

## Chapter 4

# A Theoretical Approach of Adaptation to Stress and Implications for Evaluation and Research

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The study of adaptation to occupational stress is a major topic of research on psychology, and other social sciences. In fact, data suggests that employees face significant levels of tension at work, and that there is an increasing of sources of stress, both in terms of intensity and diversity [1].

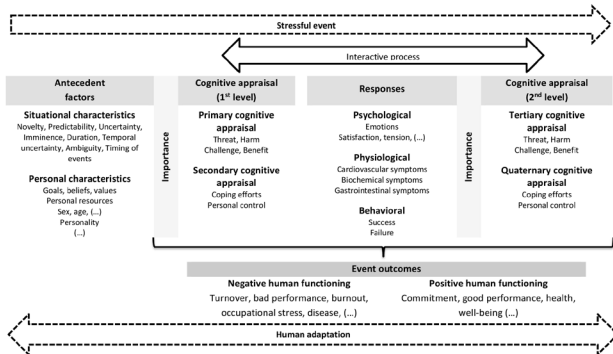
In this chapter, we analyze adaptation to stress by focusing at the individual level, discussing how professionals evaluate and cope with stressors that impose significant efforts of adjusting. However, this does not mean that occupational stress is strictly an individual phenomenon; by the contrary, a better understanding of stress at work should assume a multifactor perspective, where the employee, the employer, the work organization, the public policies and laws of work, and the cultural values and norms that influence professional relations between all these agents, play together and determine if the working activity will be a pleasant or dysfunctional experience for professionals. Despite the importance of considering all these factors when studying the working activity, it is also obvious that the way each worker adapt to their working conditions is a pivotal factor to understand how this activity can represent a source of personal gratification or, by the contrary, can ended represent a negative, or even indifferent, experience.

The analysis of individual adaptation of work will be done conceptually by using the Interactive Model of Human Adaptation to Stress [2] that relies mainly on the

cognitive-motivational-relational theory of stress and emotions of Lazarus [3,4]. Both perspectives posit that occupational stress depends of a transactional or interactive relation between the individual and the specific stress situation that is faced. The model of Lazarus points out that cognitive, motivational, and relational factors explain the adaptation to stress, reinforcing the need of putting together the stress situation, cognitive appraisal, coping, and emotions. The interactive model also reinforces the need of analyzing the stress experience considering the stressful events, the processes of cognitive appraisal (first and second levels), and the individual responses (psychological, physiological, and behavioral) that can influence human adaptation to stress (see Figure 1). However, this model considers that evaluation of importance is the first step of confrontation with stress, assuming to be the *gateway* to the experience of stress at work. In fact, if the individual does not attribute any importance to the situation of stress (that is, it does not compromise any personal or professional value), then it will unlikely that efforts of coping will be mobilized to deal with the situation; by the contrary, if the situation is perceived as important to the individual, then it is likely that efforts of coping will be mobilized in order to achieve a positive human functioning (or, at least, avoid a significant negative human functioning). Also, the interactive model admits that the processes of cognitive appraisal occur at two levels. The first level, relates to the initial impact of stress on the individual, generating the need of evaluating the situation and then dealing with it.

In some cases, the stressful event can end when first level of cognitive appraisal is mobilized, but it should be admitted that this is not the case for all the stress situations an individual can face throughout the professional career. In fact, there are stressors at work that can elicit continuous efforts of cognitive appraisal (ex: overload of tasks to be done, multiple roles to assume, among others), characterized by advances and setbacks in the process of coping with stress, turning the adaptation at work an ongoing process that requires continuous efforts of cognitive appraisal, until it is achieved a final adaptation to the stressful event. Finally, the interactive model gives particular relevance to cognitive appraisal, mediating the relation between stressful events and the event outcomes, and attributes to the antecedent factors (situational and personal characteristics) the status of moderator variables between the stressful event and the event outcomes.

All the components of the interactive model will be discussed in this chapter, giving indications of their role on human adaptation to stress. By the other hand, we will provide two evaluation tools in order to capture the experience of adaptation stress, as a complex and integrated phenomenon. As will explain latter, research has a need of evaluation tools that can analyze the processes involved on adaptation to stress, and this is even more important if we consider that evaluation, reaction, and responses to stress should be analyzed together in order to provide better indications of what factors can play a major role in positive or negative adaptation to stressful events.



**Figure 1:** Interactive Model of Human Adaptation to Stress (Gomes, 2014).

## The Research So Far

One main aspect when we look at literature is that we can find studies that intend to capture human adaptation to stress by looking their components in an isolated perspective. In fact, several studies exist about sources of stress that can impose efforts of adaptation for individuals [5-10], processes of cognitive appraisal when facing the stressor [11-13], coping [14,15], and even the emotions that results from the interaction between the individual and the stress situation [16,17]. However, much less evidence is available about how these factors interplay each other in order to produce the final adaptation to stress [18-21].

The optimistic view of the “state of art” on human adaptation to stress is that, despite this imbalance between

studies, the ones devoted to analyze the whole process of adaptation indicate that it is a valuable effort to proceed this line of research [19,22,23]. In fact, one of the main conclusions of all of data provided by research is that cognitive appraisal, coping, emotions, and responses concur to explain adaptation to stressful events. If this is the case, then it is obvious that all these factors should be included in the same study in order to accomplish an integrated understanding of how individuals evaluate, react, respond, and adapt to work demands

This is much easier to say than easier to accomplish. Several reasons contribute to this difficulty. First, the experience of stress is rarely an isolate event of a few minutes or even hours; by the contrary, most of the stressors at work extend for days or even months, and, unfortunately in some cases, for years. This is the case of stressors related to tasks and roles assumed at work, the increase of pressure to perform more activities as well as to assume more complex activities. If this is the case, studying occupational stress requires longitudinal plans of investigation, which of course are more complex than transversal methodologies. Second, the experience of stress implicates different psychological factors of the individual, which are elicited multiple times in a very dynamic relation with the stressful event. In fact, a single adaptation to a stressor includes personal beliefs and motivational factors (“what does this situation of stress means to me?”), cognitive beliefs of wellbeing and personal safety (“can this situa-

tion threaten the way I see myself?”), cognitive beliefs of personal competence (“What can I do to face this situation?”), and even multiple personal responses to the event (“How am I feeling? How will this affect my behavior?”). All these factors come together to explain the adaptation to stress, influencing each other during the event. Again, if this the case, then it is obvious the difficulty of studying occupational stress, discerning the specific influence of each factor and also understanding how they come together to explain the final adaptation to stress. Finally, the nature of the specific stress situation is also an important factor to address. There is evidence that some professional activities are more stressful than others [24] but it is also important to understand what specific characteristics of the stressful event turn the situation more demanding for each individual. Again, this implies the analysis of the dynamic relation established between the specific stressor and the way it is perceived by the individual, knowing in advance that cognitive appraisal can give the stressor different personal meanings (more positive or more negative), and that efforts to deal with the situation can, in the limit, change the way it is perceived in the final process of human adaptation.

