

Comparative Study of Positivity and Self-Efficacy for the Regulation of Negative Emotions in Persons with and without Cardiovascular Disease

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Abstract

Among chronic diseases, cardiovascular disease is considered to be the leading cause of death in developed countries. Numerous investigations have determined the influence of several factors on the development and prognosis of the disease; among these factors, some are associated with sociodemographic variables, such as socioeconomic status; and others to psychological variables such as positive orientation towards life or self-efficacy for the regulation of negative emotions. The present investigation follows an ex post facto prospective design in which two samples are to be compared, one with cardiovascular disease (N = 369) and the other without cardiovascular disease (N = 320). All participants responded to a questionnaire assessing both their socio-demographic characteristics (socioeconomic status, age, sex, life in pairs, work status), as well as the psychosocial and dispositional variables related to the evolution of cardiovascular disease, self-efficacy for the regulation of negative emotions and positivity or positive orientation towards life. The results showed that the positivity is positively and significantly related to the socioeconomic level of the participants and to the self-efficacy for negative emotional regulation (for the whole sample and independently in both samples). While older participants showed greater self-efficacy for the regulation of negative emotions (distress and despair); these relationships remained significant in the sample of patients with cardiovascular disease. Univariate analyzes showed that the patient sample maintained a higher level of positivity and self-efficacy for the regulation of negative emotions than the general population sample. However, the men of both show significantly more self-efficacy for the regulation of negative emotions, both of anguish and despair. This result allows us to advance an important line of intervention in women with cardiovascular disease; especially relevant to the increase in mortality in women due to this cause. Finally, given that our results confirm previous research on the relationship between cardiovascular disease and socioeconomic status and employment status, the need to intervene by providing more disadvantaged groups of the population with psychological strategies to cope with the disease is discussed.

Keywords: Health; Cardiovascular Disease; Positivity; Self-Efficacy; Regulation of Negative Emotions

Abbreviations

NSI: National Statistical Institute; NCD: Non-Communicable Diseases; CVD: Cardiovascular Disease; NA: Negative Affectivity; EI: Emotional Intelligence; IMIBIC: Biomedical Research Institute of Cordoba; RESE: Regulatory Emotional Self-Efficacy Scale; NEG: Negative Emotions; ANG: Anger-Irritation; DES: Dismay-Despair; SD: Standard Deviation

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Introduction

The aging of the population has now become a key global issue. Both proportionally and in number, our aging population is growing at a remarkable rate [1]. This aging of the population is essentially mediated by two factors: the increase in life expectancy (resulting from the decline in infant mortality and improvement in social and sanitary conditions), as well as the drop-in fertility rates, caused by the accessibility of anti-contraceptives and changes to gender norms [1].

According to data from the National Statistical Institute [2], 18.4% (8.657.705 people) of the population in Spain are aged 65 and over and 6.0% are octogenarians. Furthermore, the NSI have predicted that there will be more than 14 million older people (or 34.6% of the total population) by 2066.

Whilst many new opportunities have presented themselves as a consequence of this increased longevity, there are also new challenges to public health [3]. Recent data collected by the World Health Organization [4], report that non-communicable diseases (from this point forward, NCD) are responsible for 70% of deaths globally. Specifically, cardiovascular diseases (from this point forward, CVD) constitute most of deaths by NCD (17.7 million each year).

With reference to Spain, according to the report carried out by Abellán, Ayala and Puyol [5], the main cause of death among older people relates to diseases of the circulatory system, causing 107.011 deaths. Given the importance of this chronic disease, the present study sets out to analyze some of the factors that boost quality of life and satisfaction with life within this sector of the population.

Cardiovascular disease and factors associated with quality of life

Since the topic of cardiovascular disease is currently of vital importance, extensive literature has been produced concerning the risk factors that contribute significantly to the pathogenesis, development and rehabilitation of coronary heart disease.

Within this range of factors are those biological factors that are traditionally studied and include smoking, the consumption of alcohol, cholesterol, hypertension, diets lacking in fruits and vegetables and physical inactivity together with a sedentary lifestyle or a certain genetic predisposition [3,6].

On the other hand, regarding psychosocial risk factors, it has been found to be the case that both low socioeconomic status and low-level employment are associated with a greater incidence of mortality resulting from cardiovascular disease [7,8]. According to Leigh and Du [6], occupations carrying a higher social status are associated with lower hypertension and, consistent with those investigations carried out by Dupre, George, Liu, and Peterson [10], find that unemployment is linked to myocardial infarction. In their study, they report that the rate of risk of myocardial infarction in a sample of unemployed people was greater in the first year.

Another aspect associated with a greater prevalence of cardiovascular disease is inadequate social support [11]. The authors of this study carried out a systematic review and meta-analysis to highlight the significance of a low level of social support in the development and evolution of cardiovascular disease. In this way, the important role performed by social support in the development and prognosis of coronary cardiopathy is demonstrated, as is the way in which social support may be related to other risk factors. The research of Yusuf, *et al.* [12] affirmed that social isolation, combined with family or work stress and depression, is linked with a higher risk of myocardial infarction. These are aspects to consider in interventions promoting a better perception of positive social resources.

With regard to the influence of sex, in the study by Bodi, *et al.* [13] there were no significant differences observed between men and women in relation to mortality resulting from acute coronary syndromes, whilst in the study by Conde-Martel, *et al.* [14] a greater predominance of myocardial infarction was found in men than in women.

