, role and emotional state, and mental health; four-measure physical pain, vitality, social activity, and health in general. The responses to the items provide two synthetic indices: Physical Component Summary (PCS) and Mental Component Summary (MCS). The subject is asked to respond to how he/she feels and how he/she can perform his/her usual activities, evaluating the day he/she completes the questionnaire and the previous 4 weeks. The scale scores have a range between 0 and 100, where 0 indicates the lowest level of health and 100 indicates the highest level.

“Valutazione è prevenzione, Sicurezza è partecipazione”, as already explained, is a questionnaire prepared by the CUG (Single Guarantee Committee for Equal Opportunities, Enhancing the Well-Being of Workers and Against Discrimination) - President Dr. S. Robiati [82]. The tool was used in a pilot study carried out between 2014 and 2015 at the Court of Rome, aimed at carrying out an initial verification of the working conditions of employees of the Roman judicial offices. The questionnaire aims to detect the subjective perception of the working environment by investigating the concrete and daily experience of workers and to verify the possible critical issues to be addressed to prevent work-related stress. It responds to the need to reflect on the ways in which the work is organized, to improve communication between the various professional figures, and to intervene on relations between colleagues who are overburdened by the workload and nevertheless considered inefficient by public opinion. The instrument aims to enhance the voice of the worker in order to understand his daily suffering, by entering the concrete working reality of the employees of the Judicial Offices of Rome. Therefore, it asks the employee to report the aspects to which his or her distress is connected, inviting him or her to communicate: whether the work spaces are sufficient for the number of operators sharing the same environment, whether voluminous folders and files are allocated in them, which reduce the space for normal work; whether the premises have adequate air conditioning systems; whether power cables are channeled and integrated or electrical equipment is concentrated in temporary solutions. The questionnaire investigates other aspects of the subjective perception of the worker or worker, asking, for example, whether he/she considers the tools provided by the Administration to be adequate; whether he/she feels he/she is being used in a way that meets his/her expectations; whether he/she feels his/her person is valued and has seen his/her work situation improve over time. It also investigates problem areas related to conflicts between colleagues within the office; any frustrating

relationships with users, which it is not possible to satisfy due to lack of time, means, resources; the lack of support from managers, working hours insufficient to perform the assigned tasks with the need to resort to overtime. The tool is composed of 28 items with questions associated with a dichotomous answer mode, of the Yes/No type.

2.2. Sample

The sample studied consists of 474 employees of the Neapolitan Judicial Offices, divided into three areas (civil, criminal, other). It is made up of subjects between the ages of 26 and 64 (median = 54 years) and for the most part it is made up. It 23% del campione of women (255, equal to 58.4% of the sample). 23% of the sample are graduates, 66% have a high school diploma and 11% a middle school diploma. The sample also includes five professional roles (15% clerks, 13% officials, 36% court assistants, 16% judicial staff, 11% clerks, 4% receptionists) and four types of employment contract (4% fixed, 94% open-ended, 1% collaboration, 1% temporary work). The description of the sample is illustrated in Table 1.

2.3. Methods

The 28 items of the questionnaire “Valutazione è prevenzione Sicurezza è partecipazione” were related to the mental and physical health measures of the SF-12. The results showed that 14 items correlate significantly with mental health measures.

A Principal Component Analysis (PCA) was carried out on the latter, from which three factors emerged, defined as: Recognition of value, Work context, Work spaces. Subsequently, the correlation between the three Factors emerged from the PCA and the dimensions of the “Questionariosullo stato di salute” was analysed. In addition, a linear regression test was carried out, using as a dependent variable the scores of the MCS sub-scale of the “Questionariosullo stato di salute” and as explanatory variables the three factors derived from the factorial analysis, in order to identify the organizational elements perceived by workers, which contribute to determine their well-being.

The local Institutional Ethics Committee approved the study (protocol number that was attributed by the ethics committee: 116/CE/2011, 14/11/2011). Participants were provided with both written and oral information regarding the possible risks and discomforts and were ensured that they were free to withdraw from the study at any time.

3. RESULTS

The first statistical processing of the study's data shows that 14 items of the questionnaire “Valutazione è Prevenzione, Sicurezza è Partecipazione” correlate with the measures of mental well-being provided by the SF-12 instrument (Table 2).

From the Analysis of the Main Components conducted on the items of the questionnaire “Valutazione è Prevenzione, Sicurezza è Partecipazione” which correlate significantly with the mental health measures of SF-12, three factors have emerged, which have been defined: Value Recognition, Work Context, Workspaces (Table 3).

Factor 1 “Recognition of value” refers to the correspondence between employment and the professional

expectations of the worker and is also composed of the adequacy of the tools provided, the support of managers and the perception of improvement or worsening of the work situation.

