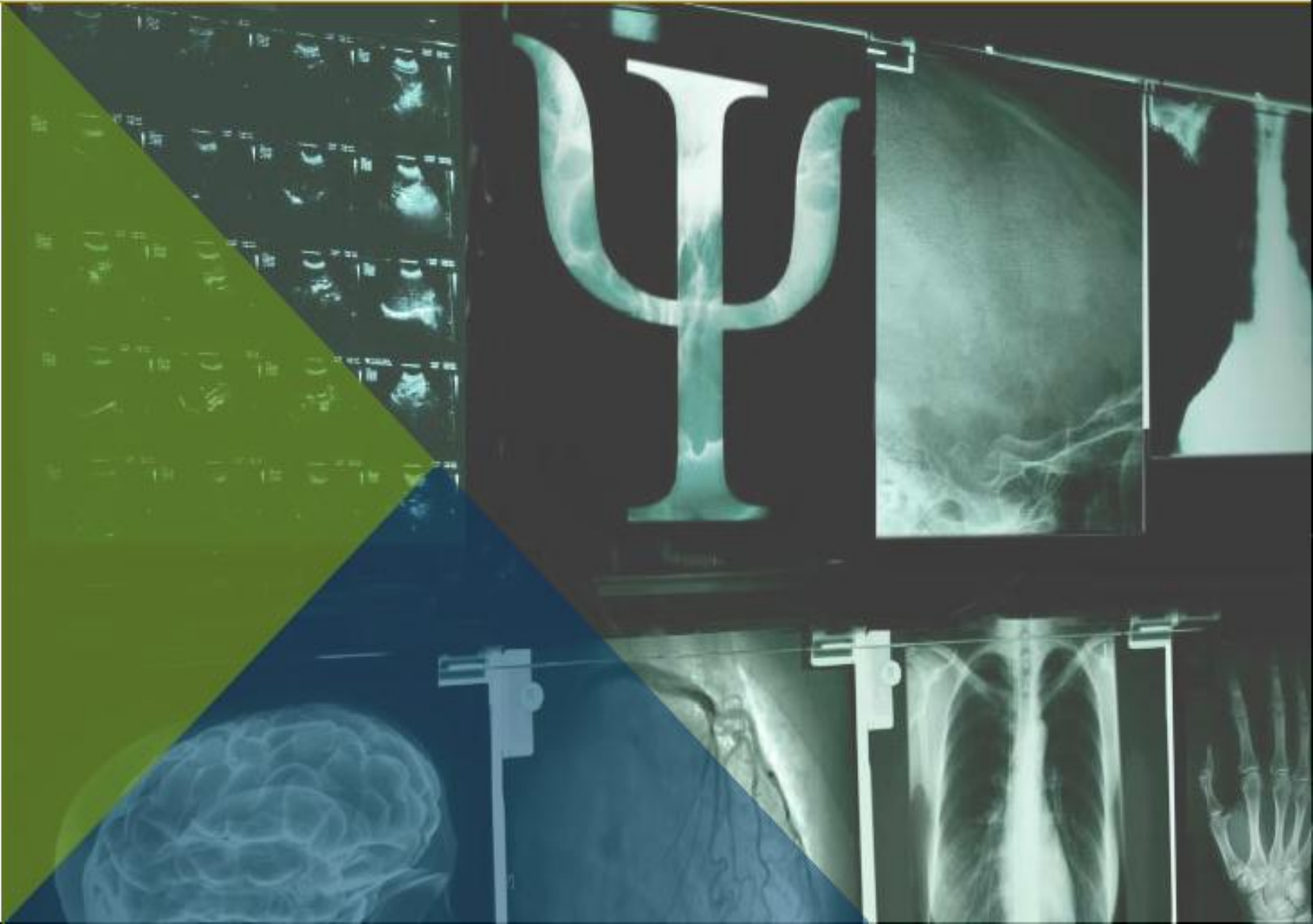


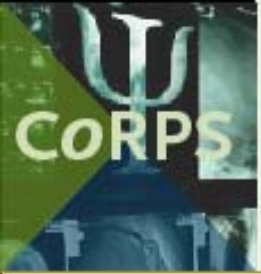


# Psychosocial issues and Type D personality: Effects on rehabilitation

Susanne S. Pedersen (PhD), Tilburg University, The Netherlands

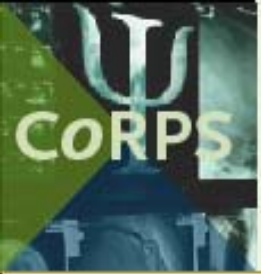
Center of Research  
on Psychology  
in Somatic diseases





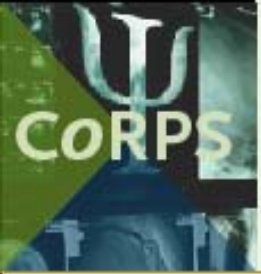
# Affiliations

- 1. Department of Medical Psychology and Neuropsychology, Center of Research on Psychology in Somatic diseases (CoRPS), Tilburg University, the Netherlands**
- 2. Thoraxcenter, Erasmus Medical Center, Rotterdam, the Netherlands**
- 3. Department of Cardiology, Odense University Hospital, Denmark**



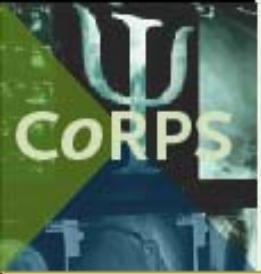
# Overview

- **The nature of Type D personality**
- **Impact of Type D across heart diseases**
- **Type D and cardiac rehabilitation**
- **Mechanisms**
- **Conclusions**

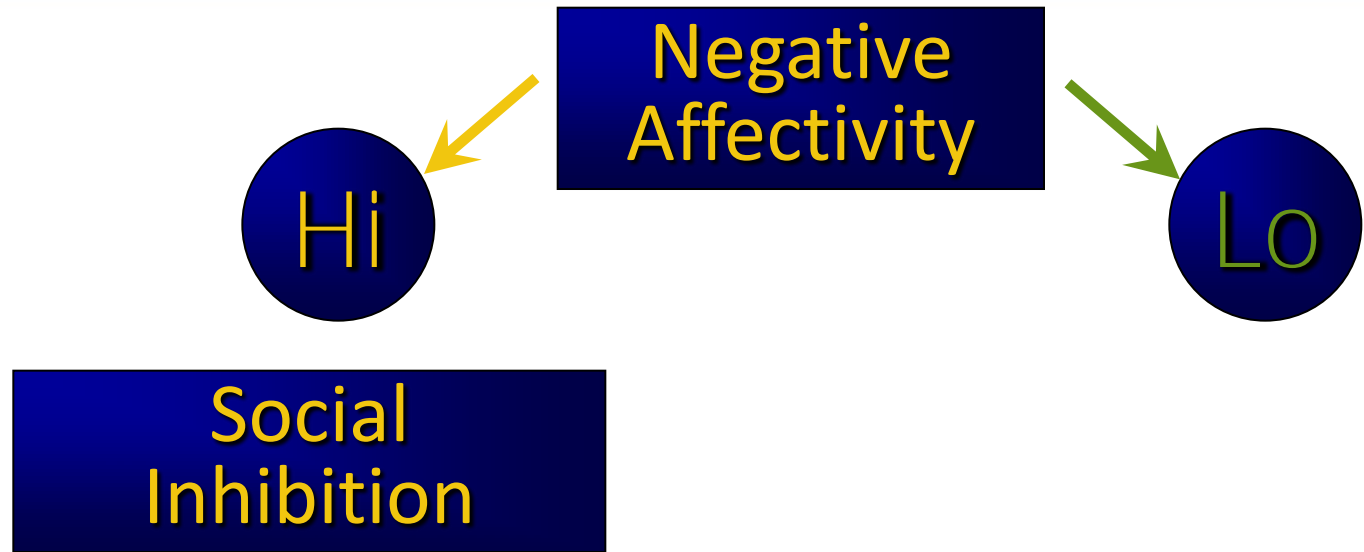


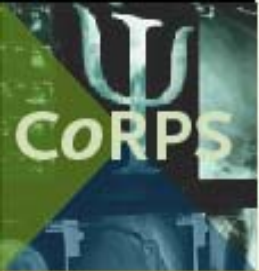
# Overview

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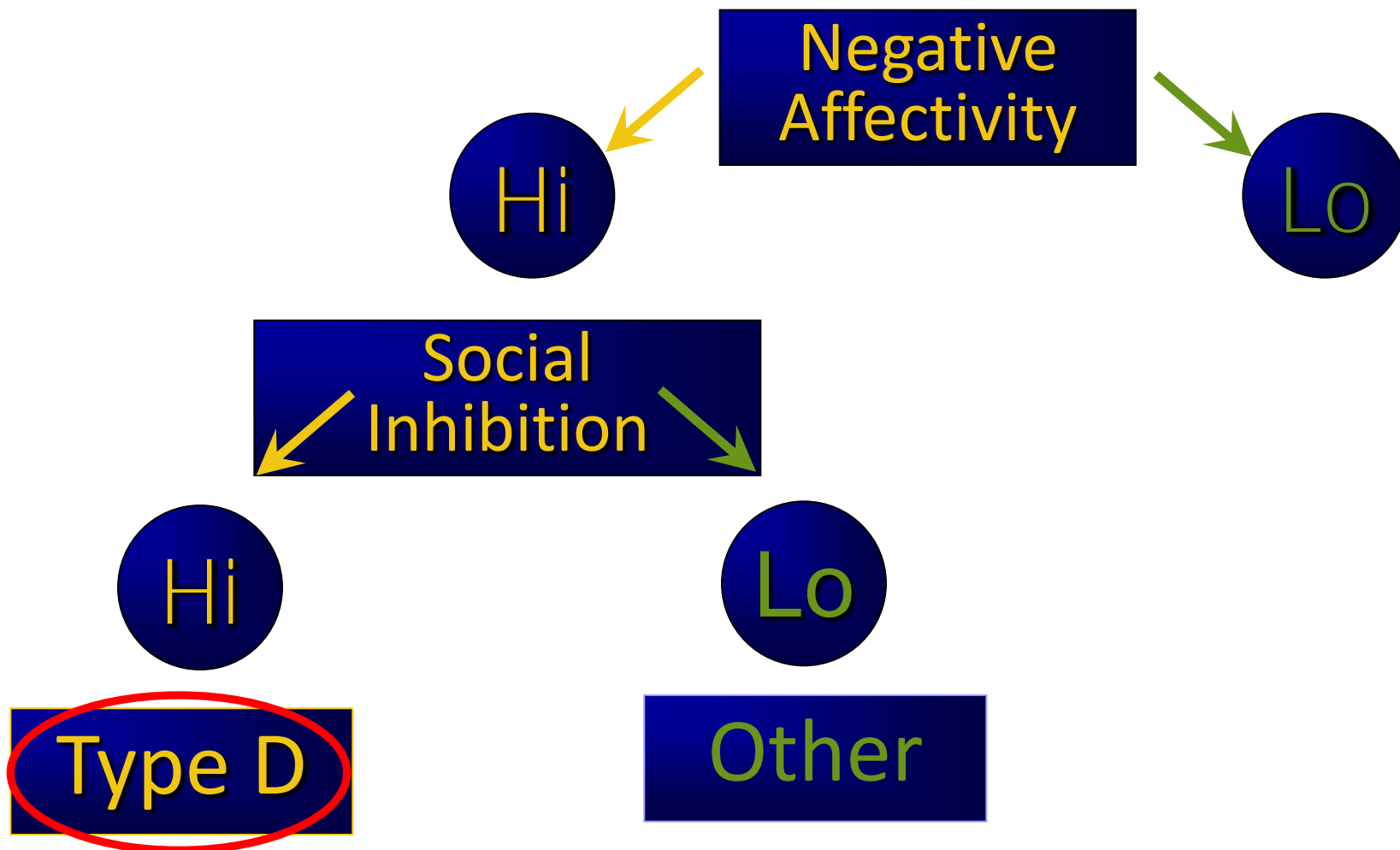


