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Personality and Social Psychology

DS14 is more likely to measure depression rather than a personality disposition in patients with acute coronary syndrome

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It has been suggested that Type D Personality is a risk factor for acute coronary syndrome (ACS) and the DS14 has been developed for its assessment. However, some of the items on the DS14 seem to evaluate depressive symptoms rather than personality features. Therefore, the present study aims to verify whether an overlap exists between the constructs of Type D Personality and depression. Three-hundred-and-four consecutive patients who were both presenting their first ACS and had no history of major depression completed the Hospital Anxiety and Depression Scale (HADS) and the DS14 to assess Type D personality at baseline and have been re-evaluated at 1, 2, 4, 6, 9 and 12-month follow-ups. Out of 304 subjects (80.6% males), 40 were diagnosed as depressed. An exploratory factor analysis of HADS and the DS14 in the second month revealed that four out of seven items on the depressive subscale of HADS (HADS-D) and six out of seven items on the Negative Affectivity (NA) subscale of the DS14 segregated on the same factor. Results were verified by a Partial Confirmatory Factor Analysis performed at the twelfth month when most of the patients achieved complete remission from the depressive episode. Temporal stability was poor for NA and Type D Personality and these construct co-vary with HADS-D over time. Our data suggests that NA and depression are overlapping constructs, supporting the idea that the DS14 measures depressed features, rather than a personality disposition.

Key words: Type D Personality, depression, Negative Affectivity, acute coronary syndrome.

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INTRODUCTION

Distressed (Type D) Personality (Denollet, Sys, Stroobant, Rombouts, Gillebert & Brutsaert, 1996) is characterised by two different dimensions: Negative Affectivity (NA) and Social Inhibition (SI). Individuals scoring highly in NA experience feelings of dysphoria, anxiety, irritability, have a negative self-view and scan the world for signs of impending trouble. High SI predisposes individuals to inhibit expressions of emotion and behaviors in social interactions in order to avoid disapproval and further leads to a feeling of tenseness and general insecurity around others. Type D Personality is defined by the presence of both high NA and SI, and a specific instrument (DS14) was developed for its assessment (Denollet, 2005).

Type D Personality seems to increase the risk of Coronary Artery Disease (CAD) (Beutel, Wiltink, Till *et al*., 2012) and to worsen cardiac outcome (Denollet & Conraads, 2011). However, the initial enthusiasm about the impact of Type D Personality on the CAD prognosis declined in more recent years (Coyne & de Voogd, 2012), and the debate on a possible overlap between Type D Personality and depression is still open. Indeed, though some studies underline how "Type D Personality refers to a chronic, more covert form of distress that is distinct from depression" (Denollet & Conraads, 2011; Denollet & Pedersen, 2008; Denollet, de Jonge, Kuyper *et al*., 2009; Denollet, Schiffer & Spek, 2010; Pelle, Denollet, Zwisler & Pedersen, 2009), others point out that Type D Personality, particularly the NA dimension, has been associated with a history of depressive disorder (Starrenburg, Kraaier, Pedersen, van Hout, Scholten & van der Palen, 2013) or presence of depressive symptoms (Bergvik, Sørlie, Wynn & Sexton, 2010; Christodoulou, Douzenis, Mommersteeg *et al*., 2013; Condén, Rosenblad, Ekselius & Åslund, 2014; Kudielka, von Kanel, Gander & Fische, 2004; Kuijpers, Denollet, Wellens, Crijns & Honig, 2007; Marchesi, Ossola, Scagnelli *et al*., 2014a; Tully & Pennix, 2012).

Trait psychological features are assumed to be stable over time (Eysenk, 1985) but a recent study that analysed the temporal stability over time of Type D Personality after Myocardial Infarction (MI) (Condén *et al*., 2014) found a low agreement between the three time measurement (hospitalization, 1 and 12 months after MI), even after excluding depressed patients (HADS-D > 10). Moreover, DS14 scores have been found to fluctuate according to the severity of depressive symptoms or distress (Marchesi, Ossola, Scagnelli *et al*., 2014b), supporting the view that the DS14 could measure depressive symptoms (Dannemann, Matschke, Einsle *et al*., 2010; Denollet *et al*., 1996; Romppel, Herrmann-Lingen, Vesper & Grande, 2012). The debate concerning the existence of an overlap between the constructs of Type D Personality and depressive symptoms could be resolved using factor analysis and evaluating temporal stability: if Type D Personality features and depressive symptoms are segregated on different factors and do not co-vary over time, the overlap between the two constructs can be excluded. To our knowledge, only one previous study (Pelle *et al*., 2009), using factor analysis of four different rating scales, did not find any overlap between NA, SI and depressive symptoms. Considering the high incidence of both depressive and cardiac disorders (Murray & Lopez, 1996) and the

interaction of the first with acute coronary syndrome (ACS) (Lichtman, Froelicher, Blumenthal *et al*., 2014), clarifying cardiac risk factors (i.e., Type D personality) could help clinicians make more reliable prognoses, and could also help disentangle the shared etiology of the two disorders.