Another aspect that affects the quality of life of cardiovascular patients is work-related stress, especially in chronic cases [15]. Work tension causes spikes in arterial pressure, allowing diverse pathologies to appear. These could be hypertension, cerebrovascular diseases, arteriosclerosis or myocardial infarctions, etc.

Due to the elevated presence of psychological ill-being (distress, anxiety, depression and hostility) amongst patients with cardiovascular diseases [16], the importance of contemplating different psychological factors is highlighted, with particular reference to emotional aspects as pathological determinants for cardiovascular disease.

Management of negative emotions

Negative affectivity is defined as the propensity to continually experience negative emotions across time and in most situations. It entails negative self-assessment, a greater number of somatic symptoms and an attention bias which predisposes them towards adverse stimuli [17].

In terms of the predisposition towards management of negative emotions, Würtz., *et al.* [18] report that having a Type D (distressed) personality, characterized by intense negative affectivity (NA) and social inhibition, increases the risk of a poor prognosis in patients with coronary diseases. Those that have this personality type do not usually manage their anger appropriately, and inhibit the expression of negative emotions in general, with a view to preventing interpersonal conflicts [19]. With regard to anger and hostility, these are deemed to be associated with a significant increase in cardiovascular risk [20]. Clinical depression and its symptoms also indicate the future incidence of coronary diseases and worsen their prognosis [21].

In highlighting the role played by negative emotions in cardiovascular disease, an emotional regulation approach becomes crucial. Emotional regulation is one of the dimensions of emotional intelligence, which is characterized by the ability to accept emotions (both pleasant and unpleasant) with the intention of either engaging with them or detaching oneself from them, depending on the assessment made by the individual of each emotion [22].

In the investigation developed by Bahreman, Alikhani, Zakiei, Janjani and Aghaei [23], it is demonstrated that people with cardiac diseases employed poor emotional regulation strategies in their daily lives (rumination, catastrophizing and self-blame, among others) making them more vulnerable to negative events and different aspects of pathology.

Continuing along this line, a Swedish study carried out a longitudinal study in which 46.393 subjects were followed for 38 years [24]. The results showed that inadequate emotional control in late adolescence is associated with an increased risk of suffering from cardiovascular disease. This association proved to be stronger in those participants who had a family history of CVD. These data suggest that poor emotional regulation can be a predictive risk factor for cardiovascular disease in the long term.

Patients with hypertension display heterogeneity in the ways in which they regulate their emotions [24]. In a stressful situation that was created experimentally, 52.3% of hypertensive patients were characterized by emotionality and weakness of emotional control, whilst the remaining 47.7% tended towards denial and repression of the emotions generated. Both strategies described are evidently inefficient in coping with emotional intensity.

Within the scope of cardiac disease, sex is another variable to consider. In this respect, diverse studies have shown that women with cardiovascular pathology usually display a higher level of emotional malaise than men [25], which results in a worse prognosis of the disease [26]. On the other hand, despite the scarce data available, Type B personality does appear to be more prevalent amongst women than men [27].

Where the age of patients is concerned, Márquez-González, Izal, Montorio and Losada [28] observed the way in which older people develop better methods for regulating their emotions. Similarly, in the study by Gartzia, Aritzeta and Balluerka [29] significant links were found between age and the regulation of the emotions of others.

On the other hand, in the study by Zeidner and Matthew [30], it is asserted that emotional intelligence (EI) and social support have a significant positive correlation. In this study, women achieved higher scores than men in their capacity for emotional intelligence. However, according to Fernández-Berrocal, Cabello, Castillo and Extremera [31], the influence of sex on emotional intelligence is unclear, given that it can be influenced by many other factors such as age. In the same way, in the investigation developed by Rey and Extremera [32], it is proven that emotional intelligence has a positive correlation with quantitatively and qualitatively greater social support. In general, studies consistently indicate that emotional competence is linked with social commitment and that social support can mediate in the benefits of EI on the results of adaptation.

Perceived self-efficacy in the regulation of negative affect is understood as the belief a person has in their capacity to improve negative emotional states for themselves in times of adversity [33]. People who know how to effectively control their negative emotions (anger, sadness, fear) are able to better utilize the mental, physical and social resources at their disposal, especially in unfavorable situations, managing not to become overwhelmed by those emotions. In the same way, people who exhibit joy, pride and enthusiasm are better prepared to cope with life on account of their positive outlook [34,35].

As per the review of the investigations above, the significant effect of regulation of negative emotions on cardiovascular diseases can be verified. As such, the protective, beneficial and promoting effect of positive emotions becomes a far-reaching approach.

Positivity on cardiovascular disease

Psychological investigation has generally centered around individual studies into the influence of self-esteem, satisfaction with life and optimism concerning well-being and quality of life; however, these three constructs can be analyzed as one single latent factor: positivity [36-38]. In this way, Caprara, *et al.* [39] postulate the existence of a positive triad that allows people to maintain a positive view of themselves, of life and of the future. Having a positive view of these areas fulfils an important biological function, making people capable of facing life in spite of adversity, failure, loss and serious illness [39].

The first construct and component of positivity, self-esteem, is defined as the assessment an individual makes with respect to themselves, which carries an attitude of approval or disapproval and indicates how far they judge themselves to be capable, important, successful and valued [40]. In the study by Santamaría, Fernández, Lorenzo, and Castro [41] people over 60 who are diagnosed with cardiac ailments are observed to exhibit a higher level of anxiety and a lower level of self-esteem than those not suffering from said disease.

