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COPING WITH CORONARY HEART DISEASE: A LONGITUDINAL STUDY

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Abstract—This longitudinal study evaluated the effects of two types of coping strategies, approach and avoidance, on anxiety, depression, and well-being in patients with coronary heart disease. Measurements were made at three timepoints: 1 month, 3 months, and 12 months after the cardiac event. Both cross-sectional and longitudinal relations were explored. At all three measurement points significant negative cross-sectional relations were found between approach and well-being, and significant positive cross-sectional relations were found between approach, on the one hand, and anxiety and depression, on the other. At the first measurement point, avoidance showed a positive association with well-being, and a negative association with anxiety. Longitudinal analyses, however, revealed a negative relationship between approach at the first measurement points and anxiety and depression at later measurement points. Likewise, there was a positive association between approach at the first two measurement points and well-being at later measurement points. The results of this study demonstrate the importance of facing and working through the trauma of the coronary event. Although unfavorable in the short term, working through the trauma can attenuate long-term emotional distress. These results suggest that assessment of the psychological consequences of coronary heart disease and development of interventions should not be based only on cross-sectional data, but should take into account longitudinal relations between coping and psychosocial outcome measures. © 1999 Elsevier Science Inc.

Keywords: Approach; Avoidance; Coping; Coronary heart disease; Longitudinal relationships; Psychological adaptation.

INTRODUCTION

In addition to major physical consequences, myocardial infarction (MI) and coronary artery bypass grafting (CABG) also have important emotional consequences. Coronary heart disease (CHD) patients may experience anxiety and uncertainty, frequently accompanied by symptoms of severe depression [1]. The way in which patients cope with the stress instigated by their heart disease, however, can influence these psychosocial consequences [2]. From a psychological point of view, stress can be defined as the result of a transaction between the individual and the environment. The basic assumptions of transactional stress coping theory are that individuals who are confronted with a stressor will evaluate this stressor, and that this evaluation determines their emotional and behavioral reactions. Lazarus [3] distinguishes two kinds of parallel evaluations or appraisal processes: primary and secondary appraisal. Primary appraisal involves assessment of the personal meaning of an event in terms of potential harm or benefit. Secondary appraisal refers to thoughts

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through which the person explores his or her coping capacity; that is, the capacity to reduce the threat, damage, or loss caused by the event. Coping is thus defined as any effort to manage or adapt to perceived external or internal demands.

Two basic strategies of coping with the stress of illness can be distinguished: approach and avoidance. For almost 40 years these concepts have been used under different labels. Terms used for approach/avoidance include, for example, monitoring/blunting, sensitization/repression, and vigilance/avoidance [4]. Mullen and Suls [5] and Suls and Fletcher [6] have concluded, on the basis of several meta-analyses, that avoidance coping strategies in the short term, together with approach coping strategies in the long term, can lead to more effective adjustment to stressful events. With respect to myocardial infarction some research suggests that avoidance or denial in the short term can lead to more positive adaptation [7, 8], whereas avoidance in the long term can lead to poorer adaptation. The research results are not unequivocal, however. Although Sherbourne and coworkers [9] found that avoidance behavior in the long term had a negative influence on adherence to medical advice, a prospective study [10] has suggested that avoidance behavior in the short term could also lead to negative psychosocial consequences in coronary heart disease patients. The effects of approach strategies in coronary heart patients have been investigated in only a few studies. One study suggested that approach behavior before and after coronary heart surgery may be negatively related to well-being if the coping behavior is directed toward emotional issues, yet positively related to well-being if it is directed toward making plans and achieving goals [11]. In another study, Holahan *et al.* [12] found that active or approach coping strategies predicted fewer depressive symptoms in cardiac patients.

