

STUDY OF THE EFFECT OF POSITIVE HUMOUR AS A VARIABLE THAT REDUCES STRESS. RELATIONSHIP OF HUMOUR WITH PERSONALITY AND PERFORMANCE VARIABLES

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The purpose of this study was to increase positive humour as a strategy for reducing participants' levels of anxiety. To this end, 31 volunteer students were selected and given a test of perceptual speed to generate stress response (anxiety). Subsequently, participants were exposed to a comedy video of about 25 minutes' duration (made specifically for this study). State-anxiety levels were assessed three times: at the beginning of the study (baseline), after the perceptual speed test and after watching the humorous video. Personality variables and level of dispositional optimism were also measured. The results indicate a statistically significant decrease in state-anxiety levels after viewing the comedy video. We also found that those participants with higher levels of dispositional optimism had lower levels of state-anxiety after viewing the comedy video, and scored lower on neuroticism and higher on extraversion. Statistically significant positive correlations were also found between neuroticism and state-anxiety. Furthermore, the results indicate that those with higher levels of anxiety at baseline were not those with the poorest performance on the perceptual speed test.

Key words: State-anxiety, Stress, Positive humour, Dispositional optimism, Neuroticism, Extraversion.

En este estudio se propone incrementar el humor positivo como estrategia para reducir los niveles de ansiedad en los sujetos. Para ello se seleccionan un total de 31 estudiantes universitarios voluntarios a los que se les administra una prueba de velocidad perceptiva para generar respuesta de estrés (ansiedad). Posteriormente los sujetos son expuestos a un video de humor de aproximadamente 25 minutos de duración (elaborado específicamente para este trabajo). Los posibles cambios en los niveles de ansiedad-estado se evalúan en tres ocasiones: al inicio, después de la prueba de velocidad perceptiva y al finalizar el video de humor. Además se miden variables de personalidad y el nivel de optimismo-disposicional de los estudiantes. Los resultados obtenidos indican una disminución de los niveles de ansiedad-estado de forma estadísticamente significativa después de visualizar el video de humor. También se encuentra que aquellos sujetos que presentan un mayor nivel de optimismo-disposicional obtienen menores niveles de ansiedad-estado después de visualizar el video de humor, y presentan puntuaciones inferiores en neuroticismo y puntuaciones superiores en extraversión. También se observan correlaciones positivas estadísticamente significativas entre neuroticismo y ansiedad estado. Además, los resultados obtenidos indican que los sujetos con mayores niveles de ansiedad al inicio de la sesión no son aquellos que obtienen un peor rendimiento en la prueba de velocidad perceptiva.

Palabras clave: Ansiedad-estado, Estrés, Humor positivo, Optimismo-disposicional, Neuroticismo, Extraversión.

The way in which illness is conceived has undergone a revolution, consisting in the recognition of the interaction between mind and body, and in the admission that the emotions and the personality have a substantial impact on our functioning and our health (Sapolsky, 2008).

Looking back in history we find that the majority of

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deaths in developed countries were caused by infectious illnesses – tuberculosis, cholera, diarrhoea, malaria, pneumonia, etc. –, all of them due to precarious conditions of life. Gradually, these illnesses were brought under control through hygienic measures. However, other illnesses came to take their place in terms of impact on mortality. Illnesses such as cancer, cardiovascular disorders, and more recently the so-called immunological and chronic degenerative illnesses, such as Alzheimer's disease, which in large measure can be considered as illnesses related to the person's way of life or behaviour, are those with the greatest repercussions on the population today.

The pace of life in today's society is "accelerated" – many people complain of lack of time for all the jobs they have to do, and despite progress in numerous areas (technological and scientific advances), new problems have emerged in connection with the modern lifestyle (urgency and multiple demands). One of the problems concerns the *stress* response, which can predispose us to unhealthy behaviours such as poor eating habits (fast food), lack of physical exercise (due to lack of time), devoting less time to social relations, smoking and drinking, and so on. Stress has increased in our society, and continues to do so in view of today's life conditions. Consequently, there has been a growth in research on stress. The problem still lies in how to define it, and in the difficulty of assessing its adverse effects on health (for example, on studying the effects of stress at work we come up against the difficulty of measuring the large quantity of potential stressors).

But in spite of the fact that stress can affect our well-being, not all people are subject to problems associated with stress. And while not everyone is affected by the same stressors, even faced with the same stressful elements, the way people respond to or cope with them differs considerably. Thus, in order to adapt to today's lifestyle, it would be useful to identify techniques and strategies to help us enjoy better health, both mental and physical.

THE STRESS RESPONSE

Faced with a situation of stress, at a physiological level, the organism prepares to meet the possible demands generated as a consequence of the situation, making available exceptional resources – basically through a substantial increase in levels of physiological, cognitive and motor activation. This helps the organism to better perceive the new situation, interpret the demands more quickly, decide which behaviour or behaviours are necessary and perform them as quickly and intensely as possible. In all probability, with these exceptional resources brought into play because of the stress response it will be easier to respond to and control the stressful situation. Once the demands of the situation have been met, the stress response ceases and the organism returns to a state of equilibrium (homeostasis).