Therefore, the present study aims to confirm if, in never depressed patients at their first ACS, the constructs of Type D Personality and depression were not overlapping.

MATERIALS AND METHODS

The Local Ethics Authority approved the study protocol and the study was conducted according to the Helsinki Declaration. The study enrolled patients consecutively admitted to the Coronary Intensive Care Unit of the University Hospital of Parma between January 2009 and March 2012 if: (a) they presented for the first time with symptoms suggestive of an acute coronary syndrome and with an ST-segment elevation myocardial infarction (STEMI); a non–ST-segment elevation myocardial infarction (NSTEMI); or unstable angina had been diagnosed (Van deWerf, Bax, Betriu *et al*., 2008; Hamm, Bassand, Agewall *et al*., 2011). The working diagnosis of NSTE-ACS was a rule-out diagnosis based on the ECG, i.e., lack of persistent ST elevation. Biomarkers (troponins) further distinguished NSTEMI and unstable angina (Hamm *et al*., 2011); (b) they had no history of major depression (MD); (c) they did not satisfy the PRIME-MD criteria for MD at baseline; and (d) they gave informed consent to participate to the study.

At baseline, social-demographic variables were collected and the presence of a Depressive Episode was evaluated with the Italian version of the Primary Care Evaluation of Mental Disorders (PRIME-MD); the severity of depressive and anxious symptoms were assessed with the Italian version of the Hospital Anxiety and Depression Scale (HADS). The Italian version of the DS14 was used to assess Type D Personality. In addition, at baseline, the GRACE score (Eagle, Lim, Dabbous *et al*., 2004) was calculated for each patient. Patients were evaluated with PRIME-MD, HADS and DS14 at baseline (within the first three days after the ACS) and at 1, 2, 4, 6, 9 and 12-month follow-ups. The PRIME-MD was followed by a short interview performed by a psychiatrist, who verified if the answers were appropriate to the patients' condition.

The HADS is a 14-item self-administered instrument for the evaluation of anxiety and depressive symptoms. Each item is rated on a five-point (0–4) scale. The HADS generates two subscale scores: the anxiety score (HADS-A) and the depression score (HADS-D). DS14 was specifically developed to assess Negative Affectivity (NA) and Social Inhibition (SI). Each subscale consists of seven items rated from zero (false) to four (true) on a five-point Likert-type scale. A subject is defined as having a Type D personality if they score higher than 10 in both the NA and SI subscales.

The Global Registry of Acute Coronary Events (GRACE) score (Eagle *et al*., 2004) is based on a risk model of 6 months mortality risk from the time of hospital discharge; it considers age, history of MI, past or current congestive heart failure (CHF), heart rate, systolic blood pressure, serum creatinine, elevated cardiac enzymes, ST-segment depression on ECG at admission, and in hospital percutaneous intervention (PCI). All the information concerning the abovementioned parameters was obtained from chart review at baseline.

After computing the rates of patients classified as depressed and non-depressed over the course of follow-up, the baseline differences among groups were evaluated using χ^2 test and Kendall's tau-c (τ) for categorical variables (i.e., gender, occupational and educational status, presence of Type D personality) and Mann-Whitney test for continuous variables (i.e., age, HADS-D, NA and SI scores). NA and SI were dichotomized according a threshold of 10 (Denollet, 2005) and patients have been divided into Type D and non-Type D personality. Then, due to criticism of the dichotomization of Type D Personality (Coyne, Jaarsma, Luttik, van Sonderen, van Veldhuisen & Sanderman, 2011), we calculated an interaction term on NA*SI, with the mean centered values.

A repeated measure ANOVA was performed to compute differences between the HADS and DS14 scores at different follow-ups, co-varying for GRACE score since the severity and extent of coronary heart disease could be related to the incidence of depression (Lane, Lip & Carroll, 2004). Because the HADS-D was not normally distributed, comparison during the follow-up has been performed with Friedman's test for related samples and pairwise comparison between depressed and non-depressed patients with the Mann-Whitney test. An Exploratory Factor Analysis (EFA) was then performed in the whole sample, using both the HADS and the DS-14 item scores collected at the two-month follow up (T2), when the overall number of depressed patients and the mean HADS-D score were highest. We considered EFA instead of a Confirmatory Factor Analysis (CFA) because it allows all of the items to load freely without constraint, thus describing the sample more accurately. Correlations between scales have been calculated with Spearman's *rho*.

