THE ROLE OF MEDIA IN SUPPORTING A STRESS MANAGEMENT PROTOCOL: AN EXPERIMENTAL STUDY

Daniela Villani[1] and Giuseppe Riva[1]

Stress management (SM) is a term widely used with a seemingly obvious meaning but it is not clear how many different forms of SM exist and how efficacious they are according to the target problem. Stress is a multidimensional condition and we believe that it requires a wide-spectrum approach. We consider that a combination of stress management techniques can produce more significant outcomes than did single-strategy programs. For this reason we propose an integration of three approaches to cope with stress and improve emotional management from different points of view: the Emotion Focused Therapy; the Behavioral Therapy, and in particular Relaxation; the Rational Emotive Therapy.

In particular, we decided to use two mediated experiences – audio and immersive 3D video - to support the Relaxation phase. The critical role in mediated experiences is played by the sense of presence that allows the experience to evoke the same perceptual reactions and emotions as a real one.

To verify the efficacy of the SM protocol we carried out a controlled trial, comparing an experimental Video group, an Audio group (that only listened to the relaxing narrative), and a control group without treatment. Results showed the efficacy of integrating different approaches to cope with stress and suggested the importance of the sense of presence as a mediating variable between the experience and the efficacy of the relaxation process.

INTRODUCTION

Stress management (SM) is a term widely used with a seemingly obvious meaning, as recently noted by a review (Ong, Linden, & Young, 2004), but it is not clear how many different forms of SM exist and how efficacious they are according to the target problem. Analyzing more than hundred research articles, results showed that the most commonly employed components in a SM program involve multicomponent cognitive-behavioral therapy (CBT) or relaxation-oriented techniques.

Stress has been associated with a variety of chronic and acute illnesses (S. Cohen et al., 1998; S. Cohen, Miller, & Rabin, 2001), with increased health care costs and decreased productivity (Pelletier & Lutz, 1988). As a consequence, considerable research has been conducted with a variety of specific types of samples applying a variety of professional-to-participant interventions. A comprehensive review of work-site-based research (Murphy, 1996) identified that the most common single stress-management techniques applied were relaxation and cognitive reframing. Importantly, at the same time the review concluded that programs that apply a combination of stress management techniques produced more significant outcomes than did single-strategy programs.

Corresponding Author:
Villani Daniela, Università Cattolica del Sacro Cuore, Interactive Communication and Ergonomics of New Technologies – ICE-NET Lab., Largo Gemelli 1, 20123 Milan, Italy, daniela.villani@unicatt.it

[1]Istituto Auxologico Italiano, Applied Technology for Neuro-Psychology – ATN-P Lab. (Italy)

We believe that this represents a critical point to cope with a multidimensional condition such as stress that requires a wide-spectrum approach. Rather than concentrating on toning down or suppressing emotions, people need to guide their emotions toward constructive action or transform them into ones that are more favorable and more helpful to problem solving.

Looking at the several existing psychotherapeutic approaches, we can recognize that, usually, each approach focuses on a specific aspect of the human experience. According to Murphy, (Murphy, 1996) we consider that a combination of stress management techniques can produce more significant outcomes than did single-strategy programs. For this reason we decided to propose an integration of three approaches to cope with stress and improve emotional management from different points of view:

- the Emotion Focused Therapy (EFT), developed by Greenberg (2004), that considers emotion as a determinant key of self-organization;
- the Behavioral Therapy, focused on using learning principles to eliminate or to reduce maladaptive behaviors. In particular we consider the importance of Relaxation (Jacobson, 1938; Schultz & Luthe, 1969);
- the Rational Emotive Therapy, developed by Ellis (1962), based on the premise that many problems arise from irrational thinking.

In particular, we decided to use two different media (Video and Audio) to support the Relaxation process. As investigated in a recent study (Villani et. al., 2007), authors concluded that people might learn relaxation strategies within controllable mediated experiences.