The development of a psychophysiological disorder as a consequence of a situation of stress depends, to a large extent, on the physiological responses triggered and the organs activated. Frequent physiological activation can lead to wear on the organs in question (exhaustion). The greater the frequency, intensity and duration of the activation responses provoked by the situation perceived as

stressful, the greater the likelihood of developing a disorder. If strategies are available for coping with the stressful situation (even if it occurs often and intensely), the situation will swiftly be brought to an end, and there will be less probability of developing psychophysiological disorders; at the same time, the more stereotyped the response (similar activation response), the more likelihood of some deterioration in the organs involved.

The stress response is not a bad thing in itself, since it facilitates access to more resources for coping with supposedly exceptional situations. But given that large quantities of extraordinary resources are activated, it involves significant debilitation for the organism, which becomes a problem when it occurs in a sustained and or frequent fashion.

At an *emotional* level, the stress response can generate reactions of anxiety, anger, fear, sadness or other emotions of a negative nature. *Anxiety* is an emotion that generates fear reactions anticipatory of danger or threat, accompanied by activation of the autonomic nervous system. It is a response to fear of the unknown, of uncertainty, and one that is generally found in situations of stress.

Therefore, the stress response can generate or facilitate health problems in the organism. There is extensive evidence confirming the influence of stress on health: cardiovascular problems, infections or exacerbation of existing problems (most people have noticed, at times of sustained stress, how their weak points become especially affected: eczemas, tension-related back pain, migraine, colds, etc.).

In the present work we argue that stress and anxiety form part of a single process, which can be defined as the *stress process*, and this is in line with Lazarus' (1966) model, which conceptualizes anxiety as an emotion of stress, in contrast to positive emotions, such as joy. *Stress* refers to the stimulus, force, pressure or threat that activates us, leading to the onset of the *stress process* (following Sandín's [1999] process-based model of stress), whereby the psychosocial demands give rise to a cognitive evaluation. The result of this cognitive evaluation is the emergence of the stress response (*strain*), involving on the one hand physiological responses, and on the other, emotional responses. These emotional responses would include anxiety, based on worry about future danger. Generally, we find this negative emotion associated with stress, but other negative emotions can also be found, such as: anger, fear, sadness-depression, envy and jealousy, as well as positive emotions, including: satisfaction, joy, pride, relief, love and compassion.

Obviously, in all of this process there is some involvement of individual differences, related to personality (e.g., a predisposition to experiencing negative affect), hereditary factors, sex, the coping strategies and social support available, and so on. Thus, not everyone responds in the same way to particular events, so that what makes a stimulus generate a stress response depends to some extent on the characteristics of the person exposed to that stimulus. It results from the combination of the stressful situation itself and the person who is prone to generating a stress reaction (Lazarus, 2006).

POSITIVE EFFECTS OF HUMOUR AND LAUGHTER. THEIR EFFECTS AS VARIABLES THAT REDUCE ANXIETY LEVELS

It is advantageous to seek techniques capable of reducing the stress and anxiety that directly affect quality of life and indirectly affect the individual's physical health. A positive sense of humour and laughter can have beneficial effects on health, but it has yet to be conclusively shown what those effects are, how the effects are exerted, in which cases they occur, and what are their weight, scope and limits. More research efforts are required in this area, and specifically, studies of greater scope and scientific rigour.

Jáuregui (2007) defines *laughter* as a *positive emotion*, characterized by a subjective feeling of pleasure and a series of easily recognizable facial, bodily and vocal expressions: a more or less pronounced smile, zygomatic muscles of the eyes contracted, fast and rhythmic abdominal exhalations that produce the characteristic "ha-ha" sound, agitation of the whole body, and activation of certain neurochemical circuits.

This emotion is innate and universal to the human species, since even children born deaf and blind begin to laugh at the usual age, without having been able to learn it by imitation. Anthropologists have found laughter in all known societies, and although there are different genres of comedy, tastes in humour and rules about how, when and where to laugh, it would appear that the same types of things awaken a sense of humour all over the world.

Idígoras (2002) attempts to define humour by quoting the Spanish writer Mingote: "humour is not being afraid to think"; in this conception, on the one hand humour does not necessarily involve laughter, but rather shows us that we can look at things in ways completely different from the usual way, and on the other, humour serves to separate us from the everyday, the routine. If one thing is clear it is that the capacity to treat things humorously depends on our thinking.

Carbelo and Jáuregui (2006) use the term humour to refer to the diverse causes of laughter (black, blue, harmless, satirical, ironic, witty, vulgar, absurd, oral, literary, graphic, physical and improvised humour). Also considered as humour are unintentionally funny events, such as slip-ups or blunders. In sum, humour is any stimulus that can provoke laughter in a person: games, jokes, funny stories, cartoons, embarrassing situations, incongruences, practical jokes, and so on – though there is no commonly accepted theory for explaining how humour gives rise to laughter, what types of humour can be distinguished, or how to describe the relations and differences between such types. Of the numerous theories proposed, the most well known are those which identify laughter with feelings of superiority, with incongruence, with the liberation of cognitive/emotional tension or with play (Jáuregui, 2007).

The types of humour proposed by Idígoras (2002) are: *benign humour*, when fun is the only intention; *tragic-comedy*, which makes suffering more bearable; *wit*, which tends to use complex mechanisms such as paradox and irony to relate aspects of reality without an apparent connection; *satire*, as a weapon for attacking others; and *craziness*, or absurd humour.