We then performed a Partial Confirmatory Factor Analysis (PCFA) (Gignac, 2009) with the resulting factors at the remission of the depressive episode (T12).

Temporal stability between baseline, second and twelfth month was then calculated with Cohen's kappa for the dichotomous variables (i.e., Type D Personality at DS14 dichotomized) and Intra Class Correlation (ICC) for continuous variables (DS14-NA, DS14-SI, interaction term NA*SI). Analysis was performed with SPSS IBM Statistics 21.0 (IBM, Armonk, NY).

RESULTS

Patients' characteristics

Three-hundred-and-ninety-seven patients met the inclusion criteria, and among them, 377 agreed to participate in the study. During the follow-up period 25 moved outside the study area, 23 refused further psychiatric evaluations, four passed away and 21 continued the rehabilitation treatment at a different hospital. The study sample, therefore, included 304 subjects at baseline (males n. 245, 80.6%), with a mean age of 61.4 $\pm$ 10.9 years (range 32–87 yrs). At two months after hospitalization 28 patients (depressed n = 2) did not complete the DS14, moreover one patients died between T2 and T12, resulting in a total sample of 275 subjects that completed the study. Figure 1 shows a flow diagram of the patients' progress through the follow-up period.

Depressive episode

Throughout the follow-up period, a Depressive Episode (major or minor) was diagnosed in 40 patients (13.2%) according to PRIME-MD and confirmed by the psychiatric interview, whereas 264 (86.8%) did not show any depressive disorder during the 12 months of follow-up. Baseline socio-demographic and clinical characteristic of depressed and non-depressed patients are shown in Table 1. Patients who developed a Depressive Disorder during the follow-up differed from those who did not in gender, family status, Type D personality and baseline scores at HADS-D (Marchesi *et al*., 2014a).

Scale consistency

The Cronbach's alpha at baseline was satisfactory for both HADS (HADS total score = 0.862; HADS-A = 0.819, HADS-D = 0.690) and DS14 (DS14 total score = 0.835;

