# THE UNIVERSITY OF HULL

# THE RELATIONSHIP BETWEEN TYPE D PERSONALITY, COPING STYLE AND PSYCHOLOGICAL DISTRESS IN HEART FAILURE PATIENTS.

# BEING A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF CLINICAL PSYCHOLOGY

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MASHAL PAREKH

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#### ABSTRACT

Aims: The main objective of this research was to determine if Type D personality predicts distress in Heart failure (HF) patients. The study also sought to examine whether there is a relationship between Type D personality, coping and psychological distress in this cardiac patient group. Method: A cross-sectional, quantitative design was used. 72 (58 %) with HF between September 2005 and March 2006 completed questionnaires in the outpatient clinic of a cardiology department. The DS14 questionnaire was used to measure Type D personality (predictor variable), the Hospital Anxiety and Depression Scale (HADS) measured psychological distress (outcome variable) and the Brief COPE inventory was the measure of coping used (mediator variable) of this HF patient sample. Main analyses: An ANOVA test investigated whether Type D predicted distress. The mediational regression model (National Institute for Clincial Excellence, 1986) was used to analyse the relationships between the three variables. Results: Type D significantly predicted depression (p<0.01), even after adjusting for demographical variables however did not predict anxiety. Patients tended to report using a mixture of Engagement and Disengagement Coping Styles. Coping did not act as a mediating variable between Type D personality and depression or anxiety (as measures of psychological distress). However disengagement coping was found to significantly mediate the relationship between the separate subscales of Type D and distress. Conclusion: Early screening of Type D personality may be helpful in identifying HF patients at risk of psychological distress. Increasing awareness of the potential disengaging coping strategies that Type D patients use may determine, not only early intervention, but early screening upon their diagnosis of HF.

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#### **CHAPTER ONE – INTRODUCTION**

## **1.2 Overview of Introduction**

This chapter will begin by providing a brief overview of Coronary Heart Disease (CHD) and its impact on peoples' lives. The different patient groups will be outlined and the position of Heart Failure (HF) patients as a high risk group will be examined. The comorbid complications of anxiety and depression in cardiac patients will be outlined followed by a discussion of the existing research on psychological distress in this patient group. Type D personality is then described and a discussion of the literature regarding Type D personality as a risk factor for distress in cardiac patients, is given. The rationale for looking at Type D personality in HF patients is also explained.

The chapter will continue to discuss how previous research has evaluated the causes of distress in cardiac patients. The two psychological variables, personality (Type D form) and coping will be discussed as potential causes of distress. The relationship between these variables and psychological distress is explained through use of the transactional stress-coping model produced by Folkman and Lazarus (1985). Finally the rationale behind exploration of the causes of distress specifically in HF patients is highlighted and a rationale given for investigating the variables Type D personality and coping. Finally an argument for early psychological intervention to identify HF patients at risk of distress will be made.

## 1.2 The importance of heart conditions and Coronary Heart disease

Diseases of the heart and circulatory system (coronary heart disease or CHD) are the main cause of death in Europe, accounting for over 4.35 million deaths each year. There are nearly 3.5 times more deaths from CHD than lung cancers and over 5.5 times more deaths than those caused by injuries or poisoning. Nearly half of all deaths are from CHD. The main forms of diseases of the heart and circulation are coronary heart disease (CHD) and stroke. CHD is the largest single cause of mortality in the UK, taking nearly 114,000 lives in 2003 (British Heart Foundation, 2003).

CHD is commonly caused by atherosclerosis, the narrowing of the arterial lumen due to the deposition of fatty material called 'atheroma'. This narrowing leads to slowing and/or complete cessation of blood flow to the heart muscle, occluding its oxygen supply (Neighbours & Tannehill-Jones, 2000). The primary clinical manifestations of CHD are Angina Pectoris (chest pain), Myocardial Infarction (heart attack), and Sudden Cardiac Death (SCD) (Timmis *et al.*, 1997). Approximately 2 million people are suffering from angina in the UK and about 1.3million people have had a heart attack. Around 670,000 people have diagnosed heart failure (HF). Hence it can be seen that heart disease is a common illness associated with significant morbidity and mortality. Recent figures show that Britain is spending more per person to treat CHD than any other country in the European Union (Excellence, 2000). The cost of HF to the National Health Service (NHS) was estimated to be 716 million pounds in 1995, and 905 million pounds in 2000 (McMurray & Stewart, 2000). This study has focused on individuals with HF. HF is a common and costly cause of admissions to hospitals each year (Excellence, 2000). More people are being diagnosed with HF because of the ageing population and improved survival rates following myocardial infarction. Consequently there are more people HF living longer, and so the cost of HF is increasing (Stewart *et al.*, 2002). Patients with HF form one of the largest groups of CHD patients and the importance and relevance of these patients will now be outlined.

## 1.3 Heart Failure (HF)

HF is the heart's inability to pump enough blood to meet the metabolic demands of the body (MacKlin, 2001). It is commonly a chronic, long-term condition, although it can sometimes develop suddenly. This condition may affect the right side, the left side, or both sides of the heart. As the heart's pumping action is lost, blood may back up into other areas of the body:

- The liver
- The gastrointestinal tract and extremities (right-sided heart failure)
- The lungs (left-sided heart failure)

With heart failure, many organs do not receive enough oxygen and nutrients, which damages them and reduces their ability to function properly. Most areas of the body can be affected when both sides of the heart fail. Figure 1.1 shows a diagram of how the heart can be affected in heart failure. Heart failure has two main forms: 'systolic dysfunction' (which is more common) and 'diastolic dysfunction'. In systolic dysfunction, the heart

contracts less forcefully and cannot pump out as much of the blood that is returned to it as it normally does. As a result, more blood remains in the lower chambers of the heart (ventricles). Blood then accumulates in the veins. In diastolic dysfunction, the heart is stiff and does not relax normally after contracting. Even though it may be able to pump a normal amount of blood out of the ventricles, the stiff heart does not allow as much blood to enter its chambers from the veins. As in systolic dysfunction, the blood returning to the heart then accumulates in the veins. Often, both forms of heart failure occur together (Beers, 2003).



# Figure 1.1: Diagrams indicating the pumping and filling problems that occur in Heart Failure (Beers, 2003).

While the commonest cause of HF is CHD, other structural or functional causes of HF include the following:

- Valvular heart disease
- Congenital heart disease
- Dilated cardiomyopathy

- Lung disease
- Heart tumor

In summary, HF could therefore either be caused by: a) pathology within the heart itself (e.g. atherosclerosis (occurring in CHD) and valve disease); or b) due to disease process elsewhere in the body, thus increasing the demands put on the heart. Hence, the causes of heart failure can be classified into cardiac or non-cardiac, respectively. Examples of non-cardiac causes include pregnancy, severe anaemia and thyrotoxicosis. This research focuses exclusively on patients with HF of cardiac origin.

# 1.4 Prevalence of Heart Failure

Heart failure can occur at all ages, including infants (i.e. those born with a heart defect). However, it becomes more common with advancing age as aetiological factors underlying the disease may take years to inflict significant damage to the heart. Also certain changes that occur with advancing age tend to make the heart pump less efficiently, for example, systolic blood pressure. Heart failure develops in about 1 of 100 people between the ages of 27 and 74 have heart failure. The disorder is likely to become more common because people are living longer and because, in some countries, certain risk factors for heart disease (such as smoking, high blood pressure, and a high-fat diet) are also increasing in prevalence (Beers, 2003). The following section will explain the signs and symptoms of heart failure.

## 1.5 The clinical implications of Heart Failure

The New York Heart Association (NYHA) Classification is used to measure functional status of the heart. It is a four-grade system that classifies the functional impairment of patients with chronic HF according to the severity of symptoms and signs (The Criteria Committee of the New York Heart Association Inc. 1964). The system ranges from patients who have few symptoms (class I) to patients who are unable to carry out activities of daily living (class IV). Table 1.1 indicates the four classes as described by the NYHA (Bowling, 1995).

 Table 1.1: The New York Heart Association (NYHA) classification of HF (The Criteria

 Committee of the New York Heart Association Inc. 1964).

New York Heart Association (NYHA)	Symptomatology
classification of HF.	
I	The patient is asymptomatic, ordinary
	physical activity does not cause fatigue,
	shortness of breath or palpitations
II	The patient is comfortable at rest but
	ordinary physical activity causes fatigue,
	palpitations or shortness of breath
III	The patient has a marked limitation of
	physical activity although is comfortable at
	rest
IV	The patient is unable to carry out any
	physical activities without causing
	discomfort

Typical symptoms of HF can include shortness of breath, fatigue, lethargy and palpitations (see Table 1.1). Shortness of breath tends to be exertional hence, can limit mobility. However, breathlessness can also occur at rest, when lying flat (orthopnoea) and may disrupt sleep (proximal nocturnal dyspnoea). A chronic dry cough may develop also (due to lung oedema). In addition mobility may decrease and disability increase. HF patients can develop swelling in the legs (oedema). The oedema may lead to dry skin on the lower part of the legs due to pressure from inside the tissue. There may also be an eczema-type rash which can be complicated by ulcers which do not heal (venous leg ulcers). Accumulation of fluid in the abdominal cavity and organs may also occur, especially the liver. The organs swell and the abdominal wall might expand.

In summary, HF is a complex clinical syndrome resulting from inefficient myocardial (heart muscle) pumping. As there are only very limited curative treatment regimes, HF patients have to bear a chronic and life-threatening disease trajectory. This disease trajectory can be characterized by severe fatigue and dyspnoea, deteriorating functional status, episodic adverse cardiac events and repeated hospital readmissions (Beers, 2003). It is not only physically debilitating, but also psychologically distressing. Therefore research into enhancing our understanding of what factors predict and play a role in mediating distress, is highly relevant and valuable. This will now be discussed, starting with review of the literature on anxiety and depression in CHD in general, before focusing specifically on HF patient research.

# 1.6 The psychological effects of heart disease1.6.1 Definitions of Anxiety and Depression

The two forms of psychological distress focused upon in this study are anxiety and depression. Anxiety can be described as the tense anticipation of a stimulus perceived to be threatening and is characterised by negative cognitions, physiological arousal and behavioural avoidance. The term 'depression' can be used to describe low mood or in the identification of a specific syndrome (Rippere, 1994). There is a general consensus that 'depressed mood' is characterized by a sense of unhappiness which often involves feelings of guilt, worthlessness, apathy and self-depreciation (Rippere, 1994). 'Depression' as a syndrome describes a cluster of symptoms which include depressed mood, disturbance of sleep and appetite, loss of interest, anhedonia and suicidal ideation (Rippere, 1994).

#### 1.6.2 Anxiety and Depression in CHD

Depression is a common problem in patients following acute cardiac events such as myocardial infarction. Up to 20% of individuals have a major depressive episode within a few weeks, and a further 25% experience minor depression or elevated levels of depressive symptoms. Around one third of patients with heart failure have depression. Cardiac illness may compound life's everyday stresses and increase the susceptibility of depression among patients with heart disease (British Heart Foundation, 2003).

Interestingly, depression has also been shown to be an independent predictor for cardiac patient prognosis (Frasure-Smith & Lesperance, 2000). Research over the last 15 years has demonstrated that patients who are depressed in the weeks following an acute coronary syndrome have a poorer cardiac outcome (Jiang et al., 2005). Frasure-Smith, Lesperance and Talajic (1995) examined the importance of major depression symptoms, history of major depression and anxiety, measured in hospital after an myocardial infarction, MI, in predicting cardiac events over the subsequent year. Cardiac events included recurrences of acute coronary syndromes as well as probable arrhythmic events. Major depression, depressive symptoms, anxiety and history of major depression all significantly predicted cardiac events independent of each other. Particular demographic variables were, however, excluded from the study which may have further explained results; for example, medical comorbidities and previous cardiac history (in addition to previous MI history) may have influenced patients' prognosis for a further cardiac event. Also the sample size was male dominant and its small size restricted detailed analyses on the prognosis of individual cardiac events. In addition, demographic variables for nonparticipants were not included in the study thus we are not entirely sure about the representability of the sample used. In addition, the history of depression was measured using a subjective interview and was reliant upon the patient recalling their depressive episodes. However, if they were currently depressed and had experienced a major life event recently (their cardiac event) then mood congruency may have influenced their recollections of the past. A more objective psychiatric history from medical records may have given more reliable data.

Junger et al. (2004) explored depression in HF patients rather than post MI patients. Specifically, they explored the impact of depression on HF patient prognosis. In multivariate analysis, depression score predicted prognosis independent of NYHA functional class, left ventricular ejection fraction (LVEF, a measure of heart rate function, whereby low LVEF describes reduced cardiac function), as well as etiology and concomitant medication. In this study the prognosis over nearly 36 months was investigated. Heart failure mortality risk associated with depression score has found to rise over time (Junger et al., 2004). Depression exerted almost no risk in the first year of follow up and increased to an 8-fold level after 30 months. This finding was in contrast to the study of MI patients by Frasure-Smith et al. (1995) who found that negative emotion had an impact upon the prognosis 1 year following myocardial infarction.

Junger et al. (2004) sample was restricted to mainly males and also those who had the highest severity of heart failure (NYHA class IV) were excluded. The majority of the patients were in NYHA functional classes II or III. Thus, this result may not represent the full population of HF patients. Furthermore, the class II and III patients may have shown a natural and expected worsening of symptoms over time rather the worsening of symptoms being due to the moderation of psychological variables. Furthermore, this study leads to the inference that depression, HF severity and mortality are linked in some way. Indeed, NYHA class was closely correlated with the depression score (r=0.40, P<0.01) and anxiety score (r=0.68, P<0.01). Depression and anxiety score increased with rising NYHA functional class and the non-survivors were mainly of a higher NYHA functional class. NYHA class IV patients were found to be at a high risk of mortality.

Thus, it may be suspected that individuals died due to having a higher severity illness and this higher severity illness had influenced the onset of depression.

Elatre et al. (2002) in their study which explored the prevalence of depression in HF patients, found a high prevalence of severe depression in outpatients with HF (46%) and a significant relationship with mortality. However there was also a significant relationship with severity of HF and most patients (51.6%) had severe HF (NYHA class III). Therefore, this study also implies these patients were more likely to have severe depression because of their physical state. Mortality rates may have been influenced by the severe disease symptoms.

Other studies, in contrast to those discussed previously have shown distress not to be related to HF severity. For example, Denollet and Brutsaert (1998) sampled 87 patients with post MI. They assessed patients' psychological status following MI and then investigated whether the patients had a non fatal MI or had experienced cardiac death 6-10 years post MI. 25% of patients experienced a cardiac event (13 fatal events) and these events were related to anxiety and depression (both p<0.02). Emotional distress in these patients was unrelated to disease severity.

In summary, Frasure-Smith et al. (1995) found that depression and anxiety predicted cardiac events over the subsequent year following MI. Junger et al. (2004) found that HF patients' depression score rises over time and their risk for further cardiac events also rises over time. Denollet and Brutsaert (1998) also found that further cardiac events

following MI were related to anxiety and depression. It is uncertain however, if distress has a direct relationship with further cardiac events or mortality or if this is *moderated* by disease severity. Nevertheless an influence of distress on cardiac prognosis is evident.

A very small number of studies however have found anxiety and depression do not predict cardiac or all-cause mortality following myocardial infarction. For example, Lane, Carroll, King, Beevers and Lip (2001) assessed the mood of 288 hospitalised MI patients. Twelve-month survival status was ascertained, and quality of life among survivors was assessed at 12 months. It was found that neither anxiety nor depression predicted cardiac or all-cause mortality. However anxiety or depression symptoms did predict quality of life. Multiple regression analyses showed that initial depression scores were the best predictors even when the severity of infarction, anxiety and living alone, were also entered in the model.

Depression is not only linked with poor quality of life but they have also been found to adhere less to treatment recommendations (Gehi, Haas, Pipkin & Whooley, 2005). Gehi et al. (2005) examined the association between current major depression (assessed using the Diagnostic Interview Schedule) and self-reported medication adherence in a crosssectional study of 940 outpatients with stable CHD. Twenty-eight (14%) of 204 depressed participants reported not taking their medications as prescribed compared with 40 (5%) of 736 nondepressed participants. The relationship between depression and nonadherence persisted after adjustment for potential confounding variables, including age, ethnicity, education, social support, and measures of cardiac disease severity. Medication nonadherence may contribute to adverse cardiovascular outcomes in depressed patients. However a criticism of this study is that the researchers assessed medication adherence by self-report. Other methods of adherence, such as electronic monitoring, pill counts, pharmacy refill records, and biological assays could have been used. Though, these other methods have been shown to be fraught with problems (Horne & Weinman, 1999). With many of these other measures of adherence, the patient is given previous warning of monitoring, which has a tendency to overestimate adherence (Kruse *et al.*, 1994). Gehi et al. (2005) study was also a cross sectional study thus again, it is difficult to be sure of the causal direction between depression and medication nonadherence.

Other studies have shown similar affects of depression on factors such as impaired health status and risk of rehospitalization. Depression may also be associated with increased health care consumption (although results to date have been mixed). Outcome is worse for the seriously depressed, but even patients with moderately depressed mood tend to have poorer cardiovascular health. The same pattern is present with HF, with an increased risk of early mortality in depressed individuals. Depression is an independent risk factor for readmission to hospital, functional decline and mortality in patients with HF (Guck *et al.*, 2003).

In summary, there is substantial evidence to support a relationship between CHD and depression. If depression is 'causal', 'predictive' or 'correlational' of increased cardiac events or mortality, it would follow that, when effectively treated, actual events and the

risk of events would decrease. Cognitive-behavior therapy has been found to be the preferred psychological treatment (Guck *et al.*, 2003). Cognitive-behavior therapy emphasizes the reciprocal interactions among physiology, environmental events, thoughts, and behaviors, and how these may be altered to produce changes in mood and behavior. Pharmacologically, the selective serotonin reuptake inhibitors are recommended whereas the tricyclic antidepressants are not recommended for depression in congestive heart failure patients. The combination of a selective serotonin reuptake inhibitor with cognitive-behavior therapy is often the most effective treatment (Guck *et al.*, 2003). This work is ongoing but extends beyond the remit of this report to discuss. The next section reviews CHD and HF.

#### 1.7 Anxiety in CHD and HF

In addition to depression as a psychological factor following heart disease, patients can also experience anxiety. A considerable overlap between anxiety and depressive disorders have been found in CHD patients (Boisseau *et al.*, 1997). Recent epidemiological data show that anxiety and depressive states represent a high comorbidity with CHD (Boisseau *et al.*, 1997). Evidence supporting the impact of anxiety is less consistent though. Nevertheless a high prevalence of anxiety has been found in CHD patients. Approximately 24% have been found to have a general diagnosis of anxiety disorder (Boisseau *et al.*, 1997).

In the Northwick Park Heart study which followed 1457 initially healthy men for a period of 10 years, men with the highest levels of phobic anxiety (as measured by the Crown-Crisp Index) had a relative risk of fatal CHD of 3.77 (95% CI: 1.64 to 8.64) compared with men reporting no anxiety (Zyzanski et al., 1976). The relationship between anxiety and CHD does not appear to be confined to phobia alone. For example, in a study by (Kawachi et al., 1994) it was found that men reporting symptoms of anxiety had elevated risk of fatal CHD, particularly sudden cardiac death. Kubzansky and Kawachi (2000) found a relationship between CHD and worry (defined as a cognitive component of anxiety). The five dimensions of worry that were considered included worry about social conditions, health, finances, self-definition and ageing. Associations were evident between social conditions, health and financial worries subscales and CHD. Zyzanski et al. (1976) in an earlier study researched 94 men undergoing coronary angiographies. Anxiety and depression correlated to degree of obstruction of the coronary vessels. Therefore a prevalence of anxiety exists in CHD patients. However in general, the relative risk estimates in studies of anxiety and CHD have been imprecise, due in part to the small numbers of events occurring and small sample size (Kubzansky & Kawachi, 2000)

Few studies have explored the role of anxiety, specifically in the prognosis of HF patients. Frasure-Smith and Lesperance (2003) examined the relative importance of depression, anxiety and anger in predicting 5-year cardiac-related mortality in 896 MI patients. Both depression and anxiety were significantly associated with increased mortality however only depression remained significant after adjusting for disease



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severity. However, the State-Trait Anxiety Inventory was used in this study, which may not take into account the physical restrictions already placed upon the individual due to their condition. A more cardiac specific anxiety questionnaire may have been more reliable in identifying anxiety symptoms in these post MI patients. Also, perhaps the gap of five years between assessing the psychological state of the cardiac patient (immediately post MI) and identifying patients' mortalities, may have influenced the result. It is probable that many patients' anxiety levels are high immediately post MI and that this diminishes over time. Perhaps a further assessment of anxiety within this time gap may have predicted later prognosis more reliably.

Jiang et al. (2004) also examined the prognostic value of anxiety and its interaction with depression in patients with HF. Anxiety and depression were highly correlated, however only depression was related to increased mortality risk at 1 year. Anxiety in this study was also measured using the State-Trait Anxiety Inventory (State-A) scale. A cut-off value of 40 for the State-A and Trait-A score was used to dichotomise cardiac patients into low and high anxiety groups, however a more continuous method of scoring would have included individuals of varying anxiety levels. Furthermore, the STAI may be less sensitive to particular types of anxiety, for example forms of panic disorder. Panic disorder has been consistently associated with CHD. Jiang et al.'s (2004) and others' use of the STAI did not assess this component. Panic symptoms may reflect somatic responses, especially of the cardiovascular system, to negative emotions, e.g. fear.

A study carried out by Moser and Dracup (1996) measured anxiety levels using the Brief Symptom Inventory less than 2 days after MI. They found that high anxiety levels were associated with 4.9 times the rate of in-hospital complications compared with lower anxiety levels. Therefore, studies using other self-reported anxiety measures have yielded different results.

#### 1.8 The interaction of anxiety and depression

We have seen that high levels of psychological distress (including anxiety and depression as factors of distress) significantly predict hospital readmission (Levine et al., 1996), poor quality of life (Rumsfeld et al., 2003) and high mortality (Lane et al., 2001); (Vaccarino et al., 2001) in cardiac patients. All these negative consequences highlight the need for a better understanding of the factors associated with psychological distress in HF patients. The studies were limited in their overall ecological validity however, as the majority of studies included mainly males which makes generalizability to women, difficult. Furthermore, in many of the studies, the measures that were used were not cardiac specific. The Hospital Anxiety and Depression Scale (HADS) was used to measure depression and anxiety or STAXI to measure anxiety. However these measures do not take into account the cardiac specific symptoms that are inevitable (e.g. shortness of breath). In addition, hospitalized patients' emotional distress was assessed. Postal questionnaires to cardiac patients' home address may have produced more reliable scores. Being in a hospital may make patients more likely to have negative emotion due to the negative connotations of a hospital. In addition, there are very few studies exploring the development of depression and anxiety in HF patients. The little research done has shown

that with time the prevalence of depression and anxiety increases in HF patients. Therefore it is likely important that individuals more prone to experiencing depression or anxiety should be pinpointed earlier thus preventing later progression to distress. The early diagnosis and treatment of anxiety and depressive states represent a major interest towards a better management of coronary patients.

In summary, symptoms of anxiety may be adversely associated with a high risk of MI and fatal CHD (Kawachi *et al.*, 1994). Other studies however, have not produced similar results. In patients with known CHD, anxiety has not been consistently associated with poor prognosis (Moser & Dracup (1996), Frasure-Smith et al. (1995)). Two studies of the effects of depression and anxiety in the CHD population found that unfavorable outcomes may be independently associated with depression but not with anxiety. The consistent finding through reviewing this literature has been that both depression and anxiety are highly correlated. Both have been shown to be prevalent in cardiac patients. Thus it is likely very important that both anxiety and depression are addressed when exploring levels of psychological distress in cardiac patients.

