Psicothema

Positivity and Self-Efficacy Beliefs Explaining Health-Related Quality of Life in Cardiovascular Patients

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Abstract

Background: Psychological well-being and health-specific self-regulation have been associated with cardiovascular health. This study aimed to examine the longitudinal relationship of positivity and health-specific self-regulatory variables to health-related quality of life in patients with cardiovascular disease. **Methods:** A sample of 550 cardiac patients completed a number of instruments (positivity, regulatory emotional self-efficacy, and cardiac self-efficacy scales, and the general health questionnaire SF-12) on two occasions 9 months apart, assessing their level of positivity, health-specific self-efficacy beliefs, and health-related quality of life. **Results:** Mediational analyses demonstrated that health-specific self-efficacy beliefs mediate the relationship between positivity and health-related quality of life. In terms of self-efficacy in managing negative affect, the despondency-distress factor showed both direct and indirect effects on health, while the anger factor showed only an indirect effect. The results of the structural equation model demonstrated suitable indices of fit. **Conclusions:** Positivity may act as a disposition helps patients to use motivational strategies related to health, be more confident in their ability to regulate their emotions, and follow the recommendations of their cardiac medical team, enabling them to perceive a higher quality of life. These findings indicate the need to promote psychosocial interventions that include these variables.

Keywords: Positivity; Cardiac self-efficacy; Self-regulation; Affect regulation; Cardiovascular disease; Health-related quality of life.

Resumen

Calidad de Vida relacionada con la Salud de Personas con Enfermedad Cardiovascular: Positividad y Creencias de Autoeficacia.
Antecedentes: el bienestar psicológico y la autorregulación se asocian con la salud cardiovascular. Este estudio tiene como objetivo examinar longitudinalmente la relación entre la positividad y variables autorreguladoras específicas de la salud con la calidad de vida relacionada con la salud en pacientes cardiovasculares. **Método:** quinientos cincuenta pacientes cardíacos respondieron dos veces a las escalas de positividad, autoeficacia para la regulación emocional, autoeficacia cardíaca y salud general SF-12 con un intervalo de nueve meses, evaluando respectivamente su nivel de positividad, creencias de autoeficacia específicas de la salud y calidad de vida relacionada con la salud. **Resultados:** los análisis mediacionales demostraron que las creencias de autoeficacia median la relación entre la positividad y la calidad de vida. La autoeficacia para el manejo del afecto negativo, concretamente el factor desaliento-angustia, mostró un efecto directo e indirecto sobre la salud. Los resultados del modelo de ecuaciones estructurales mostraron índices de ajuste adecuados para el modelo longitudinal propuesto. **Conclusiones:** la positividad puede actuar como un factor disposicional que facilita desarrollar estrategias motivacionales relacionadas con la salud, tener mayor confianza en la capacidad para regular las emociones y seguir las recomendaciones del equipo médico-cardíaco, permitiendo así a los pacientes percibir una mayor calidad de vida.

Palabras clave: positividad; autoeficacia cardiaca; autorregulación; afecto negativo; enfermedad cardiovascular; calidad de vida relacionada con la salud.

The progressive ageing of the population is associated with the emergence of chronic diseases, of which cardiovascular disease (CVD) is the leading cause of death worldwide, according the European Society of Cardiology (Timmis et al., 2018). In this sense, one of the goals in the United Nations 2030 Agenda for Sustainable Development is the reduction of premature CVD deaths (Collins et al., 2018). The origins and subsequent evolution of CVD are due not only to genetic factors but also to variables that are malleable to change, such as lifestyles (Greco et al., 2020) and attitudes (Kessing et al., 2016). Nevertheless, to date, the scientific community has devoted less attention to research on the role of psychosocial factors as triggers both for new lifestyles related to treatment adherence and to the life expectancy of these patients (Piepoli et al., 2016).

Given the prevalence of this chronic illness, the present study is focused on the field of promotion of cardiovascular health from a psychosocial perspective, and in this respect, positivity (as the

tendency to think positively about oneself, life, and the future) has proved to be a strong predictor of well-being and health (G. V. Caprara et al., 2019), even to cope to with an illness such as cancer. Along the same lines, Serrano et al. (2020) have shown the role of optimism as a mediator between facets of the personality, such as perseverance or emotional control, and subjective well-being in a young population, while in people with CVD, one of the big five personality factors, consciousness, also showed a positive relationship with subjective well-being (Tabernero et al., 2019). Likewise, from a social cognitive perspective, Bandura (2005) has assigned an essential role to perceived self-efficacy as crucial among psychosocial variables that promote health and prevent the onset of disease. In this sense, a recent meta-analysis (Banik et al., 2018) has concluded that stronger self-efficacy beliefs were associated with better health perception in cardiovascular patients across different ages and cardiovascular surgeries. In addition, both the onset and development of CVD have been associated with emotional functioning—negatively with anxiety, anger and hostility (Pérez-García et al., 2011) or depression (Steca et al., 2013) and positively with high optimism, which in turn has a negative relationship with the level of pessimism (Serlachius et al., 2015).

