Chapter 10
The Relation of Optimism to Cardiac Patients' Subjective Health Through Illness Representations: Does the Level of Optimism Matter?

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1 Introduction

A crucial human strength, which has repeatedly been related to efficient functioning and health, is dispositional optimism. Dispositional optimism represents a significant determinant of adaptation to stressful conditions, such as chronic illness, as it is involved in the self-regulation efforts aiming at dealing with the stressful condition (Scheier and Carver 1985). In this context, the aim of our study was to examine whether optimism is related to chronic patients' subjective health through their representation of illness, which constitutes a central part of the illness-related self-regulation process. A second aim was to investigate whether this relation is conditional on the values of optimism.

1.1 Optimism

According to Scheier and Carver (1985, 1992), dispositional optimism represents a generalized tendency to expect positive outcomes even in the face of obstacles. Optimism differentiates two classes of behavior: continued striving versus giving up. When confronting an adversity, like an illness, those who preserve their optimism are expected to persist in the effort to achieve their goals (e.g., feel better) as they have more confidence in their ability to manage difficulties. Consequently, they are more likely to adapt effectively, experience more positive feelings, and have higher levels of well-being (Carver and Scheier 2001; Rasmussen et al. 2006).

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A growing number of studies have shown that optimism is negatively related to anxiety and depressive symptomatology in the general population (e.g., Vickers and Vogeltanz 2000), whereas it is positively related to subjective well-being and positive affective state (e.g., Carver et al. 2005; Eid and Diener 2004). Furthermore, dispositional optimism has extensively been related to better health outcomes (e.g., recovery from illness, mortality, physical and psychological symptoms) in several medical conditions, such as cardiovascular diseases, cancer, HIV/AIDS, arthritis, and diabetes (Barry et al. 2007; Carver et al. 1993; Contrada et al. 2008; Ferreira and Sherman 2007; Fournier et al. 2002; Helgeson 1999; Oxland and Wade 2008; Rasmussen et al. 2006; Shen et al. 2004; Shnek et al. 2001; Symister and Friend 2003). There is also some evidence that dispositional optimism has a protective role for all-cause mortality in old age (Giltay et al. 2004). Optimism has been linked to health both directly and indirectly through affectivity and self-esteem, the promotion of more beneficial health habits, and the use of effective coping strategies (such as problem-focused coping) and effective ways of emotional regulation (Chang and Sanna 2001; Scheier and Carver 1987; Symister and Friend 2003; Taylor and Armor 1996).

1.2   Optimism and Illness Representations

There is also evidence that optimism is involved in the illness-related self-regulation process. For example, Fournier et al. (2002) and Karademas et al. (2011) found that optimism is related to a more "positive" representation of illness (i.e., as less threatening and more controllable). Illness representation is an essential part of the illness-related self-regulation process, which aims at helping patients understand their condition and cope with it (Leventhal et al. 1980, 1992). According to the Common Sense Model (CSM) of illness representation, the main clusters of illness representation are the following: identity (the disease label and associated symptoms), cause (causal attributions of the disease), the consequences of the disease, timeline (perceptions about the course of the disease), cure/control (what can be done to cure or manage the disease), as well as the emotional reactions to the disease, including anxiety, depression, and anger (Leventhal et al. 1980, 1992). In general, representations of control have been related to health outcomes in a positive way, whereas consequences, timeline, and emotional reactions have been related to health outcomes in a negative way (for a review, Hagger and Orbell 2003). The CSM suggests that the representation of illness serves as the pathway through which broader personal and contextual factors are related to health outcomes (Leventhal et al. 1980). In this regard, it is possible that illness representations also mediate the relation of dispositional optimism to chronic patients' well-being.

However, the relations between illness representations, health, and the broader social or personal factors, such as optimism, are rather complicated and may exceed simple mediations (Leventhal et al. 1980; Diefenbach and Leventhal 1996). Thus, it is possible that the indirect relation of optimism to well-being through illness

representations varies at different levels of optimism. For instance, the negative relation of the "negative" illness representations (e.g., chronicity or consequences) to health outcomes may be reduced at higher levels of optimism, given the protective impact of the latter on health and adaptation to illness. If this is indeed the case, then the "optimism–negative illness representations–health" relation may be weakened at the higher levels of optimism because of the moderating role of optimism in the relation between representations and health outcomes (i.e., the path from negative illness representations to health may be "inactive" at higher levels of optimism). Likewise, the relations of the more "positive" illness representations, such as representations of control, to health may also be interrupted at higher levels of optimism. This might be the result of a "ceiling effect": a "positive" representation of a specific situation (i.e., illness) may not have the potential to add to the already strong impact of the general positive expectations (i.e., optimism) on health.