We have reviewed how anxiety and depression are highly implicated in morbidity and mortality of cardiac patients. We have also highlighted how anxiety and depression likely interact to influence patient outcomes. However, what is needed is a broader understanding of other variables that may mediate the demonstrated links between distress and negative cardiac outcomes. These variables can be illustrated and understood using a model of stress and coping proposed by Lazarus and Folkman (1984).

# 1.9 Traditional thoughts about the factors that influence stress The Lazarus and Folkman (1984) Transactional stress-coping model

There has been surprisingly meager research exploring the interrelationships among these conceivably related psychosocial variables and the possible mechanisms by which they relate to one another and affect the outcomes of CHD. Recent research has identified the need to explore the underlying mechanisms of psychological distress in CHD. In the past few decades, researchers have established that several psychosocial factors, including personality characteristics and depression are independent risk factors for the onset and progression of CHD (Rozanski *et al.*, 1999).

Research on stress is concerned primarily with discovering the antecedents or causal variables of an adaptational outcome to the stress. Outcomes have ranged from impaired performance, a temporary emotional disturbance that could serve as a precursor of disease, to an increased risk of a disease itself such as ulcer, cardiovascular ailment, cancer or hypertension. Research seeks to understand the causes of these outcomes. The antecedent-consequent approach to research takes two main directions.

The first direction, which is more dominant, is motivated by the stimulus definition of stress and focuses on the environment. The assumption here is that some environmental condition (the stimulus) has an impact on the person and social group that produces stress. Life events research illustrates this environmentalist focus (Dohrenwend & Dohrenwend, 1974). Because of their heavy adaptational demands, a preponderance of

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certain life events such as loss of a loved one, divorce, change of job, sudden illness, or health emergencies are said to be stressors that increase the risk of illness (Lazarus & Folkman, 1984). However, a given environmental condition does not affect all individuals in the same way, because of person characteristics such as constitutional predispositions, values and commitments, beliefs, styles of thinking and coping, and specific skills.

The second main direction that research based on the antecedent-consequent model takes is to identify personality variables that mediate the stressful or damaging effects of environmental factors. This style of research has attempted to show that personality characteristics (e.g., typologies such as Type A and Type B) have predictive value for adaptational outcomes such as somatic illness or psychological disturbance (Kobasa, 1979).

In contrast to the unidirectional antecedent-consequent model, the transactional model views the person and the environment in a mutually reciprocal, bidirectional relationship. This latter model has been better approved by Lazarus and Folkman (1984) as mediating processes are studied repeatedly and more or less directly (e.g., through self reports about appraisals and coping, or through behaviours that imply the use of particular forms of coping). Research and theory in stress, coping and adaptation is multileveled, including, in addition to psychological interpretation, the social and physiological. Figure 1.2 indicates the model formulated by Lazarus and Folkman (1984) combining the transactional model and the traditional cause-effect model of stress, coping and

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adaptation. This model has been implemented in the current research to investigate if the relationships between specific variables exist in HF patients as implied by this general model.

Causal	Mediating	Immediate	Long-term
antecedants	processes	effects	effects
SES	Social supports as	Social disturbances	Social failure
Cultural templates	preferred	Government responses	Revolution
Institutional systems	Available	Sociopolitical pressures	Social change
Group structures	social/institutional	Group alienation	Structural changes
Group structures	means of ameliorating		
(e.g., role patterns)	problems		
Social networks			
PERSON	Vulnerabilities	POSITIVE OR	Morale
VARIABLES:	Appraisal – reappraisal	NEGATIVE	
values-commitments		FEELINGS	Functioning in the world
beliefs-assumptions,	COPING: problem-		
e.g., personal control,	focused, emotion-	Quality of outcome or	
cognitive-coping styles	focused, cultivating,	STRESSFUL	
Environmental	seeking & using social	ENCOUNTERS	
(Situational) variables:	support		
Situational demands	Perceived social		
imminence, timing,	support: emotional,		
ambiguity, social and	tangible, informational		
material resources			
Genetic or constitutional	Immune resources	Somatic changes	Chronic illness
factors	Species vulnerability	(precursors of illness)	Impaired physiological
Physiological	Temporary vulnerability		functioning
conditioning –	Acquired defects	Acute illness	Recovery from illness
individual response			Longevity
stereotypy			
Illness risk factors –			
e.g., smoking			

# Figure 1.2 The Lazarus and Folkman (1984) Transactional stress-coping model

#### **1.10 Personality**

# 1.10.1 Personality as a risk factor for anxiety and depression in cardiac patients

Personality refers to a complex organization of trait dispositions ((Watson *et al.*, 1994). These traits reflect consistencies in the general affective level and behaviour of individuals. Different models of personality have identified two (Weinberger & Schwartz, 1990), three (Eysenck, 1991), or five ((McCrae & Costa, 1987) global traits that are relevant in a large number of situations. In non-clinical populations, evidence suggests that broad and stable personality traits represent major determinants of depression (Watson, Clark & Harkness, 1994), psychological distress (Depue & Monroe, 1986), and well-being (Costa & McCrae, 1980).

In the past two decades, there has been a resurgence of interest in the role of personality in health and disease (Sher, 1999). While many studies have demonstrated the role of psychosocial and behavioural risk factors in the aetiology and pathogenesis of cardiovascular disorders (for example, (Musselman *et al.*, 1998; Sher, 1999; Williams & Littman, 1996), the role of individual differences in risk has to a great extent been overlooked. Personality traits may be able to explain individual differences in distress, morbidity and mortality in cardiac patients. Personality traits or the interaction of traits may also exert a more stable influence on outcome in cardiac patients than other individual differences e.g. gender (Denollet & van Heck, 2001). Identified biological and lifestyle risk factors for CHD and hypertension, such as smoking, obesity, dyslipidemia, hypertension and diabetes account for a small portion of the variance in the development of such diseases. Thus, researchers have been examining the impact of psychological factors such as personality on the disease process. Personality also affects the likelihood of risk-taking behaviour.

Smith and Ruiz (2001) reviewed literature on personality and characteristics of the social environment as risk factors for CHD. The most well known of these personality types is behaviour pattern'. This includes ambitiousness, 'type Α aggressiveness, competitiveness, impatience, muscle tenseness, alertness, rapid and empathic vocal style, irritation, cynicism, hostility, and increased potential for anger (Musselman et al., 1998; Sher, 1999; Williams & Littman, 1996). Type A individuals are at increased risk for developing CHD (Heilbrun & Friedburg, 1988) Among the CHD-related personality traits, hostility has been examined extensively. Hostility was found to confer increased risk, and a group of risk factors involving depression and anxiety were thought to be especially important following myocardial infarction. Hostility has been identified as the 'toxic-component' of type A behaviour. It has been recognized as a modest and robust predictor of CHD (Miller et al., 1996). Some studies have failed to find a link between hostility and long-term mortality (Hemingway & Marmot, 1999), however this could be due to sample selection and restriction of population range (Miller et al., 1996). Despite these conflicting results, psychosocial interventions designed to modify hostile tendencies for CHD patients have demonstrated reduced mortality and improved quality of life (Dusseldorp et al., 1999). Therefore particular personality characteristics, such as, having Type A behaviour patterns can influence one's prognosis in terms of health consequences, emotional and psychological well-being and ultimately, long-term mortality.

#### 1.10.2 The relevance of Type D personality

A new personality construct proposed to be related to CHD outcome, with consistent associations with morbidity and mortality has been proposed. The 'Type D' or "distressed" personality construct was developed by Denollet in his investigation of coping styles in men with CHD (Denollet & De Potter, 1992). It would be interesting to find out if there is a similar relationship in HF patients.

The distressed, Type D personality is an emerging risk factor that has been associated with increased psychological distress, symptoms of exhaustion, adverse health outcomes and adverse clinical outcome despite appropriate treatment (Pederson & Middel, 2001). The following sections will define Type D personality and its components, and how past research has shown it to predict psychological distress in patients with CHD.

#### 1.10.3 Type D personality

The Type D construct was delineated according to existing personality theory and the notion that the interaction of specific traits may have deleterious effects on health (Denollet et al., 1995); (Denollet & Brussaert, 1998). Type D personality subtype is characterized by the joint tendency to experience negative emotions such as depressed mood, anxiety, anger, hostile feelings, and to inhibit these emotions while avoiding social contacts. Type D is defined as the interaction between these two characteristics: negative affectivity, NA and social inhibition, SI.

## 1.10.4 Negative Affectivity (NA)

NA is defined as the tendency to experience negative emotions, including depressed mood, anxiety, anger and hostile feelings (Watson & Pennebaker, 1989). High NA individuals are more likely to experience negative affect across time and regardless of the situation. Individuals scoring high on negative affectivity are not only dysphoric but have a negative view of self, report more somatic symptoms, and have an attention bias towards more adverse stimuli (Denollet et al., 2000). In women with breast cancer, for example, NA is associated with heightened sensitivity to treatment-induced symptoms (Cameron et al., 1998) and a self-defeating way of comparing one's own situation with that of other breast cancer patients (Van der Zee et al., 1998). Likewise, evidence suggests that NA is an important determinant of subjective well-being and emotional distress in CHD patients (Denollet, 1991). The NA trait has also been conceptualized as neuroticism (McCrae & Costa, 1987). NA correlates 0.68 with the neuroticism scale from the NEO-FFI<sup>1</sup> in healthy subjects (De Fruyt & Denollet, in press.) and 0.64 with the neuroticism scale from the Eysenck Personality Questionnaire in patients with CHD (Denollet, 1998). Hence these personality constructs share about 40-50% common variance, implying that they are closely related but not identical. Both NA and neuroticism are centrally defined by the tendency to experience negative affect (Watson & Pennebaker, 1989).

## 1.10.5 Social Inhibition (SI)

SI is defined as the tendency to inhibit the expression of emotions and behaviours in social interaction (Asendorpf, 1993), i.e., high-SI individuals are more likely to feel inhibited, tense and insecure when with others. Individuals scoring high on SI frequently feel inhibited, tense, uncomfortable and insecure in encounters with other people. The SI trait correlates -0.52 with the extraversion scale from the NEO-FFI in healthy subjects (De Fruyt & Denollet, in press.) and -0.65 with the extraversion scale from the Eysenck Personality Questionnaire in patients with CHD (Denollet, 1998). Hence, these personality constructs share about 25-45% common variance, implying that they are closely related but not identical. SI has in fact been related to the avoidance of potential "dangers" involved in social interaction such as disapproval or non reward by others (Asendorpf, 1993). Although inhibited individuals are quiet on the surface, they may actually avoid interpersonal conflict through excessive control over self-expression (H. S. Friedman & Booth-Kewley, 1987). Hence, SI refers to pervasive individual differences in reticence, withdrawal, nonexpression, and discomfort in encounters with other people. As a result, SI has been associated with high negative emotionality and personal distress (Eisenberg et al., 1995). Social inhibition seems to act as a moderator. The prevalence of cardiac events for individuals who score high in negative affectivity but low in social inhibition is less than for that for individuals scoring highly in both components (Denollet et al., 2006b).
# 1.10.6 The interactive effect of NA and SI

Recent studies have shown that these two subtypes of Type D personality have an interactive effect upon cardiac outcomes in patients(Denollet et al., 2006b; J. Denollet et al., 1996) investigated whether SI modulates the effect of negative emotions on clinical outcome following percutaneous coronary intervention (PCI<sup>2</sup>). 875 patients completed HADS as well as DS14 scales as measures of depression, anxiety, NA and SI 6 months following their surgery (PCI). The endpoint, being a major adverse cardiac event (death, myocardial infarction) was recorded at 9 months following assessment. The findings showed that SI modulates the impact of negative emotions on prognosis. An interaction between SI and NA was associated with a 92% increase in risk of cardiac events. This study's findings were consistent with those from previous studies that show that Type D independently predicts long term cardiac events (DenolletJ. Denollet, 2000; J. Denollet & Brutsaert, 1998; Denollet, 1996). It confirmed the findings in 1996 that the high mortality risk among Type D patients was not attributable to the main effect of either SI or NA but rather to their interactive effect. However, these findings can be criticized, as there were significant differences on some baseline characteristics between responders and nonresponders, hence it is difficult to ascertain generalisability. Furthermore, previous cardiac or medical history was not recorded which may have also affected patients' prognosis.

Habra et al. (2003) investigated whether Type D personality was related to cardiovascular health, specifically physiological reactivity. Contrary to Denollet's findings that the

<sup>&</sup>lt;sup>1</sup> Percutaneous Coronary Intervention

individual traits on their own were not predictive of disease status, Habra et al. (2003) found that the overall Type D construct i.e., the joint tendency of NA and SI was unrelated to physiological variables, while its individual dimensions were. However this may be due to the sample consisting largely of young, healthy undergraduates. Denollet's studies have mostly consisted of older cardiac patients. It may be that over time, synergistic effects of the Type D dimensions become more pronounced. Additionally, the Type D dimensions were differentially related to physiology depending on the stress system measured. They found that SI was associated with heightened reactivity in the sympathetic-adrenal-medullary (SAM) system and the hypothalamic-pituitary-adrenal (HPA) system. NA was associated with greater activation of the HPA system, but dampened responsivity of the SAM system. Therefore, it may be that the Type D dimensions exert different pathogenic effects on the cardiovascular system. Self report measures were used in Denollet's previous studies for the assessment of emotional distress i.e. looking at overall distress rather than separate stress systems.

Nevertheless, the characteristics of Type D personality both represent characteristics that are associated with a significant level of physiological response, such as vital exhaustion, and high blood pressure. NA and SI do not cover the entire range of individual differences in personality but these global traits do represent major domains of personality and may be immediately relevant to patients with CHD. (Denollet, 2000) suggested NA and SI were important determinants of distress. Patients who display a combination of high inhibition and high negativity are referred to as patients with a Type D personality. Therefore to enhance our understanding of the role of distress in HF patients, it may be prudent to investigate the stress outcome mediator Type D personality.

## 1.10.7 Type D as a risk factor for cardiac patients

According to Folkman and Lazarus (1985) transactional stress-coping model, personality may be a mediator of distress. We have discussed how the Type D construct is comprised of 2 components (NA and SI) and how these may interact to affect cardiac outcomes. We will now review evidence for Type D as a risk factor for cardiac patients.

Conraads et al. (2005) hypothesized that Type D personality, known to independently predict long-term mortality in patients with CHD, would relate to immune activation in HF. Ninety-one HF patients with moderate to severe left ventricular systolic dysfunction (LVSD) participated in the study. This study provides the strongest evidence to date that chronic emotional distress may be associated with immune activation in HF. However 79% of the patient sample were males thus again generalisability is compromised. Other medical conditions can also affect immune activation however, there is no record of such comorbidities. Furthermore a control group of healthy individuals was not used which may have been useful to show whether the association between Type D personality and immune activation is specific for patients with a chronic cardiac condition. Also, it was found that Type D patients were more likely to be classified as NYHA functional class III or IV (severe HF). However, in this study NYHA class was scored according to the patients' perception. Therefore it is likely that one of the key traits of Type D personality

i.e. negative affectivity, could have skewed NYHA classification. Therefore, Type D personality could have been an epiphenomenon, reflecting disease severity in patients with severe HF.

Nevertheless, a distinct relationship between Type D personality and TNF-α/TNF receptor plasma levels (markers of immune system activation) in patients with HF was seen, and this association is independent of age, sex, disease, aetiology and severity. However, it is not known whether personality traits have a prognostic impact on a broader population of HF patients.

Cardiac patients with Type D personality have also been found to have other physiological characteristics worsening their cardiac prognosis. Pederson and Middel (2001) investigated whether Type D was a predictor of vital exhaustion in 217 coronary patients who were scheduled for coronary angioplasty (33%), bypass surgery (29%) or conservative medical treatment (38%). Vital exhaustion represents a mental state characterised by fatigue, demoralization and irritability (Appels & Mulder, 1988) and has been associated with an increased risk of cardiac events following coronary angioplasty (Kop *et al.*, 1994). Accordingly, Type D was a significant predictor of vital exhaustion, even when controlling for all other variables including treatment and signs of angina pectoris. Type D patients were at substantially increased risk of suffering from vital exhaustion at baseline. They were also at increased risk of suffering from exhaustion following medical treatment or revascularization despite the fact that treatment was successful in reducing angina pectoris. However, no objective indices were included to control for cardiac variables such as the severity of cardiac ischaemia. Nevertheless, the findings are in keeping with the notion that Type D is a marker of distress and that the Type D scale could serve as a screening instrument for patients at risk.

Habra et al. (2003) examined the relationship between Type D personality and laboratory indices of cardiovascular health. One hundred and seventy three undergraduates (86 male) completed a stress protocol involving a mental arithmetic task with harassment. Blood pressure, heart rate (HR), and salivary cortisol were measured both prior to and during the task. The results of this study suggest a possible plausible mechanism linking Type D personality to CHD by physiological hyperresponsivity, i.e., a marker of CHD development (Habra et al., 2003). Following from previous research the findings suggest that personality traits contribute to individual differences in cardiovascular reactivity to stress. These findings are generally limited to how personality and physiology relate to stress experienced in the laboratory, which may not be representative of stress experienced during daily life.

Denollet et al. (1995) examined the role of personality traits in mortality after MI. The rate of depression for patients with a distressed personality type (11/28 = 39%) was significantly greater than that for patients with other personality types (4/77 = 5%). Among patients with poor physical health, those with a distressed personality type had a five-fold mortality risk. Consistent with the findings of other investigators, depression (p<0.005), life stress, use of benzodiazepines (p<0.01), and somatization (p<0.05) were also related to post MI mortality. These psychosocial risk factors were more prevalent in

the Type D personality patients than in the other personality types. Although an important personality effect was observed, this study again used a male sample thus we are not able to generalize to the general male and female population of MI patients. Nevertheless, this study does suggest that personality traits may play a role in the detrimental effect of emotional distress in MI patients.

Type D Personality can also affect the positive effects of medical surgery. It has been found that Type D personality is related to the effectiveness of stents in keeping clogged coronary arteries open. After being treated for heart disease with the most advanced types of stents, people with Type D personality are at increased risk of death (Pederson *et al.*, 2004). Fatal cardiac events occurred in 5.6 percent of Type D subjects and 1.3 percent of non-type D patients. Personality type remained a factor regardless of other, traditional risk factors or the type of stent used (Pederson et al., 2004).

In summary, research over the past decade has indicated how Type D may predict adverse cardiac health outcomes. Research has also shown however, that Type D individuals tend to experience and inhibit negative emotions such as depressed mood, anxiety, hostile feelings and anger, and to inhibit these emotions while avoiding social contacts (Denollet, 2000; Denollet & Van Heck, 2001). This relationship between Type D personality and distress will now be reviewed. Type D individuals may be more likely to experience psychological distress.

# 1.10.8 Psychological distress and Type D

There are few studies that have explored the relationship between psychological distress and Type D. Much of the research has shown a relationship with depression however limited literature has focused on the relation of Type D personality, mood and anxiety disorders. While this research base may be small, it has shown a strong relationship between psychological distress and Type D personality.

Type D has been associated with increased anxiety and depressive symptoms in patients with an Implantable Cardioverter Defibrillator (Pederson et al., 2004). 182 patients completed the Hospital Anxiety and Depression Scale (HADS). Clinical variables for the patients were obtained from medical records. Following the adjustment of all other variables, Type D was shown to independently relate to anxiety and depressive symptoms. Underlying cardiac disease pathology did not explain differences in patient distress.

In summary, the Folkman and Lazarus (1985) transactional model of stress and coping (see Figure 1.2) shows that personality characteristics are a potential antecedent variable that may influence distress and thus impact health outcomes. Indeed the above evidence indicates the adverse effect of Type D personality on cardiac prognosis and psychological morbidity. The recent introduction of the 14-item Type D scale (Denollet, 2005) as a standard measurement of Type D personality makes it possible to address these issues as this brief scale posing minimal burden to patients, has been shown to predict distress and

future cardiac events. What is not known however is whether or not Type D personality is implicated in mediating distress in HF patients and this is one of the areas under investigation in this study. However, using the transactional stress-coping model to understand health outcomes, we also need to consider person characteristics in mediating distress. To this end, the concept of 'coping' will be reviewed.

## 1.11 Coping

## 1.11.1 Psychological Distress and Coping

The psychological construct of coping has been studied extensively in medical populations and in health psychology. The conceptual analysis of stress and coping offered by Lazarus in 1966 argues that stress consists of three processes, primary appraisal, stress appraisal and coping. Primary appraisal is the process of perceiving a threat to oneself. Secondary appraisal is the process of bringing to mind a potential response to threat. Coping is the process of executing that response. Coping can be defined as cognitive and behavioural efforts to manage stressors (Folkman & Lazarus, 1985).

## 1.11.2 Coping styles and their influence in chronic illness

The occurrence of a chronic medical illness represents a major life event that may severely tax one's coping abilities. The patient is confronted with numerous threats and challenges, in maintaining a reasonable emotional balance. Diagnostic uncertainties, disability, dependency, social stigma, lifestyle changes, and other self management tasks have been identified as illness-induced disruptions to valued activities. (Murberg & Bru, 2004) referred to these as 'adaptive tasks' facing people with chronic conditions. The notion of adaptive tasks implies that chronically ill people must cope with the relevant threat or challenge and thereby, depending on the results of their coping efforts, maintain adequate levels of emotional, physical and social functioning. These types of functioning can be expressed in measures of well-being.

## 1.11.3 Different coping styles defined

Traditionally, coping strategies have been labeled active (e.g. planning) or passive (e.g. denial), emotion-focused (e.g. acceptance) or problem-focused (e.g. seeking support for information). Theoretically, in situations where active coping efforts yield good outcomes, planning, taking action and making the best of the situation might be considered 'adaptive'; while denial, disengaging, or giving up might be considered 'maladaptive'. Lazarus and colleagues have explored emotion-focused coping (i.e., efforts directed at affect regulation) and problem-focused coping (i.e., strategies directed at minimizing or solving the impact of the stressful event). These and other (e.g. Billings & Moos (1981) first generation coping theoreticians and researchers often viewed coping dimensions as comprised of these two separate styles, of coping. Controllability over a disease or illness is very important and cognitions around controllability can effect how well one perceives him or herself to recover.

Although the distinction between problem-focused and emotion-focused coping is an important one, it has proven to be too simple. Carver et al (1989) derived an instrument, the 'COPE inventory' which incorporates 13 conceptually distinct scales. Other scales were included because research indicated that the coping tendencies they reflected either may be of value or may impede adaptive coping.

Burker et al (2005b) used the COPE to explore whether coping strategies used by spouses of cardiac patients pursuing heart transplant predicted depression. The coping styles of 28 spouses (86% female) of cardiac patients were measured using the COPE inventory (Carver et al., 1989). This measure showed four coping strategies, two generally considered as adaptive ('behavioural disengagement' and 'denial'); and two as maladaptive, ('positive growth' and 'reinterpretation'). The findings indicated that maladaptive coping styles were associated with psychological distress and more adaptive coping was associated with lower levels of psychological distress. However, this 'adaptive versus maladaptive' configuration of coping may be too limited in its categorization. The current study assessed HF patients' use of a variety of coping strategies.

More recent efforts at conceptualizing coping have included other configurations: engagement vs. disengagement coping continuum (Carver et al., 1989). The broader classification system will now be discussed.

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## **1.11.4 Engagement and Disengagement coping styles**

Engagement coping includes: a) problem-focused solving, b) planning, c) information seeking, d) positive reinterpretation or appraisal, e) cognitive restraint, f) confrontation and fighting spirit, g) seeking social support, and h) expressing/ventilation of emotions. Livneh (2000) found these were all predominately associated with better psychosocial indices of adaptation to cancer. Disengagement coping included: a) denial, b) wishful thinking c) problem-avoidance, d) self-criticism, e) social withdrawal, f) substance use, behavioural disengagement, g) fatalism or resignation. Livneh (2000) found these to be associated with poorer psychosocial outcomes. The effects of the coping constructs of engagement and disengagement coping on psychosocial outcomes, particularly their influence on psychological distress, shown in cancer patients (Livneh, 2000) are predicted to also have similar results in HF patients due to similar palliative emotional strain experienced form diagnosis of a life threatening condition. Furthermore, this prediction was made in the absence of any research exploring cardiac patients' coping strategies in terms of engagement and disengagement coping styles.