For all these reasons, there is a need of considering together these psychological factors when it comes to study occupational stress, by using retrospective methodologies that analyses previous situations of stress or prospective methodologies that analyses upcoming stressors. Both have advantages and limitations. Retrospective method-

ologies rely on the individual ability to remember the situation (which can certainly compromise the “truthiness” of the adaptation process) but is much easier to apply and to collect data. For example, by using “critical incidents” analysis, it is possible to understand how the individual evaluated and coped with a specific event of stress. Prospective methods can improve the “naturalistic” method of collecting data, by following the different steps of adaptation to stress and how the psychological factors influence each other until the final adaptation is reached. However, these methods are much harder to use, imposing frequent limitations to data collection due the need of contacting to individuals when they are facing a stress situation. In some cases, the dropout can be a serious problem because people do not have always have the necessary motivation to participate in all the defined data collections planned in the study.

Independently of the methodologies to follow in the study of adaptation to stress, there is also a need of specific evaluation tools to capture the psychological factors involved in the response to the stress event. This is due the fact that tradition in the study of stress followed a compartmentalized perspective, studying in a separate way the stress experience, the cognitive appraisal processes, the coping efforts, and the stress responses. But, if we aspire to achieve a broad understanding of human adaptation to stress we need evaluation tools that allow an integrated understanding of the complex and dynamic relations established between all these variables.



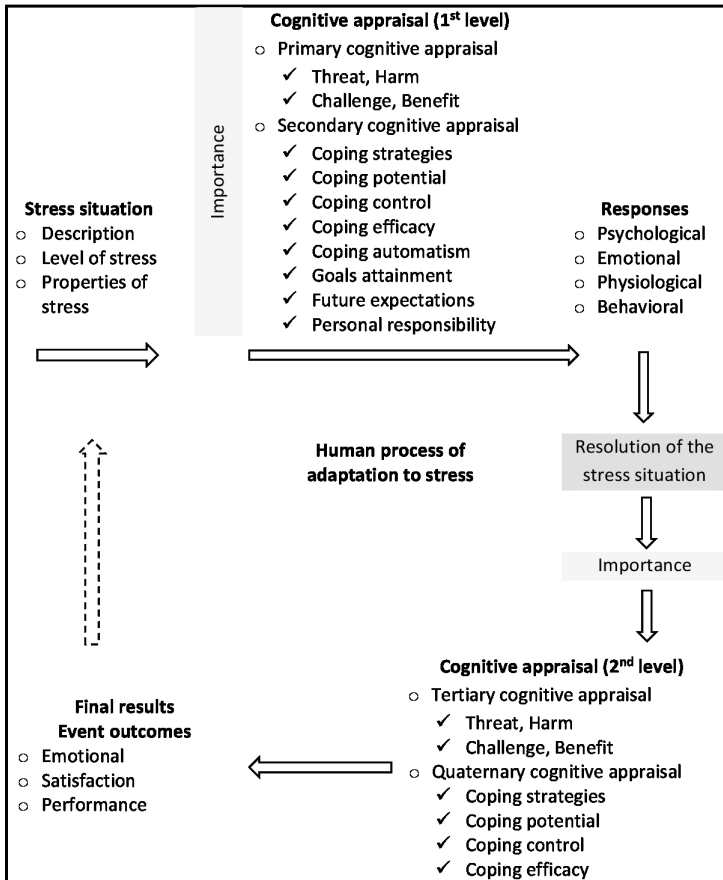
Taking into consideration this need, we will provide two instruments that can be used to capture the experience of adaptation to stress, both at a qualitative and quantitative levels [25]. The instruments can be used separately in order to study adaptation to stress, or they can be used simultaneously, allowing a mixed approach between a deeper comprehension of the topics (qualitative) and a more normative and comparative comprehension of the topics (quantitative). In fact, mixed-methods of research have been reinforced as powerful tools to comprehend human processes of adaptation to several events and conditions of life [26]. Appendix 1 includes the interview guide and Appendix 2 includes the questionnaire. During the text, we will indicate the questions proposed in the instruments in order to evaluate the dimensions of the Interactive Model of Adaptation to Stress.

## Capturing the Whole Experience of Stress: A Proposal

Probably the main challenge for research is how to develop methodologies to understand the whole experience of stress. Considering our interactive model of adaptation to stress, we will now discuss some of the main dimensions involved when facing and managing a stress event.

In order to specify all the variables implicated in this process, Figure 2 describe the interactive of adaptation to stress, starting by the stress situation and ending in the fi-

nal results of the event. Although this figure simplifies the different steps that follow the interactive relation between the individual and the stress situation, it is important to say that the relation between the proposed psychological processes is much more complex (and interactive) than the one proposed on this figure. This means that the relation between cognitive appraisal (first and second levels) and multiple responses to stress is very dynamic and very reactive to particular characteristics of the transaction established between the person and the situation. So, it is much more exact to say that the arrows defined in Figure 2 go on a certain direction but they can turn back depending of what is happening to each individual facing a stress situation. However, it is also accurate to say that both processes of cognitive appraisal and responses are main factors involved in adaptation to stress and they can play a major role explaining the final adaptation to the stressful event. Considering this aspect, let us now discuss in more detail each one of these components.



**Figure 2:** Capturing the whole experience of stress: An evaluation proposal.

## Stress Situation: What is going on?

Although it can be said that the pivotal aspect of adaptation to stress is cognitive appraisal, as we will defend

later, it is very important to comprehend the particular situation of stress, the level of stress imposed to the individual, and the personal characteristics of the individual.