Life satisfaction refers to the global judgment a person makes about their life, comparing their acquisitions and achievements with their expectations and what they had been hoping to attain [42]. In the study by Boehm, Peterson, Kivimaki and Kubzansky [43] both personal satisfaction and satisfaction with life, family and work are linked to a lower risk (23%) of being diagnosed with ischemic heart disease. In this vein, some investigations have concluded that patients with CVD and a low level of perceived social support had less satisfaction with life and scored more highly for depression [44].

With regard to optimism, this is understood as the holding of generalized favorable expectations for the future, and thereby increasing the frequency with which a person experiences positive feeling [45]. In a meta-analysis centered on the relationship between optimism and physical health, it was concluded that there is a significant link between optimism and better health in various areas, cardiovascular health being among them [46]. In addition to this, in their review concerning psychological well-being and cardiovascular health, Boehm and Kubzansky [47], found that optimism played a protective role in cardiovascular health.

Regarding the differences in positivity according to sex, the results found by different investigations appear to contradict each other. On the one hand, Caprara, Caprara and Steca [48] reported that men were more positive in comparison with women, whilst Alessandri, *et al.* [36] asserted that, in terms of positivity, no difference was seen between sexes in the participants of their study.

Positivity appears to be influenced by psychological maturity. Children, for example, are more predisposed to be positive, on account of having more gratifying experiencing and receiving more love and care [49]. Other studies have shown the stability of positivity throughout development and the beneficial effect this has on health, performance at work, psychological well-being and social adaptation [50].

In summary, it should be noted that, for patients with cardiovascular diseases, positive psychological constructs (optimism, psychological well-being, positive affect...) seem to be associated with better health in general and a reduced rate of acute episodes. Finally, although limited, investigations into those interventions putting the aforementioned constructs into practice with cardiovascular disease patients are efficient, and have the potential to promote the health and survival of the vulnerable in society [51].

Having carried out a review of the research literature, it is evident that cardiovascular disease is closely related to the management of negative emotions in preventing the development of the disease, whilst positivity and the management of positive emotions appear to have a protective effect on health. Addressing the need to make a greater investigative effort into this type of chronic illness, we consider it necessary to study the influence of these constructs, that is, self-efficacy in emotional regulation as well as positivity, in a sample of patients with cardiovascular disease compared with a sample from the general population.

Objective and Hypothesis

As such, the main objective will be to compare the assessment given to having a positive orientation toward life (positivity), as well as self-efficacy in emotional regulation, in a sample of patients with cardiovascular disease against a sample of people without the disease, which we shall call the general population. At the same time, the hypotheses formulated around the relationships between all studied variables are as follows:

- H1. People who score more highly in positivity, independently of their background, have better self-efficacy for the regulation of negative emotions.
- H2. The psychological variables analyzed (positivity and self-efficacy for the regulation of negative emotions) according to the socio-demographic characteristics studied:
 - H2a. People with a higher socioeconomic level will show a higher level of positivity and self-efficacy for the regulation of negative emotions.
 - H2b. Older people will show higher level of positivity and self-efficacy for the regulation of negative emotions.
 - H2c. Women will show higher level of positivity and self-efficacy for the regulation of negative emotions in comparison with men.
 - H2d. People who live with a partner will show higher level of positivity and self-efficacy for the regulation of negative emotions.
 - H2e. Unemployed people will show a lower level of positivity and self-efficacy for the regulation of negative emotions.

Materials and Methods

Participants and procedures

Based in Montero y León [52], the present investigation follows an *ex post facto* prospective design, given the impossibility of manipulating the independent variable: having or not having cardiovascular disease. A questionnaire consisting of a set of psychological scales was used as a tool to obtain empirical evidence.

For our investigation, we have taken a total sample of 689 participants, 369 of which are cardiovascular disease patients (from this point forward CVD) who form part of the CORDIOPREV study at Reina Sofia University Hospital, Cordoba and IMIBIC (Spain), and our sample which is referred to as “population with CVD”. The remaining 320 are family members of first year Primary Education students at the University of Cordoba (Spain), who in turn shall be known as “general population”, due to the fact that they show no signs of heart trouble. The characteristics of the total population are shown in table 1.

Variable	Option	No. (%)
Age	26 - 35	18 (2.6)
	36 - 50	150 (21.8)
	51-65	309 (44.8)
	66-88	212 (30.8)
Sex	Male	470 (68.2)
	Female	219 (31.8)
Socioeconomic Level	Low	166 (24.1)
	Mid	410 (59.5)
	High	95 (13.8)
	Very high	18 (2.6)
Employment Status	Unemployed	100 (14.5)
	Part-time Employment	43 (6.2)
	Full-time Employment	226 (32.8)
	Retired	311 (45.1)
Partner	Living with a partner	578 (83.9)
	Not living with a partner	111 (16.1)
Total		689 (100)

Table 1: Sociodemographic characteristics of the total sample.

First of all, the general population group is formed of 46.6% men and 53.4% women, with an average age of 55.42, in which the youngest participant is 26 and the eldest is 88. In terms of socioeconomic status, 74.4% of subjects report themselves to be at mid-level and 16.3% at the lowest level. From an employment standpoint, it can be reported that 43.8% of this group are in full-time employment and 22.5% are retired, whilst 20.6% are not in employment and 10.3% are in part-time employment. With regard to co-habitation with a partner, 20.3% of participants report not living with a partner, against the other 79.7% who do.