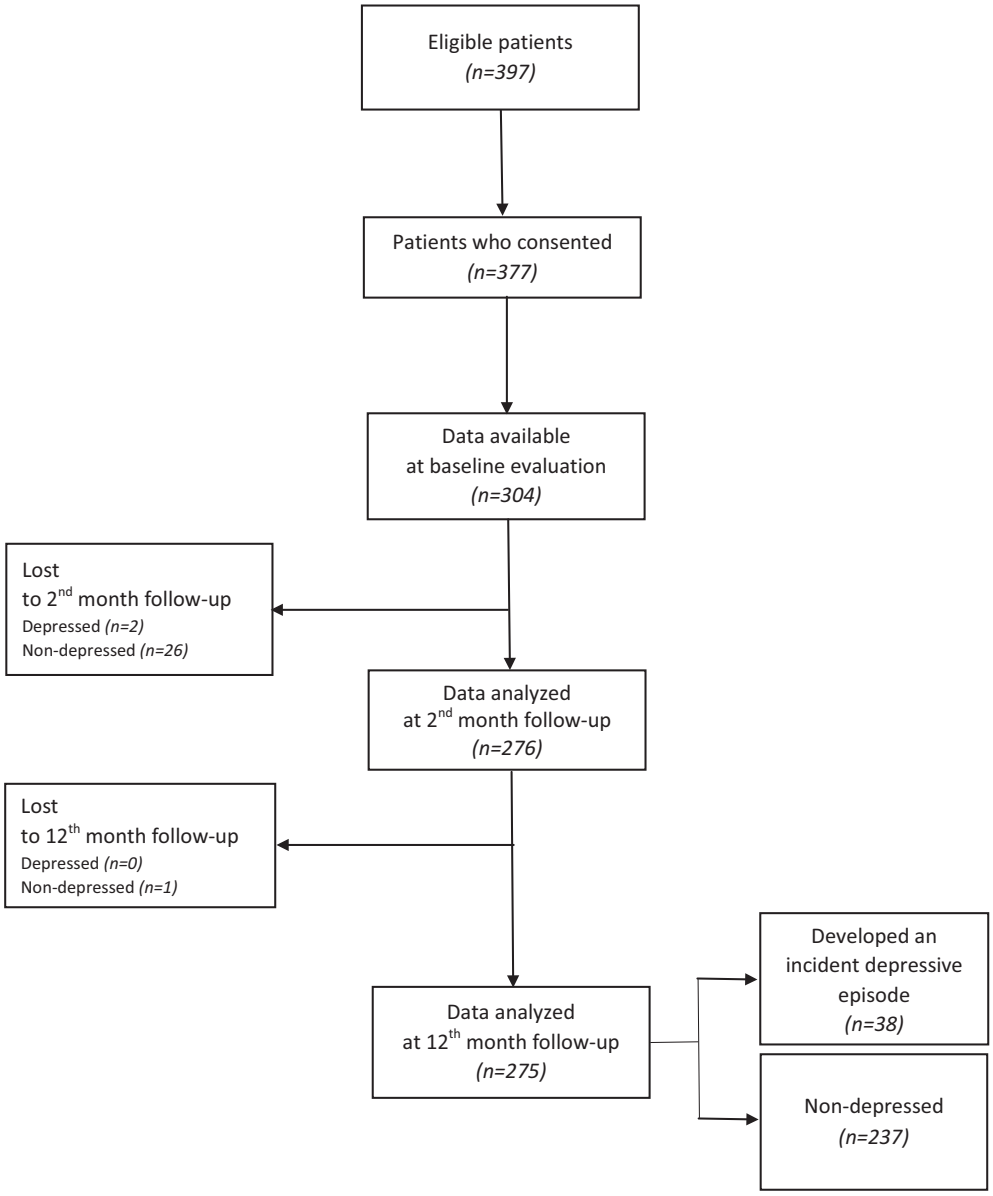

Fig. 1. Patients flow diagram.

DS14-NA = 0.844; DS14-SI = 0.650). These values demonstrate that the questionnaires have a good internal consistency and reliability.

Repeated measures ANOVA for HADS

The repeated measures with GRACE score as a covariate, revealed the highest differences in HADS-D within the depressed group between T2 and T12 (HADS-D at T2 = 10.20 ± 4.07; HADS-D at T12 = 6.53 ± 3.71; $\chi^2(1) = 13.37$; $p < 0.001$). Moreover at T2 the differences in HADS between depressed and non-depressed patients was the highest (HADS-D at T2 depressed = 10.20 ± 4.07; HADS-D at T2 non-depressed = 6.86 ± 4.04; U = 2551.5; z = −4.3; $p < 0.001$). The pattern of variation was similar for both HADS-D, NA and NA*SI confirming previous results from part of this data-set (Marchesi *et al*., 2014b). Since the aim of this study is to evaluate the overlap between the two scales, we performed factor analysis and assessed temporal stability in these two follow ups (i.e., T2 and T12). The variation of the scales over time are shown in Fig. 2.

Exploratory factor analysis at T2

The Kaiser-Meyer-Olkin index (KMO = 0.884) and the Bartlett's test of sphericity ($p < 0.0001$) showed that data fulfilled the assumption for factor analysis of HADS and DS14. The scree plot has a doubt inflexion point on the sixth factor (Eigenvalue = 1.045) and the Kaiser's Criterion extracted six factors. In order to understand how many factors we needed to retain, we then performed a Parallel Analysis (O'Connor, 2000) which revealed a five factors model at both T2 and T12. Convergent validity was moreover confirmed by the correlation between HADS-D and DS14-NA at T2 that was moderate in the whole sample ($\rho = 0.434$; ($p < 0.001$)) and strong in the depressed patient group ($\rho = 0.697$; ($p < 0.001$)).

