Chapter 5:

Immersed vs. Detached Reappraisal Strategies: Behavioral, Physiological and Experiential Responses.

Study III

Summary: The present study aimed at the investigation of cognitive reappraisal and its short-term outcomes on three emotional response systems: behavior, physiology and subjective experience. 163 nursing students were asked to watch the same high-impact event (amputation of an arm) which was incorporated within a longer clip assembled using the films provided by the previous study (Study 2). Two different reappraisal strategies were compared: in one group, subjects (N=83) were asked to distance themselves in front of the negative event to down-regulate negative emotions, whereas in the second group (N=80) participants were asked to adopt an immersed and participated attitude towards the events. The study presents the results about the effect of the type of scenario and type of regulation instruction on emotional responses belonging to subjective experience (indexes of emotional impact), behavioral expression (face, gaze, posture and head movements) and physiological arousal (HR and EDA).

5.1 Introduction

As previously explained in the theoretical introduction, the *process model of emotion* (Gross, 1998a; Gross, 2001; John & Gross,2004) represents a major model within the psychological study of emotion regulation. According to this model, regulatory strategies may be differentiated according to the moment in which they have impact on the emotion generative process. This means that emotions might be regulated either by manipulating the input to the system (antecedent-focused) or by manipulating its output (response-focused). Antecedent-focused strategies include things we do very soon in the emotion generation process, that is before the complete activation of emotion response tendencies has changed our overt behavior and physiological responding. By contrast,

response-focused strategies intervene later and refer to things we do once an emotion is already happening and after the response tendencies have already been generated. For instance, one powerful means of emotion regulation is to modify the way a situation is evaluated. It is widely agreed that a situation typically does not trigger an emotion in itself. Rather, it is the individual's evaluation (*appraisal*) of that situation that is able to generate it (Scherer, 1984). Within emotion regulatory strategies, cognitive change concerns the evaluation of the situation one is in a way to alter its meaning and emotional significance, either by changing the point of view one thinks about the situation or about one's capacities to deal with it. One form of cognitive change which has been particularly investigated by experimental research is reappraisal (Gross, 1998a; Gross & Thomson, 2007). Reappraisal belongs to the antecedent-focused strategies and it consists in the attempt to change the way one thinks about the situation/event or to think about it in non-emotional terms (Gross, 1998a, 2002).

5.2 Goals of the present study

The main goal of the present study concerned the investigation of cognitive reappraisal and its short-term outcomes on multiple emotional response systems, i.e. behavior, physiology and subjective experience. In one of his earliest experimental studies on the process model, Gross (1998a) investigated whether reappraisal (antecedent focused) vs. suppression (response focused) strategies had different consequences on emotional responses within stressful and negative emotion eliciting events. To the purpose of analyzing reappraisal regulatory strategy, the present study started from Gross (1998a) – for a detailed description of the study see *1.4.2* – and aimed at introducing two main differences.

First, we focused on the possible different ways to cognitively modify the meaning of a situation and in particular on the role of self-relevance to down or up regulate emotions. Ochsner et al. (2004) suggested that *self-focused* strategies alter the self-relevance of events making people feel more or less connected to what is going on. To this purpose, two different reappraisal strategies were compared. The first strategy asked the subjects

to distance themselves in front of a negative event to down-regulate negative emotions: participants were asked to adopt a detached attitude towards the clip trying to think about what they were seeing objectively and in terms of the technical aspects (Gross, 1998a; Richards & Gross, 2000; Ochsner et al., 2002). On the other way, the second strategy asked participants to adopt an immersed and participated attitude towards the events narrated in clip: participants were asked to try to imagine «to be there» as the actions in the clip happened (Ochsner et al., 2004).

Second, we considered the stimulus or «input» of the emotional process, focusing on the role of the context: the input-event was conceived as necessarily embedded within a situational context as it usually happens in real life, where people are confronted with matrices of information rather than with isolated events. In Gross (1998a) participants watched a surgery clip (i.e. the amputation of an arm) – which had been previously used in a number of studies to elicit disgust (Gross & Levenson, 1993; Ekman, Friesen, & O' Sullivan, 1988) – and they had to regulate their emotions either by reappraising or by suppressing their expressions. As reported in the overall research structure, Study 3 employed the same stimulus. However, in our study, the same high-impact event was showed incorporated within a longer clip which was assembled using the films provided by the previous study (Study 2). In fact, according to appraisal theories (Scherer et al., 2001), emotional responses do not arise as consequences of an event *per se* considered, but they are mediated by a cognitive evaluation of the event itself: situational meaning structures are at the basis of emotion generation (Frijda, 1988). For instance, Lazarus and colleagues (1970) demonstrated how adding soundtracks or statements denying the pain involved in the surgery it was possible to alter the appraisal of the stimuli and thus reduce the disturbing features of the film events (Lazarus, Averill, & Opton, 1970). In this view, our hypothesis was that an event may elicit different emotional responses according to the context in which it was incorporated and appraised. To address this question, four different scenarios were created though the manipulation of two appraisal dimensions (self relevance and coping outcome) as already described in Study 2. The scenarios represented different contexts within

which the amputation event was appraised: the amputation was presented as the treatment either to stop a rare illness (the flesh-eating bacteria) which can hit anybody or to face injuries of anti-man mines which hit people in war countries; in addition people might be able to cope with it or not. All scenarios had been tested in Study 2, and results had showed that although they were matched on emotional impact, they elicited different patterns of emotions. In this study, we addressed the question of whether the amputation event would give rise to different emotional responses when included and appraised within scenarios which differed over manipulated appraisal dimensions: are stronger affective responses elicited when – for example – the subject may think that the amputation could happen to him/her own or to one of his/her relatives? To maximize the contextualization of the surgery event, we decided to recruit nursing students as participants to our study. This choice was due to several reasons: a) first of all, surgeries are part of the professional education of nursing students since during their internship in hospital they are confronted with surgeries, medical procedures, etc.; b) for this reason, they are motivated to learn adaptive strategies to cope with such events; c) since the amputation clip had proved a disturbing emotional stimulus (Gross, 1998a), we considered ethically questionable to show it to a population of volunteers who had no preparation or motivation to watch it. In addition, regulatory and coping strategies of nursing students were preliminarily assessed: Study 1 showed that when they were compared with a control sample, an overall similarity emerged between nursing students and same-age students attending other faculties.

In Study 3 we were addressed the following questions:

a) concerning reappraisal strategies, whether the subjects asked to adopt a detached attitude would exhibit a different short-term response profile compared to the subjects asked to adopt an immersed point of view. In particular, considering each response system, we expected that the subjects asked to watch the amputation from a technical point of view would feel less connected to the events and thus they would show fewer behavioral expressions (Gross, 1998a); less intense negative

experience (Ochsner et al., 2004) and less physiological activation. As to physiological response, in previous studies (Gross, 1998a) the expected decrease in physiological arousal as a consequence of reappraisal strategy was not found and the lack of physiological reduction remained an open question;

b) concerning reappraisal strategies, whether stable individual differences in reappraisal (Study 1) might moderate the short-term effects on the emotion response systems of the reappraisal strategies experimentally induced;

c) concerning reappraisal strategies, whether stable individual differences in reappraisal (Study 1) had short-term effects on emotion comparable to experimental manipulation. To this purpose, a within-subject condition was included in the experimental procedure where subjects had to watch a surgery clip under no instruction (spontaneous emotion regulation). In particular, we expected that high reappraisers would report less negative experience than low reappraisers (Mauss et al., in press; Egloff et al., 2006) and less expressive behavior (Egloff et al., 2006). As to physiological responding, contrasting hypotheses could be formulated: according to Mauss et al. (in press), we could expect that high reappraisers would show a more adaptive physiological profile than low reappraisers, whereas according to Egloff et al. (2006) reappraisal would show no associations with physiological indicators;

d) concerning the contextual scenarios, whether the contextual information preceding the amputation clip would alter the appraisal of the clip itself and thus the subjects' emotional responses (Lazarus et al., 1970). In particular, we expected that subjects would show more behavioral expressions and physiological activation while watching the amputation when incorporated within the self-affecting scenario;

e) concerning the contextual scenarios, whether the contextual information preceding and following the amputation clip would alter the appraisal of the clip itself and thus the subjects' self-report

ratings after watching it (Lazarus et al., 1970). In particular, we expected that the subjects would report different experiential responses after watching the amputation clip according to the scenarios in which the surgery was incorporated. According to the results obtained in Study 2, we expected that subjects watching the amputation within the self-affecting scenario would report more fear and disgust, whereas subjects watching the amputation within the other-affecting scenario would report more sadness, compassion and anger; moreover we expected that subjects watching the amputation within the positive version of scenario would report more pleasantness than subjects watching the amputation within the negative one;

f) whether the emotional impact – considering both indexes of emotional strength and emotional direction – of the surgery event was modified by the contextual scenario in which the amputation was embedded;

g) whether the short-term outcomes of the two reappraisal strategies were influenced by the type of scenario in which the amputation event was included; for instance we hypothesized that the distancing strategy would be more demanding and hence less effective when the eliciting event is perceived as dangerous for oneself.

5.3 Method

5.3.1. Participants

163 nursing students (age: M=22,5; SD=4,47; M=28; F=135; 82,8% women) were recruited from the Faculty of Nursing Sciences of the Bicocca University in Monza and Lecco. Students belonged to three different year courses (I=54, II=62, III=47). Subjects were invited to participate by the dean of the Nursing School and they believed that their ability to control their negative emotions while viewing upsetting surgical procedures was important for their later career success. Student nurses were told they were participating to a study on emotion and were explained

that they would see the type of upsetting material they would soon be confronting in an emergency room and in their internship. All subjects were volunteers.

5.3.2.Assignement to experimental groups

Participants were assigned to eight experimental groups: 2(detached vs. immersed) x 2(affecting the self vs. affecting others scenario) x2(positive vs. negative version). Because of the goals of the study, it was important to make sure that experimental groups were balanced for year course and stable individual differences in coping and emotion regulation strategies, so that no *a priori* differences were present between the groups.

To this purpose, we developed a brief 6-item questionnaire to measure individual differences in the use three regulatory strategies within the nursing professional context. In one study investigating spontaneous emotion regulation, Egloff et al. (2006) found that the regulation strategy used by an individual in a specific situation is shaped by the joint influence of situational and dispositional factors. In particular, developing a brief scale to measure reappraisal and suppression during stressful tasks, the authors provided subjects with six different context within which they should decide how to regulate their emotions (public speech, dentist, sport competition, etc.). Results showed meaningful variation in responses to the specific scenarios because of situational factors. In this view, as in Study 3 participants were confronted with high contextualized stimuli, we decided to introduce a brief questionnaire aimed at assessing the regulatory strategies on which participants relied in their practice of the nursing profession, rather than in general situations (ERQ). The questionnaire consisted in three scales (2 items each) assessing three different ways of coping with stressful events: Avoidance or escape (items 1 and 6), Personal Involvement (item 2 and 4) and Distancing (item 3 and 5). Each item corresponded to a short story narrated by a nurse explaining an episode of his/her professional experience where he/she had to cope with the death of a patient and his/her way of reacting. To develop the questionnaire, three different judges selected the stories as they best represented each

specific coping strategy[1] starting from 30 narrations which had been previously collected. Instructions asked the subjects to read the stories carefully and to rate on a 9-point Likert scale the degree to which they would act in the same way as the protagonist of the narration. The questionnaire is showed in Appendix.

Table 5.1. Cronbach's α coefficients, means and standard deviations.

Scale	α	M	SD
Avoidance	.68	2.09	1.70
Personal Involvement	.70	6.49	1.26
Distancing	.67	3.61	1.81

Item and factor analysis were conducted to check internal consistency of the three sub-scales. Cronbach's alpha coefficients (see table 3.2) and item-total correlations (item1=.52; item2=.43; item3=.51; item4=.43; item5=.51; item6=.52;) were computed for each scale. A Principal Component Analysis was conducted. The PCA yielded three clear factors confirming the intended three-factor structure of the scale. Varimax rotated factor loadings are showed in table 5.2.

Finally, correlations with other coping and emotion regulation scales were examined. The Distancing scale was significantly ($p<.01$) related to the Reappraisal scale ($r=.20$); the Personal Involvement scale showed a significant positive relation to Emotion Focused Coping ($r=.30$) and Venting ($r=.34$) and a negative association to the Suppression scale ($r=.25$);

[1] Avoidance or Escape strategy was represented by stories in which the nurse tried to avoid the stressful situation (the suffering of a patient) and escaped as he/she was not able to cope with it and with the negative emotions it elicited. Personal Involvement was represented by stories in which the protagonist was deeply involved in the situation (e.g. illness of a patient) and felt strong and overwhelming anxiety and negative emotions. Distancing was represented by stories of nurses who tried to remain detached and who thought that emotions at work may be dangerous and should be limited as they can overstep into their private life.

the Avoidance scale was negatively related to the Reappraisal scale (r=-13), the COPE Positive Reinterpretation scale (r=-.30) and to Problem focused coping (r=-23). Thus, the analyses performed seemed to confirm the reliability of our brief questionnaire and supported its use in the study.

Table 5.2. Principal Component Varimax rotated factor loadings.

	F1	F2	F3
Item 1	-.06	**.88**	-.08
Item 2	.08	-.04	**.85**
Item 3	**.85**	.15	-.15
Item 4	-.15	.00	**.84**
Item 5	**.87**	-.04	.08
Item 6	.17	**.86**	-.08
% VAR	29,9	23,4	22,3

Participants were divided into three groups: High (n=54), Medium (n=62) and Low (n=47) Distancing according to the frequency distribution (tertile) of a weighted score which was calculated for each subject subtracting the mean score of the Distancing scale to the mean score of the Personal Involvement scale. Performing a one-way ANOVA, significant differences between the groups emerged for several emotion regulation and coping scales: Suppression [F(7, 156) = 6.839, p<.01], Emotion Focused coping [F(7, 156) = 5.816, p<.01], Social Diversion [F(7, 156) = 5.906, p<.01], Searching Social Support for Emotional Reasons [F(7, 156) = 5.999, p<.01] and Venting [F(7, 156) = 9,042, p<.01].