Factor 2 “Work context” refers to the inadequacy of the spaces in which to place folders or files, the presence of power cables that hinder the passage between desks, the presence of printers that lose toner and the presence of dust that make the environment unhealthy. Moreover, this factor includes relational aspects such as the conflict between colleagues due to excessive workloads, the relationship with users and the presence of prejudices related to the proper functioning of the judicial system.

Factor 3 “Workspaces” refers to workspaces in relation to their size and brightness.

In order to describe the predictive capacity of the three factors extracted from the tool “Valutazione è prevenzione Sicurezza è partecipazione”, the following statistical analyses were carried out.

1) The correlation between the three Factors and the size of the Questionariosullo stato di salute has been calculated.

From the statistical analysis (Table 4) it emerges that the three Factors correlate significantly with the physical and mental health measures obtained through the SF-12 tool.

2) A linear regression test was carried out using as an dependent variable the scores of the MCS sub-scale of the “Questionariosullo stato di salute” tool and as explanatory variables the three factors derived from the factorial analysis (Table 5).

The analysis shows that Factor 1 (Recognition of value) and Factor 2 (Employment context) explain 17% of the variance. Well-being increases by 24% (Beta: 0.237) when one unit of Factor 1 increases and by 25% (Beta: 0.249) when one unit of Factor 2 increases.

4. DISCUSSION

The study carried out on the employees of the Court of Naples shows that the conditions of well-being/work sickness are linked to two main factors: the recognition of the value and the working environment. The first Factor concerns the adequacy of the tools provided within the working environment, the support of management and the correspondence between work and the professional expectations of the worker, the worker's perception of improvement or deterioration. It is conceivable that the more the organization recognises the positive value of the worker, the more it provides him with adequate tools for carrying out the work and assigns him a job corresponding to his professional expectations. The worker, in this condition, perceives an improvement in the working situation over time. The second factor, on the other hand, concerns mainly physical-environmental aspects such as insufficient space for folders or files, the presence of power cables that hinder the passage between desks, the presence of printers that lose toner or dust that make the environment unhealthy. This factor also evaluates relational aspects, such as the conflict between

colleagues due to excessive workloads, the relationship with

users and the presence of prejudices related to the proper functioning of the judicial system.

Table 1. Sample description.

Level of Education	N.	%
Middle school	51	11%
High school	314	66%
Degree	109	23%
OFFICIES:	-	-
Civil court	214	45%
Criminal court	243	51%
Other	17	4%
Types of Employment Contract	-	-
Permanent	446	94%
Fixed-term	19	4%
Collaboration	6	1%
Temporary work	3	1%
ROLES:	-	-
Missing data	24	5%
Registrar	69	15%
Officer	63	13%
Judicialassistant	173	36%
Legal practitioner	75	16%
Clerk	52	11%
Switboard operator	18	4%

Table 2. - Table of correlations between the 28 items of “Valutazione è prevenzione Sicurezza è partecipazione” and the mental health measures obtained from the SF-12.

Items	-	Mentalhealth
Tools provided	1	-,197**
Professional expectations	2	,184**
Improved work situation	3	-,130**
Worsened work situation	4	,299**
Professional updating	5	,096*
Valorization of people	6	0,091
Increase skills course	7	0,043
Conflict workload	8	,226**
Judicial system not functioning	9	,177**
Support from managers	10	-,198**
Backlog	11	,116*
Sufficient time	12	0,083
Enough space	13	-,158**
Lighting spaces	14	-,114*
Working in dark spaces	15	0,007
Heating	16	-0,06
Air conditioning	17	-0,016
Leave building cause hot	18	0,039
Lack of storage space	19	,158**
Integrated and channelized power and data network cables	20	0,046
Power and data network cables hinder desks	21	,145**
Electronic solutions	22	0,013
Dust	23	,140**
Printers and toners	24	,147**

(Table 2) cont....

Items	-	Mentalhealth
Printers and operatorsnumber	25	0,031
New generation monitors	26	-0,037
Conflictresourceesshortages	27	,189**
Case revocation	28	0,052

** = p <.01 - * = p<.05

Table 3. Analysis of the main components.

Matrix of rotatedcomponents	Factor 1	Factor 2	Factor 3
-	Value recognition	Work Contest	Workspaces
Toolsprovided	-0,607	-0,105	0,072
Professionalexpectations	0,519	0,27	0,012
Improved work situation	-0,775	-0,055	-0,049
worsened work situation	0,75	0,09	-0,097
conflict workload			
support from managers	0,251	0,347	-0,198
Judicialsystemnotfunctioning	0,245	0,422	0,084
support from managers	-0,444	0,005	0,166
Enoughspace	-0,026	-0,131	0,773
Lightingspaces	-0,157	0,045	0,71
lack of storagespace	0,022	0,554	0,038
Power and data network cables hinder desks	0,074	0,458	-0,071
Dust	0,112	0,636	0,104
Print and toner	0,061	0,531	-0,257
Conflictresourceesshortages	-0,003	0,678	-0,077
KMO and Bartlett Test	-	-	-
Kaiser-Meyer-Olkin's measure of the adequacy of sampling	.751	-	-
P	<.01	-	-

Table 4. Table of Correlations between the three factors and physical and mental health measures obtained through the SF-12.