A mediated experience may evoke the same perceptual reactions and emotions as a real one (Levin & Simons, 2000), and we consider that the sense of presence plays a critical role to reach this effect (Riva, Davide, IJsselsteijn, 2003; IJsselsteijn, Lombard, Freeman, 2001; Riva et. al., 2004). The phenomenon of presence has been researched in several domains, such as films, books and virtual environments, using different labels. In film theory, it is known as the diegetic effect (Burch, 1979; Tan, 1996), and in literature theory and research on the persuasiveness of narratives it is known as transportation (Gerrig, 1993; Green & Brock, 2000). On one side, in film, the diegetic effect is defined as the "experience of the fictional world as the environment" or that "the feature film creates the illusion of being present in the fictional world" (Tan, 1996, p. 52). Tan assumes that the diegetic effect is based on the general effect that paintings and photographs draw "the beholder in a position that is defined in relation to an imaginary space behind the window formed by the picture plane and the frame" (p. 53). The viewer of the film becomes an onlooker on an environment, "viewers experience the fictional events as if they were happening all around them" (Bordwell, Staiger, & Thompson, 1985, p. 37).

On the other side, everybody knows that reading a gripping novel can transport us far away from the armchair to the environment described in the text, and that we can be totally absorbed in this experience. Building on this spatial metaphor, Green and Brock (2000) have called this phenomenon transportation. In their definition of transportation, they assume that mental imagery evoked by a story has an impact on the attitudes of the reader when it is activated in the state of high transportation, because transportation inhibits a critical scrutinising of the content and the "message" of the imagery. According to the different perspectives developed until now, we consider that the sense of presence could be a key factor to support an optimal experience. In this direction, some authors (Plante, Cage, Clements, & Stover, 2006; Plante et al., 2003) have recently observed that individuals who interact in a mediated environment are enriched with a variety of positive visual and auditory stimulation, and report greater improvement in

self-efficacy and mood (McAuley, Talbot, & Martinez, 1999; Turner, Rejeski, & Brawley, 1997). This suggests that it is possible to use mediated incident for manipulating experience-related self-efficacy and mood.

As we stated before, we intended to use the mediated experiences as support to the relaxation process. For this reason they should be included in an emotional management protocol involving additional aspects to relaxation, that could be integrated also in external activities to the mediated experience, such as in introducing it or briefing it.
The research aimed to test the efficacy of a SM protocol integrating important strategies: a relaxation training; a monitoring record card to help participants to be aware of their own emotions, thoughts and behaviors; an imagination guided experience, related to a personal positive experience, to rehearse positive emotions.

To verify its efficacy we carried out a controlled trial. According to Freeman and colleagues categorization (Freeman, 2003; Ijsselsteijn et al., 2000), we fixed the "media content" that includes the theme, narrative represented by the medium (in this study it was constituted by the integration of different relaxation techniques) and we manipulated the "media form" dimension, that refers to physical, objective properties of a display medium (in this study two mediated experiences: audio and video). For this reason we compared two mediated conditions: an immersive 3D VIDEO group (without interaction) and an AUDIO-tape group, we also included a control group without treatment. In particular we aimed to test several hypotheses:

Hypothesis 1: The protocol that integrates different techniques to manage stress is effective in both conditions (Video and Audio) considered.
Hypothesis 2: There is a significant difference between the efficacy of the mediated experiences proposed. In particular we expected that Video group could obtain better outcomes.
Hypothesis 3: We hypothesized that a prediction relationship exists between the sense of presence experienced and treatment outcomes. `

Method

Participants and design

We recruited thirty-six participants, aged 18 to 35 years for the study from the principal Universities of Milan (M=24.89; SD=5.19). In agreement with Scherer's theory (Sander, Grandjean, & Scherer, 2005), we maintain that the coherence between the content of the experience and the goal of the participant is critical. For this reason we selected the participants with a cut-off level of stress, corresponding to the higher quartile, measured through the MSP questionnaire (Tessier et al., 1990; Di Nuovo et al., 2000).

We randomly allocated groups of 12 participants to each of the 3 conditions by a true random number service (http://www.random.org). They voluntarily participated to the experiment after subscribing the informed consent.
In order to study the efficacy of the whole protocol, supported by the technology in the Relaxation phase, a between subjects design was used with 2 experimental conditions, a control group, and repeated measurements (pre and post-sessions).