First of all, it is important to evaluate the stress event, where and when occurred. Also, the duration of the event is important in order to determine if the event is delimited on time (acute) or extends on time (chronic). It is proposed two questions to evaluate this point, starting by asking about the general sources of stress (question 1 of the interview guide) and then asking about one specific situation that caused higher levels of stress (question 2 of the interview guide; question 1 of the questionnaire). It is considering this particular event of stress that all the questions will be address. This option is justified because using general sources of stress or multiple events of stress will impose to individual different processes of adjustment, being virtually impossible to comprehend why some situations may have assumed positive courses of adaption while others ended as negative for the individual.

Second, it is important to guarantee that the specific situation of stress incorporated enough tension in order to generate adaptation efforts for the individual (question 3 of the interview guide; question 2 of the questionnaire). By asking the level of stress produced by the event can give the researcher a better idea of selecting a relevant case to discuss with the person. For example, asking the level of stress of the situation in a scale of five point can give a better idea of choosing the right event. Some studies suggest

specific cut-offs to select the stressful event [22,27], and considering at least moderate levels of stress (values equal or higher than two points in both instruments) can help the researcher to know when to proceed with data collection or asking the person to select another stressful event.

Third, after selecting the event, it is now adequate to understand the specific context and moment where it occurred (question 4 of the interview guide).

## Antecedent Factors of the Interactive Model

Antecedent factors of the interactive model encompass two main levels: the characteristics (or *properties*) of the situation that maximize the possibility of being perceived as stressful, and the characteristics (or *properties*) of the individual that exposes or protect from negative effects of stress.

### Properties of the Stressful Event: Why Tension Occurred?

In this step, it is important to understand why the situation can have the potential to cause stress to the individual. The properties of stress can help understand why the situation can be demanding for the individual. In the evaluation protocols, we analyze eight properties, as proposed by Lazarus and Folkman [28]:

(1) Novelty: the extent to which the stress situation has been experienced by the person previously.

(2) Predictability: the extent to which the stress situation is according to the expectations of occurrence by the person.

(3) Event uncertainty: the extent to which the stress situation is likely to happen.

(4) Imminence: the extent to which there is the possibility of anticipating the occurrence of the stress situation.

(5) Duration: the extent to which the stress situation lasted more or less time.

(6) Temporal uncertainty: the extent to which the exact moment of the occurrence of the stress situation is known by the person.

(7) Ambiguity: the extent to which there is clear information on the circumstances of the occurrence of the stress situation.

(8) Timing of events in relation to the life cycle: the extent to which there were other stressful events occurring at the time of the stress situation.

These properties can allow the researcher a better understanding of what characteristics turned the event potentially stressful. For example, some situations encompass tension because they are novelty for the individual (i.e., never experienced). However, in some other cases, the situation is not new but the unpredictability and uncertainty of occurrence “caught” the person unprepared to deal effectively with the situation. In other cases, people can be well prepared to deal with the stress event but when

it occurred, the person was also dealing with other significant events in their lives, which increased dramatically the ability to cope positively with the stressor.

By checking these properties, researchers can signalize with a simple of marker of “yes” (the characteristic was present) or “no” (the characteristic was not present) the existence of these properties for that particular person [29]. These properties are evaluated, both for the interview guide (question 5) and for the questionnaire (question 3).

### Properties of the Individual: The “I” Matters?

Although the comprehension of adaptation to stress is mainly dependent of cognitive appraisal, as we will explain later, other personal characteristics of the individual involved in the stress situation can make a difference in a positive or negative adaptation to stress. For example, Lazarus [4] describes goal commitment, values, beliefs about the self and the environment, and situational intentions as important aspects of the individual when facing a stressful event. The concept of goal commitment is somewhat similar to the concept of “importance” of the interactive model, meaning that the person should evaluate the stress situation as significant to their individual goals. Using the own words of Lazarus [4] “if there is no goal commitment, there is nothing of adaptational importance at stake in an encounter to arouse a stress reaction”.

Other important aspects include personal resources (e.g., educational level, economic resources, social skills, life experiences, social support, health status, physical abilities) that can make a difference in the final adaptation to stress influence [1,4,30].

Personality characteristics of the individual can also make a difference. There are indications that some traits of personality (e.g., rigid personalities, addicted to drugs, neurotic, depressive tendencies) can make individuals more exposed to stress [31,32].

Finally, some demographic factors, such as age and sex, can also be involved in the adaptation to stress [33-35], and they should also be considered antecedent variables in the process of dealing with stressful events.

### Antecedent Variables: How They Should be Tested?

Antecedent variables can interfere in the final adaptation to stress, existing different possibilities of testing this influence, according the research interests defined for each study. When testing the Interactive Model of Adaptation to Stress, one the possibilities is attributing them the statute of moderator variable between stress, cognitive appraisal, responses, and event outcomes. This means that antecedent variables can interfere in the direction and/or strength of the relation between an independent or predictor variable (e.g., stress situation) and a dependent or criterion variable (e.g., event outcomes) [36].



This is very useful for research and even for intervention. For example, by knowing the moderator influence of situational or personal characteristics on the final adaptation to stress, we may give specific indications for practitioners about what aspects they should pay attention when dealing with the experience of stress of their clients. Although people can suffer the negative effects of stress, depending mostly on the way they evaluate and cope with this phenomenon, it is quite evident that some situational, professional, and personal conditions can increase or decrease the possibility of a positive or negative adaptation.

## Cognitive Appraisal of the Interactive Model

### First Level of Cognitive Appraisal: Why and How Adaptation Occurs?

Understanding human adaptation to stress is difficult (if not impossible) without consider processes of cognitive appraisal, both at first level, and if justified, at second level.

In the interactive model, the perception of importance attributed to the stress event is the *gateway* of adaptation to the situation. In fact, only events considered relevant to the individual can indeed generate efforts of adaptation, even when they potentially generate stress to that specific individual without being particular significant. In fact, many times, we are exposed to situations that impose significant amount of stress, but because we attribute low

importance to our wellbeing or believes, they do not produce substantial impact on our personal functioning. For example, knowing that we will be in a very busy highway can indeed be very stressful, but in cases where it does not have a particular importance for us, being in that situation do not generate any specific effort of adaptation. So, facing a stressful event increases the need of adaptation to stress, but considering the personal meaning of the stressful event (i.e., importance) gives a better understanding of initializing, or not, a process of adaptation to stress. So, importance is evaluated in the process of adaptation to stress (question 6 of the interview guide; question 4 of the questionnaire) and it can also be measured quantitatively by asking the level of importance of the specific event. The same cut-off of the evaluation of stress levels can be applied to decide if the individual is describing a situation that can mobilize efforts of adaptation (two points).

