Paper

Psychological implications of the application of health state continuous monitoring systems in cardiovascular pathologies

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Abstract— In recent years, specialist literature has particularly focused on the understanding of the modes of psychological adaptation to organic pathologies. A number of close investigations within the fields of medical and health psychology have been devoted to the analysis of situations characterised by a state of chronicity of organic pathology. Relying on the data deriving from such studies, the different authors tend to point out that illnesses represent a threat to the subject's psychophysical and relational integrity, thus constituting as a source of frustration and anxiety. Researchers belonging to different theoretical approaches raise a number of questions as to the role of personality and/or the subjective mode to react to tough, stressful, unexpected, negative situations, such as the emergence of a severe physical illness. Current research approaches essentially intend to explain the individual differences in the reactivity to negative stimuli by analysing the interactions between situational attributes and personality dispositions (for instance, trait anxiety).

Keywords— personality, cognitive style, appraisal, defences, mastery, coping.

1. Introduction

In recent years, specialist literature has particularly focused on the understanding of the modes of psychological adaptation to organic pathologies. A number of close investigations within the fields of medical and health psychology have been devoted to the analysis of situations characterised by a state of chronicity of organic pathology [2, 5, 17, 21, 23, 29]. Relying on the data deriving from such studies, the different authors tend to point out that illnesses represent a threat to the subject's psychophysical and relational integrity, thus constituting as a source of frustration and anxiety. Moreover, it is stressed that somatic illness, though it may potentially induce maturative responses leading to new forms of personal adaptation and balance, and apart from its objective degree of severity, is lived as a hinder preventing the subject from the achievement of the physical, psychological and social well being. Both in the case of acute pathology and chronic pathology, the person is compelled to commit herself to the vital task of the preservation of her own physical and psychological identity. It is also underlined the need to pass from a view entirely centred on illness to a view focused on the ill individual. From this new perspective, it is important to evaluate the outcomes of pathology: not as much in terms of the objective characteristics of the morbid process, as in terms of an array of complex and closely related variables such as the physician-patient relationship, the influence of psychological factors on pharmacological compliance, the impact of the illness on the patient's personality.

The specialist knowledge seems now to address the adaptive tasks which the illness imposes to the subject, forcing her to integrate a new reality, to accept a higher degree of dependence, to create a new organization for her interpersonal relationships, to modify, though only temporarily, her self-image. Hence, it is pointed that illness entails a psychological change beside a somatic one, and that such more or less stable psychological modification is brought about by the activation of specific defence mechanisms.

Researchers belonging to different theoretical approaches raise a number of questions as to the role of personality and/or the subjective mode to react to tough, stressful, unexpected, negative situations, such as the emergence of a severe physical illness. These authors hold that the evaluation of the patient's defensive style provides important indication as to her compliance to the treatment, her response to the physical illness and the possibly ensuing complications. In particular, the problem of the possible complications deriving from a physical illness seems to be very relevant to predict the type of adaptation or maladjustment developed by the patient in response to a chronic illness (such as cardiopathy), an event radically transforming her life, or to the communication of a diagnosis of severe or invalidating or fatal pathology [2, 5].

Researches on the responses of psychological adaptation to pathologies such as AIDS, various forms of cancer, diabetes, or cardiovascular diseases have highlighted how the use of defensive strategies otherwise considered pathological represents a good psychological adjustment to such environmental situation. Denial, generally considered as a low level defensive mechanism, insofar as it prevents a part of experience from having access to consciousness, is to be regarded as a resource and is highly correlated to a better capacity for adaptation in neoplastic pathologies.

The majority of researches, though directly addressing the psychological coping with organic pathologies, do not pay enough attention to the psychological implications of

the therapeutic strategies and the medical interventions employed in the treatment of the diverse types and different degrees of pathologies. Literature on the topic ideally places the different medical interventions on a continuum ranging from a highly invasive extreme to a non-invasive one. It also stresses the importance of taking into account the specific defensive strategy employed by the patient. The strategy includes coping not only with the disorders and modifications produced by the organic pathology, but also with the specific conditions and limitations imposed by the kind of treatment administered to the patient. The application of a system of control aiming at the continuous monitoring of the health condition, for instance, will necessarily entail some psychological adjustment. In this case, it is duly to conceive of the source of psychological stress as coming not only form the cardiovascular pathology, but also from the monitor system employed to keep such a kind of pathology under control.

Hence, the element considered as pivotal by the whole scientific literature is represented by the relationship between the coping skills in traumatic and stressful conditions and personality.