The fact that the available research results are not unambiguous may be partly attributable to the measurement instruments and research designs used in these studies. One limitation is that many coping scales, such as the Ways of Coping Inventory [13], are based on the assumption that coping processes in diverse stressful situations will have the same content and achieve the same results. In addition, the Ways of Coping Inventory has six emotion-focused subscales, but only two subscales focus on active problem solving. Recent research has shown that coping measures should be specific to relevant clinical phenomena and to the problem at hand, and should measure both approach and avoidance strategies [2]. Another weakness of much of the existing research on the effectiveness of coping strategies is the use of cross-sectional designs [14]. Longitudinal designs in which an attempt is made to interpret unidirectional relations between coping strategies at first measurement points and psychological adaptation at later measurement points can provide more insight into the effects of particular coping strategies on psychological functioning [2].

To overcome these limitations, a Coping Questionnaire for Coronary Patients (CQCP) [4, 15] was developed, measuring both approach and avoidance strategies in three specific domains. This scale operationalizes situation specificity in terms of three different problem situations, in line with the WHO definition of health ("health is a state of complete physical, psychological and social well-being"). The three situations concern a medical problem ("If I have heart problems"), a psychological problem ("If I am worried about my heart disease"), and a social problem ("If other people treat me like a patient"). Approach strategies are operationalized

as cognitive processes aimed at confronting those three problem situations, whereas avoidance strategies are operationalized as cognitive processes aimed at distraction from the problem situations. To investigate both cross-sectional and longitudinal relations between approach and avoidance coping strategies and psychological adaptation in a population of coronary heart patients, the CQCP was administered at three measurement points after a cardiac event. To take into account both positive and negative emotions as a consequence of a cardiac event, coping was investigated in relation to anxiety, depression, and well-being. To tap coping processes at an appropriate level of specificity, only coping with the psychological problem situation was investigated.

In the present study, relationships between coping (approach and avoidance strategies) with a psychological problem situation and anxiety, depression, and well-being were investigated in a population of CHD patients. Those relationships were investigated both cross-sectionally and prospectively.

METHOD

Participants

A total of 278 patients, 244 men and 34 women, participated at the first and second measurement points. The average age of the patients was 54 years (sd 8.45, range 32–74). The entry cardiac event was MI for 154 patients, CABG for 29 patients, percutaneous transluminal coronary angioplasty (PTCA) for 2 patients, a diagnosis of “unstable angina” for 11 patients, and a combination of these events for 82 patients. The patients participated in the study on a voluntary basis. Two hundred thirty-two of the patients (206 men and 26 women) participated in the follow-up measurement 1 year later. A total of 46 subjects (16.5%) dropped out for various reasons, including death, worsening health, and lack of motivation.

Design

Questionnaires were administered at three measurement points to assess the patients' coping strategies and psychological adaptation. The first measurement (T1) was taken within a month of the entry cardiac event. Measurement points T2 and T3 were 3 and 12 months after T1.

Descriptive analyses of the research variables were carried out for each of the three measurement points. The hypothesized relationships between coping and positive and negative emotions were specified in three separate linear structural models and then tested using the computer program EQS version 5.4 [16]. A χ^2 was calculated for global evaluation of the models. A model is assumed to show good fit to the data if the χ^2 value is statistically nonsignificant ($p > 0.05$). Using the maximum-likelihood estimation method it is also possible to evaluate all estimated coefficients separately in all models for statistical significance (criterion $p < 0.05$). The structural coefficients estimated by EQS can be interpreted as regression coefficients.

The first model to be tested was a basic model specifying relationships between coping and emotional outcomes, which are suggested by existing theory and empirical findings. The basic model is shown in Figure 1. The model includes both cross-sectional and prospective relations between coping strategies on the one hand, and anxiety, depression, and well-being on the other.

Measurement instruments

Coping strategies were measured with:

- *The Coping Questionnaire for Coronary Patients* (CQCP) [4, 15]. This questionnaire consists of three sections. Patients are asked how they would behave in three different situations involving a medical problem, a psychological problem, and a social problem, respectively. For each problem situation, eight items measure approach responses to the problem situation and eight items measure the avoidance responses to the situation. All of the items are scored on a four-point scale. The present study utilized only the CQCP section concerning coping with a psychological problem situation. (“If I am worried about my heart disease . . .”). Items concerning use of an approach strategy include: “. . . I think how easy it is for healthy people” and “. . . I allow myself to be controlled by it.” Items concerning use of an avoidance strategy include: “. . . I try to keep my mind off it” and “. . . I think that worrying about it doesn't make much sense.”