- In VIDEO Condition, participants watched a 3D animation Video in immersion (experienced with a head-mounted display) but without interaction. The Video took them to specific zones of a natural park, such as for example the river, the waterfall or the garden and they did the relaxation exercises supported by a relaxing narrative.
- In AUDIO-tape Condition, participants listened to the same relaxing narrative. In this condition imagination

skills were required from the participants to contextualize the relaxing experience.
*   Control group participants didn't follow any treatment.

Measures

The dependent variables were stress and anxiety. We also evaluated the sense of presence experienced by the participants using different technologies. Our proposed Integrated Multimodal Assessment – combining quantitative and qualitative methodologies – was used to provide a more robust mechanism to identify the affective state of the participants. Several questionnaires were used:

*   The *MSP (Mesure du Stress Psychologyque)* Questionnaire (Tessier et al., 1990; Di Nuovo et al., 2000) is a self report measure that evaluates stress levels perceived within the last three months. It considers six dimensions: lose of control and irritability, psychophysiological feelings, sense of effort and confusion, depressive anxiety, pain and physical problems, hyperactivity and accelerated behaviors. We used this questionnaire to select the sample with a cut-off level of stress, corresponding to the higher quartile.
*   *The PS (Perceived Stress) Questionnaire* (Levenstein et al., 1993) measures the stress perceived in the last month focusing on these areas: harassment, overload, irritability, worries and tension. In particular the PSQ is widely used to investigate minor physical symptomatology in basically healthy individuals and we used all the scales identified by the authors.
*   *The State Trait Anxiety Inventory (*Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, & Jacobs, 1983) is a self-report measure that assesses anxiety levels. According to the authors, State Anxiety reflects a "transitory emotional state or condition of the human organism that is characterized by subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity." Trait anxiety considers the tendency to perceive stressful situations as dangerous and threatening that reply to the several situations with different intensity.
*   *The VAS - Visual Analogue Scale* (Gross and Levenson, 1995), typically is an instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured. We decided to use 8 adjectives questionnaire to describe different emotions, in particular: happiness, anger, rage, disgust, relaxation, fear, sadness and surprise.

From a physiological point of view, we consider stress to be accompanied by the generalized activation of the nervous central system, autonomous nervous system, and neuromuscular system. This implies an increase in muscular tension, heart rate, blood pressure, palmar sweating, peripheral vasoconstriction, and the rate and irregularity of respiration. For this reason, we selected different physiological parameters to test the activation of the subjects in correspondence of emotional arousal at the begin and at the end of each session. We used the BioGraph Infiniti Procomp and in particular we considered:
*   Respiration Rate and Respiration Amplitude. The sensor is applied with a band on the chest of the participant round to the thorax.
*   Heart Rate and Heart Amplitude. The sensor is applied on the middle finger through a small rubber strap.
*   Skin Conductance. We used two small sensors positioned on the index and the ring fingers of the hand through the use of two rubber straps.
*   Electromyography. The EMG sensor is positioned on the forearm of the participant.
    To measure the level of subjective presence we used:
*   The *ITC- Sense of Presence Inventory (ITC-SOPI)* (Lessiter et al., 2001), that is a subjective presence measure

including two parts, *after* and *during* a media experience. It considers four dimensions: Physical space (a sense of physical placement in the mediated environment, and interaction with, and control over, parts of the mediated environment), Engagement (a tendency to feel psychologically involved and to enjoy the content), Ecological Validity (a tendency to perceive the mediated environment as life-like and real), and Negative effects (adverse physiological reactions).

Tools and strategies

The immersive 3D animation video condition involved different natural zones related to different relaxation exercises: lake, river, waterfall, garden and forest. In Figure 1 and Figure 2 two images of the video are presented.
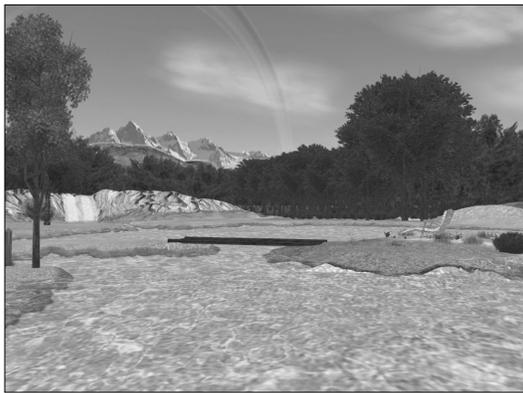