The population with CVD is constituted of 87% men and 13% women, the average age of which is 62.12, with the youngest participant being 37 and the eldest, 74. With respect to the socioeconomic level, there is greater variability here, with 46.6% of the group reporting a mid-socioeconomic level, 30.9% a low level and 18.4% a high level. In terms of participants’ employment status, 64.8% are retired, 23.3% work full-time, 9.2% are unemployed and 2.7% hold part-time positions. Finally, the data concerning whether or not participants live with a partner is very similar across the two populations, 87.5% of those with cardiovascular disease confirm that they live with a partner, whilst 12.5% report the opposite.

Measures

A questionnaire has been devised for our investigation and includes different measures, with issues concerning different socio-demographic areas and corresponding scales to evaluate the main variables under study. The collection of data has been done through self-reports done by the subjects themselves.

Sociodemographic variables. In terms of socio-demographic variables, age, sex, socioeconomic level, employment status and whether or not the participant lives with a partner have all been explored.

Self-efficacy for the regulation of negative emotions. On the one hand, we have used the Spanish version of the Regulatory Emotional Self-Efficacy scale (from this point forward, RESE) designed by Caprara, *et al* [33]. It is intended to register the management of negative affect in the face of adversity or frustrating events, and the way in which positive emotions such as enthusiasm, pride, etc. are expressed. The aforementioned scale comprises 12 items assessed on two sub-scales: Positive emotions (from this point forward, POS) which has four items, and negative emotions (from this point forward, NEG) which has eight items. We have focused specifically on the latter, on the negative, given that, as discussed in the theoretical justification, it is negative emotions that have been seen to be damaging to health, particularly for those with cardiovascular disease. This subscale, in turn, is formed of two other constructs: firstly, anger-irritation (from this point forward, ANG) which has four items, one of which being "...quickly getting over irritation after making a mistake" and secondly, dismay-despair (from this point forward, DES) which has another four items, for example, "...not feeling depressed when I'm alone". All of these items are classified on a 7-point Likert-type scale measuring the level of confidence, 1 being "no confidence" and 7 being "total confidence".

The RESE was found to be reliable and valid in the study by Caprara, *et al.* [33] with samples from different countries of origin, where the internal consistency indices were 0.82 (DES) and 0.73 (ANG) for a sample of people from Italy, 0.72 (DES) and 0.70 (ANG) for a sample of people from the USA and 0.81 (DES) and 0.68 (ANG) for a sample of people from Bolivia sample. In other studies, such as that by Pan, Zhang, Liu, Ran and Wang [53], a Cronbach's alpha of 0.80 (DES) and 0.79 (ANG) was obtained, and in the study by Calia, Lai, Aceto, Luciani, Camardese, Lai, *et al.* [54] the reliability index for the whole scale was 0.82. In relation to the current study, the results for reliability have been similarly elevated for the scale of negative affect, 0.78 (DES) y 0.85 (ANG) for the general population sample; 0.83 (DES) y 0.82 (ANG) the sample of patients and 0.90 for the general scale.

Positivity: To evaluate patients' tendency towards having a positive outlook on life, the Spanish version of the Positive Scale, created by Caprara, Alessandri, Trommsdorff, Heikamp, Yamaguchi and Suzuki [55] has been used. This scale was created through the union of three different scales: Rosenberg's Self-esteem Scale; [40], Satisfaction with Life Scale; [56] and Life Orientation Test, LOT-R; [57], with a view to evaluating the construct of Positivity, gathering together aspects associated with its three underlying constructs: self-esteem, optimism and satisfaction with life. The aforementioned scale is made up of 8 items, such as "I have a lot of confidence in the future" or "I don't think I have very much to be proud of", which are also measured on a Likert-type scale, value 1 being "completely false" and value 7 being "completely true", in order to measure how far each of the statements reflects the way the subject thinks, feels and acts.

In previous investigations, the same scale has shown a strong internal consistency, for example as in the study by Alessandri, Vecchione, Tisak, Deiana, Caria and Caprara [58], whose Cronbach's alpha was 0.85, or the study by Vallejo Sánchez and Pérez García [59] in which a Cronbach's alpha of 0.83 was obtained. In our case, the reliability index found was 0.72 for the general population sample and 0.80 for the cardiovascular disease patient sample.

Statistical Analysis

For data analysis, we will use the statistics program IBM SPSS Statistics 20. With this, we will carry out correlational analyses considering both the total sample and distinguishing between the background of the samples, with the aim of assessing the relationship between the studied variables and testing the hypotheses that have been set out. The Chi-square test will be used in order to establish the possible differences between socio-demographic variables in both populations studied. Subsequent to that, we will carry out a series of univariate linear models. This analysis will allow us to analyze the main effects of each independent variable separately (the background of the sample and the distinct socio-demographic variables) concerning positivity and self-efficacy for the regulation of negative emotions. Furthermore, the different univariate analyses will allow us to analyze the effects of interaction between the background of the sample and each of the socio-demographic variables studied.

Results and Discussion

Relation between variables

As can be seen in table 2, the correlation analysis carried out for the whole sample indicates that older people have a significantly lower socioeconomic level, while at the same time it can be seen that the positive orientation towards life increases significantly at a higher socioeconomic level. Moving onto positivity, the significant way in which it influences self-efficacy for the negative emotional regulation is considered, that is, the more positive a person is, the greater self-efficacy they have for both anger (ANG) and despair (DES). Finally, another significant relationship between age and perceived self-efficacy for the regulation of negative affect becomes evident, the older the age, the greater the levels of self-efficacy are for the regulation of negative affect.