Positivity is understood as a generalized way of interpreting and confronting the reality that influences the subjectivity with which people evaluate their experiences; that is, it is considered a positive orientation towards life, which integrates the concepts of self-esteem, satisfaction with life, and optimism (G. V. Caprara et al., 2019). Furthermore, positivity promotes self-efficacy for regulation of negative affect, which refers to "beliefs regarding one's capability to ameliorate negative emotional states once they are aroused in response to adversity or frustrating events and to avoid being overcome by emotions such as anger, irritation, despondency, and discouragement" (G. V. Caprara et al., 2008, p. 228) through more optimistic personal judgments (G. V. Caprara et al., 2016). Self-efficacy in expressing positive emotions refers to "beliefs in one's capability to experience or to allow oneself to express positive emotions, such as joy, enthusiasm, and pride, in response to success or pleasant events" (G. V. Caprara et al., 2008, p. 228). In fact, positivity represents a basic attitude to face illness (G. V. Caprara et al., 2019). Moreover, the strong links of positivity with self-efficacy beliefs are pointed out by empirical studies (G. V. Caprara et al., 2016). M. Caprara et al. (2020) found that the self-perceived problems of older adults related to health were lower when they reported higher levels of positivity. Finally, the relation between positivity and quality of life was examined in cancer patients, and positivity was associated with less dysfunctional symptoms and a better quality of life (G. V. Caprara et al., 2016).

Proposals for intervention have been published, emphasizing the role of self-regulating mechanisms for maintaining a healthy lifestyle (Suls et al., 2020). Therefore, relevant variables to be studied might be related to the concept of health-specific self-efficacy beliefs (Bandura, 2005). Furthermore, health-specific self-efficacy beliefs have been shown to play an important role in achieving and maintaining healthy habits, as well as contributing to the improvement of chronic disease (Bandura, 2005). At the same time, self-efficacy beliefs are established as one of the variables that has received attention in the prediction of HRQoL (Suls et al., 2020). Thus, applying this theoretical framework to the field of CVD, self-efficacy could play an important role in predicting the HRQoL of cardiac patients. In this line, self-efficacy for regulatory

negative affect is related to the self-belief of the ability of people to manage negative affect (G. V. Caprara & Gerbino, 2001; G. V. Caprara & Steca, 2005; G. V. Caprara et al., 2008; M. Caprara et al., 2020).

Health problems have been related to negative emotions, namely discouragement, anger, fear, shame, and guilt (Kraynak et al., 2018). Indeed, it has been shown that the continuity over time of negative emotions, such as hostility (och Dag et al., 2020), has a negative impact on the quality of life and cardiovascular health of the general population, as well as the well-being of patients with a diagnosis of CVD (Pérez-García et al., 2011), and therefore on their HRQoL index. Similarly, in relation to CVD, Pérez-García et al. (2011) emphasize how anger and mental stress influence the development and evolution of disease. In the same vein, Serlachius et al. (2015) indicate that negative emotions influence the development of CVD, while Fredrickson and her colleagues (Fredrickson et al., 2020) note that positive emotions are associated with the best levels of health perception. In the same way, it has been emphasized that self-efficacy for regulation of negative affect is positively related to life satisfaction and to better adaptation to disease (G. V. Caprara & Steca, 2005). In this regard, new trajectories about negative self-efficacy beliefs have been explored by Alessandri et al. (2015). Thus, since self-regulation of negative affect seems to play a determinant role in relation to health, we propose that self-efficacy beliefs could exert a predictive role on HRQoL. According to the systematic review of Koechlin et al. (2018), inadequate emotional regulation, as in the case of the suppression of negative affect, can lead to major levels of anxiety, for example, an increase in the heart rate.

In this line of research, cardiac self-efficacy beliefs are related to behavioural healthy changes (Sullivan et al., 1998), and influence on HRQoL in patients with CVD (Greco et al., 2015). It has been proven that intervention programmes, which were taught to generate judgments of cardiac self-efficacy in patients with CVD, effected an improvement in the state of health (Herber et al., 2012). In addition, when patterns of behaviour associated with a healthy lifestyle are adopted (e.g., following the Mediterranean diet, playing sports, or maintaining social relationships), the result is a benefit for patients suffering from CVD (O'Neil et al., 2013). Then, cardiac self-efficacy could act as a mediating and predictive variable of HRQoL in patients with CVD. Furthermore, self-efficacy has been considered to be a mediating signifier between the perception of severity of CVD and health satisfaction, such as HRQoL (Steca et al., 2013).

Therefore, as positivity has been established as a predictor of self-efficacy and it in turn influences health status, a possible mediating effect of self-efficacy is hypothesized in the established relationship between positivity and HRQoL. Moreover, the Tabernero et al.'s (2019) study has shown that affective balance predicts cardiac self-efficacy, which in turn influences HRQoL. Then, being affective balance and regulatory affect self-efficacy closely related, it can be hypothesized that self-efficacy for the regulation of negative affect would predict cardiac self-efficacy. Hence, a possible mediating effect of cardiac self-efficacy in the relationship between regulatory negative self-efficacy and HRQoL is posed.