Fig. 1. Video: view of lake and waterfall

Fig. 2. Video: view of garden and lake

The relaxation phase is only one of the strategies of the protocol, which included different strategies to learn how to cope with stress. We selected three techniques aiming to increase self-awareness, learn to control and to relax, substitute negative emotions and induce positive emotions:

1) A self-monitoring record card to help participants be aware of their own emotions, thoughts and behaviors. The record card refers to the ABC *(Activating Event, Belief Consequent Emotion)* model developed by Ellis (Ellis and Harper, 1961) that describes the sequence of events ultimately leading to the experienced feelings. The self-monitoring card recommends that people break down their experience into these three areas in order to discover if distortions or "irrational beliefs" are present.

2) A relaxation training. After analyzing the literature in this field and the results achieved in the previous study, we decided to use different techniques to induce relaxation, involving Autogenic training (Schultz & Luthe, 1969), Progressive Muscular Relaxation (Jacobson, 1938), and breathing techniques. In particular this approach is supported by the use of different technologies.

3) A guided imagery experience. According to the phase of "transforming emotion" included in the EFT (Greenberg, 2004), positive imagery represents a good strategy of effecting an emotional response. Through practice people can learn how to generate opposite emotions through imagery and use them as an antidote to negative emotions.

For this reason we decided to include a guided imagery experience, one of the most well-studied integrative therapies (Lehrer et al., 1980; Lehrer et al., 1994), related to a personal positive experience, to induce positive emotions. More and more, patients are relying on the use of guided imagery to provide a significant source of strength, support, and courage in order to manage the daily stresses.

The treatment was actually similar between the two groups, except for the Video / Audio difference.
The computerized and mediated materials consisted of:
- a portable computer (Fujitsu Siemens AMILO Processor, Pentium 4 ATI Radeon 9007, 128 Mb graphic memory);
- a Head-Mounted Display: Sony Glastron PLM S-700
- an Audio-tape with headphones (Sony MDR-EX51LP Fontopia in-the-ear headphones).

PROCEDURE

Participants sat in a swivel armchair that was in front of a computer and were tested once per session. At the beginning of the sessions, they provided their informed consent and received a set of instructions about the experiment. Table 1 is presents the protocol schema, the experiment consisted of 6 sessions. The first 4 sessions were carried out within two weeks. The last two sessions were carried out after one month (first follow up) and after three months (second follow up) to assess the maintenance of the obtained results.

In the 1st session we carried out a *Baseline Assessment* (Pre-treatment), consisting of:
- A 3-minute physiological measurement (baseline);
- Administration of the questionnaires to assess anxiety and stress levels (VAS, STAI-state and trait, PSQ);
- Delivery of a document about Theory of stress, emotions and emotional regulation and information about the content of the research and the used strategies.
- Introduction of the self-monitoring record card referred to the ABC model.

In the 2nd session we carried out the *Therapeutic session*:

1st week	2nd week	1st Follow up (after 1 month)	2nd Follow up (after 3 months)
1st session - baseline assessment - self-monitoring record card ABC	3rd session - Assessment before Session 3 - Use of self-monitoring record card ABC - Relaxation phase - Assessment after Session 3	5th session - Assessment before Session 5 - Questions about strategies used - Self- Relaxation phase - Assessment after Session 5	6th session - Assessment before Session 6 - Questions about strategies used - Self- Relaxation phase - Assessment after Session 6
2nd session - Assessment before Session 2 - Imagination phase - Relaxation phase - Assessment after Session 2	4th session - Assessment before Session 4 - Relaxation phase - Assessment after Session 4 - Delivery of Audio CD		

- *Assessment before Session 2 (before Treatment)*: A 3-minute physiological measurement (baseline) and Administration of the questionnaires to assess anxiety levels (VAS, STAI-state);
- Imagination phase. The guided imagery experience, related to a personal positive experience, was used to induce positive emotions.
- Instructions for participants in the Video condition to use the specialized equipment.
- Relaxation phase. Participants in all conditions listened to the relaxing narrative and did the relaxing exercises, based on PMR, Autogenic Training, and deep breathing techniques.
- *Assessment after Session 2 (Post-treatment)*. A 3-minute physiological assessment was conducted. Then participants completed the questionnaires (VAS, STAI-State) to assess anxiety levels.