Assignment was constrained so that equal numbers of nursing students of the first, second and third year courses and equal numbers of participants relying on High, Medium and Low Distancing were assigned to each condition. Performing a one-way ANOVA, no significant differences between the groups emerged for all the main emotion regulation and coping scales: Reappraisal [F(7, 156) = .541, p>.05], Suppression [F(7, 156) = .767, p>.05], Problem Focused coping [F(7, 156) = 1.752, p>.05], Emotion Focused coping [F(7, 156) = 1.056, p>.05], Social Diversion [F(7, 156) = 1.536, p>.05], Avoidance [F(7, 156) = 1.222, p>.05], Active Coping [F(7, 156) = 1.744, p>.05], Planning [F(7, 156) =

1.474, p>.05], Seeking Social Support for Emotional Reasons [F(7, 156) = .503, p>.05], Seeking Social Support for Instrumental Reasons [F(7, 156) = .471, p>.05], Venting [F(7, 156) = 1.594, p>.05], Positive Reinterpretation [F(7, 156) = .807, p>.05], Denial [F(7, 156) = 1.594, p>.05], Mental Disengagement [F(7, 156) = 1.959, p>.05], Behavioral Disengagement [F(7, 156) = 1.475, p>.05].

5.3.3. Film Stimuli

Three validated (Gross & Levenson, 1995; Gross, 1998a) films were used. The first film (3 min) was the baseline clip tested in Study 2 that elicited very little emotion of any kind. The second and third films showed medical procedures. The first showed a kidney transplant and was 95 sec long. The second showed a close-up of the amputation of an arm (amputation film) and was 64 s long. In pretesting, these two films elicited self-reported disgust, with little report of other emotion (Ekman, Friesen, & O'Sullivan, 1988, Gross, 1998a). The amputation clip was then included within a longer clip which provided the situational context: the clip was assembled using the PRE and POST films tested in Study 2 which preceded and followed the amputation respectively. Half participants watched the amputation included within the bacteria scenario (affecting the self), whereas half participant watched the same clip included within the anti-man mines scenario (affecting the others). Half participants watched the amputation included within the «positive» version of the clips, whereas the remaining half watched the surgery within the «negative» version.

The complete reel is displayed in Figure 5.1: 1) the reel started with the first part of the baseline clip (120 sec); 2) all participants then watched the kidney transplant clip under the same instruction, i.e. simply watch; in the same way as the amputation, the surgery was preceded by contextual information (90 sec) showing patients who experienced dialysis before the transplant; 3) the first surgery clip was then followed by a second baseline period (90 sec); 4) participants received the instructions (30 sec) about emotion regulation strategies (immersed vs. detached) determined by the assignment to experimental groups; 5) finally participants watched the amputation clip preceded and followed by the context scenarios.

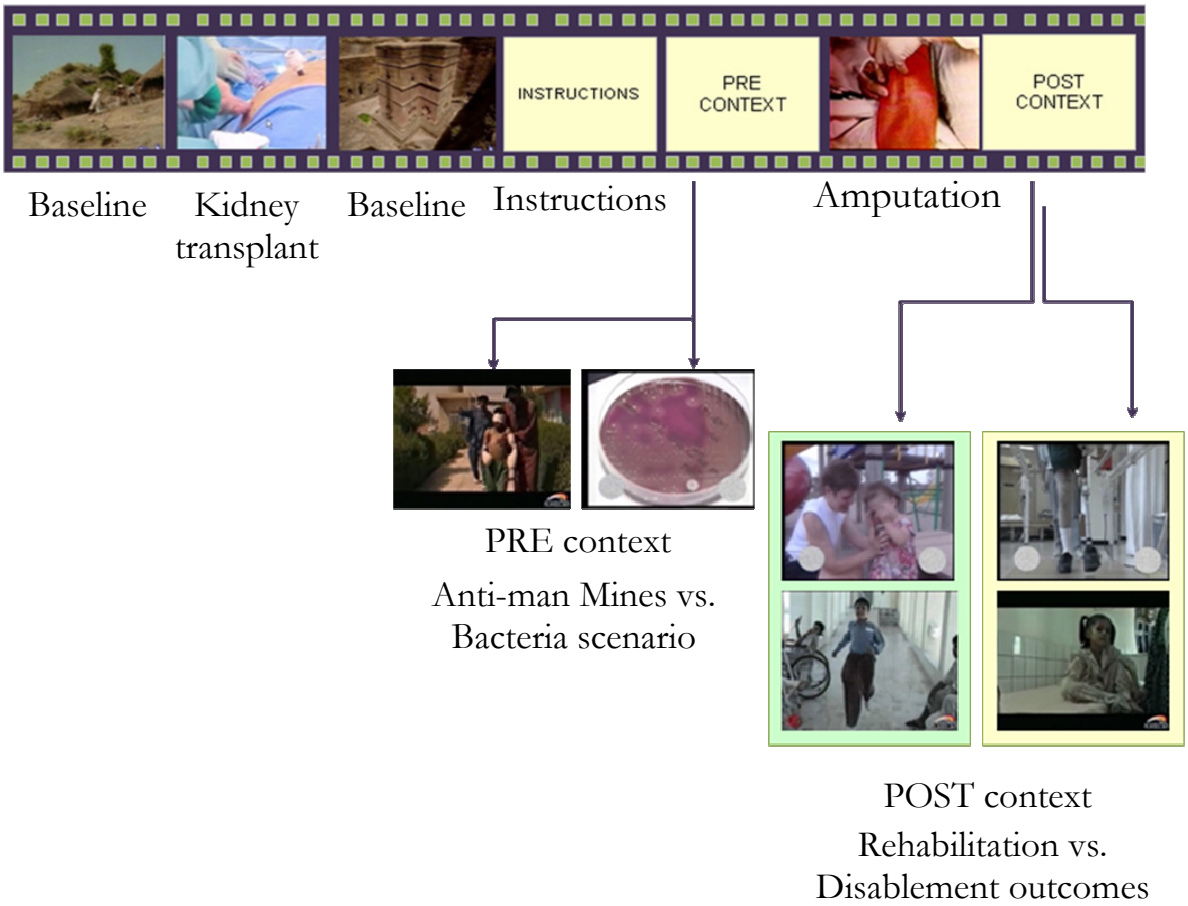


Figure 5.1. Film Stimuli

5.3.4. Procedure

On arrival, participants were seated in a quiet and well-lit room. They were informed that the experiment was concerned with emotion and that they would be videotaped. After signing the consent forms, physiological sensors were attached.

5.3.4.1. Current Mood

Participants used a self-report form to answer questions concerning demographics and their current mood. Since emotional responses are usually superimposed upon some prior affective state and the use of sensors to record bio-signals could induce stress or anxiety, the PANAS scale (Watson, Clark, & Tellegen, 1988) was administered to a) assess the affective state (or mood) of participants before running the experiment and b) to verify that no differences were present between the groups. The

PANAS scale consists of 20 positive and negative adjectives (e.g. active, determined, nervous, scared, distressed, etc.). The positive Affect scale reflects the level of pleasant engagement, whereas the Negative Affect scale reflects a general dimension of negative engagement and distress. Subjects rated on a 5-point Likert scale how much they were feeling as indicated by the adjectives.

5.3.4.2. Instructions

Participants were then shown the short film segments on a 17-in. computer monitor. The procedure lasted about half an hour. All instructions were prerecorded and presented via the computer monitor. Both types of instruction ended with a task to motivate subjects to follow the provided requests.

The «Detached» group (n=83) received the following instructions:

> We will now be showing you a short film clip. In this clip you will observe some kind of situations that teams of physicians and nurses have to face. It is important to us that you watch the film clip carefully. Please try to adopt a detached attitude as you watch the film and try to think objectively about what nurses and physicians are doing and about the technical competences that they are showing. At the end of the clips, you will be asked to describe your technical and professional opinions about what you have observed.

The «Immersed» group (n=80) received the following instructions:

> We will now be showing you a short film clip. In this clip you will observe some kind of situations that patients have to face. It is important to us that you watch the film clip carefully. Please try to adopt a participated attitude as you watch the film. Try to think to be there in that situation, to assist those patients yourself and to participate in their stories. At the end of the clips, you will be asked to write a short communication to these patients and their relatives and to explain them what has happened.

Participants then watched the amputation film, which was included within a specific scenario determined by the assignment to the experimental conditions. After the clips, participants completed an emotion-rating form and answered several additional questions concerning their responses to the amputation film. Finally, they were asked to rate how difficult instructions had been using a 7-point Likert scale.

5.3.5. Measures

Data were collected in three response domains: expressive behavior, subjective experience and physiology. Self-report, behavioral and physiological data were available for baseline and film periods.

5.3.5.1. Subjective Experience

For each clip, participants rated a) whether they had felt emotions watching the film or not (yes/no); b) the emotions experienced during the film using both discrete emotion (labels) and dimensional (pleasant vs. unpleasant) scales; c) the general involvement experienced; d) whether they had ever seen the clip before.

As in Study 2, to rate emotional experience different scales were used. Emotional general involvement was rated on a nine-point Likert scale ranging from 0 «not at all» to 8 «extremely». Dimensional valence was rated on a nine-point Likert scale from 0 «unpleasant» to 8 «pleasant». Discrete emotional categories were rated on the Geneva Emotional Wheel (GEW: Scherer, 2005). This scale allows the ratings of both presence/absence of each category and its intensity (1-5).

5.3.5.2. Physiology

Physiological data were recorded by means of an innovative unobtrusive device provided by the Sensibilab of the Politecnico of Milan. The design of this innovative monitoring device started from the generic concept of a monitoring device composed by the hardware system able to acquire and pre-process inputs and the algorithms able to extract the required features and to classify them. The assembly consisted of a system created in order to provide an adaptable and reliable monitoring station for electrocardiogram (ECG), Heart rate (HR), breathing rate (BR), movement

and galvanic skin response (GSR) (Di Rienzo, Andreoni, & Piccini, 2004). The transmission of data to the computer was accomplished by means of Bluetooth technology and was synchronized to the film stimuli and to the video acquisition[2]. Two measures were selected for use in this study to provide indexes of the activity of physiological systems especially relevant to emotional responding. The first measure assessed activation of the sympathetic branch of the autonomic nervous system, whereas the second measure reflected both sympathetic and parasympathetic activation:

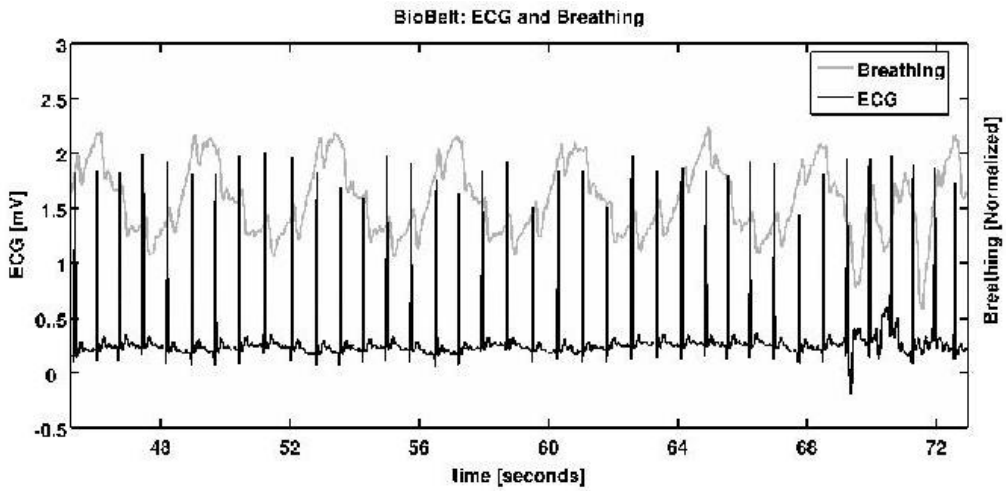


Figure 5.2. ECG signal and breathing signal acquired through the system.

*GSR (*or Electro-Dermal Activity*, EDA):* The Galvanic skin response is detected measuring the modification of the skin conductance, related to the sweat gland activity elicited by the Autonomic Nervous System. Regular electrodes (using a skin conductance electrode paste) were attached to the palmar surface of the middle phalanges of the first and third fingers of the non-dominant hand.

Electrocardiogram. ECG data were collected at the left and right wrists typically applying Ag-AgCl snap electrodes on the subjects' skin. The interbeat interval was calculated as the interval (in milliseconds) between successive R-waves. The time intervals between consecutive heart beats are

[2] To synchronize the physiological signals and the videos, a software was created by Ing. Luca Piccini with Microsoft Visual Basic, which controlled both video and physiological acquisition and the stimulus administration. Temporal markers were inserted each time a new clip started.

customarily measured in the electrocardiogram from the beginning of a QRS complex to the beginning of the next QRS complex and these intervals are conventionally named RR intervals.

Intervals corresponding to different clip periods were separated (thanks to the temporal markers), artefacts were removed and median scores were computed and normalized (Z scores) for each participant representing the averages of the physiological variables for each clip periods. We adopted the same descriptors used in previous research involved in the investigation and identification of emotion through bio-signals (Picard et al., 2001): standard deviations for both RR intervals and EDA variations were computed and normalized (Z scores) as indicators of variability. Change scores for the four measures were computed by subtracting baseline scores from film periods.

5.3.5.3. Behavior

A web-camera recorded participant's facial behavior and upper body movements. The camera was set to a 352x488 video format and 25fps sample rate. Each video lasted 15 minutes. Behavior was rated using the Behavioral Coding System (Ciceri, Balzarotti & Colombo, 2005).

The BCS is a coding system which was set up for rating videotapes of single subjects involved in different experimental tasks, as for example film or slides watching. Its main goal is to provide a sensitive measure of a subject's non verbal expressive behavior when under a particular kind of stimulation. Therefore, the Behavioral Coding System does not include emotional categories or labels, but it is aimed at the micro-analysis of single behavioral units. The BCS is a categorical coding system, because the coding procedure consists in the progressive (*frame by frame*) annotation of presence/absence, onset/offset of each behavioral category. The BCS is a multimodal system since it is constituted by 4 different Macro-categories: Facial Expression, Gaze Direction, Posture and Head Movements, Vocal Behavior as showed in Table 5.3.