The current study explores these particular engagement and disengagement coping strategies in HF patients. These two coping strategies, engagement and disengagement have been classed as positive and negative respectively.

## 1.11.5 Coping Styles and Psychological Distress in CHD patients

The way in which CHD patients cope with psychological distress instigated by their heart disease, can inf3luence their physical and mental health outcomes. Chiou et al (1997) investigated the relationship between anxiety, depression and coping methods in Taiwanese patients 3-5 days after they had suffered a myocardial infarction. Forty post-MI patients were interviewed in a general cardiovascular unit. Coping methods were measured using a translated version of the Jaloweic Coping Scale. The 60 items represented eight coping styles: evasive, confrontative, optimistic, emotive, palliative, supportant, and self reliant. The findings showed that the majority of individuals displayed relatively low levels of anxiety or depression. This unexpected result may be explained, in part, by the timing of their assessment. As they were assessed shortly after the event, they may have been in shock and not fully appreciated the events. The HADS measure may not account for the health or emergency circumstances they would have just experienced. This finding may also be related to older age and/or a cultural difference. The optimistic coping style was the most often used and the most effective method of coping. The two least used coping styles were emotive and palliative coping styles. Emotional reactions and coping styles following MI correlated with age, social class, the severity of MI and the perceived severity of MI. Controlling for these factors may have enabled a more accurate result looking solely at the relationship between emotional reactions and coping methods. In addition the coping strategies measured cannot each be labeled as a positive or negative strategy (e.g., as engaged or disengaged).

Burker et al (2005b) investigated the coping strategies used by heart transplant patients and whether coping strategies were related to depression. Fifty cardiac patients who were inpatients being evaluated for heart transplant were assessed using the COPE inventory and the Hamilton Depression Rating Scale. Patients reported using a variety of adaptive coping strategies. Multiple regressions demonstrated that disengaged coping styles, such as denial had a strong association with depression. However similar to Chiou et al's (1997) study, negative coping strategies were the least frequently used by patients. The literature reviewing the coping and psychological distress in HF patients is to be discussed next.

#### 1.11.6 Coping styles in HF patients

Doering et al (2004) aimed to identify whether there was a link between 3 coping styles and emotional states in HF patients. They sampled 84 advanced HF patients who were recruited from an outpatient clinic. The Dealing with Illness-R (Billings & Moos, 1981) checklist was used to measure coping and the Profile of Mood States (REF) to measure emotional distress. Patients who reported greater use of active behavioural coping (i.e. coping through soliciting help from friends and family for emotional, instrumental, and informational support) demonstrated less fatigue and more vigor than patients who reported lower use of that coping style. Active cognitive coping (i.e.) coping through using appraisal to judge the stressfulness of their illness compared with other individuals or to other situations they have faced) was also used however this did not appear to lower levels of negative emotions. The third coping style explored by Doering et al (2004) was 'avoidance'. Avoidance coping styles (i.e. coping by avoiding thinking about the illness (denial or suppression), and relying on things such as self-medication and/or alcohol or drugs to deal with the stressor were shown to increase anxiety and depression in HF patients (Doering *et al.*, 2004). This result is consistent with what has been found in with patients with other chronic illnesses such as cancer (Friedman et al., 1992) or human immuno-deficiency virus (HIV) (Fukunishi *et al.*, 1997). Avoidance coping is included in the 'disengaged coping' continuum conceptualised in the COPE. However, a small amount of people used avoidance coping and more used active-behavioural coping or active cognitive coping.

In the past, studies that have examined the relationship between coping and mortality have suggested that patients who used avoidance-oriented coping styles were at higher risk of death than those who used approach-oriented or active coping styles (Stein *et al.*, 1989). Although this finding is related to cancer patients, both HF and cancer patients experience some type of palliative emotional strain. Very few studies have been concerned with the relationship between coping styles and mortality in HF patients. As inidicated previously, people with HF are likely to experience reduced physical and social functioning and although not every individual, HF patients have been shown to suffer levels of depression. This may manifest as disengagement or reduced coping efforts. In order to reduce the threat to mortality that a diagnosis of HF encompasses, patients must actively engage in treatment. It follows that use of avoidance-oriented coping styles, such as 'behavioural disengagement', may lead to exacerbation of the

disease as disengagement could result in a lack of concordance with advice about exercise and medical treatment. For example, Lowery et al (1992) found that avoidance can leave patients depressed in the long term, by preventing active participation in decision making and inhibiting adherence to treatments. Other avoidance coping strategies may be similarly destructive to prognosis. The maintenance of 'denial' or a related style that involves distortion of reality may also be maladaptive for similar reasons.

More recently, Murberg and Bru (2004) explored whether avoidance coping styles have critical health outcomes, specifically on mortality in symptomatic HF patients. One hundred and nineteen patients were recruited from an outpatient cardiology practice. They used the COPE inventory (Carver et al., 1989) as a measure of coping. Fifty one deaths occurred during a 6 year follow up period, all from cardiac causes. Within the avoidance coping styles measured, a marginal effect of mental disengagement and a significant effect of behavioural disengagement on mortality was found. These relationships were found even after controlling for severity of HF, functional status (NYHA Class), sex and age. However, coping was only measured at one time point. Perhaps measuring coping at different time points within the 6-year period may have ascertained the principle coping style relating to mortality, thus increasing the reliability of the results. Participants were generally suffering moderate HF thus these result may not be generalisable to a general HF population. Non-participants were generally older and more functionally impaired; therefore, it is possible that the non-participants would be more likely to use avoidant coping styles. In addition, the sample was male dominant (71.4%) and the sample was relatively small. For 64.7% of the sample, the cause of their HF was myocardial infarction, thus again restricting the generalisability of the data to female population and to HF patients that have other causal histories e.g. dilated cardiomyopathy, valvular heart disease and hypertension. Despite this critique however, (Murberg & Bru, 2004) found a significant association between behavioural disengagement coping styles and HF mortality.

While it appears that avoidance coping is maladaptive, there is some conflict as suggested by (Buetow et al., 2001). Semi-structured interviews were conducted with 62 HF patients under GP care. Those patients over age 70 seemed to use 'avoidance' to cope and found this to be a minimization technique to reduce emotional arousal, thus found it to be a beneficial coping strategy. Therefore this was found to be a positive coping strategy in contrast to Doering et al (2004). This difference may relate to the age difference in the two groups. Patients were of an age range 18 or older in Doering et al (2004)'s study however the age range in Buetow et al (2001)'s study was over 45 years. Thus an assumption could be made that avoidance coping is used more adaptively in older people. Perhaps avoidance may be more useful in the short term following diagnosis of HF. Indeed, Buetow et al (2001) found that the lack of understanding and dependency that avoidance produces may reduce anxiety and aid recovery during acute heart failure. However Lowery et al (1992) found that avoidance can leave patients depressed in the long term, by preventing active participation in decision making and inhibiting adherence to treatments. Again methodological differences may account for differences in these results. Buetow et al (2001) used a qualitative design evaluating individuals coping

strategies through interviews, however, Doering et al (2004) used a coping checklist thus it may be arguable that interviews give a more reliable, subjective response taking into account each individual's specific circumstances. However it is also true this method of data collection is subject to researcher bias. Additionally, the Profile of Mood states used in Doering et al's (2004) study required patients to rate their feelings in terms of the adjectives presented. However this may not be a reliable measure as individuals may interpret these adjectives differently.

Theoretically, although age and the time since diagnosis may affect the coping strategy that HF patients choose, it appears that positive reconstruction of thoughts, accepting ones illness, and actively responding to ones emotional needs through taking emotional, social or instrumental support were found to be positive adaptive coping strategies in HF patients. Doering et al (2004)'s findings about the negative consequences of avoidance coping support clinicians' belief that the most effective management of HF includes a patient who is an active participant in decision making (Grady *et al.*, 2000). Researchers have proposed that those who are mobilized to deal with illness in a positive way function much better than those who attempt to avoid issues raised by chronic illness (Namir *et al.*, 1987). Buetow et al (2001) have found HF patients of moderate severity of HF and under age 65, to use a positive style of coping that is found engaging for them – 'disavowal coping'. Disavowal coping involves registering and acknowledging reality, but to palliate the emotional strain the illness produces, and to affirm their health, they seek at the same time to dissociate that awareness from its personal impact. This is done by positively reconstructing the personal meaning and significance of the illness. This fits

in with Namir et al's (1987) thoughts as well as Beck's cognitive triad, in which negative thoughts and behaviours about the self, the world, and the future are linked to negative feelings, and conversely, positive thoughts and behaviours are associated with positive feelings.

Other coping strategies explored by Buetow et al(2001) were 'denial' (defined as 'refusal to believe or accept') and 'acceptance' (defined as consciously acknowledging the validity of the received diagnosis of HF without attempting to reconstruct positively). Denial was not exhibited by any of the HF patients. 'Acceptance' was, however, highly salient 3 or more years after the diagnosis at ages 70 and older. For those patients who used this coping strategy, acceptance was the only objective, non-destructive approach they could take to control their illness.

Most of the studies exploring coping in HF patients, are limited in that they examine three or four coping strategies only. However, it is possible some individuals have other coping strategies which were not accounted for. There is a rationale for broadening the possible range of coping styles for these patients. The current study attempts to achieve this by exploring further coping strategies, primarily exploring the difference in effects of engagement versus disengagement coping styles continuums on psychological distress in HF patients.

In summary, the limiting and life threatening nature of HF may generate overwhelming stressors for the patient. This in turn results in significant challenges in terms of coping adaptively. The strategies that a patient uses to cope with the physical and psychological problems caused by the illness are varied and in line with the transactional stress-coping model. They can depend on personal characteristics i.e., personality. The final section of this chapter intends to review research that provides evidence for this link between coping and distress.

## **1.12** Personality and Coping

# 1.12.1 Research reviewing the relationships between personality and coping

Personality and coping were deemed inseparable variables in early health psychology literature. However in the 1960s, coping became increasingly conceptualized as a transactional process between the individual and the environment, with more of an emphasis on personality (Lazarus, 1966). In the 1980s, the original personality-coping link was revisited and began to gain ground. Today it is generally agreed that personality is closely associated with coping processes (Hewitt & Flett, 1996). Nevertheless, more research is still needed to understand the complex nature of this relationship.

The personality traits of extraversion and neuroticism are thought to have a stable influence on an individual's ability to cope with stressful life events, a view that is supported by Carver (1989). For example, individuals who score highly on extraversion inventories are expected to be more likely to use active, problem focused coping strategies because of their tendency to consider negative life events as challenges instead of threats. By contrast, individuals who score highly on neuroticism are more likely to rely on passive or emotion focused strategies because of their inclination to appraise stressful life events as threats rather than challenges.

As discussed previously, Lazarus and Folkman (1984) have argued that an individual's coping responses are influenced both by dispositional (personality) and situational variables, (such as individual differences in psychological vulnerability, in personal resources and capacity etc...). Consistent with this assumption, several authors have reported that both stable and situational factors are of importance in the prediction of coping responses. Parkes (1986) reported that personality and coping are exclusively related and each is of importance in the prediction of adjustment or stress outcomes. In line with this finding, Fleischman (1984) found that coping responses were influenced more by the nature of stressful encounters than by personality variables. These studies suggest that personality, coping and other factors may independently effect stress outcomes.

Murberg et al. (2002)investigated the role of personality in stress and coping processes in HF patients. One hundred and nineteen HF patients from an outpatient clinic participated in the study. Individuals scoring high on neuroticism were more likely to use emotionfocused coping styles. Extraversion showed significant associations with some of the individual coping styles that generally reflected problem-focused coping. It was clear that coping and personality shared significant amounts of variance however there was still much unshared variance that needed investigating in order to explore more fully the associations between coping and personality. Although situational variables may be able to explain patients' coping responses more fully, it is possible that the methodology may have influenced results. For example, the sample was made up of elderly patients who were under severe strain due to their age and the majority suffering from moderate to severe HF. This may explain why this study does not support the hypothesis that associations between coping and outcomes are determined by personality. The results may not generalize to all severities and ages of HF patients. Thus, the current research aims to explore whether there is indeed a relationship between personality and coping, using a heterogeneous sample of heart failure patients of older and younger adults with differing severities of HF.

In contrast, relationships between these variables have been found in earlier studies however these studies were concerned with a different CHD patient group. Carver et al. (1989) assessed coping strategies used by particular individuals presented with hypothetical stressful events. Optimists were more inclined to choose active coping responses and seek social support. They were less likely to vent negative emotion. Other past and recent studies (described in previous sections of this chapter) have looked at the independent effects of personality and coping on psychological distress in cardiac patients. However, although these psychosocial factors are conceptually correlated, research seldom examined their mutual relationships and their joint effects on health. Shen et al. (2003) therefore intended to explore the relationships among these psychosocial variables and their independent and mediated effects on physical health outcomes. The study explained the mediational processes by which optimism facilitates health functioning via decreasing maladaptive coping and preventing depression.

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However, the independent direct effects of optimism on health functioning however could not be explained by their associations with other baseline variables and psychosocial constructs. One explanation may be that some unidentified psychosocial components (possibly situational factors) may further account for these associations. However, this study was again, male dominant thus may only be relevant for men recovering from CHD.

Although both dispositional and situational factors are thought to play a role in an individual's coping responses, a critical issue is whether such responses are more than just a reflection of stable personality traits. This also begs the question of whether specific coping behaviours come together to form a consistent style. However, this question assumes that the personality characteristics explored are stable and consistent. One of the defining features of personality traits is consistency.

Denollet et al (2006a) found evidence to show that Type D is a stable personality trait. They investigated the relative effect of stress and type D personality on prognosis of CHD at 5 year follow-up. Psychological stress and type D personality were associated with an almost threefold increased risk of a composite of an increased risk of death, acute myocardial infarction or cardiac surgery (odds ratio 4.84, 95% confidence interval 1.42 to 16.52, p<0.01) compared with non-type D patients at 5-year follow up. This was found through multivariate analyses, even after adjusting for gender, age and biomedical risk factors. Previous research has shown that the personality traits that define type D personality are stable over time ((J. Denollet, 2005). Denollet et al (2006a) confirms that

type D personality reflects more than temporary changes in stress level, because it predicted events after controlling for concurrent stress symptoms thus providing more evidence that Type D is a stable personality type.

It is still uncertain whether negative personal characteristics would affect the coping methods chosen by specifically HF patients. Particular negative coping styles have been shown to have been associated with negative emotion in HF patients. Doering et al's (2004) finding that avoidance coping was associated with significantly higher negative emotional states. Social Inhibition, one of the components of Denollet's Type D personality, denoted the stable tendency to inhibit the expression of emotions and behaviours in social interactions (Denollet & Brutsaert, 1998). This relates to avoidance of potential dangers specifically involved in social interactions, and is characterized by withdrawal and non-expression. Therefore, it may share commonalities with avoidance. However, social inhibition involves the conscious exclusion of negative emotions form awareness, whereas avoidance may be both conscious and unconscious. Similarly, denial implies underreporting of emotional distress, which is consistent with avoidance. However, avoidance also involves cognitive and behavioural strategies, such as acceptance and emotional discharge that deflect active confrontation with stressors and reduce emotional tension (Ketterer et al., 1998). It is likely that avoidance and Type D personality contain shared elements. Doering et al. (2004)recommended highlighting the relationship among these related constructs in HF patients. Additionally, it would be highly beneficial to understand if there is an impact of the individual constructs of Type

D personality upon coping styles and in turn if these variables determine psychological distress in these patients.

In summary, the relationship between Type D personality and coping and its influence upon distress (Anxiety and Depression) has not been explored in cardiac patients and particularly not in HF patients to date. By examining the influence of the two personality subscales in Type D personality (social interaction, and negative affectivity), on specific coping responses, a broad outline of the relations between specific coping behaviours and this personality type may be seen.

# 1.13 Hypotheses

From the above literature review, the following hypotheses have been constructed:

**Hypothesis 1**: A proportion of HF patients will be suffering from clinically significant anxiety and/or depression.

Null Hypothesis: There will be no HF patients suffering from clinically significant anxiety and/or depression.

Hypothesis 2: A proportion of HF patients will satisfy the criteria for Type D personality.

Null Hypothesis: There will be no HF patients that will satisfy the criteria for Type D Type D personality is not prevalent in HF patients Hypothesis 3: There is a relationship between Type D personality and psychological distress.

Null Hypothesis: There is no relationship between Type D personality and psychological distress.

Hypothesis 4: There is a relationship between Type D personality, coping styles and psychological distress.

**Null Hypothesis**: There is no relationship between Type D personality, coping styles and psychological distress.

Hypothesis 5: Coping styles will act as a mediator between Type D personality and psychological distress in HF patients.

Null Hypothesis: Coping styles has no mediating effect between Type D and psychological distress.

# **1.14 Research Questions**

- What is the prevalence of Type D personality in a HF patient sample?
- Is Type D personality a predictor of depressed mood in HF patients?
- What is the main coping style in the HF patient sample?
- What is the relationship between Type D personality, coping style and distress in the HF patient sample?

# CHAPTER TWO –AIMS AND RESEARCH QUESTIONS 2.1 Rationale

HF develops in about 1 of 100 people between the ages of 27 and 74 have heart failure. The disorder is likely to become more common because people are living longer and because, in some countries, certain risk factors for heart disease (such as smoking, high blood pressure, and a high-fat diet) are also increasing in prevalence (Beers, 2003).

There is a significant risk of mortality in HF which is furthered by the influence of psychological factors. Research has found depression to be prevalent in HF patients It has also been found that depression predicted prognosis in HF patients (Junger et al., 2004). Anxiety has been shown to be highly correlated with depression in HF patients (Jiang et al., 2005). Frasure-Smith and Lesperance (2003) found that both depression and anxiety were significantly associated with increased mortality.

Research implies relationships between the variables, Type D personality, coping and distress. However an interactive effect has not been investigated. Observation of such an effect of these variables upon each other in the way described by Lazarus and Folkman (1984), specifically in a high risk patient group such as HF may allow early identification of those HF patients that are most at risk of psychological distress.

Type D personality has been found to be prevalent in cardiac patients, such as Post MI patients and cardiac patients who have had undergone cardiac surgery (J. Denollet,

2000). It is predicted that Type D personality would also be prevalent in HF patients. Type D personality has been found to be a risk factor for cardiac patients as it is known to independently predict mortality and morbidity (Conraads et al., 2005). In addition it has been found to predict psychological distress in cardiac patients as well (e.g. Denollet et al. (2006b). This previous research implies there to be a predicative effect of Type D on distress in HF patients which may have implications for the early identification of those HF patients at risk of experiencing psychological distress and thus increased vulnerability to morbidity and mortality.

Additionally, particular coping strategies have been found to influence psychological distress in positive and negative ways. This relationship between particular disengaging coping styles (e.g. behavioural disengagement or avoidance coping strategy) has been shown to influence distress (Doering et al., 2004) in HF patients which has in turn influenced mortality rate (Murberg et al., 2002).

Thus from past research as well as the constructs demonstrated in Lazarus and Folkman's transactional stress-coping model, there seems to be a potential pathway between Type D personality, coping and distress. If such a relationship is found in the current research, there could be significant benefits for the use of the Type D personality questionnaire (DS14) in identification of 'at risk' newly diagnosed HF patients. Therefore even if these individuals have not yet experienced symptoms of anxiety or depression, difficulties in social interaction and emotional expression, as well as types of coping strategies used, may be positively altered by psychological interventions. In addition this increased

understanding may contribute to increased awareness and monitoring by health professionals of HF patients emotional responses and coping strategies to maximize functional adaptation and reduce the risk of mortality and morbidity.

## **2.2** Aims

The current study aimed to determine if Type D personality is a predictor of distress in Heart failure (HF) patients. The study also aimed to investigate whether there is a relationship between Type D personality, coping style and psychological distress in HF patients.

## 2.3 Epistemiological Statement

A hypothetico-deductive, critical realist stance has been assumed. The proposed study is pragmatic i.e. past evidence and an established model has been used to produce testable hypotheses and make predictions. The study will be cross-sectional to establish links between concepts using quantitative measures.

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### **CHAPTER THREE - METHODOLOGY**

# 3.1 Design.

A non-experimental, cross-sectional design was used to examine whether Type D personality is a predictive of distress in HF patients, and also whether there is a relationship between Type D personality, coping style and distress in a HF patient sample. The study also aimed to investigate the prevalence of Type D personality in participating HF patients.

The study was questionnaire based generating quantitative data only. Specific validated and reliable questionnaires were selected to address each research question.

## **3.2 Participants**

Seventy-two consenting patients diagnosed with HF attending the Heart Care outpatient clinic at the Cardiology department at a district general hospital in the North of England participated. Participants were recruited over a six month period between September 2005 and March 2006. Over the data collection period, two clinics per week were allocated for study recruitment, each clinic containing approximately 15-20 patients. Of the total 161 patients with HF that attended clinics over the 6 month period in which recruitment for the study was possible 106 (66%) agreed to participate. Fifty-five (34%) did not participate in the study and have been termed 'non-participants' for the purpose of

the analyses. The reasons for non-participation were due to participants returning empty questionnaires, not wanting to participate or simply patients not being approached due to leaving clinic prior to being invited to participate. For more details refer to Results section, Table 4.1.

Of the total number of 106 patients approached, 72 patients consented and responded (58% of the total 161 HF patients, 68% of the 106 patients who agreed to participate). The remaining thirty-four participants however did not return questionnaires. Two of these participants returned an empty questionnaire booklet explaining in writing that they did not feel the questionnaires were relevant to them as they were not suffering from any emotional distress. These 34 HF patients have been termed 'non-responders' for the purpose of analyses. Figure 3.1 indicates a flow diagram of recruitment and retention, giving percentage response rates at each stage for a) total no. of participants, b) those patients approached / invited to participate.



Figure 3.1: Flow diagram of recruitment and retention, giving percentage response rates at each stage for a) total no. of participants, b) those patients invited to participate.

The inclusion criteria for the study were:

• Participants who had a confirmed diagnosis of HF.

The official cardiac diagnosis was based on a previous echocardiogram result. This was recorded in the hospital department database. Type and severity of HF and its level of progression were characterized using the New York Heart Association classification (The Criteria Committee of the New York Heart Association, 1964) indicating which class best described the patients' symptoms. NYHA functional class was determined by an independent investigator. In addition, the database also stated whether the HF patient was symptomatic, asymptomatic, or asymptomatic on treatment.

• Patients willing to participate

The exclusion criteria for the study were:

- Patients with concurrent diagnosis of serious illness or chronic debilitatory disease e.g.) multiple sclerosis or cancer.
- Patients who had Congenital Heart Failure
- Patients not wanting to participate
- Patients unable to speak or read English (questionnaires validated in English language only)

Information regarding concurrent diagnosis and whether patients were diagnosed with congenital heart failure was obtained from the patient consented database. This includes consented demographic and medical information about each HF patient attending at the hospital department of academic cardiology.

# Power Calculation

The Sample size calculation was based on the main research objective of estimating the prevalence of Type D personality in a HF patient sample. As the prevalence of Type D personality has not yet been investigated in this patient group, the power calculation is based on previous studies in post-MI patients. For example Denollet (2000) has found that 27-30% of Post MI patients to have a Type D personality, thus it is expected that 30% of this HF cardiac sample to be classified as Type D personality. A sample size of 70 produces a 95% confidence interval equal to the sample proportion plus or minus 0.1 when the anticipated prevalence is 30% or 0.3. Therefore a sample size of between 70 and 200 was deemed adequate to accurately estimate prevalence accurately and enable multiple regression modeling to be carried out to answer the other research questions.