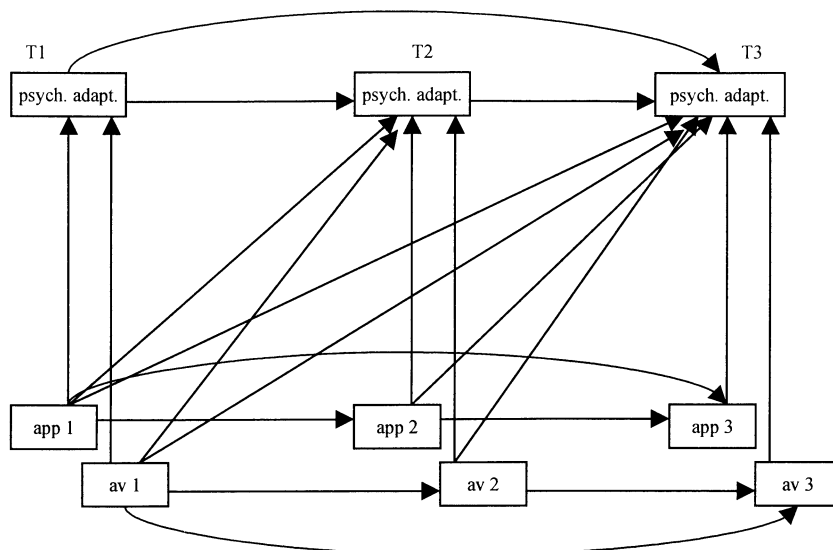


Fig. 1. Path model of hypothetical relationships between approach (app) and avoidance (av) coping strategies and psychological adaptation at three measurement points.

Positive and negative emotions were measured with:

- *Validated Dutch State Anxiety version of Spielberger's State-Trait Anxiety Inventory (STAI, Zelf-Beoordelings Vragenlijst [The Self-Assessment Questionnaire], ZBV [17]), state anxiety subscale (20 items, range 20–80).*
- *Maastricht Questionnaire for Vital Exhaustion and Depression (henceforth referred to as depression) [18, 19], a shortened version consisting of 14 items (range 14–42).*
- *Validated Medical Psychological Questionnaire for Heart Patients (MPOH, Medisch Psychologische Vragenlijst voor Hartpatiënten, MPVH [20]), well-being subscale (12 items, range 12–36).*

RESULTS

Table I shows mean scores on approach coping (Cronbach's $\alpha=0.79$) and avoidance coping (Cronbach's $\alpha=0.76$), separately for each measurement point, as well as mean scores on anxiety, depression, and well-being.

The scores on the anxiety ($F[2, 227]=8.91, p<0.01$) and depression ($F[2, 215]=$

Table I.—Means (M) and standard deviations (SD) on approach and avoidance coping strategies, and on anxiety, depression and well-being

Variables	T1 (n = 278)		T2 (n = 252)		T3 (n = 232)	
	M	SD	M	SD	M	SD
Approach coping	12.02	3.82	11.87	3.91	11.62	3.90
Avoidance coping	19.86	4.67	20.29	4.89	20.26	4.58
Anxiety	39.05	12.47	37.00	11.47	36.00	11.07
Depression	24.61	7.07	23.69	6.61	23.29	7.17
Well-being	24.66	8.47	27.39	8.02	28.43	7.88