Primary cognitive appraisal: The next step is related to knowing how the situation is evaluated regarding the individual wellbeing, being adopted the possibility of a negative appraisal of threat to the individual (question 7 of the interview guide; question 5 of the questionnaire) or a positive appraisal of challenge for the individual (question 8 of the interview guide; question 6 of the questionnaire). Primary cognitive appraisal will start indicate if the individual is facing a situation that is approached in a more pessimist perspective (threat or harm) or approached in a more optimistic perspective (challenge or benefit). Please note that both dimensions are evaluated separately be-

cause it can be admitted that the same stress event can be perceived as challenging (because some aspects of the situation can be perceived as positive by the individual) and as threatening (because other aspects of the situation can impose a negative view by the individual). For example, a student that was going to do a written test in school, felt worry about what can happen and concerns about the difficulty of some parts of the topics of the test (threat appraisal); by the other hand, he felt he was well prepared for the text, and because he likes that subject and also the possibility of testing his ability, the situation was also somewhat positive (challenge appraisal). As we can see in this example both dimensions are present in the stress situation, enabling the interviewer to clarify which one was more prevalent or influent for the student.

Secondary cognitive appraisal: At this level, the main questions are “how the situation is faced by the individual” and “what psychological mechanisms are involved?” The first question is answered by analyzing the coping strategies used by the individual to cope with the situation. There are many proposals to organize coping strategies to deal with stress [37]. It is very famous the proposal of Lazarus and Folkman [28] by describing two main possibilities. The problem-focused coping strategies that are used when the individual increase efforts in order to alter the situation for the better (and if the efforts are successful, then threat and harm can be reduced or even eliminated). The emotion-focused coping strategies that are used

when the individual increases efforts to regulate emotional distress caused by threat or harm by using, for example, avoidance of thinking about the sources of stress. In the interview, question 9 allow the research to understand what specific efforts of coping were assumed by the individual when facing the stressful event. In the questionnaire, question 7 evaluates four types of coping strategies: (a) the ones related to problem-focused (questions 7.1. and 7.2.), (b) the ones related to emotion-focused that are more active (questions 7.3. and 7.4.), (c) the ones related to emotion-focused that are more passive (questions 7.5. and 7.6.), and (d) (b) the ones related to social support, both at emotional and instrumental levels (questions 7.7. and 7.8.).

The second question about the psychological mechanisms involved in the stress response is a bit more complex because it is hard to say how many factors are implicated in adaptation to stress and if some of them are more important than others. Following some theoretical and empirical indications [2,4,38], we propose seven dimensions for evaluation, which certainly offer a very broad perspective of factors that can turn the adaptation to stress more or less positive. All of these indicators are available for both instruments. In this way, the coping potential indicates if the individual feels that he or she can solve the demands posed by the stress situation (question 10 of the interview guide; question 8 of the questionnaire); the coping control indicates if the individual feels that the situation of stress can be changed by personal efforts (question 11 of the in-

terview guide; question 9 of the questionnaire); the coping efficacy indicates if the efforts of coping resulted as desired by the individual (question 12 of the interview guide; question 10 of the questionnaire); the coping automatism indicates until what point the coping strategies were used in a more automatic or controlled way by the individual (question 13 of the interview guide; question 11 of the questionnaire); the goals attainment indicates until what point the stress situation compromised personal goals of the individual (question 14 of the interview guide; question 12 of the questionnaire); the future expectations indicates until what point the stress situation compromised future goals of the individual (question 15 of the interview guide; question 13 of the questionnaire); and personal responsibility indicates until what point that situation of stress could be attributed to the individual or arises due the action or responsibility of others (question 16 of the interview guide; question 14 of the questionnaire).

## Levels of Response of the Interactive Model

From a theoretical point of view, it is supposed that if the individual evaluates the stress situation as more positive (e.g., challenging) and/or if coping strategies produce the expected impact on stress, then it should be expected more facilitative responses to stress adaptation. By the contrary, if the individual evaluates the stress situation as more negative (e.g., threatening) and/or if coping strategies do not produce the expected impact on stress, then

it should be expected more debilitating responses to stress adaptation.

It should be said that in the interactive model, it is important to distinguish the responses that occurs *during* and *after* the stress event. That is, when the individual is approaching and facing the stressful situation, a set of immediate responses arise, tending to be very dynamical and influencing each other. Using again the previous example, just before the written test in school the student experienced a mix of different psychological, emotional and physiological responses (ex: some doubt about what can happen that generates anxiety, some tension in the muscles but also confidence on his/her skills). All these responses should not be confused with final adaptation to stress. In this case, we are much more concerned on understanding how the all process of adaptation to stress ended for the individual, evaluating the more stable and consistent effects of stress on human functioning.

## Responses to Stress: What Occurs During Adaptation?

Processes of cognitive appraisal results in a set of responses that influence human adaptation to stress. The instruments propose the discrimination of four types of responses: psychological (question 17 of the interview guide; question 15 of the questionnaire), physiological (question 18 of the interview guide; question 16 of the questionnaire), behavioral (question 19 of the interview guide; question 17 of the questionnaire), and emotional

(question 20 of the interview guide; question 18 of the questionnaire). The emotional responses of the questionnaire include the specification of 15 emotions [3], being aware that depending of the specific context of evaluation, some of the emotions may be more appropriate than others [39-41]. For example, for sports contexts probably the ten first emotions described in our list may be more appropriate than the last five.

It should be noted that the next section of the questionnaire is related to the final results of the adaptation to the stress situation. For the interview guide, it is proposed the evaluation of second level of cognitive appraisal, because in this case it is easier to check if the stress event had produced long term effects for the individual.

## **Second Level of Cognitive Appraisal: Why and How Adaptation Continues?**

Processes of cognitive appraisal at a second level reinforces one main idea: in some cases, and probably not so few as desired, the interaction during the individual and the stress situation lengthens in time, requiring additional efforts of adaptation. In fact, some authors defend that limit the adaptation to stress to first level of cognitive appraisal can be a narrow perspective when we have to study processes that occurs for long periods of time, particularly in cases where stress and negative responses maintain after the initial efforts of resolution by the individual [42-44].

