Validity of the Type D personality construct in Danish post-MI patients and healthy controls

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Validity of the Type D personality construct in Danish post-MI patients and healthy controls

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Abstract

Objective: Type D personality has been associated with increased risk of depression, vital exhaustion, social alienation, a higher number of reinfarctions, and higher mortality rates in patients with established coronary artery disease (CAD) independent of traditional biomedical risk factors. The construct was developed in Belgian cardiac patients, but little is known about its applicability in other nationalities. The objectives of the present article were to cross-validate the Type D Personality Scale-16 (DS16) in a Danish sample of patients with a first myocardial infarction and a random sample of healthy controls, and to investigate whether Type D is associated with posttraumatic stress disorder (PTSD). **Methods:** A questionnaire was given to 112 consecutive patients with a first myocardial infarction 4 to 6 weeks post infarction, and to 115 healthy controls selected randomly from the general population. **Results:** The two-factor structure of the DS16 and the internal consistency of the Negative Affectivity ($\alpha = .83$) and Social Inhibition ($\alpha = .76$) subscales were confirmed. The construct validity of the DS16 was confirmed against scales that measure similar constructs, and the discriminant validity of the DS16 against measures of psychopathology. In a pooled sample of patients and healthy controls, comparison of both groups confirmed that Type D may be conceptualised as a marker of general emotional distress, with Type D persons scoring higher on depression, anxiety, and the PTSD symptom clusters arousal and avoidance compared with non-Type D persons. A regression analysis run in two steps showed that the inclusion of Type D in the model lead to an improvement in the level of prediction of PTSD above and beyond a model that included gender, age, MI, neuroticism, and extroversion. Type D (OR = 4.46; 95% CI: 1.36 to 14.64), diagnosis of MI (OR = 4.03; 95% CI: 1.43 to 11.35), and neuroticism (OR = 1.32; 95% CI: 1.13 to 1.53) were independently associated with PTSD, adjusting for all other variables. **Conclusion:** These findings indicate that the Type D construct is equally applicable in Danish patients with CAD, and that Type D is associated with PTSD.

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Introduction

Studies have shown that approximately 20% of cardiac patients suffer from psychological sequelae following a cardiac event, including poor perceived health, anxiety, depression, and posttraumatic stress disorder (PTSD) [1–5]. In turn, these sequelae have been shown to have negative prognostic impact independent of disease severity [3,6,7]. However, the role of individual differences in risk has to a great extent been overlooked, in particular since the controversy surrounding the TYPE A BEHAVIOUR PATTERN emerged [8,9]. 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 difference variables, e.g., gender, routinely included in cardiovascular research [10,11]. In addition, traits may impede the development of social contacts and, hence, the availability of social support [12,13]. Lack of social support has been related to increased morbidity and mortality [14,6], and increased cardiac symptoms [15,16].

With the introduction of "the distressed personality" (Type D) and the development of the Type D Personality Scale-16 (DS16) to measure this construct, focus is again being directed at the role of individual differences in coronary artery disease (CAD) [17]. The Type D construct was delineated according to existing personality theory and the notion that the interaction of specific traits may have

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deleterious effects on health [18,19]. Type D is defined as the interaction of negative affectivity (the tendency to experience negative emotions) and social inhibition (the tendency to inhibit the expression of these emotions in social interaction) [17,20]. The inhibition of expression of emotions is conscious in order to avoid the disapproval of others. Social inhibition is a moderator, such that prevalence of cardiac events for individuals high in negative affectivity but low in social inhibition is less than for individuals high in both components [17,21].

It is important to note that Type D is an attempt to emphasise the role of normal personality characteristics in CAD rather than psychopathology [17]. Therefore, the prevalence of Type D is expected to be similar in healthy individuals and in individuals with established CAD. Furthermore, Type D is not considered an etiological risk factor for CAD, but a prognostic factor in patients with confirmed CAD. Type D has been associated with increased risk of depression, social alienation, a higher number of reinfarctions, and higher mortality rates independent of established biomedical risk factors [18–21]. Type D also seems to moderate the effects of medical treatment [20]. A recent Dutch study found that Type D patients were at a six-fold risk (OR = 6.35; 95% CI: 3.01–9.69) of suffering from vital exhaustion at baseline, and at more than a four-fold risk (OR = 4.74; 95% CI: 0.73–8.75) of suffering from vital exhaustion following percutaneous coronary intervention or pharmacological treatment compared with non-Type D patients [11]. In other words, despite appropriate medical treatment patients with the Type D personality remained at an increased risk of vital exhaustion, which is a risk factor for recurrent cardiac events in angioplasty patients [22]. Little is known, however, about the applicability of the Type D construct in other nationalities.