	1	2	3	4	5	6
1. Age	-					
2. Socioeconomic Status	-0.089*	-				
3. Positivity	-0.025	0.118**	-			
4. RESE ANG	0.112**	0.038	0.373**	-		
5. RESE DES	0.133**	0.044	0.377**	0.786**	-	
6. RESE	0.130**	0.043	0.397**	0.947**	0.943**	-
M	59.01	1.95	5.12	4.89	4.83	4.86
SD	11.44	0.69	1.00	1.32	1.27	1.22

Table 2: Means, standard deviations and correlations between studied variables (whole sample).

*: Correlation is significant at the 0.05 level (bilateral).

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

Where the general population is concerned, there is a significant relationship between age and positivity, indicating that older people have a less positive orientation towards life. Socioeconomic status is also observed to have a significant influence on this as well, but in the opposite way: as the socioeconomic level increases, so does the positive attitude. Self-efficacy for emotional regulation is also significantly mediated by positivity, the more positive a person is, the greater self-efficacy they have for emotional regulation of negative affect, particularly with respect to anger and despair.

Within the population with CVD we also find several significant correlations. Age correlates significantly with socioeconomic status; older people having a lower socioeconomic level. It can also be observed that as the age of the participants increases, the higher they score for self-efficacy for negative emotional regulation, both in terms of anger (ANG) and despair (DES). Likewise, as can be seen in table 3, this self-efficacy for the emotional regulation of negative affect is significantly influenced by positivity, the more positive someone is, the more effective they will be in regulating their negative emotions.

	1	2	3	4	5	6	M P.C.	SD P.C.
1. Age	-	-0.106*	0.099	0.145**	0.136**	0.149**	62.12	8.04
2. Socioeconomic Status	-0.109	-	0.092	0.072	0.058	0.068	1.96	0.81
3. Positivity	-0.194**	0.173**	-	0.439**	0.453**	0.469**	5.22	1.07
4. RESE ANG	-0.004	-0.024	0.255**	-	0.805**	0.950**	5.16	1.29
5. RESE DES	0.052	0.015	0.238**	0.745**	-	0.950**	5.06	1.29
6. RESE	0.024	-0.006	0.264**	0.939**	0.929**	-	5.11	1.22
M G.P.	55.42	1.94	5.00	4.59	4.58	4.58	-	
SD G.P.	13.55	0.531	0.90	1.30	1.20	1.17		-

Table 3: Means, standard deviations and correlations between studied variables for each of the analysed samples. The data concerning the general population sample are collected from beneath the diagonal, while the data from above the diagonal reflects the sample with cardiovascular disease.

G.P.: General Population; P.C.: Population with CVD (Cardiovascular disease)

*: Correlation is significant at level 0.05 (bilateral).

**: Correlation is significant at level 0.01 (bilateral).

Differences in positivity and self-efficacy for negative emotional regulation according to the background of the sample

Continuing with the analysis of variance, the levels of positivity and self-efficacy for negative emotional regulation are checked according to whether or not cardiovascular disease is present.

There are statistically significant differences in self-efficacy for the emotional regulation of anger (ANG) between the population of patients with CVD and the general population $F(1,680) = 33.04$ $p < 0.001$ $\eta^2 = 0.05$ $Pot. = 1$. The mean for patients is 5.16 (SD = 1.29) and, for the general population, 4.59 (SD = 1.30). Similarly, there are significant differences in self-efficacy for the emotional regulation of despair (DES) $F(1,679) = 25.59$ $p < 0.001$ $\eta^2 = 0.04$ $Pot. = 0.999$, where the mean for cardiovascular patients is 5.06 (SD = 1.29), and that for participants in the general population is 4.58 (SD = 1.20). It follows that significant differences were also observed for general negative emotional regulation (RESE) $F(1,680) = 33.19$ $p < 0.001$ $\eta^2 = .05$ $Pot. = 1$, with a mean of 5.11 (SD = 1.22) for the population with CVD and another of 4.58 (SD = 1.17) for the general population.

As for positivity, we also see significant differences $F(1,687) = 8.04$ $p < 0.005$ $\eta^2 = 0.01$ $Pot. = 0.81$, the population with CVD having a greater mean, 5.22 (SD = 1.07) compared to the general population, which has a mean of 5.01 (SD = 0.90).

Differences in positivity and self-efficacy for negative emotional regulation according to sex and background of the sample

The results of the univariate linear model show significant differences in the perceived positivity of the population with CVD and of the general population, with a higher perceived positivity in the patient sample. This result follows the same pattern as the differences found for the perceived self-efficacy for the regulation of negative emotions. As such, the results show significant differences, both in general and for the emotions associated with the regulation of anger and emotions associated with regulation of despair; the patients with CVD are those who assert themselves to have greater self-efficacy for the regulation of emotions.

On the other hand, the results show significant differences according to the sex of the sample, with men seeing themselves as having greater self-efficacy in the regulation of negative emotions, both those associated with anger and with despair. With regard to positivity, although the women with CVD showed more positivity than the men, the differences were not significant. Finally, considering the effects of interaction, the results did not show a significant effect of interaction between sex and the background of the sample in any of the analysed variables, positivity or self-efficacy for the regulation of emotions.