This aspect is recognized in the interactive model by including the second level of cognitive appraisal, with three distinctive aspects. First, perception of importance remains as the *gateway* of continuous adaptation to stress. In fact, second level of cognitive appraisal will only be mobilized if the individual continues to attribute a personal meaning to the situation; otherwise, the adaptation to stress will end. Second, contrary to Fletcher, Hanton, and Mellalieu [45], second level of cognitive appraisal is not only based on dealing with emotional reactions, which results of the efforts to resolve the stress situation. In fact, second level of cognitive appraisal will be mobilized in a more generalized approach, being used to deal with all the responses to stress, namely the psychological, emotional, physiological, and behavioral levels. This broad perspective can capture deeply the subjective experience of each individual when facing stress situations that prolonged on time, being quite hard to believe that one level of response will gain preponderance on the stress adaptation. Third, contrary to Folkman [44], second level of cognitive appraisal is not only based on dealing with negative situations of stress that ended in a negative human functioning. Although we can accept that negative events not resolved by the person can elicit more frequently additional efforts of adaptation (e.g., second level of cognitive appraisal), there is any reason to believe that even when individual ended the adaptation with a positive human functioning, the final adaption had really finished. In fact, in some cases, individuals can achieve an optimistic perspective of the



advances made in that specific moment but they can feel that they need to improve more when the stress situation arise again.

Using as example a student that was done a written test in school, we conclude that he felt the situation as challenging (due the possibility of testing personal abilities) but also somewhat threatening (due some feelings of doubt and anxiety that occurred just before the test). He felt some difficulties in controlling these negative ideas during the test but it did not affect much his performance during the situation. Therefore, when coming back home he was satisfied with his performance but also felt that improvements can be made in order to deal even better with the next test. In this case, we can conclude that the final adaptation to stress was positive but some aspects can be improved in the next evaluation at school. That is, the stress situation will remain for the student, and by using second level of cognitive appraisal, he can improve even more the personal abilities to deal with this type of events. We believe that by accepting second level of cognitive appraisal, even in situations of positive human functioning, we can have a much more challenging and optimistic view of how humans develop in contexts of stress along the life cycle.

In terms of evaluation, second level of cognitive appraisal includes checking the resolution of the stress situation by using the first level of cognitive appraisal (question 21 of the interview guide); then if the situation remains

as needing additional efforts of adaptation, a set of questions are proposed: perception of importance (question 22 of the interview guide), threat appraisal (question 23 of the interview guide), challenge appraisal (question 24 of the interview guide), coping potential (question 25 of the interview guide), coping control (question 26 of the interview guide), coping strategies (question 27 of the interview guide), and coping efficacy (question 28 of the interview guide). These questions allow the researcher a better understanding of how human adaptation to stress develop over time, until a point where it is achieved a final result, the last step of the interactive process of adaptation to stress.

## Event Outcomes of the Interactive Model

Events outcomes represent the final step of human adaptation to stress. As said before, there are different possibilities to achieve final results. In some cases, adaptation can occur after first level of cognitive appraisal; however, in some other cases, the stress situation can demand ongoing efforts of adaption, turning the stress experience a chronic one. In the limit, individuals can face situations of stress for all their lives, requiring constant efforts of adaptation. Some stressful activities as, for example, health professionals, civil and military professionals, among others, may impose constant sources of pressure that require constants efforts of adaptation. But, most important, to comprehend the event outcome we need to understand

the individual in a very broad way: what specific situation is faced, what personal characteristics are involved, what is at stake in the stress situation, how the situation is evaluated, what specific actions and reactions occurred during the stress event, and, most difficult, how all these factors interact to produce the final adaptation. Backing to the previous example, because the student managed more positively the demands of the next written test (second level of cognitive appraisal), he felt more confidence just before the text (responses to the stress situation), and after the text he felt a reinforcement of personal competence and sense of ability to deal this type of stressful events in the future (e.g., positive human functioning).

For the final adaptation, we propose the possibilities of positive or negative states of human functioning. However, probably the best way to understand adaptation to stress is achieved by adopting a continuous spectrum between the two opposite states. In fact, there are different intensities and qualities of positive human functioning (meaning that we can feel highly satisfied or only moderately satisfied) and negative human functioning (meaning that we can feel highly sad or only moderately sad) or, even cases, that can make the individuals sad and happy at the same time, due the feelings of gaining some aspects but also feelings of loss on other aspects. For a convenience reason, let us divide the final adaptation on positive or negative.

## Event Outcomes: Positive or Negative Human Functioning?

In order to evaluate the results of adaptation to stress, we propose three types of indicators, recognizing that other indicators can be used by researchers according to the specific objectives and hypothesis to be tested. The first indicator is emotional states, one the key factors to understand adaptation to stress [3,4]. Emotional final reactions are evaluated in both instruments (question 29 of the interview guide; question 19 of the questionnaire), using the same type of questions proposed for the emotional responses. Satisfaction is the second indicator, representing a measure of subjective wellbeing toward the final state of adaptation to stress (question 30 of the interview guide; question 20 of the questionnaire). The last indicator is performance, checking how the adaptation to stress produced, in the end, an improving or decreasing in the expected performance (question 31 of the interview guide; question 21 of the questionnaire). It should be said that the term performance can be adapted according to the specific situations of individuals facing stress. For example, in the case of students, we may be talking about “final grades”, and the term performance can be substituted by the specific options of results in a certain test. However, for the case of sports, especially for elite athletes, the term performance is a more common form of refer to what can be achieved in competition. Question 32 of the interview guide is included in order to check if the person wants to correct or included some other information. The final re-

quest is used for research purpose, checking the truthiness of the collected information.

## Studying the Whole Experience of Adaption to Stress

As said in the beginning of this chapter, one of the major challenges of research is how to “put all together” when it comes to study the variables involved in the evaluation and reaction to stressful events.

The interactive model [44,46-48] try to respond this challenge by setting the interactive nature between the stress situation and the individual, and by reinforcing also the interactive changes between processes of cognitive appraisal and responses to stress. All of that seems adequate relatively the mainstream of conceptualization of adaptation to stress.