Table 1. *Socio-demographic and clinical characteristics of patients*

	Depression n = 0	No Depression n = 264			
Gender (male)	26 (65%)	219 (83.0%)	$\chi^2(303) = 7.2$		$p = 0.007$
Age (years)	63.4 ± 11.7	61.1 ± 10.8	$U = 4568$	$z = -1.3$	$p = 0.17$
Education			$\chi^2(303) = 1.4$		$p = 0.70$
			$\tau = -0.04$		$p = 0.28$
Primary school	8 (20.0%)	42 (15.9%)			
Secondary school	17 (42.5%)	97 (36.7%)			
High school	12 (38.6%)	102 (38.8%)			
University	3 (7.5%)	23 (8.7%)			
Family status			$\chi^2(303) = 24.3$		$p < 0.001$
			$\tau = 0.11$		$p = 0.002$
Never married	4 (10%)	32 (12.1%)			
Married/Living together	22 (55%)	201 (76.1%)			
Separated/Divorced	4 (10%)	20 (7.6%)			
Widowed	10 (25%)	11 (4.2%)			
Occupation			$\chi^2(303) = 6.2$		$p = 0.10$
			$\tau = -0.03$		$p = 0.40$
Unemployed	2 (5%)	6 (2.3%)			
Retired	19 (47.5%)	131 (49.6%)			
Housewife	5 (12.5%)	11 (4.2%)			
Employed	14 (35%)	116 (43.9%)			
GRACE Score	133.3 ± 30.5	129.7 ± 29.0	$U = 5013.5$	$z = -0.52$	$p = 0.61$
At baseline	n = 40	n = 264			
Type D personality	24 (60%)	80 (30.3%)	$\chi^2(303) = 13.6$		$p < 0.001$
HADS-D score	8.6 ± 4.0	6.8 ± 4.2	U = 3992	$z = -2.5$	$p = 0.01$
At the 2nd month	n = 38	n = 238			
Type D personality	21 (55.2%)	63 (26.5%)	$\chi^2(275) = 14.2$		$p < 0.001$
HADS-D score	10.1 ± 4.0	6.8 ± 4.0	U = 2551.5	$z = -4.3$	$p < 0.001$
At 12th month	n = 38	n = 237			
Type D personality	8 (21.1%)	44 (18.6%)	$\chi^2(274) = 0.27$		$p = 0.37$
HADS-D score	6.3 ± 3.8	5.4 ± 3.8	U = 3848.5	z = −1.4	$p = 0.16$

Notes: Hospital Anxiety and Depression Scale: Depression (HADS-D).

Hence, we extracted five factors that accounted for the 61% of the total variance (Table 2). Then, in order to maximise the load of each variable on factors, we performed an oblique rotation considering the correlation of factors in analysing psychological variables in a human sample (Field, 2013; Loo, 1979). The structure matrix is shown in Table 2. The first factor (Negative Affectivity) segregated two anxious and four depressive items of HADS and six NA items of the DS14. One more NA item showed a slightly high loading on the first factor even though it loaded higher on the fifth factor. Social Inhibition segregated on the third, fourth and fifth factors, whereas anxiety was mainly on the second factor (5 HADS-A and 3 HADS-D). Consistency of resulting factors according Cronbach's alphas was satisfactorily high for four out of five factors (Table 2). The forth factor showed a lower alpha, that could be affected by the number and characteristics of items (only the two reverse items).

Partial Confirmatory Factor analysis at the remission

The results at the PCFA were overlapping with the EFA at T2. A three-factor model (i.e., Negative Affectivity, Anxiety and Social Inhibition) was adequate (KMO = 0.852, Bartlett's test, ($p < 0.001$) and the data fitted it satisfactorily (Goodness of fit test: $\chi^2 = 673.02$; df = 297; ($p < 0.001$; Comparative fit index, CFI = 0.90; Root mean square error of approximation, RMSEA = 0.06; Standardized Root Mean Square Residual, SRMR = 0.05). Five out of seven items of the HADS-D loaded on the first factor (Negative Affectivity) with five items of the DS14-NA, whereas four of these segregated on the second factor too.

Temporal stability of DS14

The temporal stability of DS14 dichotomized, measured with Cohen's kappa, was fair in the non-depressed group with the lowest score in the depressed group between T0 and T2 (Table 3) as observed previously (Condén *et al*., 2014). The ICC showed a moderate agreement between T0 and T2 for NA and NA*SI but a poor agreement between T2 and T12, specifically for the depressed group. On the other hand, SI showed during the follow-up period a moderate-strong agreement between the measurement both in the depressed and non-depressed group.

DISCUSSION

In this study, we evaluated whether or not Type D Personality features overlap with symptoms of depression in a sample of never depressed patients at their first episode of ACS. The inclusion of patients with no history of ACS or depressive disorder allowed us to infer that Type D Personality features were unlikely to be confounded by long lasting depressive or coronary illnesses, and could not represent a "scar" following such diseases, as was previously hypothesised (Starrenburg *et al*., 2013).