In the 3rd session we carried out the *Therapeutic session:*
- *Assessment before Session 3 (before Treatment)*: A 3-minute physiological measurement (baseline) and Administration of the questionnaires to assess anxiety levels (VAS, STAI-state);
- Conversation about the filling out of the Self-monitoring record card ABC.
- Instructions and Relaxation phase. Participants in all conditions listened to the relaxing narrative and did the relaxing exercises, based on PMR, Autogenic Training and deep breathing techniques.
- *Assessment after Session 3 (Post-treatment)*. A 3-minute physiological assessment was conducted. Then participants completed the questionnaires (VAS, STAI-State) to assess anxiety levels.

In the 4th session we carried out the *Therapeutic session:*
- Assessment before Session 4 (before Treatment): A 3-minute physiological measurement (baseline) and Administration of the questionnaires to assess anxiety levels (VAS, STAI-State);
- Instructions and Relaxation phase. Participants in all conditions listened to the relaxing narrative and did the relaxing exercises, based on PMR, Autogenic Training and deep breathing techniques.
- *Assessment after Session 4 (Post-treatment)*. A 3-minute physiological assessment was conducted. Then participants completed the questionnaires (VAS, STAI-State and Trait, PSQ, MSP) to assess anxiety and stress levels.
- Delivery of Audio CD with the narratives listened within the sessions in order to continue the relaxation training at home.

Participants in the control condition did not receive the treatments, but were only assessed on 1st and 4th sessions. These participants completed the questionnaires to assess their emotional states, anxiety and stress levels.

Follow up 1 (after 1 month) and follow up 2 (after 3 months) were carried out in the same way. At the beginning of these sessions, we conducted the physiological assessment. Then we questioned about the use of the strategies learned in daily life and we proposed that the participants filled in the questionnaires. During the session, we asked the participants to apply one of the learned strategies to relax them-selves. At the end we carried out the physiological assessment after session.

Results

In statistics, an exact (significance) test is a test where all assumptions upon which the derivation of the distribution of the test statistic is based upon are met, as opposed to an approximate test, in which the approximation may be made as close as desired by making the sample size big enough. This will result in a significance test that will have a false rejection rate always equal to the significance level of the test. For example an exact test at significance level 5% will in the long run reject a true null hypothesis exactly 5% of the time (Fisher, 1925), avoiding Type I Errors.

While exact p values are preferred for scientific inference, they often pose formidable computational problems and so, as a practical matter, asymptotic p values are used in their place. For large and well-balanced data sets, this makes very little difference, since the exact and asymptotic p values are very similar. But for small, sparse, unbalanced, and heavily tied data, the exact and asymptotic p values can be quite different and may lead to opposite conclusions concerning the hypothesis of interest.

In this situation, the Monte Carlo method (Manley, 1991) provides an unbiased estimate of the exact p value, without the requirements of the asymptotic method. The Monte Carlo method is a repeated sampling method. For any observed table, there are many tables, each with the same dimensions and column and row margins as the observed table. The Monte Carlo method repeatedly samples a specified number of these possible tables (about 10,000) in order to obtain an unbiased estimate of the true p value .

For these reasons, given the small sample of the study, we compared samples using the Exact Tests procedure with Monte Carlo estimate (SPSS 13 Exact Tests Module).

- First, before treatment we compared the participants involved in the three conditions (Video, Audio and Control) and we didn't find significant differences between groups.
- Then, we analyzed the degree of change of the dependent variables achieved with the treatment separately for each group (within groups effects).
- As a third analysis set, we focused on testing whether the degree of change was different among the three groups (between groups effects).
- A final analysis tested whether a relationship existed between sense of presence and efficacy of the treatment through multiple regression analyses. Eakin and colleagues (1989) developed an explicit relationship between sample size, sampling error, and related costs for the application of multiple regression models in observational studies. Their method reveals that, in most cases, the imprecision of estimates and minimum total cost are rela tively insensitive to increases in sample size beyond n=20. Because of the intrinsic variation of the regression model, even if larger samples are optimal, the relative change in the total cost function is small when the cost of imprecision is a quadratic function. For this reason, even with our small sample (n=12) we decided to use a mul tiple regression to evaluate the possibility of using Presence subscales to predict the outcome of the treatment. In the analysis we followed the procedure suggested by Prescott (1987) to overcome Type I errors (SPSS 13 Regression Models Module):
- we used as estimation procedure a bayesian estimation (Oman, 2002) instead of the ordinary least squares one;
- we considered as significant only Multiple Regressions with an adjusted R Square higher than 0.65.