# **3.3 Measures**

# **Demographics**

The basic demographical data were obtained from the departmental database. Of the nonmodifiable factors identified through the review of the literature, subjective and objective measures of psychiatric history, severity of HF, medical comorbidities, cardiac history, and level of mobility were taken. The time since diagnosis, was not measured in the current study because the primary focus was on antecedent and mediating factors that could be subject to intervention. The following variables were recorded for each participant:

- Age and gender
- HF diagnoses and symptomatology a) symptomatic, b) asymptomatic or c) asymptomatic on treatment.
- NYHA class and Cardiac History
- Psychotropic medication taken
- Previous heart surgeries and MIs
- Level of day-to-day mobility

These variables were measured in order to adequately describe the sample in terms of physiological variables, and to compare participants with non-participants to verify whether the sample of participating HF patients was representative of the total cohort. A summary of the formal measures employed in the study is displayed in Table 3.1. These measures are described below.

Table 3.1 <u>A summary of formal measures used in the study.</u>

PSYCHOSOCIAL MEASURE	SCORING
Type D personality: DS14 questionnaire	
(Denollet, 1998)	affectivity (NA) and social inhibition (SI)
Negative Affectivity (NA) (7 items)	(greater than or equal to 10), as determined
Social Interaction (SI) (7 items)	by a median split, are classified as Type D.
Type D (score high on both NA and SI)	
Non Type D	0.21 High score = high appriate $0.21$
(HADs)	U-21 Iligh score – high unsiety, U-21 High score = high depression
(IIAD3)	Cases:
Anxiety (7 item, score 0-3)	0-7 not significant
Depression (7 item, score 0-3)	8-10 mildly anxiety/depression
	11-14 moderate anxiety/depression
	15-21 severe anxiety/depression
Brief COPE inventory (Carver, 1997)	
	Each scale is examined to see what relation
(score 1-4)	it may have to other variables
Self-distraction, items 1 and 19	
Active coping, items 2 and 7	
Denial, items 3 and 8	
Substance use, items 4 and 11	
Use of emotional support, items 5 and 15	
Use of instrumental support, items 10 and	
Behavioral disengagement items 6 and 16	
Venting, items 9 and 21	
Positive reframing, items 12 and 17	
Planning, items 14 and 25	
Humor, items 18 and 28	
Acceptance, items 20 and 24	
Religion, items 22 and 27	
Self-blame, items 13 and 26	

The predictor variable for this study was 'Type D personality' (as defined in Section 1.10.3). This was measured using the DS14 scale (Pederson & Denollet, 2003). The score attained from the DS14 questionnaire indicates whether an individual has Type D personality characteristics or not.

The outcome variables in the study were 'psychological distress' (anxiety and depression) as measured by the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) and coping style as measured by the Brief COPE inventory (Carver, 1997).

# Predictor variable

DS14 measure – Type D personality questionnaire (Denollet 1998)

The DS14 is a brief, valid and practical measure of Type D personality. Due to the brevity of the instrument, it is also a practical research tool that can easily be included together with other measures. The construct was developed in Belgian cardiac patients and has also been cross-validated in a Danish sample of patients with a first myocardial infarction (Denollet, 1998). The DS14 comprises of two scales: Negative Affectivity (NA) and Social Interaction (SI). These scales measure the tendency to experience negative emotions across times and situations, and the tendency to inhibit the expression of emotions and behaviours in social interactions, respectively. The Denollet questionnaire is made up of 14 statements that are rated between 0 and 4, (0=false, 1=mostly false, 2=neutral, 3=mostly true, 4=true). Each item is rated according to this 5-point Likert scale. Patients who score greater than or equal to 10 on *both* negative affectivity and social inhibition, are classified as Type D. Those who score less than 10 on either of these subscales are therefore classified as having a 'Non Type D' personality.
in Belgian cardiac patients with Cronbach's alpha of 0.89 and 0,82 and test-retest reliability of 0.78 and 0.87 for the Negative Affectivity and Social Inhibition subscales, respectively (Denollet, 1998; Denollet et al. 2000). Furthermore, both 7-item trait scales (i.e., for NA and SI) are internally consistent (alpha=0.88 and alpha=0.86, respectively).

#### Utilisation:

The DS14 questionnaire was also used to measure Type D personality in Pederson et al. (2006) who examined predictors of the onset of depressive symptoms following cardiac surgery in the form of percutaneous coronary intervention (PCI) following a myocardial infarction (MI).

#### Outcome variables

• Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983)

This is a self-report measure and is self-administered. It is used widely in hospital settings as a screening instrument for anxiety disorders and depressive illnesses. In a review of the HADS, Hermann (1997) reported it to be a reliable and valid scale, sensitive to change. In this review, subscale internal consistencies were reported as 0.8 for anxiety and 0.81 for depression. A high correlation was shown for test retest reliability (r>0.80). Tests for validity showed factorial validity with a two-factor solution. However discriminant validity of the HADS was questionable. The scale consists of 14 items divided into two subscales for anxiety and depression, in which the patient rates each item on a 4-point scale from 0 to 3. It has two subscales: anxiety and depression.

High correlations were found between the anxiety and depression sub-scales, for most patient groups. Hermann (1997) argued these correlations were mainly due to a real coincidence of anxious and depressed symptoms in patient groups as opposed to inadequacies with the instrument.

The HADS does not contain questions pertaining to somatic complaints, making it less likely to be confounded by the direct effects of medical conditions. There is no generally accepted cut-off score for the HADS. Zigmond and Snaith (1983) recommend the following: cut-off scores of 7-8 for possible and 10-11 for probable anxiety or depression. In this study a score above 8 on each subscale was used to define levels of anxiety and depression (as these symptoms were used to define psychological distress for patients in this study). The Hospital Anxiety and Depression scale was used as a generic measure 'psychological distress'.

#### Utilisation:

Hermann (1997) identified more than 200 publications reporting original experiences with the instrument in approximately 35,000 persons. Hermann (1997) stated that the scale is generally well accepted by patients and non-patients alike. This measure was utilized by Junger et al. (2004) as it is well established among cardiac patients. Junger et al. (2004) used this measure as a self assessment of depression and anxiety in patients with HF to investigate to the impact of depression on the prognosis of HF.

#### • Brief COPE inventory (Carver, 1997)

This is a brief measure of coping assessing several responses known to be relevant to engagement and disengagement coping. It is a brief form of a previously published measure called the COPE inventory (Carver et al. 1989) which has been shown to be useful in health related research. The Brief COPE has been used in a variety of populations, for example, research with breast cancer patients and with a community sample recovering from Hurricane Andrew data from the study of survivors of Hurricane Andrew indicate that the priori scales have adequate internal reliability. An exploratory factor analysis yielded a factor structure that was generally consistent with that reported earlier for the full COPE. A shorter item set was produced as earlier patient samples became impatient at responding to the full instrument. It also provides researchers with a way to quickly assess potentially important coping responses.

The Brief COPE inventory includes 28 items, which measure 14 conceptually differentiable coping reactions. There are two items for each scale. The Brief COPE Response options range from 0 (I haven't been doing this at all) to 3 (I've been doing this a lot).

#### Utilisation:

The Brief COPE has been used in a variety of populations, for example, research with breast cancer patients. This is a shorter version of the COPE inventory. As is the COPE inventory, the Brief COPE is a measure used for many health-relevant studies: drugs

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addiction, ageing, breast cancer, depression, AIDS. Culver et al. (2002) used the Brief COPE to examine coping and distress in women with early stage breast cancer. The current study is the first study to use the brief COPE with HF patients.

#### 3.4 Procedure

This study gained local ethics committee and R&D approval prior to commencement (see Appendix II, for ethics approval letter). The consultant cardiologist with primary clinical responsibility for the HF patient sample gave permission to access the departmental database.

Patients were invited to participate in the study whilst attending a routine clinic appointment at the cardiology outpatient clinic. They were invited verbally and provided with written information about the study (see Appendix III). Details of participation involvement were clearly stated in the consent form. Formal agreement to partake in the study was taken upon signature of two consent forms (see Appendix III) the second copy being retained by the rescarcher.

Patients were asked to complete the questionnaire booklet whilst waiting for their clinic appointment. They were also given the option to take the questionnaire booklet home and return completed form (as well as one signed consent form), in a prepaid envelope. Contact details were provided if there were any concerns or questions raised during or following completion of the questionnaire booklet.

#### **3.5 Data Analysis**

Data were analysed using the Statistical Package for the Social Sciences for Windows Version 13.0 (SPSS-13.0). Alpha was set at 0.05.

The data distributions for the main outcome variables were inspected using histograms. The demographical data for participants and non-participants were compared using the the non-parametric Kruskal-Wallis test or Pearson's Chi-square test. The prevalence of Type D in HF patients (Research Question 1) and the most used coping style (Research Question 3) were reported using descriptive statistics. Research Question 2, exploring whether Type D personality is a predictor of distress, was investigated using univariate analysis of variance (ANOVA). Research Question 4, looking at the relationship between Type D personality, coping and distress, was examined using correlational analyses would be used to test for relationships between coping styles and the levels of psychological distress (anxiety and depression). A mediational regression model proposed by Baron and Kenny (1986) was used.

#### 3.6 Justification of Tests Used in the Statistical Analyses

#### Selection of statistical procedure for Comparison of Means

A Univariate Analysis of Variance (ANOVA) was used to compare differences between the distress scores of HF patients and estimate the effect of Type D personality on the dependent variable distress. There were other factors that could affect the patients' distress levels that needed controlling for. These were specifically, whether the patient has undergone any heart surgery ('heart surgery'), the main form of heart disease they have been diagnosed with ('cardiac history'), age, whether the HF patient has experienced a heart attack before ('heart attack'), past psychiatric history ('psychotropic medication'), severity of heart disease ('NYHA severity') and most importantly Type D personality. The results demonstrate whether the addition of other covariate variables to the ANOVA, with Type D as the main variable of interest, would still lead to a statistically significant result.

Backward elimination was then used to establish which variables played a role in affecting Type D's predictability. It begins with the ANOVA model that includes all the independent variables considered in this research (as named above). Then, one variable is deleted at a time. Non-significant p-values determine if a variable should be deleted or not. Once a significant effect is demonstrated in the univariate analyses procedure, with the main interest variable Type D, then this elimination procedure stops.

#### Selection of Statistical Procedure for Correlational Analyses

Pearsons Correlational analyses were used to explore the following three relationships: a) the relationship between the two main coping styles, engagement and disengagement to establish whether one could predict another; b) the relationship between coping strategies and psychological distress and c) the relationship between the two Type D subscales and psychological distress.

#### The Mediational Regression Model

This model was used to evaluate whether the variable 'coping' was indeed a mediating factor between the predictor variable (Type D personality) and the outcome variable (psychological distress). This model assumes a three causal system such that there are two causal paths feeding into the outcome variable: the direct impact of the predictor variable (Path c) and the impact of the mediator (Path b). There is also a path from the predictor variable to the mediator (Path a).

To test for mediation three regression equations need to be tested and four conditions must hold. The details of these regression equations and conditions are indicated in Appendix V.



Figure 3.2: The Mediational Model (Baron & Kenny, 1986)

#### **CHAPTER FOUR – RESULTS**

#### 4.1 Overview of Results

#### **4.2 Recruitment and Patient Demographics**

Of the total 161 patients with HF that attended clinics between September 2005 and March 2006, and from which recruitment for the study was possible, 106 (66%) agreed to participate. The remaining 55 patients (34%) that did not participate in the study have been termed 'non-participants'. Out of these 55 patients, 36 (65%) were not approached due to their leaving clinic prior to being invited to participate; they have been termed 'missing patients'. Nineteen patients (34.5%) did not want to participate and some of the reasons given were: fatigue following their clinic appointment; not having enough time to participate. Two of the 19 patients reported experiencing a major life event (e.g. family bereavement) and did not feel ready to reflect upon their emotions at the time they were approached. One of these 19 patients reported feeling too emotionally upset in general to complete the questionnaires (see Table 4.1).

Out of the 106 HF patients who did agree to participate in the study, 34 did not return questionnaires. Two of these participants returned an empty questionnaire booklet explaining in writing that they did not feel the questionnaires were relevant to them as they were not suffering from any emotional distress. These 34 HF patients have been termed 'non-responders' for the purpose of analyses. Table 4.1: Reasons for non-participation.

Reason for Non-Participation	Number of patients (%)
Missing patients	36
Patients not wanting to participate	19
Not want to participate due to a negative experience of a concurrent major life event (e.g. bereavement)	2
	1
Not want to participate due to feeling unable to complete the questionnaires due to emotional distress	
	16
Not want to participate due to not having time to participate / fatigue after heart care appointment and expressing the measures were too lengthy.	
Non-Responders	34
TOTAL	89

Therefore, of the 106 HF patients approached and invited to participate, 72 patients consented and subsequently returned completed questionnaire booklets. This represents a 68% response rate. A flow diagram of the process of recruitment and retention is shown in the Methodology section in Figure 3.1.

#### Representativeness of Sample

Demographic data for all patients with HF within the data collection period were obtained from the outpatient cardiology clinic. The data summarized in Table 4.2 indicates the demographic data for both participants and non-participants. This enabled comparison of participants, non-responders (HF patients who consented to completing questionnaires however did not respond) and non-participants (see table 4.2) in terms of age, gender, heart failure diagnosis, cardiac history medication consumption, mobility levels and comorbidities.

In summary, from the Chi-square analyses done, there does not seem to be any significant differences between participants and non-participants in terms of the demographical variables recorded. A Kruskal-Wallis test was used to test whether there was a significant difference in the ages of participants and non-participants. Seventy-two HF participants (Mean=70.31, s.d.=12.31) and 89 non-participants (Mean =72.96, s.d= 10.56) were involved in the analysis. There was no significant difference between age in the groups (p=0.452). Therefore, as no significant differences have been found between participants and non-participants, the patient sample is representative of the general HF population coming to the outpatient clinic. The data was shown to be normally distributed.

### Table 4.2: Demographic data for participants and non-participants

Demographic	Participants N=72	Non-participants N=89	Significance using
Variables			Chi-square result
Age	Mean=70.31	Mean=72.96	
	S.d=12.31	S.d=10.56	(Kruskal-Wallis test
			used)
Gender	54M (75%)	55M (61.8%)	0.112
	18F (25%)	34F (38.2%)	
Heart Failure	66 (91.7%) symptomatic <sup>3</sup>	84 (92.2%) symptomatic	0.202
diagnosis	4 (5.5%) asymptomatic <sup>4</sup>	5 (7.8%) asymptomatic	
	2 (2.8%) unknown	0 (0%) unknown	
Cardiac Ilistory - Coronary Heart Disease (CHD) - Other <sup>5</sup>	- 55 (76.4%) - 10 (13.9%)	- 61 (68.5%) - 18 (20.2%)	0.704
- Unknown Severity of Heart	- / (9.7%)	- 10 (11.2%)	0.538
Failure <sup>7</sup> - Mild (I) - Moderate (II), - Severe (III, IV)	- 15 (20.8%) - 39 (54.2%) - 18 (25.0%)	- 10 (11.2%) - 57 (64.0%) - 22 (24.7%)	
Myocardial Infarction - No - Yes - More than 1	- 34 (47.2%) - 31 (43.1%) - 7 (9.7%)	- 43 (48.3) - 44 (49.4) - 2 (2.2)	0.264
Heart Surgery - No - Yes	- 54 (75%) - 18 (25%)	- 66 (74.2%) - 23 (25.8%)	0.992
Medication Psychotropic <sup>8</sup>	6 (8.3%)	12 (13.5%)	0.557
Mobility level - Good - Reduced - Reduced (uses stick) - Reduced (uses chair / frame) - Not known	- 36 (50.0%) - 19 (26.4%) - 14 (19.4%) - 1 (1.4%) - 2 (2.8%)	- 37 (41.7%) - 26 (29.2%) - 16 (18.0%) - 5 (5.6%) - 5 (5.6%)	0.230

# 4.3 Research Question 1: What is the prevalence of Type D personality in a HF patient sample?

The Type D scores on the DS14 were calculated and the number of HF patients satisfying criteria for Type D personality was found to be 24 out of 70 participants (34.3%) (See Figure 4.2). 4.1% of the total sample of participants failed to complete the DS14.



Figure 4.2: Percentage of HF patients with Type D personality.

#### 4.4 The pattern of psychological distress

Table 4.3 illustrates the descriptive statistics regarding the distribution of psychological distress within the HF patient sample. The number of patients completing the depression questions more than those completing the anxiety questions due to missing data.

Psychological distress as measured by	N	Min	Max	Mean	Std.
Hospital Anxiety and Depression Scale (HADS)					Deviation
HADS depression score	71	0	16	5.08	3.71
HADS anxiety score	69	0	17	4.72	3.78
Valid N (listwise)	69				

Table 4.3: The descriptive data of anxiety and depression scores of the HF patient sample

The maximum anxiety score is 16 and the maximum depression score is 17 thus both lying above the borderline severe range of distress. In general, the majority of patients seemed to score within the range of 0-7 on the HADS measure for both anxiety and depression. The descriptive data for the depression and anxiety scores in HF patients were very similar, with the mean score for depression being slightly higher than the anxiety scale (mean=5.08, s.d=3.71; mean=4.72, s.d=3.78 respectively). The standard deviations are quite large in comparison to the mean indicating a wide spread in the data.

The frequencies of HF patients displaying non-clinically significant, clinically significant mild, moderate and severe levels of anxiety and depression are shown in the bar charts in Figures 4.3 and Figure 4.4. The majority of HF patients had anxiety and depression scores below the clinically significant range, thus indicating they were not clinically distressed i.e) 77.5% and 82.6% of HF patients scoring between 0 and 7 respectively.

Twenty three percent and 17% of HF patients scored between 8 and 21 (i.e. in the clinically significant range) for clinical depression and anxiety respectively.

When looking at the different levels of distress, there were a greater percentage of patients scoring mild depression and anxiety (12.68% and 10.14% respectively) than there were scoring moderate (8.45% and 4.35% respectively) or severe (1.41% and 2.90% respectively). When comparing anxiety and depression scores (as different constructs of psychological distress), more patients seem to have mild-moderate depression (21.13%) than had mild-moderate anxiety (14.49%). However a few more patients seemed to display clinically severe (i.e. in the range 15-21) anxiety symptoms than severe depression symptoms.



Figure 4.3: <u>Bar chart of the percentages of HF patients scoring within the different</u> significant levels of depression.



Figure 4.4: <u>Bar chart of the percentages of HF patients scoring within the different</u> <u>significant levels of anxiety.</u>

### 4.5 Research Question 2: Is Type D Personality a predictor of psychological distress?

Using a Univariate ANOVA data was examined to determine whether mean distress scores (of depression or anxiety) could be predicted by Type D personality. The main effects of six other variables were considered in the analysis: 'heart surgery', 'previous cardiac surgery', 'cardiac history', 'age', 'previous myocardial infarction', 'psychiatric history' and 'HF severity'. The results indicated that, even when controlling for all six variables, Type D personality predicted depression in this sample of HF patients (F=9.142 p<0.01) (See Appendix VII for output data).

However when controlling for all 6 covariates, Type D personality did not significantly to predict anxiety levels of this patient sample (F=2.593, p<0.113). However, when eliminating 4 of the covariates ('previous heart attack', 'cardiac history', 'age', 'previous heart surgery') from the ANOVA through use of Backward Elimination, Type D showed to significantly predict anxiety (F=5.146, p<0.05).

#### Summary

#### Answer to Research Question 2

- Type D personality significantly predicts depression (p<0.01), but not anxiety. This result was found after controlling for the 6 covariates.
- Eliminating 'history of cardiac surgery', 'psychiatric history', and 'severity of HF' lead to Type D significantly predicting anxiety.

Hypothesis 2: A proportion of HF patients will satisfy the criteria for Type D personality.

The hypothesis is accepted and the null hypothesis rejected.

#### Pattern of psychological distress

Hypothesis 1: A proportion of HF patients will be suffering from clinically significant anxiety and/or depression.

The hypothesis is accepted. The following details explain the extent to which it is accepted.

- Participants predominantly scored within non-clinically significant range for anxiety and depression (between 0-7). The mean scores for anxiety and depression were very similar.
- A greater percentage of patients scored mild depression and anxiety than scored moderate-severe depression and anxiety.
- A greater percentage of patients scored mild-moderate depression than mildmoderate anxiety.
- A greater percentage of patients scored severe anxiety than severe depression.

#### 4.6 Research Question 3: What is the main coping strategy in this HF sample?

Figure 4.5 illustrates the mean scores of all 14 coping strategies. It appears that the main coping strategy used by this group of HF patients was Acceptance. However, the box plots shown in the APPENDIX illustrate there are a considerable amount of people who scored lower than the average spread of the scores for usage of this coping strategy. Therefore, there is little reliability in this mean score. HF patients reported using the 'substance use' coping strategy less frequently than other coping strategies. There is more reliability however in this mean score as indicated by there being minimal variability in the scores shown in the box plot in APPENDIX ....



Figure 4.5: <u>A bar chart indicating the mean scores for each of the coping stregies from</u> the Brief COPE measure, where S.d = Standard deviation.

The Brief COPE can be grouped into two main styles of coping: Engagement and Disengagement coping styles. For the purpose of this research, these were the main focus as opposed to the individual 14 coping strategies. Figure 4.6 and 4.7 display the descriptive data and mean scores for these two coping styles for the HF patient sample.



Figure 4.6: <u>A bar chart to show the mean scores for the eight types of Engagement</u> <u>Coping styles where S.d=Standard deviation for each coping strategy and N=no.</u> <u>participants completing question for each coping strategy.</u>



Figure 4.7: <u>A bar chart to show the mean scores for the four types of Disengagement</u> <u>Coping Styles where S.d=Standard deviation for each coping strategy and N=no.</u> participants completing question for each coping strategy.

#### 4.6.1 Relationship between engagement and disengagement coping

Pearson's correlational analyses indicated a weak, positive relationship between engagement and disengagement coping at the 0.05 level (r=0.273, df=56, p<0.042). These results imply HF patients seem to cope in various ways and are not prone to either/or positive or negative styles of coping (engagement and disengagement respectively). In proceeding analyses, both engagement and disengagement coping styles were included due to this positive correlation shown. As stated earlier 'acceptance coping' is reported to be the most used coping strategy (mean=6.45, s.d.=1.91). Livneh (2000) did **not** categorise an 'acceptance' coping strategy as an engagement or disengagement coping style thus there seems to be some ambiguosity about whether this coping strategy is positive and adaptive for the individual or negative and maladaptive. Further analyses will now investigate whether there is a relationship between this coping strategy and psychological distress to decipher if it has a positive or negative effect on this patient sample. This question will be investigated in the procedures needed to answer research question 4.

#### Summary:

#### Answer to Research Question 3:

- 'Acceptance' is the most used coping strategy by HF patients (Mean = 6.45, S.d = 1.91) with 'Substance use' is the least used coping strategy by HF patients (Mean = 2.09, S.d = 0.33).
- A weak positive correlation was found (p<0.042) implying that HF patients who cope by using engagement coping methods are more likely to also be using disengagement coping styles as well.

## 4.7 Research Question 4: Is there any relationship between Type D personality, coping style and psychological distress?

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Hypothesis 3: There is a relationship between Type D personality and psychological distress.

Hypothesis 4: There is a relationship between Type D personality, coping styles and psychological distress.

Hypothesis 5: Coping styles has a mediating effect between Type D personality and psychological distress in HF patients.

Hypotheses 3, 4 and 5 are accepted as statistically significant relationships have been found between Type D, and distress and coping style and distress.

#### 4.7.1 The relationship between coping strategies and psychological distress

Pearson's correlational analyses was used to explore whether there was any relationship between each individual coping strategy and psychological distress. Appendix IX indicates the output data found for all coping strategies. Table 4.4 and 4.5 below highlight the coping strategies that significantly correlated with depression and anxiety. There seem to be overall strong relationships shown.