A large part of the studies in this field have addressed the physiological, psychological and social effects of laughter and humour. It has always been believed that laughter is healthy, and that a joke is a good way of beginning a speech or reducing hostility. Recently, research has begun to evaluate the effects, both positive and negative, of laughter.

As Jáuregui (2007) points out, humour has effects in four dimensions:

- a- Psychological effects
- b- Physiological effects
- c- Effects on productivity
- d- Interpersonal effects

Here we look at them in more detail.

a- Psychological effects:

Laughter triggers *pleasure*. It activates the mesolimbic dopaminergic system (a reward system that provides us with pleasure when we obtain something valued or desired). Reiss, Mobbs, Greicius, Eiman and Menon (2003), using neuroimaging techniques, observed that humour activates subcortical regions, including the nucleus accumbens, a key component of the mesolimbic dopaminergic system. The degree of intensity of the humour correlated positively with the activation of these regions.

Humour can provide a good way of *getting through* situations, of putting everyday problems in perspective, of dealing with *everyday stressors* (we burn the cooking, our car won't start, etc.). This positive emotion would be in opposition to any negative emotion we might experience in these situations, such as anxiety, sadness or anger. Humour can be an effective strategy in the process of coping problems, and is an element of resilience (Martin, 2006). People who score highly on the *Coping Humor Scale* tend to be more able in dealing with stressful situations: they interpret problems as challenges rather than threats, are capable of distancing themselves emotionally, and cope actively with problems. Such people also tend to experience fewer negative emotions in stressful situations.

Some research has suggested that one of the best strategies for helping people adapt to work situations is the use of a sense of humour in the workplace (Mornhinweg & Voignier, 1995; Decker & Rotondo, 1999; Cohen, 2001; Spitzer, 2001; Yates, 2001).

The capacity of a sense of humour to *improve our mood* and help us solve our problems also contributes to preventing mental illnesses, and perhaps even to fighting them. However, not just any type of humour will do: what counts is positive humour. The first attempts to investigate the empirical relationship between sense of humour in general and mental health were not very successful. In recent years this relationship has been confirmed, but only in the case of certain humour styles – those involving overcoming obstacles and problems, laughing at absurdity or making other people laugh. People with this type of behaviour and positive attitudes tend to experience less depression, anxiety and negative emotions, and report higher self-esteem and more positive emotions.

Humour can be effective for *combating stress*, as has been shown in diverse experiments. For example, it was explained to individuals taking a test that during the session they would receive an electric shock, a lie that was intended to provoke a state of stress. Those participants who, at the start of the session, listened to a comedy recording scored lower on a self-administered anxiety scale than those who listened to less humorous material. Other experiments have also found differences in physiological measures of stress (heart rate, skin temperature and conductivity) between people in “humorous” and “non-humorous” conditions.

Although it is true that certain specific applications of humour can have psychological benefits, other applications may be detrimental, or even counter-productive (e.g., when a victim is ridiculed – bullying at school or

work – , cruel or hurtful jokes – gender violence), insofar as they can trigger serious problems in the targets of the humour.

b- Physiological effects:

Numerous studies have tried to confirm whether humour produces healthy psychological changes: stimulation of the immune system, reduced sensitivity to allergies, lower blood pressure, and so on, but the empirical results in this field are often contradictory, confusing or questionable. For example, not all medical studies support the thesis of a therapeutic effect of humour; moreover, such studies often have methodological deficiencies or are too small-scale, and in any case it is far from clear what precise mechanism produces the hypothetical benefits (Martin, 2001; Martin, 2004).

Various studies have found a negative relationship between humour and health, with those scoring higher on a humour scale showing poorer medical condition (more illness and higher mortality than more serious people) (Friedman, Tucker, Tomlinson-Keasey, Schwartz, Wingard, & Criqui, 1993; Kerkkanen, Kuiper, & Martin, 2004). This would appear to be due to an association between sense of humour and a more care-free lifestyle that makes unhealthy habits more likely: smoking, drinking, over-eating, unprotected sex, and so on. Thus, people with a happy, optimistic and fun-loving disposition may have a greater tendency to take part in risky activities and to neglect their physical ailments, contributing to poorer health. In an interesting study, a positive correlation was found between sense of humour and health in those who gave a high value to their life activities, but a negative correlation among those who did not give much value to the things that occupied their time (Svebak, Gotestam, & Naper, 2004). Different types of relationship have also been found between health and different kinds of *sense of humour*. For example, Kuiper, Grimshaw, Leite and Kirsh (2004) found a relation between positive humour (for overcoming obstacles and problems, for laughing at the absurdity of life or for making others laugh) and better mental health (less depression and anxiety, fewer negative emotions, higher self-esteem, and more positive emotions). However, such an association was not found in the case of negative humour (humour that was aggressive or involving rudeness), and the relationship was inverted in the case of types (self-criticism for making other laugh).

We should be careful about generalizations such as “laughter is good for you,” since laughter has not been shown to cure any illness; nor is it clear that people with

a sense of humour are healthier or live longer. A study carried out in this field failed to find any correlation between sense of humour (measured with the SHQ scale) and various objective measures of health (Svebak, 1996). However, in other research (e.g., Kuiper & Nicholl, 2004) a relationship was indeed detected between sense of humour and the subjective perception of better health.