In sum, according to the reviewed scientific literature in the field of health, in which different psychological variables have been seen to influence HRQoL in patients with CVD, and to be related to each other, we will analyse the potential mediator effects of (a) health-specific self-efficacies (for regulation of negative affect and

cardiac self-efficacy) in the positivity–HRQoL link and (b) cardiac self-efficacy in the negative affect self-efficacy–HRQoL link. In addition, we will explore a longitudinal explanatory model of HRQoL by analysing the relationships that the different predictive variables establish between themselves and with HRQoL over time.

Method

Participants

The sample consisted of a total of 550 participants (age range = [34, 82], *M* = 63.54, *SD* = 9.11); 14.2% were women and 85.8% were men. In general terms (see Table 1), a high percentage of the participants had a low educational level as well as a medium to low level of income, the majority were retired and lived with a partner. All participants were considered patients with chronic CVD given that they had already suffered a first cardiac event and were a part of the CORDIOPREV study at the Reina Sofia University Hospital of Córdoba and IMIBIC (Delgado-Lista et al., 2016). According to the inclusion/exclusion criteria of the primary study, all participants had an established coronary heart disease (unstable coronary disease, acute myocardial infarction, unstable angina, or chronic coronary disease at high risk for event) without clinical events in the last 6 months (Delgado-Lista et al., 2016). The current study has been approved by the Research Ethics Committee of the Servicio Andaluz de Salud and the Reina Sofía Hospital (June 30th, 2015).

Instruments

Next, we present the different scales contained in the questionnaires that were used. The alpha value of each variable used in the study, which showed high reliability in Time 1 and Time 2 (similar to the original scales), are expressed in Table 2. After reliability indexes were calculated, each variable was generated from the mean scores of the items indicated below.

Positivity

To assess the tendency of individuals to view their lives and experiences with a positive outlook, the *Positivity Scale* of G. V. Caprara et al. (2012) was used. Participants responded to the eight items (e.g., "I have great faith in the future") on a 7-point Likert scale, where 1 = false and 7 = completely true. The Positivity Scale (G. V. Caprara et al., 2012) has shown adequate psychometric properties in various countries (United States: α = .83; Japan: α =

Table 1
Socio-demographic characteristics of the sample

Socio-demographic variables	N (550)	%
Educational level		
Primary or basic education	346	62.9
Secondary education	78	14.2
Vocational school	61	11.1
College/University	64	11.6
NR/DK	1	0.2
Employment situation		
Unemployment	46	8.4
Half-time job	16	2.9
Full time work	127	23.1
Retired	361	65.6
Socio-economic status (annual income)		
Less than < 10.800 €	159	28.9
10.800 – 22.000 €	220	40
22.000 – 43.000 €	98	17.8
More than 43.000 €	23	4.2
NR/DK	50	9.1
Marital status		
Single	20	3.6
Common-law partner	7	1.3
Married	465	84.5
Separated	13	2.4
Divorced	16	2.9
Widow/er	28	5.1
NR/DK	1	0.2

Table 2
Correlations, means and standard deviations of the studied variables (***p < .001). The reliability values (α) of all studied variables are presented at the diagonal of the table

Variables	1	2	3	4	5	6	7	8	9	10
Time 1										
1 Positivity	(.79)									
2 Self-Efficacy anger	.40***	(.79)								
3 Self-Efficacy despondency	.45***	.80***	(.82)							
4 Cardiac Self-Efficacy	.40***	.38***	.43***	(.84)						
5 Health-related Quality of Life	.44***	.34***	.39***	.44***	(.81)					
Time 2										
6 Positivity	.62***	.33***	.39***	.35***	.37***	(.76)				
7 Self-Efficacy anger	.35***	.35***	.36***	.22***	.25***	.45***	(.79)			
8 Self-Efficacy despondency	.35***	.33***	.37***	.23***	.29***	.46***	.81***	(.85)		
9 Cardiac Self-Efficacy	.30***	.19***	.24***	.42***	.28***	.48***	.39***	.39***	(.82)	
10 Health-related Quality of Life	.47***	.30***	.35***	.35***	.64***	.52***	.38***	.43***	.39***	(.82)
Mean	5.24	4.91	5.21	5.73	3.99	5.25	5.26	5.37	5.85	4.12
Sd	1.02	1.23	1.27	0.83	0.78	0.95	1.23	1.32	0.81	0.82
Range Minimum	1.00	1.00	1.00	2.00	1.58	1.63	1.00	1.00	2.23	1.08
Maximum	7.00	7.00	7.00	7.00	5.33	7.00	7.00	7.00	7.00	5.33

.80; Spain: α = .73). The Spanish version was utilized, which was developed in G. V. Caprara et al.'s study (2012).