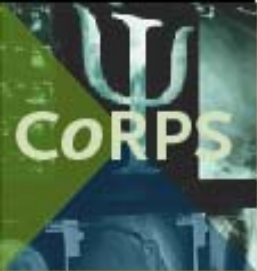
# Type D personality traits





# Type D personality traits



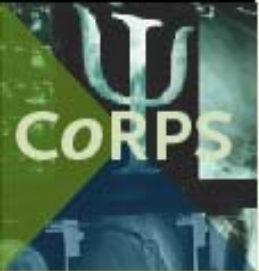


# The burden of increased negative emotions and inhibition

**No!!  
I do not want to  
share my emotions  
with others...**

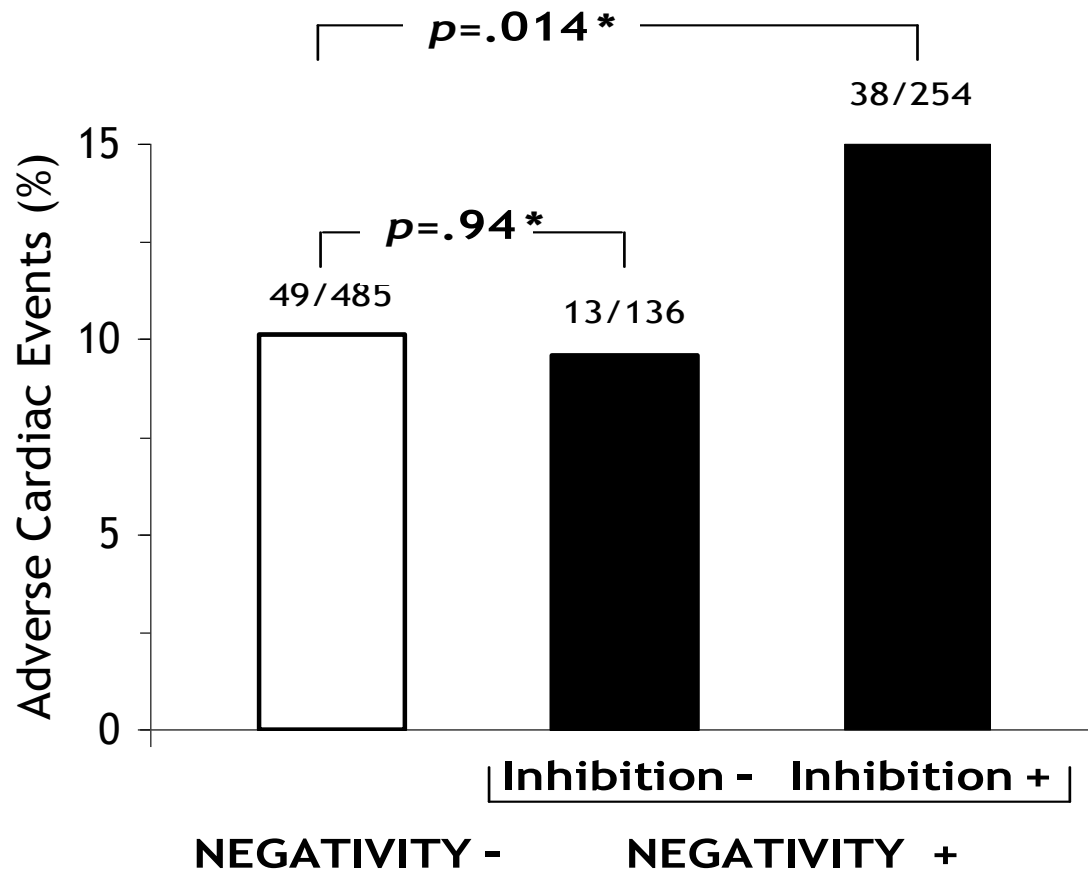


**Type D ?**



# Modulating effect of inhibition

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Center Rotterdam





## Depression *versus* Type D personality

Construct	Negative emotions	Social inhibition	Duration
Depression	Depressed affect in particular	Not specified	Episodic (<2 years)
Type D*	Negative affect in general (incl. worry, irritability)	Elevated levels (non-expression)	Chronic (≥2 years)

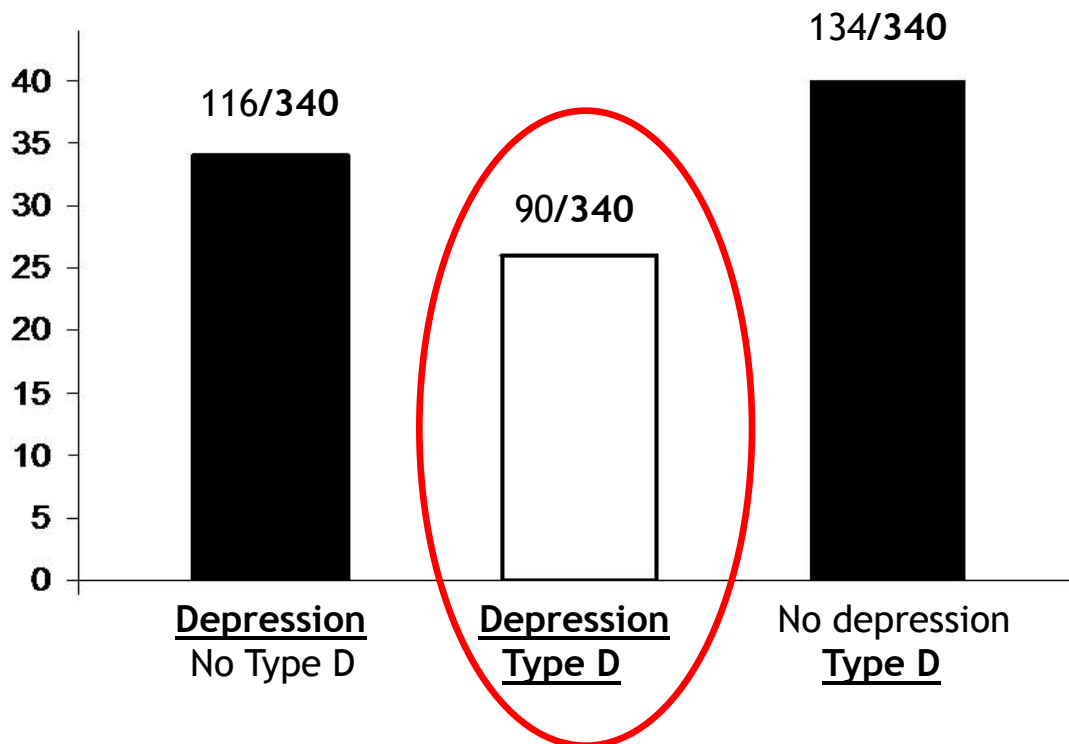
\*Type D: **normal** personality construct vs. depression: **pathology**



# Percentage of distressed post-MI patients, stratified by depressive disorder and Type D personality

Distressed Post-MI (%)

**N=340**



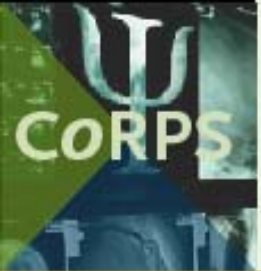
Depression: patients who met ICD-10 criteria for major or minor depressive disorder as assessed by the Composite International Diagnostic Interview (World Health Organization, 1990)



# Head-to-head comparison of Type D *versus* depressive symptoms

Table. Predictors of Major Adverse Cardiac Events at the 5-Year Follow-up Examination<sup>a</sup>

Baseline Characteristic	Event Free, No. (%) (n=291)	Cardiac Events, No (%) (n=46)	Odds Ratio (95% Confidence Interval)	P Value
Univariate analysis				
Male sex	260 (89)	37 (80)	0.49 (0.22-1.11)	.09
Age ≤ 55 y	128 (44)	20 (44)	0.98 (0.52-1.83)	.95
Poor exercise tolerance	156 (54)	24 (52)	0.94 (0.51-1.76)	.86
Index MI at baseline	107 (37)	29 (63)	2.93 (1.54-5.59)	.001
LVEF ≤ 40%	24 (8)	9 (20)	2.71 (1.17-6.27)	.02
No CABG at baseline	93 (32)	33 (72)	5.40 (2.72-10.75)	<.001
Type D personality	75 (26)	23 (50)	2.88 (1.52-5.43)	.001
Depressive symptoms	90 (31)	23 (50)	2.23 (1.19-4.19)	.01
Multivariable analysis				
Index MI at baseline			1.14 (0.48-2.76)	.76
LVEF ≤ 40%			4.46 (1.71-11.63)	.002
No CABG at baseline			5.88 (2.29-15.06)	<.001
Type D personality			3.06 (1.48-6.33)	.003
Depressive symptoms			1.29 (0.62-2.66)	.49



## Unconfounded by disease severity

**N = 475**

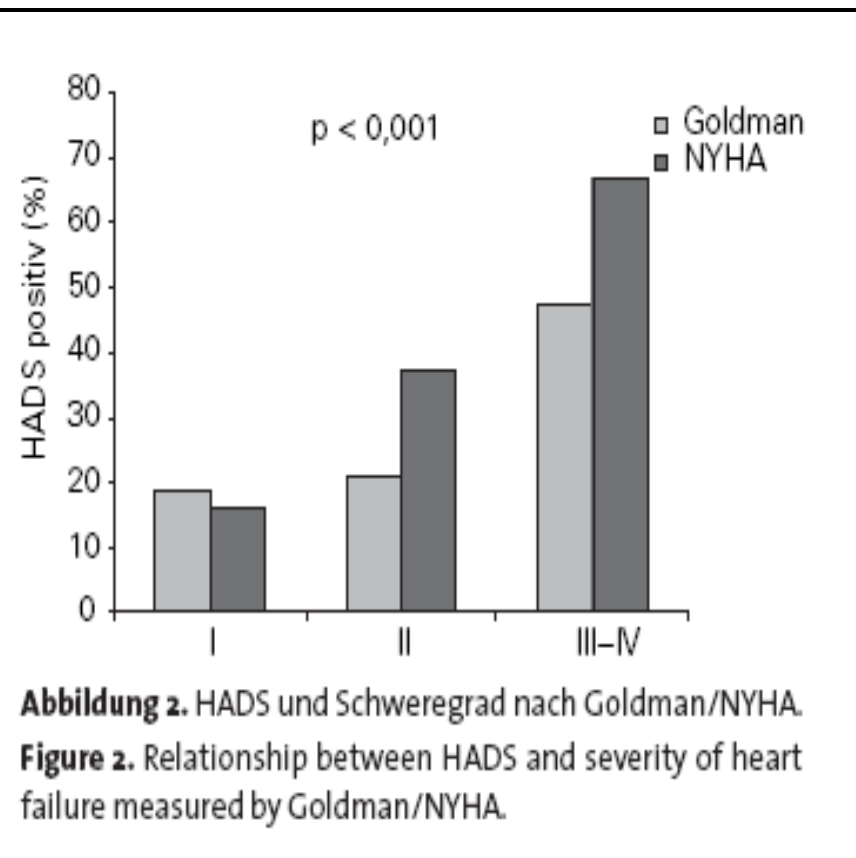
- Type D personality in AMI patients was **stable** over an 18-month period\*:  
T0 = 18.3%; T1 = 22.2%; T2 = 23.2%
- Type D was **neither confounded** by disease severity, nor other clinical and demographic variables nor anxiety and depressive symptoms