We analyzed data from the following "moments/time points" in the treatment: T1 (baseline); T2a (before Session 2); T2b (after Session 2); T3a (before Session 3); T3b (after Session 3); T4a (before session 4); T4b (after Session 4 - post the whole treatment); T5 (1st follow up); T6 (2nd follow up).

Hypothesis 1
Some significant changes were found related to the self-reports using the analyses within groups, as showed in Table 2 (we reported in the Table only the more significant and representative results). To compare different moments of the treatment for each condition we used the Friedman and Wilcoxon tests (paired samples).
Since the time separating the four sessions involved in each condition was 3-4 days, some participants started each session with different anxiety state levels in comparison to the ones achieved at the end of the previous session. For

this reason we considered the outcomes obtained both in each session and in the whole treatment (T1-T4). As represented in table 2, we found that during the three guided sessions (session 2, 3 and 4):

- Either in VIDEO and AUDIO condition there are significant changes in State Anxiety reduction (STAI). Only the VIDEO group significantly reduced State Anxiety steadily in all sessions.
- Furthermore, we found a significant increase of Relaxation State (VAS) in VIDEO and AUDIO conditions. Also in this case, only the VIDEO group reached relaxation steadily during all sessions.

No significant changes were found in Control condition and they were not reported in the table.
(T1-T4b): Analyzing the period of time between the beginning of the treatment and the end of the guided sessions for each condition, it appears that AUDIO group reached significant changes.

In fact, AUDIO group shows:
- a significant reduction of Overload (F=-1.976, p<.05) and Irritability (F=-2.264, p<.05), both measured by the PSQ questionnaire.

Psychological Dimensions	Condition	Session 2	Session 3	Session 4	T1-T4b
Anxiety State (STAI)	VIDEO	Z=-2.380, p<.01 (M2a=44.90; DS2a=10.77; M2b=37.70; DS2b=8.04)	Z=-2.151, p<.05 (M3a=42.70; DS3a=8.12; M3b=39.20; DS3b=7.55)	Z=-2.670, p<.005 (M4a=44.40; DS4a=8.72; M4b=38.40; DS4b=6.82)	Z=-2.091, p<.05 (M1=44.80; DS1=8.66; M4b=38.40; DS4b=6.82)
	AUDIO	Z=-1.837, p<.05 (M2a=37.50; DS2a=12.32; M2b=31.40; DS2b=9.06)	Z=-2.710, p<.005 (M3a=40.80; DS3a=9.94; M3b=35.30; DS3b=8.18)	-----------	-----------
Relaxing State (VAS)	VIDEO	Z=-2.565, p<.005 (M2a=3.60; DS2a=1.51; M2b=5.00; DS2b=1.33)	Z=-2.121, p<.05 (M3a=4.10; DS3a=1.10; M3b=4.70; DS3b=1.06)	Z=-2.126, p<.005 (M4a=3.90; DS4a=.88; M4b=4.70; DS4b=1.25)	-------------
	AUDIO		Z=-2.636, p<.05 (M3a=4.30; DS3a=1.49; M3b=4.80; DS3b=1.23)	Z=-2.828, p<.005 (M4a=4.30; DS4a=1.34; M4b=4.80; DS4b=1.29)	Z=-1.997, p<.05 (M1=3.70; DS1=1.64; M4b=4.80; DS4b=1.29)

In the time occurring between the fourth session and the two follow up (T4-T5; T4-T6), participants received an audio CD to listen to the relaxation exercises and to improve their ability.