Regulatory Affect Self-Efficacy

To assess to how confident individuals manage their negative affect, the *Regulatory Emotional Self-Efficacy Scale* (RESE) (G. V. Caprara & Gerbino, 2001; alphas for despondency and anger factors were 0.82 and 0.73, respectively) was used in its Spanish version (G. V. Caprara et al., 2008; alphas for despondency and anger factors were 0.81 and 0.68, respectively). The four items related to the self-efficacy to regulate positive affect were not evaluated. Participants responded to the eight items on a 7-point Likert scale, where 1 = absolutely not capable and 7 = totally capable. This scale is divided in two subscales: self-efficacy for managing despondency-distress (SEDes) (e.g., "How confident are you that you can avoid discouragement in the face of difficulties?") and self-efficacy for managing anger (SEAng) (e.g., "How confident are you that you can avoid flying off the handle when you get angry?").

Cardiac Self-Efficacy

In order to assess how individuals judge their level of confidence in their ability to follow the recommendations of their medical team, we used a short version of the *Cardiac Self-Efficacy Scale* (Sullivan et al., 1998). Participants responded to 13 items (e.g., "How confident are you that you know you can control your breathlessness by changing your activity levels?") on a 7-point Likert scale, where 1 = no confidence and 7 = total confidence. All patients responded to the Spanish version of the Cardiac Self-Efficacy Scale (Tabernero et al., 2019) which has showed good psychometric properties in cardiac populations (α = .83).

Health-Related Quality of Life

To evaluate the perception of HRQoL of the participants, the *General Health Questionnaire Short Form* (SF-12), adapted to Spanish by Failde et al. (2010), was used. Participants responded to a 12-item short form (e.g., "In general, you would say your health is?"). All cardiovascular patients responded to the Spanish version (Tabernero et al., 2019) which has demonstrated good psychometric properties and has been utilized at the Cordioprev study with cardiac patients with good reliability (α = .81)

Procedure

Participation in the study, which began in April 2016 at Time 1 and in January 2017 at Time 2, was totally anonymous and voluntary (20% of the participants abandoned the study in phase 2, although no significant differences were observed in the psychological variables analysed at Time 1 with respect to the 550 who remained at Time 2). Prior to its completion, the participants were informed of the objectives of the research and signed their informed consent. Each day, an average of five cardiovascular patients came to the clinic and completed, in the presence of a member of the research team, a battery of online questionnaires created using the program *Questback* (Unipark) 10.9. The average time to complete the questionnaire was about an hour (M = 58' 51", SD = 23' 25" at Time 1 and M = 62' 76", SD = 23' 59" at Time 2).

Data Analysis

To test the means and standard deviations of the study variables, as well as the associations between them, descriptive analyses and Pearson correlations were performed. Also, linear regression analysis was carried out with the SPSS program (version 25) to evaluate the percentage of variance explained. The mediation model was analysed with the macro PROCESS SPSS and mediation analyses were performed following model 6 of the macro PROCESS for SPPS (Hayes, 2018). The resampling procedure (10,000 bootstrap samples) indicated a significant indirect effect, with a 95% confidence interval. In addition, to confirm the predictive HRQL model, we performed a path analysis using the AMOS program (v. 25).

Results

Preliminary Analysis

Descriptive statistics and correlation analyses were performed for all the psychological variables of the study, as shown in Table 2. The correlations, which check the relationship between all the psychological variables of this study, are in the expected direction and the pattern was similar in both Time 1 and Time 2. All variables studied showed a significant relationship with HRQoL (dependent variable). Specifically, positivity and health-specific self-efficacy beliefs showed a positive and significant relationship with HRQoL. Repeated measures analyses were carried out to evaluate the level of stability of each variable between both measurement moments. Results showed that a non-significative change was observed for positivity [$F(1,549) = 0.07$, $p = 0.79$; $\eta^2 = 0.00$] which indicated the stability of the measure; however, significant changes were observed for self-efficacy for despondency regulatory emotion [$F(1,549) = 6.64$, $p = 0.701$; $\eta^2 = 0.01$]; self-efficacy for anger regulatory emotion [$F(1,549) = 34.53$, $p = 0.001$; $\eta^2 = 0.06$], cardiac self-efficacy [$F(1,549) = 10.79$, $p = 0.01$; $\eta^2 = 0.02$], and health related quality of life [$F(1,549) = 19.91$, $p = 0.001$; $\eta^2 = 0.04$]; these significant changes indicated that specific self-efficacy beliefs were higher in the second moment of evaluation.

Relations of Mediation

As can be seen from the results of mediation, the mediational hypotheses were corroborated. Namely, it can be verified that all the mediating variables exert their mediating role between positivity at Time 1 and HRQoL at Time 2 (a) when including the mediating variables of Time 1 (R^2 = .26, F(4, 545) = 48.02, p < .001; Boot (95% CI) = -.011 [.003; .022]; see Figure 1) and (b) when including the mediating variables of Time 2 (R^2 = .33, F(4, 545) = 67.33, p < .001; Boot (95% CI) = .011 [.003; .023]; see Figure 2). Specifically, there was a mediational effect of the specific self-efficacy beliefs studied (self-regulation of negative affect, anger and despondency and cardiac self-efficacy) between positivity and HRQoL. In summary, all the variables influenced HRQoL both directly and indirectly, except for self-efficacy to manage anger, which had only an indirect effect on HRQoL through the influence it has on self-efficacy to manage despondency-distress when including the mediating variables of Time 1, and through the influence it has on self-efficacy to manage despondency-distress and on cardiac self-efficacy when including the mediating variables of Time 2.