No studies have looked at the relationship between PTSD and Type D, and whether Type D may be a marker of PTSD. PTSD is characterised by the presence of intrusive symptoms occurring against symptoms of avoidance and hyperarousal. Symptoms have to be present for at least 1 month and lead to impairment in functioning [23]. The gateway to a diagnosis of PTSD is the stressor criterion, i.e., a life-threatening event, including fear and helplessness at the time of the event. As indicated in a recent review, evidence suggests that survivors of MI with PTSD may be at increased risk of recurrent cardiac events [24]. Although no study to date has focused explicitly on the long-term consequences of PTSD in survivors of MI, a recent study found that PTSD was associated with nonadherence to medication and adverse medical outcome [25]. Since Type D has been related to depression and vital exhaustion, it is conceivable that Type D is also a marker of PTSD.

The objective of the present study was two-fold: (1) to cross-validate the DS16 in a population of Danish consecutive patients with a first MI and a random sample of healthy controls and (2) to test the hypothesis that Type D is a marker of PTSD.

Method

Sample

Consecutive patients with a first MI were recruited from August 1999 to January 2001 from Aarhus University Hospital and Horsens Hospital, Denmark. Patients were assessed 4 to 6 weeks post-MI. A diagnosis of MI was based on increased levels of troponin T (>0.10 μg/l) and ECG changes, according to the most recent guidelines [26]. Patients were excluded if they suffered from other life-threatening diseases and cognitive impairments, had a history of psychiatric disorders, or were unable to understand and read Danish. One hundred and sixty-four patients were screened for inclusion in the study. Three patients were excluded due to previous psychiatric history and other life-threatening diseases, and 12 patients were not approached due to personnel error. Of the remaining 149 patients, 37 (25%) refused to participate. The patient sample thus consisted of 112 patients. No statistically significant differences were found between patient responders and nonresponders on gender, age, left ventricular function (assessed by means of echocardiography), and symptoms of angina pectoris (results not shown).

We also included 115 healthy controls drawn from a national register[1]. Controls were excluded if they suffered from CAD or other life-threatening diseases and cognitive impairments, had a history of psychiatric disorders, or were unable to understand and read Danish. Ethical approval was obtained from the ethical committees in Aarhus and Vejle Municipalities, and the study was carried out in accordance with the Helsinki Declaration.

Measures

Personality Type D was assessed with the 16-item DS16, which was developed in Belgian cardiac patients [17]. The scale measures negative affectivity (the tendency to experience negative emotions) and social inhibition (the tendency to inhibit self-expression in social interaction). Each item is rated according to a 5-point Likert scale from 0 (*false*) to 4 (*true*). Patients who score high on both negative affectivity and social inhibition, as determined by a median split, are classified as Type D. The psychometric qualities and prognostic power of the scale have proven satisfactory in Belgian cardiac patients with Cronbach's alpha of .89 and .82 and test–retest reliability of .78 and .87 for the Negative Affectivity and Social Inhibition subscales, respectively [17,20].

Neuroticism and extroversion were assessed with the 24-item short version of the Eysenck Personality Questionnaire

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[1] The national register contains the names and addresses of all residents and citizens of Denmark. At the time of birth or immigration, every citizen/resident is given a personal ID number that consists of the birth date and a four-digit number. The last digit of the four-digit number reveals the gender of the person.

(EPQ) [27,28]. The Neuroticism and Extroversion subscales of the EPQ were included in the current study in order to examine the construct validity of the DS16 against these scales, since they measure theoretically similar constructs. Each of the subscales contains 12 items with the response categories 1 (*yes*) and 0 (*no*). The total score for each of the subscales ranges from 0 to 12 with a high score indicating more of the personality trait. The validity and reliability of the two subscales have proven satisfactory with alpha coefficients ranging from .81 to .87 for the Neuroticism subscale and from .72 to .85 for the Extroversion subscale [28].

We included the ANXIETY AND DEPRESSION subscales of the Trauma Symptom Checklist (TSC-33) to examine the discriminant validity of the DS16 against scales of psychopathology [29]. The TSC subscales contain nine items, respectively, which are answered on a 4-point Likert scale from 0 (*never*) to 3 (*very often*), yielding a score range of 0–27. The psychometric properties of the subscales are adequate with Cronbach's $\alpha = .72$ for the Anxiety and Depression subscales, respectively [29].