The purpose of our study was to examine this complex relationship in a sample of chronic cardiac patients. Our hypothesis was that optimism is related to higher levels of "positive" illness representations (i.e., representations of control) as well as to lower levels of "negative" representations (i.e., representations of illness chronicity, consequences, and emotional representations). In turn, "positive" representations were expected to be related to better subjective health, whereas "negative" representations to worse health. However, provided that optimism moderates the relation of illness representations to subjective health, we also hypothesized that the indirect relations of optimism to subjective health via representations are conditional on the levels of optimism. More specifically, we hypothesized that these indirect relations are statistically nonsignificant at higher levels of optimism.

2   Method

2.1   Participants and Procedure

Consecutive patients suffering from a variety of cardiac diseases were recruited at the outpatient cardiology departments of three public hospitals in Greece. The study included patients who were 18 years or older. Exclusion criteria were inability to speak or read Greek, understand the study protocol, and provide informed consent. Two hundred thirty-three patients (176 males) agreed to participate in the study. After obtaining informed consent from the patient, a research assistant was administering the study questionnaires to each participant. Participants' mean age was 61.73 years (SD = 12.75, Min = 37). The majority (73.39%) was married; 21.01% were divorced or widowed; 5.60% were single. With respect to the education level, 42.06% had finished the 9-year mandatory education; 39.49% had finished high school; 18.45% were holders of a higher education degree. One hundred and thirty-three participants had suffered a myocardial infarction in the past (of them, 54 had undergone a coronary angioplasty or a coronary artery bypass graft surgery); 48 had a coronary artery disease with severe angina pectoris,

whereas 17 had a mild angina pectoris; 6 were dealing with a congestive heart failure, 7 were suffering from a valvular disease, and 22 from arrhythmias. The majority (78.97%) had been hospitalized at least once in the past. The mean time elapsed since initial diagnosis was 8.30 years (SD = 5.02). The study was approved by the Ethics Committee of each hospital.

2.2 Measures

Illness representations. Illness representations were assessed with the Revised Illness Perception Questionnaire (IPQ-R; Moss-Morris et al. 2002). Participants were asked to respond in relation to their personal "cardiac problem." We assessed seven dimensions of the illness representation included in the IPQ-R: timeline acute/chronic (chronicity) that includes beliefs that illness will last a long time (six items; e.g., My cardiac problem will last for a long time); consequences, which refers to the possible consequences of the health condition (six items; e.g., My cardiac problem has major consequences on my life); personal control that refers to evaluations about the degree to which there is personal control over the illness (six items; e.g., The course of my cardiac problem depends on me); treatment control, which refers to evaluations about the efficacy of the illness treatment (five items; e.g., The treatment can control my cardiac problem); illness coherence that reflects the patient's ability to make sense of the illness (five items; e.g., I have a clear picture or understanding of my cardiac problem); timeline cyclical that consists of beliefs regarding illness predictability and variability (four items; e.g., My cardiac problem is very unpredictable); and emotional representations, which assess the degree of the emotional impact of the disease (six items; e.g., My cardiac problem makes me feel afraid). The IPQ-R dimension of "identity" was not included in this study to avoid any possible confounding with subjective health measures. Also, the IPQ-R dimension of "causes" was not assessed since no previous research has been conducted in Greek cardiac patients with regard to their representations of causes, which could provide a quantitative assessment of them. To answer the questionnaire, respondents used a five point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Reliabilities (Cronbach's α) ranged from .72 to .90.