Numerous empirical studies support the hypothesis according to which it is the peculiar aspects of personality to exert a major influence on the interpretation of events as traumatic and stressful, rather than neutral or pleasurable.

We shall now present a brief review of the theoretical positions and empirical researches which seem more relevant for the goals of this work.

2. Some definitions

Since the term *personality* is employed with many different hints of meaning, it seems necessary to clarify that in the present work we refer to the definition proposed by the World Healt Organization (1992) describing *personality* as:

"*A structured modality of thought, feeling and behaviour which characterises a subject's type of adjustment and lifestyle and which results from constitutional, developmental factors and from social experience*".

Furthermore, we use the definition of personality traits proposed by the Diagnostic Statistic Manual of Mental Disorders (DSMIV) of the American Psychiatric Association. Thus, by *personality traits* we mean:

"*The stable modes of perceiving, relating to and thinking with respect to the environment and the self, which become manifest in a wide spectrum of social and personal contexts*".

The basic assumption relative to the notion of traits is that **people have wide predispositions to react in peculiar ways, which are named traits**. In other words, people can be described in terms of the likelihood they have to behave, feel, think in a particular way; for instance, the likelihood to act in a friendly and demonstrative way or to feel nervous or worried or to think about a project or an artistic idea. Even though they use diverse modes to determine the basic personality traits, the various authors supporting this approach unanimously believe that the traits are the fundamental constituents of personality.

3. Cognitive style and negative events

Current research approaches essentially intend to explain the individual differences in the reactivity to negative stimuli by analysing the interactions between situational attributes and personality dispositions (for instance, trait anxiety).

Starting from the fifties, different authors have begun to stress the importance of the "competence by which each individual explores and attempts to master the environment" [44], and to focus on the subjective perception of one's own capacity to react or respond to the event. In particular, Rotter proposes the notion of **locus of control**, defining it as a more or less generalised system of expectations characterised by the tendency to attribute to the external – which is, to the fate, the chance – or, rather, to the internal – which is, by referring to one's will, responsibility determination – the causality of one'own success [34, 35, 38].

This perspective has gained a position of prominence in the empirical studies aiming at identifying the conditions increasing the probability that an event has a negative impact on the subject's health. These studies lead to consider a series of factors which affect the subject's capacity to develop adequate strategies of coping with the events. The factors include a **giving-up attitude** and a feeling of being abandoned or blamed (**being given up**), all resulting in the subject's feelings of **helplessness** and **hopelessness**.

In particular, within the field of **health psychology**, the dimension of locus of control has appeared to be **strongly associated to the compliance with the treatment** in diverse pathologies, as well as to the **prognosis** of the pathologies themselves. Indeed, the evidence of the researches seem to prove that the more one believes that her own health is determined by her own behaviours, the more one is bound to take care of it.

The importance of the **subject's modality to cope with anxiety** in situations of stress is highlighted by a series of studies focusing on the relationships between personality characteristics and incidence and the course of neoplastic illnesses. These studies evidence that a modality of response which is characterised by helplessness and hopelessness negatively interferes with the person's capacity to effectively cope with the stressful event and is highly correlated to the future relaplse of the illness. A totally opposed style of reaction is characterised by a *fighting spirit*, which, according to some authors, is linked to the biological system of attack.

Moreover, it is pointed out that it is possible to identify those personality dimensions allowing to predict the increase in the emotional reactivity in conditions of stress. Such dimensions or traits seem to influence the baseline

of negative emotions even in case of absence of stressful conditions [13].

From a constructivist point of view, Rahe and Arthur [32], for instance, claim that the effects exerted on the subject by various stressful events may be considered as a function of the characteristics of the event, the subjective perception of the event itself (subject's personal history, cognitive style, internal/external locus of control), the defences used to cope with anxiety, the evoked psycho-physiological response, the cognitive and emotional strategies employed by the subject to manage such reactions, as well as her behavioural reactions.

The model proposed by Rahe and Arthur, therefore, allows to link the perception of the stressful event to the effects produced by the event itself on the organism, and stresses the **connection between the subject's affective and cognitive strategies** and **the possible onset of a somatic illness, starting from the way the event is perceived to end with the possible onset of the illness**.

This approach, underlining the importance of **appraisal** (the subjective appreciation of the event) is thus based on the assumption that the perception of an event is an active and constructive process, and the attribution of a positive or negative connotation is the result of a subjective construction. The individual response to a negative and/or stressful stimulus-situation may so be predicted taking into account that:

- the behaviour is function of a process of bijective and continuous interaction between the individual and the environment;
- the individual is an active and intentional agent;
- motivational, affective and cognitive variables are fundamental to determine the way a person will react to a specific situation;
- the psychological meaning which a person attributes to a situation is essential in determining her behaviour.