\*longitudinal hierarchical latent class regression models (Latent GOLD)



# Type D and primary care CHF patients ( $N = 363$ )

- **33.9% Type D patients**
- **Type D personality was not related to measures of disease severity:**
  - **NYHA class**  
( $\chi^2 = 3.90; p = .14$ )
  - **Goldman's Specific Activity Scale (SAS)**  
( $\chi^2 = 4.50; p = .11$ )



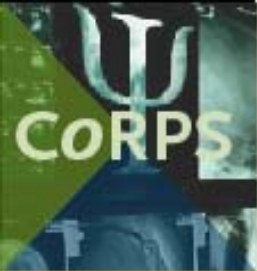


# Type D Scale (DS14)

**0=FALSE 1=RATHER FALSE 2=NEUTRAL 3=RATHER TRUE 4=TRUE**

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





# Cross-cultural validity

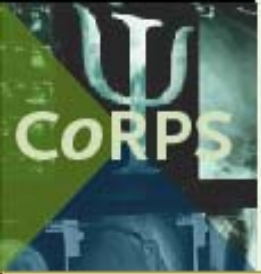
## Established:

- Belgium
- China
- Denmark
- Germany
- Italy
- Netherlands
- Ukraine
- Hong Kong
- Norway

## Submitted/in preparation:

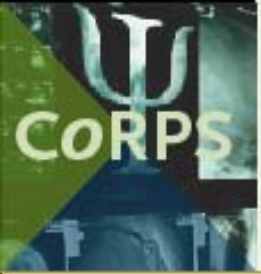
- Iceland
- Russia

*Czech Republic, Finland, Hungary, India, Indonesia, Iran, Ireland, Israel, Japan, Latvia, Lithuania, Pakistan, Poland, Portugal, Russia, Spain, South-Korea, Sweden, Turkey, United Kingdom, USA; all countries participating in the Euro-Cardio-QoL (ESC) project*



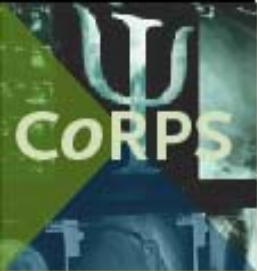
# Why look at personality factors?

- **Emphasis on the studying of patient-centered outcomes and their determinants** ⇒ **identification of high-risk patients** [*Krumholz et al. 2005*]
- **Accumulating evidence that cardiac patients with a Type D personality comprise high-risk patients** [*Pedersen & Denollet, 2006*]
- **Personality factors may be less prone to the influence of acute events** [*Nicholson et al. 2006*]
- **Personality factors moderate the effect of treatment** [*Gorwood et al. 2009; Tang et al. 2010*]



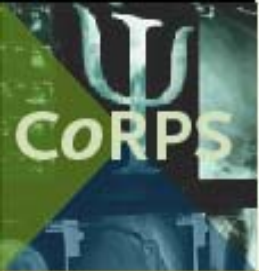
# Overview

- The nature of Type D personality
- **Impact of Type D across heart diseases**
- Type D and cardiac rehabilitation
- Mechanisms
- Conclusions



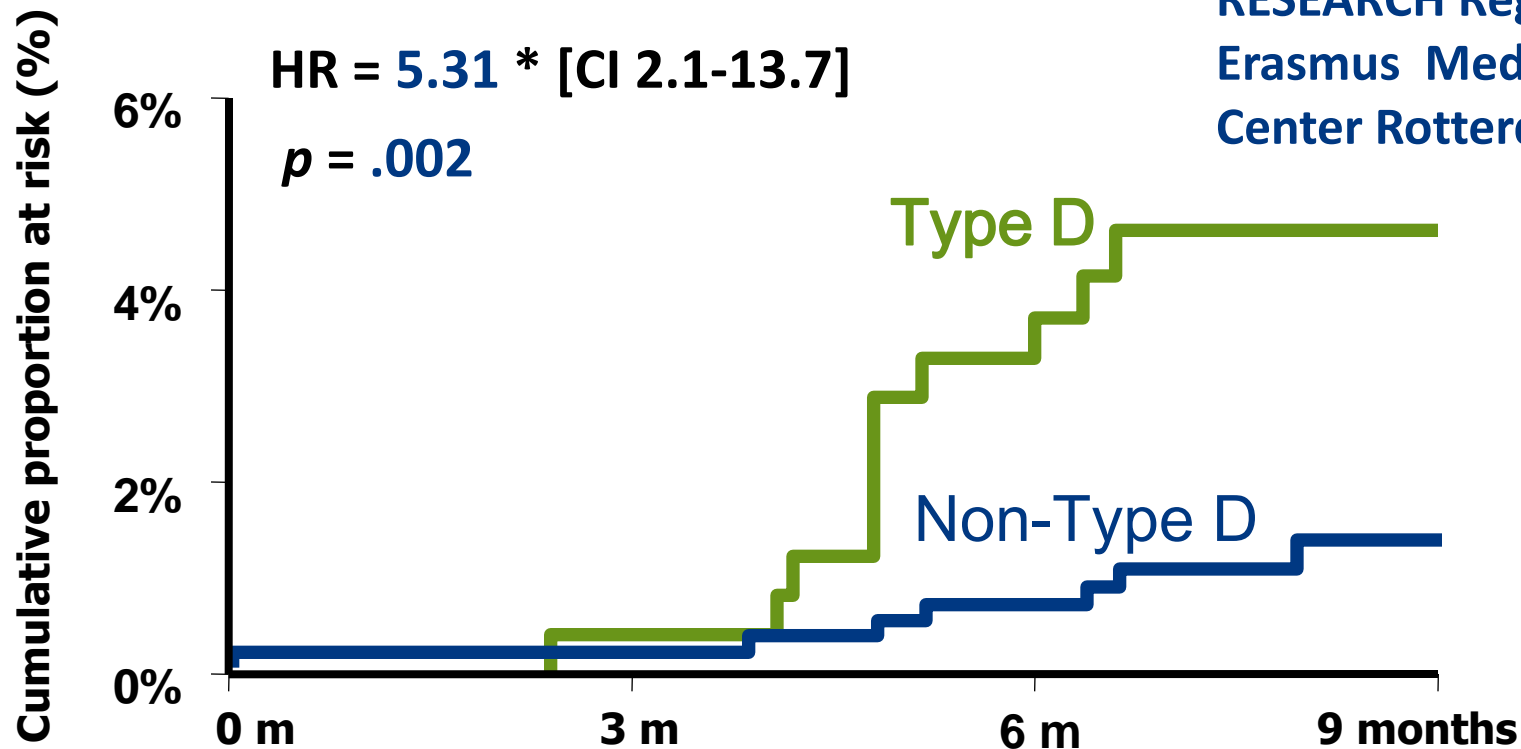
# Prevalence of Type D personality

- **Ischemic heart disease: 25-36%**  
*[Pedersen 2001, 2004, 2007; Al-Ruzzeh 2005; Denollet 2005; Whitehead 2007]*
- **Chronic heart failure: 21-45%**  
*[Schiffer 2005,2007, 2009; Scherer 2006]*
- **ICD: 23-25%**  
*[Pedersen 2004, 2007, 2008; van den Broek 2009]*
- **Peripheral arterial disease: 34-35%**  
*[Aquarius 2005, 2007, 2008, 2009]*
- **Hypertension: 53%**  
*[Denollet 2005]*
- **General population: 13-24%**  
*[Pedersen et al, 2004; Denollet, 2005; Aquarius et al, 2005; Hausteiner et al, 2010]*

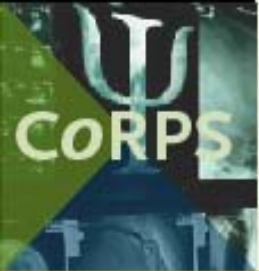


# PCI patients: Death/MI

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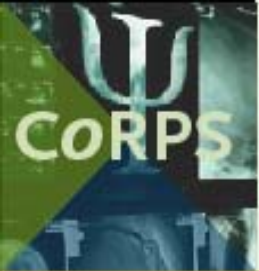
Type D	254	253	244	242
Non-Type D	621	620	616	609
Numbers at risk				



# Consistency of findings

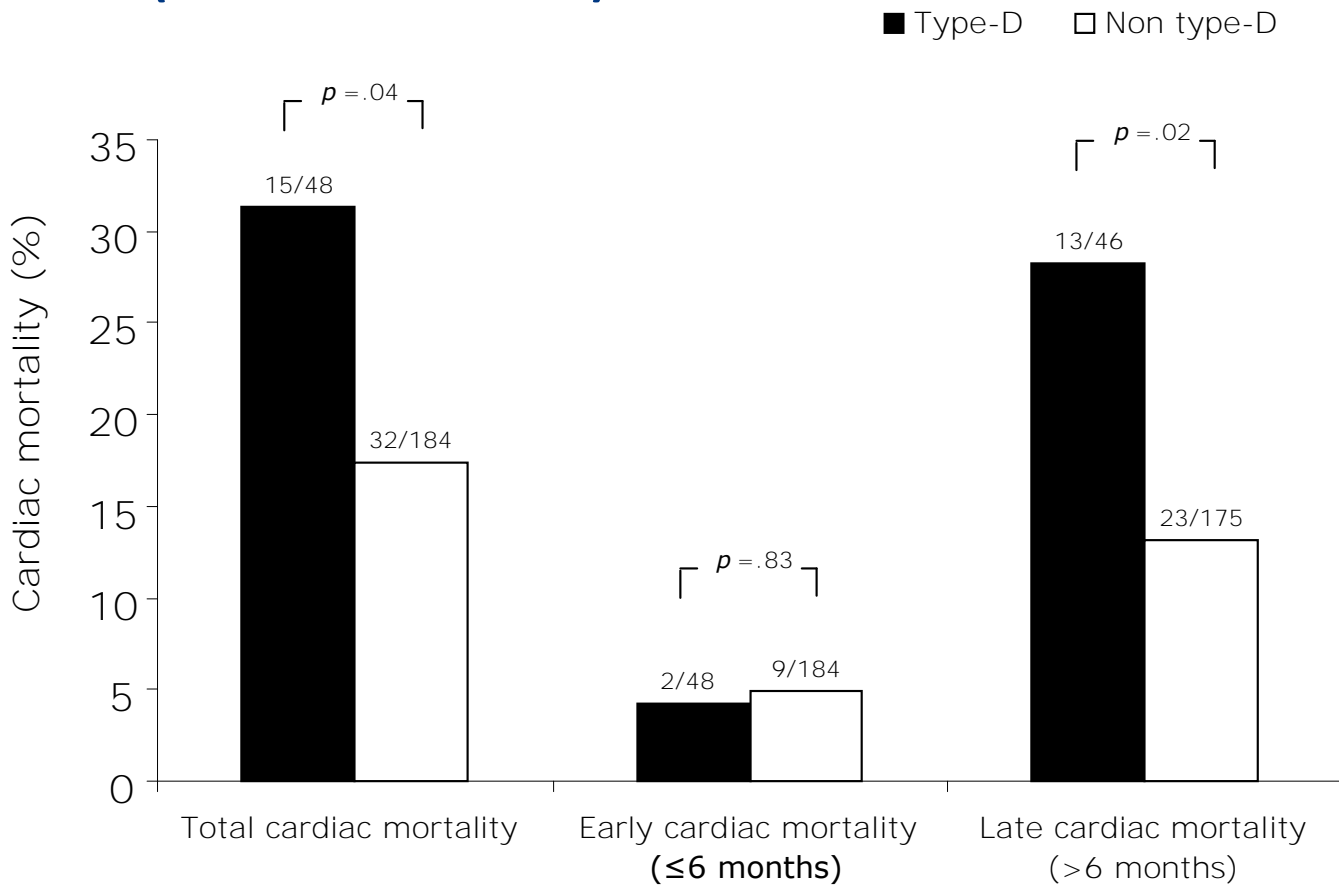
## Type D and Clinical Events in CAD Patients