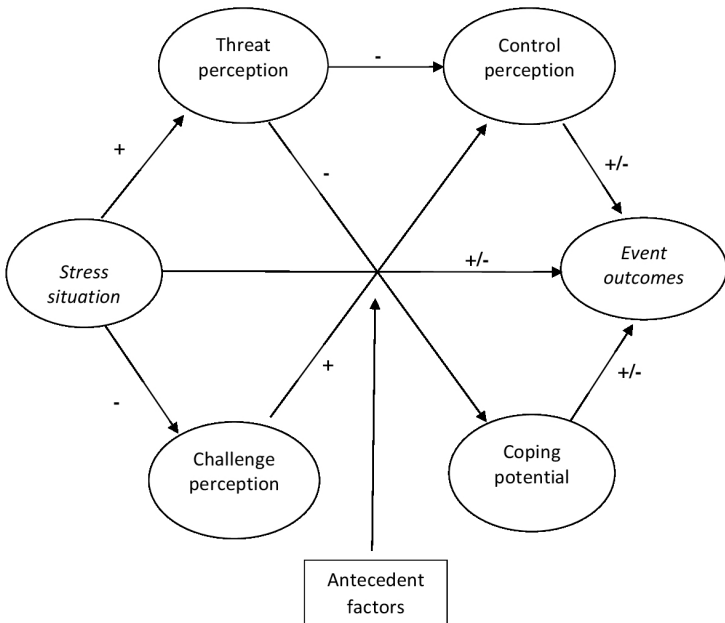
However, this is much easier to say than to do. Research have substantial difficulties in including all the relevant variables involved in adaptation to stress and in capture the dynamic nature of this adaptation. The purpose of presenting two instruments (both at a qualitative and quantitative levels) try to overcome this problem, giving indications to researchers of how to include all the variables in the same study. Of course, this proposal is not absence of problems or even critics. For example, the methodology is more suitable to study previous events of stress in an “incident” perspective, than to study events that are just occurring or that can occur in a near future. Also, the significant number of questions included in the evalua-

tion protocol can indeed turn data collection more difficult, especially in cases where individuals facing stress are less available to participate in research projects. Finally, these substantial numbers of variables can eventually turn more demanding the task of data analysis, with the need of applying techniques that can test the relations from the beginning until the end of the adaptation process.

Considering these problems, Figure 3 presents a proposal of how these variables can be tested, trying to overcome some of these limitations. Please note that not all variables proposed in the instruments are included, but only the most significant (stress situation, cognitive appraisals of threat, challenge, coping potential, coping control, and final result). Of course, researchers can include other variables, but, in principle, they should be tested adopting this type organization. More specifically, as antecedent variable we propose the stress situation (that can be evaluated using, for example, questionnaires of sources of stress), as mediating variables we propose cognitive appraisal, as consequent variables researchers may select the indicators presented in this study or others considered more adequate, and as moderate variables the antecedent factors related with the individual or the situation. It is also important that we established the expected relations between all these variables, letting open the possibility of positive or negative effects for the relations established with the event outcomes. In fact, if we select a negative outcome (as, for example, burnout) the relations from stress should be positive and negative from coping potential and control perception. If we select a positive outcome

(as, for example, commitment) the relations should be the opposite.

Despite all the possible advantages and disadvantages of studying adaptation to stress according to the interactive model, and by using the proposed evaluation tools, we leave to researchers the decision of considering these ideas as useful or not. For us, the most important is contribute to this fascinating endeavor of understanding how human beings evaluate, react, and adapt to stress.



**Figure 3:** Capturing the whole experience of stress: The relation between variables.

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## **Appendix 1**

### **Adaptation to stress: A qualitative approach**

#### **Interview guide**

##### **Section 1**

###### **Personal and occupational information**

**Note:** it should be collected information according the goals of each researcher.

##### **Section 2**

###### **Stress situation**

###### **General stress situations**

1. To begin with, I would like you to describe the sources of stress that you feel in your work activity, as a professional. We understand stress as all the situations that can cause tension and pressure in your activity. Try to give me concrete examples of the situations that caused stress in your activity (e.g., when and where they occur).

###### **Major stress situation**

2. Of all these stress situations we were talking about, could you choose the one that caused you the highest levels of pressure and stress? Please, think of all situations and choose the one that has caused you the most pressure and stress. If you need, I can remind you of the situations you just described to me.



3. From 0 to 4, what level of stress has this situation caused to you? Please, tell me your answer using this scale:

- Value 0 corresponds to no stress at all
- Value 1 corresponds to some stress
- Value 2 corresponds to moderate stress
- Value 3 corresponds to high stress
- Value 4 corresponds to very high stress

4. Why this situation caused you the highest levels of stress? Where did it happen? Please, try to describe as well as possible the situation where that source of stress/tension occurred.

### **Properties of the major stress situation**

5. Now I would like to ask you some more specific questions about this stress situation, in order to have a better understanding.

5.1. Was it the first time the stress situation occurred to you, or has it happened before? When? Do you think it contributed to increasing the level of stress you felt?

5.2. Did you expect the stress situation to happen to you? Why? Do you think that contributed to increasing the level of stress you felt?

5.3. To which point the stress situation was usual for you? Was it a predictable situation or an unexpected

one? Why? Do you think that contributed to increasing the level of stress you felt?

5.4. Did you have time to prepare for the stress situation? If so, for how long did you anticipate the situation? Do you think that contributed to increasing the level of stress you felt?

5.5. For how long did the stress situation last? When did it begin and finish? Do you think that the time of lasting contributed to increasing the level of stress you felt?

5.6. Where you expecting the stress situation to occur to you at that exact moment? Why? Do you think that contributed to increasing the level of stress you felt?

5.7. To which point did you think you had enough information or knowledge about the situation? Why? Do you think that contributed to increasing the level of stress you felt?

5.8. Did you experience other stressful situations in your life when this stress situation happens to you? If so, which ones? Do you think that contributed to increasing the level of stress you felt?

### Section 3

#### **Appraisal of the stress situation: First level of cognitive appraisal**

##### **Primary cognitive appraisal: Importance perception**

6. To what extent the stress situation was important for you? If so, explain to me why this situation was important for you.