Subjective health measures. The physical functioning and the emotional well-being scales from the RAND 36-item Health Survey (version 1.0) were used to assess subjective health. The items of the RAND Health Survey are identical to the Medical Outcomes Study SF-36 (Ware and Sherbourne 1992; Stewart and Ware 1992). However, the RAND Survey employs a more straightforward scoring procedure. The final scores range from 0 to 100, with higher scores indicating better health (for more details, http://www.rand.org/health/surveys_tools/mos/mos_core_36item.html). The physical functioning scale consists of ten items regarding current limitations imposed by the health status (e.g., climbing several flights of stairs; Cronbach's α = .93). The emotional well-being scale consists of five items regarding personal feelings during the past 4 weeks (e.g., "felt downhearted and blue"; Cronbach's α = .87).

Optimism. Dispositional optimism was assessed with the Life Orientation Test – Revised (Scheier et al. 1994). It consists of ten items, six of which measure optimism and the remaining four are fillers (Cronbach's α = .82).

2.3 Statistical Analysis

The mediating role of illness representations in the relationship between optimism and subjective health was examined with the method for assessing indirect effects developed by Preacher and Hayes (2008). This method provides the bootstrapped confidence intervals for each indirect effect and also allows controlling for covariates (i.e., it estimates specific indirect effects). Estimates are calculated using OLS regressions (for more information, Preacher and Hayes 2008). In this study, we controlled for gender, age, years since initial diagnosis, and the type of cardiac problem (i.e., myocardial infarction, myocardial infarction plus surgery, artery disease with angina; remaining conditions were collapsed in a single category due to the very few cases representing these cardiac problems) coded as a series of dummy variables.

Also, in order to determine whether the strength of these effects depends on (is moderated by) the level of optimism, we used the approach and SPSS syntax developed by Preacher et al. (2007). This approach is based on a multiple regression analyses and bootstrapping framework developed to probe conditional indirect (i.e., moderated mediation) effects. In this study, we performed the analyses corresponding to Model 1 of this approach, after controlling for the variables described in the previous paragraph. According to this model, the independent variable is assumed to affect (moderate) the path from the mediator to the dependent variable. Furthermore, this approach determines whether indirect effects vary at different levels of the moderator (by default, indirect effects are reported at M and $\pm 1SD$ of the moderator). Both normal theory tests and bias corrected and accelerated bootstrapping are employed to test these effects since the latter produces more accurate confidence intervals (for more details, we refer to Preacher et al. 2007).

3 Results

Table 10.1 presents the correlations of illness representations with optimism and subjective health. Higher optimism was related to better physical functioning and emotional well-being, higher levels of personal and treatment control, and illness coherence, as well as to lower levels of timeline, timeline cyclical, consequences, and emotional representations ($ps < .005$). Also, subjective health measures were positively associated with representations of personal and treatment control, and illness coherence, but negatively associated with timeline cyclical, consequences, and emotional representations ($ps < .001$).

Table 10.1 Descriptive statistics and correlations of illness representations to dispositional optimism and subjective health measures ($N = 233$)

	Optimism	Physical functioning	Emotional well-being	Mean (SD)
Optimism				20.79 (5.18)
Physical functioning	.31**			60.99 (27.07)
Emotional well-being	.41**	.43**		60.52 (21.26)
Timeline	−.23**	−.12	−.06	23.11 (4.44)
Timeline cyclical	−.19*	−.35**	−.21*	11.49 (3.25)
Consequences	−.29**	−.36**	−.36**	18.44 (5.15)
Personal control	.36**	.43**	.30**	20.68 (4.88)
Treatment control	.41**	.38**	.30**	18.27 (3.57)
Illness coherence	.19*	.29**	.29**	17.80 (4.49)
Emot. representations	−.29**	−.32**	−.48**	20.12 (5.61)

SD standard deviation
**$p < .001$; *$p < .005$

Table 10.2 The indirect effects of optimism on subjective health measures through illness representations