Variable	Population with CVD				General Population				Background and Interaction					
	Man		Woman		Man		Woman		Sex		Sample Background		Sex X Sample Background	
	M	SD	M	SD	M	SD	M	SD	F (1, 684)	η^2 ; Pot.	F (1, 684)	η^2 ; Pot.	F (1, 684)	η^2 ; Pot.
Positivity	5.21	1.05	5.30	1.16	5.03	0.81	4.98	0.98	0.039	0.00; 0.05	8.25**	0.01; 0.82	0.484	0.00; 0.10
RESE ANG	5.20	1.28	4.92	1.36	4.88	1.18	4.34	1.34	11.07**	0.02; 0.91	13.29**	0.02; 0.95	1.14	0.00; 0.19
RESE DES	5.11	1.28	4.76	1.30	4.79	1.13	4.39	1.23	9.60**	0.01; 0.87	8.28**	0.01; 0.82	0.037	0.00; 0.05
RESE	5.15	1.22	4.84	1.25	4.83	1.07	4.37	1.20	11.71**	0.02; 0.93	12.11**	0.02; 0.93	0.447	0.00; 0.10

Table 4: Means, standard deviations for the variables of Positivity and Self-efficacy for the regulation of emotions in the sample of patients with CVD and the general population sample for both men and women. Univariate analysis of the studied variables considering the sex factor (man vs woman), the sample background factor (patients with CVD vs general population) and the interaction between both factors.

Note: * $p < 0.05$; ** $p < 0.01$

Differences in positivity and self-efficacy for negative emotional regulation according to the condition of living or not living with a partner and the background of the sample

As can be observed in the results (Table 5), there are significant differences in perceived self-efficacy for negative emotional regulation between the general population and patients with CVD, with the patients having the highest scores. The same occurs for the regulation of despair and anger.

On the other hand, there are also significant differences relating to co-habitation with a partner; people who live with a partner score more highly for positivity than those who do not. Finally, it must be mentioned that there is no interaction effect between the background of the sample and the condition of living with a partner for any of the variables that are the object of our study.

Variable	Population with CVD				General Population				Couple		Sample Background		Couple X Sample Background	
	Living with Partner		Not Living with Partner		Living with Partner		Not Living with Partner		F (1, 685)	η ² ; Pot.	F (1, 685)	η ² ; Pot.	F (1, 685)	η ² ; Pot.
Positivity	5.25	1.04	5.01	1.24	5.03	0.89	4.90	0.95	3.12 #	0.00; 0.42	2.48	0.00; 0.35	0.273	0.00; 0.08
RESE ANG	5.16	1.30	5.19	1.25	4.63	1.31	4.45	1.26	0.285	0.00; 0.08	21.78**	0.03; 1	0.591	0.00; 0.12
RESE DES	5.04	1.30	5.19	1.20	4.61	1.22	4.43	1.10	0.015	0.00; 0.05	20.40**	0.03; 0.99	1.55	0.00; 0.24
RESE	5.10	1.23	5.19	1.17	4.62	1.19	4.44	1.07	0.130	0.00; 0.06	23.83**	0.03; 1	1.11	0.00; 0.18

Table 5: Means, standard deviations for the variables of Positivity and Self-efficacy for the regulation of emotions in the sample of patients with CVD and the sample of general population for both those living with a partner and those not living with a partner. Univariate analysis of the studied variables considering the couple factor (living with a partner vs. not living with a partner), the sample background factor (patients with CVD vs general population) and the interaction between both factors.

Note: # $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Differences in positivity and self-efficacy for negative emotional regulation according to the socioeconomic status and the background of the sample

The results of the following univariate linear model show significant differences in positivity according to the socioeconomic level of the sample. According to post-hoc analyses through the Bonferroni test, participants at low socioeconomic level have significantly lower means for positivity compared to those who report having a high socioeconomic level ($t = -0.4431$; $p < 0.01$). A priori, the differences found in the self-efficacy for the regulation of negative emotions according to the socioeconomic level were significant.

Regarding the background of the sample, there are significant differences in self-efficacy for negative emotional regulation, with the population with CVD having significantly higher self-efficacy scores for the regulation of anger and despair and of negative emotions in general. As to the possible interaction effect between the background of the sample and the socioeconomic status on the studied variables, no significant differences were found.

Variable	Population with CVD								General Population								SE Status		Sample Background		SE Status X Sample Background	
	Low		Medium		High		Very High		Low		Medium		High		Very High		F (3,681)	η ² ; Pot.	F (1,681)	η ² ; Pot.	F (3,681)	η ² ; Pot.
Positivity	5.11	1.12	5.19	1.08	5.49	0.90	5.17	1.10	4.65	0.98	5.06	0.88	5.20	0.84	5.42	0.14	4.22**	0.02; .86	0.875	0.00; 0.15	1.18	0.00; 0.32
RESE ANG	4.99	1.50	5.19	1.20	5.47	1.16	4.75	0.79	4.52	1.24	4.63	1.32	4.54	1.12	3.33	2.04	2.14 #	0.01; 0.55	14.03**	0.02; 0.96	0.906	0.00; 0.25
RESE DES	4.93	1.49	5.07	1.22	5.33	1.09	4.70	0.99	4.40	1.16	4.63	1.20	4.59	1.26	3.50	0.66	2.23 #	0.01; 0.57	11.18**	0.02; 0.92	0.563	0.00; 0.17
RESE	4.96	1.43	5.13	1.15	5.40	1.07	4.72	0.81	4.46	1.11	4.63	1.18	4.56	1.14	3.42	1.13	2.46 #	0.01; 0.61	14.23**	0.021; 0.96	0.765	0.00; 0.21

Table 6: Means, standard deviations for the variables of Positivity and Self-efficacy for the regulation of emotions in the sample of patients with CVD and the sample of general population for different socioeconomic statuses. Univariate analysis of the studied variables according to the socioeconomic status factor (low vs medium vs high vs very high), the sample background factor (patients with CVD vs general population) and the interaction between both factors.