All mediational relationships were maintained. Only the relation between self-efficacy to manage anger and cardiac self-efficacy, which was insignificant when the mediators introduced were those of Time 1, came out as significant when the mediators introduced were those of Time 2.

Predictive Model of HRQoL

The linear regression analysis showed that the predictive model explained 26% of the variance when including all psychosocial variables (positivity and self-efficacy variables) measured at the first time on HRQoL of the second time as dependent variable [$F(4,549) = 48.03; p < .001$]; once all variables of Time 1 (positivity, self-efficacy measures and HRQoL) and Time 2 (positivity and self-efficacy measures) were incorporated into the regression model, 53% of variance was explained [$F(9,549) = 69.13; p < .001$]. Subsequently, to confirm the predictive model of HRQoL, structural equation modelling was used with the AMOS program (.22). This approach allows for a more causal explanation of
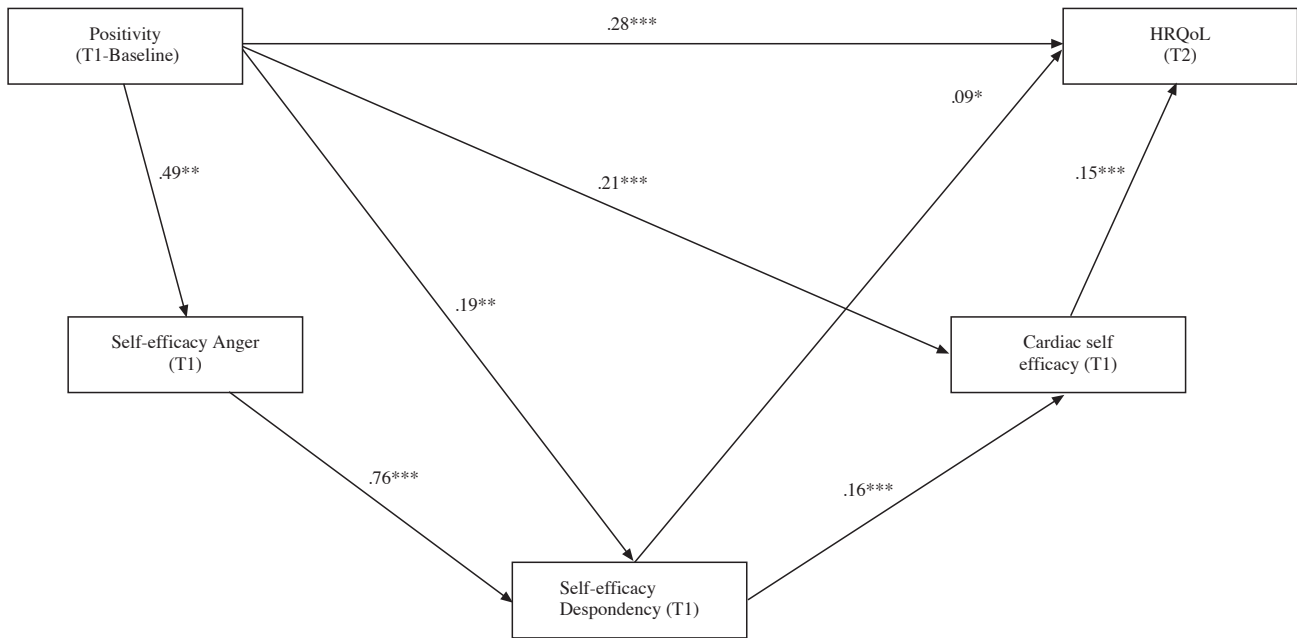