As far as certain *positive attitudes* (e.g., optimism) are concerned, links have been shown between them and physical health. As Seligman (2004) points out, in various studies optimists have been seen to achieve better academic results and to be more successful in what they do than pessimists; it even seems they live longer and in better health. This last inference derives from studies on *learned helplessness*, in which it was observed that learned helplessness in rats made them more susceptible to tumours, suggesting that it affected not only their behaviour but also their cell system, and made their immune system more passive. Thus, the less one is subject to experiences of learned helplessness, the better the condition of the immune system. Moreover, pessimists, convinced that their illness is “permanent” “no matter what they do,” will not act to prevent the illness or seek treatment when they become ill. Pessimists are also less likely to seek social support.

Positive emotions, regardless of how they have been generated, can have analgesic effects, stimulate immunity or help neutralize the sequelae of negative emotions (Fredrickson, 1998). The results from Matsunaga et al. (2009) suggest that when we experience positive emotions they may be associated with activity in the central nervous system (watching romantic films increases the activity of the parasympathetic nervous system and activates the following brain regions: medial prefrontal cortex, thalamus, superior temporal gyrus, interior frontal gyrus and cerebellum) and the cardiovascular system, the brain perceiving that the body is in a positive state.

It has been demonstrated that *humour reduces anxiety* (Martin, Kuiper, Olinger, & Dance, 1993; Newman & Stone, 1996). If, as it is argued, one of the responses to stress might be the presence of negative emotions such as anxiety, then humour or laughter would be positive emotions opposite to such anxiety or other negative emotions; therefore, they could be understood as a contrary response, which would in turn produce a contrary response in the organism to that produced by anxiety. Thus, laughter is capable of reducing the stress and anxiety that directly worsen quality of life and indirectly affect physical health.

Sustained and noisy laughter relaxes the body; indeed, physiological studies have confirmed that *laughter temporarily reduces body's muscle tone*. In this case the reference is to the act of laughing, not to humour or fun perceived but without laughter. Thus, *vigorous* laughter is associated with changes in circulating catecholamines and in cortisol levels (Hubert & de Jong-Meyer, 1991, Hubert, Moller, & de Jong-Meyer, 1993), and can in turn have a substantial effect on various components of the immune system (Dantzer & Mormede, 1995). This is the reasoning behind techniques of “laughter therapy”, based on forcing laughter in the absence of humour (Kataria, 2005). Fry (1994) points out that relaxing laughter gives rise to a significant increase in heart rate, so that for normal hearts it brings diverse benefits for the heart muscle, similar to those obtained from any aerobic exercise.

Another benefit of humour derives from its capacity for *increasing tolerance to physical pain*. According to Zweyer, Velker and Ruch (2004), the enjoyment of comedy is capable of raising tolerance to subjective pain for at least half an hour. The effect is of mild intensity (e.g., in a field study in a hospital context it was seen how watching comedy films reduced demand for mild analgesics, such as acetylsalicylic acid, but not for stronger medication) and is observed to be dependent not on the quantity of laughter expressed but rather on the subjective feeling of laughter.

On the other hand, despite the popular belief that laughter stimulates the secretion of endorphins, this has not yet been proven scientifically. Moreover, curiously, the analgesic effect is not confined to humour and other positive emotions, but has also been observed in the case of negative emotions (in similar experiments, people who watched tragic or unpleasant films withstood pain at the same level as those who watched comedy films on putting their arm in iced water), suggesting that it may occur in the presence of any strong emotion.

By way of summary, Martin (2001) points to four mechanisms (each associated with different types of humour) through which humour might influence physical health:

- ✓ Laughter can produce physiological changes in diverse body systems, which can have beneficial effects on health. For example, it is suggested that vigorous laughter exercises and relaxes the muscles, improves breathing, stimulates the circulation, increases the production of endorphins, reduces stress-related hormones and improves the immune system. According to this model, laughter is crucial for obtaining health benefits.

- ✓ Humour and laughter can affect health by inducing positive emotional states, which will have beneficial effects on health, such as increasing tolerance to pain, improving the immune system and avoiding the consequences of negative emotions at a cardiovascular level. According to this model, laughter is not crucial for obtaining health benefits, since humour induces positive mood with or without laughter.
- ✓ Humour can benefit health indirectly by moderating the adverse effects of stress on health. Stressful experiences in one's everyday life can be detrimental to health, for example by suppressing the immune system and increasing the risk of infectious illnesses and heart disease. According to this model, cognitive-perceptual components are more important than mere laughter, as well as the ability to see the funny side at adverse moments.
- ✓ Humour can benefit health indirectly by increasing one's social support. An individual with a good sense of humour may be more competent and attractive, and more capable of reducing tension and conflict in his or her personal relations.

c- Effects on productivity:

The pleasure provided by humour makes it a natural motivating element (an amusing or fun activity is intrinsically motivating).

Humour and other positive emotions foster greater mental flexibility (creativity).

Non-aggressive humour can even increase feelings of being eager to study. In research with a sample of 81 students, they were divided at random into two groups: one group watched 12 minutes of a comedy video and the other group watched a video that was not humorous. The humour condition significantly increased feelings of energy, whilst feelings of tension did not differ between conditions (Dienstbier, 1995).