	Point estimate	SE	Z	Bootstrapping 95% confidence intervals[a]	
				Lower	Upper
Dependent variable: physical functioning					
Timeline	.1708	.1103	1.5484	−.1002	.2519
Timeline cyclical	.4089	.1597	2.5611	.0133	.3422
Consequences	.3975	.1733	2.2938	.1920	.6986
Personal control	.8779	.2293	3.8289	.2492	.7887
Treatment control	.9832	.2396	4.1029	.1239	.6907
Illness coherence	.2534	.1275	1.9869	.0535	.3920
Emotional representations	.3893	.1573	2.4750	.1297	.5577
Dependent variable: emotional well-being					
Timeline	.1245	.0803	1.5508	−.2558	.0989
Timeline cyclical	.1151	.0886	1.2990	.0012	.2040
Consequences	.2643	.1178	2.2434	.1483	.5848
Personal control	.3191	.1424	2.2403	.0371	.4887
Treatment control	.3098	.1425	2.1745	.0297	.4653
Illness coherence	.1570	.0853	1.8411	.0360	.3363
Emotional representations	.4631	.1467	3.1579	.2469	.7549

SE standard error
[a]Bootstrapping bias corrected and accelerated (5,000 bootstrap samples) after controlling for covariates. Indirect effects are significant at $p < .05$ for the 95% bootstrap confidence intervals when the derived intervals do not include values of zero

The indirect effects of optimism on physical functioning through illness representations are presented in Table 10.2. Timeline cyclical, consequences, personal control, treatment control, illness coherence, and emotional representations mediated the relation of dispositional optimism to physical functioning. With

Table 10.3 Mean indirect effects (*SE* in parentheses) of optimism on subjective health through illness representations at specific values of optimism and confidence intervals[a] (bias corrected and accelerated)

Mediator	− 1 SD [CI (95%)]	Levels of optimism Mean [CI (95%)]	+ 1 SD [CI (95%)]
	Dependent variable: Physical functioning		
Consequences	.868 (*.231*)***	.491 (*.134*)***	.101 (*.113*)
	[.48 to 1.52]	[.25 to .78]	[−.10 to .35]
Treatment control	.837 (*.185*)***	.511 (*.107*)***	.246 (*.232*)
	[.50 to 1.14]	[.20 to .85]	[−.21 to .71]
Illness coherence	.918 (*.234*)***	.524 (*.126*)***	.069 (*.137*)
	[.48 to 1.37]	[.18 to .75]	[−.18 to .36]
Emotional representations	.576 (*.184*)**	.343 (*.114*)**	.108 (*.099*)
	[.27 to 1.01]	[.16 to .61]	[−.05 to .35]
	Dependent variable: Emotional well-being		
Consequences	.707 (*.190*)***	.395 (*.110*)***	.085 (*.110*)
	[.39 to 1.14]	[.21 to .64]	[−.13 to .31]
Treatment control	.472 (*.142*)***	.161 (*.109*)	−.134 (*.167*)
	[.22 to .78]	[−.04 to .39]	[−.48 to .19]
Illness coherence	.247 (*.107*)*	.133 (*.071*)	.021 (*.077*)
	[.07 to .49]	[.02 to .31]	[−.11 to .21]

SD standard deviation; *CI* confidence intervals
*$p < .05$; **$p < .01$; ***$p < .001$
[a] Indirect effects are significant at $p < .05$ for the 95% bootstrap confidence intervals when the derived intervals do not include values of zero

respect to the indirect relation of optimism to emotional well-being, the same set of illness representations was found to act as mediators. In all cases, mediations were partial ($Bs_{optimism} = .91$–1.56, $ps < .01$ after controlling for the mediator, that is, illness representations).