-	Value recognition	Work Contest	Workspaces
Mentalhealth	,318**	,303**	-,158**
Physicalhealth	,131**	,111*	-,119*

Table 5. The analysis of linear regression. In this table are described dependent and explanatory variables.

DependentVariable	Mentalhealth	B	Beta	T	Sign.
-	(Constant)	34,477	-	7,473	0
ExplanatoryVariables	Factor 1	2,061	0,237	4,645	0
-	Factor 2	1,721	0,249	4,887	0

R² = 0,175

From the survey carried out, therefore, two factors emerge that contribute significantly to the genesis of the stress experienced by employees, both of which refer to the perception by workers of both physical-environmental and organisational-relational aspects related to the work activity. The above variables emerged from the study are in line with the wide range of literature produced on the subject [25, 26, 34, 88 - 90]. For example, Spaltro [91], in 1993, points out how elements related to the working environment (such as temperature, altitude, humidity) interact with each other,

generating in workers a feeling of wellbeing/psycho-physical discomfort; in the same way, aspects related to the organisational structure (such as available support, work procedures, leadership style) generate positive/negative sensations that can be translated into having the pleasure of being in a specific context or not. As pointed out by Capodilupo [92], one of the main explanatory models of work-related stress is the Person Environment Fit Theory [93 - 97], a model of Lewinian origin that links the personal characteristics of the subject (related to motivations, expectations, individual

representations) with factors of environmental nature, highlighting how it is more stressful for the subject the situation that assumes for him the meaning of a greater incidence of threat. The influence that the physical and organizational aspects of the work context exert on the state of well-being or discomfort of workers is certainly not a surprising discovery in the survey on work-related stress, as it is well highlighted by the numerous scientific research carried out on the subject. What seems to us more useful to highlight as a result of our study is the possibility to investigate the factors that contribute to generate work distress through a flexible and versatile questionnaire, such as “Valutazione è prevenzione, Sicurezza è partecipazione”. This tool, developed by the CUG of Rome, as it consists of a small number of items (which correlate in a statistically significant way with the health indexes of employees and help to predict the level of distress), can contribute to the evaluation of work-related stress, reducing the time and resources to be used in the assessment activity. This methodological proposal, therefore, needs to be investigated through further studies, which can verify and deepen the usefulness of the tool. The study conducted with the employees of the Court of Naples can also open the way to future research, aimed at studying the complexity of the interactions involved in the genesis of work distress (*i.e.*, between personal factors, related to subjective aspects of workers: *e.g.* personality characteristics, expectations, motivations, skills; physical-environmental: *e.g.* lighting, width, temperature of the work environment; organizational-relational: such as work procedures, role responsibilities, availability of support, conflicts with colleagues) through new methods of investigation and analysis, developed in the field of Artificial Intelligence.

CONCLUSION

Work-related stress is a particularly relevant aspect of health and safety at work, which implies a specific assessment through an appropriate methodological pathway. Our study aimed at analysing the questionnaire “*Valutazione è prevenzione, Sicurezza è partecipazione*”, a methodological proposal put forward by the CUG in Rome. Our analysis of a sample of employees of the Court of Naples has shown that this tool contributes to the detection of occupational stress. In particular, from the statistical analysis, two significant factors linked to the subjective perception of physical-environmental aspects and organizational-relational aspects can be inferred. These factors, according to the scientific literature on the subject, play a central role in determining work-related distress. Therefore, it is clear that there is a need to conduct future scientific research in order to further explore the tool of the CUG in Rome and assess the contribution it can offer to the identification of factors that contribute to the genesis of malaise in the workplace, in order to implement effective measures for prevention and management of work-related stress. Having highlighted two factors that significantly saturate the presence of work distress, starting from subjective experience and using a small number of questions, allows us to plan an articulated research path. In this programme, the pattern of subjective factors will be identified in very large samples of workers. This will be elaborated through a neural

network that explains in a complete and satisfactory way the emergence of work stress. The future expectation is, therefore, the formulation of an agile tool that approaches the complexity of work-related stress through deep learning methods.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

HUMAN AND ANIMAL RIGHTS

Not applicable.

CONSENT FOR PUBLICATION

Participants were provided with both written and oral information regarding the possible risks and discomforts and were ensured that they were free to withdraw from the study at any time.

AVAILABILITY OF DATA AND MATERIALS

The data supporting the findings of the article is available in the [PsicologiaClinicaMedicinaunina] at <http://www.psicologiaclinicamedicina.unina.it/wp-content/uploads/2020/04/reference-n.zip>

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CONFLICT OF INTEREST

The author declares no conflict of interest, financial or otherwise.

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