In another study, researchers explored the influence of positive affect (induced) on decision-making in medical students. Participants were required to decide on the diagnosis of 6 hypothetical patients, verbalizing their clinical reasoning and explaining how they would solve the problem. Between the "positive affect" group and the "control" group no differences were observed in the tendency to make a correct diagnosis, but participants in the positive affect condition made their diagnoses more quickly, and also showed less confusion and disorganization in their protocols (Isen, Rosenzweig, & Young, 1991).

d- Interpersonal effects:

Another well-documented aspect of humour is its social character. We laugh with, and often also at, those around us. It is rare to laugh when we are alone, or surrounded by strangers. Various experiments have identified a whole range of social factors that facilitate laughter, including physical proximity, face-to-face orientation, looking into each other's eyes, and cultural similarity. When we hear or see something funny we feel a desire to tell someone about it and laugh together. And laughter is contagious, even when we do not understand its cause.

On laughing together we feel identified with others (cohesion effect), though it can also divide (mockery, ridicule and sarcasm are types of humour in which another person is excluded or marginalized) (Martineau, 1972). Laughter is a predominantly social phenomenon, and which when shared has the effect of bringing people together or closing distances, or even of reducing conflict and hostility (Idígoras, 2002). Thus, laughter can help form the interpersonal and group bonds that all individuals need for their survival, development and realization as a person and as a member of society.

One of the emotional consequences of laughter is the *reduction of anger*, through its beneficial effect on interpersonal tensions and hostility.

Humour also plays an important role in human communication, since it permits one to attract public attention, reduces distances, stimulates the memory and cushions the negative impact of problematic messages.

Idígoras (2002) proposes the following aspects as benefits of humour, among many others: it helps us to relate to others in a more relaxed manner, it helps us to deal with our fear of making a fool of ourselves (to avoid being laughed at, it is better to laugh at ourselves, so that humour acts as a remedy for shyness), it "relativizes" reality (permits us to seek different perspectives on all of those things that make our existence more complicated), it can help us to find solutions to the problems of everyday life, it helps us adapt to change (humour offers many alternative angles), it can help us to reduce feelings of frustration, it permits us to defend ourselves against criticism or offence that challenge our emotional equilibrium (Idígoras quotes G.B. Shaw, who on receiving an anonymous letter bearing nothing but the word "idiot", exclaimed simply, "I've received many letters without a signature, but this is the first time I've received a signature without a letter"), it can serve to interrupt emotional pain – for giving us a chance to catch our breath and a "time out" from anxiety or sadness (it being likely that

once the humour has done its job, the distress will have abated a little) – and it can help prevent conflicts.

In conclusion, generally in response to stress there emerge negative emotions which lead to distress. Positive emotions such as humour are in contradiction to them, and might therefore offset their negative effects, at least temporarily, and help us on our way toward an eventual solution to the situation. As Idígoras (2002) notes “A patient cannot be sad at the moment of laughter, and the latter is more agreeable than the former”; this, indeed, is in line with the principle of reciprocal inhibition formulated by J. Wolpe.

Thus, laughter and humour (together with other positive emotions such as love, hope, joy or happiness) reduce negative emotions (or neutralize them), whilst increasing subjective well-being. This is one of the main reasons why in the present work we study positive humour, given that the emotions have a decisive influence on mental and even physical health.

MODULATING VARIABLES: NEUROTICISM, EXTRAVERSION AND OPTIMISM

People tend to differ in the way they modulate their stress responses. Character, temperament and personality have a great deal to do with the way we perceive the situation, interpret it and rate the resources at our disposal. Therefore, personality factors can make individuals more vulnerable to stress or more resilient.

In this work we consider Eysenck’s model, and more specifically extraversion (traits of sociability, liveliness, activity, assertiveness, sensation-seeking, nonchalance, dominance, spontaneity and adventurousness) and neuroticism (traits of anxiety, depression, guilt, low self-esteem, tension, irrationality, shyness and emotivity).

Karl, Peluchette and Harland (2007) examined the role of personality (following the Big Five model) and attitudes toward fun and levels of experiencing fun. They found extraversion to be positively related to attitudes toward fun. Extraversion and emotional stability (low neuroticism) were positively related to levels of experiencing fun. That is, individual differences in personality could influence attitudes toward fun and the fact of experiencing it. They explain how people scoring higher in extraversion tend to be funnier, more optimistic and more energetic, and even more satisfied with their job.

Following Michelle Craske’s (2003) model for the development of anxiety and affective disorders, there are vulnerability factors for these disorders, such as negative affectivity: a temperamental variable defined as the tendency to experience negative emotions such as fear,

sadness, guilt and hostility in diverse situations, and even in the absence of an objective stressor (Watson & Clark, 1984). In contrast, positive affect refers to the tendency to experience positive mood states, such as feelings of joy, interest, enthusiasm or confidence. Thus, the presence of *positive affect* as a temperamental variable of the person would be a protective factor against emotional problems such as anxiety and depression. And as Idígoras (2002) explains, humour will be more frequent the greater one’s predisposition to see the funny side of things.