Conditional indirect effects (i.e., whether optimism also moderates the relation between representations and subjective health) were examined only in those relations that a significant indirect effect was identified. Regarding the indirect effects of optimism on physical functioning, those mediated by consequences ($B = .254$, SE $= .050$, $p < .001$), treatment control ($B = −.197$, SE $= .069$, $p < .005$), illness coherence ($B = −.137$, SE $= .064$, $p < .05$), and emotional representations ($B = .149$, SE $= .049$, $p < .005$) were conditional on the values of optimism. For these significant interactions, indirect effects at different levels of optimism were estimated. By default, the program produced the indirect effects at three values of optimism: the mean (20.79), one standard deviation above the mean (25.97), as well as one standard deviation below the mean (15.61). Table 10.3 presents the normal theory tests for each conditional indirect effect as well as the bootstrap confidence intervals. In all cases, the relations of illness representations to physical functioning were statistically nonsignificant at higher levels of optimism (+1SD; see also Fig. 10.1) resulting, thus, in also statistically insignificant indirect effects of optimism on physical functioning.
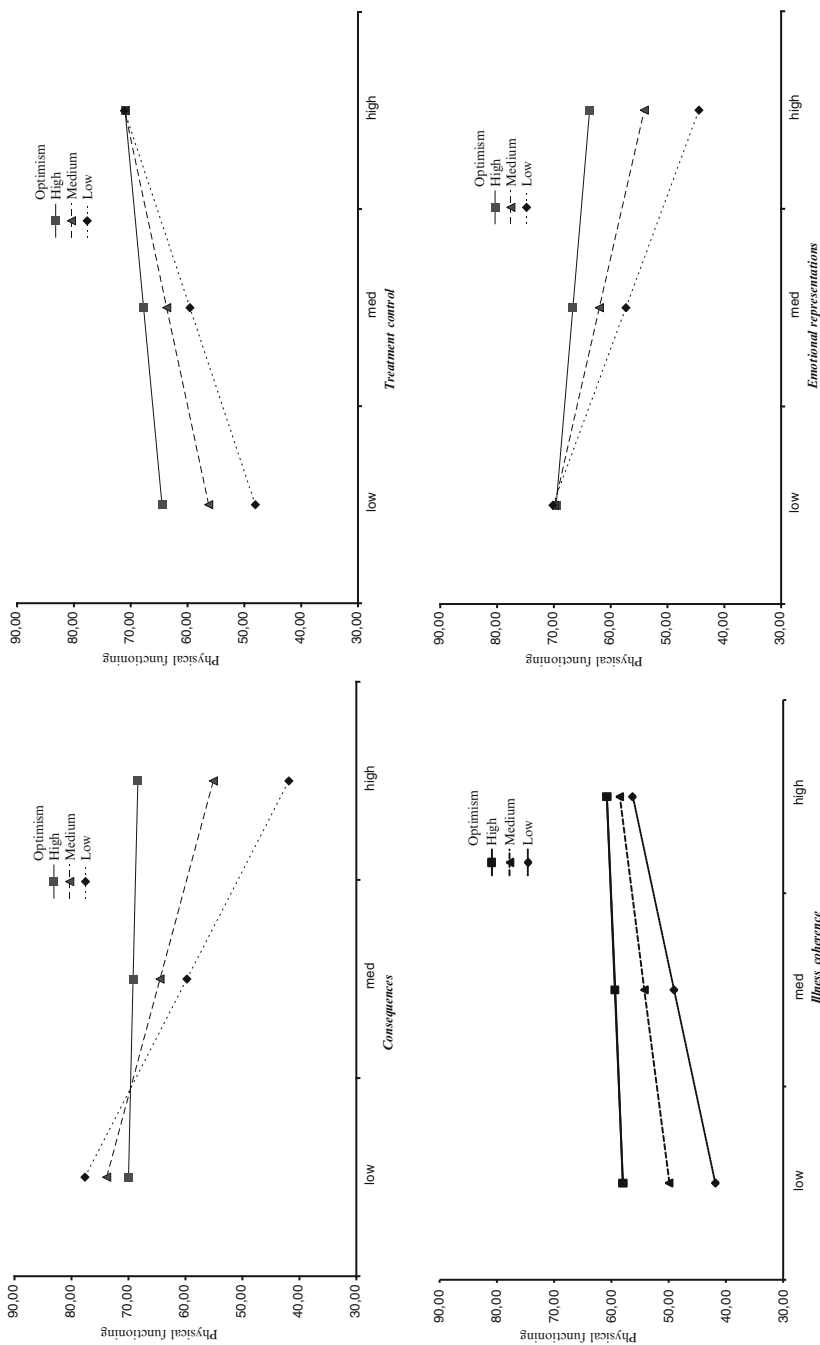
Fig. 10.1 Graphical representation of the simple moderation effects of dispositional optimism on the relation of illness representations to physical functioning

Regarding the indirect effects of optimism on psychological well-being, those mediated by consequences ($B = .205$, SE $= .044$, $p < .001$), treatment control ($B = −.213$, SE $= .059$, $p < .001$), and illness coherence ($B = −.148$, SE $= .054$, $p < .01$) were conditional on the values of optimism. As previously, the indirect effects were not statistically significant at the higher levels of optimism (+1SD; see Table 10.3 and Fig. 10.2).