Please, tell me your answer using this scale:

- Value 0 corresponds to without any importance
- Value 1 corresponds to some importance
- Value 2 corresponds to moderate importance
- Value 3 corresponds to high importance
- Value 4 corresponds to maximum importance

##### **Primary cognitive appraisal: Threat perception**

7. Did you evaluate the stress situation as something threatening for you? Why?

##### **Primary cognitive appraisal: Challenge perception**

8. Did you evaluate the stress situation as something challenging? Why?

##### **Secondary cognitive appraisal: Coping strategies**

9. When you faced the stress situation, what did you think? What did you try to do?

**Secondary cognitive appraisal: Coping potential**

10. When you came across with the stress situation, how much did you feel you could solve the demands placed on? Can you give me some examples, please?

**Secondary cognitive appraisal: Coping control**

11. When you came across with the stress situation, how much did you feel you could control or change it, or felt that there was not much or nothing to be done? In other words, to which point did you feel that changing the situation depended on your efforts? Why?

**Secondary cognitive appraisal: Coping efficacy**

12. To what extent do you think that what you have tried to do in order to deal with the stress situation was efficient or produced the outcome you were expecting? If yes, in what way was it effective?

**Secondary cognitive appraisal: Coping automatism**

13. To what extent did you have to reflect and think about what to do to deal with the stress situation? That is, what you have done was something that “came out in an automatic manner” or you had to do a lot of thinking about what might be done?

**Secondary cognitive appraisal: Goals attainment**

14. To what extent did the stress situation put at risk the goals that you have established at that moment? If so, in which way?

**Secondary cognitive appraisal: Future expectations**

15. At the time, did you think that the stress situation might strengthen or prejudice your future goals? In which way?

**Secondary cognitive appraisal: Responsibility**

16. To what extent did you think the stress situation you were in was from your responsibility, or what has happened to you was due to others persons' action/responsibility? Why?

**Section 4**

**Psychological, physical, and behavioral responses**

I would like you to describe me some of your reactions and responses DURING the stress situation. Please, try to remember how you felt and behaved in the stress situation.

**Psychological responses**

17. How did you feel from the psychological point of view? Can you give me examples?

**Physical responses**

18. How did you feel from the physical point of view? Did you feel any reactions in your body? Can you give me examples?

### **Behavioral responses**

19. In terms of your behavior, did you feel changes in your way of functioning? Can you give me examples?

### **Emotional responses**

20. What kind of emotions and feelings did you have during the stress situation? Can you tell me the type of emotions you felt during the whole stress situation?

## **Section 5**

### **Appraisal of the stress situation: Second level of cognitive appraisal**

Now I would like to talk about what occurred AFTER you have tried to deal with the stress situation. That is, let us talk about what happened after you went through the stress situation.

### **Resolution of the stress situation**

21. At the end, to what extent did you feel that the stress situation was resolved or was still going on? That is, did you feel the “matter was finished” or that there were “unfinished issues”?

### **Options**

A. If the person feels the stress situation was a unique event, located in time and space, the previous questions will be enough to evaluate the stress episode. In

this case, the interview should move to section six, in order to evaluate the final result.

**B.** If the professional feels the stress situation has not been resolved and has remained over time, then the following questions concerning this section five should be addressed. After this section, the interview should continue with section six to evaluate the final result.

**Tertiary cognitive appraisal: Importance perception**

**22.** Did you give importance to the fact of the stress situation remain unresolved? If so, tell me to what extent the stress situation was still important for you, using this scale again:

- Value 0 corresponds to without any importance
- Value 1 corresponds to some importance
- Value 2 corresponds to moderate importance
- Value 3 corresponds to high importance
- Value 4 corresponds to maximum importance

**Tertiary cognitive appraisal: Threat perception**

**23.** The fact of the stress situation remained unsolved was considered as something threatening for you? Why?

**Tertiary cognitive appraisal: Challenge perception**

24. The fact of the stress situation remained unsolved was considered as something challenging for you? Why?

**Quaternary cognitive appraisal: Coping potential**

25. When you realized that the stress situation remained unsolved, how much did you feel you could solve the demands placed on? Can you give me some examples, please?

**Quaternary cognitive appraisal: Coping control**

26. When you realized that the stress situation remained unsolved, how much did you feel you could control or change it, or felt that there was not much or nothing to be done? In other words, to which point did you feel that changing the situation depended on your efforts? Why?

**Quaternary cognitive appraisal: Coping strategies**

27. What did you think or do to deal with the fact that the stress situation still remains?

**Quaternary cognitive appraisal: Coping efficacy**

28. To what extent do you think that what you have tried to do in order to deal with the fact the stress situation still remain, was efficient or produced the outcome you were expecting? If yes, in what way was it effective?



## Section 6

### Final result

To finish, I would like you to describe some of the reactions and responses you had AFTER the stress situation.

#### Note

- If the stress situation still remains, the questions below should be equally addressed, informing the person that the answers should be given based on the way he/she feels at that actual moment.

#### Emotional result

29. What kind of emotions and feelings did you have AFTER finishing the stress situation?

#### Result in satisfaction

30. At the end of the stress situation, to what extent did you feel satisfied?

#### Result in performance

31. At the end of the stress situation, to what extent did you feel that this situation influenced your professional performance? Was it a positive or negative influence in your performance?

## **Section 7: Finalization**

**32.** Would you like to add something to what you told me? Do you have any doubts or questions?

**Final Request** (for research purpose)

As I told you before, my next task is to transcribe the information you have given me, so that I can analyze it in more detail. This task depends very much on having understood well what you told me. Therefore, I want to ask you to read the transcription of the interview and see if it is in accordance with the opinions you mentioned. You can correct as many aspects you think necessary. This would help me gain greater certainty on the information collected from this interview.

**Thanks for your help and collaboration!**

## Appendix 2

### Adaptation to stress: A quantitative approach Questionnaire

#### Section 1

##### Personal and occupational information

**Note:** it should be collected information according the goals of each researcher.

#### Section 2

##### Stress situation

At work, professionals are exposed to several stressful situations. Notice that, in this case, we understand stress as all the situations that can cause tension and pressure in your activity.

##### Major stress situation

1. To begin with, try to remember the situation that has caused you the **HIGHEST** level of stress in your professional career and describe it below.

The stress situation that generated me MAJOR tension and pressure was...

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## 2. What level of stress has this situation caused me?

No stress at all	Some stress	Moderate stress	High stress	Very high stress
0	1	2	3	4

3. Analyse each of the questions below, **thinking on the stress situation** you have just described. Indicate the option that best fits your case.