The Posttraumatic Diagnostic Scale (PDS) was included to determine whether Type D is a marker of PTSD [30,31]. The PDS assesses PTSD according to DSM-IV [23]. The scale has been validated against the Structured Clinical Interview for DSM-IV and has good sensitivity and specificity [31]. The scale yields three scores for each of the symptom clusters intrusion (5 items), avoidance (7 items), and arousal (5 items), a total symptom score, and a diagnosis of PTSD. The 17 symptom cluster items are measured on a 4-point Likert scale from 0 (*not at all* or *only one time*) to 3 (*5 or more times a week/almost always*) (score range 0–51). Patients were asked to fill in the questionnaire with reference to their MI as the traumatic event in order to control for the potentially confounding effect of prior traumatisation. Healthy controls were asked to fill in the questionnaire in a standard fashion, i.e., relating symptoms to the traumatic event that bothered them the most of a list of possible events. The validity and reliability of the scale is acceptable with Cronbach's alpha of .92 and test–retest reliability of .83 for the 17 items.

Statistical analyses

Prior to statistical analyses, one control was excluded due to too many missing values on the Type D personality scale. The chi-square test (Fisher's exact test when appropriate) was used to examine between group differences on categorical variables. Analysis of variance for multiple dependent variables was employed for multiple comparisons between groups on continuous variables in order to avoid capitalisation on chance by performing multiple *t* tests. All tests used were two-tailed. Principal components analysis (varimax rotation) was used to examine the factor structure of the Danish DS16 scale. A scree plot was used to determine principal components to retain. Cronbach's alpha was calculated to determine the internal consistency of the

subscales. Pearson's correlations were used to examine the construct validity of the Type D Scale against the theoretically similar Neuroticism and Extroversion subscales of the EPQ, and to investigate the discriminant validity of the Type D Scale against measures of depression, anxiety, and the symptom clusters of PTSD. Logistic regression analysis was performed to determine whether Type D was associated with PTSD adjusting for other variables. The regression analysis was run in two steps, including gender, age, MI, neuroticism, and extroversion in the first step. Type D was introduced in the second step to investigate whether the construct confers any additional value to the prediction of PTSD above and beyond the variables included in the first step. All analyses were performed using SPPS 10.1.

Results

Baseline characteristics

Baseline characteristics of patients and controls are presented in Table 1.

Prevalence of Type D personality

Before pooling patients and controls, we examined between-group differences on the DS16 items. We found no statistically significant differences between patients and controls on any of the items ($P > .05$).

In the pooled sample of patients and controls, 55/226 (24%) [27/112 (24%) patients and 28/114 (25%) controls] were categorised as Type D according to a median split on

Table 1
Baseline characteristics of MI patients and controls

	MI Patients ($n = 112$)			Controls ($n = 114$)		
	n (%)	Mean (S.D.)	Range	n (%)	Mean (S.D.)	Range
Females	33 (30)			43 (38)		
Age (years)		60 (9.7)	40–79		58 (10.7)	41–79
Schooling (years)		8.5 (1.5)			9.3 (1.9)	
Continuing education (years)		3.2 (3.7)			4.5 (6.4)	
Married/ partner	98 (87)			89 (78)		
Living with others	98 (88)			94 (82)		
Working	47 (42)			65 (57)		
Smokers	13 (12)			35 (31)		
Angina pectoris	12 (11)					
LVEF						
0–40%	14 (12)					
41–59%	41 (37)					
60% >	56 (50)					
Missing	1 (1)					

Table 2
External and structural validity and internal consistency of DS16 and its subscales

Items of the DS16	Item mean		Principal component analysis		
	Non-Type D	Type D	Factor I	Factor II	Internal consistency[a]
Negative Affectivity					
1. I feel happy most of the time[b]	1.1	1.6**	0.70	0.04	.54
2. I take a gloomy view of things	0.9	1.7**	0.57	0.19	.50
6. I am hopeful about the future[b]	1.0	1.7**	0.72	0.07	.59
9. I am often in a bad mood	0.8	1.5**	0.72	0.16	.66
10. I often feel unhappy	0.6	1.5**	0.63	0.12	.54
12. I often worry about something	1.7	2.4**	0.55	0.02	.44
15. I feel at ease most of the time[b]	0.9	1.5**	0.72	0.11	.58
16. I am often down in the dumps	0.7	1.4**	0.72	0.13	.64
			Eigenvalue I = 4.58		α = .83
Social Inhibition					
3. I often talk to strangers[b]	1.2	1.9**	0.30	0.42	.36
4. I have little impact on other people	1.8	2.1*	0.15	0.27	.21
5. I find it hard to express opinions	1.0	2.0**	0.08	0.66	.48
7. I am often in charge in groups[b]	1.8	2.7**	0.03	0.66	.50
8. I find it hard to make ''small talk''	1.0	1.9**	−0.10	0.73	.55
11. I make contact easily[b]	1.0	1.9**	0.35	0.51	.46
13. I like to be in charge of things[b]	1.9	2.8**	−0.02	0.70	.51
14. I don't find things to talk about	1.0	2.0**	0.13	0.75	.58
			Eigenvalue II = 2.35		α = .76