Figure 1. Mediational analyses (***$p < .001$; *$p < .05$).
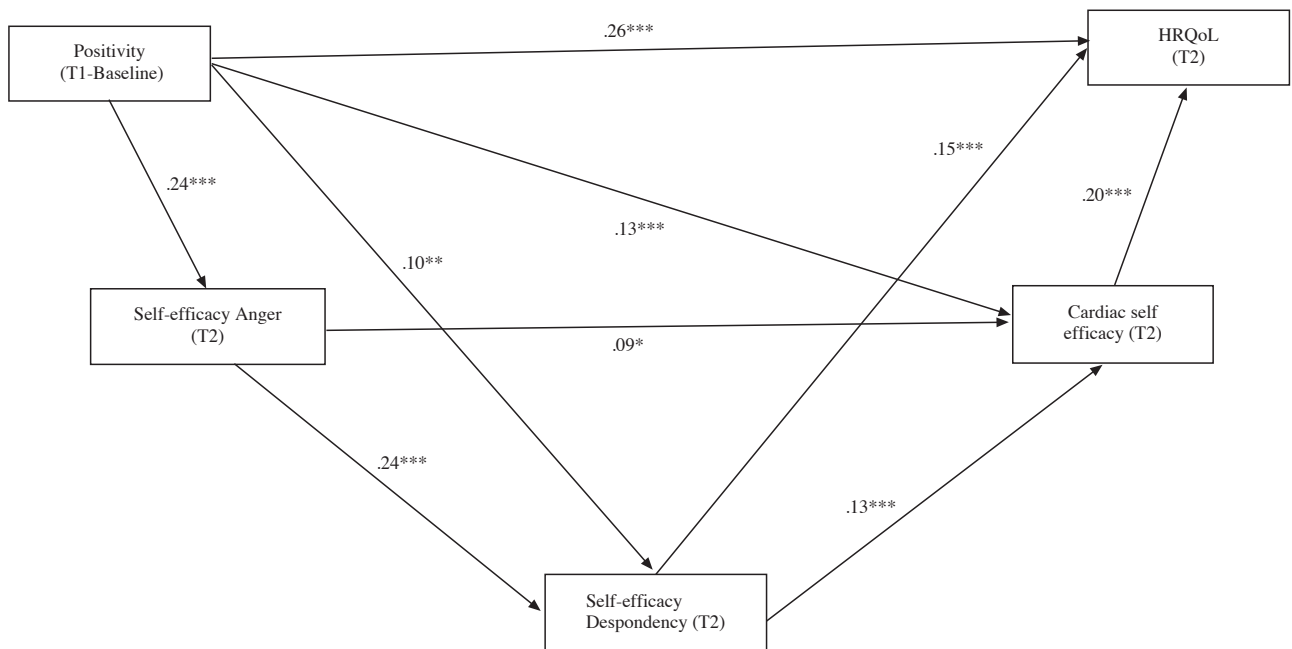T1= Time 1 - Baseline; T2 = Time 2 - Follow-up (9 months)

Figure 2. Mediational analyses. (***$p < .001$; **$p < .01$; *$p < .05$; # $p < .07$).
T1= Time 1 - Baseline; T2 = Time 2 - Follow-up (9 months)

findings, and for that, the true causes of variation in the dependent variable are a more accurate representation. The results allowed us to determine the weight and relation across time to the main variables in the incidence of HRQoL (Figure 3). The adjustment rates were excellent (χ^2 (20, N = 550) = 20.234, p = .443; $RMSEA$ = .005, 95% CI [.001, .037]); GFI = .993; $AGFI$ = .980; CFI = 1.000). Specifically, the results show adjustment indices suitable for the proposed explanatory model, which indicates that positivity, self-efficacy to manage despondency, and cardiac self-efficacy at Time 1 are directly related to the HRQoL at Time 2, whereas self-efficacy to manage anger at Time 1 is indirectly related to the HRQoL at Time 2.

Discussion

The results of mediation show that self-efficacy to manage despondency and cardiac self-efficacy directly influence the HRQoL of patients with CVD, meanwhile self-efficacy to manage anger impacts only indirectly on HRQoL, as a result of the effect it has on third variables. It has been indicated that high positivity scores reflect a higher HRQoL, as already indicated by G. V. Caprara et al. (2012). Furthermore, in agreement with the social cognitive theory studies developed by Bandura (2005, 2008), self-efficacy proves to be an important mediator in relation to the HRQoL of patients with CVD. As such, participants with higher levels of health-specific self-efficacy beliefs experience higher levels of HRQoL. Specifically, we have studied the mediating role of specific self-efficacy beliefs (regulation of negative affect and cardiac self-efficacy) on the relationship between positivity and HRQoL. Then, it seems that positivity can act as a relevant dispositional variable that provides cardiac patients with cognitive and motivational strategies that facilitate them to feel more capable to regulate their emotions and to follow the recommendation of their medical team. Also, both variables, positivity and self-efficacy beliefs, provide them with higher levels of HRQoL.