Many studies within the framework of *Positive Psychology* refer to the sense of humour as one of the strengths of the human being (it is a durable personality trait) (Seligman, 2002), conceiving it as the capacity to experience and/or stimulate a highly specific reaction, laughter (observable or not), and in this way to achieve or maintain a positive mood. Moreover, studies such as that of Solberg and Segerstrom (2006) find a positive relationship between *dispositional optimism* (referring to generalized expectations that good things will happen in the future, and the negative aspects will be minimal) and better adjustment to various stressors, which is attributed to the effects of optimism on coping strategies (people with higher levels of dispositional optimism use more strategies that permit them to eliminate, reduce or control stressful elements or emotions and use fewer strategies of avoidance or of ignoring or circumventing problems). Perczek, Carver, Price and Pozo-Kaderman (2000) report the existence of multiple studies explaining the benefits of optimism for both physical and psychological health (e.g., optimism confers better resistance to developing low mood state after giving birth). Kennedy and Hughes (2004) also explain the beneficial effects on health of dispositional optimism (it is inversely related to depressive symptoms, and is also associated with better adjustment to illnesses such as heart disease, cancer or AIDS). The magazine *Harvard Men’s Health Watch* from May 2008 summarizes a range of studies that associate optimism with better health: optimists develop fewer respiratory infections than less positive individuals, are better protected against heart attacks (optimism “protects” the heart and circulation), are less likely to develop hypertension, and live longer.

OBJECTIVES AND HYPOTHESES

Given what we have seen so far, in the present study it is proposed to increase feelings of humour as a possible strategy for reducing anxiety levels in participants. The stress response (anxiety) is generated by means of a per-

ceptual speed test. A comedy video is then watched with the aim of reducing participants' state-anxiety. State-anxiety is measured at three points during the study (at the beginning – baseline –, after the perceptual speed test and after the comedy video). Moreover, at the beginning of the session participants' dispositional optimism and personality are assessed.

The hypotheses of the present study fall into three categories:

1. – Humour and anxiety
2. – Personality and optimism
3. – Performance in the perceptual speed test

1. – Humour and anxiety

H1: Participants' mean score on the STAI-S-1 state-anxiety test (baseline assessment) will be lower than the mean score obtained by participants on the STAI-S-2 state-anxiety test (after the perceptual speed test).

H2: Participants' mean score on the STAI-S-2 test (after the perceptual speed test) will be higher than the mean score obtained by participants on the STAI-S-3 test (after watching the comedy video).

H3: Participants' mean score on the STAI-S-1 test (baseline assessment) will be higher than the mean score obtained by participants on the STAI-S-3 test (after watching the comedy video).

In sum, it is hypothesized that the effect of the humorous video will help to regulate participants' activation levels (in the same way as other techniques such as relaxation or respiration), reducing levels of state-anxiety.

2. – Personality and optimism

H4: Participants who score higher in the dispositional optimism test (DIOP) will score lower in the anxiety tests (STAI-S-1, STAI-S-2 and STAI-S-3) than participants who score low in dispositional optimism (DIOP).

H5: Participants who score higher on the extraversion scale (Eysenck Personality Questionnaire Revised-Abbreviated, EPQR-A) will score higher on the dispositional optimism scale (DIOP).

H6: Participants who score higher on the neuroticism scale (EPQR-A) will score lower on the dispositional optimism scale (DIOP).

H7: Participants who score higher on the extraversion scale (EPQR-A) will score lower on the state-anxiety scale (STAI-S-1).

H8: Participants who score higher on the neuroticism scale (EPQR-A) will score higher on the state-anxiety scale (STAI-S-1).

3. – Performance on perceptual speed test

H9: There will be no statistically significant differences in the results obtained on the perceptual speed tests according to participants' scores in the optimism test – that is, the degree of optimism will not influence the results of the perceptual speed test.

H10: Participants who score higher in anxiety (STAI-S-1) will show poorer performance in the perceptual speed test.

METHOD

Participants

A total of 31 university student volunteers (17 women and 14 men aged between 19 and 32; mean age: 21.55 years) from four different areas of study: Psychology, Music teaching, Foreign language teaching and Social Education.

PROCEDURE

At the beginning of the group session (duration approximately 1 hour 30 minutes), experimental participants were administered three instruments:

- ✓ STAI-State (Spielberger et al., 1968).
- ✓ DIOP (Dispositional Optimism, Joiner, 1997)
- ✓ Eysenck Personality Questionnaire Revised-Abbreviated, EPQR-A (Francis et al., 1992)

Next, with the intention of generating anxiety, participants were assessed by means of a perceptual speed test. This instrument was an adaptation of the Raven intelligence test. The Raven test involves finding the missing piece in a series of figures (in this case, a total of 36, in which the first was only an example, not taken into account in the participants' total scores). In this test the participant was required to analyze the series presented and, following the horizontal and vertical sequence, choose one of the six pieces suggested, that which fitted perfectly both horizontally and vertically; for deducing which piece was missing participants had to use perceptual, observational and analogical reasoning skills.

For this study a time limit was imposed on the Raven test, so that each figure was presented for just two seconds, and the time between figures was 8 seconds, of which 4 seconds were used for noting the response on a test sheet and the remaining 4 constituted a countdown to the appearance of the next figure. Total duration of the test, not counting the time employed in its explanation, was around 6 minutes.

With the aim of increasing the stressful characteristics of the test, it was explained to the participants that at the end of the session the results obtained, on a scale of 0 to

10, would be displayed publicly, so that they could see their position relative to the other participants.

The perceptual speed test was administered by means of Microsoft Office Power Point and a projector.

Immediately after this test state-anxiety (STAI-S) was assessed again.

Next, with the excuse of entertaining the participants whilst the perceptual speed tests were being marked, they were invited to watch a video.