- ✓ *Facial Expression*: in this Macro we included a selection of the main Upper and Lower Face action units (AU) and descriptors (AD)

Table 5.3. The Behavioral Coding System (BCS) structure

Macro	Micro categories	Action Units
Facial Expression	Upper Face	AU 1,2,4,5,7,6,9
	Lower Face	AU 10,12,14,15,16,17,25
	Lips movements	AU 18,20,23,24,28
		AD 19,30,32,33,34,37
Gaze Direction	To the task	Looking at the screen
	Around	Looking around the room
	To oneself	Looking at one's own body
Posture and Head	Approach	Moving towards the screen
	Withdrawal	Moving backward
	Head	AU 51-52, 55-56, 57,58
Vocal Behavior	Speech	Speaking or labial
	Non Linguistic	Exclamations, etc.
	Laugh	Laughing
	Others	Yawning, panting, crying

comprised in the Facial Action Coding System (Ekman & Friesen, 1978; Ekman, Friesen, & Hager, 2002);

- ✓ *Gaze Direction* was included in the rating as a useful index of the subjects' attention level. This macro category is basically intended to signal if the subjects' attention is directed to the experimental task or not (e.g. in film viewing, gaze direction will include a category such as «directed to the screen»). Changes in gaze direction may involve concurrent head movements or not.
- ✓ *Posture and Head Movements*: This macro includes the rating of body movements, including posture and head. This category provides an index of overall body movement. Movement of the head, hands, and shoulders are considered.

- ✓ *Vocal behavior*: This macro is intended to record whenever the subjects use speech or other forms of vocal behavior.

In Study 3, each macro category included a number of micro-categories for a total of 52 behavioral units scored. The 163 videos were rated by two coders (1 man and 1 woman) who were unaware of the experimental conditions. Both coders received an extensive training in the use of this coding system to achieve adequate levels of inter-rater reliability. After training, mean inter-rater reliability was = .89. Such training included the previous learning of the Facial Action Coding System (FACS, Ekman & Friesen, 1978; Ekman, Friesen, & Hager, 2002). Moreover, because of the precision needed, the video coding was performed with the aid of The Observer® XT 7.0, a software for the analysis of observational data (NOLDUS, The Netherlands).

A second level of measurement concerned the extraction of emotion, i.e. the selection of those behavioral profiles indicative of emotional states (Davidson, Ekman, Saron, Sennulis, & Friesen, 1990). Not all behavior is emotional and behavioral expressions may have multiple functions (Kaiser & Wehrle, 2001). Thus, one of the most challenging – both theoretical and methodological – problems concerns the selection of relevant features and the associated process of semantic attribution. To date, the main approach has been the fixed and stable attribution of an emotional label to a specific configuration of signals. For example, the well-known Facial Action Coding System (FACS) – or better the EMFACS – involves a stable link between configurations of Action Units and six discrete basic emotions. However, it has been remarked that a system based on linear emotional coding-decoding and functioning through the attribution of a fixed number of emotional labels to a fixed number of expressive indexes seems not much reliable and ecologically unlikely (Kaiser & Wehrle, 2001): first of all, continuous expressive modifications occur during the interaction; secondly complex or mixed emotions may be expressed.

To face these issues, in Study 3 we employed the Multidimensional Emotional Appraisal Semantic Space (MEAS, Ciceri & Balzarotti, 2007). The MEAS is a dimensional semantic model of emotion elaborated by our

lab in the last years which locates the former in a four axes space: we decided to use appraisal dimensions (or stimulus evaluation checks) to impose structure on the instrument. If one adopts the notion that emotions are elicited and differentiated by appraisal, then the structure of the emotion system should be largely determined by the major appraisal dimensions (Scherer, 2005). The first three dimensions corresponded to appraisal criteria derived from SECs (novelty, pleasantness and coping) whereas the last one corresponded to the level of physiological arousal (circumplex model; Russell, 2003). The componential organization all these different levels gives birth to multiple and fuzzy emotional experiences that are in part signalled through patterns of non verbal expression and that can change their intensity in relation to the relevance of the event for the individual (graduation of the axes) and in relation to the arousal given by physiological signals.

The MEAS procedure of scoring had as a starting point the previously mentioned analysis of patterns of multimodal signals (BCS). At a second level of analysis, the two judges scored the three axes derived from SECs on a 5 point rating scale from -2 to +2. The coders received a specific training until they reached acceptable inter-rater reliability (r=.79), since the scoring of the axes was based on a set of defined rules (see Appendix). These rules were defined starting from indications found in literature and defined the correspondence between a pattern of behavioural signals and the score of a specific emotional dimension:

- ✓ Novelty: this dimension was scored in correspondence of behavioral units signaling the evaluation that a change in the pattern of external or internal stimulation occurred (e.g. raising eyebrows, brow lowering, widening eyes, etc.) or that a stimulus is known and too expected (moving gaze away, yawning, etc);
- ✓ Valence: this dimension was scored in correspondence of behavioral units signaling the evaluation that a stimulus event was pleasant (e.g. smile, approach tendencies) or unpleasant (nose wrinkle, avoidance tendencies, etc.);
- ✓ Coping: this dimension was scored in correspondence of behavioral units signaling the evaluation that the coping potential

available to the organism, particularly the degree of control over the event was high (approach tendencies, nodding, etc.) or low (withdrawal, closing eyes or moving gaze away, etc.).

5.3.6.Data Analysis

In Study 3, data concerning the surgery clips (kidney and amputation) are presented. Data analysis considered the following steps:

1. First, we checked whether the assignment to experimental groups and other manipulations were effective. In particular: a) a two way 8(group) x 2(positive and negative affect) mixed ANOVA was performed with repeated measure on the positive/negative affect variable to assess the current affective state or mood (PANAS) of participants before running the experiment; b) an independent-samples *t* test was performed on the participants' ratings about the difficulty of the instructions they had received to assess that the two types of instructions did not differ with respect to the perceived level of difficulty; c) a chi-square test was performed to assess that the baseline clip was judged as unemotional; d) ANOVAs or non parametric tests were performed on self-report, physiological and behavioral measures concerning the kidney transplant to evaluate that no difference between the experimental groups were present. In fact, all participants viewed the initial surgery film under the same instructions and therefore it provided an opportunity to evaluate the effectiveness of our assignment of participants to experimental conditions.
2. Second, since all participants viewed the initial surgery film (the kidney transplant) under the instruction to simply watch the film, analyses were performed on this film to evaluate spontaneous emotion regulation, i.e. whether stable individual differences were associated with short-term outcomes on the experiential, behavioral and physiological response system. Two different measures of individual differences were used: the brief questionnaire to assess coping strategies within the professional context as previously explained (see 5.3.2) and the ERQ assessing

emotion regulation strategies in general situations. Regarding this last measure, subjects were divided into three groups according to their score in the Reappraisal scale: High (M=5,71, SD=.46, N=53), Medium (M=4.64, SD=.24, N=60) and Low (M=3.21, SD=.78, N=50) reappraisers. Data analysis concerned three response systems:

a. concerning self-report experiential data
   - ✓ paired *t* test were preliminary performed on all indexes of emotional impact to test whether the kidney transplant film was characterized by a higher emotional impact than the baseline clip;
   - ✓ one-way ANOVAs were performed on all indexes of emotional impact to test whether groups relying on different levels of Distancing or Reappraisal (3; high, medium and low) differed for emotional subjective experience;
   - ✓ SAS® CATMOD procedure for the analysis of repeated measurement categorical data was used to test whether groups relying on different levels of Distancing significantly differed for the number of selections of three emotional categories (compassion, fear, sadness).

b. concerning expressive behavior, total numbers for each behavioral micro-category were first extracted from The Observer® XT 7.0. As the baseline and the surgery clips had different durations (2 minutes for the baseline, 95 seconds for the kidney transplant) the extraction was performed selecting the central interval of the baseline so that the durations were matched. Successively, since each Macro-category consisted of a different number of micro-categories, we computed weighted indexes for each Macro averaging the frequencies of all the micro-categories included. These indexes were used to perform:
   - ✓ Wilcoxon non parametric tests to analyze whether the kidney clip was successful at eliciting a higher number of behavioral units than the baseline;

- ✓ one-way 3(High, Medium, Low) ANOVAs were performed to test whether the level of Distancing and Reappraisal influenced expressive behavior;

c. concerning physiological data, one-way 3(High, Medium, Low) ANOVAs were performed to test whether the level of Distancing and Reappraisal influenced each of the four measures (RR interval, RR standard deviation, EDA, EDA standard deviation).

3. Third, we considered the amputation clip and analyzed the influence of three variables – i.e. type of instruction, type of scenario and type of outcome of the film in which the amputation was included – on three emotional response systems:

a. concerning self-report experiential data:

- ✓ paired *t* test were preliminary performed on all indexes of emotional impact to check whether the amputation film was characterized by a higher emotional impact than the baseline clip;
- ✓ a three-way 2(immersed vs. detached) vs. 2(bacteria vs. mine) x 2(positive vs. negative) ANOVA was performed on all indexes of emotional impact;
- ✓ two ANCOVAs were performed to test whether the level of Distancing and the level of Reappraisal moderated the effect of the reappraisal strategies experimentally induced;
- ✓ SAS® CATMOD procedure for the analysis of repeated measurement categorical data was used to test differences in the number of selections of four emotional categories (compassion, fear, sadness, disgust).

b. concerning expressive behavior, total numbers for each behavioral micro-category were first extracted from The Observer® XT 7.0. As the baseline and the surgery clips had different durations (2 minutes for the baseline, 60 seconds for the amputation) the extraction was performed selecting the

central interval of the baseline so that the durations were matched. Successively, since each Macro-category consisted of a different number of micro-categories, we computed weighted indexes for each Macro averaging the frequencies of all the micro-categories included. These indexes were used to perform:

- ✓ Wilcoxon non parametric tests to analyze whether the kidney clip was successful at eliciting a higher number of behavioral units than the baseline;
- ✓ two-way 2(type of scenario) x 2(type of instruction) ANOVAs were performed to test whether these variables influenced expressive behavior.

c. concerning physiological data, two-way 2(type of scenario) x 2(type of instruction) ANOVAs were performed to test whether these variables influenced each of the four measures (RR interval, RR standard deviation, EDA, EDA standard deviation).

4. Fourth, associations between stable individual differences in the use of coping and emotion regulation strategies assessed in Study 1 and short-term subjective, behavioral and physiological responses were tested by means of analysis of variance and correlations. Finally, a *frame-by-frame* micro-analysis of the behavioral emotional responses is presented.

5.4 Results

5.4.1. Assignment and Manipulation Checks

Concerning current mood, a two way 8(group) x 2(positive and negative affect) mixed ANOVA was performed with repeated measure on the positive/negative affect variable. Results showed a significant within effect [$F(1,154)=887.352$, $p<.001$, $\eta^2=.82$] indicating that the mood of participants was characterized by more Positive Affect than Negative Affect. Interaction [$F(7,154)=.735$, $p>.05$] and group effects [$F(7,154)=.709$, $p>.05$] were not significant, thus indicating homogeneity between the groups.

Concerning instructions, an independent samples (type of instruction) *t* test was performed. The effect of the between variable was not significant [$t(161)=-1.502$, $p>.05$] indicating that participants who received the instructions to adopt a detached attitude didn't judged this instruction more difficult than participants who were asked to adopt an immersed point of view. Moreover, the mean score (M=1,72, SD=1,34) also indicated that both instructions were globally rated as easy and understandable.

Also, as expected the baseline clip was significantly judged as unemotional [$\chi^2=6.681$, $p<.05$]. Finally, since all participants viewed the initial surgery film (the kidney transplant) under the same instructions to simply watch the film, this clip provided an opportunity to evaluate the effectiveness of our assignment of participants to experimental conditions. Analyses of variance (ANOVAs) performed on self-reported dimensional valence [$F(7,156)=.407$, $p>.05$] and general involvement [$F(7,156)=1.022$, $p>.05$] failed to reveal any differences among participants assigned to the eight groups during this films; in the same way a Kruskall-Wallis analysis of variance was performed on the indexes of overall facial behavior and no significant difference was found [$\chi^2=2.109$, $df=7$, $p>.05$]. No differences between groups were found for normalized RR [$F(7,153)=1.022$, $p>.05$] and normalized EDA [$F(7,104)=1.348$, $p>.05$]. Therefore, these results suggested that our assignment had been successful.

5.4.2. Spontaneous emotion regulation

5.4.2.1 Subjective experience

As expected, the kidney transplant was significantly judged as emotional [χ^2=125.545, p<.001]. Moreover, paired *t* test were performed to analyze whether the kidney clip significantly differed from the baseline for all the main indexes of emotional impact. Mean scores are displayed in table 5.4. Results showed a significant difference for all the indexes considered: general involvement [t=-16.781, df=162, p<.001], overall intensity [t=-9.444, df=162, p<.001], number of emotion elicited [t=-8.999, df=162, p<.001] and dimensional valence [t=3.107, df=162, p<.01] indicating that the kidney transplant clip was more involving and less pleasant than the baseline clip.

Table 5.4. Mean scores of emotional impact indexes for baseline and kidney transplant clip.

Index	Baseline		Kidney	
	Mean	SD	Mean	SD
Involvement	2.50	2.13	5.63	1.81
Intensity	3.26	4.73	8.21	5.69
Number	0.98	1.43	2.94	1.69
Valence	4.51	1.52	3.91	1.84

Significant differences between subjects relying on High, Medium and Low Distancing groups were found for scores in dimensional valence [F(2,160)=7.300, p<.01, η^2=.08]. In addition, adjusted (Bonferroni) pairwise comparisons showed that the group using High Distancing rated the kidney transplant as significantly more pleasant than the groups using Medium (p<.01) and Low (p<.05) Distancing. Concerning emotional strength, significant differences were found for overall intensity [F(2,157)=3.501, p<.05, η^2=.04] and number of emotions elicited [F(2,153)=4.529, p<.05, η^2=.06]; adjusted contrasts indicated that the group relying on high Distancing reported less intense and fewer emotions (p<.05) than the group relying on low Distancing. No differences were found for general involvement [F(2,160)=1.525, p>.05].