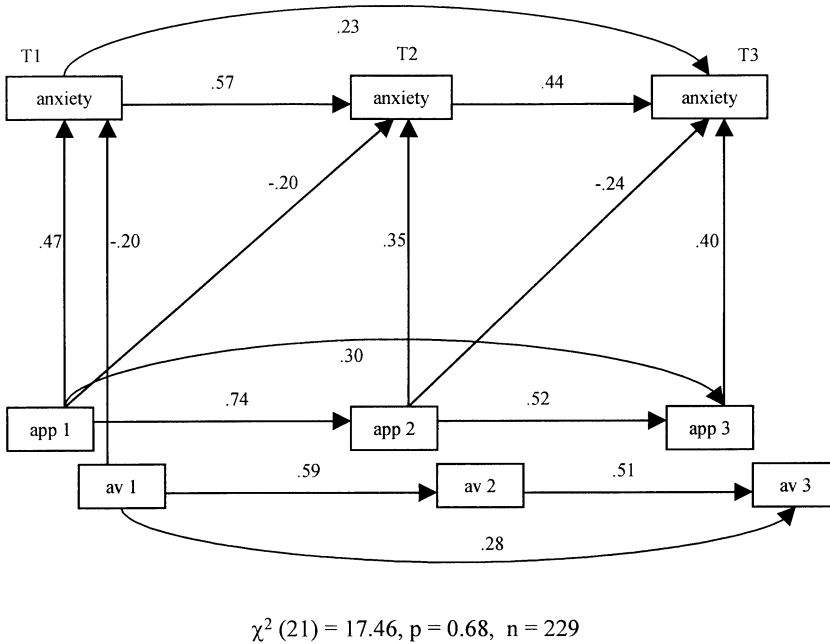


Fig. 2. Path model of significant structural coefficients ($p < 0.05$), indicating relations between approach and avoidance coping strategies and anxiety.

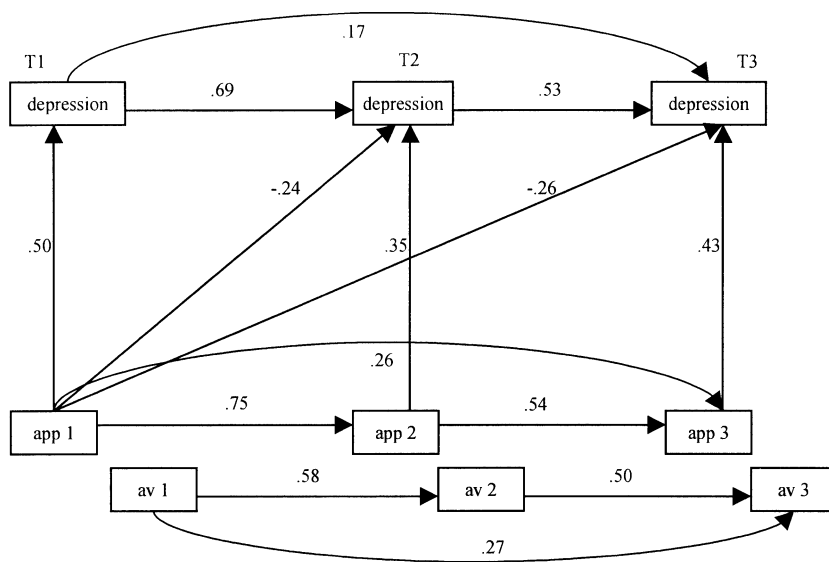
8.25, $p < 0.01$) scales showed a significant decrease over time, whereas scores on well-being showed a significant increase over time ($F[2, 219] = 29.70, p < 0.01$). Scores on the approach and avoidance coping scales showed no significant changes over time (analyses of variance with repeated measurements).

The correlations between anxiety and depression at the three measurement points were 0.56 (T1), 0.68 (T2), and 0.65 (T3), respectively; those between anxiety and well-being were -0.61 (T1), -0.66 (T2), and -0.63 (T3); and those between depression and well-being were -0.64 (T1), -0.70 (T2), and -0.70 (T3).

Figures 2, 3, and 4 show the standardized maximum-likelihood estimates for the structural coefficients, which indicate significant relations between coping strategies on the one hand, and anxiety, depression, and well-being on the other. Nonsignificant relationships were excluded from the final model testing. Neither of the χ^2 values were significant, which means that the models cannot be rejected on statistical grounds.