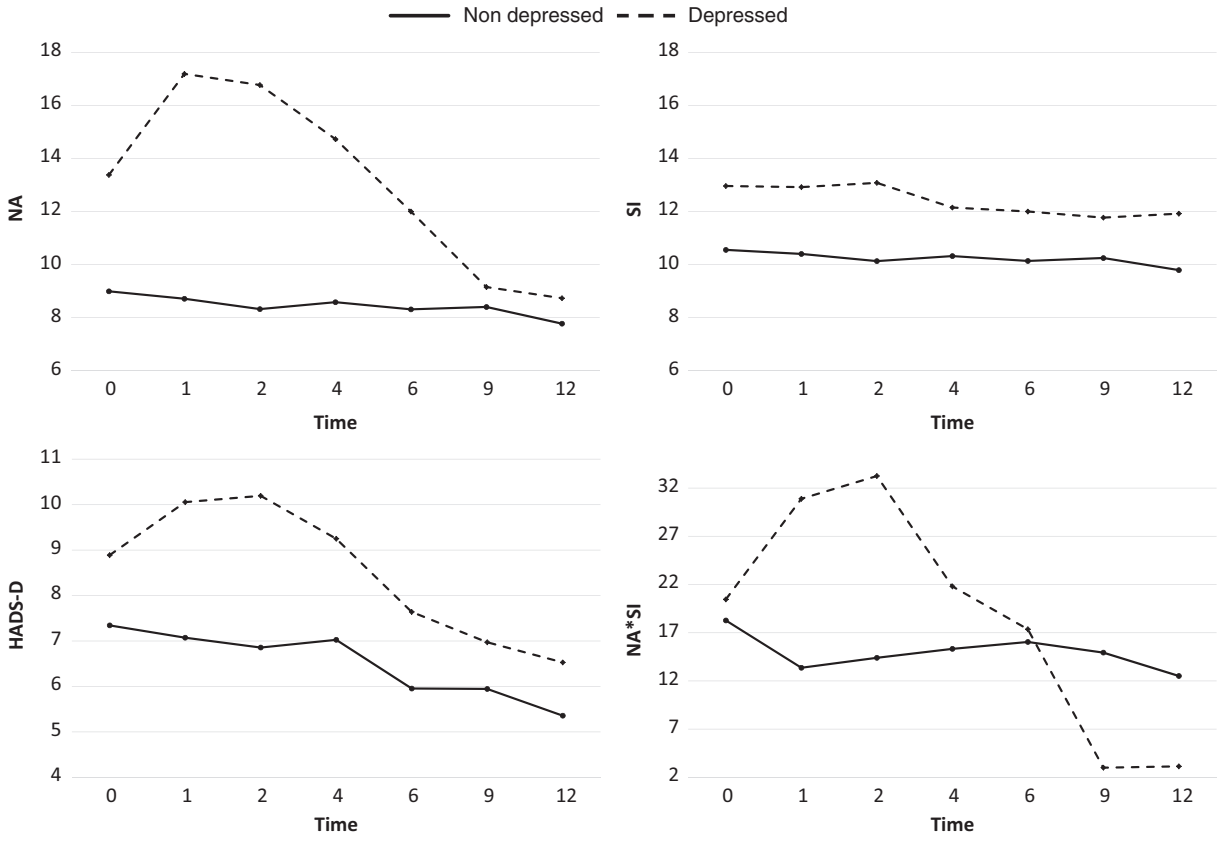

Fig. 2. Variation of the HADS and DS14 scores during the follow-up period in depressed (n = 38) and non-depressed patients (n = 237).

Exploratory Factor Analysis of the DS14 and HADS identified one factor (Negative Affect), which segregated six out of seven DS14-NA items, e.g., "I am often in a bad mood," "I often feel unhappy," "I am often down in the dumps") together with four depression items and two anxiety items on the HADS. This, together with the moderate to strong correlation between scales, suggests that the NA and depression constructs are overlapping in a clinical sample; this overlap, however, was found to be weak in a general population (Kudielka *et al*., 2004). Interestingly, this overlap was observed even though we used, as a measure of depression, the HADS-D scale. This evaluates only the anhedonic component of depression, rather than the mood component, which instead can be gauged by the NA dimension. The results of the present study do not confirm the findings of Pelle *et al*. (2009), who did not find any overlap between depression and Type D Personality. However, in their high-order factor analysis, NA loaded with some depressive scales (i.e., HADS-D and BDI) whereas SI did not. Contrary to these findings, Svansdottir, Karlsson, Gudnason *et al*. (2012), despite the strong correlation between NA and depression at HADS-D, did not find an overlap between the two in a factor analysis.

Interestingly, in our sample, 55.2% of depressed patients satisfied a diagnosis of Type D personality as well; this prevalence decreases to 21.1% at the achievement of remission of the depressive episode. This is not statistically different from the rate of Type D personality in the non-depressed group (18.6%; Table 1). These results partially overlap with what was observed by Denollet and colleagues (2009), who found that out of 206 patients who developed depression, 90 (43.7%) had Type D personality; whereas only 134 (13.4%) out of 998 had Type D personality in the non-depressed group. However, in their study patients were not evaluated on remission of the depressive episode.