[a] Corrected item–total correlations.
[b] Items have been reversed.
* P = .066.
** P < .001.

the DS16. In other words, an approximately equal number of patients and controls were categorised as Type D.

External and structural validity and internal consistency of the DS16

As shown in Table 2, all of the negative affectivity items differentiated between persons with the Type D and the non-Type D typologies at P < .001. Seven of the social inhibition items differentiated between Type D and non-Type D at P < .001, whereas one item (Item 4) did not distinguish between the two typologies (P = .066). Type D persons scored higher on all items, including Item 4, compared with

non-Type D persons. The principal components analysis confirmed the two-factor structure of the DS16, although Item 4 loaded with only .27 on social inhibition. The internal consistency was confirmed for the subscales Negative Affectivity (α = .83) and Social Inhibition (α = .76). The Danish version of the DS16 is presented in the Appendix A.

Construct validity

The Type D subscales were closely related to scales measuring theoretically similar personality constructs (Table 3). There was a positive relationship between Negative Affectivity of the DS16 and the Neuroticism scale of the EPQ

Table 3
Construct and discriminant validity of the DS16 Negative Affectivity and Social Inhibition subscales

		Intercorrelation matrix								
		1.	2.	3.	4.	5.	6.	7.	8.	9.
1. DS16	Negative Affectivity	–								
2. DS16	Social Inhibition	0.32**	–							
3. EPQ	Neuroticism	0.57**	0.20**	–						
4. EPQ	Extroversion	−0.22**	−0.52**	−0.10	–					
5. TSC	Depression	0.51**	0.14*	0.55**	−0.05	–				
6. TSC	Anxiety	0.42**	0.10	0.50*	−0.01	0.54**	–			
7. PDS	Intrusion	0.25**	0.06	0.30**	0.09	0.34**	0.39**	–		
8. PDS	Avoidance	0.42**	0.18*	0.41**	−0.04	0.49**	0.38**	0.50**	–	
9. PDS	Arousal	0.36**	0.18*	0.44**	0.03	0.52**	0.39**	0.46**	0.63**	–

DS16: Type D Scale 16-item form; EPQ: Eysenck Personality Questionnaire; TSC: Trauma Symptom Checklist; PDS: Posttraumatic Diagnostic Scale.
* P < .05 level (two-tailed).
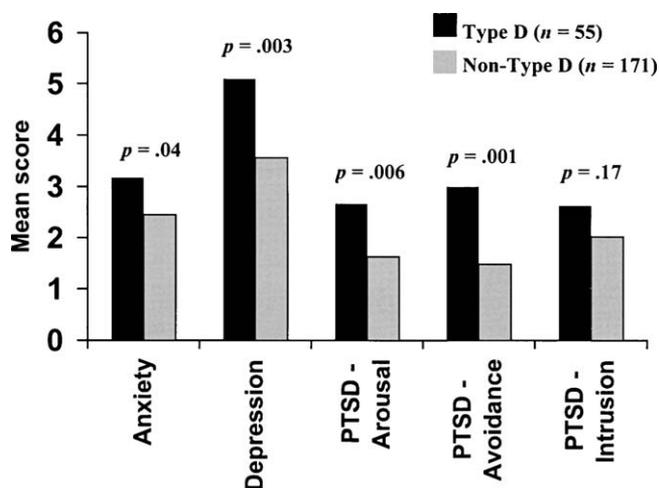** P < .01 level (two-tailed).

Fig. 1. Relationship between Type D and psychological distress.