(T4b-T5; T4b-T6): Monitoring the results obtained after the guided sessions and analyzing the outcomes achieved at the follow up sessions the situation appears different. Both AUDIO and VIDEO groups gained good improvements during the period of time after the guided sessions.
AUDIO group shows:
- a significant reduction of the Harassment, measured by the PSQ questionnaire, between T4 and T5 (F=2.058, p<.05) and between T4 and T6 (F=-2.329, p<.05);
- a significant reduction of the Psycho-physiological feelings, measured by the MSP questionnaire, between T4 and T5 (F=2.226, p<.05) and between T4 and T6 (F=-1.826, p<.05);
- a significant reduction of the Hyperactivity and accelerated behaviours, measured by the MSP questionnaire, between T4 and T5 (F=2.333, p<.05) and between T4 and T6 (F=-2.047, p<.05).

VIDEO group shows:
- a significant reduction of the Lack of joy, measured by the PSQ questionnaire, between T4 and T5 (F=1.902, p<.05) and between T4 and t6 (F=-1.785, p<.05);
- a significant reduction of the Fatigue dimension, measured by the PSQ questionnaire, between T4 and T5 (F=2.232, p<.05);
- a significant reduction of the Tension, measured by the PSQ questionnaire, between T4 and T6 (F=-1.845, p<.05);
- a significant reduction of the Depressive Anxiety, measured by the MSP questionnaire, between T4 and T5 (F=2.555, p<.005) and between T4 and T6 (F=-2.116, p<.05).

Furthermore, participants of Video group learned the ability to control their physical reactions. In particular they showed a good capacity to reduce heart rate both in the first follow up (Z=-2.589, p<.05) and in the second follow up session (Z=-2.354, p<.05).

Hypothesis 2
Our second hypothesis was related to finding differences between groups. We investigated whether the degrees of change in anxiety, relaxation, emotional states and traits were different among the three groups (VIDEO, AUDIO and Control) through the Mann Withney (3 independent samples) test.
Considering the physiological parameters, significant differences were found during the first follow up. The VIDEO group showed a higher level of heart rate reduction (Z=-2.216; p<.05) compared to the other groups.

Considering the stress dimensions:
- between the first and the fourth session (T1-T4b), the AUDIO group showed a higher reduction of Strain and Confusion feeling (MSP) (Z=-1.998; p<.05) and a higher reduction of Irritability (PSQ) (Z=-2.042; p<.05) compared to the other groups.
- between the first session and the first follow up (T1-T5), the VIDEO group showed a higher reduction of Depressive Anxiety (MSP) (Z=-2.503; p<.05) compared to the other groups.

The absence of numerous significant differences between groups could be interpreted that all participants followed the same steps of the protocol. They used the same techniques (cognitive, relaxation and imagery) and they could have found the mediated experience to be positive: they listened to the same narrative and did the same relaxation exercis-

es. A deep explanation will be treated in the discussion paragraph.

HYPOTHESIS 3

At the end, we were interested in investigating whether a causal relationship existed between presence factors and emotional changes. To reach this aim we carried out the regression analyses with the VIDEO group. Some interesting results emerged, as showed in Table 3, and thus helps us understand the direction of the relationship existing between the sense of presence experienced by the participants and the treatment outcomes.

In the third session:
* the sense of presence is a good predictor of the Anxiety state (measured by STAI) at the end of the session;

In the fourth session:
* the sense of presence is a good predictor of the Relaxation state (measured by VAS) at the end of the session.

Session	Dependent Variables	Model	Variables	t	P
3	Anxiety State (STAI)	R square=.787 R adjusted=.666 F=6.478 p<.05	Negative Effect	t= 3.789	p<.01
			Physical space	t= -3.031	p<.05
			Ecological Validity	t= 3.329	p<.05
4	Relaxation State (VAS)	R square=.800 R adjusted=.686 F=6.996 p<.05	Engagement	t= -4.751	p<.005
			Physical space	t= 5.030	p<.005

It is important to underline that the results coming from the regression analysis involve the same emotional changes obtained from the analysis within subjects. In particular, both anxiety reduction and relaxation increases were found in VIDEO condition during the guided sessions. Regression analysis showed that there is a prediction between the sense of presence perceived by the participants and these achieved outcomes.