This video was made up of different scenes designed to cover all types of humour. It lasted a total of 25 minutes 10 seconds. The video, produced specifically for this study, was comprised clips from different TV comedy programmes. It was projected by means of a computer and shown on a screen.

Finally, state-anxiety (STAI-S) was assessed for a third time.

In order to guarantee the confidentiality of the personal data obtained, the list of scores on the perceptual speed test was not actually displayed; instead, a humorous image was shown at the end of the experimental situation, and through which the students were thanked for their participation.

The results were analyzed with SPSS and Microsoft Excel.

RESULTS

Below we show the statistical data obtained, summarized in tables. Table 1 shows the mean scores and standard deviations at the three application points of the STAI-State. Table 2 shows the comparison of means between the three application points, and Table 3 shows the correlations between those scores.

As can be seen in Table 2, there are no statistically significant differences between the results obtained on the STAI-S-1 and STAI-S-2, that is, state-anxiety levels did not increase in a statistically significant way after the perceptual speed test with respect to baseline. Table 3 indicates a high and significant correlation between STAI-S-1 and STAI-S-2, corroborating once more the similarity between the results on these two tests.

Statistically significant differences were indeed found for the comparison between scores on the STAI-S-1 and STAI-S-3, with a $p < 0.005$. That is, after the screening of the comedy video there was a highly significant reduction in state-anxiety levels with respect to the scores obtained at baseline.

There were also statistically significant differences for the comparison between scores on the STAI-S-2 and STAI-S-3, with a $p < 0.005$, indicating that after partici-

pants had watched the comedy video there was a highly significant reduction in state-anxiety levels with respect to the scores obtained after the perceptual speed test.

In conclusion, H1 is not fulfilled: the perceptual speed test does not significantly increase anxiety with respect to baseline, although the values are close to being significant. *But there is indeed fulfilment of the hypotheses that watching the comedy video will reduce anxiety in a statistically significant way with respect to the two previous measurements (H2 and H3).*

As regards the relationship between personality and optimism, Table 4 shows scores on the various EPQR scales and Table 5 shows the correlations between scores on the DIOP and at the three points at which State-Anxiety was measured with the STAI-S. Finally,

Table 1
Means and Standard Deviations (SD) for the STAI-State at the three application points

State-Anxiety measured with STAI-S	Mean	SD
At baseline	21.032	9.523
After perceptual speed test	24.29	10.955
After watching 25' 10" of a comedy video	13.193	8.113

Table 2
Comparison of STAI-S means at the three application points (T1:baseline, T2: after perceptual speed test and T3: after comedy video)

Comparison of means between STAI-S scores	N	t Test	Sig. (bilateral)
T1-T2	31	-2.002	0.054
T1-T3	31	4.299	0.000**
T2-T3	31	4.760	0.000**

** Correlation is significant at the 0.01 level (bilateral)

Table 3
STAI-S correlations at the three application points (T1:baseline, T2: after perceptual speed test and T3: after comedy video)

	N	Pearson correlation	Sig.
T1-T2	31	0.617	0.000**
T1-T3	31	0.346	0.057
T2-T3	31	0.098	0.601

** Correlation is significant at the 0.01 level (bilateral)

Table 4
Means and Standard Deviations (SD) on the EPQR-A Personality Questionnaire

EPQR-A Scales	Mean	SD
Neuroticism	2.612	1.838
Extraversion	4.548	2.013
Psychoticism	2	1.264
Lies	2.193	1.74

Table 6 shows the correlations between the EPQR dimensions and the DIOP and STAI-S scores.

As can be seen in Table 5, there is no statistically significant correlation between dispositional optimism (DIOP) and the results obtained in the STAI-S-1. That is, high score on the dispositional optimism scale does not mean that anxiety levels at baseline will be lower. Even so, a trend in this direction can be observed ($p=0.066$). Nor did we find a significant correlation between dispositional optimism and the STAI-S-2; indeed, as already mentioned, there were no significant differences between STAI-S-1 and STAI-S-2. However, we did observe a significant correlation between dispositional optimism and the STAI-S-3, whereby *the higher the score in dispositional optimism, the lower the score on the state-anxiety test applied after participants had watched the comedy video*. Thus, it can be stated that those participants with higher scores in dispositional optimism will reduce their anxiety levels to a greater extent than those who score lower on the optimism scale after watching a video of positive humour. Therefore, part of H4 is fulfilled.

In Table 6 it can be seen that those participants scoring higher in extraversion (EPQR-A) also score higher on the dispositional optimism scale (DIOP), and this relationship is highly significant ($p=0.001$). Therefore, H5 is fulfilled.

Participants who scored higher on the neuroticism

	N	Pearson	Sig.
DIOP and STAI-S-1	31	-0.334	0.066
DIOP and STAI-S-2	31	-0.229	0.215
DIOP and STAI-S-3	31	-0.602	0.000**

** Correlation is significant at the 0.01 level (bilateral)

	Mean	Pearson correlation	Sig.
STAI-S-1 and Neuroticism	31	0.601**	0.000
STAI-S-1 and Extraversion	31	-0.124	0.505
STAI-S-1 and Perceptual speed	31	0.065	0.728
Neuroticism and Extraversion	31	-0.112	0.549
Neuroticism and Perceptual Speed	31	0.132	0.479
Neuroticism and DIOP	31	-0.442*	0.013
Extraversion and Perceptual Speed	31	0.119	0.525
Extraversion and DIOP	31	0.557**	0.001
DIOP and Perceptual Speed	31	-0.031	0.867

** Correlation is significant at the 0.01 level (bilateral)
*Correlation is significant at the 0.05 level (bilateral)

scale (EPQR-A) scored lower on the dispositional optimism scale (DIOP). That is, the higher the score in neuroticism, the lower the score in dispositional optimism. H6 is fulfilled with a $p=0.013$.