3.1. Was it the first time the stress situation occurred to you?	Yes ____	No ____
3.2. Did you expect the stress situation to happen to you?	Yes ____	No ____
3.3. The stress situation was usual for you?	Yes ____	No ____
3.4. Did you have time to prepare for the stress situation?	Yes ____	No ____
3.5. For how long did the stress situation last?	One Day ____ One Week ____ One Month ____ More than one Month ____	
3.6. Were you expecting the stress situation to occur to you at that exact moment?	Yes ____	No ____
3.7. Did you think you had enough information or knowledge about the stress situation?	Yes ____	No ____
3.8. Did you experience other stressful situations in your life when this stress situation happens to you?	Yes ____	No ____

### Section 3

#### Appraisal of the stress situation: First level of cognitive appraisal

**4. To what extent the stress situation was important for me?**

Without any importance	Some importance	Moderate importance	High importance	Maximum importance
0	1	2	3	4

**5. To what extent the stress situation was threatening for me?**

Not threat full at all	Somewhat threat full	Moderately threat full	Highly threat full	Totally threat full
0	1	2	3	4

**6. To what extent the stress situation was challenging for me?**

Not challenging at all	Somewhat challenging	Moderately challenging	Highly challenging	Totally challenging
0	1	2	3	4

7. Try to remember what you **thought** and **tried to do** when you faced the stress situation. Please indicate if you used the strategies that are described below, by choosing one of the five options, from 0 (“Never used”) to 4 (“Always used”).

When facing the stress situation, I...	Never used	Used a few times	Used some times	Used many times	Always used
7.1. Did what had to be done to solve the stress situation	0	1	2	3	4
7.2. Increased my efforts to solve the problem	0	1	2	3	4
7.3. Accepted what was happening and tried to see something positive in the situation	0	1	2	3	4
7.4. Tried to control my emotions, so that I could feel better in the situation	0	1	2	3	4
7.5. Pretended that the situation was not happening to me or had happened	0	1	2	3	4
7.6. Blamed myself for the situation that happened	0	1	2	3	4
7.7. Talked to others about what I was feeling	0	1	2	3	4
7.8. Asked for others' opinion on what I could do	0	1	2	3	4

### 8. When facing the stress situation, I felt...

Not able at all to solve the situation	Somewhat able to solve the situation	Moderately able to solve the situation	Highly able to solve the situation	Totally able to solve the situation
0	1	2	3	4

**9. How much control did I have to deal with the stress situation?**

Any control at all	Some control	Moderate control	High control	Total control
0	1	2	3	4

**10. What I did to deal with the stress situation was...**

Any efficacy at all	Some efficacy	Moderate efficacy	Highly efficacy	Totally efficacy
0	1	2	3	4

**11. What I had to do to deal with the stress situation...**

Occurred without thinking	Occurred after thinking a little bit	Occurred after thinking moderately	Occurred after thinking a lot	Occurred after thinking very hard
0	1	2	3	4

**12. The stress situation did...**

Not compromise my immediate goals	Compromise somewhat my immediate goals	Compromise moderately my immediate goals	Compromise highly my immediate goals	Compromise totally my immediate goals
0	1	2	3	4

**13. The stress situation did...**

Not compromise my future goals	Compromise somewhat my future goals	Compromise moderately my future goals	Compromise highly my future goals	Compromise totally my immediate goals
0	1	2	3	4

**14. Thinking about the occurrence of the stress situation, I felt I had...**

Any responsibility at all	Some responsibility	Moderate responsibility	High responsibility	Total responsibility
0	1	2	3	4

**Section 4****Psychological, physical, and behavioral responses**

Below are some questions that intend to evaluate your reactions and responses DURING the stress situation. Please, try to remember how you felt and behaved in the stress situation.

**15. From the PSYCHOLOGICAL and emotional point of view, I...**

Felt very bad	Felt bad	Did not felt bad or good	Felt good	Felt very good
0	1	2	3	4



**16. From the PHYSICAL point of view, I...**

Felt very bad	Felt bad	Did not felt bad or good	Felt good	Felt very good
0	1	2	3	4

**17. In terms of my daily routines, my BEHAVIOR...**

Changed very negatively	Changed negatively	Did not changed negatively or positively	Changed positively	Changed very positively
0	1	2	3	4

**18. DURING the stress situation, I felt...**

	Not at all	A little	Moderately	Quite a bite	Extremely
18.1. Anxiety	0	1	2	3	4
18.2. Anger	0	1	2	3	4
18.3. Sadness	0	1	2	3	4
18.4. Fear	0	1	2	3	4
18.5. Guilt	0	1	2	3	4
18.6. Shame	0	1	2	3	4
18.7. Relief	0	1	2	3	4
18.8. Hope	0	1	2	3	4
18.9. Pride	0	1	2	3	4
18.10. Happiness	0	1	2	3	4
18.11. Envy	0	1	2	3	4
18.12. Jealousy	0	1	2	3	4
18.13. Love	0	1	2	3	4
18.14. Gratitude	0	1	2	3	4
18.15. Compassion	0	1	2	3	4

## Section 5

## Final result

## 19. At the END of the stress situation, I felt...

	Not at all	A little	Moderately	Quite a bit	Extremely
19.1. Anxiety	0	1	2	3	4
19.2. Anger	0	1	2	3	4
19.3. Sadness	0	1	2	3	4
19.4. Fear	0	1	2	3	4
19.5. Guilt	0	1	2	3	4
19.6. Shame	0	1	2	3	4
19.7. Relief	0	1	2	3	4
19.8. Hope	0	1	2	3	4
19.9. Pride	0	1	2	3	4
19.10. Happiness	0	1	2	3	4
19.11. Envy	0	1	2	3	4
19.12. Jealousy	0	1	2	3	4
19.13. Love	0	1	2	3	4
19.14. Gratitude	0	1	2	3	4
19.15. Compassion	0	1	2	3	4

## 20. At the end of the stress situation, I felt...

Any satisfaction	Some satisfaction	Moderate satisfaction	High satisfaction	Very high satisfaction
0	1	2	3	4

## 21. At the end of the stress situation, I felt that this situation had...

Higher negative impact on my performance	Some negative impact on my performance	Any impact on my performance	Some positive impact on my performance	Higher positive impact on my performance
0	1	2	3	4