Camina Stala	Coming	Completion	N (much an of	
Coping Style	Coping	Correlation	IN (number of	p-value
	Strategy	coefficient (r)	cases)	<u> </u>
Engagement	Venting	0.392	68	0.001 (p<0.001)
coping	Positive	-0.267	65	0.031 (p<0.05)
	Reframing			
	Humour	-0.290	67	0.017 (p<0.05)
	Religion	-0.241	68	0.048 (p<0.05)
	Self distraction	0.45	68	0.171
	Active Coping	0.019	67	0.273
	Emotional	0.052	66	0.331
	Support			
	Instrumental	0.016	68	0.728
	Support			
	Planning	0.006	67	0.134
	Acceptance	0.014	68	0.343
Disengagement coping	Denial	0.270	68	0.026 (p<0.05)
	Behavioural Disengagement coping	0.565	68	0.000 (p<0.01)
	Self Blame	0.320	66	0.009 (p<0.01)
	Substance Use	1.826	68	0.829

 Table 4.4: <u>The results from the correlation analyses between coping and depression</u>

 results

Coping Style	Coping Strategy	Correlation coefficient (r)	N (number of cases)	p-value
Engagement	Venting	0.568	66	0.001 (p<0.01)
coping	Emotional Support	0.247	65	0.048 (p<0.05)
	Positive Reframing	0.014	65	0.121
	Humour	-0.037	67	0.134
	Religion	-0.011	68	0.453
	Self distraction	0.027	68	0.126
	Active Coping	0.049	67	0.246
	Instrumental Support	0.086	68	0.728
	Planning	0.05	67	0.187
	Acceptance	0.032	67	0.428
Disengagement coping	Denial	0.476	66	0.000 (p<0.01)
	Behavioural Disengagement	0.591	66	0.000 (p<0.01)
	Self Blame	0.372	64	0.002 (p<0.01)
	Substance Use	0.005	65	0.821

Table 4.5: The results from the correlation analyses between coping and anxiety results

### 4.7.2 Does 'coping' have a mediational effect between Type D personality and distress?

'Coping style' is predicted to function as a mediator to the extent that it accounts for the relationship between the predictor, 'personality' and the criterion variable, 'distress'. Engagement and disengagement coping styles are investigated separately. Figure 4.8 indicates the pathway that is predicted to occur between the three variables.



Figure 4.8: The Mediational Model (Baron & Kenny, 1986)

When both 'engagement coping' and 'disengagement coping' were independently regressed on 'Type D personality', non significant relationships were found [F(1,57)=2.221, p=0.142, B= -0.398; F(1,61)=1.827, df=62, p=0.181, B=0.284, respectively). Type D failed to predict either coping style.

The Beta coefficients indicate that the direction of the relationship, although insignificant, seems to be in a negative direction when engagement coping is regressed on Type D (B=-0.398) and in a positive direction when disengagement coping is regressed

on Type D (B= 0.284). Therefore, although statistically insignificant, data imply that a) patients with Type D personality are less likely to use engagement coping styles than Non-Type D patients and b) Type D personality patients are more likely to use disengagement coping styles than Non-Type D patients.

As there was no statistically significant relationship between the binary measure of Type D and engagement and disengagement coping, individual subscales of Type D were explored: Negative Affectivity (NA) and Social Inhibition (SI).

# 4.7.3 Do Engagement coping styles have a mediational effect between the individual subscales of Type D personality, Negative Affectivity (NA) and Social Interaction (SI) and psychological distress?

Regression Equation 1: Does the predictor variable (NA/SI subscale of Type D) have an effect on engagement coping?

The results demonstrate no significant effects of either NA or SI for the engagement coping style (F(1,58)=0.650, p=0.423; F(1,57)=0.225, p=0.637, respectively). Neither NA or SI has an effect on engagement coping, and therefore cannot be a mediator in this model.

# 4.7.4 Do Disengagement coping styles have a mediational effect between the individual subscales of Type D personality, Negative Affectivity (NA) and Social Interaction (SI) and psychological distress?

Regression Equation 1: Does the predictor variable (NA/SI subscale of Type D) have an effect on disengagement coping?

The results of this analyses indicated strong significant effects when disengagement coping was regressed on both NA (F(1,62)=12.617, p<0.001) and SI (F(1,61)=5.245, p<0.05). The beta coefficients indicated that high NA Type D personality (B=0.052; t(63)=3.55, p<0.01) and SI Type D personality (B=0.043; t(62)=2.29, p<0.05) predicts disengagement coping. Participants with high NA and SI scores use disengagement coping strategies more than participants with low NA and SI scores.

Regression Equation 2: Does the predictor variable (NA subscale of Type D) have an effect on depression?

For the second condition to be analysed, the HADS total depression scores (outcome variable) were regressed on to the NA subscale of Type D (predictor variable). A strong significant regression was found (F(1,68)=25.804, p<0.000; t(69)=5.080, B=0.298). People with NA are significantly more depressed.

Regression Equation 3: Is there a significant relationship found when depression is regressed on to both the mediator variable (disengagement coping) and the predictor variable (NA subscale of Type D)?

Again, a strong significant overall regression was found (F(2,60)=16.034, p<0.001) showing that both NA and disengagement coping (mediator) significantly effect depression (outcome variable). This was indicated by the statistically significant results when depression scores were regressed on both the disengagement coping and NA (B=1.313, t=2.443, p<0.05; B=0.245; t=3.650, p<0.001 respectively). Hence, all the results of the regression equation and the first three conditions of the mediational model hold in the predicted direction.

Finally when regressing depression on both these variables (as in Regression Equation 3 above), the effect of Negative Affectivity on depression (t=3.650, B=0.245, p<0.001) was less than when depression is regressed *only* on Negative Affectivity (as in Regression Equation 2) (t=5.080, B=0.298, s.e.=0.059). Therefore according to the results, the fourth condition of the mediational model (see Appendix XI) is satisfied. Therefore disengagement coping acts as a mediator variable in the path between the NA subscale of Type D personality and depression.

# 4.7.5 Does disengagement coping act as a mediator between social inhibition (SI) subscale of Type D personality and depression?

Regression Equation 1: Does the predictor variable (SI subscale of Type D) have an effect on disengagement coping?

The results of this analyses indicated strong significant effects when disengagement coping was regressed on SI Type D personality (B=0.043; t(62)=2.29, p<0.05) predicts disengagement coping. Participants with high SI scores use disengagement coping strategies more than participants with low NA and SI scores.

Regression Equation 2: Does the predictor variable (SI subscale of Type D) have an effect on depression?

For the second condition to be analysed, the HADS total depression scores (outcome variable) were regressed on to the SI subscale of Type D (predictor variable). A strong significant regression was found (B=0.329; t(69)= 4.159, p<0.001). People with SI are significantly more depressed. The positive beta coefficients from the above two results indicate that as social inhibition increases, patients are more likely to use disengaged coping styles and experience depression.

Regression Equation 3: Is there a significant relationship found when depression is regressed on to both the mediator variable (disengagement coping) and the predictor variable (SI subscale of Type D)?

Again, a strong significant overall regression was found (F(2,59) =13.222, p<0.001), showing that both SI and disengagement coping (mediator) significantly effect depression (outcome variable). This was indicated by the statistically significant results when depression scores were regressed on both the disengagement coping and SI (B=1.711, t=3.261, p<0.01; B=0.243; t=2.962, p<0.01 respectively). Hence, all the results of the regression equation and the first three conditions of the mediational model hold in the predicted direction.

Finally when regressing depression on both these variables (as in Regression Equation 3 above), the effect of Social Inhibition on depression was less than (t=2.962, p<0.004) when depression is regressed *only* on SI (as in Regression Equation 2) (F=17.297, p<0.000, t=4.159, B=0.329). Therefore according to the results, the fourth condition of the mediational model (see Appendix XI) is also satisfied. Hence this implies that disengagement coping acts as a mediator variable in the path between the SI subscale of Type D personality and depression.

In summary, disengagement coping seems to act as a mediator variable between the Type D personality subscales NA and SI and depression, however only when the two subscales of Type D personality (i.e.) are looked at independently in terms of their relationship with

disengagement coping and depression. Those with more characteristics of NA or SI are more likely to use disengagement coping styles and experience depression.

# 4.7.6 Do Disengagement coping styles have a mediational effect between the individual subscales of Type D personality, Negative Affectivity (NA) and Social Interaction (SI) and anxiety?

The mediational model was analyzed in terms of the relationship between the same independent variables, NA and SI and the mediator variable disengagement coping style and anxiety as a form of psychological distress. Regression equation 1 has already been satisfied (See Section 4.7.4) indicating there is a significant regression of the mediator variable (coping style) on the independent variable (Type D) is only found when looking at specifically disengagement coping styles and the two subscales of Type D. The next regression equations were analysed using HADS anxiety scores as the measure of psychological distress.

Significant affects were shown in the first, second and third regression equations of the mediational model. Therefore, NA was shown to significantly affect disengagement coping in the first regression equation (F=12.617, p<0.001, t=3.552, p<0.001, B=0.052, df=63), and in the second regression equation NA was shown to significantly affect depression (F=27.257, p<0.000, t=5.221, p<0.000, B=0.312,). The positive beta coefficients from the above two results indicate that as negative affectivity increases, patients are more likely to use disengaged coping styles and experience anxiety. In the

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third equation, when anxiety was regressed on both NA and disengagement coping, a strong significant overall regression was found (F=20.480, p<0.000), indicating that disengagement coping significantly affects anxiety. This was indicated by the statistically significant results when anxiety scores were regressed on both the disengagement coping and NA (t=3.593, p<0.001; t=3.475 p<0.001 respectively). Hence, all the results of the regression equations and the first three conditions of the mediational model hold in the predicted direction.

Finally when regressing anxiety on both these variables (as in Regression Equation 3 above), the effect of NA on anxiety was less than (t=3.475, p<0.004) when depression is regressed *only* on SI (as in Regression Equation 2) (B=0.329, p<0.001, t=4.159). Therefore according to the results, the fourth condition of the mediational model (see Appendix V again if necessary) is also satisfied. Hence this implies that disengagement coping acts as a mediator variable in the path between the NA subscale of Type D personality and anxiety.

# 4.7.7 Does disengagement coping act as a mediator between the SI subscale of Type D personality and anxiety?

Significant affects were shown in the first, second regression equations of the mediational model. Therefore, SI was shown to significantly affect disengagement coping in the first regression equation (F=5.245, p<0.025, t=2.290, p<0.05, B=0.043,), and in the second regression equation SI was shown to significantly affect depression (F=0.009, p<0.01,

t=2.712, B=0.236). The positive beta coefficients from these two results indicate that as social inhibition increases, patients are more likely to use disengaged coping styles and experience anxiety. In the third equation, when anxiety was regressed on both SI and disengagement coping, a strong significant overall regression was found (F=13.112, p<0.000), indicating that disengagement coping significantly affects anxiety. When anxiety scores were regressed on both the disengagement coping and SI there was a significant affect of disengagement coping on anxiety (t=4.374, p<0.001, B=2.234). However there was no significant affect shown of SI on anxiety (t=1.383, p<0.172, B=0.111). Hence, the insignificance of this result in the third regression equation indicates that disengagement coping does not act as a mediator variable in the path between the SI subscale of Type D personality and anxiety.

#### <u>Summary</u>

- Type D failed to predict either coping style. Therefore the subscales of Type D (NA and SI) were used in further analyses
- Disengagement coping seems to act as a mediator variable in the path between the NA and SI subscales of Type D personality and depression.
- Disengagement coping also seems to act as a mediator variable between the NA subscale of Type D personality and anxiety as well.
- Disengagement coping does *not* act as mediator variable between the SI subscale of Type D and anxiety.

• A pathway seems to exist between Type D personality, coping and distress when looking specifically at the subscales of type D and at disengagement coping style.

#### 4.8 Overall Summary of Results

All hypotheses 1-5 are accepted: i.e. a proportion of HF patients suffer from clinically significant anxiety and depression; a proportion of HF patients satisfy the criteria for Type D personality; there is a relationship between Type D personality and psychological distress; there is a relationship between Type D personality, coping styles and psychological distress; and coping styles have a mediating effect between Type D personality and psychological distress in HF patients. However, Type D personality was not predicative of anxiety, only depression. Therefore Null hypothesis 3 is accepted for anxiety. Also Hypothesis 5 is only accepted when looking at the separate constructs of Type D personality, i.e. NA and SI. The following summary explains this in more detail.

- 34.3% (24 out of 70 participants) satisfied the criteria for Type D personality
- After controlling for the 6 covariates when using the GLM, Type D significantly predicts depression, however not anxiety. Type D only predicts anxiety when eliminating the 3 covariates: history of cardiac surgery, psychiatric history and severity of HF, from the Univariate ANOVA.
- The majority of patients (77.5% and 82.6% respectively) scored in the nonclinically significant range of both depression and anxiety. A few more patients

scored severe anxiety than severe depression. However more patients scored mild-moderate depression than mild-moderate anxiety.

- Overall in comparing all 14 coping strategies, the main coping strategy is Acceptance, however the reliability of these scores is an issue. Substance abuse is the least used strategy. Observation of mean scores indicate engagement coping is the coping style used the most, in which 'emotional support' is the coping strategy most used. The disengagement coping style most used is 'self blame'.
- A weak positive correlation was found between Engagement and Disengagement coping, thus one coping style did not predict the other.
- Coping did not act as a mediating variable between Type D and Psychological Distress. Although there was no significant affect shown in Regression 1 of the mediational model, data implied Type D patients were lees likely to use engagement coping styles.
- Engagement coping does not act as a mediating variable.
- Disengagement coping acts as a mediating variable between the each of the two subscales of Type D and depression. It also seems to have a significant mediating affect between the NA subscale of Type D and anxiety. However it does not have a significant mediating affect between the SI subscale of Type D and anxiety.

#### **CHAPTER 5 – DISCUSSION**

#### 5.1 Overview of Discussion

The discussion will begin by summarizing the main findings from the study, according to the research questions. Following this, the clinical implications of the research will be outlined, including a discussion of the clinical utility of the DS14 questionnaire and its use in the guidance of psychological interventions for people with HF. The theoretical implications of the research will then be considered followed by the theoretical and methodological strengths and limitations of the study. Finally, the discussion will conclude with recommendations for future research.

#### 5.2 The prevalence of Type D personality in HF patients

This study showed that Type D personality was prevalent in 34% of participating HF patients. It is possible that patients who had a Type D personality chose not to participate. The characteristics of Type D personality includes socially inhibited individuals as well as inhibited emotional expression. Thus Type D individuals may have been more reluctant to participate. Therefore the 34% prevalence found in the patients who participated may underestimate the prevalence of Type D personality in this patient sample, had the non-participants participated. Furthermore, this prevalence of Type D may reflect a male-dominant, older aged group of patients of moderate severity of HF.
Type D is slightly more prevalent in HF patients than it is in the population of post MI patients (27-30% as found by Pederson & Denollet, 2004). However when compared with the prevalence of Type D in the general population, Denollet (2000) found that about 20% of the general population could be classified as Type D. As Type D personality has been shown to have physiological influences on the heart, Type D patients have been more prone to poor prognosis in terms of future cardiac events (Habra et al., 2003). The slightly greater prevalence of Type D in HF patients than the general cardiac population, suggests the HF population is a more at risk group. As shown in past research morbidity and mortality in HF patients is associated with Type D personality (Kop et al., 1994); (Pederson & Middel, 2001); (Conraads et al., 2005).

Denollet (2000) has found that more than 50% of hypertensive patients have a Type D personality. It was evident from the demographic data in the current study that 15% of HF patients suffered hypertension. Future longitudinal research could explore whether there is any relationship between patients suffering hypertension and whether or not they have a Type D personality.

# 5.3 Type D personality as a predictor of Psychological Distress5.3.1 The pattern of Psychological Distress in HF patients

Although a proportion of HF patients had clinically significant anxiety and depression in the current study, more than 70% of patients showed evidence of anxiety and depressive symptoms in the *non-clinically* significant range. There is a fairly great difference between this prevalence in a HF patient sample and the prevalence of anxiety and depression in the population of older adults. Beekman et al. (2000) found that 74% of older adults have anxiety disorder and 53% have depressive disorder. Therefore even though the sample used in the current research included the majority older adult HF patients, it is surprising that only few had significant anxiety and/or depression. Further research may facilitate an explanation for this.

The HF patient sample in the current study was male-dominant. Thus gender may have influenced the results found. There were more females who did not participate than males. Kessler et al (1994) found that women have a greater tendency to express depression and anxiety. However limited research has focused on women as the majority of studies exploring the psychological effects of heart disease have recruited male dominant patient samples. This male-dominance in research samples likely reflects the ratio of men to women in CHD and HF populations generally i.e. about 3:1 heart disease and HF population.

In addition this finding may have represented the patient sample that agreed to participate. Those not suffering clinical anxiety or depression were more likely to participate in the study and complete the questionnaires. It can be seen from Table 4.1 that some of the reasons for not participating in the study were due to fatigue, emotional distress or having recently experienced for example, a bereavement. Therefore, the percentage of clinically depressed or anxious patients may be somewhat underestimated. Close observation of the general levels of clinical depression and anxiety in this HF patient sample indicated that slightly more patients experienced mild-moderate depression than severe. This may be due to the small number of HF patients experiencing severe HF (NYHA class III / IV). There has been uncertainty about whether distress has a direct relationship with illness severity, (as found by Junger et al 2004), or not (as found by Denollet and Brusaert 1998). As the current patient sample had HF patients with predominantly mild-moderate severity of HF, it follows that participants were generally experiencing mild-moderate HF symptoms. Therefore Junger et al's findings may explain why they experienced a mild-moderate level of distress.

In the current study, there was, however, a difference in the experience of depression and anxiety. Slightly more patients experienced mild-moderate depression than those who experienced similar level of anxiety. Yet, more patients appeared to experience severe anxiety than experienced severe depression. Future research could be done involving a larger HF sample size to explore the prevalence of depression and anxiety in HF patients. This would indicate the level of psychological risk in this patient group, and alert staff as to the need for psychological intervention. Due to the small sample size of the current study, it is difficult to confirm the results found.

In the current study, while a difference in anxiety and depression was seen, the difference was not great. Indeed, Jiang et al. (2004) had demonstrated when evaluating the prognostic value of anxiety and depression in patients with HF, that anxiety and depression were highly correlated.

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### 5.3.2 Type D as a predictor of distress

In exploring this research question, the demographical variables controlled for were: patients receiving cardiac surgery, cardiac history indicating the main precursor of the patient's heart failure, age, patients experiencing previous heart attacks, patients with a previous psychiatric history and the severity of HF (NYHA class). Even after adjusting for these variables, Type D personality was shown to significantly predict the experience of depression in this HF patient sample. It did not however predict anxiety symptoms. This is in contrast to Denollet (2000) who found that Type D is a major determinant of negative emotion, including anxiety. Other recent studies have found an association between Type D and anxiety and depression. These studies also used the HADS measure, for example Pederson et al. (2004) who recruited patients with an Implanted Cardioverter Defibrillator (ICD - CHD patients at risk of fatal arrhythmia and implanted with an internal defibrillator). Although their cardiac disease is different, their symptoms are similar to patients with other forms of CHD and HF patients. There was a correlational relationship found between Type D and psychological distress (in the form of anxiety and depression). However in the current study a significant predicative relationship between Type D and depression in HF patients was found. A similar predicative relationship between Type D and anxiety may not have been found due to the low statistical power of this analysis (because of the relatively small sample size).

The severity of HF (NYHA class) also predicted distress (anxiety/depression). There is much debate in the literature as regards the extent to which emotional distress is caused by the severity of cardiac disorder (as discussed earlier in Chapter 1). Within the current research, results suggest that emotional distress is also significantly predicted by the sevirty of HF. However, just as other research has found (e.g. Pederson et al. 2006), Type D personality has been shown to independently predict depressive symptoms in cardiac patients. Through the Univariate analyses the same result was found in HF patients in the current study.

A limitation of this study was that 'history of psychological illness' was only recorded on a subjective level and psychiatric illness was measured according to the data recorded on the departmental database. No patients stated in the final question that they had experienced psychological or psychiatric illness in the past. Although it may be justifiable that no participants had a psychiatric history, it is possible that patients may have chosen not to state this information, or may have forgotten such information. Records from GP or medical records may have been another way this information could have been extracted. However this was not done due to patient confidentiality and the fact that some may have been willing to have their notes looked at for this reason.

### 5.4 The main coping style in HF patients

Firstly, when evaluating the individual coping strategies, 'acceptance' was found to be the overall main coping strategy in this HF patient sample. This coping strategy was also found by Buetow et al. (2001) to be highly salient at ages 70 or older. They described it as an 'objective, non destructive approach' used to control illness (Buetow et al., 2001). The majority of patients in this study were also above 70 years of age.

'Acceptance' has been described by Lazarus and Folkman (1984) as an individual accepting the reality of a stressful situation as someone engaged in the attempt to deal with the situation. Acceptance impinges on 2 aspects of the coping process: Acceptance of a stressor as real occurs in primary appraisal and acceptance of a current absence of active coping strategies relates to primary appraisal (Lazarus, 1966). Therefore according to early research, acceptance seems to be a positive coping strategy. This finding as well as Buetow et al. (2001) is in conflict with acceptance being traditionally termed as 'emotion-focused' coping. As indicated by the literature reviewed in Chapter 1, 'emotion-focused' coping has been indicated traditionally to be less adaptive (Lazarus & Folkman, 1984).

The relationship between coping and psychological outcome is an important one, and enables us to evaluate whether a particular coping strategy is beneficial or not for a particular patient group, in this particular case, HF patients. From simple observation of the mean scores, engaged coping styles appeared to be used more than disengagement coping styles. The most used engagement coping strategy was 'emotional support'. This might be explained by the fact that emotional support is conceptualized as the expression of positive affect, empathetic understanding and the encouragement of expressions of feeling (Sherbourne *et al.*, 1996). These actions are relevant in combating the commonly reported negative feelings of self-blame, anger and shame in HF patients (Friedman et al., 1992). In the current research, the most used disengagement coping strategy was 'self blame'. This may be due to IHD/HF patients being seen to be somehow responsible for their disease through certain behaviours e.g. poor diet, smoking, lack of exercise etc. Although the usage of these coping strategies was low (as indicated by the mean scores being less than 4), they were used relatively more than other coping strategies. The coping method of 'active behavioural coping' used by HF patients in Doering et al. (2004) resulted in patients feeling less fatigue and more vigour. This coping method was similar to the engagement coping strategy 'emotional support' used by HF patients in the current study as it involved patients soliciting emotional, instrumental and informational support. However the latter two forms of support ('instrumental and informational') were not used so much by the current HF patients. This may be because most people seem to be using an 'acceptance' coping strategy, they may not be seeking out support in terms of 'information' regarding their illness as they may still be coming to terms with their diagnoses.

# 5.5 The relationship between Type D personality, coping and psychological distress in HF patients

# 5.5.1 The relationship between coping styles and psychological distress

When exploring the relationship between coping and psychological distress, it seemed that the engagement coping strategies, positive reframing and emotional support significantly decreased depressive symptoms (see Table 4.4 for the strong significant correlations found, (p<0.05 for both)). These engagement coping strategies, if categorized

as in Doering et al's (2004) study, may be termed 'active cognitive coping' and 'active behavioural coping' respectively. With using these two terms, this current research implies that both 'active behavioural' and 'active cognitive' coping influence negative emotion by decreasing it. This is in contrast to the finding of Doering et al. (2004) that active cognitive coping (i.e. coping through using appraisal to judge the stressfulness of their illness compared with other individuals or to other situations they have faced) does not have any influence upon negative emotion. In the past, other investigators have found that patients with chronic disease who use an active cognitive coping style are less likely to have maladaptive thoughts and attitudes of an obsessional and ruminative nature (Namir et al., 1987). In terms of HF, patients cannot alter the illness or its consequences by using cognitive coping skills. This may explain why 'active cognitive coping' in these HF patients may have had no impact in Doering et al's (2004) study. However this does not explain why this strategy of coping was found to have a positive impact in reducing depressive symptoms in HF patients in the current research. Although a different coping measure was used in both studies, they both employed a cross-sectional design, including the majority of HF patients with severity NYHA class II. Thus the sample drawn in both studies included all HF patients and the majority of patients in both studies seemed to be having to cope with a similar level of physical symptoms of HF. However, in this statement we are disregarding individual differences between patients which may be affecting their coping styles. For example, the difference in the two studies was the average age group. In Doering et al. (2004) participants were generally between 50 and 60 years of age.