Table 5.5. Mean scores of emotional impact indexes for low, medium and high Distancing groups.

Index	Low		Medium		High		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Involvement	5.96	1.81	5.39	1.84	5.55	1.74	5.63	1.81
Intensity	8.96	4.41	7.85	4.82	6.41	5.14	7.81	4.85
Number	2.40	1.20	2.15	1.23	1.66	1.22	2.10	1.24
Valence	3.85	1.87	3.37	1.74	4.68	1.71	3.91	1.85

Differences in emotion direction were further examined taking into account emotional categories. As in Study 2, we considered emotion categories which totalized the higher proportional frequencies: compassion, fear, sadness. The effects of the Distancing level (high, medium, low) was investigated by SAS® CATMOD procedure analysis for repeated measurement categorical data with the Repeated statement specifying the within variable (type of emotion). Percentages of responses are displayed in figure 5.2.

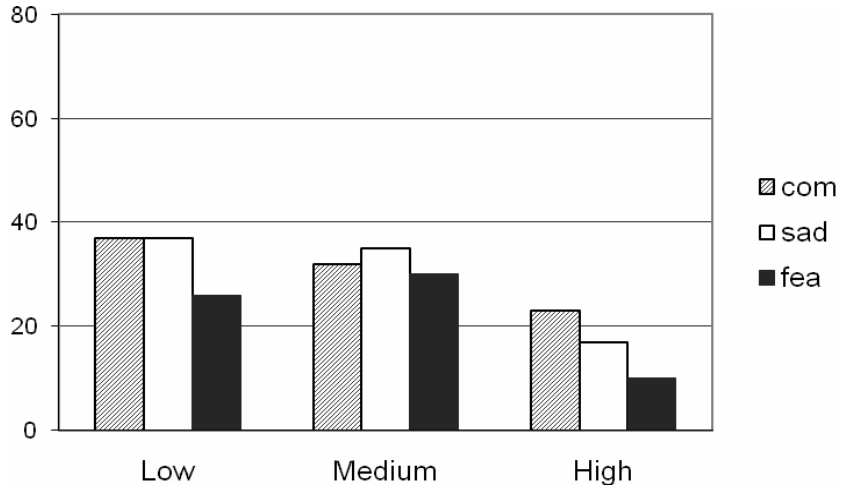


Figure 5.3. Percentages of subjects relying on high, medium or low Distancing with a favorable response to three emotional categories (compassion, sadness and fear) in the kidney transplant clip.

Results of analysis of variance showed a significant main effect of the Level of Distancing [χ^2= 12.20, df=2, p<.01]. Contrasts analysis showed that the group relying on high distancing significantly differed from both

the groups using low [χ^2= 8.58, df=2, p<.01] and medium distancing [χ^2= 9.45, df=2, p<.01].

No differences between High, Medium and Low Reappraisers were found for dimensional valence [F(2,160)=.848, p>.05], general involvement [F(2,160)=1.536, p>.05], overall intensity [F(2,157)=.841, p>.05] and number of emotions elicited [F(2,153)=.675, p>.05].

Table 5.6. Mean scores of emotional impact indexes for low, medium and high reappraisers.

Index	Low		Medium		High		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Involvement	5.57	1.94	5.38	1.75	5.98	1.71	5.63	1.81
Intensity	7.41	5.20	8.45	4.96	7.43	4.33	7.81	4.85
Number	2.04	1.36	2.25	1.23	1.98	1.14	2.10	1.24
Valence	3.94	1.81	3.68	1.73	4.14	2.01	3.91	1.84

5.4.2.2 Physiology

One way 3(Low, Medium, High) ANOVAs were performed to test whether physiological measures (normal mean RR interval, RR standard deviation, EDA and EDA standard deviation) differed with respect to the level of Distancing and Reappraisal. Concerning Distancing, no differences were found for normal mean RR interval [F(2,157)=.932, p>.05], RR standard deviation [F(2,158)=1.463, p>.05], EDA [F(2,97)=.070, p>.05] and EDA standard deviation [F(2,107)=.883, p>.05].

Concerning Reappraisal, no differences were found between high, medium and low reappraisers for normal mean RR interval [F(2,158)=1.268, p>.05], RR standard deviation [F(2,149)=.849, p>.05], EDA [F(2,97)=.183, p>.05] and EDA standard deviation [F(2,107)=.164, p>.05].

Table 5.7. Physiology: means and standard deviations for high, medium and low Distancing and for high, medium and low Reappraisers.

Distancing	Low		Medium		High		Total	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD
RR norm	1.04	.22	.997	.18	.993	.15	1.01	.19
RR-STD	1.23	.63	1.11	.53	1.04	.48	1.13	.55
EDA norm	-.638	.91	-.559	.99	-.570	.89	-.589	.92
EDA-STD	22.67	15.91	22.32	17.86	18.01	14.87	21.22	16.39
Reappraisal	Low		Medium		High		Total	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD
RR norm	1.04	.21	.981	.18	1.02	.18	1.01	.19
RR-STD	1.19	.60	1.06	.48	1.16	.59	1.13	.55
EDA norm	-.508	.91	-.646	.93	-.589	.96	-.589	.92
EDA-STD	19.80	14.99	21.61	17.16	21.99	16.96	21.22	16.39

5.4.2.3 Expressive behavior

Total numbers for each behavioral category as extracted from The Observer XT 7.0 were considered and frequency indexes weighted for the number of micro-categories were computed (*see* 5.3.6). Results are displayed in figure 5.4 indicating that that some categories (voice and posture) were used by a low number of subjects, whereas other categories (especially upper face) totalized a higher number of frequencies. Second, we compared the two clips to test whether the kidney film had elicited significantly more behavioral units than the baseline. This difference was tested performing the Wilcoxon non-parametric test for two related samples. Since voice was used by less than the 10% of subjects, it was excluded from further analyses. A significant difference was found for upper face [$Z=-5.597$, $p<.001$], lower face [$Z=-2.461$, $p<.05$], lips [$Z=-2.339$, $p<.05$], gaze [$Z=-4.061$, $p<.001$] and head [$Z=-5.464$, $p<.001$] indicating that the kidney film was characterized by a higher number of face expressions (upper and lower face) and of head movements and by a lower number of lip movements and changes in gaze direction, i.e. gaze

was fixed on the screen longer than for the baseline clip. No differences were found for posture [Z=-.560, p>.05].

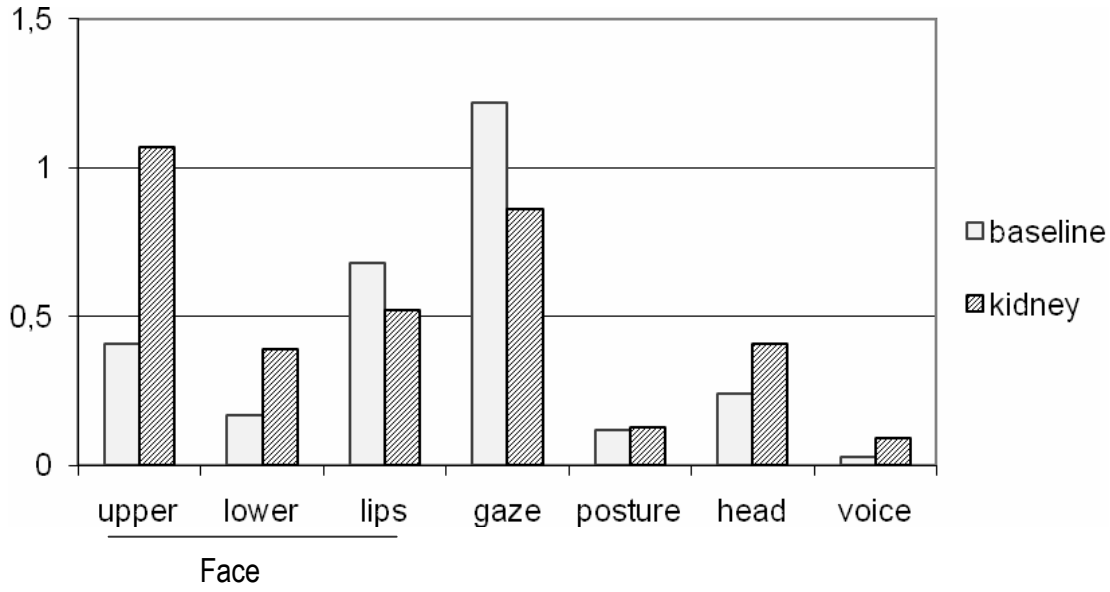


Figure 5.4. Weighted total numbers for different categories of expressive behavior (N=163).

Concerning micro-categories, the kidney clip was characterized mainly by Action Units 4 (M=2.65; SD=4.85), 1+2 (M=1.13; SD=2.66) and 7 (M=1.71; SD=4.89) for upper face; by unit 17(M=0.92; SD=3.07) for lower face; by units 14 (M=0.91; SD=1.88) and 24 (M=1.04; SD=2.47) for lip movements; by head tilted (M=1.30; SD=1.80) and head forward (M=0.65; SD=1.11) for head movements.

Secondly, we decided to focus on the categories for which the kidney clip had elicited a higher number of behavioral units than baseline clip (upper and lower face) to test whether significant differences in behavioral expression could be found with respect to the level of Distancing and the level of Reappraisal (high, medium and low). However, examining the distributional properties of our variables, it was noted that data were highly dispersed since all standard deviations were above the mean values, even after the deletion of outliers. For this reason, we decided to compute a total index of facial movements (Upper and lower face) and to split the sample in three different groups: 1) the first group was called Non-Exhibitors (n=48), i.e. included subjects who didn't show any behavioral

unit: this group was no further considered; 2) the second group was called Low Exhibitors (n=51) and included subjects showing a number of behavioral units below the median; 3) the third group was called the High Exhibitors (n=63) and included subjects showing a number of behavioral units above the median. Further analyses were thus computed for each group separately.

Table 5.8. Total number: means and standard deviations for high, medium and low Distancing and for high, medium and low Reappraisers.

Distancing	Low		Medium		High		Total	
Exhibitors	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Low	0.31	0.15	0.25	0.15	0.27	0.11	0.28	0.13
High	1.49	1.31	1.95	1.70	1.78	1.22	1.76	1.47

Reappraisal	Low		Medium		High		Total	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Low	0.28	0.12	0.27	0.16	0.30	0.13	0.28	0.14
High	2.01	1.93	1.66	1.28	1.92	1.83	1.88	1.70

Means and standard deviations are displayed in Table 5.7. One-way ANOVAs failed to reveal significant differences between groups relying on high, medium and high Distancing for both Low [$F(2,48)=.759$, $p>.05$] and High Exhibitors [$F(2,61)=.050$, $p>.05$] and between high, medium and low Reappraisers for both Low [$F(2,48)=.229$, $p>.05$] and High Exhibitors [$F(2,61)=.2320$, $p>.05$].

A second level of analysis concerned the extraction of emotional episodes through the scoring of three emotional dimensions (novelty, valence, coping), as explained in 5.3.5.3. An example of application of this methodology is displayed in Figure 5.5. In the lower part of the image, it is possible to observe the scoring of the three dimensional axes (novelty, pleasantness, coping) in correspondence to the multimodal behavioral patterns which are showed by both the video image sequence and action unit scoring in the upper part of the image. The application of the MEAS

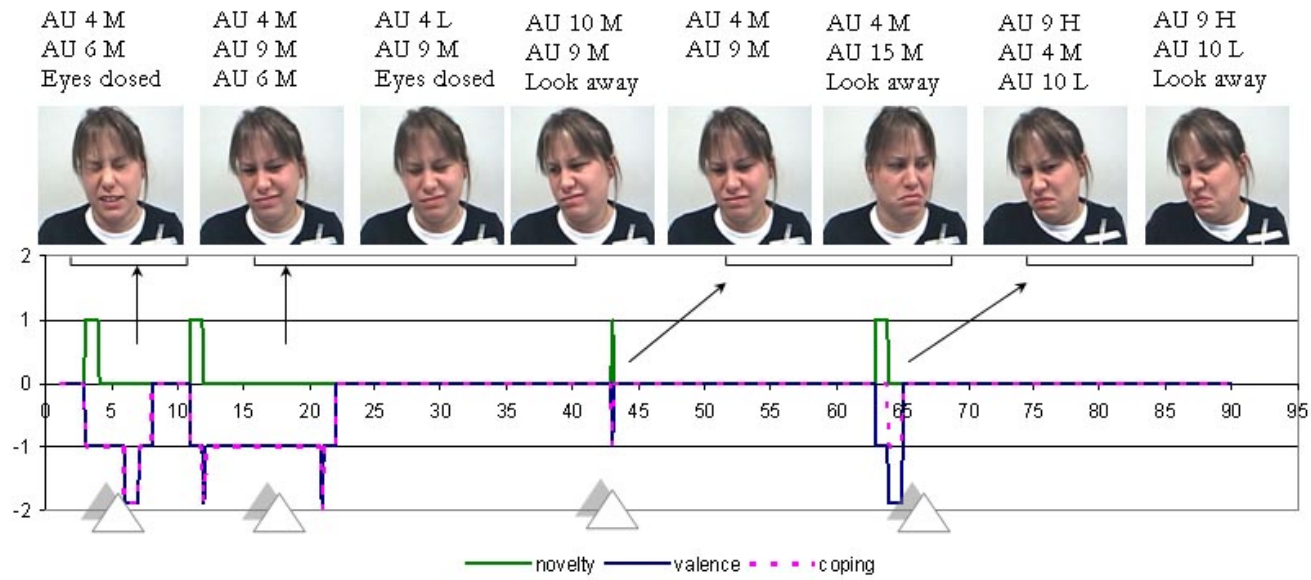


Figure 5.5. Scoring of the MEAS dimensions: an example.

coding system enabled to extract a few emotional episodes from the longer clip period (95 sec; x-axis). The number of extracted emotional episodes was submitted to statistical analysis by SAS® CATMOD procedure for the analysis of repeated measurement categorical data. Results revealed that the kidney clip elicited a significantly higher number of emotional episodes than the baseline clip [χ^2=36.25, df=1, p<.0001], whereas no differences were found between groups relying on high, medium and low level of Distancing [χ^2=3.54, df=2, p>.05].