Regardless of the theories of reference, all empirical works emphasise the personality characteristics with respect to the definition and identification of an event as traumatic. In particular, the hypothesis seems to be maintained which, within certain limits, an event acquires its traumatic/stressful, positive or neutral connotation only within the encounter with the person perceiving it. In this hypothesis a specific reference is made to the subject's psychological, cultural and socio-demographic characteristics. The connotation of the events, thus, seems to substantially depend on the peculiar modality of encounter with the events characterising the subject. Moreover, in this perspective the subject's type of reaction would mainly rely on the individual characteristics more than objective characteristics of the event.

4. The response to stress

Hence, literature underline a strong individual variability with respect to each subject's mode to cope with stressful situations. Such variability concerns not only the specific behavioural reaction to a certain situation or class of traumatic/stressful events, but also the type of processing to which the diverse stimuli referring to such situations are subdued. It is held that these general modalities of response to stressful situations and to internal or external aversive conditions, predict the kind of information processing of the stimuli as well as the attentive strategy employed by a particular subject in a specific situation.

In the past twenty years, studies have intensified which concern the human response to stressful events, with a specific focus on the modes of psychological adjustment to physical illness. The researchers' interest has been progressively shifted from a view of the human being as beset with unpredictable and uncontrollable events to a more adaptive view in which stressful events are regarded as challenges or situations to master through the resort to thought and to the psychological and social instruments available to the individual [6, 28]. From this perspective, in fact, it is possible to identify modes of response of which adaptive value, which is, efficacy, depends on the peculiar interaction between the subject's personality characteristics and the environmental or situational characteristics. In particular, White [45], Holland and Rowland [18] believe that the objective of adaptation can be pursued as well by resorting to automatic responses evoked by situation of threat or safety (**defences**), as using specific capacity to face one's own psychological states and processes as problems to solve (**mastery**), or developing strategic actions and effective behaviours to tackle difficult and unusual situations (**coping**). In particular coping responses are meant:

- to reduce the negative affect;
- to facilitate the return to the baseline functioning;
- to increase the capacity to face and solve the problem [1].

While the responses based on defence mechanisms would, instead, play a double role which can be described as:

- avoiding the load of anxiety or other disrupting emotional responses;
- re-establishing a comfortable level of functioning.

Some authors maintain that coping strategies would be characterised by a hierarchical organization of transversal type and would develop according to a predictable temporal sequence [9, 15, 33, 41]. Reecently, Aspinwall and Taylor have further carried on the analysis of such strategies and individuated a "**proactive coping**", the set of processes apt to detect potential stressful agents and to act on advance to reduce their impact [3].

A further investigation of the notion of coping is proposed by Kobasa who distinguishes between a **regressive coping** and a **transforming coping** [24]. The regressive coping refers to a mode of facing the negative event characterised by the basic denial of one's own responsibility, self-devaluation and devaluation of both the objective and subjective importance of the event, and by the search for narcissistic reinforces reducing the personal capacity to be constructively in charge of the problem. The transforming coping rather refers to a more effective strategy: the problem is evaluated in less global terms, the area of its impact is circumscribed (work, physical health, social and relationship context) and apt behaviours are adopted in order to modify the situation. While **regressive coping**, mainly founded on attempts to shift attention from the problem, does not allow to adequately tackle the situation-problem, the **transforming coping enables the person to implement a series of more effective measures and functional behaviours**. The latter strategy, according to Kabasa, produces an increase in the **hardiness**, which is, it enhances the individual capacity to "resist" the negative events, individuating objectives and priorities. The construct of hardiness has been empirically translated in terms of **commitment**, the capacity to identify the objective and priorities and to trust in the efficacy of one's own actions, **control**, the trust in one's capacity to positively and favourably influence one's own life events, and **challenge**, the capacity to live stressful events as chances for personal development rather than as a threat to one's own security. Such operational definition has led to create specific instruments of evaluation of hardiness (**scales of hardiness**) and paved the way to a series of empirical studies. These works have enabled to prove the existence of a positive correlation between hardiness and the personal state of health. More specifically, the empirical data have highlighted that people with high scores on hardiness scales show a better capacity to use the environmental support for a transforming coping. For instance, in case of onset of a chronic pathology (a condition requiring the active management of the pathology and the therapy on the part of the patient's), subjects with low scores on hardiness scales tend to delegate others to deal with their problems, continuously seek for reassurance and patronizing, tend to reduce their interests and activities and to establish a relationship of dependence with the people taking care of them. The hardiness dimension has proved its buffering effect, specially in those conditions characterised by the presence of numerous and recurring stressors. Hardiness has resulted to be highly correlated to the course of HIV infection, in which the stressor is represented not only by the infection, but also by the kind of treatments which the patient has to undergo, the situation of uncertainty in which she plunges and the necessity to reorganise her lifestyle.