SE Status: Socioeconomic Status

Note: # $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Differences in positivity and self-efficacy for negative emotional regulation according to employment status and the background of the sample

As can be seen in table 7, on the one hand, there are significant differences in perceived positivity and in self-efficacy for the regulation of negative emotions according to employment status. As post-hoc analyses show through the Bonferroni test, those in full-time employment have significantly higher means for positivity compared to those who are unemployed ($t = 0.4142$; $p < 0.01$). The same happens between the retired and the unemployed, with retirees having significantly higher positivity scores ($t = 0.4042$; $p < 0.01$). In self-efficacy for the regulation of anger and for negative emotional regulation in general, the differences follow the same line. The unemployed participants score significantly lower than those in full-time work for anger ($t = -5649$; $p < 0.01$) and for the regulation of negative emotions in general ($t = -0.3930$; $p < 0.05$), the same way the unemployed participants score significantly lower than the retirees for anger ($t = -0.784$; $p < 0.01$) and negative emotions in general ($t = -0.5760$, $p < 0.01$). Specifically, in terms of self-efficacy for the regulation of despair, there are only significant differences between retirees and the unemployed, the retirees scoring significantly higher in this variable ($t = 0.4387$; $p < 0.05$).

On the other hand, considering the condition of having a CVD or not, there are significant differences where the population with CVD are the ones who score significantly higher in self-efficacy for the negative emotional regulation in general and for the regulation of anger and despair in particular.

Variable	Population with CVD								General Population								Employment Status		Sample Background		Employ. Status x Sample Background	
	Unemploy.		Part-time employ.		Full-time employ.		Retired		Unemploy.		Part-time employ.		Full-time employ.		Retired		F (3, 672)	η ² ; Pot.	F (3, 672)	η ² ; Pot.	F (3, 672)	η ² ; Pot.
Positivity	4.59	1.46	5.06	0.95	5.27	0.94	5.30	1.03	4.90	1.05	4.86	0.98	5.18	0.78	4.87	0.84	5.10**	0.02; 0.92	0.833	0.00; 0.15	3.23*	0.01; 0.74
RESE ANG	4.72	1.49	4.97	0.88	5.23	1.10	5.20	1.33	4.19	1.41	4.59	1.16	4.75	1.22	4.66	1.39	3.85**	0.02; 0.82	10.63**	0.02; 0.90	0.045	0.00; 0.06
RESE DES	4.92	1.60	5.10	1.21	5.07	1.07	5.08	1.32	4.37	1.20	4.60	1.23	4.59	1.19	4.73	1.25	0.880	0.00; 0.24	10.41**	0.01; 0.90	0.170	0.00; 0.08
RESE	4.82	1.47	5.04	0.88	5.15	1.02	5.14	1.27	4.28	1.23	4.59	1.02	4.67	1.13	4.69	1.24	2.26#	0.01; 0.57	11.87**	0.02; 0.93	0.028	0.00; 0.05

Table 7: Means, standard deviations for variables of Positivity and Self-efficacy for the regulation of emotions in the sample of patients with CVD and the sample of general population for the different employment status. Univariate analysis of the studied variables, considering the employment status factor (unemployment vs. part-time employment vs. full-time employment versus retired), the sample background factor (patients with CVD vs general population) and the interaction between both factors.

Unemploy.: Unemployment; Part-time employ.: Part-time employment; Full-time employ.: Full-time employment.

Note: # $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Finally, we found an interaction effect between the background of the sample and employment status for positivity. In figure 1 you can see how, in considering employment status, CVD patients score significantly higher in positivity compared to the general population. However, unemployed people who also have CVD show significantly lower means than the unemployed in the general population.

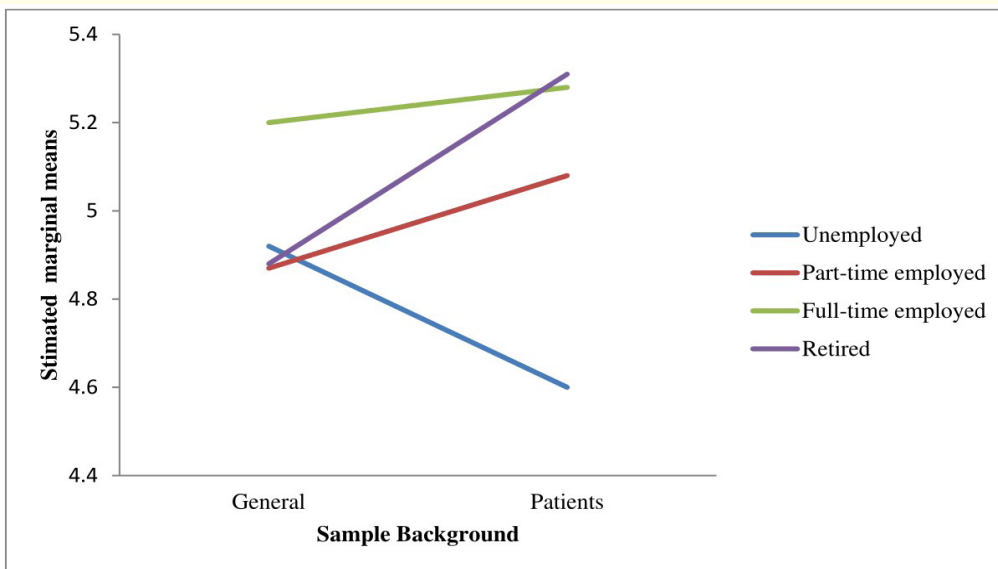


Figure 1: Interaction between the background of the sample and employment status for positivity.