5.4.3. Immersed vs. Detached reappraisal strategies

5.4.3.1 Subjective experience

As expected, the amputation clip was judged as emotional [χ^2=146.395, p<.001]. Moreover, paired *t* test were performed to analyze whether the amputation clip significantly differed from the baseline for all the main indexes of emotional impact. Mean scores are displayed in table 5.7. Results showed a significant difference for all the indexes considered: general involvement [t=-18.618, df=161, p<.001], overall intensity [t=-12.332, df=162, p<.001], number of emotion elicited [t=-16.002, df=162,

p<.001] and dimensional valence [t=7.555, df=160, p<.001] indicating that the amputation clip was more involving and less pleasant than the baseline.

Table 5.9. Mean scores of emotional impact indexes for the baseline and the amputation clip.

Index	Baseline		Amputation	
	Mean	SD	Mean	SD
Involvement	2.50	2.13	6.09	1.76
Intensity	3.26	4.73	10.73	6.55
Number	0.98	1.43	3.94	1.85
Valence	4.51	1.52	2.75	2.35

A three way 2(type of scenario) x 2(type of instruction) x 2(type of outcome) ANOVA was performed on each index of emotional impact. No differences were found when considering indexes of intensity or emotional strength: general involvement, overall intensity and number of emotion elicited (see table 5.10 Appendix).

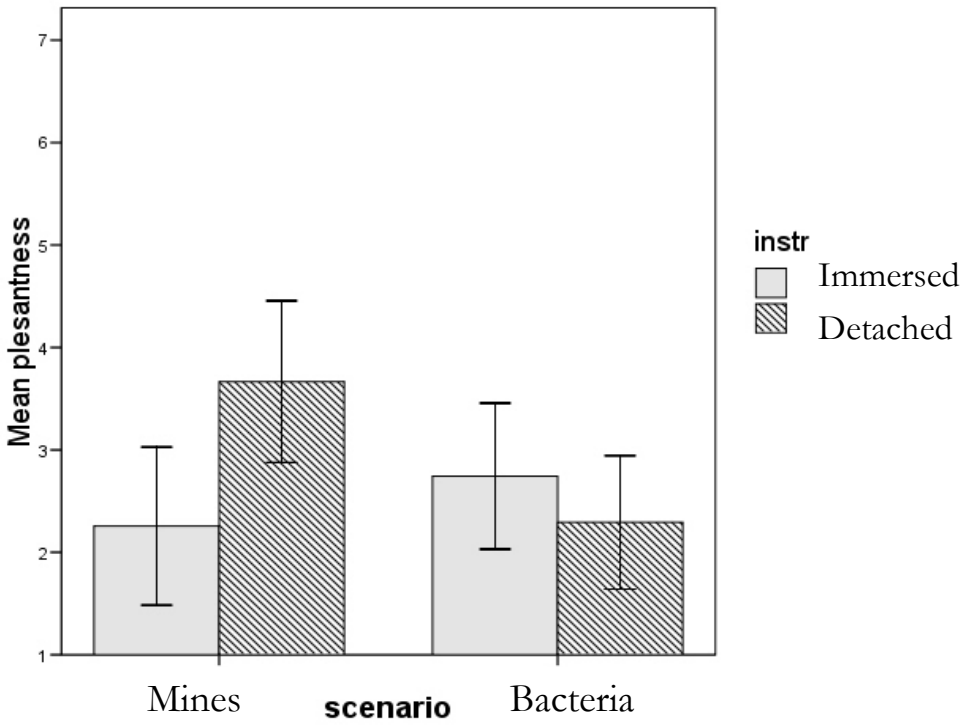


Figure 5.6. Amputation clip: type of scenario x type of instruction effect.

Concerning dimensional valence, the ANOVA revealed a significant interaction effect between type of scenario and type of instruction [$F(1,153)=6.435$, $P<.05$, $\eta^2=.06$] indicating that when the amputation was included within the anti-man mines scenario the subjects who were asked to remain detached rated the clip as more pleasant than the subjects who were asked to be immersed, whereas when the amputation clip was included within the bacteria clip, the two groups receiving different reappraisal instructions did not differ significantly.

Secondly, we decided to examine whether stable individual differences in Reappraisal and Distancing influenced the dependent variable. Two ANCOVAs were performed with type of scenario (2) and type of instruction (2) as fixed factors and level of Distancing (3) and of Reappraisal (3) alternatively as covariates.

Table 5.11. ANCOVAs results.

Source	SSQ	df	MSQ	F	p	η^2
DISTANCING	97.990	1	97.990	20.806	.000	.12
Scenario	10.723	1	10.723	2.277	.133	.01
Instruction	9.147	1	9.147	1.942	.165	.01
Scenario x instruction	34.616	1	34.616	7.350	.007	.05
Error	734.703	156	4,710			
REAPPRAISAL	12.973	1	12.973	2.469	.118	.02
Scenario	8.022	1	8.022	1.527	.218	.01
Instruction	7.724	1	7.724	1.470	.227	.01
Scenario x instruction	38.333	1	38.333	7.295	.008	.05
Error	819.720	156	7,295			

The results of the ANCOVAs covariate are displayed in table 5.11. Only the level of Distancing was significant ($\beta=.992$), but not Reappraisal ($\beta=-.361$). As displayed in table 5.11, the interaction effect was still significant (for the bacteria scenario, corrected marginal means were 2.29 and 3.67 for the immersed and detached group respectively; for the mines scenario 2.74 and 2.29).

Finally, differences in emotion direction were further examined taking into account emotional categories. As in Study 2, we considered emotions categories which totalized the higher proportional frequencies: compassion, fear, sadness and disgust. The effects of the type of scenario (2), type of instructions (2) and type of outcome (2) was investigated by SAS® CATMOD procedure analysis for repeated measurement categorical data with the Repeated statement specifying the within variable (type of emotion).

Results of the analysis of variance showed a significant main effect of the type of scenario [χ^2= 5.05, df=1, p<.05], type of emotion [χ^2= 8.76, df=3, p<.05] and an interaction effect between them [χ^2= 35.55, df=1, p<.0001]. Percentages of responses are displayed in figure 5.7. The nested-by-value effect analysis revealed a significant effect of type of emotion in both the anti-man mine scenario [χ^2= 22.62, df=1, p<.0001] and in the bacteria scenario[χ^2= 28. 32, df=1, p<.0001].

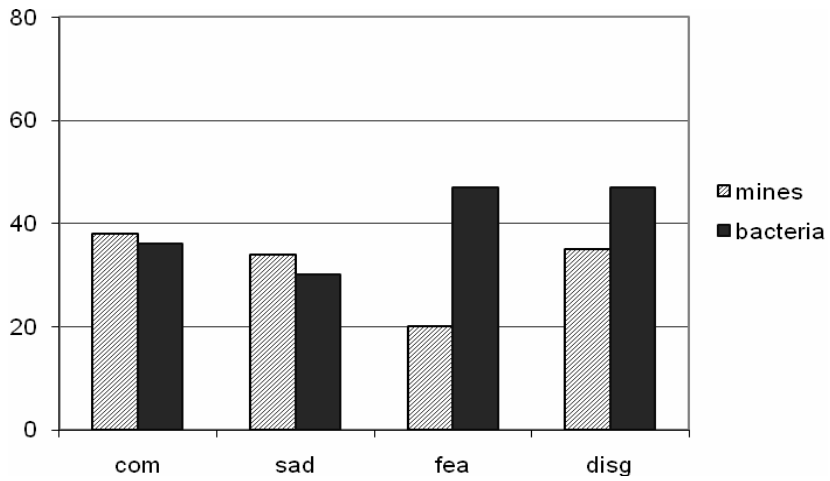


Figure 5.7. Amputation clip: type of scenario x type of emotion.

An analysis of contrasts indicated that the subjects watching the amputation included within the anti-man mine scenario selected fear significantly less than compassion [χ^2= 19.21, df=1, p<.0001], sadness [χ^2= 7.94, df=1, p<.01] and disgust [χ^2= 4.58, df=1, p<.05]. The subjects watching the amputation within the bacteria scenario selected fear significantly more than compassion [χ^2= 15. 62, df=1, p<.0001] and sadness [χ^2= 20. 29, df=1, p<.0001] .

5.4.3.2 Physiology

Table 5.12. Physiology: means and standard deviations for type of instruction (immersed vs. detached) and type of scenario (mines vs. bacteria).

	Mines				Bacteria			
Distancing	Immersed		Detached		Immersed		Detached	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD
RR norm	.967	.23	.925	.33	.974	.14	.953	.21
RR-STD	.768	.48	.827	.57	.924	.51	.807	.55
EDA norm	-1.06	.87	-1.25	.53	-1.19	.82	-.958	.67
EDA-STD	9.63	7.88	7.46	7.12	10.98	6.86	10.25	6.52

Two-way 2(type of scenario) x 2(type of instruction) ANOVAs were performed on four physiological measures (normal mean RR interval, RR standard deviation, EDA and EDA standard deviation). Results failed to reveal significant differences (see table 5.14 in Appendix). An example of extraction of physiological signals are displayed in figure 5.8.

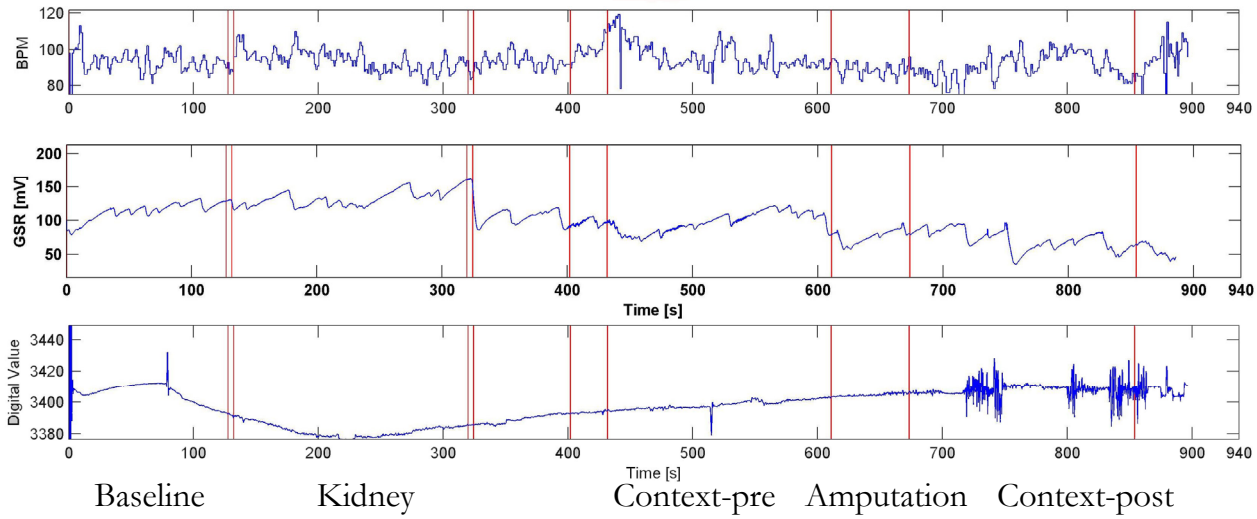


Figure 5.8. Physiological signals: heart rate (BPM), EDA and movement during the whole experimental session. Examining the signals, it is possible to observe a decrease in heart rate variability in correspondence to the amputation clip, thus indicating a physiological activation..

5.4.3.3 Expressive behavior

Total numbers for each behavioral category as extracted from The Observer XT 7.0 were considered and frequency indexes weighted for the number of micro-categories were computed (see 5.3.6). Results are displayed in figure 5.9. The indexes provided two types of information: results showed first that some categories (voice and posture) were used by a low number of subjects, whereas other categories (especially upper face) were highly used; second, that the baseline and the amputation clips differed with respect to some Macro categories. To test whether the amputation film had elicited significantly more behavioral units than the baseline clip, the Wilcoxon non parametric test for two related samples was performed. Since voice was used by less than the 10% of subjects, it was excluded from further analyses. A significant difference was found for upper face [Z=-6.127, p<.001], lower face [Z=-3.511, p<.001], lip movements [Z=-3.480, p<.001], and gaze [Z=-6.166, p<.001] indicating that the amputation film was characterized by a higher number of upper and lower face movements and by a lower number of movements for the other categories, i.e. fewer changes in gaze direction and lip movements. No differences were found for posture [Z=-.763, p>.05] and head [Z=-.771, df=1, p>.05].