Table 4
Variables associated with a diagnosis of PTSD[a]

Variables entered	β	p	OR	(95% CI)
Step 1				
Gender[b]	−.046	.922	.96	(0.38–2.42)
Age	−.008	.727	.99	(0.95–1.04)
MI[c]	1.32	.011	3.73	(1.36–10.26)
Extroversion	.059	.538	1.06	(0.88–1.28)
Neuroticism	.306	<.001	1.36	(1.18–1.57)
Step 2				
Gender[b]	−.261	.599	.77	(0.29–2.04)
Age	−.013	.573	.99	(0.94–1.03)
MI[c]	1.393	.008	4.03	(1.43–11.35)
Extroversion	.215	.074	1.24	(0.98–1.57)
Neuroticism	.277	<.001	1.32	(1.13–1.53)
Type D[d]	1.495	.014	4.46	(1.36–14.64)

[a] $n = 202$.
[b] 0 = male; 1 = female.
[c] 0 = control; 1 = patient.
[d] 0 = non-Type D; 1 = Type D.

(r = .57) sharing 32% of the variance. There was a negative relationship between Social Inhibition of the DS16 and the Extroversion scale of the EPQ (r = −.52) with a shared variance of 27%. Hence, both negative affectivity/neuroticism and social inhibition/introversion are related but distinct personality constructs. Accordingly, Type D persons scored higher on neuroticism (mean = 5.4 ± 2.9) than their non-Type D counterparts (mean = 3.2 ± 2.9), P < .001. Likewise, Type D persons scored lower on extroversion (mean = 5.2 ± 1.8) than their non-Type D counterparts (mean = 7.6 ± 2.2), P < .001.

Discriminant validity

When examining the discriminant validity of the Type D subscales against measures of psychopathology, we found that negative affectivity correlated positively with all measures, including depression, anxiety and the three symptom clusters of PTSD (i.e., intrusion, avoidance, and arousal) (Table 3). The shared variance ranged from 6% to 26%.
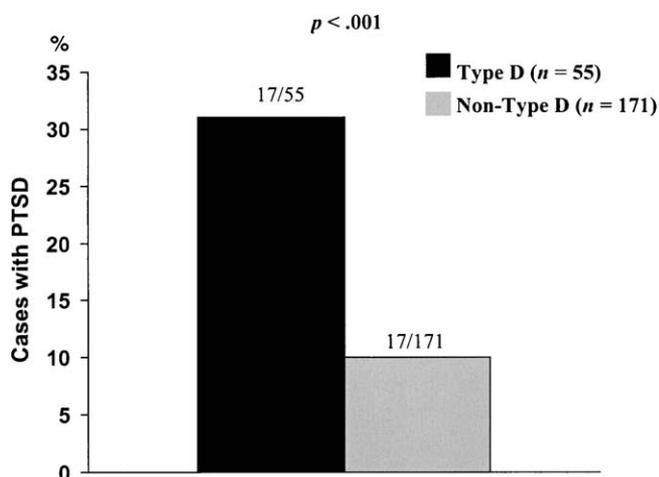

Fig. 2. Relationship between Type D and a diagnosis of PTSD.

We also found a positive correlation between social inhibition and all measures of psychopathology, although the shared variance was less, ranging from 1% to 3%. These results indicate that although there is an overlap, the Type D subscales are distinct from measures of psychopathology.

Type D persons scored higher on depression, anxiety, arousal, and avoidance compared with non-Type D persons (Fig. 1). No statistically significant differences were found on intrusion, but a post-hoc power analysis indicated that this was due to reduced power.

Relationship between Type D personality and a diagnosis of PTSD

Seventeen (31%) of 55 Type D persons qualified for a diagnosis of PTSD compared with 17 (10%) of 171 non-Type D persons, $\chi^2(1, N = 226) = 14,315, P < .001$ (Fig. 2).

Multivariate analysis showed that inclusion of Type D in the regression model increased the level of prediction of PTSD indicated by an improvement in the chi-square statistics from 34.2 (df = 5; P < .0001) to 40.3 (df = 6; P < .0001). Type D (P = .014) diagnosis of MI (P = .008) and neuroticism (P < .001) were independently associated with PTSD, adjusting for gender, age, and extroversion (Table 4). Type D was associated with more than a fourfold risk of PTSD (OR = 4.46; 95% CI: 1.36–14.64). Diagnosis of MI was similarly associated with a four-fold risk of PTSD (OR = 4.03; 95% CI: 1.43–11.35), whereas neuroticism was associated with a slightly increased risk of PTSD (OR = 1.32; 95% CI: 1.13–1.53).