- **Study #1**                      **Lancet 1996**                      **OR = 4.1**
- **Study #2**                      **Circulation 1998**                      **HR = 4.7**
- **Study #3**                      **Circulation 2000**                      **OR = 8.9**
- **Study #4**                      **JACC 2004**                      **HR = 5.3**
- **Study #5**                      **Am J Cardiol 2006**                      **OR = 4.8**
- **Study #6**                      **Arch Intern Med 2008**                      **OR = 3.1**



# Impact of Type D on mortality in CHF

**N = 232 (47 cardiac deaths)**





# Type D and PAD: Poor prognosis

**N = 186**

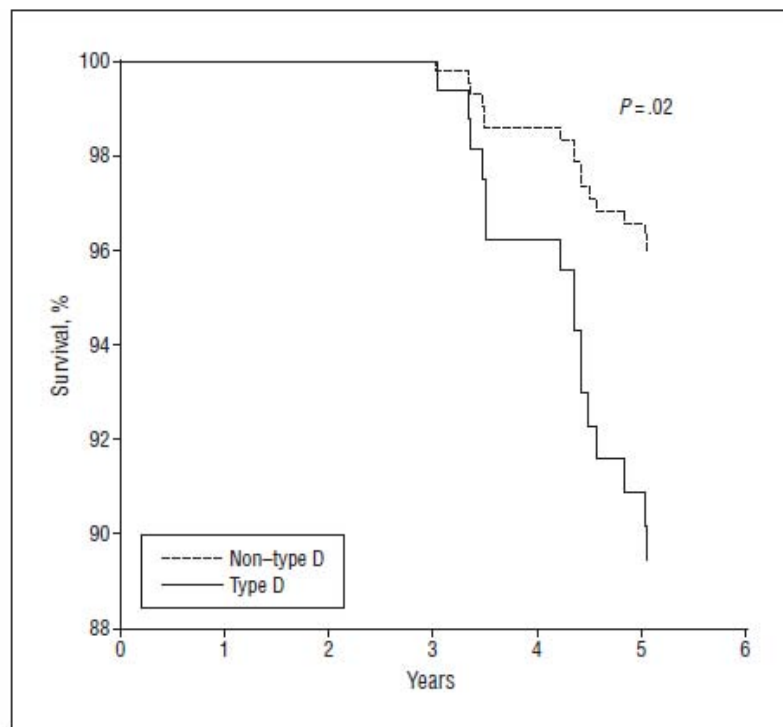


Figure 1. Cumulative survival across time stratified by type D personality.

Table 3. Independent Predictors of All-Cause Mortality in Patients With Peripheral Arterial Disease

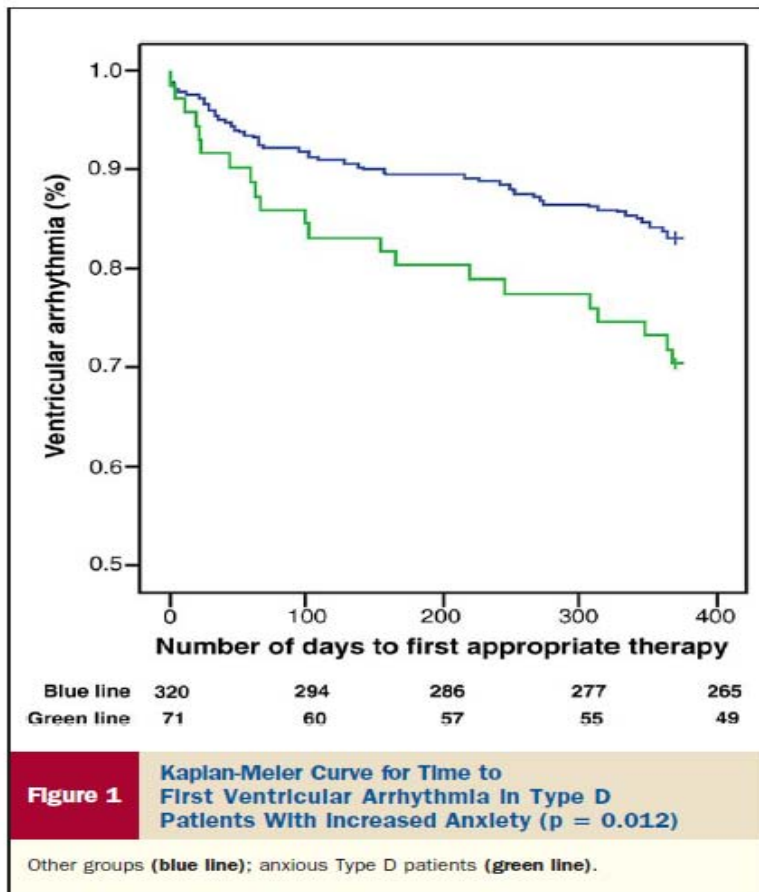
Predictor	OR (95% CI)	P Value
Type D personality	3.5 (1.1-11.1)	.04
Age	1.1 (1.0-1.2)	.02
Male sex	2.3 (0.6-8.6)	.20
ABI	1.0 (0.9-1.0)	.34
Diabetes mellitus	2.3 (1.2-4.6)	.02
Renal disease	2.3 (1.0-5.3)	.04
Pulmonary disease	1.4 (0.7-3.2)	.37

Abbreviations: ABI, ankle-brachial index; CI, confidence interval; OR, odds ratio.



# Anxious Type D patients with a defibrillator and increased VTs

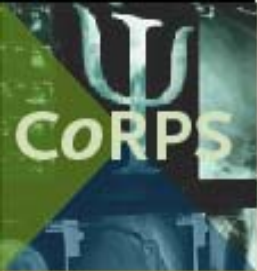
N = 391



**Table 3** Multivariable Predictors of Ventricular Arrhythmias

	Ventricular Arrhythmias		
	HR	95% CI	p Value*
Male	1.02	0.56–1.86	0.94
Age	0.98	0.96–1.01	0.16
Secondary prevention	<b>1.91</b>	<b>1.14–3.20</b>	<b>0.014</b>
Nonischemic etiology	1.08	0.61–1.92	0.80
Severely decreased ejection fraction†	1.30	0.63–2.67	0.47
Prolonged QRS duration‡	0.98	0.59–1.61	0.92
No prescription of angiotensin-converting enzyme inhibitor	1.05	0.62–1.76	0.86
No prescription of beta-blocker	1.54	0.89–2.66	0.12
<b>Anxious Type D cluster</b>	<b>1.72</b>	<b>1.03–2.89</b>	<b>0.039</b>

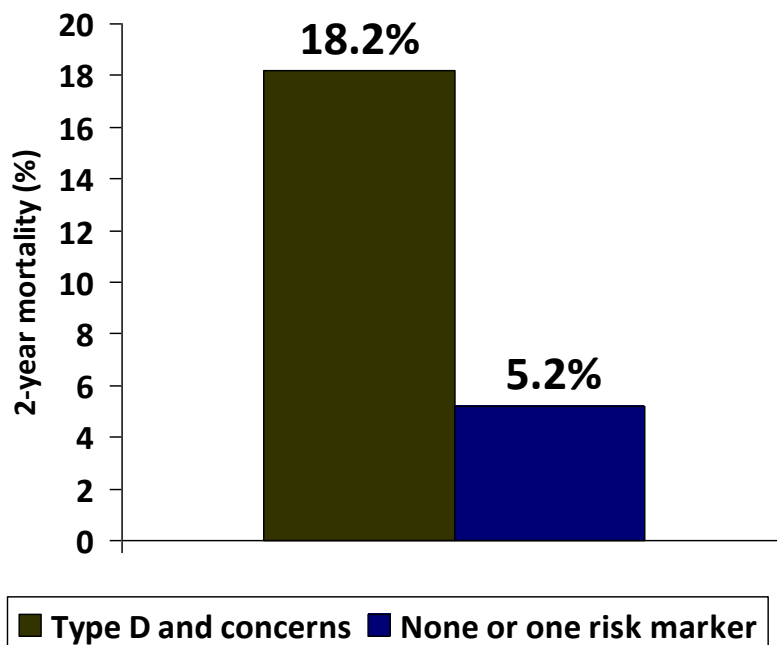
\*p ≤ 0.10 are presented in bold. †Ejection fraction ≤35%. ‡QRS duration ≥120 ms. Abbreviations as in Table 2.



# Clustering of Type D personality and high ICD pre-implantation concerns and mortality

**N = 391**

**HR: 3.65; 95%CI: 1.57-8.45;  $p = .003$**

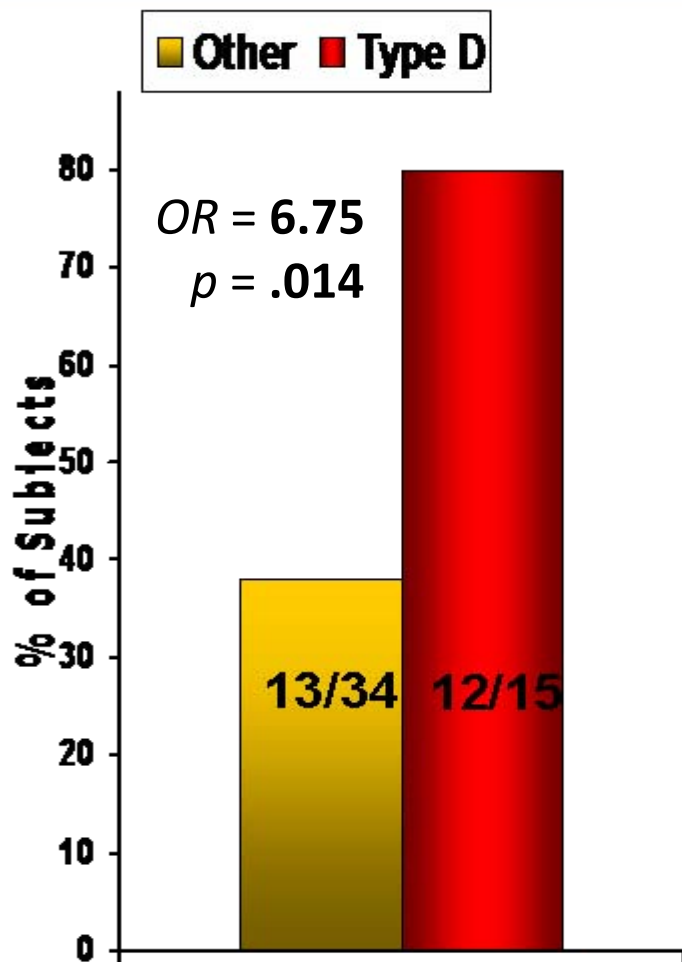


## Multivariable predictors of 2-year mortality

	HR	[95% CI]	<i>p</i>
Type D and concerns	3.86	[1.64-9.10]	.002
Male sex	0.65	[0.23-1.82]	.41
Age	1.03	[0.99-1.08]	.14
Primary indication	0.68	[0.29-1.68]	.37
CAD etiology	2.08	[0.72-6.01]	.18
Any shock during fup	3.09	[1.36-7.04]	.007