In Figure 2, it can be seen that the three cross-sectional coefficients between approach strategies and anxiety were positive. This suggests that use of approach strategies was accompanied by greater feelings of anxiety. The two longitudinal coefficients (T1→T2 and T2→T3) were negative, which indicates that use of approach strategies (at both T1 and T2) was accompanied by less anxiety at subsequent measurement points (T2 and T3). Figure 2 also shows that use of avoidance strategies at T1 was accompanied by lower anxiety. This relationship was not evident at T2 and T3. No significant longitudinal effects were found for avoidance strategies.

As can be seen in Figure 3, the cross-sectional coefficients representing the rela-



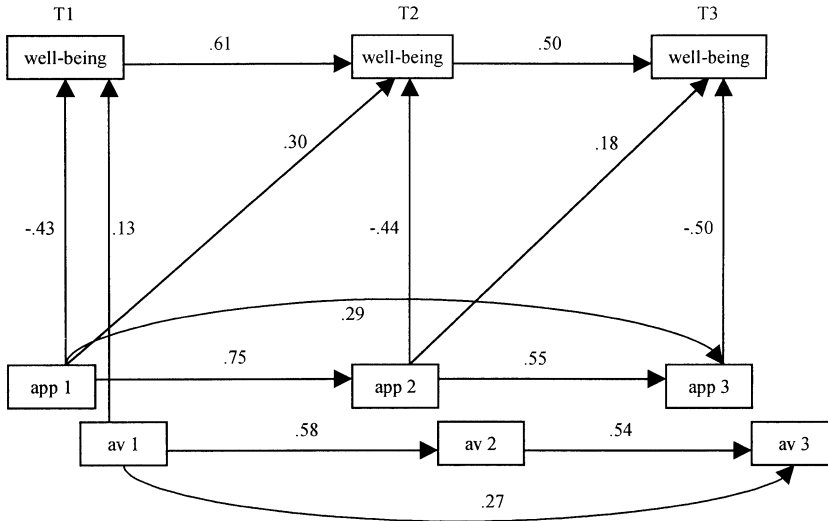
$$\chi^2 (22) = 20.43, p = 0.56, n = 217$$

Fig. 3. Path model of significant structural coefficients ($p < 0.05$), indicating relations between approach and avoidance coping strategies and depression.

tionship between approach strategies and depression were positive at all three measurement points. This indicates that approach strategies were associated with a greater degree of depression. There were two significant negative longitudinal relationships between approach strategies at the first measurement point and depression at subsequent measurement points (T1→T2 and T1→T3). There were neither significant cross-sectional nor longitudinal relationships between avoidance and depression.

As can be seen in Figure 4, the cross-sectional coefficients representing the relationship between approach and well-being were negative at all measurement points. This indicates that approach strategies were accompanied by lower feelings of well-being. The two longitudinal coefficients (T1→T2 and T2→T3) were positive, which indicates that use of approach strategies at measurement points T1 and T2 was accompanied by greater well-being at subsequent measurement points (T2 and T3). In addition, avoidance of the situation at T1 was accompanied by greater well-being at the same measurement point. There were no significant cross-sectional relations between avoidance of the situation at T2 and T3 and well-being. Finally, no significant longitudinal correlations were found between avoidance and well-being.

To examine the effects of coping strategies for specific diagnoses, the models presented in Figures 2, 3, and 4 were also tested for myocardial infarction patients separately. The goodness-of-fit indexes for anxiety ($\chi^2 = 15.16$; $df = 21$; $p = 0.82$; $n = 128$) and depression ($\chi^2 = 21.77$; $df = 22$; $p = 0.47$; $n = 116$) indicated that the models were also valid for this subgroup of patients considered separately. For these two outcome variables the signs of the cross-sectional and longitudinal coefficients were un-



$$\chi^2 (22) = 30.32, p = 0.11, n = 221$$

Fig. 4. Path model of significant structural coefficients ($p < 0.05$), indicating relations between approach and avoidance coping strategies and well-being.

changed and the sizes of the coefficients showed only small departures from the results for the complete patient sample.