Discussion

The present findings confirm the validity of the Type D construct in a Danish sample of consecutive patients with a

first MI and a random sample of healthy controls. The two-factor structure and the internal consistency of the DS16 were replicated in this culturally distinct population. In addition, all items on the Negative Affectivity subscale and seven of eight items on the Social Inhibition subscale were able to discriminate between Type D and non-Type D persons. Thus, there was a consistent pattern indicating that Type D persons scored higher on all items of the DS16 compared with non-Type D persons. The construct validity of the DS16 was also confirmed against the Neuroticism and Extroversion subscales of the EPQ. In addition, the discriminant validity of the DS16 was confirmed against measures of psychopathology. We also found that Type D persons were at more than a fourfold risk of qualifying for a diagnosis of PTSD compared with non-Type D adjusting for other factors, and that the inclusion of Type D in the regression model increased the level of prediction of PTSD compared with the predictive value of a model including gender, age, MI, neuroticism, and extroversion.

There is evidence to suggest that patients following MI are at increased risk of PTSD [2,24]. PTSD has also been related to a four-fold risk of suffering an MI, independent of smoking, body mass index, and alcohol use [32]. In other words, patients with PTSD following MI may be at risk of recurrent cardiac events. Although no longitudinal studies have investigated the consequences of PTSD in survivors of MI, a recent study found that PTSD was related to non-adherence with medication and poor medical outcome [25]. It is noteworthy that in the current study Type D was associated with more than a four-fold risk of a diagnosis of PTSD adjusting for other variables including MI, whereas the risk associated with the single trait neuroticism was significantly lower. In other words, Type D, i.e., the combination of traits, shows a stronger association with PTSD than the single trait neuroticism.

Personality factors have received little attention in cardiovascular research, since the controversy surrounding the TYPE A BEHAVIOUR PATTERN [8,9] and studies showing that neuroticism (negative affectivity) is not related to objectively impaired health [33–35]. Although neuroticism may not be an etiological factor in CAD, it may play a role in outcome once disease is manifest. Neuroticism has been shown to be associated with the presence of ischemic heart disease [36]. A recent study also showed that neuroticism was an independent predictor of mortality at 2 years' follow-up in 119 patients with heart failure after controlling for disease severity [37]. Neuroticism may also interact with other personality traits affecting prognosis adversely. As noted earlier, studies on the Type D personality construct indicate that the interaction between negative affectivity (which is closely related to neuroticism) and social inhibition is associated with increased risk of depressive symptoms, a higher number of reinfarctions, and higher mortality rates [20,21]. Furthermore, Type D seems to moderate the effects of medical treatment, such that Type D impedes the full benefits of treatment [11,20]. Type D has also recently been associated with increased scores on vital exhaustion [11], and the current study found an association between Type D and PTSD. In other words, there is increasing evidence that Type D is associated with several types of distress, and that this personality type may impact on psychosocial adjustment following an acute MI.

The findings of studies on Type D research indicate that it may be premature to conclude that broad and stable personality traits, such as negative affectivity or social inhibition, have no impact on outcome in patients with established CAD. If anything, Type D research indicates that negative affectivity or neuroticism, in particular in conjunction with other traits such as inhibition, may be detrimental to the mental and physical health of cardiac patients, which was also corroborated in the current study.

Nevertheless, the results of the current study should be interpreted with some caution. The cross-sectional design of the study does not allow for determination of cause and effect. Previous traumatisation was not controlled for in the healthy control group, which is a known risk factor for the development of PTSD following subsequent traumas. In addition, the results are based on a relatively small sample size. Therefore, the results should be replicated in a prospective design with a larger sample.

In conclusion, the validity of the Type D construct was confirmed in a Danish sample of patients with a first MI and a random sample of healthy controls. Type D was associated with more than a four-fold risk of a diagnosis of PTSD adjusting for gender, age, MI, neuroticism, and extroversion. Type D was more strongly associated with PTSD than single personality traits. The DS16 is a brief, valid, and practical instrument that does not overburden cardiac patients. It may be used in clinical practice to determine which cardiac patients are at increased risk of morbidity and mortality. Due to the brevity of the instrument, it is also a practical research tool that can easily be included together with other measures. Future research is now required to determine which interventions are appropriate to decrease the impact of Type D on morbidity and mortality. Although personality traits are generally perceived of as stable and, therefore, as unchangeable, it is certainly possible to reduce the levels of psychological distress experienced by Type D persons [10]. In turn, such interventions have proven successful in reducing morbidity and mortality in cardiac patients.

Appendix A. Type D Scale (DS16) (Danish version)

Nedenfor finder du en række udsagn, som folk ofte bruger til at beskrive sig selv. Det er meningen, at du ud for hvert udsagn skal sætte en cirkel omkring det tal, der bedst passer på dig. Der er ingen rigtige eller forkerte svar.