DISCUSSION

As we stated at the beginning, relaxation is only one of the strategies to include in a stress management protocol. According to Murphy, (Murphy, 1996) we considered that a combination of stress management techniques can produce more significant outcomes than single-strategy programs. For this reason, we developed a protocol that integrates different techniques to cope with stress and improve emotional management according with the three emotional processing principles of the emotion-focused therapy (Greenberg 2004):

1. To increase "awareness of emotions", we used the self-monitoring record card. This card, referred to the ABC model (Ellis, 1962), helped participants to be aware of their own emotions and to learn how to break down their experiences in Activating events, Belief and consequent Emotion, in order to discover if distortions or "irrational beliefs" were present.

2. To enhance "emotion regulation", we applied the Relaxation training involving Autogenic Training (Schultz & Luthe, 1969), Progressive Muscular Relaxation (Jacobson, 1938) and breathing techniques. In particular, we decided to use two different media - VIDEO and AUDIO - to support the relaxation phase.

3. According to the "transforming emotions" phase, we used the guided imagery experience as a good strategy of affecting the emotional response. The aim was to support participants to learn how to generate opposing emotions through imagery and use them as an antidote to negative emotions.

The study aimed to verify three hypotheses. Our first hypothesis was to verify the efficacy of the whole protocol, supported by different media.

According to previous results (Banos et al., 2004; Riva et al., 2007) showed that mediated experiences can induce affective responses, as they are real, these results also confirmed the efficacy of VIDEO and AUDIO-tape as affective media that produce the expected emotional state. In fact, both media during the three guided-sessions (session 2, 3 and 4) supported the Relaxation process and outcome.

After the guided sessions, participants received an audio CD to listen to the relaxation exercises and to continue the relaxation training. After one month and after three months participants of both mediated groups confirm a reduction of several stress dimensions. Furthermore, only the participants of the VIDEO group showed a good ability to control their physical reactions, in particular to reduce heart rate. The best ability of VIDEO group in managing the bodily function could be interpreted considering that the sense of presence did not necessarily require the consciousness of the subject.

According to Vincelli (1999), thanks to visual presentation of the mediated content, the experience is more vivid and real than the one that most subjects can create through their own imagination and memory. Probably, the visual presentation of a calm scenario has helped participants to practice and master relaxation and acceptance techniques.

Although the results obtained confirmed the efficacy of the proposed protocol, we were also interested (Hypothesis 2) in finding significant differences between the mediated proposed experiences. In particular we expected that Video group could obtain better outcomes. On the contrary we did not find a lot of significant differences between groups. This result could be ascribed to the complexity of the protocol that involved different aspects. The outcomes achieved are probably the consequences of the different strategies used (cognitive, relaxation and imagery) and in the whole protocol the media supported only the relaxation phase. As we stated before, the content of the experience was the same and all participants could have found positive the mediated experience: they listened to the same narrative and did the same relaxation exercises. In this sense, according to the Stimulus Evaluation Check theory of (SEC) Scherer and colleagues (Sander et al., 2005; Scherer, 2001), the intrinsic pleasantness and goal conduciveness could have induced similar effects in the different mediated experiences proposed. Furthermore, relaxation therapies and guided meditation practices can have induced and extended the duration of pleasant experiences (Smith, 1990).

A mediated experience may evoke the same perceptual reactions and emotions as a real one (Levin & Simons, 2000), and we consider that the sense of presence plays a critical role to reach this effect (Riva, Davide, Ijsselsteijn, 2003;

Ijsselsteijn, Lombard, Freeman, 2001; Riva et. al., 2004). The regression analyses showed that predictions exist between presence factors and the emotional changes obtained during the guided sessions and helped us to understand the direction of these relationships.

In particular, the sense of presence perceived by the participants in VIDEO condition is a good predictor of the Anxiety state reduction and the Relaxation state increasing.
The results obtained are very encouraging. The protocol supported by mediated experiences appears to be effective. In addition, we can state that a relation exists between presence and treatment outcomes.

Due to the limitation of the small sample (n = 36), the results should be interpreted with caution until they are replicated. However, the good findings coming from the previous works and from this one encourage us to open the doors to new applications of the mediated experiences, such as promoting positive emotions and well being.

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