Participants who scored higher on the extraversion scale (EPQR-A) did not score lower on the state-anxiety scale (STAI-S-1); that is, the most extraverted participants do not score lower in state-anxiety. Therefore, H7 is not fulfilled.

Those participants scoring higher on the neuroticism scale (EPQR-A) score higher on the state-anxiety scale (STAI-S-1). Participants with higher scores in neuroticism also score high in state-anxiety, so that H8 is fulfilled, with a $p=0.000$.

There are no statistically significant correlations in the results obtained in the perceptual speed tests according to participants' scores on the optimism scale; that is, the degree of optimism does not influence the results of the perceptual speed test, so that H9 is fulfilled.

Finally, participants who score higher in anxiety (STAI-S-1) do not present statistically significant differences in performance on the perceptual speed test, compared to those participants who score lower in anxiety. Therefore, H10 is not fulfilled.

DISCUSSION AND CONCLUSIONS

The results from this study support the hypothesis that *the use of positive humour can serve as an effective coping strategy for reducing anxiety levels*. Our results are similar to those of previous research showing how humour can reduce anxiety levels (Martin, Kuiper, Olinger, & Dance, 1993; Newman & Stone, 1996).

It was expected that the more optimistic participants would score lower in state-anxiety at the three assessment points (with the STAI-S), and although the results obtained are not statistically significant for the first two assessments (STAI-S-1 and STAI-S-2), a statistically significant correlation does indeed emerge between optimism and STAI-S-3 score (*the higher the dispositional optimism, the lower the state-anxiety after watching the comedy video*). With a larger sample this trend observed in the STAI-S-1 would perhaps become significant. In any case, it would have been interesting to measure Trait-Anxiety in the context of this correlation, with a view to explaining why not all the data are statistically significant.

The results show that between *optimism* and *extraversion* there is a significant positive correlation (people who score high in extraversion tend to be more optimistic). These results can be related to those from the

study by Karl, Peluchette and Harland. (2007), indicating that extraverts experience higher levels of fun, and we can conclude that in the case of the extravert participants the effects of the comedy video were more effective due to their personality characteristics.

Also, participants who score higher in neuroticism score lower in optimism and higher in state-anxiety (affective congruence). However, participants with higher scores on the extraversion scale do not score lower on the state-anxiety scale.

It is surprising to find that participants with the highest anxiety levels at baseline are not those who perform worst in the perceptual speed test. In other studies it was seen how high levels of anxiety affect performance in tests (Head & Lindsley, 1983), and high anxiety levels have also been shown to affect academic performance (Grases, 2009). In any case, it is observed that of the 31 participants assessed only 9 obtain scores of more than 5 on a scale of 0 to 10, and this suggests that the test itself may have been too difficult for effective discrimination between participants.

This study has a series of limitations, the most important of which is the lack of a control group. Indeed, future studies might do well to include, in addition to a control group, other experimental groups, which would be required to watch video material from other genres, such as drama or horror, plus neutral material, with a view to observing the differences between them in relation to dependent variables such as anxiety; in this way it would be possible to investigate the influence on health of emotions or aspects other than humour.

In future research it would be interesting to study the possibility of significant reductions in anxiety related to sex and age, as well as taking into account the different styles of humour described in theories in this field.

It would also be of interest to consider another personality model (here we have considered that of Eysenck), such as that of the Big Five, thus taking into account dimensions such as responsibility or openness to experience and their possible relationship with sense of humour.

As far as the relation between humour and feelings of energy is concerned, and following the work of Dienstbier (1995), we could have assessed this effect in the present study by changing the order of presentation of the comedy video and perceptual speed test; that is, we could have ascertained whether humour improved performance on the test.

Finally, we can state this is a field of study of enormous potential interest, and in which a great deal more

research is necessary to reach conclusions that would indicate the therapeutic use of positive humour. Although it is a relatively new field, the research carried out up to now already suggests that a well developed sense of humour is beneficial, since it permits people to cope with certain situations or provides them with the ability to adapt to them (Saper, 1990). Moreover, humour and laughter can be effective tools for coping with stress: humour permits us to see problems from another perspective and laughter helps us to release accumulated physical tension (Wooten, 1996).

Clearly, given the enormous numbers of stressful elements in today's society, "positive humour" will not be the only technique to help reduce the anxiety levels that can generate stressful stimuli, but if we have at our disposal certain elements for dealing with such stimuli (one of which might be the ability to promote or enjoy positive humour), we can indirectly benefit our health. The strategy applied in this study might even be used for reducing anxiety in certain situations that generate high levels of it (prior to an exam, before giving a talk in public, or even in long supermarket queues or doctors' waiting rooms), given that, as we have seen, positive emotions such as humour are contradictory to negative emotions like anxiety, so that they can offset their negative effects, at least temporarily, and help us on the road to resolving the situation.

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