In particular, Solomon *et al*. have evidenced that AIDS patients who are still alive five years after the diagnosis (*long survivors*) show a higher hardiness in comparison with people living for a shorter period of time [39]. Apart from demonstrating the capacity of hardiness to change the individual response to the events, this study, also shows that this kind of patients tend to perceive their social environment as particularly able to provide support and to concretely relieve their life conditions.

Also Horowitz, from a different theoretical perspective, stresses the importance of the modes of reaction to a specific event and proposes to measure them on the basis of a specific scale [19, 20]. This author, more specifically, claims that the **individual modes of response to a traumatic event** can be placed on a continuum ranging within two extremes. The first extreme is characterised by an **avoidant mode** in which there is a costant **effort to avoid thinking of the events and to exclude from the perceptive field anything which may remind of it**, besides counterphobic behaviours. On the other extreme there is an **intrusive mode, consisting of the incapacity to exclude from consciousness the thoughts regarding the unpleasant event**, and the emergence of repetitive behaviours.

Many empirical studies referring to this theoretical model have analysed the relationship between the modes of reaction to the diagnosis of a severe illness and the efficacy of clinical treatments. In particular, Epping-Jordan *et al*. have noted that subjects with high scores of avoidance showed a poorer clinical situation one year after they had been diagnosed with cancer [14].

What appears to be relevant to the purpose of this presentation is the commonly held idea of the importance of the function played by the diverse reactions to the specific situation. In this sense, the different reactions are meant in terms of self-regulatory efforts and it is only their efficacy to determine their adaptive value. As previously noted, behaviours which would be generally regarded as severely pathological immature and maladaptive, can be seen as normal and even appropriate and adaptive in case of the intense stress produced by a physical illness. From this perspective [10]. The diverse strategies of response (coping, defence, mastery) are, therefore, regarded as essentially corresponding to self-regulatory efforts. The possible bad functioning of the process is, then, interpreted as a failure in the mechanism of self-regulation rather than in terms of the activation of more or less pathological mechanisms. Thus, the emphasis is posed on the circular interaction of four elements:

- triggering stimulus or input; such stimulus is represented by any element from the subject's perceptive field and can concern internal subjective states as well as aspects of the external reality;
- value of reference, which is, the subject's term of comparison; it essentially refers to what is to be pursued (attractors and goals) or avoided (repulsors or anti-goals);
- a system matching the input with the value of reference; it is variable in sensitivity;
- output or accomplished behaviour, meaning not only the overt enactments, but also the internal modifications as to the way of thinking and feeling.

The match between the stimulus, meant as the current situation, and the value of reference triggers the conducts aimed at reducing or enhancing the perceived discrepancy, dependent on whether the value of reference exerts an attraction or a repulsion. Objective, therefore, assume a pivotal role in the organization of conducts. They direct and fuel the action, and implicitly or explicitly attribute a meaning to the individual conduct. According to Carver and Scheier, self-regulatory mechanisms tend to interrupt the stream of action and to evaluate the chance of success on the basis of the available information. If expectations are favourable enough, the aptest response should be represented by the intensification of the efforts to pursue the desired objective. In case of unfavourable expectations, a reaction of total or partial disengagement is expected to take place, with the abandoning or retrenchment of the objective. Coping strategies then consist in both the effort to pursue the desired goals, if actually reachable, and in the effort to modify, reduce or substitute them, in case they are out of reach.
Relying on such premises, three categories of coping strategies or adaptive processes are commonly described:

– **coping focused on the problem**: the whole of the attempts made to remove the obstacle or to buffer its impact;

– **coping focused on emotions**: the whole of the attempts made to reduce emotional suffering caused by aversive circumstances, by reconsidering the obstacles or focusing on the emotion itself;

– **avoidance coping**: the whole of the responses aiming at avoiding the awareness of the obstacle (by resorting to an active devaluation of actual impact of the event or to self-distracting fantasies), or blocking any attempt to tackle the problem (for instance, by early abandoning).