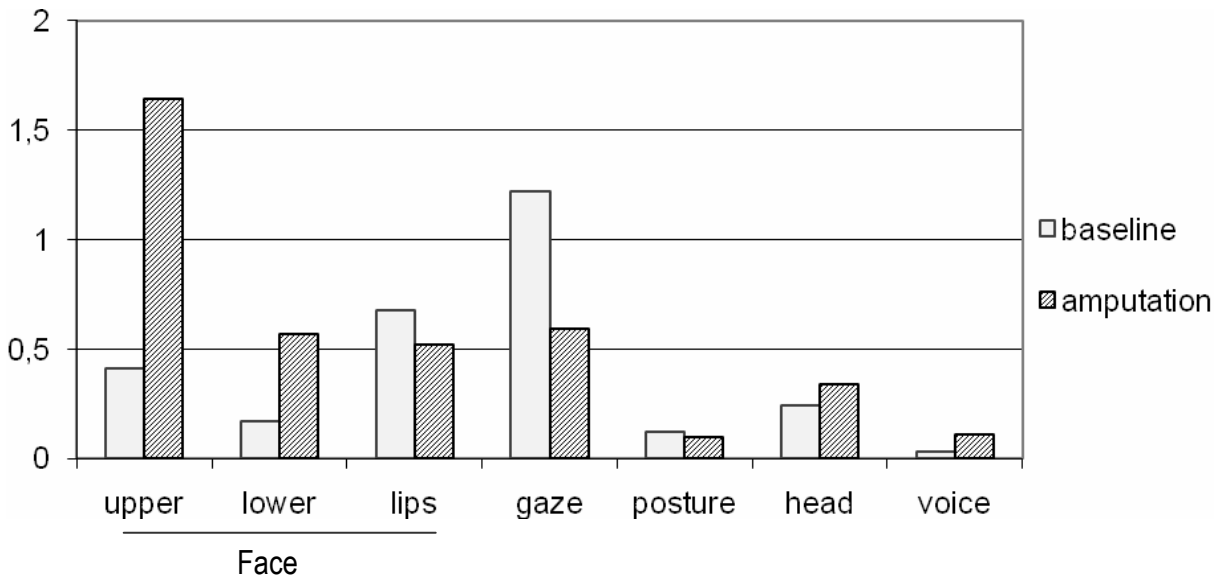


Figure 5.9. Weighted indexes for different categories of expressive behavior (N=163).

Concerning micro-categories, the amputation clip was characterized mainly by Action Units 4 (M=2.27; SD=4.13), 7 (M=1.28; SD=3.18) and 9 (M=0.92; SD=3.36) for upper face; by unit 10 (M=0.57; SD=2.23) for lower face; by unit 14 (M=1.15; SD=2.62) for lip movements; by head tilted (M=0.57; SD=0.98) and head forward (M=0.18; SD=0.44) for head movements.

Secondly, we decided to focus on the behavioral category for which a difference with the baseline clip had emerged (upper and lower face) to test whether significant differences in behavioral expression could be found for the type of instruction received (immersed vs. detached) and type of scenario (bacteria vs. mines). However, examining the distributional properties of our variable, it was noted that data were highly dispersed since all standard deviations were above the mean values, even after the deletion of outliers.

For this reason, we decided to compute a total index of facial movements (Upper and lower face) and to split the sample in three different groups: 1) the first group was called Non-Exhibitors (n=54), i.e. included subjects who didn't show any behavioral unit: this group was no further considered; 2) the second group was called Low Exhibitors (n=47) and included subjects showing a number of behavioral units below the median; 3) the third group was called the High Exhibitors (n=54) and included subjects showing a number of behavioral units above the median. Further analyses were thus computed for each group separately.

In the group of low exhibitors, a two-way 2(type of scenario) x 2(type of instruction) ANOVA was performed; scenario main effect [$F(1,43)=.706$, $p>.05$], instruction main effect [$F(1,43)=.077$, $p>.05$] and interaction effect [$F(1,43)=.027$, $p>.05$] were not significant. In the high exhibitors group, a two-way 2(type of scenario) x 2(type of instruction) ANOVA was performed; scenario main effect [$F(1,50)=.483$, $p>.05$], instruction main effect [$F(1,50)=.347$, $p>.05$] and interaction effect [$F(1,50)=.454$, $p>.05$] were not significant.

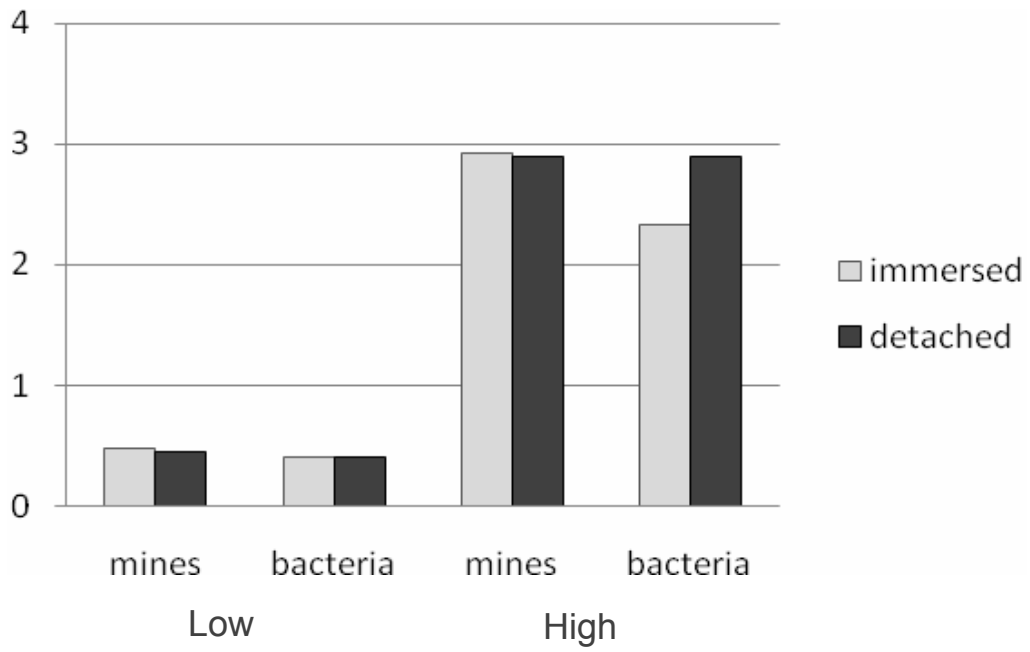


Figure 5.10. Indexes of facial expression in Low and High Exhibitors: type of scenario x type of instruction

A second level of analysis concerned the extraction of emotional episodes through the scoring of three emotional dimensions (novelty, valence, coping), as explained in 5.3.5.3. The number of extracted emotional episodes was submitted to statistical analysis by SAS® CATMOD procedure for the analysis of repeated measurement categorical data. Results revealed that the amputation clip elicited a significantly higher number of emotional episodes than the baseline clip [χ^2=139.32, df=1, p<.001], but no significant differences were found for type of instruction or type of scenario [Residual: χ^2=2.2, df=6, p>.05].

5.4.3.4 Stable individual differences and emotional response systems

The scores obtained to the coping and emotion regulation questionnaires (Study 1) were taken into consideration. Since no differences were found with respect to our experimental variables, we were interested in testing whether stable individual differences were associated in some way with the short-term responses obtained in the behavioral and physiological system.

To this purpose, we considered the three groups who were created in the analysis of behavioral data (Non exhibitors, Low and High exhibitors)

and a one-way ANOVA was performed on the two scales of the Emotion Regulation Questionnaire, on our brief questionnaire assessing the Level of Distancing, on the Problem-Focused and Emotion focused Coping Scale of the CISS and finally on two scales (Positive Reinterpretation and Venting) of the COPE questionnaire. Results revealed significant differences in the Level of Distancing [$F(2,157)=3.494$, $p<.05$] and in Emotion focused Coping [$F(2,157)=4.901$, $p<.01$] (see table 5.15. in Appendix). In particular, Tukey post-hoc tests indicated that Non and Low Exhibitors significantly differed from High exhibitors.

Secondly, in a similar way two groups were created (High and Low physiological arousal) according to the distribution of the EDA standard deviation: a low physiological arousal (mean=7.50, SD=1.68, N=35) and a high arousal (mean=18.53, SD=6.72, N=35) groups were selected from the top and bottom tertile respectively. Independent samples *t* test were performed on the scores obtained to the mentioned coping and emotion questionnaire. No differences were found (see table 5.16 in Appendix).

Table 5.13. Correlations between emotional response systems and measures of stable individual difference in the use of coping strategies.

	Di	EF	RE	SU	UF	LF	IN	VA	EDA	EDA-S
Distancing	-	-.04	-.24**	-.13	.08	.08	.14	-.32**	.04	.19*
Emotion-F		-	-.05	.04	.00	-.07	-.14	.06	.19*	.11
Reappraisal			-	.09	-.07	-.13	-.04	-.11	-.02	-.24**
Suppression				-	-.13	-.11	-.09	.14	-.09	-.06
Upper face					-	.74**	.20*	-.13	-.02	-.05
Lower face						-	.18*	.04	.02	.04
Intensity							-	-.13	.06	.33**
Valence								-	.08	-.01
EDA									-	-.08
EDA-STD										-

*Note: *p<.05; **p<.01*

The association between stable individual differences and emotional response systems was also tested by means of correlation analyses. Three significant differences were found: the Level of Distancing was negatively related to self-port pleasantness ($r=-.32$, $p<.01$) and positively related to EDA standard deviation ($r=.19$, $p<.05$); Emotion-Focused coping was positively related to EDA ($r=.19$, $p<.05$).

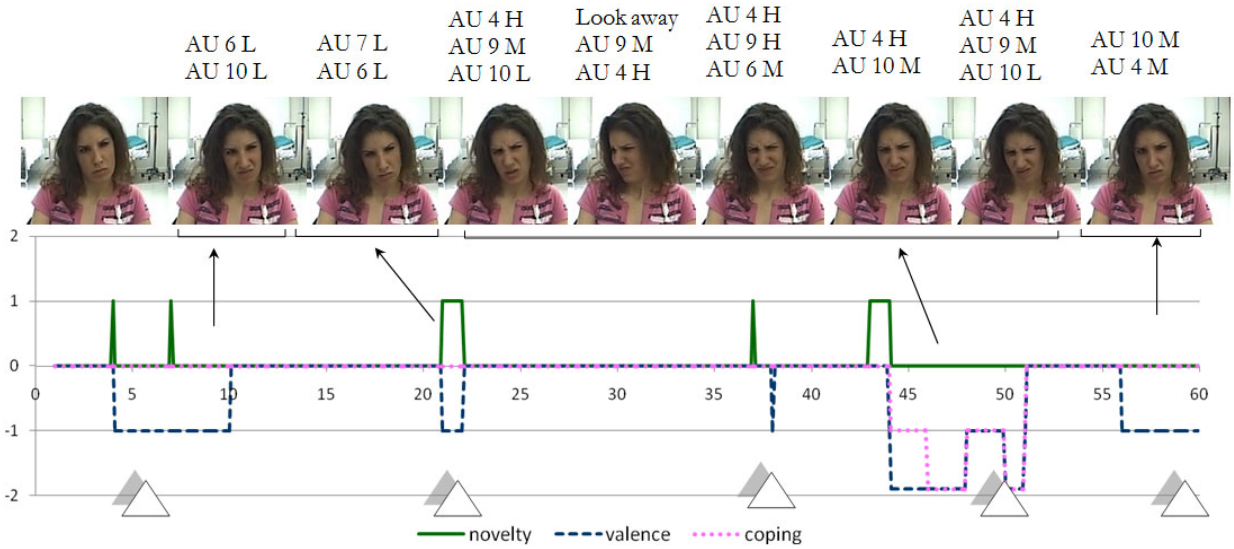
Finally, correlations between different emotional response systems were tested. Behavioral expression showed significant associations with subjective experience but not with physiological arousal: in particular, both upper face ($r=.20$, $p<.05$) and lower face ($r=.18$, $p<.05$) behavior was positively related to self-report overall intensity. Overall intensity was also positively related to EDA standard deviation ($r=.33$, $p>.01$).

5.4.3.4 Frame-by-frame micro-analysis

In this section, a *frame-by-frame* micro-analysis is presented to focus on more subtle differences. An example of application of this methodology is displayed in Figure 5.11. Four participants watching the amputation clip (60 sec) were extracted. Subjects were selected so that two subjects had been classified as low exhibitors (*see* 5.4.3.3) and two subjects as high exhibitors. Moreover, two participants had watched the amputation included within the bacteria context, whereas the other two subjects had watched the amputation within the anti-man mines context. For each subject, the scoring of the three MEAS dimensional axes in correspondence to the multimodal behavioral patterns (action units) are showed. The green line represents novelty, the blue one represents pleasantness and the pink one the coping dimension.

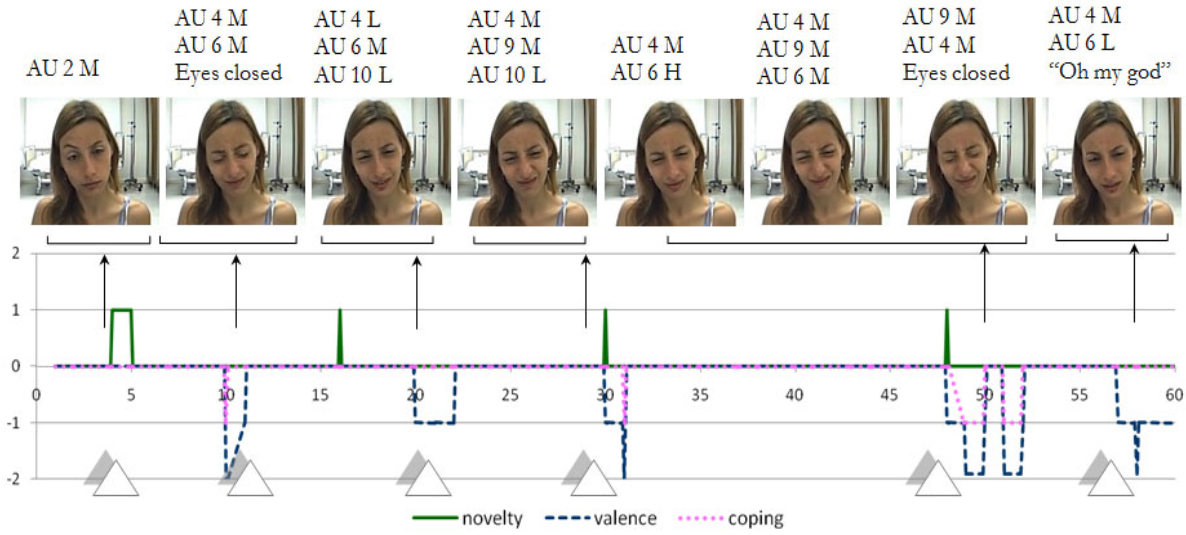
The scoring of the MEAS dimensions enabled to extract a few emotional episodes from the longer clip period (60 sec, x-axis). Thus, emotional behavioral expressions were not spread over the whole clip indistinctly but seemed to concern specific intervals and actions: the initial seconds of the clips (4 sec) where the surgical incision begins, seconds 10-13 where the incision is performed, seconds 20-22 where the skin and the muscles are removed, seconds 45-50 where the surgeon starts to cut the bone and the conclusion of the amputation.