Conclusion

In this study, we set out to compare perceived self-efficacy in negative emotional regulation and positivity in a sample of cardiovascular patients with a sample of the general population, along with the possible interaction of sociodemographic factors in these psychological variables.

The results obtained support the first hypothesis (H1), according to which those people with greater positivity will present greater self-efficacy for the regulation of negative emotions.

In relation to the differences between the general population and the population with CVD, the differences found in regard to self-efficacy for the regulation of negative emotions do not square with the findings of Bahremand, *et al.* [23], Pervichko, *et al.* [60] and Potijk, *et al.* [23]; nor do they coincide with previous findings regarding positivity [43,47], given that our data show that patients with CVD have a greater self-efficacy for negative emotional regulation and greater positivity. This result may be due to the fact that the sample with CVD are participating in a cardiac rehabilitation program which includes work on several aspects related to promotion of health. In addition, as some authors point out [29,28], emotional regulation improves with age, that is, at the time of life in which CVD is most prevalent [61].

The second hypothesis (H2) of our research, which relates to the psychological variables analyzed with the collected sociodemographic characteristics, is partially supported by the results obtained.

As for the H2a hypothesis, in which we formulate the idea that people with a higher socioeconomic status will present both greater positivity and greater self-efficacy for negative emotional regulation, our results confirm previous research [7,8] about the relationship

between cardiovascular disease and socioeconomic status. Therefore, we emphasize the need to intervene with this disadvantaged group using psychological strategies to help them cope with the disease.

In relation to our H2b hypothesis, we found that older people tend to have a greater self-efficacy for negative emotional regulation, a fact that is corroborated by previous research [29,28]. In addition, according to Fagnani, Medda, Stazi, Caprara and Alessandri [50], positivity stabilizes with development, which does not coincide with the obtained results, since an inverse relationship is observed between age and positivity.

In the H2c hypothesis, women were expected to obtain higher scores on positivity and self-efficacy for negative emotional regulation, according to work of Alessandri, *et al.* [36] and Zeidner and Matthew [30]. The obtained results partially support this hypothesis, since the female participants of this study score higher for positivity. However, the men have achieved greater self-efficacy for the regulation of negative emotions. These data, along with the reviewed literature, suggest that it is necessary to continue investigating the differences between both sexes in self-efficacy for emotional regulation and positivity for this group. It is necessary to move forward in specific intervention proposals for women with this type of affection, given the considerable increase of mortality in women caused by this.

The hypothesis that considers people who live with a partner to be more positive and have greater self-efficacy for negative emotional regulation (H2d), is partially fulfilled. Our results support the idea that people who report living as a couple tend to be more positive [44]. However, these results were not anticipated by the findings of Rey and Extremera [32], who relate social support to emotional intelligence, because, although it is not significant, it was the people not living with partners who showed greater self-efficacy for the regulation of negative affect.

Regarding the last hypothesis H2e, the results obtained corroborate that the people in unemployment are both less positive and show less self-efficacy for negative emotional regulation. The importance of having a job and job stability is highlighted, since being unemployed or having a precarious employment situation is a risk factor for cardiovascular disease [10]. Therefore, we believe that it is vitally important to approach this aspect in prevention programs and intervention for cardiovascular diseases. As we have seen in our results and previous research, there are relationships between cardiovascular disease and socioeconomic level and work status. These data support the need to intervene in disadvantaged groups in order to provide them with psychological strategies to deal with cardiovascular disease.

The results obtained are relevant, mainly due to the absence of a similar study with such a large sample; however, there are some limitations related fundamentally to the age of both samples (patients with CVD and general population). Based on this, we propose future research using a population with similar sociodemographic characteristics, as well as the possibility of longitudinal study of the variables we have contemplated, so that we can see the evolution and consistency of the constructs "self-efficacy for emotional regulation" and "positivity" in the same population that could potentially develop these health problems.

The sample of this research is broad and allows a certain generalization, nevertheless, we cannot affirm that it is representative of the Spanish cardiac population and care must be taken before assuming that these results will hold for other cultures, other age groups or other groups of the population with characteristics or beliefs that are different from those held here.

Finally, we should focus on the importance of developing programs for the rehabilitation of patients with CVD and prevention campaigns, which include strategies to improve aspects related to the studied variables. At present, the role of emotions has been highlighted in numerous works concerning health promotion, raising the need to study cognitive styles that favor them and giving rise to a new challenge of cognitive psychology in relation to current research in cardiovascular health. Despite the recent interest in studying the psychological variables that influence our state of health, there is still a need for a greater volume of research to be carried out in this field, in order to delineate with greater precision how vulnerability to these types of health problems is generated.

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Conflict of Interest

There are not any conflicts of interest.

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