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It may be that active cognitive coping is only beneficial for younger patients. The majority of participants in the current study were between 70 and 80 years of age, and cognitive coping strategies (such as, positive reframing) were found to correlate with lower levels of distress, indicating their benefit. Therefore, the usefulness of active cognitive coping could be dependent upon age. One possible explanation for this may be that older adults have more opportunity to refelect on their circumstances and/or are less likely to use behavioural strategies versus younger adults.

It seems that when HF patients used the positive reframing coping strategy, there was a positive impact on their psychological well-being. When correlating 'venting' (another engagement coping strategy from the Brief COPE) with depression or anxiety, a significant positive relationship was found. Thus those using venting as a coping strategy received more of a negative psychological response. It could be inferred that the ways in which HF patients were venting was disengaging or maladaptive. For example, perhaps they were appraising their illness in a negative way. However due to the use of a self report measure of coping, this was not able to be investigated. One could criticize the Brief COPE measure in the way 'venting' is termed as an engagement coping style. With this reasoning it could be suggested that 'venting' be termed as an engagement as well as a disengagement coping style; perhaps using positive statements as examples of how people would vent in a neutral positive way (engaging coping strategy), and then using negative statements as examples of how people would vent in a negative way. The patient could then pick the strategy most appropriate to them. However, it is possible that the coping strategy 'venting' warrants further

investigation for its use by HF patients. With further research, it may be found that in HF patients, particularly older adults, people may vent in positive as well as negative ways. However this presumption is yet to be confirmed.

The disengagement coping strategies, behavioural disengagement, denial and self blame. were found to be strongly, significantly, positively correlated with both depression and anxiety. The positive correlation between self blame and distress seems logical as 'self blame' involves by definition, 'a critical self analysis'. Studies on cancer patients have also suggested it being associated with greater emotional distress (Berckman & Austin, 1993) and increased levels of depression (Faller et al., 1995). The effects of the other disengagement coping strategies, behavioural disengagement and denial (both being forms of avoidance coping), upon psychological distress also seem to fit with previous research (Doering et al. 2004; Stein et al. (1989) and Lowery et al. (1992)). This suggests that there is an increased risk of mortality for patients using these styles. Murberg and Bru (2004)also found a negative effect of behavioural and mental disengagement. Mental disengagement seemed to have a marginal effect however behavioural disengagement had a significant effect on mortality in HF patients. Therefore it may be inferred that behavioural disengagement may be affecting mortality rate due to its impact on apsychological well-being. The methodological similarities between the current study and Murberg & Bru (2004) indicates that there is a high possibility that this link exists. In addition similar coping measures were used in both studies as well as the method of grouping the strategies of coping (the COPE in Murberg & Bru, 2004; and the brief version of the COPE inventory in the current study).

Behavioural disengagement and denial therefore both seem to be negative coping strategies and have been termed 'avoidance' strategies (Doering et al. 2004). The majority of HF patients in the current research were over 70 years. The negative effect of using these avoidance coping strategies shown in the current research is in conflict with Buetow et al (2001)'s finding, that patients over 70 found avoidance to be a beneficial coping strategy. Future research could use interviews to determine why individuals used particular coping styles, through analyses of HF patients' subjective responses. Buetow et al. (2001) interviewed individuals in their study and found that avoidance can reduce anxiety and aid recovery during *acute* HF. Patients in the current research were experiencing *chronic* HF, which requires long term adjustment. Avoidance may have prevented active participation in decision making and lifestyle changes – both required in long-term adjustment – thus resulting in psychological distress (Lowery et al. 1992). This may explain why these avoidance coping strategies seem less beneficial for chronic HF.

# 5.5.2 The relationship between personality, coping and distress

Therefore there seems to be relationships between particular coping strategies and distress and also a predicative effect of Type D personality upon depression or anxiety. When exploring whether there is a directional pathway between these three variables, it was found that coping did not act as a mediator variable when investigating the relationship of Type D on distress. Type D needed to be explored in terms of its separate

subscales NA and SI. When the independent variable, personality, was looked at in this way, coping then showed a mediating effect between personality and psychological distress. Previous research has found that NA and SI have an interactive effect upon cardiac outcomes in patients (e.g.) Denollet et al. 2006). Habra et al. (2003) found that SI and NA exerted different pathogenic effects in the cardiovascular system and thus may also affect emotional distress differently.

# 5.6 The Clinical Utility of Type D personality measured using the DS14 questionnaire

The significant predicative affect of Type D on depression suggests that the Type D DS14 questionnaire may be an appropriate measure for detecting patients experiencing or at risk of depression. Furthermore, the DS14 questionnaire can not only indicate the likelihood that individuals experience distress, it can also provide insight into the source of that distress (e.g. the coping style being used). In this sense, it is arguably a more useful tool in early screening, than standardized symptom assessment measures.

A limitation of the DS14 questionnaire is that it employs a 5-point likert scale (0-4). This posed difficulties in the current study as participants often circled 2 (i.e. 'Neutral'). This may be unhelpful as this response gives no indication of the participants level of NA or SI. Indeed, the DS14 lacks any explanation of how to interpret 'neutral' responses. If the clinician was to examine the questionnaire in a qualitative way, i.e. looking at the

responses to each individual question to explore which areas may need intervention, then this task may be more difficult if a neutral response in the DS14 is given.

#### **5.7 Clinical Implications**

The current study implies that certain HF patients are at risk of experiencing depression if they have a Type D personality. This has important implications for service provision as peoples' inhibitions to socialise, as well as inhibitions to express oneself emotionally, can impact on psychological distress. Therefore awareness by staff and carers of the HF patient regarding NA/SI tendencies via early screening using the DS14 questionnaire\_may allow early identification of at risk patients and may also suggest use of maladaptive, disengagement coping styles. If these styles are present, they may then be targeted by psychosocial interventions. It is important this occurs early following diagnosis of HF as previous research has shown that depression symptoms increase with the years following diagnosis (Junger et al., 2004). Increasing patient awareness regarding their vulnerabilities of experiencing distress, may also be beneficial. This could be achieved by education programmes, attendance at CR programmes which have built-in sessions around coping etc. This may increase the likelihood of them challenging their beliefs and personal habitual characteristics, thus affecting future vulnerabilities of experiencing psychological distress.

A further clinical implication of utilizing this personality diagnosis of Type D is that the characteristics of this personality type suggests an 'inhibited self'. As these individuals,

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by definition, will find it difficult to express emotion, this may imply that one of the goals for therapy would be to facilitate this expression through the process of cognitive behavioural therapy. A behavioural approach could be used to begin the therapeutic process. This may involve, for example, a graded desensitization procedure enabling an increase in the individual's self confidence and self esteem regards social interaction. An increase in self-confidence in confronting anxiety-provoking situations may encourage generalization of this successful behaviour to other more anxiety provoking situations whilst exploring thoughts and feelings using this cognitive behavioural approach.

Further to this the current research implies that HF patients use a variety of coping styles. More importantly, Type D patients are more likely to use Disengagement coping styles which may be maladaptive. Some coping styles are arguably better than others and psychosocial interventions could target these.

In conclusion, the use of a standardized measure, such as the DS14, could increase the accuracy and efficiency of the assessment process and serve to guide the development of individualized care plans for HF patients. However the likert scale used in the DS14 should perhaps be reduced to a 4-point scale (i.e. 0-3) to avoid 'neutral' answers.

### **5.8** Theoretical Implications of Research

Previous research has only investigated the prevalence of Type D in other cardiac patients (e.g. Post MI patients, Denollet et al. (1995)). Previous literature has also

indicated the ability of Type D to predict depression (e.g. Denollet et al. (2006b). The prevalence of Type D found in this study indicate that the patients are at risk of depression. Indeed, it was found that Type D predicted distress in this HF patient sample. Psychological distress has been shown to predict mortality and a poor prognosis in HF patients (e.g. Denollet et al. (2000)). Hence this prevalence of Type D in a third of HF patients would imply such risks of mortality and morbidity in this proportion of HF patients. As Type D has been found to predict depression, this supports the transactional stress-coping model which presents personality as an antecedent of psychological distress. This therefore adds to the literature on HF patients in terms of locating those patients more at risk of poor prognosis and mortality. However, it does not predict anxiety for the possible reasons mentioned above. The interactive effects of NA and SI predict depression. However, when exploring the mechanism behind this effect, coping only mediates this effect when these two characteristics of Type D personality are looked at separately. This finding has not been established in previous studies.

When exploring the mediator effects of coping in the relationship between Type D and psychological distress, coping did not act as a mediator. This may be due to Type D being a dichotomous variable. This means that patients are termed as either Type D or Not Type D. Type D only concerns those patients with definite NA and SI characteristics. There is no concept in current theory of Type D regarding 'the level of Type D' a patient may have. This may have had consequences on the findings for Research Question 4 of this study, as it excludes patients with higher NA/SI than others however do not quite reach the criteria for a label of Type D personality. The subscales of Type D however are

continuous variables. This indicates that patients could lie anywhere along a continuum of NA and SI. This is likely a more realistic way of conceptualizing personality. When NA and SI were used independently in the mediational model, coping did have a significant mediating effect and therefore, may be more successful in investigating coping styles of HF patients. This implication is in contrast to previous findings showing NA and SI to have an interactive effect on psychological distress (DenolletJ. Denollet, 1998; Denollet, 2000)

The finding that coping does not mediate between Type D and distress could also imply that other factors of the Lazarus and Folkman model are mediating between personality and distress. Participants in the study voluntarily commented on their thoughts regarding the questionnaires they completed. Rather than, or in addition to 'coping' which has been used as the mediating factor in this study, beliefs and health perceptions may be other factors influencing patients' distress levels. As understood by Beck's cognitive model of depression (Beck, 1976), life experiences and critical events may antecede certain thoughts, beliefs about oneself (self perception) and the level at which diagnosis of HF impacts on people their. Such events also in turn, affect peoples' mood (Beck, 1976). This is illustrated from patients comments on questionnaires obtained during the study:

#### Patient A:

"These questions are dependent on the individual's mind. The answer to the question really depends on your own individual experiences. Your answers are dependent on your thoughts and beliefs"

# Patient B:

"I have been very active throughout my life. The hardest thing is to be less active. I have been flying aeroplanes all my life and have taken this in my stride. I have been through the war time period. Compared to what I have been through, this heart problem is nothing! I just get on with it. I don't really have any stress....I just get very tired and worn out easily and this is the frustrating thing."

Patient A and B's response indicate the ambivalence in some patients about choosing a response on a questionnaire. This ambivalence was specifically shown when completing questions in the Brief COPE. Interviewing patients regarding their coping styles may have elicited more subjective responses and increased the validity of patients' coping measures.

Some individuals felt that their level of distress depended on their age (Patient C). Other patients commented on the limitations caused by their physical symptoms (e.g fatigue, work limitations) which appear to precipitate their frustration and low mood (Patient D).

Patient C:

"I feel that the older you get, you get more impatient with things anyway."

# Patient D:

A wife commented on her husband: "He gets really breathless and that limits him a lot. That's the main thing really, it limits you."

Therefore, in addition to the physical limitations HF inflicts on an individual, an individuals life experiences and the patients' illness beliefs and perceptions of their illness may also play an important role in level of distress experienced.

Patients' subjective responses such as those given above, may imply that there are other factors which may mediate the relationship between Type D and depression. The factors mentioned above may all play a role in this relationship (i.e. illness beliefs and perceptions, how individuals appraise their situation and their physical symptoms, and their life experiences).

Another implication of this research is that it seems to support previous research theorizing that emotional expression is beneficial. Participants scoring highly on the Type D scale suggests these people show inhibitions to express emotion and to interact with others, i.e. forms of inhibition of emotional expression. Furthermore, this and other research has shown that Type D predicts depression, which implies that lack of emotional expression may lead to depressive symptoms. The DS14 questionnaire could be used indirectly to measure 'level of emotional expression'. Psychological intervention to promote emotional expression and/or social interaction may then reduce the risk of patients developing depression.

However contradictory to this line of theorizing, when people used 'emotional expression' as a coping strategy in the current study, distress increased. For example, the more HF patients used the 'venting' coping strategy, the more distressed they were. This equivocal result clearly warrants further investigation.

# 5.9 Theoretical strengths and limitations

The main theoretical strength is use of two constructs from the Lazarus-Folkman transactional stress coping model to investigate distress in HF patients. Coping is complex construct but it adds to the literature through its role in mediating personality and distress. It adds to descriptive research regarding coping in cardiac patients.

Previous results found when investigating post-MI patients (i.e. a 30% prevalence) has been replicated in HF patients. Furthermore, previous research has shown that HF patients are at risk of suffering distress. Type D has been found to be a predictor of distress.

Psychological distress in HF patients has been found to increase risk of significant morbidity and mortality. Thus, identifying vulnerability factors may be highly beneficial in attempting to reduce morbidity and mortality.

There are theoretical limitations to this research though. Firstly, Type D includes personality characteristics, which shows to be linked to psychological distress. Due to the dichotomous nature of the Type D personality construct (i.e. Type D or not), it does not allow for those people who may partially fulfill the criteria for the construct. Hence this limits the ecological validity of the research.

Research to date however, acknowledges the potential benefits of identifying whether a HF patient is Type D or not. This may be clinically useful to alert staff to the vulnerability of experiencing psychological distress and an increased risk of cardiac events (Denollet et al. 2006). Denollet et al. (1996) also found that the high mortality risk among Type D patients was attributable to the interactive effect of the two subscales, NA and SI. However, other studies have found that the individual contributions of each subscale explain the mechanism behind the experience of psychological distress much clearer, than when solely measuring Type D as an overall construct (e.g. Habra et al. 2003). In the current study, these individual subscales of Type D personality were related more to disengagement coping strategies (e.g. denial, self blame) versus the overall Type D construct. Furthermore, coping style was found to mediate the positive relationship between Type D personality and distress when the separate subscales of NA and SI were analysed.

Furthermore, other mediating variables were not explored. Lazarus and Folkman (1984) model include appraisal and perceived social support as other psychological mediating processes. Primary appraisal is only one component of Lazarus' stress-coping framework.

Lazarus bases this framework not only on the appraisal of an event as stressful but also in terms of how individuals appraise the coping resources they have available to them in order to cope with the demands of the stressful event Lazarus and Folkman 1984). The current study did not explore how the individuals appraise coping. However, according to Lazarus, it is necessary to consider appraisal of coping in order to determine emotional outcome (Lazarus and Folkman 1984). Hence although it was not an objective of this research to explore appraisal in HF patients, it brings the suitability of using the primary appraisal component of the model into question.

In addition, perceived social support has also been suggested as a determinant of psychological distress, (Morris *et al.*, 1991) and this was not measured in the present study. Although it may not be feasible to directly influence the amount of support an individual receives from family and friends, it may be possible to enhance perceived support by providing professional psychosocial support throughout the treatment process. Furthermore, encouraging patients to attend cardiac rehabilitation programmes may enhance perceived social support and this may, in turn lead to a reduction in psychological distress. The variable 'support' was touched on in the Brief COPE however, 'perceived social support' was not. Individuals may be receiving a lot of emotional or instrumental support, however they may not perceive it as 'support'. This is therefore an indication for future research.

Further to this it is evident that other premorbid and prospective information could have been taken into account, such as patients living with a partner or family versus patients

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living alone. These factors may have provided a measure of 'social support'. Social isolation and a lack of emotional support have been repeatedly identified as factors relating to ill health and premature mortality (House et al., 1988). This research however could hypothesise, using the framework of from the Lazarus and Folkman stress and coping model, that individual differences in personality may encourage or discourage individuals to use social support, and therefore assessing for Type D personality may be more fundamental than measuring the level of social support. Furthermore, psychological interventions, such as, Behavioural Therapy, could be targeted at aspects of Type D personality whereas to change an individual's social circumstances may be more difficult and/or service and cost intensive.

Nevertheless, as previous literature has indicated, other factors may also affect the level of psychological distress experienced by these patients. The majority of the sample, used in the current study, were older adults. Factors such as cognitive deficits and other physical health problems may have also contributed to the level of psychological distress. For example, memory deficits and anxieties due to these may encourage increased frustration and low mood in older adults. Furthermore, patients also suffering comorbid physical pain may further contribute to the individual's level of distress experienced. However, even if these pieces of information were recorded and adjusted for, the power of the results may be significantly reduced due to the relatively small sample size. A future larger scale study may benefit from measuring such factors and controlling for them within the analysis. This would allow a more reliable result to be achieved when investigating the extent to which Type D is indeed a predictor of depression and/or anxiety in HF patients.

#### 5.10 Methodological strengths and limitations

The current study employed a cross-sectional, quantitative design. The sample used included HF patients of all severities and a range of ages. It is one of few studies that have investigated psychological distress in all HF patients regardless of severity of NYHA class. Thus it is not subject to limitations of previous research which included HF patients aged 40 and over, only patients with severe HF, or excluding patients with severe HF. The results of the current study have intended to be generalisable to the HF patient population in general. In terms of HF severity, mental health history and cardiac history, in addition to age and gender, the participants of this sample was found to be representable of the general HF population.

The Brief COPE inventory has the advantage of being built from acknowledged theoretical models (Lazarus' transactional model of stress, 1984; behavioral self-regulation model, Carver and Scheier, 1981, 1998). It can be used to assess trait coping (the usual way people cope with stress in everyday life) and state coping (the particular way people cope with a specific stressful situation). Thus, it was appropriate for this study due to these reasons. In addition, it is a multidimensional measure and measures a variety of coping strategies.

As is the COPE inventory, the Brief COPE is a measure used for many health-relevant studies : drugs addiction, ageing, breast cancer, depression, AIDS... Both measures are widely used in Anglophone countries and translated in many languages. Today, the COPE inventory has been validated among Estonian, Croatian, Chinese, and Italian populations and the Brief COPE is also validated among Spanish people. Thus, the worldwide use of this coping inventory should allow a broad comparison of medical and psychological research for coping strategies regarding every kind of pathologies.

However individuals generally used a mixture of positive and negative coping styles. It may be that the Brief COPE was not appropriate for this group of patients. As this measure was not specifically related to a cardiac population, patients may have found it difficult to answer and relate the questions asked to their situation.

Nevertheless, a further methodological strength of this study was the manner in which the data were collected. Due to the presence of the researcher within the department during the time participants took to complete questionnaires, participants were able to have their queries regarding particular questions, answered there and then, thus increasing the validity of the responses given. However, some participants were unable to complete the questionnaire in the department thus completed it at home. Furthermore, some participants used their partners or friends to discuss questions which may have also affected the reliability of the responses. Having a separate room in which participants could have space for participants to independently complete the questionnaire, may have reduced this potential confounding variable.

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Therefore, in addition to the strengths described above, there are also limitations to the current study that must be considered. Firstly, although the HF patient sample in the study was found to be representable of the general HF population, this study could be criticized as there was a ratio of 3:1 (men to women respectively). Also the majority of patients were in the age range of 70-80 years, and were diagnosed with NYHA class II severity of HF. However, the predominance of males and older people may reflect the characteristics of the actual HF population. Also, there may be other demographical details not accounted for in this study that may have impacted on individuals' levels of distress e.g. marital status and social support and living alone. However, introducing questions regarding these possible confounding variables may have reduced the focus of the study.

Table 4.1 indicates the reasons why people chose not to participate. The main reasons were regarding their experience of an emotional event, thus did not feel in the right frame of mind to complete the questionnaire. Interviews may have been an alternative approach as they would be able to talk through their difficulties or concerns.

In terms of the measures used in the study, the HADS was not cardiac specific. HADS has been validated on a medical population and is a brief measure of both anxiety and depression. However, it does not seem to take into account the inevitable physical symptoms of HF (i.e. the typical symptoms of HF being, shortness of breath, fatigue,

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lethargy and palpitations) and may attribute them to solely arise from psychological causes.

Finally, the study may have benefited from a larger sample size. This may have allowed for a greater number of participants in the subgroups (i.e. in the different groups of distress levels, or HF severity). Analyses was dependent on small numbers. Although this is sufficient to detect trends in the data, the statistical power to detect differences and associations between variables was low. Despite this it is important to highlight that the participant sample represented 45 percent of all HF patients and 58% of patients approached during the data collection period.

The above limitations not withstanding, this study contributes to the currently limited research base of prospective studies on HF patients and Type D personality and the relationship between Type D personality, coping and distress.

# 5.11 Recommendations for Future Research

The current study suggests that Type D predicts depression however not anxiety in HF patients. Although this may be a valid finding, this may have been reached as a result of the measure of anxiety being used. Subsequent research may overcome this shortcoming by using Cardiac-specific questionnaires such as the Cardiac Depression Scale and the Cardiac Anxiety Questionnaire. Also, the implementation of a large scale study would increase participant numbers thus possibly increasing the number of participants with

significant anxiety. Increased participant numbers in a large scale study may also allow the results to be less influenced by individual variation. This may have influenced the problem in exploring the main coping strategy or coping style.

An additional recommendation for further research is to conduct an interventional study to explore whether CBT intervention may help with patients using more disengagement coping styles, and thus impact on their level of psychological distress. Finally, further research is warranted to validate these preliminary findings and this study may help to direct future research regarding the mechanism behind the experience of psychological distress in HF patients.

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# APPENDICES

## Appendix I:

- Questionnaire Booklet

Hull and East Yorkshire Hospitals

**NHS Trust** 

Castle Hill Hospital Castle Road Cottingham East Yorkshire HU16 5JQ

This is the questionnaire booklet.

Throughout this questionnaire, we are interested in what YOU think, feel and believe. There are NO right or wrong answers. Please feel free to ask any questions.

Thank you for taking the time to complete this questionnaire. Please make sure you fill in all sections and try not to miss any pages.

Thank you.

**Yours Sincerely** 

Dr. D. J. Frizelle Clinical Psychologist Mashal Parekh Research Assistant <u>Part 1:</u> The following questions look at how you have been feeling DURING THE PAST 7 DAYS. Please read each question and place a tick in the box opposite the reply which comes closest to how you have been feeling during the past week. Please try to answer all of the questions and not miss any out if you can. Thank you.

#### 1. I feel tense and 'wound up':

Most of the time	Τ
A lot of the time	
Time to time, occasionally	
Not at all	1

#### 2. I still enjoy the things I used to enjoy:

Definitely as much	
Not quite so much	
Only a little	
Hardly at all	

## 3. I get a sort of frightened feeling as if something awful is about to happen:

Very definitely and quite badly	
Yes, but not too badly	
A little but it doesn't worry me	
Not at all	

## 4. I can laugh and see the funny side of things:

As much as I ever could	
Not quite so much now	
Definitely not so much now	
Not at all	

5. Worrying thoughts go through my mind:

A great deal of the time	
A lot of the time	
From time to time but not too often	
Only occasionally	

#### 6. I feel cheerful:

Not at all	
Not often	
Sometimes	
Most of the time	

#### 7. I can sit at ease and feel relaxed:

Definitely	
Usually	
Not often	
Not at all	

#### 8. I feel as if I am slowed down:

Nearly all of the time	
Very often	
Sometimes	
Not at all	

## 9. I get a sort of frightened feeling like 'butterflies' in the stomach:

Not at all	
Occasionally	
Quite often	
Very often	

#### 10. I have lost interest in my appearance:

Definitely	
I don't take as much care as I should	
I may not take as much care	
I take just as much care as ever	

## 11. I feel restless as if I have to be on the move:

Very much indeed	
Quite a lot	
Not very much	
Not at all	

#### 12. I look forward with enjoyment to things:

As much as I ever did	
Rather less than I used to	
Definitely less than I used to	
Hardly at all	

#### 13. I get sudden feelings of panic:

Very often indeed	
Quite often	
Not very often	
Not at all	

## 14. I can enjoy a good book or radio or television programme:

Often	
Sometimes	
Not often	
Not at all	

<u>**Part 2:**</u> This section asks you things about how you feel <u>at present</u>. Next to each statement there is a rating scale. Please rate each statement by putting a cross in the box that best applies to you.