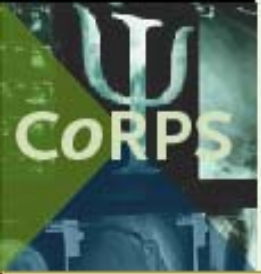


# Heart transplantation: unfavorable outcome



- 49 heart transplant recipients
- 15 Type D patients pre-HTX
- 5.4 years of follow-up (mean)
- 25 had unfavorable outcome
  - long-term death ( $n = 6$ )
  - rejection grade  $\geq 3A$
  - early rejection

**Type D sign. associated with**  
long-term death ( $p = .013$ )  
early rejection ( $p = .032$ )



# Overview

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# CICRP

June 2008, Volume 16, No.2

Current Issues in Cardiac Rehabilitation and Prevention

## Psychosocial Issues in Cardiac Rehabilitation

Official publication of:

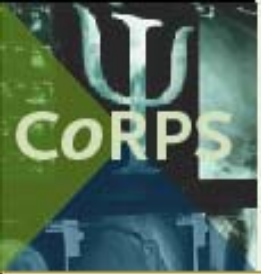


Canadian Association  
of Cardiac Rehabilitation

### **Does Personality Matter After All? Type D Personality and its Implications for Cardiovascular Prevention and Rehabilitation**

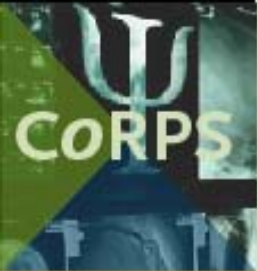
Heather Tulloch, PhD, Robert Pelletier, MSW

MINTO Prevention and Rehabilitation Centre, University of Ottawa Heart Institute



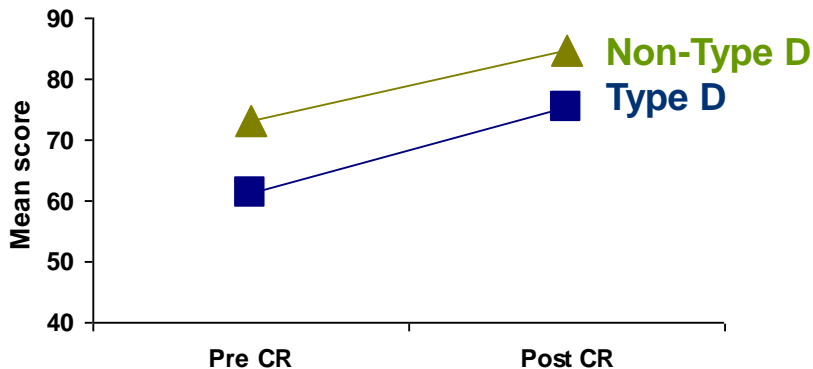
## Two main questions

- **Do Type D patients experience benefits from cardiac rehabilitation?**
- **Is it possible to change Type D – and is this the way forward with respect to moderating the effects of Type D on health outcomes?**

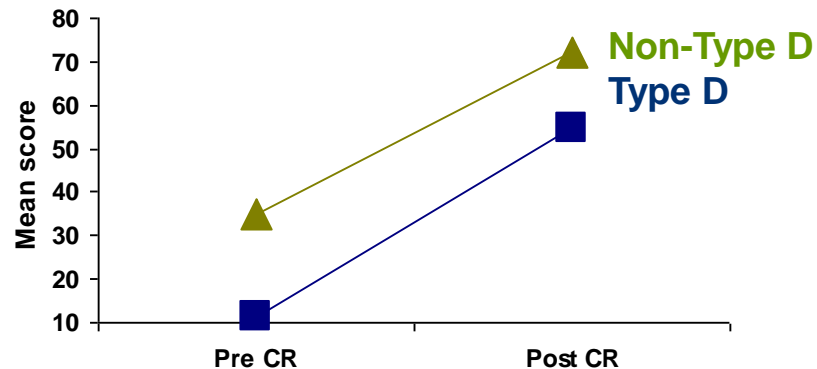


# Type D: Changes in health status

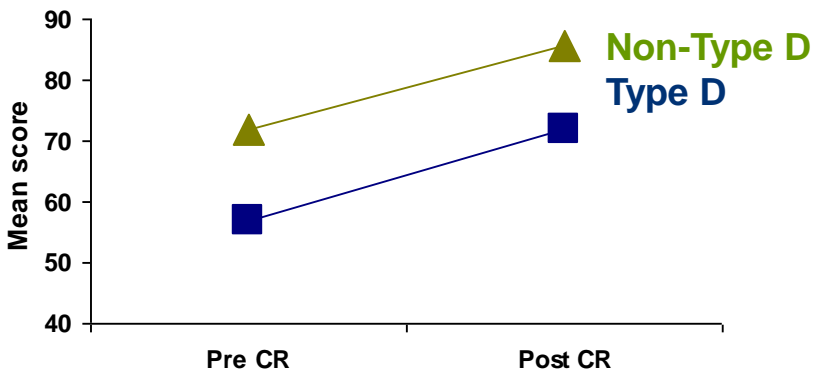
### Physical functioning



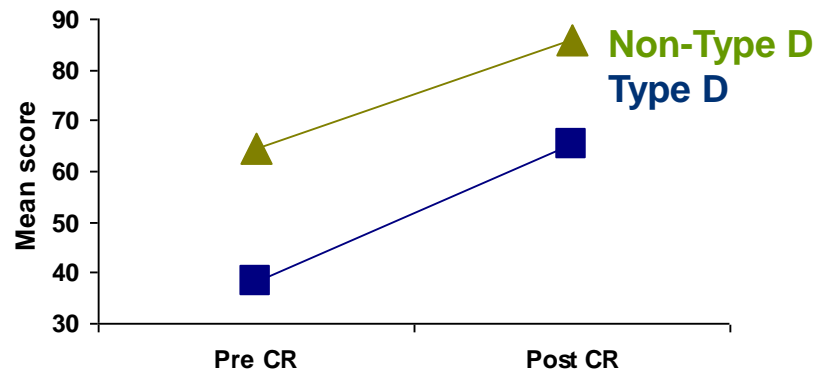
### Role physical functioning

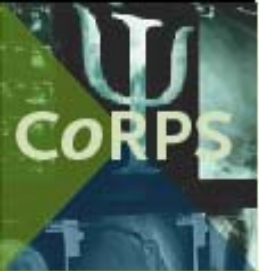


### Social functioning



### Role emotional functioning

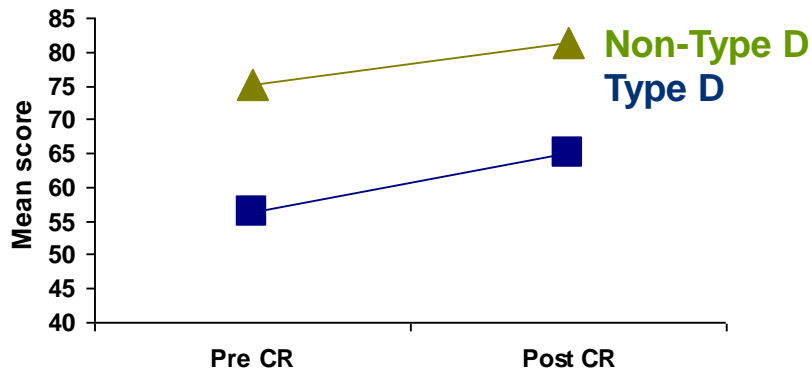




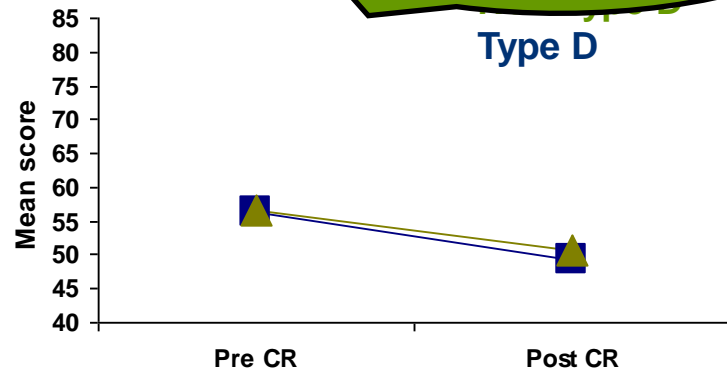
# Type D: Changes in status

Time:  $p < .001$   
Time x Type D:  $p = .23$   
Type D (main effect):  $p < .001$