The choice between these three classes of adaptive processes varies depending on situations, individual expectations, the more or less optimistic-pessimistic general attitude (Carver and Scheier [9]). The optimist is thought to more frequently use active coping strategies focused on the problem, privileging constructive thought, the acceptation of reality; the pessimist, rather, would privilege the avoidant type of coping.
The failure of the adaptive processes and the ensuing pathological and maladaptive consequences are explained by the authors in terms of:

- **Misregulation**. An inadequate functioning of any of the components of the self-regulatory feedback process. All this leads to actions and feelings to be based on the wrong or irrelevant information, with a consequent more or less massively biased perception of reality [7]. Misregulation in itself does not produce stress, since the subject is unaware of it. The stressful experience is due to the often clearly pathological consequences of the enacted behaviours, for which any responsibility is disavowed.

- **Conflicts between objectives**. The desire to reach more hierarchically equivalent objectives can produce stress, when it is not possible to pursue all of them with the same commitment and success. The strategies enacted to avoid or reduce the conflict is represented by the attempt: a) to alternate between conflicting objectives, which is in itself fatiguing and may convey the sense of acting in a totally inadequate manner; b) to chose between objectives, reorganizing the personal hierarchy of value. The former strategy is substantially successful, although it is more difficult to apply, specially in case of high level goals concerning self-image.

- **Automatic doubts**. It is the residual sense of doubt or inadequacy emerging after repetitive failures in the same area of experience. If the doubt is strong enough, the person experiences the impulse to give up after the first aversive signs, given the negative or frankly "catastrophic" expectations on her own chances of success [42]. An internal more or less paralysing hinder is created which prevents from the moves towards the desired goals.

- **Premature interruption of the effort**. The doubts can induce the retrenchment of the objectives or their complete abandoning. When the sense of inadequacy in a certain area of experience is particularly pervasive, a recurring behaviour of precocious renouncement and distraction to other situations develop, resulting in a difficulty in actually reaching this objective. Sometimes the renouncement is only temporary and partial. In this case it, above all, represents a flee from adversity, based on behaviours of cognitive interference and, also physical, distancing from what is associated to the desired goal [36]. Nonetheless, the subject still invests in the goal which retains its affective importance and relevance. In such cases, a profoundly stressful vicious circle can set up, made of attempts,-doubts-flees.new attempts [8, 10, 31].

- **Incapacity to abandon or substitute goals which cannot be achieved**. As opposed to the previous situation, the subject continues to pursue objectives which are out of her reach, collecting failures and preventing herself from noticing, realising and embracing new opportunities [4, 22].

5. Conclusions

In the light of the previous review of literature, *it results vital to identify some personality dimensions which have proved to be predictive of the person's capacity to use the information referring to a situation of probable subjective risk in an adaptive and effective manner.*

These dimensions refer to both the cognitive style and the coping strategies employed by the subject. The identification of such dimensions will, thus, allow for a *preliminary evaluation of the subjects which may benefit from* a state of health continuous monitoring system.

An initial screening of the subjects is then to be hoped for. The screening should be accomplished by administering a battery of appositively created tests which allow to evaluate and identify the cognitive style (locus of control) and the modalities of coping. It is plausible to hypothesise that it is preferable to orient the choice of the subjects to whom apply such system to the ones characterised by an internal locus of control and by a coping focused on the objective. Moreover, the **setting-up of a system of signalling which increase the likelihood of the subject's effective response**. This system should enhance the likelihood of employment of strategies of adaptation allowing the subject to focus her/his attention on the task (to follow the prescribed controls and the operations) and **decrease the likelihood to resort to strategies focused on emotions or avoidant strategies**. In this context, the latter strategies, even though they enable the subject to deal with the emotional suffering, would turn out as not only scarcely effective but also dangerous. As a consequence, it seems fundamental to employ a communicative style aiming at increasing the subject's **Mastery** and her/his resort to effective coping strategies, focusing her efforts on the problem solving. The subject will have to be informed of about the objectives of the project and the procedures to be followed in case of alert. Particular attention should be paid to carefully explain and to provide detailed information about the value and meaning of the diverse signals of alert and the adequate behaviours and attitude to adopt in the various situations. The patient should be trained to correctly detect the symptomatic indexes.

Moreover, the patient should be offered the possibility to directly contact with the medical and paramedical personnel, in order to receive an adequate guide to the reading of the diverse signals and effective indications for the specific situation.

Particular attention will also have to be paid to the characteristics of the selected monitoring system: it should not be invasive and should not interfere with the subject's capacity of movement and lifestyle. It should thus appear on the background, attracting the subject's attention only when the detected indexes hint for the resort to any kind of intervention.

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