Our results are strengthened by the overlap with the PCFA performed in the twelfth month and by the low temporal stability of NA in the depressed group. These data confirm recent results (Condén *et al*., 2014), that observed the lowest stability over time for the item "I often feel unhappy" that seems to measure mainly a depressive state-dependent feature.

In contrast to the NA results, no overlap between depressive symptoms and SI dimension was found in the present study. However, this finding might be explained by the structure of the HADS, which assessed only the anhedonic dimension of depression, while the disruption of social interaction induced by depression was not evaluated by this scale. Nonetheless, SI showed a good temporal stability suggesting that it could measure a more stable feature, such as introversion (Denollet, 2005; Svansdottir *et al*., 2012), which is less affected by a state component such as depressive symptoms. Concerning the results of the factorial analysis, the fact that item 1 and 3 ("I make contact easily when I meet people" and "I often talk to strangers") loaded on the same separate factor could reflect both the shared reverse structure and the common investigated domain (i.e., social poise) (Denollet, 2005). Item six ("I often feel inhibited in social interaction"), instead could load on the fifth factor (Table 2), separately from the others SI items (i.e., discomfort in social interaction and reticence) because it more accurately reflects the social disruption induced by depression.

Table 2. *Exploratory factor analysis of the Hospital Anxiety and Depression Scale and the Type D personality Scale items at second month (T2) (structure matrix) (n = 276)*

			Factors				
			Negative affect	Anxiety	Social inhibition		
Subscale	#		1	2	3	4	5
DS14-NA	4	I often feel unhappy	0.748				
DS14-NA	13	I am often down in the dumps	0.735				
DS14-NA	5	I am often irritated	0.674				
DS14-NA	9	I am often in a bad mood	0.673				
HADS-D	2*	I still enjoy the thinks I used to enjoy	0.647				
HADS-D	4*	I can laugh and see the funny side of things	0.633				
HADS-D	12*	I look forward with enjoyment to things	0.633				
HADS-A	7	I can sit at ease and feel relaxed	0.617				
HADS-D	14*	I can enjoy a good book or radio or TV programs	0.540				
HADS-A	9	I get a sort of frightened feeling like 'butterflies' in the stomach	0.493				
DS14-NA	12	I often found myself worrying about something	0.476				
DS14-NA	2	I often make a fuss about unimportant thinks	0.435				
HADS-A	13	I get sudden feelings of panic		0.909			
HADS-D	6*	I feel cheerful		0.872			
HADS-D	8	I feel as if I am slowed down		0.842			
HADS-A	11	I feel restless as if I have to be on the move		0.841			
HADS-D	10	I have lost interest in my appearance		0.805			
HADS-A	5	Worrying thoughts go through my mind		0.795			
HADS-A	1	I feel tense or "wound up"		0.766			
HADS-A	3	I get a sort of frightened feeling as if something awful is about to happen		0.761			
DS14-SI	10	I am a closed kind of person			0.783		
DS14-SI	11	I would keep other people at a distance			0.682		
DS14-SI	14	When socializing, I don't find the right things to talk about			0.544		
DS14-SI	3*	I often talk to strangers				0.657	
DS14-SI	1*	I make contact easily when I meet people				0.481	
DS14-NA	7	I take a gloomy view of thinks	0.507				0.727
DS14-SI	6	I often feel inhibited in social interaction					0.677
DS14-SI	8	I find it hard to start a conversation			0.588		0.623
		Eigenvalue	6.88	5.78	1.87	1.46	1.10
		% of variance	24.57	20.62	6.66	5.20	3.95
		Cronbach's α	0.875	0.944	0.693	0.438	0.735

Notes: HADS-D = depression subscale of Hospital Anxiety and depression scale; HADS-A = anxiety subscale of Hospital Anxiety and depression scale; DS14-NA = Negative affectivity subscale of Type D personality questionnaire; DS14-SI = Social Inhibition subscale of Type D personality questionnaire; # = item number; * = reversed item.