For well-being, although the signs of the coefficients remained unchanged and their sizes did not differ substantially from the results for the complete sample, the goodness-of-fit index ($\chi^2 = 41.04$; $df = 22$; $p = 0.01$; $n = 122$) indicated that the model was not valid for myocardial infarction patients considered separately. Due to the limited number of patients with CABG, percutaneous transluminal coronary angioplasty (PTCA), or unstable angina in the present study, the models were not tested separately for these subgroups of patients.

DISCUSSION

The present study investigated cross-sectional and longitudinal relations between coping strategies on the one hand, and anxiety, depression, and well-being on the other. At all three measurement points, positive cross-sectional relations were found between approach and anxiety, and between approach and depression, whereas negative cross-sectional relations were found between approach and well-being. These results are consistent with those of Scheier et al. [11], which suggested that use of approach coping strategies is negatively related to well-being if these strategies are aimed at emotional problems or issues. Coping behavior was operationalized in terms of agreement with statements reflecting emotionally oriented responses to the problem situation; for instance, ascribing blame to oneself and viewing the world pessimistically.

Negative cross-sectional relations between avoidance and anxiety, and positive

cross-sectional relations between avoidance and well-being, were only found at the first measurement point. Greater avoidance at the first measurement point was associated with lower anxiety and greater well-being. At the second and third measurement points no significant cross-sectional relationships were found. These results are also consistent with findings in the literature [6, 7], which suggest that avoidance in the short term leads to more positive adaptation.

In contrast to the cross-sectional relations, the longitudinal relationships between approach and anxiety and between approach and depression were negative. Furthermore, the longitudinal relationships between approach and well-being were positive. Negative associations were found between approach at T1 and anxiety at T2, between approach at T2 and anxiety at T3, and between approach at T1 and depression at T2 and T3. In line with these findings positive associations were found between approach at T1 and well-being at T2 and between approach at T2 and well-being at T3. The finding that approach coping was related cross-sectionally to negative emotions and longitudinally to positive emotions could indicate that the “work of worrying” leads to more positive adaptation in the long term. Horowitz [21] characterized the reactions of people who have experienced a traumatic event in terms of five phases, namely “outcry” (anxiety, grief, anger), “denial,” “intrusion” (unwanted thoughts about the event), “working through” (the recognition of the reality of what has happened), and “completion” (getting on with the rest of one’s life). He argued that therapy should be aimed at the “working through” phase, to support clients in getting on with their lives. Pennebaker, Colder and Sharp’s [22] inhibition–confrontation model is based in part on similar ideas. According to Pennebaker *et al.* [22], confrontation of traumatic experiences will, in the short term, elicit negative emotions, but may, in the long term, improve health and emotional functioning. Verbalization concerning one’s traumatic experiences may also be beneficial, particularly for those who feel inhibited about doing so.

No longitudinal relationships were found between avoidance and positive or negative emotions, suggesting that avoidance does not influence psychological adaptation in the longer term. This finding is consistent with conclusions drawn by Levenson *et al.* [7] and Levine *et al.* [8].

Additional remarks can be made regarding the goodness-of-fit of the model for well-being. The stability of the structure for well-being was lower than that for anxiety and depression. Although this model was not valid for myocardial infarction patients considered separately, relationships found for this subgroup are consistent with those for the total patient sample. Another remark concerns the fact that this study included not only myocardial infarction patients, but also PTCA, CABG, and angina patients. Future research should explore whether the present results would hold for each of these subgroups considered separately. Due to the limited size of these latter subgroups in this study, it was not possible to give a definite answer to this question.

In sum, it can be concluded that the present study demonstrates that longitudinal analyses can make an important contribution to coping research. It shows that “the work of worrying” at an early point in time can have a positive effect on emotional functioning at a later time. These results have implications for screening and selection of CHD patients for various forms of psychosocial rehabilitation. It is quite possible that emotional upheaval during the phase immediately following a cardiac

event may constitute a sort of necessary trauma processing phase, which should not be perceived as undesirable. During this phase, CHD patients may benefit more from intervention methods, such as those reported in the trauma processing literature, than from other stress management techniques.

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