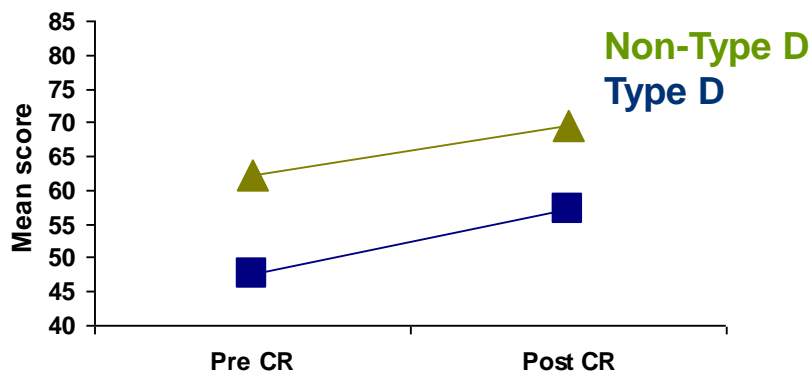
### Mental health



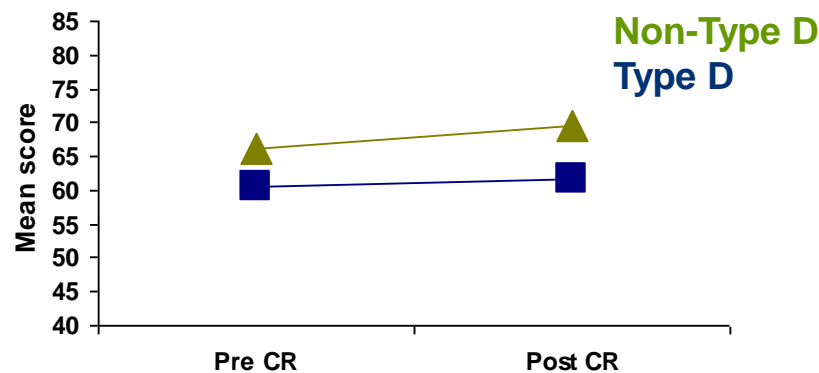
### Bodily pain

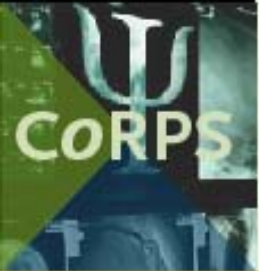


### Vitality



### General health





# Type D: Distress and poor quality of life

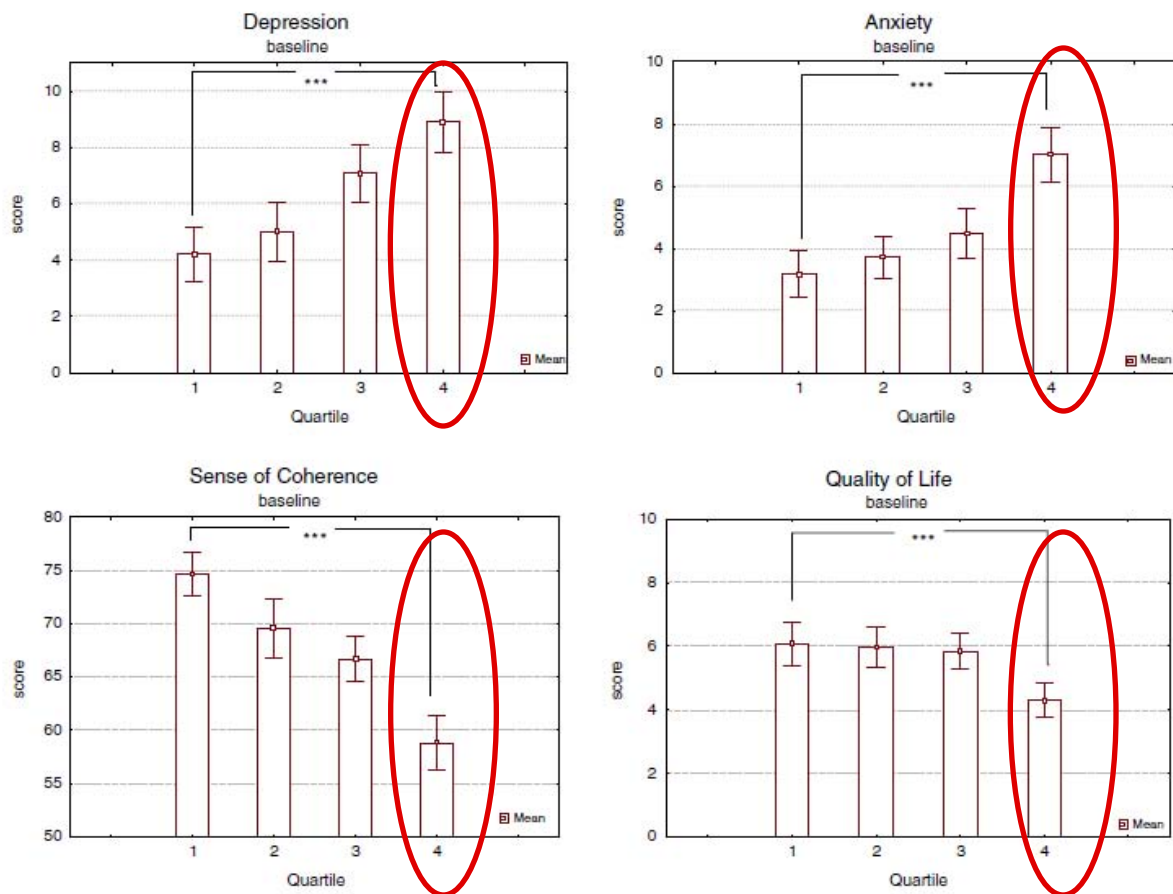
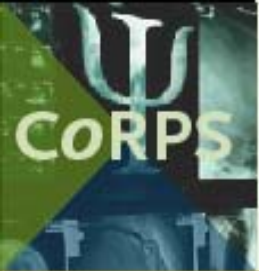
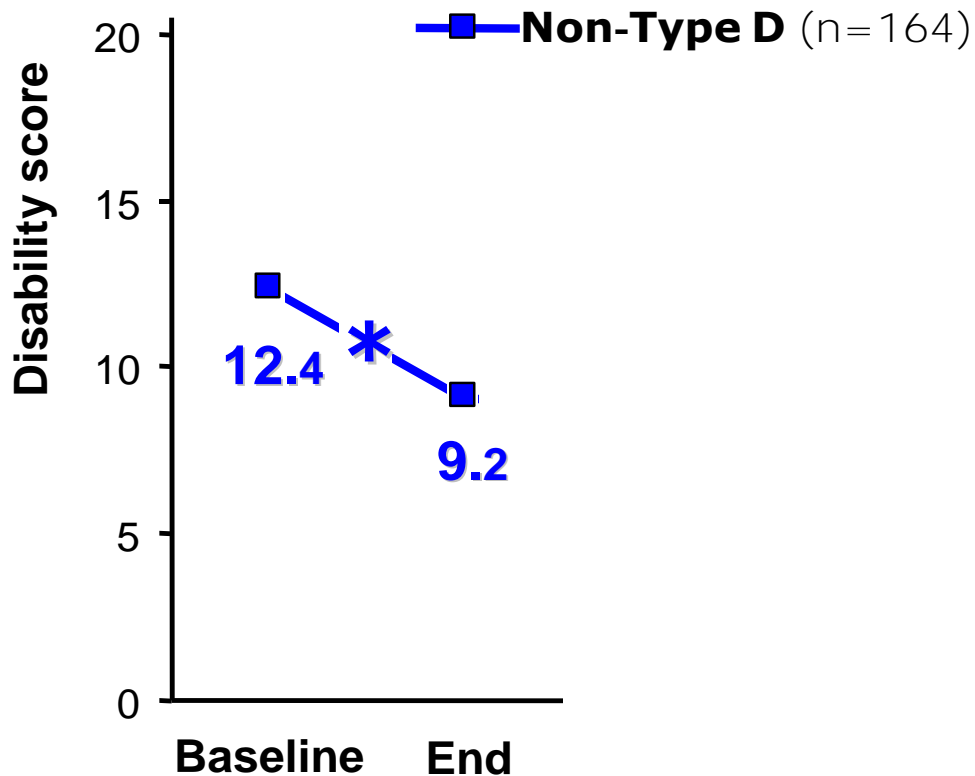


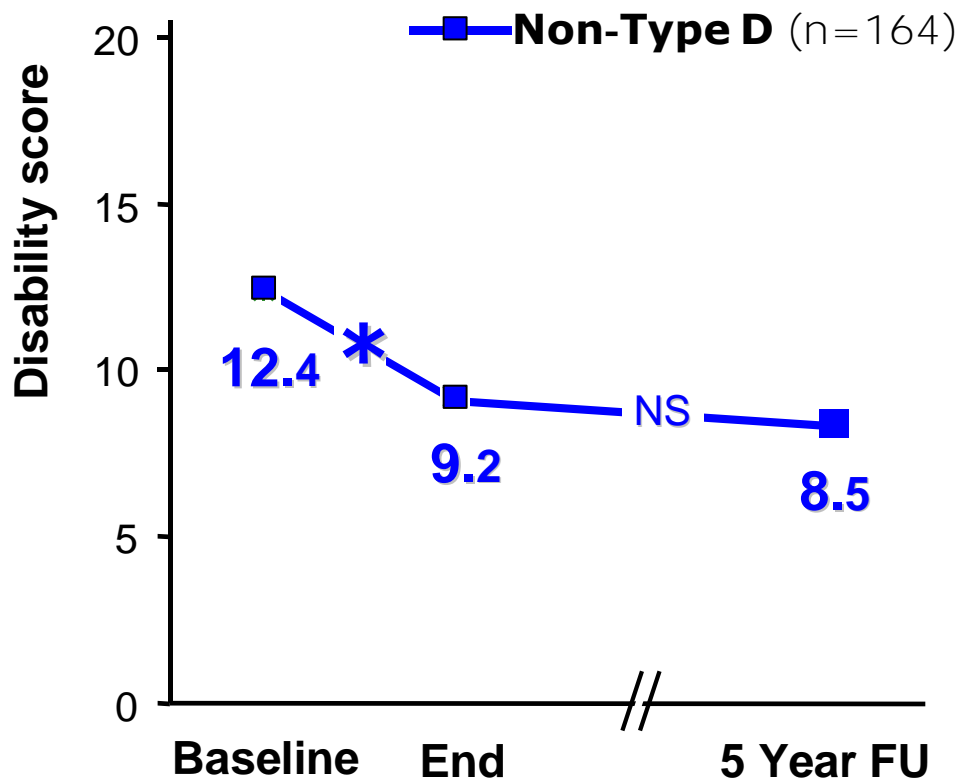
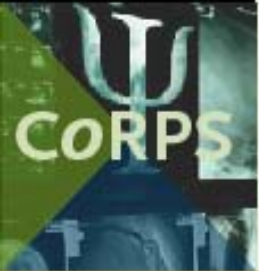
Fig. 2 Depression, Anxiety, Sense of Coherence value and Quality of Life score in relation to type D score (Q1-Q4) at baseline. Values are means with an indication of 95% Confidence Intervals (CI). \*\*\* $p < 0.001$



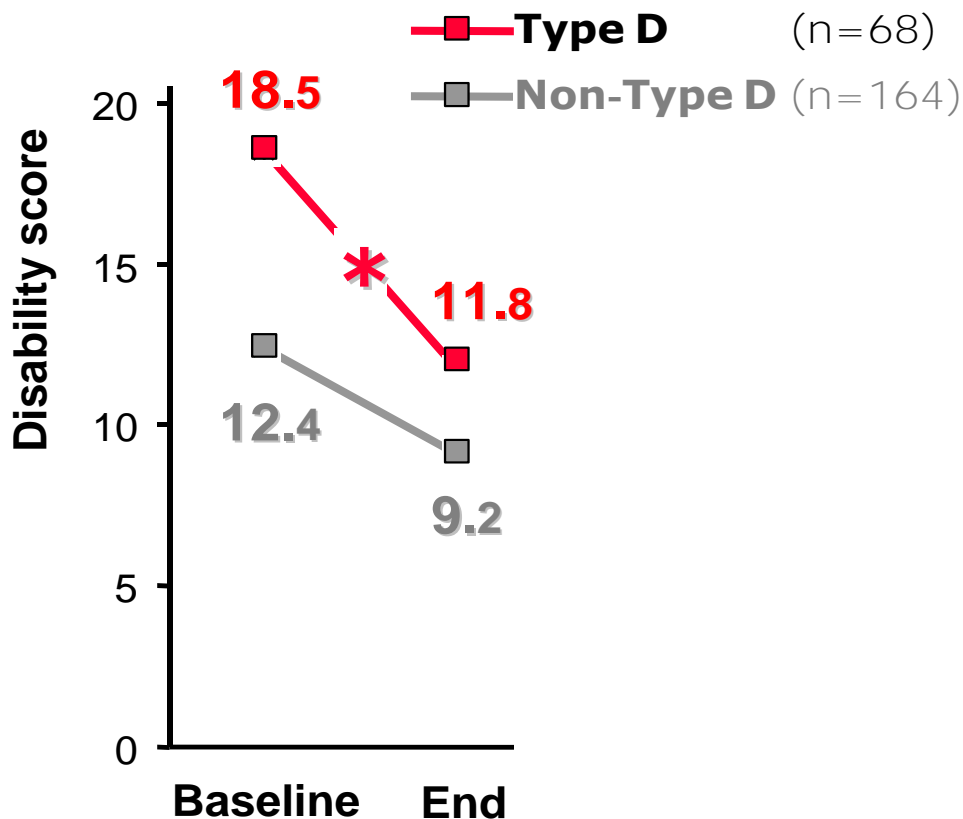
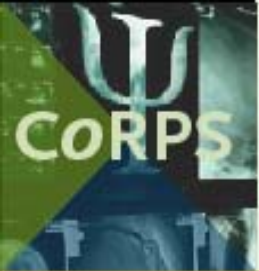
# Type D: Reduction in disability in over time