At average and lower levels of optimism, better physical and psychological health was in almost all cases significantly associated with higher levels of treatment control and illness coherence as well as with lower levels of consequences and emotional representations ($ps < .05$).

4   Discussion

The aim of this study was to examine whether illness representations mediate the relation of dispositional optimism to subjective health in a sample of chronic cardiac patients. A further aim was to examine whether this indirect relationship depends on the level of optimism. According to the results, optimism was positively related to both physical and psychological subjective health, as well as to a more "positive" representation of illness (i.e., a perception of illness as a more controllable or coherent condition). On the contrary, optimism was negatively related to a less "positive" representation of illness (i.e., a perception of a burdensome and distressing condition). These results are consistent with the suggestions made by the Common Sense Model of illness representations (Leventhal et al. 1980) and similar to the findings reported in several other studies (e.g., Contrada et al. 2008; Karademas et al. 2011; Symister and Friend 2003).

In addition, the results of this study revealed that almost all illness representations mediated the relation of optimism to physical functioning and emotional well-being. As hypothesized, higher optimism was related to a more "positive" representation of illness, which in turn was related to better subjective health. Previous research has shown the ability of optimism to impact health through several pathways (e.g., through coping strategies and health-related behaviors; Scheier and Carver 1987, 2001). According to our findings, illness representations seem to act as a further link between dispositional optimism and chronic patients' subjective health verifying, thus, the suggestion made by Leventhal et al. (1980) that adaptation to illness does not occur in a vacuum, but is linked to the broader way each patient perceives his or her self and life.

However, a closer look at the data revealed that this link is complicated. The results indicated that half of the indirect relations of optimism to subjective health measures depended on the levels of optimism: at higher levels of optimism, the "optimism–illness representations–subjective health" relation was statistically nonsignificant. Further analyses showed that at higher optimism, subjective health levels were relatively high regardless of the illness representation values. On the other hand, at average and lower levels of optimism, subjective health was
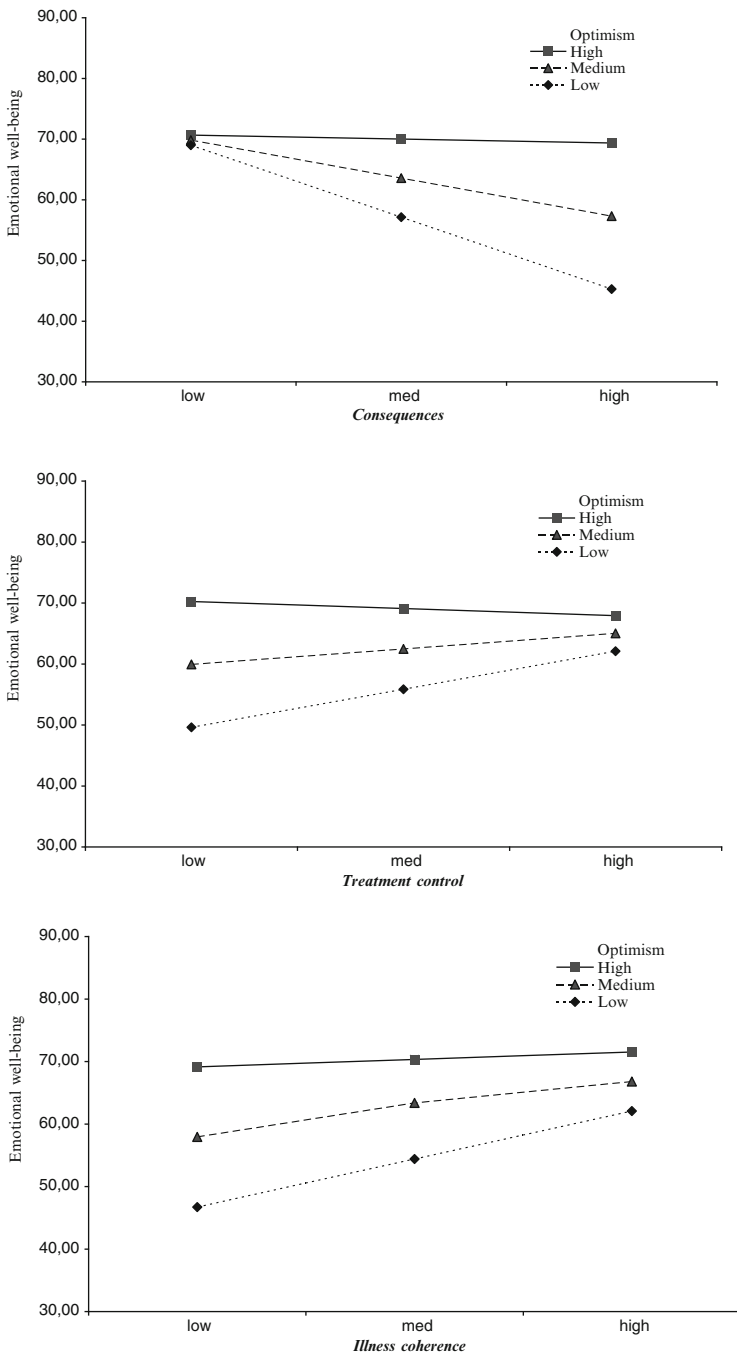
Fig. 10.2 Graphical representation of the simple moderation effects of dispositional optimism on the relation of illness representations to emotional well-being