Anti-man Mines



Reappraisal Scale=4.50; Suppression scale=2.75; Level of Distancing= Low
Self ratings: Involvement=8; Pleasantness=2; Emotions: Compassion (3); Sadness (4), Fear (5), Interest (5).

Bacteria

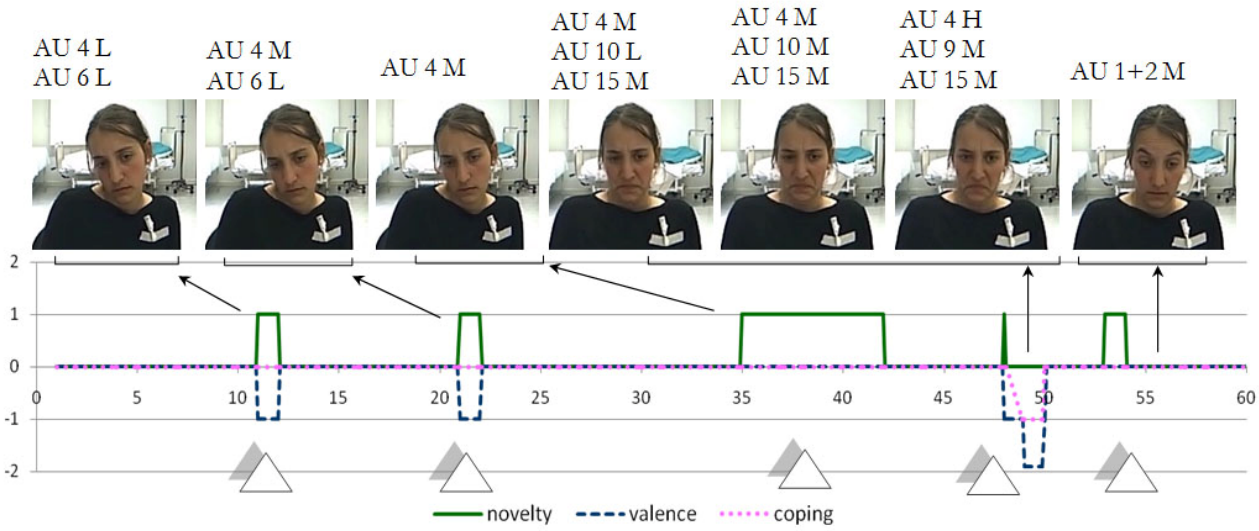


Reappraisal Scale=3.17; Suppression scale=1.25; Level of Distancing= Medium
Self ratings: Involvement=7; Pleasantness=1; Emotions: Compassion (4); Disgust (3)

HIGH EXHIBITORS

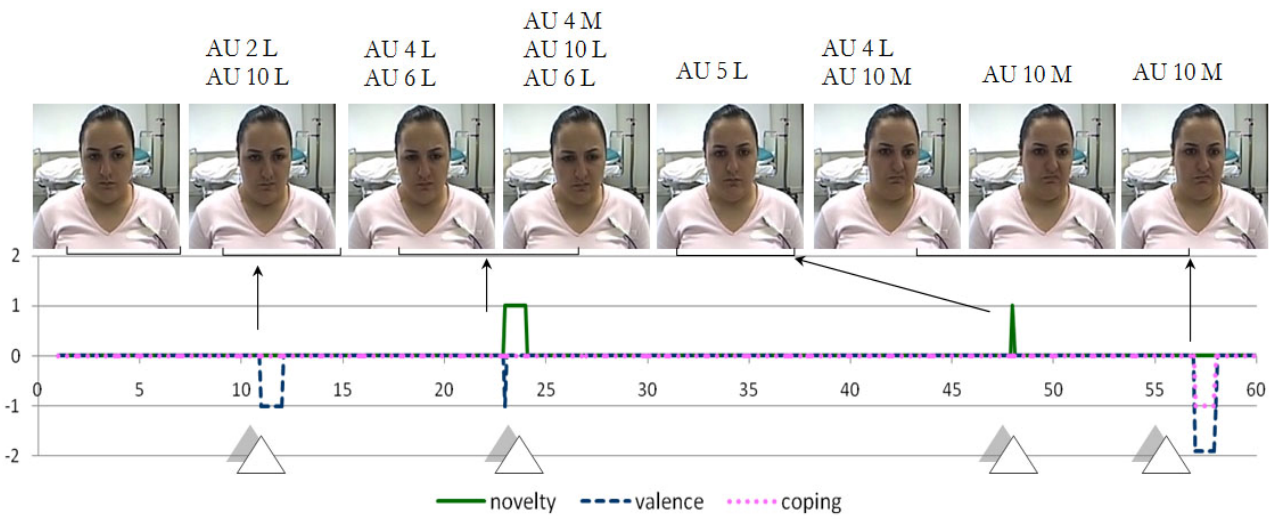
Figure 5.11. Frame-by-frame micro-analysis

Anti-man Mines



Reappraisal Scale=2.67; Suppression scale=2.25; Level of Distancing= Low
Self ratings: Involvement=7; Pleasantness=0; Emotions: Disgust (4).

Bacteria



Reappraisal Scale=5.33; Suppression scale=1.50; Level of Distancing= Low
Self ratings: Involvement=8; Pleasantness=0; Emotions: Compassion (5); Sadness (5), Fear (5), Interest (5).

LOW EXHIBITORS

Figure 5.11. Frame-by-frame micro-analysis

5.5 Discussion

These findings suggest a number of considerations about reappraisal regulatory strategies and their interaction with contextual variables. We will consider the short-term effects of both long term individual differences and experimentally manipulated strategies on the three main systems of emotional response (Gross, 1998a; Egloff et al., 2006): subjective experience, expressive behavior and physiological arousal.

5.5.1. Spontaneous emotion regulation

The first main goal of Study 3 consisted in the investigation of the correlates of spontaneous emotion regulation while watching a high-impact contextualized emotional event. Spontaneous emotion regulation means that – in contrast to the experimental approach – the use of certain regulatory strategies (if any) was not induced by means of an instruction (Egloff et al., 2006). In fact, all participants viewed the initial surgery clip (the kidney transplant) under the instruction to simply watch the film. Thus, participants were free to use the strategy that fitted best their personal preference. This condition enabled us to evaluate whether stable individual differences were associated with short-term outcomes on the experiential, behavioral and physiological response systems. We considered two different measures of stable regulatory strategies: the first measure consisted in the Reappraisal scale of the Emotion Regulation Questionnaire (*see* Study 1) which assesses the use of reappraisal regulatory strategy in general situations; the second measure concerned the level of Distancing within the nurse working context (*see* 5.3.2).

First of all, we considered whether emotion was actually elicited (and thus eventually regulated) testing the hypothesis that the kidney film induced adequate emotion levels (emotional impact) and variability in emotional responding when compared to the baseline. Our data clearly showed that the film was effective in inducing experiential, behavioral, and physiological responses. Concerning subjective experience, the kidney clip totalized a significantly higher score in all indexes of emotional strength and it was judged as significantly less pleasant than the baseline, thus

indicating the elicitation of negative emotional states. Regarding behavior, differences were found across almost all behavioral macro-categories. Within Face macro-category, participants displayed a significantly higher number of upper and lower face movements and a lower number of lip movements. As displayed in table 5.3, the upper and lower face categories included the major FACS (Ekman, Friesen & Hager, 2002) action units which are involved in emotional facial expressions (EMFACS), whereas the category of lip movements included all lip action units which are not specific of any emotional state, as for instance lip bite, lip wipe, etc. Within Gaze macro-category, during the kidney film fewer changes in gaze direction were recorded indicating that participants maintained their gaze fixed on the screen. A more stable gaze upon the computer screen suggested higher levels of attention and novelty, which were also supported by the higher number of Head movements, e.g. head forward. No changes were found in Posture indicating that there were no difference in overall body movements. Finally, concerning physiological signals, normalized change scores of heart rate and electro-dermal activity confirmed that our protocol was effective in emotion elicitation.

Secondly, we considered the influence of emotion regulatory strategies. Our results indicated that in our sample of nursing students the only measure of stable regulatory strategies which was associated to differences in short-term emotional responses was the level of Distancing in the professional context, i.e. the score obtained to the brief questionnaire aimed at assessing the regulatory strategies on which nursing students relied in their practice of the nursing profession. In particular, these differences concerned subjective experience: the students who relied on a high ability to distance themselves from stressful events concerning their profession – for instance the death of a patient – were able to modify the appraisal of the kidney clip which they judged as less unpleasant than the students relying on lower levels of Distancing. Moreover, they also reported a lower number of emotions and a lower level of overall intensity thus indicating that they felt fewer and less intense emotions. Finally, high distancing students reported less fear, less compassion and less sadness than low or medium distancing students. Interestingly, the only self-report

measure which did not present significant differences was general involvement: we may conclude that Distancing influenced several indexes of emotional impact reducing both the strength and the direction of the stimulus impact without reducing the general feeling of involvement.

However, similar differences were not found in the behavioral and physiological response systems. The hypothesis that students who were more able to distance themselves from negative events would show less behavioral expression and less physiological arousal was not confirmed since high, medium and low distancing subjects displayed similar levels of emotional behavioral expressions and similar heart rate and electro-dermal activity. Because self-report ratings were collected retrospectively using questionnaires, it seemed that Distancing can influence the retrospective recall and reconstruction of the emotional experience but has no influence on the emotional process as it is occurring (behavioral and physiological recording). This hypothesis should however be better tested, for instance relying on rating dial methodologies which afford continuous measures of emotion subjective experience (Rottenberg et al., 2007).

Finally, no significant differences were found for high, medium and low reappraisers (ERQ). Previous studies (Mauss et al., in press; Egloff et al., 2006) had found that Reappraisal was associated with short-term emotional response profiles, i.e. less negative and more positive subjective experience, less behavioral expression of anxiety and a more adaptive physiological response profile. Our results did not replicate these findings: high and low reappraisers showed no significant differences with respect to subjective experience (Study 2), behavior and physiological signals. Concerning physiological arousal, our findings confirmed the results by Egloff et al. (2006), who had found no association between reappraisal and physiological indicators such as skin conductance level and heart rate. Instead, the lack of differences within subjective experience and behavioral expression was less easy to explain. One possible reason may be due to different elicitation methods. Both previous studies (Mauss et al., in press; Egloff et al., 2006) had used lab setting situations rather than film-watching as emotion-inducing situations: anger provocation in the former and evaluated speaking tasks in the latter. Moreover in both studies, the

ERQ was administered after the experimental session – and in Egloff et al. (2006) immediately after the speech task – whereas in our study participants completed the questionnaires approximately one month before the film watching session. A second explanation makes reference to the differences between the two instruments used in our Study and to the role of contextual variables. In fact, whereas the ERQ is aimed at the assessment of reappraisal and suppression in general situations, the brief questionnaire assessed coping strategies (Distancing) within the nursing professional context. For this reason we suggest that it offered a more sensitive measure of differences between subjects who were confronted with a contextualized event, i.e. a surgery, which directly concerned the internship experience of nursing students.

5.5.2. Immersed vs. detached reappraisal strategies

The second major goal of Study 3 consisted in the analysis of the short-term effects of two reappraisal strategies which were experimentally induced through instructions.

In the same way as for spontaneous regulation, we preliminarily considered whether emotion was actually elicited (and thus eventually regulated) testing the hypothesis that the amputation film induced adequate emotion levels and variability in emotional responding when compared to the baseline. Our data clearly showed that the amputation film was effective at inducing experiential, behavioral, and physiological responses. In fact, concerning subjective experience, the amputation clip totalized a significantly higher score in all indexes of emotional strength; moreover it was judged as significantly less pleasant than the baseline indicating that it elicited negative emotion. Secondly, differences were found across almost all behavioral macro-categories. Concerning Face, participants displayed a significantly higher number of upper and lower face movements and a lower number of lip movements. As explained above, the upper and lower face categories included the major action units involved in emotional facial expressions, whereas the category of lip movements included all lip action units which are not specific of any emotional state. Within Gaze macro-category, fewer changes in gaze

direction were recorded since gaze was steadily directed upon the computer screen, indicating higher levels of attention and novelty. No differences were found in Posture and Head movements. Finally, normalized change scores of heart rate variability and skin conductance confirmed that our protocol was effective in emotion elicitation.

Induced regulatory strategies produced significant differences in subjective experience. As expected (Gross, 1998a; Ochsner et al., 2004) subjects who tried to adopt a detached perspective evaluating the events displayed from a «technical» and objective point of view reported significantly less negative experience than subjects who tried to adopt a participated and immersed attitude. Interestingly, this was true only when the amputation clip was included within the anti-man mines scenario, whereas no differences emerged when the amputation was included within the bacteria context. This means that when the events displayed might affect the person watching (affecting the self), the attempt to remain detached is no more (or less) effective at down-regulating negative emotion. This was the first study to consider two types of reappraisal strategy while systematically varying the available contextual information. In their study, Ochsner and collaborators (2004) had examined both down- and up-regulation of negative emotion by comparing self and situation focused reappraisal strategies while watching emotion-eliciting pictures (IAPS, Lang et al., 1995). In our study, we focused on self focused strategies examining whether they were effective at down-regulating emotion when the appraisal of the eliciting event was systematically modified by different situational contexts. Our results indicated that the effectiveness of reappraisal strategies at changing the evaluation of events and reducing negative emotion may depend on the situation and in particular on the degree to which the event is perceived as a threat to oneself. Moreover, this was the first study to examine the role of stable individual strategies and their influence when subjects are instructed to intentionally use reappraisal. Our results showed that the down-regulation effect of the detached reappraisal strategy when dealing with events which concern other people's lives was influenced by stable individual differences. In fact, when Distancing was included as a covariate, it

showed a highly significant effect. In addition, the interaction effect between type of instruction and type of scenario increased its significance. Thus, these findings suggested that it is possible to voluntary adopt a specific regulatory strategy – as for instance trying to remain objective and detached – to down-regulate negative emotion and the effectiveness of this strategy will depend on one side on the situational context and on the other on one's own habitual regulation style. In other words, the adoption of a detached point of view will be easier for people who usually rely on high Distancing.