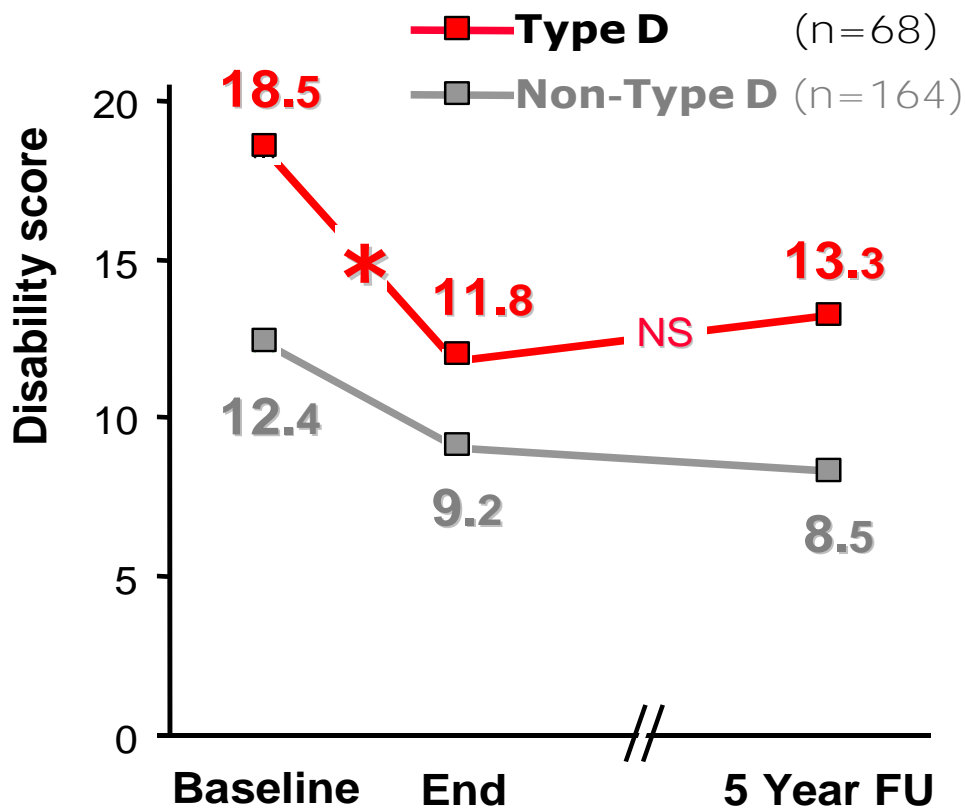
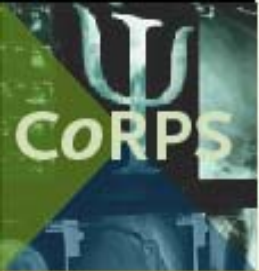
■ Effect Program  
 $p < .0001$



- Effect Program  $p < .0001$
- Stability (5y FU) effect program



- Effect Program  $p < .0001$
- Stability (5y FU) effect program
- Type D x Change  $p = .01$



- Effect Program  $p < .0001$
- Stability (5y FU) effect program
- Type D x Change  $p = .01$
- Stability (5y FU) effect Type D



# Type D: Poor quality of life and mortality

TABLE 4. Independent Predictors of Impaired QOL

Variable	OR	95% CI	P
Poor perceived health*			
Failure to quit smoking	2.3	1.2-4.5	0.014
Symptoms of depression	3.3	1.9-5.8	0.0001
Type D personality	2.2	1.2-3.8	0.007
LVEF ≤ 50%	2.0	1.0-3.9	0.049
History of hyperlipidemia	2.0	1.1-3.4	0.016
Depressive affect†			
Failure to quit smoking	2.6	1.3-5.1	0.009
Symptoms of depression	2.7	1.5-5.2	0.002
Type D personality	2.6	1.4-4.8	0.002
Female sex	3.0	1.1-8.1	0.032
Symptoms of anxiety	2.5	1.3-4.6	0.005

\*n=104 of 299 patients.

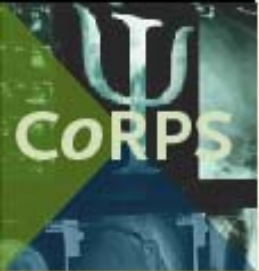
†n=82 of 299 patients.

TABLE 3. Independent Predictors of 5-Year Prognosis

Variable	OR	95% CI	P
Cardiac events*			
LVEF ≤ 50%	3.0	1.4-11.1	0.009
Type D personality	8.9	3.2-24.7	0.0001
Age ≤ 55 y	2.6	1.0-6.6	0.05
Total events†			
LVEF ≤ 50%	2.0	1.4-6.0	0.004
Type D personality	4.5	2.3-8.5	0.0001

\*Fatal and nonfatal cardiac events (n=22).

†Cardiac events plus revascularization procedures (n=49).

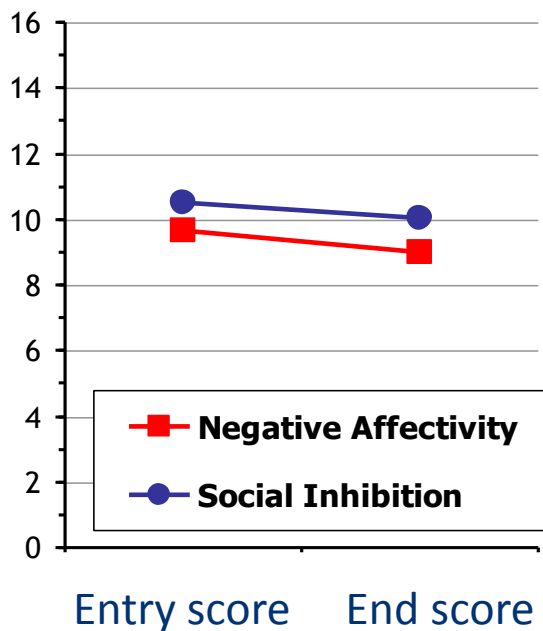


# Type D: Stable over time

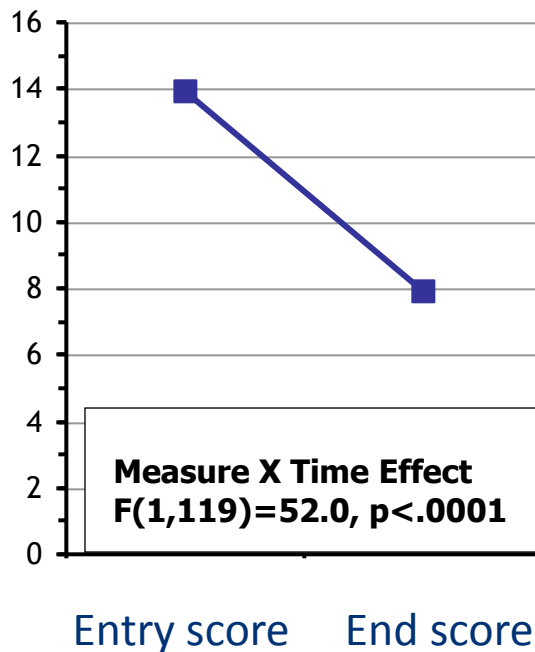
Entry: baseline assessment  
End: following rehabilitation

*N* = 121 cardiac patients

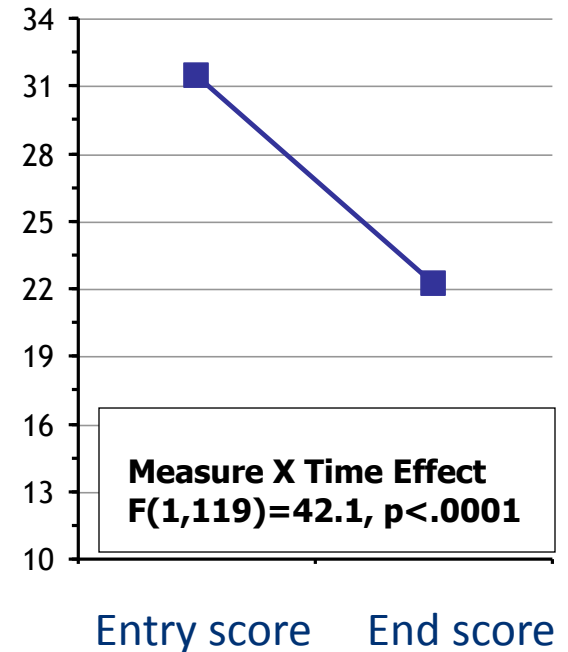
(a) TYPE D PERSONALITY

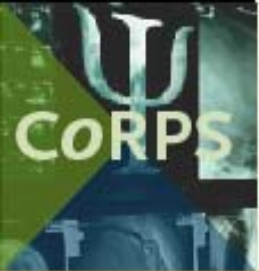


(b) MOOD: Negative Affect



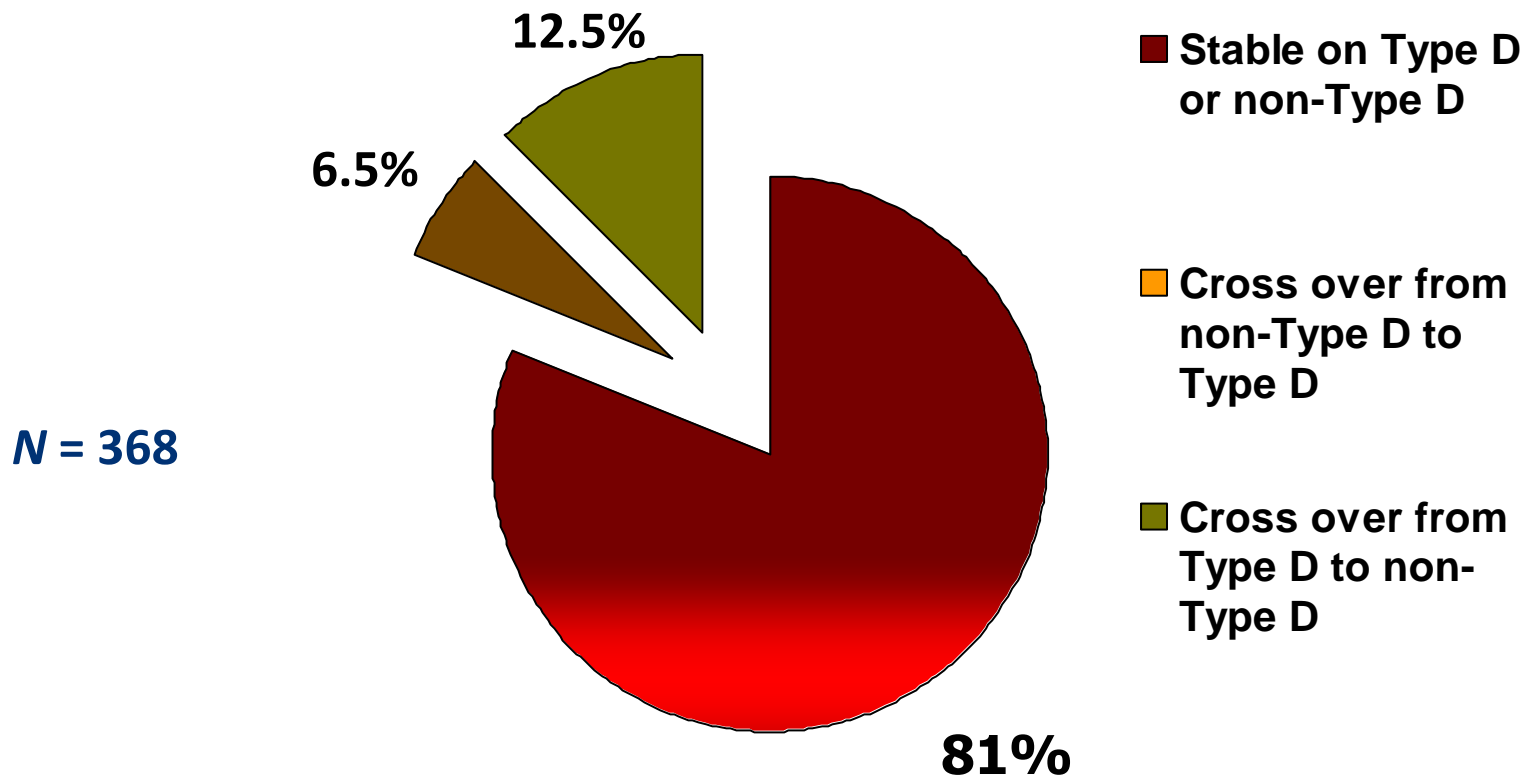
(c) HEALTH COMPLAINTS

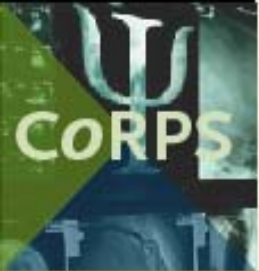




# Type D: Stable over time

There was a 5.9% reduction in patients with a Type D personality from 26.6% prior to CR to 20.7% post CR ( $p = .012$ )