	Never 0	Rarely 1	Sometimes 2	Often 3	Always 4
1. I pay attention to my heart beat					
2. I avoid physical exertion		<u> </u>		1	
3. My racing heart wakes me up at night					
4. Chest pain/discomfort wakes me up at night					
5. I take it easy as much as possible					
6. I check my pulse					
7. I avoid exercise or other physical work					
8. I can feel my heart in my chest					
9. I avoid activities that make my heart beat faster					
10. If tests come out normal, I still worry about my heart			• •		
11. I feel safe being around a hospital, physician or other medical facility.					
12. I avoid activities that make me sweat					
13. I worry that doctors do not believe my symptoms are real					
When I have chest discomfort or wh	hen my hea	art is beatir	ng fast:		
14. I worry that I may have a heart attack					
15. I have difficulty concentrating on anything else					
16. I get frightened					
17. I like to be checked out by a doctor					
18. I tell my family or friends					

Part 3: This section asks you things about how you feel at present. Next to each statement there is a rating scale from 1 to 7 for you to indicate how much you agree or disagree with each statement. Please indicate how strongly you agree or disagree with each statement by circling one of the numbers on the scale

For example: Strongly disagree

1(2)34567

Strongly agree

This indicates that you quite strongly disagree with the statement. As before, there are NO right or wrong answers. Please ENSURE you have completed ALL the questions

<b>CHECK TO MAKE SURE YOU HAVE</b>	STRONGLY STRONGLY					
ANSWERED ALL QUESTIONS	DISAGREE AGREE					
1. I have dropped many of my interests	1 2 3 4 5 6 7					
and activities	None dropped All dropped					
2. My concentration is as good as it ever	1 2 3 4 5 6 7					
was	Very poor Excellent					
	Concentration Concentration					
3. I can't be bothered do anything	1 2 3 4 5 6 7					
much	Keen to do Can't be					
	Things bothered					
4. I get pleasure from life at present	1 2 3 4 5 6 7					
•	No pleasure Great					
	Pleasure					
5. I am concerned about the uncertainty	1 2 3 4 5 6 7					
of my health	Not concerned Very					
	concerned					
6. I may not recover properly						
	Completely recover					
	<u>Completely</u> recover					
7. My sleep is restless and disturbed						
	Not restless Very					
	Kestless					
8. I am not the person I used to be						
	Just the same Completely					
9. I wake up in the early hours of the	1 2 3 4 5 0 /					
10. I fool like I'm living on horrowed	1 2 3 A 5 6 7					
time	Unlimited Very much on					
	Time borrowed time					
11 Sometimes I feel life is not worth	1 2 3 4 5 6 7					
living	Very true Not true					
m . m P	atall					
	1 2 3 4 5 6 7					

12. I feel in good spirits	Very poor spirits	Excellent
	1 2 3 4	5 6 Spirits
13. The possibility of sudden death	1 2 3 4	5 6 7
worries me	Not at all	Very worried
14. There is only misery in the future for	1 2 3 4	5 6 7
me	No misery	Only Misery
15. My mind is as fast and alert as	1 2 3 4	5 6 7
always	Slow and	Very fast
	Inattentive	and alert
16. I get hardly anything done	1 2 3 4	5 6 7
	Everything	Nothing
	Done	done
17. My problems are not yet over	1 2 3 4	5 6 7
	All problems	Still major
	Over	problems
18. Things which I regret about my life	1 2 3 4	5 6 7
are bothering me	Absolutely no	Great
	Regrets	regrets
19. I gain just as much pleasure from my	1 2 3 4	5 6 7
leisure activities as I used to	No pleasure	Very great
	atall	pleasure
20. My memory is as good as it always	1 2 3 4	5 6 7
was	Very poor	Excellent
	Memory	memory
21. I became tearful more easily than	1 2 3 4	5 6 7
before	Not tearful	Very easily
	atall	tearful
22. I seem to get more easily irritated by	1 2 3 4 3	5 6 7
others than before	Never irritated	Very easily
		irritated
23. I feel independent and in control of	1 2 3 4 5	5 6 7
my life	No independence	Completely
		Independent
24. I lose my temper more easily	1 2 3 4 5	5 6 7
nowadays	Never lose	Lose it very
	my temper	easily
25. I feel frustrated	1 2 3 4 5	5 6 7
	Not at all	Extremely
	Frustrated	frustrated
26. I am concerned about my capacity	1 2 3 4 5	5 6 7
for sexual activity	No concern	Grave
	atall	concern

<u>PART 4:</u> This section asks you about some of your personal characteristics. Below are a number of statements that people often use to describe themselves. Please read each statement and then *circle* the appropriate *number* next to that statement to indicate your answer. There are NO right or wrong answers. Your own impression is the only thing that matters.

۰.

0=FALSE	1=MOSTLY FALSE 2=NEUTRAL 3=MOSTLY TRUE 4=TRU
	<sup>1</sup> I make contact easily when I meet people $\Box 0$ 1 2 3 4
	<sup>2</sup> I often make a fuss about unimportant things $\Box 0$ 1 2 3 4
	<sup>3</sup> I often talk to strangers
	<sup>4</sup> I often feel unhappy
	<sup>5</sup> I am often irritated 🖓 0 1 2 3 4
	<sup>6</sup> I often feel inhibited in social interactions 📮 0 1 2 3 4
	<sup>7</sup> I take a gloomy view of things
	<sup>8</sup> I find it hard to start a conversation $\Box 0$ 1 2 3 4
	<sup>9</sup> I am often in a bad mood
	<sup>10</sup> I am a closed kind of person
	<sup>11</sup> I would rather keep other people at a distance <b>Q</b> 0 1 2 3 4
	<sup>12</sup> I often find myself worrying about something $\Box 0$ 1 2 3 4
	<sup>13</sup> I am often down in the dumps 📮 0 1 2 3 4
	<sup>14</sup> When socializing, I don't find the right things

<u>PART 5:</u> This section looks at the ways you've been coping with the stress in your life since being told you have a heart condition. There are many ways to try to deal with problems and these questions ask what you've been doing to cope.

Obviously, different people deal with things in different ways, but I'm interested in how YOU have tried to deal with it. Each item says something about a particular way of coping. I want to know to what extent you've been doing what the item says. How much or how frequently. (Don't answer on the basis of whether it seems to be working or not just whether or not you're doing it!)

Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

1 = I haven't been doing this at all
2 = I've been doing this a little bit
3 = I've been doing this a medium amount
4 = I've been doing this a lot

	I haven't been doing this at all	l've been doing this a little bit	l've been doing this a medium amount	l've been doing this a lot
	1	2	3	4
I've been turning to work or other activities to take my		<u>-</u>	<u> </u>	
Thind off unitigs.				
I've been concentrating my errorts on doing				
something about the situation I'm in.				
I've been saying to myself "this isn't real.".				
I've been using alcohol or other drugs to make		<u> </u>		
myself feel better.				
I've been getting emotional support from others.				
I've been giving up trying to deal with it.				
I've been taking action to try to make the situation				
better				
I've been refusing to believe that it has happened				
I've been saving things to let my unpleasant feelings				
escane				
L've been getting bein and advice from other people				
I've been yelding help and advice from other people.				
through it			:	
live been trying to see it in a different light, to make it				
soom mom nositive				
Sectif more positive,				
I ve been chucizing myseir				
I we been trying to come up with a strategy about				
What to do.				
The been getting comfort and understanding from			[	
Someone.				
The been giving up the alternit to cope.				
I ve been looking for something good in what is				
nappening.				
I've been making jokes about it.				
I've been doing something to think about it less, such				
as going to movies, watching IV, reading,				
daydreaming, sleeping, or snopping.				
I've been accepting the reality of the fact that it has	l l	i i i i i i i i i i i i i i i i i i i		
nappened.				
I've been expressing my negative reelings.		ł		
I've been trying to find comfort in my religion of spiritual beliefs.				
I've been trying to get advice or help from other				1
people about what to do.			1	
I've been learning to live with it.				
I've been thinking hard about what steps to take.				
I've been blaming myself for things that happened.				]
I've been praying or meditating.				
I've been making fun of the situation.				

[NOW PLEASE TURN OVER] 7

**Part 6:** This final section asks for your views about your health. Please answer every question by marking the answer as indicated. If you are unsure about how to answer, please give the best answer you can.

1. In general, would you say your health is:	(Circle one)
--	--------------

Excellent	1
Very good	.2
Good	3
Fair	4
Poor	5
	-

2. Compared to 1 year ago, how would you rate your health, in general now? (Circle one)

Much better now than 1 year ago1	Į
Somewhat better now than 1 year ago	2
About the same now as 1 year ago	J
Somewhat worse now than 1 year ago	ļ
Much worse now than 1 year ago	5

3. Activities	Yes, limited lot	a	Yes, limited little	a	No, not limited at all
Vigorous activities such as running, lifting heavy objects, taking part in strenuous sport					
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling or playing golf					
Lifting or carrying groceries					
Climbing several flights of stairs					
Climbing one flight of stairs					
Bending, kneeling or stooping					
Walking more than a mile					
Walking several miles					
Walking one mile					
Bathing or dressing yourself					

4. During the past 4 weeks, have you had any problems with your work or other daily activities as a result of your physical health?

Circle ONE number on each line		No
Cut down the amount of time you spent on work or other activities		2
Accomplished less than you would like		2
Were limited in the kind of work or other activities	1	2
Had difficulty performing the work or other activities (e.g. it took extra effort)	1	2

5. During the past 4 weeks, have you had any problems with your work or other regular activities as a result of any emotional problems (such as feeling depressed or anxious)

Circle ONE number on each line	Yes	No
Cut down the amount of time you spent on work or other activities	1	2
Accomplished less than you would like	1	2
Didn't do work or other activities as carefully as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours or groups?

Not at all	1
Slightly	2
Moderately	
Ouite a bit	4
Extremely	5

7. How much bodily pain have you had during the past 4 weeks?

Non	1
Very mild	2
Mild	3
Moderate	4
Severe	5
Very severe	6

8. During the past 4 weeks, how much did pain interfere with your normal work or activities?

Not at all	
A little bit	2
Moderately	
Ouite a bit	4
Extremely	

9. These questions are about how you feel and how you have been during the past 4 weeks. How much of the time during the past 4 weeks -

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
Did you feel full of energy?						
Have you been a very nervous person?						
Have you felt so down in the dumps that nothing could cheer you up?						
Have you felt calm and peaceful?						
Did you have a lot of energy?						
Have you felt downhearted or sad?						
Did you feel worn out?						
Have you been a happy person?						
Did you feel tired?						

10. During the past 4 weeks, how much has your physical health or emotional upset interfered with your social activities (like visiting friends, relatives etc?)

All of the time	1
Most of the time	2
Some of the time	3
A little of the time	4
None of the time	5

[NOW PLEASE TURN OVER] 10

#### 11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
I seem to get ill easier than other people					
I am as healthy as anybody I know					
I expect my health to get					
worse					
My health is excellent				1	

It would be useful for us to know if you are also coping with any other health problems at present. If you are, please could you state below what these are. Thank you.

#### WE THANK YOU VERY MUCH FOR YOUR TIME AND CONSIDERATION IN TAKING PART IN THIS RESEARCH STUDY.

## THIS QUESTIONNAIRE IS NOW COMPLETE. PLEASE COULD YOU TAKE A MINUTE TO CHECK BACK OVER YOUR ANSWERS AND MAKE SURE THAT NO PAGES OR SECTIONS ARE MISSED.

#### PLEASE RETURN TO THE RESEARCH ASSISTANT AT THE CLINIC.

### WE THANK YOU VERY MUCH FOR YOUR TIME AND CONSIDERATION IN TAKING PART IN THIS RESEARCH STUDY.

## Appendix II:

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- Ethics approval form



#### Hull and East Riding Local Research Ethics Committee

Room SC39 Coniston House (Trust Headquarters) Willerby Hill Business Park Willerby HULL **HU10 6NS** 

> Telephone: 01482 389246 Facsimile: 01482 303908

18 July 2005

Dr. Dorothy J. Frizelle Clinical Lecturer University of Hull **Department of Clinical Psychology** Hertford Building Cottingham Road, Hull. HU6 7RX

Dear Dr. Frizelle

Full title of study:

#### Prevalence of Type D personality in heart failure patients: relationship between Type D personality, coping style and distress. **REC reference number:** 05/Q1104/98

Thank you for your letter of 30/06/2005, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair

#### Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

The favourable opinion applies to the research sites listed on the attached form.

#### **Conditions of approval**

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application		03 June 2005
Investigator CV	Dr Frizelle	(None
		Specified)
Investigator CV Marshal Parekh		18 July 2005
Protocol	Flow Diagram version 3	01 June 2005
Protocol	Version 6	03 June 2005
Covering Letter	Letter addressing the	30 June 2005
	points raised by the	
	committee	
Copy of Questionnaire	Questionnaire Booklet	(None
		Specified)
Letters of Invitation to Participants	Version 2	18 July 2005
Letters of Invitation to Participants	version 3	01 June 2005
GP/Consultant Information Sheets	version 3	01 June 2005
<b>GP/Consultant Information Sheets GP letter</b>	3	01 June 2005
Participant Information Sheet	3	01 June 2005
Participant Information Sheet	version 3	01 June 2005
Participant Consent Form	Version 3	01 June 2005
Participant Consent Form	3	01 June 2005
Response to Request for Further Information		(None
•		Specified)
Letter from Professor J Cleland re the		06 July 2005
Supernova Database		
Other	University Review form	01 February
		2005
Other	Response to review	01 June 2005
	comments	

#### Management approval

The study should not commence at any NHS site until the local Principal Investigator has obtained final management approval from the R&D Department for the relevant NHS care organisation.

#### Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

#### Notification of other bodies

The Committee Administrator will notify the research sponsor and the R&D Department for NHS care organisation that the study has a favourable ethical opinion.

#### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

05/Q1104/98 Please quote this number on all correspondence

With the Committee's best wishes for the success of this project,

Yours sincerely aeme Duthie Mr Chair

Email: louise.carrison@humber.nhs.uk

Enclosures:

Attendance at Committee meeting on 18 July 2005 Standard approval conditions Site approval form (SF1)

### Appendix III:

- Patient Invite letter
- Patient Information Sheet
- Consent Form

# Hull and East Yorkshire Hospitals



NHS Trust

Castle Hill Hospital Castle Road Cottingham East Yorkshire HU16 5JO

Department of Clinical Psychology Post Graduate Medical Institute Hertford Building, University of Hull Hull, HU6 7RX

### Date

#### Dear Sir/Madam:

You are being invited to take part in a research study. The purpose of the research is to look at how personality, thoughts and feelings influence whether a person with heart problems experiences distress or not. Research has shown that these things are important for other heart patients, for example, in people who have just had a heart attack. So far, we do not know how these things influence people who have other types of heart condition. If we can understand how personality, thoughts and feelings might affect someone with a heart condition then we may be better able to care for them.

Before you decide to take part it is important for you to understand more about why the research is being done and what it will involve. Please take time to read the following information sheet carefully and do not hesitate to ask if there is anything that is not clear or if you would like more information.

Thank you for your time and consideration;

Yours Sincerely,

Dr. D. J. Frizelle Clinical Psychologist 07970 863996 d frizelle@hull.ac.uk

Professor J. Cleland Academic Cardiology 01482 875875

Mashal Parekh **Research Assistant** 07977 035 661 mashalp@hotmail.com

# Hull and East Yorkshire Hospitals

NHS Trust

Castle Hill Hospital Castle Road Cottingham East Yorkshire HU16 5JQ

#### **INFORMATION SHEET**

#### Type D personality in Heart Patients

Researcher: Dr. Dorothy J Frizelle

Research assistant: Mashal Parekh (available to answer any questions)

Unique Number: .....

#### 1. Who is carrying out the study?

The study is being carried out by Dr. Dorothy J Frizelle, Clinical Psychologist, Department of Clinical Psychology, University of Hull. The study is supervised by Professor John Cleland, (Cardiologist, Hull & East Yorkshire Hospitals NHS Trust) and Professor Esme Moniz-Cooke (Research Director, Department of Clinical Psychology, University of Hull.).

#### 2. What is the study about?

Past research studies have shown that many heart patients can experience low mood or some type of upset or anxiety as a result of their heart condition. We call this upset and low mood 'distress'. Researchers have also found that different aspects of peoples' personalities can affect whether or not they get distressed.

Therefore, this study is about how peoples thoughts, feelings and personalities might influence whether or not they get distressed by having to deal with a heart condition.

#### 3. I am interested in speaking to:

People who have a heart condition

#### 4. Do I have to take part?

It is up to you to decide whether or not to take part. If you decide to take part you are still free to withdraw at any time and without giving a reason. Participation or non-participation will not affect the standard of care or treatment you receive.

#### 5. What would I have to do?

If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. Everyone who takes part will be asked to complete a questionnaire which asks about their thoughts, feelings and different aspects of their personality.

#### 6. Will the information I give be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the hospital will have your name and address removed so that you cannot be recognised from it.

#### 7. Risks and benefits of taking part in this research.

Benefit - if you are showing signs or smptoms of clinically significant depression or anxiety, with your approval, a letter will be sent to your GP and copied to your cardiology consultant. Participants will also have the opportunity to discuss their thoughts and feelings with regards to their heart condition should they so desire.

Risks - time taken to complete questionnaires.

#### 8. I might be interested ...

If you decide you wish to take part in this research or there are any questions you wish to ask please do not hesitate to ask me at any time.

#### 9. What happens next?

You are asked to read and sign a consent form. You will then be given the questionnaire booklet to complete. The answers will then be put together with basic medical information from the clinic database. The information you give will then be analyzed along with everyone else's. Eventually, any conclusions or findings may be published in medical journals to help guide how people with a heart condition are cared for. All information which is collected about you during the course of the research will be kept strictly confidential and anonymous. You will not be able to be identified in any way.

#### 10. What if I change my mind?

You can withdraw from this study at any time, and you do not have to give reasons. If you do decide to withdraw, questionnaires will be destroyed. There are no penalties for withdrawing and no one else will be informed of your decision.

Participant identification number for this trial:.....

## I would like to take this opportunity to thank you for the time taken to read this.

Dr. D. J. Frizelle Clinical Psychologist 07970 863996 d.frizelle@hull.ac.uk Professor J. Cleland Academic Cardiology 01482 875875

Mashal Parekh Research Assistant 07977 035 661 (or 01482 464106)

# Hull and East Yorkshire Hospitals

NHS Trust

Castle Hill Hospital Castle Road Cottingham East Yorkshire HU16 5JQ

### **CONSENT FORM**

Title of the project: Type D personality in Heart Patients

Name of Researcher: Dr. Dorothy J Frizelle

Research Assistant: Mashal Parekh (available to answer any questions)

#### Unique number: .....

Please read and tick the box as appropriate.

- 1. I confirm that I have read and understood the information sheet dated 01-06-05 (version 3) for the above study and have had the opportunity to ask questions.
- 2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected.
- 3. Part of the questionnaire asks about your mood and emotional state. If from your responses we find any signs or symptoms of low mood or anxiety, we would notify your GP and Cardiologist.

YES - notify my GP & cardiologist	NO - do not notify

4. I agree to take part in the above study.

.

Name of patient	Date	Signature	
Name of researcher	Date	Signature	

-

(1 for patient; 1 for researcher; 1 to be kept for hospital notes)

2

## Appendix IV:

.

- Letter to GP to inform patients' consent to participate

# Hull and East Yorkshire Hospitals



**NHS Trust** 

**Castle Hill Hospital Castle Road** Cottingham East Yorkshire HU16 5JO

Department of Clinical Psychology Post Graduate Medical Institute Hertford Building University of Hull Hull, HU6 7RX.

Date

Dear Dr.

I am writing to inform you that your patient,

has agreed to take part in a research study to look at prevalence of type D personality in heart failure patients and how this relates to coping style and distress. This study has been approved by Hull & East Yorkshire Local Research Ethics Committee and Hull & East Yorkshire Hospitals Research & Development Department. During the course of the research, should it become apparent that your patient is showing signs of clinical significant distress, following the patient's permission, we will inform you. Should you have any questions or concerns please do not hesitate to contact us. Contact details have been given below.

Yours Sincerely,

Dr. D. J. Frizelle Clinical Psychologist 07970 863996 d.frizelle@hull.ac.uk

Professor J. Cleland Academic Cardiology 01482 875875

Mashal Parekh **Research Assistant** 07977 035 661
# Appendix V

- Mediational Model

### **Regression Equation 1:**

Regress the mediator on the independent variable

**Regression 2:** 

Regress the dependent variable on the independent variable

### **Regression 3:**

Regress the dependent variable on both the independent variable and on the mediator

Condition 1: the IV must affect the mediator in the first equation;

Condition 2: the IV must affect the DV in the second equation;

Condition 3: the mediator must affect the DV in the third equation;

**Condition4**: If all the above conditions hold in the predicted direction, then the effect of the independent variable on the dependent variable must be less in the third equation than in the second.

# Appendix VI

# - Preliminary Analyses

	Individual's status			Statistic	Std. Error
Vears old	Particoant	Mean		70.307	1.4503
		95% Confidence	Lower Bound	67.415	
		Interval for Mean	Upper Bound	73.199	
		5% Trimmed Mean		71.221	
		Median		71.850	
		Variance		151.441	
		Std. Deviation		12.3061	
		Minimum		29.0	
		Maximum		90.8	
		Range		61.8	
		Interguartile Range		14.0	
		Skewness		-1.157	.283
		Kurtosis		1.416	.559
	Non-responder	Mean		73.054	1.8233
	• • • • •	95% Confidence	Lower Bound	69.349	
		Interval for Mean	Upper Bound	76.760	
		5% Trimmed Mean		73.552	
		Median		75.700	
		Variance		116.350	
		Std. Deviation		10.7866	
		Minimum		46.0	
		Maximum		88.4	
		Range		42.4	
		Interquartile Range		17.5	
		Skewness		537	.398
		Kurtosis		435	.778
	Non-participant	Mean		72.896	1.4298
		95% Confidence	Lower Bound	70.028	
		Interval for Mean	Upper Bound	75.764	
		5% Trimmed Mean		73.706	
		Median		73.750	
		Variance		110.401	
		Std. Deviation		10.5072	
		Minimum		39.7	
		Maximum		89.6	
		Range		49.9	
		Interquartile Range		13.0	
		Skewness		-1.252	.325
		Kurtosis		2.195	.639

Descriptives

# NPar Tests Kruskal-Wallis Test

#### Ranks

	Individual's status	N	Mean Rank
Years old	Particpant	72	75.85
- - -	Non-responder	35	85.33
	Non-participant	54	85.06
	Total	161	

#### Test Statistics<sup>a,b</sup>

	Years old
Chi-Square	1.588
df	2
Asymp. Sig.	.452

a. Kruskal Wallis Test

b. Grouping Variable: Individual's status



# <u>Gender – preliminary analysis</u>

			Gender		
			Male	Female	Total
Individual's	Particpant	Count	54	18	72
status		% within Individual's status	75.0%	25.0%	100.0%
	Non-responder	Count	24	11	35
•		% within Individual's status	68.6%	31.4%	100.0%
	Non-participant	Count	31	23	54
		% within Individual's status	57.4%	42.6%	100.0%
Total		Count	109	52	161
		% within Individual's status	67.7%	32.3%	100.0%

#### Individual's status \* Gender Crosstabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.383ª	2	.112
Likelihood Ratio	4.348	2	.114
Linear-by-Linear Association	4.286	1	.038
N of Valid Cases	161		

 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.30.