This study has some limitations. First, the small number of depressed patients in this sample limits the reliability of our results, especially regarding temporal stability. However, such a small sample reflects the inclusion criteria of the study: only patients free from previous major depressive episodes and at the clinical onset of CAD. Conclusions from our results should be drawn with precaution, as the present data need to be verified by using larger samples. Second, the use of HADS-D could represent a limit, since its validity in assessing depression has been recently criticized (Iani, Lauriola & Costantini, 2014; Norton, Cosco, Doyle, Done & Sacker, 2013). In our study, depression was diagnosed using the PRIME-MD, an interview performed to evaluate mental disorders in primary care, which showed a good specificity (98%) and sensibility (57%) in detecting depression in primary care (Spitzer, Kroenkem & Williams, 1999). Moreover, the compilation of the PRIME-MD by the patients was followed by a short interview performed by a psychiatrist, who verified if the answers were appropriate to the patients' condition, making the diagnosis more reliable in our study. Third, some stressful situations could have a state effect on personality (Caspi, Roberts & Shiner, 2005). This could justify the overlap after an event such as an ACS; however, in our sample, this overlap has been confirmed even at the 1-year follow-up when most of the patients (n = 35) achieved remission from the depressive episode present at the second month. A possible alternative explanation is that HADS-D measures the 'negative affectivity' trait, which could overlap with NA. Nevertheless, the difference in HADS-D between depressed and non-depressed groups was significant at the 2nd month, but not at the 12th (HADS-D at T12 depressed = 6.52 ± 3.71; HADS-D at T12 non-depressed = 5.35 ± 3.84; U = 3848.5; z = −1.4; p = 0.16), suggesting that this scale reflects a more unstable state component.

Table 3. *Temporal stability of DS14 in the sample*

		T0-T2			T2-T12		
		Total (n = 276); D (n = 38); ND (n = 238)			Total (n = 275); D (n = 38); ND (n = 237)		
		k	CI 95%	p	k	CI 95%	p
Type D	Total	0.412	0.305–0.519	< 0.001	0.494	0.375–0.613	< 0.001
	D	0.321	0.033–0.609	0.05	0.424	0.191–0.657	0.01
	ND	0.369	0.248–0.490	< 0.001	0.389	0.256–0.522	< 0.001
		ICC	CI 95%	p	ICC	CI 95%	p
DS14-NA	Total	0.540	0.450–0.618	< 0.001	0.483	387–0.569	< 0.001
	D	0.520	0.243–0.718	0.001	0.136	−0.188–0.433	0.205
	ND	0.483	0.379–0.575	< 0.001	0.549	0.454–0.632	< 0.001
DS14-SI	Total	0.466	0.368–0.553	< 0.001	0.701	0.636–0.757	< 0.001
	D	0.485	0.200–0.695	0.001	0.771	0.602–0.874	< 0.001
	ND	0.424	0.314–0.523	< 0.001	0.666	0.588–0.731	< 0.001
NA*SI	Total	0.544	0.456–0.622	< 0.001	0.515	0.423–0.597	< 0.001
	D	0.421	0.121–0.650	0.004	0.180	−0.144–0.470	0.136
	ND	0.514	0.415–0.602	< 0.001	0.611	0.525–0.685	< 0.001

Notes: Type D = dichotomous evaluation of Type D personality; NA*SI = Interaction term between mean centred scores at Negative Affectivity and Social Inhibition subscales of DS14; DS14-NA = Negative affectivity subscale of Type D personality questionnaire; DS14-SI = Social Inhibition subscale of Type D personality questionnaire.
D = depressed according PRIME-MD and psychiatric interview; ND = non depressed according PRIME-MD and psychiatric interview.

CONCLUSION

In sum the data of the present study suggests that the NA dimension, measured through the DS14, and depressive symptoms are largely overlapping constructs and therefore, DS14-NA could evaluate a depressive condition rather than a personality profile.

Further, the present findings represent a possible explanation of the long-recognized association between the self-reported measures of the NA dimension of Type D Personality and depression (Christodoulou *et al*., 2013; Condén *et al*., 2014; Dannemann *et al*., 2010; Denollet *et al*., 1996; Kuijpers *et al*., 2007; Marchesi *et al*., 2014a, 2014b; Romppel *et al*., 2012; Starrenburg *et al*., 2013; Tully & Pennix, 2012).

The results of this study may support the hypothesis that Type D Personality can both be a risk factor and influence the prognosis after an Acute Myocardial Infarction (i.e., mortality, new cardiac events) since it represents a measure of depression rather than a personality disposition, as suggested by previous observations (Coyne *et al*., 2011). Since Type D personality has been proposed as a prognostic factor in CAD (Denollet & Pedersen, 2008; Denollet *et al*., 2013), clinicians should bear in mind that, when using the DS14, it could reflect a state depressive component instead. Because of contrasting results on the prognostic validity of Type D (Grande, Romppel & Barth, 2012; Meyer, Hussein, Lange & Herrmann-Lingen, 2014) and depression (Frasure-Smith & Lespérance, 2008) on cardiac outcome, further studies, specifically aimed at disentangling this issue, are needed.

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