A second effect concerned the type of emotion elicited. When subjects watched the surgery clip included within the bacteria context, they reported more fear and disgust than sadness and compassion, whereas subjects watching the clip within the anti-man mines scenario reported more sadness and compassion than fear. This pattern of emotions was consistent with our hypotheses and with the results obtained in Study 2. Therefore, according to previous studies on appraisal manipulation (Lazarus et al., 1970), our findings suggested that the contextual information may modify the appraisal of an event and consequently the related emotional experience. Concerning the emotional impact of the amputation clip, we can conclude that reappraisal strategies and contextual scenarios were able to modify its direction (i.e. dimensional valence and type of emotion) but not its strength: no differences were found in general involvement, overall intensity and number of elicited emotions. Thus, it seemed that the attempt to adopt a detached vs. immersed perspective on one side and the contextual information on the other are effective at altering the evaluation of pleasantness of the event (reducing negative affect) and the type of emotion elicited, but they may have no effect on intensity of the stimulus and of the related emotional experience.

The hypothesis that subjects adopting a detached point of view would exhibit fewer behavioral expression and less physiological activation was not confirmed since no significant differences were found in the behavioral and physiological response systems. In the same way, the preceding contextual information (affecting the self vs. affecting the others) had no effect on the amount of expressive behavior and

physiological arousal. Whereas also previous studies failed at finding the expected reduction in physiological activity as a consequence of reappraisal strategy (Gross, 1998a; Egloff et al., 2006), previous findings demonstrated that reappraisal was effective at reducing expressive behavior. Nonetheless, our results indicated that facial movements (upper and lower face) and variability in electro-dermal activity were related to self-report overall intensity (Mauss et al., 2005). Since this index of emotional impact was also not influenced by either reappraisal or context, these results may suggest that the amputation event elicited a general and undifferentiated activation (Russell, 2003) which was not affected by either instruction or preceding contextual information. In fact, as already stated about spontaneous emotion regulation, self-report ratings were collected retrospectively using questionnaires, and thus regulatory mechanism may act on the retrospective recall and reconstruction of the emotional experience and have no (or less) influence on the emotional process as it is occurring (behavioral and physiological recording). However, further considerations are needed. First, the influence of stable individual differences should be considered, since both behavioral and physiological systems were moderately associated to stable strategies: non exhibitors and low exhibitors were characterized by lower Distancing and higher Emotion-focus Coping than high exhibitors; electro-dermal activity was negatively correlated to Reappraisal and Distancing. Second, our sample consisted of nursing students: although few differences were found in coping and emotion regulation strategies between nursing student and a control group (Study 1), they may be nonetheless characterized by specific regulatory styles. In a recent study, Vlahou and Vanman (2004) found that nurses reported experiencing less disgust and tension but more sadness while watching surgery clips than the controls. Moreover, the use of reappraisal was not related to nursing experience or to self-reported physical and emotional health, and it did not result in decreased sympathetic activation during the clips. Finally, Study 3 concerned only the emotional responses during the amputation clip: a future analysis of the behavioral and physiological signals during the PRE and POST contextual clips may help to understand the entire process.

APPENDIX

Alcuni infermieri raccontano brevemente momenti intensi della loro esperienza in ospedale. Utilizzando la scala di punteggi sottostante, per favore indica in ciascuno spazio libero **quanto ti rispecchi e pensi/credi che ti saresti comportato allo stesso modo :**

0 1 2 3 4 5 6 7 8

Non mi rispecchio per niente Neutrale Mi rispecchio moltissimo

_____ Entro nella stanza, il rumore dell'umidificatore copre quello del suo respiro, sta morendo. La moglie non c'è, farfuglio qualche cosa alla figlia e vado via. A metà corridoio mi fermo, delle persone che camminano in direzione opposta alla mia mi guardano perplesse, mi rendo conto che sto scappando, non l'ho neanche toccato. Nonostante questa consapevolezza non torno indietro. So che non è giusto ma sto troppo male a vederlo così. Quella notte ho dormito poco e male.

_____Mi ha toccato particolarmente Elisa, una bambina di sei anni, piccola e magra. Da qualche giorno non riesce più a parlare e comunica a sua mamma quello che desidera con gesti che diventano sempre più deboli. Usa molto lo sguardo. Quando entro nella sua camera, sta guardando una Barbie vestita da sera. Poi comincia ad agitarsi perché le è venuta un'idea ma non sa come comunicarla. Finalmente la mamma capisce: vuole farmi vedere una foto di carnevale dell'anno prima, che la ritrae vestita da principessa. «Sei più bella tu della Barbie» le dico mentre lei sistema la foto vicino a sé. Poi di colpo si addormenta, stanca. Dopo poche ore Elisa muore, con la sua piccola foto ancora vicina. Ho fatto uno sforzo enorme per trattenere le lacrime. E' difficile gestire situazioni simili e il coinvolgimento che un evento come questo può portare.

_____Ho iniziato a lavorare come infermiere da giovane e ho visto la gente morire. Ho imparato a difendermi e aprire troppi spazi di comunicazione con i malati ho timore che mi riporti all'angoscia di allora. Forse sono troppo razionalista, ma credo che per svolgere determinate mansioni dobbiamo escludere le emozioni. Mi rendo conto che devo operare un certo distacco altrimenti mi viene troppo difficile. Penso che in questi casi sia necessaria la freddezza sennò è difficile svolgere un lavoro come il mio.

_____Un'esperienza per me dolorosa è stata la morte di una donna, ancora abbastanza giovane, che ha lasciato il marito, un figlio sedicenne e la

madre nel dolore più profondo. Si chiamava Anna e quando l'ho conosciuta, circa due mesi prima della sua morte, era spaventata e non riusciva a capacitarsi di quanto le stava succedendo. Il male faceva passi da gigante, e ogni volta che l'andavo a trovare si notava visibilmente un peggioramento; la poverina era afflitta da molti dolori che non la lasciavano tranquilla, salvo quando, sotto l'effetto di sedativi, riusciva a dormire. Di fronte a lei mi sentivo impotente e tutte le volte che si lamentava e mi pregava di aiutarla non sapevo proprio come fare se non accarezzarla e tenerle la mano. L'ho vista morire e ho provato una grande angoscia, non dimenticherò mai il suo sguardo prima di chiudere gli occhi sotto l'effetto della morfina.

_____Il lavoro mi ha portato a contatto con la morte tante volte. Tempo fa ho assistito una signora anziana malata terminale. Aveva lottato per anni contro il suo male ma ora la sofferenza fisica la stremava. Era assistita da suo marito che pregava i medici di fare il possibile. Ogni giorno le misuravo la temperatura e i parametri vitali. Un giorno, all'inizio del turno, i colleghi mi hanno detto che era morta. Mi è dispiaciuto, ma cerco di accettare la morte con serenità. Secondo me il coinvolgimento emotivo può essere un rischio che può compromettere sia la relazione con l'utente e il tuo benessere; vivere con troppa empatia le storie delle persone che conosci nel tuo lavoro ti può arricchire, ma anche danneggiare, intromettendosi nella tua vita privata.

_____«Ciao Luigi, oggi come va?» Ma Luigi non mi sorride come al solito e non mi dà la mano. Quando ho conosciuto Luigi camminava ancora, quindici giorni dopo non poteva più alzarsi dal letto, il male galoppante si era esteso alle ossa e lo aveva definitivamente immobilizzato. Anche la voce era svanita, solo gli occhi e il sorriso resistevano. Al mio arrivo mi salutava con uno sguardo sorridente e una stretta di mano, che durava a lungo. Era la nostra sola comunicazione: parlavo, mi sorrideva e non lasciava la mia mano. Ma oggi no. Capisco che il male continua inesorabile la sua strage, e allora, approfittando del sonno che sopraggiunge vado via. Non aspetto nemmeno l'infermiera che di solito aiuto a cambiarlo, pulirlo, medicarlo. Vado via. Il modo con cui affronto la situazione è più che altro una fuga. La sera Luigi muore.

Table 5.10. ANOVAs results for indexes of emotional strength.

Source	SSQ	df	MSQ	F	p
INVOLVEMENT					
Scenario	5.135	1	5.135	1.647	.201
Outcome	.762	1	.762	.244	.622
Instruction	3.132	1	3.132	1.005	.318
Scenario x outcome	.478	1	.478	.153	.696
Scenario x instruction	1.623	1	1.623	.521	.472
Outcome x scenario	1.947	1	1.947	.625	.431
Outcome x scenario x instr	6.540	1	6.540	2.098	.149
Error	480.003	154	3.117		
INTENSITY					
Scenario	33.131	1	33.131	.751	.388
Outcome	1.284	1	1.284	.029	.865
Instruction	5.657	1	5.657	.128	.791
Scenario x outcome	48.701	1	48.701	1.104	.295
Scenario x instruction	33.742	1	33.742	.765	.383
Outcome x scenario	.704	1	.704	.016	.900
Outcome x scenario x instr	2.331	1	2.331	.053	.818
Error	6749.721		44.116		
NUMBER					
Scenario	.150	1	.150	.042	.838
Outcome	.077	1	.077	.022	.883
Instruction	2.274	1	2.274	.641	.424
Scenario x outcome	4.622	1	4.622	1.303	.255
Scenario x instruction	.817	1	.817	.231	.632
Outcome x scenario	.156	1	.156	.044	.834
Outcome x scenario x instr	.002	1	.002	.001	.980
Error	542.525	153	542.525		

Table 5.14. Physiological signals during the amputation clip: ANOVAs results.

	Source	SSQ	df	MSQ	F	p
RR	Scenario	.10	1	.010	.173	>.05
	Instruction	.042	1	.042	.740	>.05
	Scenario x instruction	.005	1	.005	.090	>.05
	Error	8.901	155	.057		
RR-STD	Scenario	.177	1	.177	.619	>.05
	Instruction	.032	1	.032	.112	>.05
	Scenario x instruction	.294	1	.294	1.031	>.05
	Error	42.205	148	.285		
EDA	Scenario	.199	1	.199	.364	>.05
	Instruction	.008	1	.008	.016	>.05
	Scenario x instruction	1.140	1	1.140	2.091	>.05
	Error	53.987	99	.545		
EDA STD	Scenario	117.37	1	117.37	2.028	>.05
	Instruction	57.678	1	57.678	.997	>.05
	Scenario x instruction	14.126	1	14.126	.244	>.05
	Error	6134.1	106	57.879		

Table 5.15. Non Exhibitors, Low and High Exhibitors: stable individual differences in coping strategies.

Scale	Non		Low		High		Exhibitors	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Reappraisal	4.51	1.19	4.63	1.10	4.43	1.13	4.52	1.14
Suppression	3.00	1.14	2.71	1.27	2.88	1.42	2.87	1.29
Distancing	2.63	2.38	2.63	2.17	3.61	2.18	2.99	1.28
Problem-focus	53.18	10.0	54.59	10.6	50.84	11.9	52.73	10.9
Emotion-focus	41.87	12.3	45.27	10.1	48.50	11.1	45.31	11.5
Reinterpretation	9.68	2.92	10.78	3.27	10.79	2.96	10.41	3.07
Venting	12.16	2.25	12.17	2.32	12.00	2.27	12.10	2.26

Table 5.16. Physiological arousal and stable coping strategies.

Scale	Low Arousal		High arousal	
	Mean	SD	Mean	SD
Reappraisal	4.74	.81	4.32	1.09
Suppression	2.94	1.38	2.79	1.20
Distancing	3.07	2.05	3.48	2.31
Problem-focus	51.21	11.95	53.51	11.22
Emotion-focus	46.60	11.55	45.74	11.19
Reinterpretation	12.17	2.28	11.94	2.38
Venting	10.28	3.42	10.28	2.52

Table 5.17. Rules to score MEAS emotion dimensions.

NOVELTY	
+	-
Face	
AU 1, AU2, AU 1+2	AU 41
AU 1+2+17	AU 43
AU 1+2+25+26	
AU 5, AU 1+5	
AU 4, AU 4+7	
AU 15+17	
AU 5+ head backward	
AU 7, AU 7+41	
AU 7+20+23	
AU 25, 26,AU 25+18	
Gaze	
Gaze to the screen	Look away
Posture	
Head forward	Head backward
Posture forward	Head tilted
	Posture backward

PLEASANTNESS	
+	**-**
Face	
AU 12	AU 15
AU 6+12	AU 6+4
AU 6+12+25	AU 6+17
AU 6+12+24	AU 9
AU 6+12+20+24	AU 9+16+25
AU 6+14+20+24	AU 6+9+14
	AU 10
	AU 17+20+24
	AU 17+20+non words
	AU 17+panting
	AU 6+7+9
	AU 14+20+24+43+head turned
	AU 16+20+25
Combination with Novelty	
AU 1+2+12+17+20	AU 4+6
AU 4 + posture/head backward	AU 1+4+20+17
AU 1+2+41	AU 1+4+17
AU 1+17+25+22	AU 4+6+7+9
	AU 1+2+9+15+17+25
Gaze	
Gaze to the screen	Look away
Posture	
	Head backward
	Posture backward
	Head turned

COPING	
+	**-**
Face	
AU 6+20+24	AU 17+22i
AU 23+24	AU 17+23 (+head backward)
AU 16+25+28	AU 17+23+shaking head
Combination with novelty	
AU 1+2+17+positive message	AU 2+17
AU 2+15+17+positive message	AU 2+17+18L+23
AU 1+2+17+ nodding	AU 2+17+20+23
AU 1+2+20L	AU 4+7+head backward
	AU 4+17+20
	AU 5+17
Combination with pleasantness	
AU 6+12+right answer	AU 6+20
	AU 12+17+18
	AU 15+17
	AU 9+15+16+17
	AU 9+17+23
Gaze	
	Look away
Posture	
Nodding Head	Shaking head
	Head backward