First, it was proposed that self-efficacy for regulation of negative affect, which is composed of two factors: anger and despondency, would act as mediator between positivity and cardiac self-efficacy and between positivity and HRQoL. The results confirmed these mediational relationships, allowing us to expand what was already
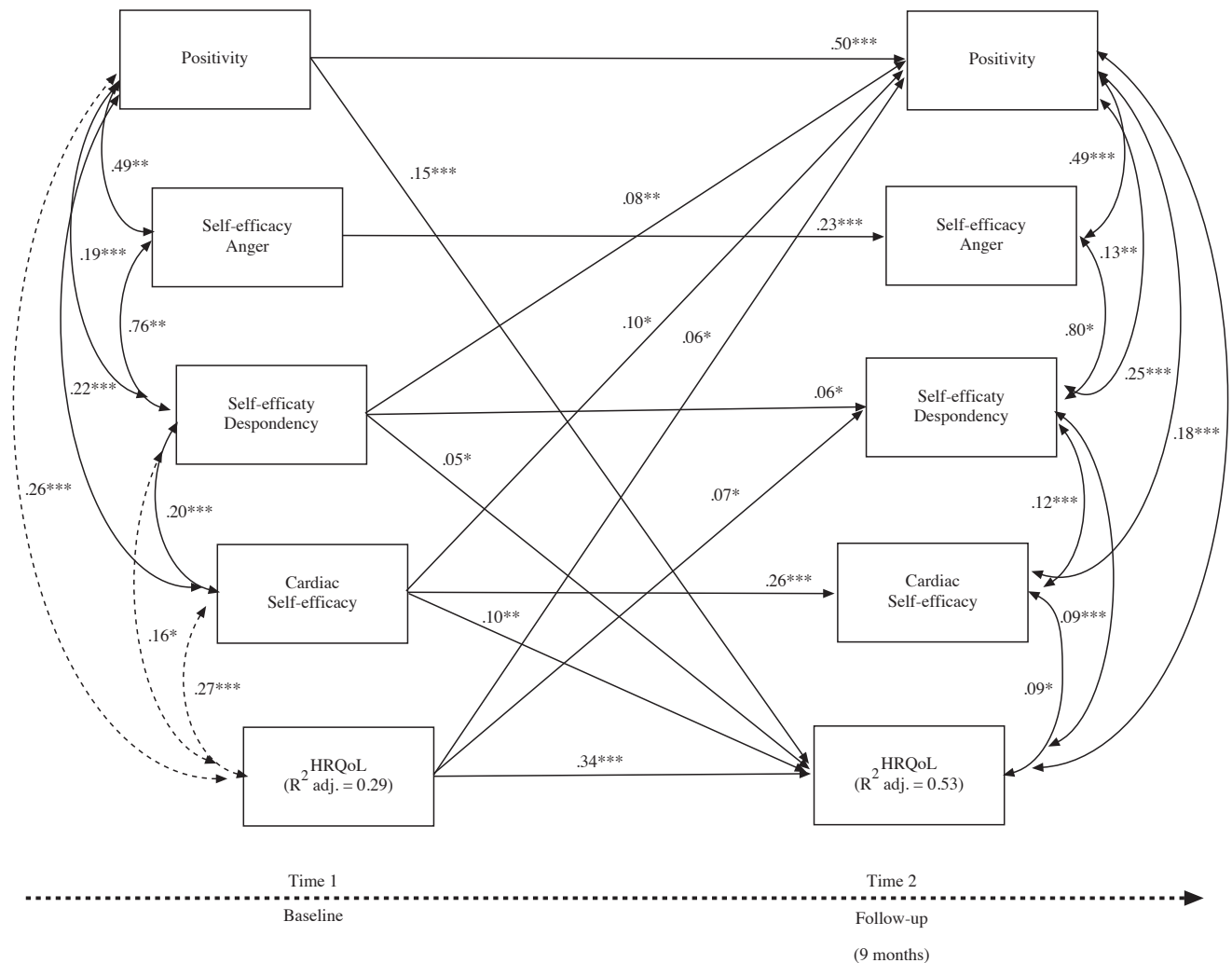

Figure 3. Predictive HRQoL Model (***p < .001; **p < .01; *p < .05; # < .07). HRQoL at Time 1 is the standardized residual of the linear regression analysis performed with Positivity, self-efficacy in managing anger, self-efficacy in managing despondency-distress and cardiac self-efficacy at Time 1 on HRQoL at Time 1. The values of the dashed lines correspond to the values of the betas of the aforementioned linear regression analysis

studied by Fredrickson et al. (2020) regarding the influence of emotional regulation on HRQoL. Previously, G.V. Caprara and Gerbino (2001) and later G. V. Caprara et al. (2008) showed interest in the affective perceived self-efficacy, studying the self-capacity for regulating emotions. Furthermore, in the same lines of the results of our study, Steca et al. (2013) have established the mediating role of self-efficacy beliefs in the relation established between illness severity and HRQoL in patients with CVD. Then, the results of this study seem to reinforce the relevance that previous studies have also found to pay special care to self-efficacy in improving the HRQoL and health of patients with CVD. Specifically, regarding self-efficacy in managing negative affect, the results point out that the despondency-distress factor showed a higher impact on HRQoL than the anger factor. Meanwhile, the despondency-distress factor had both a direct and an indirect effect on HRQoL (through the effect it had on cardiac self-efficacy), while the anger factor only had an indirect effect (through the influence it had on the despondency-distress factor and on cardiac self-efficacy). The importance of distress in cardiac patients has been mostly demonstrated; scientists have shown that psychological stress and distress are relevant contributors to the cardiac disease process and affect cardiovascular outcomes across the lifespan (Holman, 2015). Then, the relevant impact of self-efficacy to manage despondency-distress, in comparison to the impact of self-efficacy to manage anger, found in this study with cardiac patients may not be surprising. Then, regarding interventions in cardiac patients, it may be relevant to pay special attention to this factor. In fact, the most recent research in neuroscience points to the relevance of psychological stress in the onset and development of CVD (Luceño-Moreno et al., 2016). Thus, stress management interventions could improve the HRQoL of cardiac patients.