	Passer 0 = slet ikke	Passer 1 = sjældent	2 = Neutral	Passer for 3 = det meste	Passer 4 = fuldstændigt
1. Jeg føler mig for det meste lykkelig	0	1	2	3	4
2. Jeg ser negativt på tingene	0	1	2	3	4
3. Jeg taler ofte med fremmede	0	1	2	3	4
4. Jeg har begrænset indflydelse på andre mennesker	0	1	2	3	4
5. Jeg har svært ved at give udtryk for min mening	0	1	2	3	4
6. Jeg ser lyst på fremtiden	0	1	2	3	4
7. Jeg tager ofte en ledende position i gruppesammenhænge	0	1	2	3	4
8. Jeg synes, at det er svært at begynde en samtale	0	1	2	3	4
9. Jeg er ofte i dårlig humør	0	1	2	3	4
10. Jeg føler mig ofte ulykkelig	0	1	2	3	4
11. Jeg kommer nemt i kontakt med andre	0	1	2	3	4
12. Jeg synes ofte, at jeg bekymrer mig om et eller andet	0	1	2	3	4
13. Jeg kan godt lide at være i en ledende rolle	0	1	2	3	4
14. Jeg ved ikke, hvad jeg skal tale med andre om	0	1	2	3	4
15. Jeg føler mig for det meste godt tilpas	0	1	2	3	4
16. Jeg føler mig ofte ''nede i kælderen''	0	1	2	3	4

Negative Affectivity = Items 1, 2, 6, 9, 10, 12, 15, 16.
Social Inhibition = Items 3, 4, 5, 7, 8, 11, 13, 14.
Items should be reversed = 1, 3, 6, 7, 11, 13, 15.

References

[1] Ladwig KH, Kieser M, König J, Breithardt G, Borggrefe M. Affective disorders and survival after acute myocardial infarction. Eur Heart J 1991;12:959–64.

[2] Kutz I, Shabtai H, Solomon Z, Neumann M, David D. Posttraumatic stress disorder in myocardial infarction patients: prevalence study. Isr J Psychiatry Rel Sci 1994;31:48–56.

[3] Frasure-Smith N, Lespérance F, Talajic M. Depression and 18-month prognosis after myocardial infarction. Circulation 1995;91:999–1005.

[4] Duits AA, Boeke S, Taams MA, Passchier J, Erdman RAM. Prediction of quality of life after coronary artery bypass graft surgery: a review and evaluation of multiple recent studies. Psychosom Med 1997;59:257–68.

[5] Pedersen SS, Denollet J. Perceived health following myocardial infarction: cross-validation of the Health Complaints Scale in Danish patients. Behav Res Ther 2002;40:1221–30.

[6] Berkman LF, Leo-Summers L, Horwitz RI. Emotional support and survival after myocardial infarction. Ann Intern Med 1992;117:1003–9.

[7] Hemingway H, Marmot M. Psychosocial factors in the aetiology and prognosis of coronary heart disease: systematic review of prospective cohort studies. Br Med J 1999;318:1460–7.

[8] Keltikangas-Jarvinen L, Raikkonen K. Emotional styles and coping strategies characterizing the risk and non-risk dimensions of type A behaviour in young men. Pers Individ Differ 1993;14:667–77.

[9] McCranie EW, Watkins LO, Brandsma JM, Sisson BD. Hostility, coronary heart disease (CHD) incidence, and total mortality: lack of association in a 25-year follow-up study of 478 physicians. J Behav Med 1986;9:119–25.

[10] Denollet J, van Heck GL. Psychological risk factors in heart disease: what Type D personality is (not) about. (Comments on the article by Pedersen and Middel: ''Increased vital exhaustion among type D patients with ischemic heart disease'') J Psychosom Res 2001;51:465–8.

[11] Pedersen SS, Middel B. Increased vital exhaustion among Type-D patients with ischemic heart disease. J Psychosom Res 2001;51:443–9.

[12] Eriksen W. The role of social support in the pathogenesis of coronary heart disease. A literature review. Fam Pract 1994;11:201–9.

[13] Pedersen SS, Middel B, Larsen ML. The role of personality var-

iables and social support in distress and perceived health in patients following myocardial infarction. J Psychosom Res 2002;53: 1171–5.

[14] Williams RB, Barefoot JC, Califf RM, Haney TL, Saunders WB, Pryor DB, Hlatky MA, Siegler IC, Mark DB. Prognostic importance of social and economic resources among medically treated patients with angiographically documented coronary artery disease. JAMA 1991;267:520–4.