	····		Hf diag	Hf diag labels condensed		
			1.00	2.00	3.00	Total
Individual's	Particpant	Count	66	4	2	72
status		% within Individual's status	91.7%	5.6%	2.8%	100.0%
	Non-responder	Count	35	0	0	35
		% within Individual's status	100.0%	.0%	.0%	100.0%
	Non-participant	Count	49	5	0	54
		% within Individual's status	90.7%	9.3%	.0%	100.0%
Total		Count	150	9	2	161
		% within Individual's status	93.2%	5.6%	1.2%	100.0%

#### Individual's status \* Hf diag labels condensed Crosstabulation

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.956ª	4	.202
Likelihood Ratio	8.439	4	.077
Linear-by-Linear Association	.194	1	.660
N of Valid Cases	161		

a. 6 cells (66.7%) have expected count less than 5. The minimum expected count is .43.

#### Individual's status \* NYHA classes condensed Crosstabulation

			NYHA	classes cond	ensed	
1			1	11	III / IV	Total
Individual's	Particpant	Count	15	39	18	72
status		% within Individual's status	20.8%	54.2%	25.0%	100.0%
	Non-responder	Count	4	23	8	35
		% within Individual's status	11.4%	65.7%	22.9%	100.0%
	Non-participant	Count	6	34	14	54
		% within Individual's status	11.1%	63.0%	25.9%	100.0%
Total		Count	25	96	40	161
		% within Individual's status	15.5%	59.6%	24.8%	100.0%

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.122ª	4	.538
Likelihood Ratio	3.113	4	.539
Linear-by-Linear Association	.905	1	.342
N of Valid Cases	161		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.43.

#### Individual's status \* Cardiac History Crosstabulation

Count							
			Cardiac History				
		Ischaemic Heart Valvular Heart Disease DCM unknown hypertension					Total
Individual's	Particpant	55	3	5	7	2	72
status	Non-responder	24	0	3	5	3	35
	Non-participant	37	4	5	5	3	54
Total		116	7	13	17	8	161

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.490ª	8	.704
Likelihood Ratio	6.734	8	.566
Linear-by-Linear Association	.721	1	.396
N of Valid Cases	161		

Chi-Square Tests

 9 cells (60.0%) have expected count less than 5. The minimum expected count is 1.52.

#### Individual's status \* Myocardial Infarction Crosstabulation

			Myocardial Infarction			
			No	Yes	More than 1 heart attack	Total
Individual's	Particpant	Count	34	31	7	72
status		% within Individual's status	47.2%	43.1%	9.7%	100.0%
	Non-responder	Count	16	19	0	35
		% within Individual's status	45.7%	54.3%	.0%	100.0%
	Non-participant	Count	27	25	2	54
		% within Individual's status	50.0%	46.3%	3.7%	100.0%
Total		Count	77	75	9	161
		% within Individual's status	47.8%	46.6%	5.6%	100.0%

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.230ª	4	.264
Likelihood Ratio	6.814	4	.146
Linear-by-Linear Association	.707	1	.400
N of Valid Cases	161		

 a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 1.96.

# Individual's status \* Heart Surgery (e.g. CABG, PCI) Crosstabulation

			Heart Surgery (e.g. CABG, PCI)			
			No	Yes	Total	
Individual's	Particpant	Count	54	18	72	
status		% within Individual's status	75.0%	25.0%	100.0%	
	Non-responder	Count	26	9	35	
		% within Individual's status	74.3%	25.7%	100.0%	
	Non-participant	Count	40	14	54	
		% within Individual's status	74.1%	25.9%	100.0%	
Total		Count	120	41	161	
		% within Individual's status	74.5%	25.5%	100.0%	

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.015ª	2	.992
Likelihood Ratio	.015	2	.992
Linear-by-Linear Association	.014	1	.905
N of Valid Cases	161		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.91.

#### Individual's status \* Number of Psychotropic drugs Crosstabulation

			Number	Number of Psychotropic drugs		
			.00	1.00	2.00	Total
Individual's	Particpant	Count	66	5	1	72
status	% within Individual's status	91.7%	6.9%	1.4%	100.0%	
	Non-responder	Count	30	5	0	35
		% within Individual's status	85.7%	14.3%	.0%	100.0%
	Non-participant	Count	47	7	0	54
		% within Individual's status	87.0%	13.0%	.0%	100.0%
Total		Count	143	17	1	161
		% within Individual's status	88.8%	10.6%	.6%	100.0%

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.006ª	4	.557
Likelihood Ratio	3.436	4	.488
Linear-by-Linear Association	.310	1	.577
N of Valid Cases	161		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is .22.

			Mobility					
			Good	Reduced	Reduced with stick	reduced - chair	not known	Total
Individual's	Particpant	Count	36	19	14	1	2	72
status		% within Individual's status	50.0%	26.4%	19.4%	1.4%	2.8%	100.0%
	Non-responder	Count	13	11	9	0	2	35
		% within Individual's status	37.1%	31.4%	25.7%	.0%	5.7%	100.0%
	Non-perticipent	Count	24	15	7	5	3	54
		% within Individual's status	44.4%	27.8%	13.0%	9.3%	5.6%	100.0%
Total		Count	73	45	30	6	7	161
		% within Individual's status	45.3%	28.0%	18.6%	3.7%	4.3%	100.0%

Individual's status \* Mobility Crosstabulation

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.522ª	8	.230
Likelihood Ratio	10.915	8	.207
Linear-by-Linear Association	1.509	1	.219
N of Valid Cases	161		

a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is 1.30.

# Appendix VII

# - ANOVA result: Type D personality as a predictor of depression

Dependent Variable: Mean disengagement coping score							
Source	Type III Sum of Squares	df	Mean Square	F	Sig.		
Corrected Model	9.046 <sup>a</sup>	12	.754	1.225	.293		
Intercept	11.662	1	11.662	18.958	.000		
TypeD	.075	1	.075	.122	.729		
MHhist	1.335	1	1.335	2.170	.147		
HeartAttack	1.330	2	.665	1.081	.347		
CardiHist	.325	4	.081	.132	.970		
Age	.014	1	.014	.023	.881		
NYHAcomb	2.470	2	1.235	2.008	.145		
HeartSurg	.100	1	.100	.163	.688		
Error	30.758	50	.615				
Total	491.813	63		ļ			
Corrected Total	39.804	62					

Tests of Between-Subjects Effects

a. R Squared = .227 (Adjusted R Squared = .042)

# Backward Elimination process (Type D predict Anxiety?)

#### Tests of Between-Subjects Effects

Dependent Variable: Total HADS anxiety scores

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	279.786*	12	23.316	1.867	.060
Intercept	32.002	1	32.002	2.562	.115
HeartAttack	1.552	2	.776	.062	.940
HeartSurg	6.986	1	6.986	.559	.458
NYHAcomb	107.626	2	53.813	4.309	.018
CardiHist	14.549	4	3.637	.291	.882
MHhist	13.307	1	13.307	1.065	.307
TypeD	32.379	1	32.379	2.593	.113
Age	.585	1	.585	.047	.829
Error	674.393	54	12.489		
Total	2473.000	67			
Corrected Total	954.179	66			

a. R Squared = .293 (Adjusted R Squared = .136)

### Heart Attack removed:

Dependent Variable: Total HADS anxiety scores							
	Type III Sum						
Source	of Squares	df	Mean Square	F	Sig.		
Corrected Model	278.234ª	10	27.823	2.305	.024		
Intercept	31.850	1	31.850	2.639	.110		
HeartSurg	6.751	1	6.751	.559	.458		
NYHAcomb	111.734	2	55.867	4.628	.014		
CardiHist	16.158	4	4.040	.335	.853		
MHhist	11.935	1	11.935	.989	.324		
ТуреD	33.238	1	33.238	2.754	.103		
Age	.452	1	.452	.037	.847		
Error	675.945	56	12.070				
Total	2473.000	67	[				
Corrected Total	954.179	66					

#### **Tests of Between-Subjects Effects**

a. R Squared = .292 (Adjusted R Squared = .165)

# Cardiac History removed:

#### Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	262.076ª	6	43.679	3.787	.003
Intercept	66.276	1	66.276	5.746	.020
HeartSurg	4.954	1	4.954	.429	.515
NYHAcomb	119.286	2	59.643	5.171	.008
MHhist	17.395	1	17.395	1.508	.224
TypeD	41.100	1	41.100	3.563	.064
Age	.040	1	.040	.003	.953
Error	692.103	60	11.535		
Total	2473.000	67			
Corrected Total	954.179	66			

Dependent Variable: Total HADS anxiety scores

a. R Squared = .275 (Adjusted R Squared = .202)

#### Age removed:

#### **Tests of Between-Subjects Effects**

#### Type III Sum Source of Squares df Mean Square F Sig. Corrected Model 262.036ª 5 52.407 4.619 .001 Intercept 660.894 1 660.894 58.246 .000. HeartSurg .507 5.057 1 5.057 .446 NYHAcomb .007 122.065 2 61.033 5.379 MHhist 17.500 1 17.500 1.542 .219 TypeD 41.231 41.231 3.634 .061 1 Error 692.143 11.347 61 Total 2473.000 67 Corrected Total 954.179 66

Dependent Variable: Total HADS anxiety scores

a. R Squared = .275 (Adjusted R Squared = .215)

#### Heart Surgery removed:

#### Tests of Between-Subjects Effects

Dependent Variable: Total HADS anxiety scores

	Type III Sum			_	
Source	of Squares	df	Mean Square	F	Sig.
Corrected Model	256.979ª	4	64.245	5.713	.001
Intercept	665.552	1	665.552	59.186	.000
NYHAcomb	117.310	2	58.655	5.216	.008
MHhist	19.436	1	19.436	1.728	.193
ТуреD	57.864	1	57.864	5.146	.027
Error	697.200	62	11.245		
Total	2473.000	67			j j
Corrected Total	954.179	66			

a. R Squared = .269 (Adjusted R Squared = .222)

# **Appendix VIII**



# Box plots of coping strategies (Note Acceptance and Substance Abuse)

# Relationship between engagement and disengagement coping style

		Mean engagement coping score	Mean disengagem ent coping score
Mean engagement	Pearson Correlation	1	.273*
coping score	Sig. (2-tailed)		.042
	Ν	60	56
Mean disengagement	Pearson Correlation	.273*	1
coping score	Sig. (2-tailed)	.042	
	N	56	64

#### Correlations

\*. Correlation is significant at the 0.05 level (2-tailed).

# Scatterplot showing the weak positive correlation between engagement and disengagement coping



# Appendix IX:

- Pearsons Correlations (see over page)

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### Correlations

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			total HADS depression score	Total HADS anxiety scores
BriefCope self-distraction	Pearson Correlation		.021	.164
SUDSCAIE	Sig. (2-tailed) N		.860 70	.181 68
BriefCope Active Coping	Pearson Correlation		138	.022
subscale	Sig. (2-tailed) N		.267	.861 65
BriefCope Denial subscale	Pearson Correlation	•	.270*	.476**
	Sig. (2-tailed) N		.026 68	.000 66
BriefCope Substance use	Pearson Correlation		.014	073
subscale	Sig. (2-tailed) N		.912 69	.556 67
BriefCope Use of	Pearson Correlation		.227	.247*
Emotional Support subscale	Sig. (2-tailed) N		.064 67	.048 65
BriefCope Use of	Pearson Correlation	•	125	.029
Instrumental Support	Sig. (2-tailed)		.320	.819
	N		65	63
BriefCope Behavioural	Pearson Correlation	**	.565**	.591**
usengagement subscale	Sig. (2-tailed) N		.000 68	.000 66
BriefCope Venting	Pearson Correlation	•	.392**	.568**
subscale	Sig. (2-tailed) N		.001 68	.000 66
BriefCope Positive	Pearson Correlation	1	267*	120
reframing subscale	Sig. (2-tailed) N		.031	.349 63
BriefCope planning	Pearson Correlation	**	.077	.224
subscale	Sig. (2-tailed)		.530	.071
	N		68	66
BriefCope Humour	Pearson Correlation		290*	191
sudscale	Sig. (2-tailed)		.017	.127
Brief Cone Accentance	Pearson Correlation		209	120
subscale	Sig (2-tailed)		.200	306
	N		.035	.505
BriefCope Religion	Pearson Correlation		241*	103
subscale	Sig. (2-tailed) N		.048 68	.410 66

•

#### Correlations

			total HADS depression score	Total HADS anxiety scores
BriefCope SelfBlame	Pearson Correlation		.320**	.372**
sudscale	Sig. (2-tailed)		.009	.002
	N		66	64
total HADS depression	Pearson Correlation	**	1	.628**
SCOLA	Sig. (2-tailed)			.000
	N		71	69
Total HADS anxiety	Pearson Correlation	**	.628**	1
scores	Sig. (2-tailed)		.000	
	N		69	69

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

Appendix X:

The Output for the Regressional Analyses used in the Mediational Model exploring whether any of the two coping styles, engagement and disengagement have mediator effects in the relationship between Type D and distress:

- Engagement coping style regressed on Type D (Regression Equation 1 of mediational model)
- Disengagement coping style regressed on Type D (Regression Equation 1 of mediational model)
- Engagement coping style regressed on Type D (Regression Equation 1 of mediational model)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.194ª	.037	.021	.99212

a. Predictors: (Constant), TypeD

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.186	1	2.186	2.221	.142ª
	Residual	56.105	57	.984		
	Total	58.291	58			

8. Predictors: (Constant), TypeD

b. Dependent Variable: Mean engagement coping score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	4.091	.163		25.083	.000
	ТуреD	398	.267	194	-1.490	.142

a. Dependent Variable: Mean engagement coping score

• Disengagement coping style regressed on Type D (Regression Equation 1 of mediational model)

Model Summary

Model	R	R Square	Adjusted R Squar <del>e</del>	Std. Error of the Estimate
1	.171ª	.029	.013	.79595

a. Predictors: (Constant), TypeD

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.158	1	1.158	1.827	.181ª
	Residual	38.646	61	.634		
	Total	39.804	62			

a. Predictors: (Constant), TypeD

b. Dependent Variable: Mean disengagement coping score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	2.579	.124		20.749	.000
	TypeD	.284	.210	.171	1.352	.181

a. Dependent Variable: Mean disengagement coping score

#### Appendix XI

The Output for the Regressional Analyses used in the Mediational Model exploring whether any of the two coping styles, engagement and disengagement have mediator effects in the relationship between any of the 2 subscales of Type D and distress:

- Engagement coping style regressed on NA subscale of Type D (Regression Equation 1 of mediational model)
- Engagement coping style regressed on SI subscale of Type D (Regression Equation 1)
- Disengagement coping style regressed on NA subscale of Type D (Regression Equation 1 of mediational model)
- Depression regressed on NA subscale of Type D (Regression Equation 2 of mediational model)
- Depression regressed on a) NA and b) disengagement coping ((Regression Equation 3 of mediational model)
- Disengagement coping style regressed on SI subscale of Type D (Regression Equation 1 of mediational model)
- Depression regressed on SI subscale of Type D (Regression Equation 2 of mediational model)
- Depression regressed on a) SI and b) disengagement coping ((Regression Equation 3 of mediational model)

- Disengagement coping style regressed on NA subscale of Type D (Regression Equation 1 of mediational model)
- Anxiety regressed on NA subscale of Type D (Regression Equation 2 of mediational model)
- Anxiety regressed on a) NA and b) disengagement coping ((Regression Equation
  3 of mediational model)
- Disengagement coping style regressed on SI subscale of Type D (Regression Equation 1 of mediational model)
- Anxiety regressed on NA subscale of Type D (Regression Equation 2 of mediational model)
- Anxiety regressed on a) NA and b) disengagement coping ((Regression Equation
  3 of mediational model)

• Engagement coping style regressed on NA subscale of Type D (Regression

Equation 1 of mediational model)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.105ª	.011	006	1.00084

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

Model	l	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.651	1	.651	.650	.423ª
	Residual	58.098	58	1.002		
	Total	58.749	59			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: Mean engagement coping score

• Engagement coping style regressed on SI subscale of Type D (Regression

Equation 1)

**Model Summary** 

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.063ª	.004	014	1.00927

a. Predictors: (Constant), Social Interaction subtype typeD total

ANOVA <sup>®</sup>
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Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.230	1	.230	.225	.637ª
	Residual	58.062	57	1.019		
	Total	58.291	58			

a. Predictors: (Constant), Social Interaction subtype typeD total

b. Dependent Variable: Mean engagement coping score

• Disengagement coping style regressed on NA subscale of Type D (Regression

Equation 1 of mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.411ª	.169	.156	.73042

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

ANOVA<sup>b</sup>

Mode	ði	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.731	1	6.731	12.617	.001ª
	Residual	33.078	62	.534		
	Total	39.809	63			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: Mean disengagement coping score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	2.116	.183		11.566	.000
	Total Negative Affectivity score for Type D qnaire	.052	.015	.411	3.552	.001

a. Dependent Variable: Mean disengagement coping score

• Depression regressed on NA subscale of Type D (Regression Equation 2 of

mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.524ª	.275	.264	3.20014

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	264.260	1	264.260	25.804	•000.
	Residual	696.382	68	10.241		
	Total	960.643	69			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: total HADS depression score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	1.830	.744		2.461	.016
	Total Negative Affectivity score for Type D qnaire	.298	.059	.524	5.080	.000

a. Dependent Variable: total HADS depression score

• Depression regressed on a) NA and b) disengagement coping ((Regression

Equation 3 of mediational model)

#### **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.590ª	.348	.327	3.07198

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire, Mean disengagement coping score

#### ANOVA<sup>b</sup>

Model	1	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	302.635	2	151.317	16.034	.000ª
	Residual	566.223	60	9.437		
	Total	868.857	62			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire, Mean disengagement coping score

b. Dependent Variable: total HADS depression score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	-1.160	1.380		841	.404
	Mean disengagement coping score	1.313	.537	.279	2.443	.018
	Total Negative Affectivity score for Type D qnaire	.245	.067	.417	3.650	<sup>•</sup> .001

a. Dependent Variable: total HADS depression score

• Disengagement coping style regressed on SI subscale of Type D (Regression

Equation 1 of mediational model)

Model	Summary
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Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.281*	.079	.064	.77515

a. Predictors: (Constant), Social Interaction subtype typeD total

ANOVA	)
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Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.151	1	3.151	5.245	.025ª
	Residual	36.652	61	.601		
	Total	39.804	62			

a. Predictors: (Constant), Social Interaction subtype typeD total

b. Dependent Variable: Mean disengagement coping score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.248	.212		10.609	.000
	Social Interaction subtype typeD total	.043	.019	.281	2.290	.025

a. Dependent Variable: Mean disengagement coping score

• Depression regressed on SI subscale of Type D (Regression Equation 2 of

mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.453ª	.205	.193	3.35893

a. Predictors: (Constant), Social Interaction subtype typeD total

#### ANOVA<sup>b</sup>

Model	]	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	195.153	1	195.153	17.297	.000ª
	Residual	755.920	67	11.282		
	Total	951.072	68			

a. Predictors: (Constant), Social Interaction subtype typeD total

b. Dependent Variable: total HADS depression score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	1.831	.887		2.063	.043
	Social Interaction subtype typeD total	.329	.079	.453	4.159	.000

a. Dependent Variable: total HADS depression score

#### Coefficients\*

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	-2.486	1.275		-1.949	.056
	Total Negative Affectivity score for Type D qnaire	.215	.062	.379	3.475	.001
	Mean disengagement coping score	1.762	.490	.392	3.593	.001

a. Dependent Variable: Total HADS anxiety scores

• Disengagement coping style regressed on SI subscale of Type D (Regression

Equation 1 of mediational model)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.281ª	.079	.064	.77515

a. Predictors: (Constant), Social Interaction subtype typeD total

ANOVA	Þ
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Mode	1	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.151	1	3.151	5.245	.025ª
	Residual	36.652	61	.601		
	Total	39.804	62			

a. Predictors: (Constant), Social Interaction subtype typeD total

b. Dependent Variable: Mean disengagement coping score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	2.248	.212		10.609	.000
	Social Interaction subtype typeD total	.043	.019	.281	2.290	.025

a. Dependent Variable: Mean disengagement coping score

• Anxiety regressed on NA subscale of Type D (Regression Equation 2 of

mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319ª	.102	.088	3.63151

a. Predictors: (Constant), Social Interaction subtype typeD total

ANOVA <sup>b</sup>	
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Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	96.968	1	96.968	7.353	.009ª
	Residual	857.211	65	13,188		
	Total	954.179	66			

a. Predictors: (Constant), Social Interaction subtype typeD total

b. Dependent Variable: Total HADS anxiety scores

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients		
		В	Std. Error	Beta	t	Sig.
1	(Constant)	2.443	.963		2.536	.014
	Social Interaction subtype typeD total	.236	.087	.319	2.712	.009

a. Dependent Variable: Total HADS anxiety scores

• Anxiety regressed on a) NA and b) disengagement coping ((Regression Equation

3 of mediational model)

#### **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.561ª	.315	.291	3.03922

a. Predictors: (Constant), Mean disengagement coping score, Social Interaction subtype typeD total

• Depression regressed on a) SI and b) disengagement coping ((Regression

Equation 3 of mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.556ª	.309	.286	3.17149

a. Predictors: (Constant), Mean disengagement coping score, Social Interaction subtype typeD total

#### ANOVA<sup>b</sup>

Mode	1	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	265.977	2	132.988	13.222	.000ª
	Residual	593.443	59	10.058		
	Total	859.419	61			

a. Predictors: (Constant), Mean disengagement coping score, Social Interaction subtype typeD total

b. Dependent Variable: total HADS depression score

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	-1.947	1.487		-1.309	.196
	Social Interaction subtype typeD total	.243	.082	.333	2.962	.004
	Mean disengagement coping score	1.711	.525	.366	3.261	.002

a. Dependent Variable: total HADS depression score

• Disengagement coping style regressed on NA subscale of Type D (Regression

Equation 1 of mediational model)

#### **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.411ª	.169	.156	.73042

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.731	1	6.731	12.617	.001ª
	Residual	33.078	62	.534		
	Total	39.809	63			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: Mean disengagement coping score

#### Coefficients<sup>a</sup>

	Unstandardized Coefficients		Standardized Coefficients		
Model	В	Std. Error	Beta	t	Sig.
1 (Constant)	2.116	.183		11.566	.000
Total Negative Affectivity score for Type D qnaire	.052	.015	.411	3.552	.001

a. Dependent Variable: Mean disengagement coping score

• Anxiety regressed on NA subscale of Type D (Regression Equation 2 of

!

mediational model)

#### **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.541ª	.292	.282	3.20124

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	279.325	1	279.325	27.257 -	.000ª
	Residual	676.366	66	10.248		
	Total	955.691	67			

a. Predictors: (Constant), Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: Total HADS anxiety scores

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients			
Model		В	Std. Error	Beta	t	Sig.	
1	(Constant)	1.388	.757		1.834	.071	
	Total Negative Affectivity score for Type D qnaire	.312	.060	.541	5.221	.000	

a. Dependent Variable: Total HADS anxiety scores

• Anxiety regressed on a) NA and b) disengagement coping (Regression Equation 3

of mediational model)

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,643 <sup>a</sup>	.414	.394	2.79080

a. Predictors: (Constant), Mean disengagement coping score, Total Negative Affectivity score for Type D qnaire

AN	OVA <sup>b</sup>
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Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	319.017	2	159.509	20.480	.000ª
	Residual	451.737	58	7.789		
	Total	770.754	60			

a. Predictors: (Constant), Mean disengagement coping score, Total Negative Affectivity score for Type D qnaire

b. Dependent Variable: Total HADS anxiety scores

#### ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	242.233	2	121,116	· 13.112	.000ª	
	Residual	526.501	57	9.237			
	Total	768.733	59				

a. Predictors: (Constant), Mean disengagement coping score, Social Interaction subtype typeD total

b. Dependent Variable: Total HADS anxiety scores

#### Coefficients<sup>a</sup>

		Unstandardized Coefficients		Standardized Coefficients		
Model		В	Std. Error	Beta	t	Sig.
1	(Constant)	-2.531	1.441		-1.756	.084
	Social Interaction subtype typeD total	.111	.080	.157	1.383	.172
	Mean disengagement coping score	2.234	.511	.498	4.374	.000

a. Dependent Variable: Total HADS anxiety scores