Second, we proposed that cardiac self-efficacy would act as mediator between positivity and HRQoL and between self-efficacy to manage negative affect and HRQoL. Like it was reviewed by G. V. Caprara et al. (2019), positivity could contribute to optimal functioning supported by stress cushioning and self-efficacy beliefs. In light of the results of mediation, both hypotheses have been confirmed, supporting the findings of Herber et al. (2012), who studied the promotion of cardiac self-efficacy and verified that it had a positive effect on the health status of patients with CVD. On the other hand, in the same way, O'Neil et al. (2013) found that cardiac self-efficacy was a determinant factor in prevention of adverse events in cardiac patients. Here, those results are confirmed, supporting the relevance of cardiac self-efficacy in promoting high HRQoL in patients with CVD and in mediating between both positivity and other self-efficacy beliefs and HRQoL.

Finally, the analyses performed with AMOS allowed us to confirm the HRQoL predictive model. All the studied variables were confirmed to be part of this longitudinal model and are therefore relevant variables in the explanation of the HRQoL of patients with CVD. Positivity, self-regulation of despondency and cardiac self-efficacy have been shown to exert a direct predictive role on HRQoL, while self-regulation of anger exerts an indirect role on HRQoL, through the effect it had on self-efficacy to manage despondency firstly and on cardiac self-efficacy secondly. Nevertheless, in the scientific literature, Pérez-García et al. (2011) found that anger and hostility have a direct impact on CVD. In our study, the relation between self-efficacy to manage anger and HRQoL is high, with correlation indices between .30 and .39 across time. Although the inclusion of more variables in the mediation

models and in the predictive model, which have a greater impact on HRQoL, blurs the relation established between self-efficacy to manage anger and HRQoL.

As for the *main contribution* of this study to the scientific community, it is that a new HRQoL model was examined, and to our knowledge, our study is the first to include the associations of the variables studied in patients with CVD in a longitudinal design using structural equation modelling. In line with this, it is worth highlighting the preparation of a predictive model that considers the interaction of positivity and self-regulation variables as indicators of HRQoL in patients with CVD. Likewise, we assume that the challenge of CVD in 21st century health requires new and more combined forms of intervention, with special attention to the psychosocial forms. This is why studying the interaction between psychosocial variables is an excellent contribution in terms of knowledge, which helps to the understanding of the set of factors that intervene between themselves, being possible to advance the HRQoL of patients with CVD.

Limitations and Future Research

A possible limitation of the study lies in the lack of biomedical data that could be related to the psychological variables analysed and the evolution of the cardiovascular health of the patients. As a starting point for *future research*, this study raises the need to delve into the psychosocial variables potentially implicated in the HRQoL of patients with CVD. It would be interesting in future research to conduct longitudinal studies to test the role of these and other variables that may also act as predictors of HRQoL in the predictive model presented. Moreover, given the association between emotional issues and the of HRQoL of patients with other chronic illness such as cancer (Martínez et al., 2021) or multiple sclerosis (Fernández-Jiménez et al., 2021), future studies could test whether the resulting model of the current study might be applied to other chronic disease populations. Another limitation of the study is that sociodemographic characteristics such as participants' age, sex and socioeconomic status were not taken into account in the model. Further research would benefit from including at least these variables given their influence in cardiovascular and perceived health (Huber et al., 2016).

To solve another possible limitation of the present research, it could be interested a longer follow-up of the perceived health of participants and evaluate the role of possible psychological mediators on their cardiovascular health. In this vein, the European Guidelines for Prevention of Cardiovascular Disease in Clinical Practice (Piepoli et al., 2016) suggest that there should be assessment of psychosocial factors in patients and individuals with CVD risk factors. This will be crucial in the near future as a means of guiding preventive efforts, according to the patient's individual risk profile. Due to the social challenge that CVD carries, these results show a way to continue investigating, and we suppose that it might be extrapolated to other disorders and diseases, such as cancer, where the influence of the positivity has been studied in patients with that diagnosis (G. V. Caprara et al., 2016) or the efficacy of the acceptance and commitment therapy and behavioural activation treatment for the most prevalent emotional difficulties in cancer survivors (González-Fernández et al., 2018). Even more relevant would be to apply this model in primary prevention in a population that does not yet have CVD but may already have some symptoms that somehow predict it, such as

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hypertension, diabetes, and high cholesterol, as well as work stress (studied as one of the most influential psychological stress factors) (Luceño-Moreno et al., 2016). Thus, studying this model in a primary prevention population might offer a broad perspective to discover people with protective factors, that is, where the variables studied have high values, compared to those with a lower score, in which case the opportunity to carry out an intervention that works for the variables under study could be promising.

Conclusions

In conclusion, the results show that patients who view their life under a more positive outlook feel more confident in their ability to regulate their emotions and to follow the recommendations of their cardiac medical team, and in turn, they show higher levels of HRQoL. The findings of this study point to the need to promote

the positivity, regulation of negative affect (specifically the despondency-distress factor) and cardiac self-efficacy. Hence, our study has relevant implications for future intervention programmes through the model presented. From the results, it can be deduced that intervention programmes focused on patients with CVD should try to encourage the training of these variables by fostering higher levels of HRQoL.

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