analogous to the type of illness representation: better at the higher levels of "positive" representations (e.g., representations of control) and worse at the higher levels of "negative" representations (e.g., consequences).

These findings suggest that the pathway from optimism to illness representations and subjective health does not work in a simple way, but it is conditional on the values of the same factors that take part in the process. A strong general expectancy of good outcomes in life seems to be able to "sweep along" a positive evaluation of personal health as well as weaken the associations between illness representations and evaluations of health. A possible explanation, as far as the "negative" representations (e.g., consequences, emotional representations) are concerned, might be that optimists tend in general to pay more attention to "positive" information, expect good outcomes even under difficult conditions, as well as believe that they can easily overcome negative experiences (Carver and Scheier 1998, 2001). As a result, optimistic patients possibly tend to rely more on their general (positive) expectations than on specific (negative) information or perceptions about their illness. On the other hand, regarding treatment control and illness coherence, a possible explanation might be that a positive representation of illness is already "expressed" through high optimism and, therefore, cannot really add to the beneficial relation of the latter to subjective health. Yet, it is interesting that at average or weaker levels of optimism, illness representations (which reflect personal knowledge and experience with illness) seem to assert their ability to mediate the relation of broader personality to health.

It is also interesting that the "optimism–illness representations–subjective health" interaction seems in most cases (i.e., either at higher levels of optimism or when a more "positive" representation of illness is reported) to "result" in a more positive evaluation of personal health. A broadly similar relationship was also found in a previous study of ours (Karademas 2012). This indicates that self-regulation may act in such a way as to "promote" a positive perception of self and, thus, facilitate adaptation to negative, distressing conditions. Furthermore, in the aforementioned study, we found that subjective health can prospectively predict the levels of optimism through illness representations. In other words, we found some evidence for a pathway reversed to the one examined in the present study. The results of the two studies together underline the interactive relationship between the experience of illness and contextual factors. As suggested by Leventhal et al. (2005), the representations of a disease and its treatment are not just affected by broader personal and social factors but also alter these contextual factors (that are not static) within a bidirectional constructive process. In this regard, the findings of the present study probably reflect only a part of this dynamic process.

The results of this study should of course be considered in relation to certain limitations. The study was cross-sectional, and, thus, no causal effects could be tested; it was based on self-reported data with all the limitations this implies; "identity" and "causes" representations were not included in the measures; the sample consisted only of chronic cardiac patients, yet the type of illness can affect patients' experience and self-regulation. However, despite these limitations, we believe that our findings are important for theory and practice. They suggest that,

within the context of chronic patients' self-regulation mechanism, broader personal factors, such as optimism, interact with specific illness-related factors, such as perceptions about illness and current health status, in complicated ways. They also underline the importance of dispositional optimism, as a substantial human strength, in promoting health and facilitating adaptation to illness. Finally, they indicate that specific interventions addressing maladaptive illness representations (see, e.g., Petrie et al. 2002) are more needed when patients report lower levels of generalized positive expectations.

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