[15] Fontana AF, Kerns RD, Rosenberg RL, Colonese KL. Support, stress, and recovery from coronary heart disease: a longitudinal causal model. Health Psychol 1989;8:175–93.

[16] Lindsay GM, Smith LN, Hanlon P, Wheatley DJ. The influence of general health status and social support on symptomatic outcome following coronary artery bypass grafting. Heart 2001;85:80–6.

[17] Denollet J. Personality and coronary heart disease: the Type-D Scale (DS16). Ann Behav Med 1998;20:209–15.

[18] Denollet J, Sys SU, Brutsaert DL. Personality and mortality after myocardial infarction. Psychosom Med 1995;57:582–91.

[19] Denollet J, Brutsaert DL. Personality, disease severity, and the risk of long-term cardiac events in patients with decreased ejection fraction after myocardial infarction. Circulation 1998;97:167–73.

[20] Denollet J, Vaes J, Brutsaert DL. Inadequate response to treatment in coronary heart disease: adverse effects of Type D personality and younger age on 5-year prognosis and quality of life. Circulation 2000; 102:630–5.

[21] Denollet J, Sys SU, Stroobant N, Rombouts H, Gillebert TC, Brutsaert DL. Personality as independent predictor of long-term mortality in patients with coronary heart disease. Lancet 1996;347:417–21.

[22] Mendes de Leon CF, Kop WJ, de Swart HB, Bär FW, Appels APWM. Psychosocial characteristics and recurrent events after percutaneous transluminal coronary angioplasty. Am J Cardiol 1996;77:252–5.

[23] American Psychiatric Association. Diagnostic and statistical manual of mental disorders, 4th ed. (DSM-IV). Washington (DC): Author 1994.

[24] Pedersen SS. Post-traumatic stress disorder in patients with coronary artery disease: a review and evaluation of the risk. Scan J Psychol 2001;42:445–51.

[25] Shemesh E, Rudnick A, Kaluski E, Milovanov O, Salah A, Alon D, Dinur I, Blatt A, Metzkor M, Golik A, Verd Z, Cotter G. A prospective study of posttraumatic stress disorder and nonadherence in sur-

vivors of a myocardial infarction (MI). Gen Hosp Psychiatry 2001; 23:215–22.

[26] Joint European Society of Cardiology/American College of Cardiology Committee. Myocardial infarction redefined—a consensus document of the Joint European Society of Cardiology/American College of Cardiology Committee for the redefinition of myocardial infarction. Eur Heart J 2000;21:1502–13.

[27] Eysenck HJ, Eysenck SBG. Eysenck Personality Questionnaire. London: Hodder & Stoughton, 1985.

[28] Sanderman R, Arindell WA, Ranchor AV, Eysenck HJ, Eysenck SBG. Eysenck Personality Questionnaire: een handleiding (Eysenck Personality Questionnaire: manual). Groningen: Regenboog, 1995.

[29] Briere J, Runtz M. The Trauma Symptom Checklist (TSC-33): early data on a new scale. J Interpers Violence 1989;4:151–63.

[30] Foa EB. Posttraumatic stress diagnostic manual. Minneapolis (MN): National Computer Systems, 1995.

[31] Foa EB, Cashman L, Jaycox L, Perry K. The validation of a self-report measure of posttraumatic stress disorder: the Posttraumatic Diagnostic Scale. Psychol Assess 1997;9:445–51.

[32] Boscarino JA, Chang J. Electrocardiogram abnormalities among men with stress-related psychiatric disorders: implications for coronary heart disease and clinical research. Ann Behav Med 1999;21: 227–34.

[33] Costa PT. Influence of the normal personality dimension of neuroticism on chest pain symptoms and coronary artery disease. Am J Cardiol 1987;60:20J–6J.

[34] Stone SV, Costa PT. Disease-prone personality or distress-prone personality? The role of neuroticism in coronary heart disease. In: Friedman HS, editor. Personality and disease. New York: Wiley, 1990. pp. 65–96.

[35] Shekelle RB, Vernon SW, Ostfeld AM. Personality and coronary heart disease. Psychosom Med 1991;53:176–84.

[36] Marusic A, Gudjonsson GH, Eysenck HJ, Starc R. Biological and psychosocial risk factors in ischaemic heart disease: empirical findings and a biopsychosocial model. Pers Individ Differ 1999;26: 285–304.

[37] Murberg TA, Bru E, Aarsland T. Personality as a predictor of mortality among patients with congestive heart failure: a two-year follow-up study. Pers Individ Differ 2001;30:749–57.