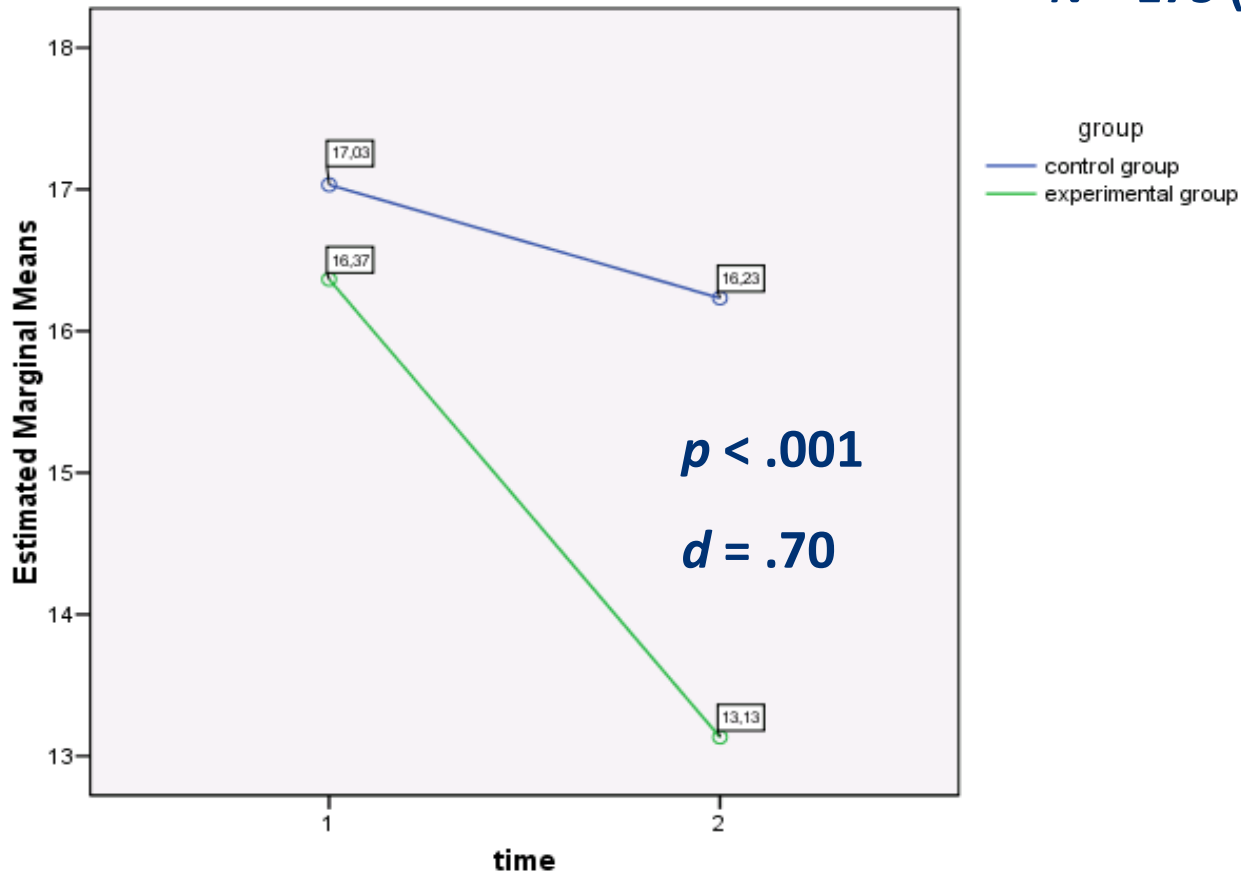


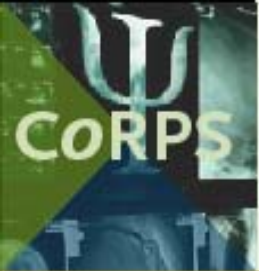


# Change in negative affectivity

Type D: negative affectivity

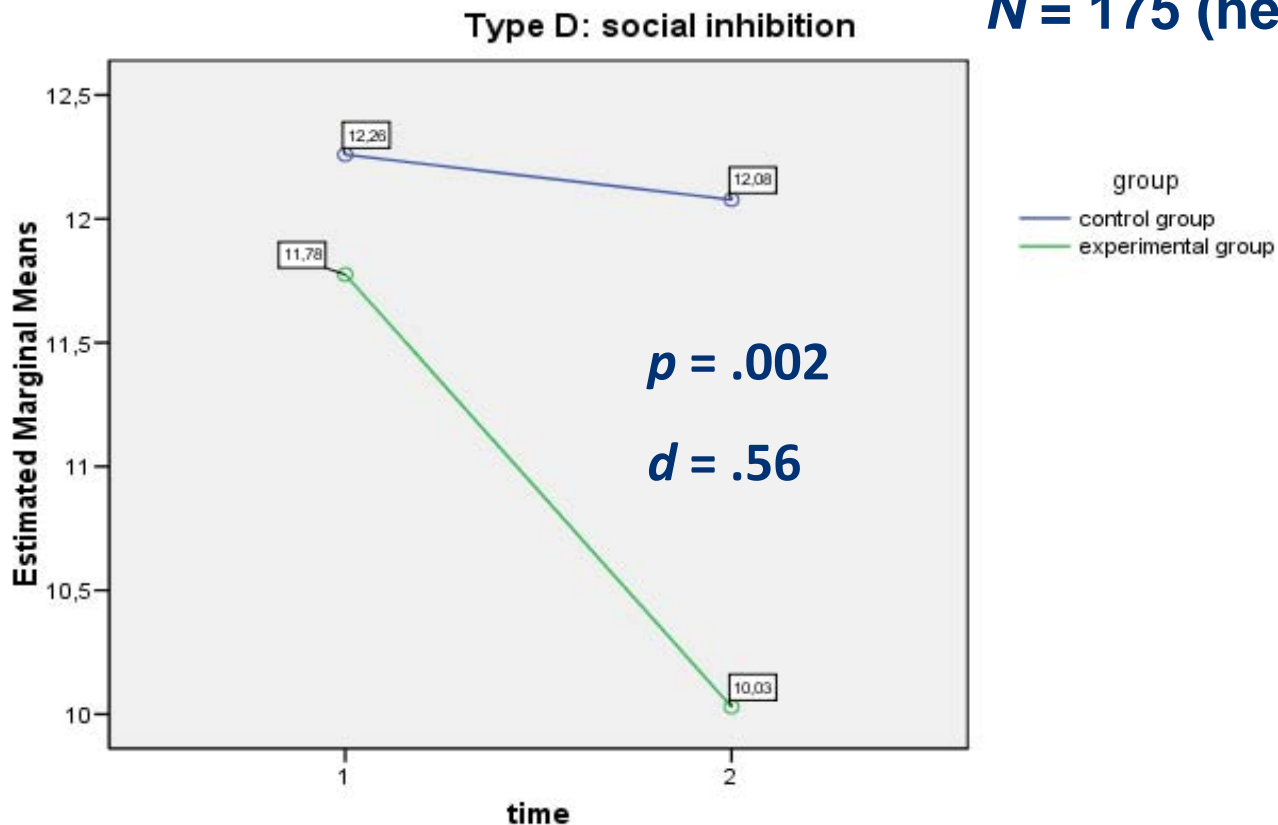
**N = 175 (healthy population)**

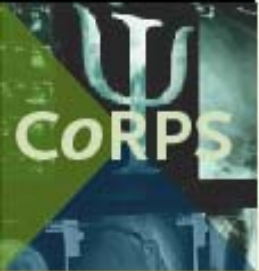




# Change in social inhibition

**N = 175 (healthy population)**





## Change in Type D caseness

	MBSR group (n=73)			Control group (n=72)		
	Before	After	change	Before	After	change
<i>Type D: N</i>	<b>39</b>	<b>33</b>	<b>-6</b>	<b>45</b>	<b>38</b>	<b>-7</b>
<i>%</i>	<b>52.8%</b>	<b>47.2%</b>		<b>62.5%</b>	<b>52.8%</b>	



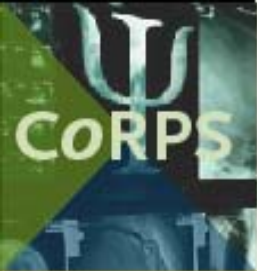
## Type D: Change in caseness

**Table 3** Type D score, depression and anxiety score at baseline and after 1 year in patients in the upper quartile of type D score (Q4)

	Baseline	12 months
Type D		
Intervention	52.1 ± 6.5	47.7 ± 8.4**
Control	53.6 ± 7.9	52.4 ± 9.2
Depression		
Intervention	8.0 ± 3.4	6.7 ± 3.1*
Control	9.4 ± 4.4	8.4 ± 4.0
Anxiety		
Intervention	6.8 ± 3.0	5.3 ± 3.0*
Control	7.2 ± 3.6	6.6 ± 3.8

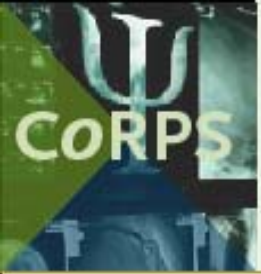
Intervention:  $n = 29$  and Control:  $n = 26$ . Mean ( $\pm$ SD)

\*  $p < 0.05$ , \*\*  $p < 0.01$  (ANOVA: change over time)



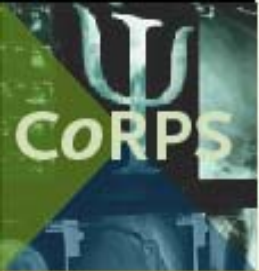
## Type D: Response to anti-depressant treatment in MIND-IT

	Intervention (n = 116)	Usual care (n = 89)	p
<i>Type D caseness</i>			
Type D personality	60.3%	73.0%	0.06
<i>Type D subdomains</i>			
Negative affectivity, mean $\pm$ SD	13.9 (7.2)	15.1 (7.1)	0.21
Social inhibition, mean $\pm$ SD	17.1 (7.5)	19.5 (7.9)	0.03

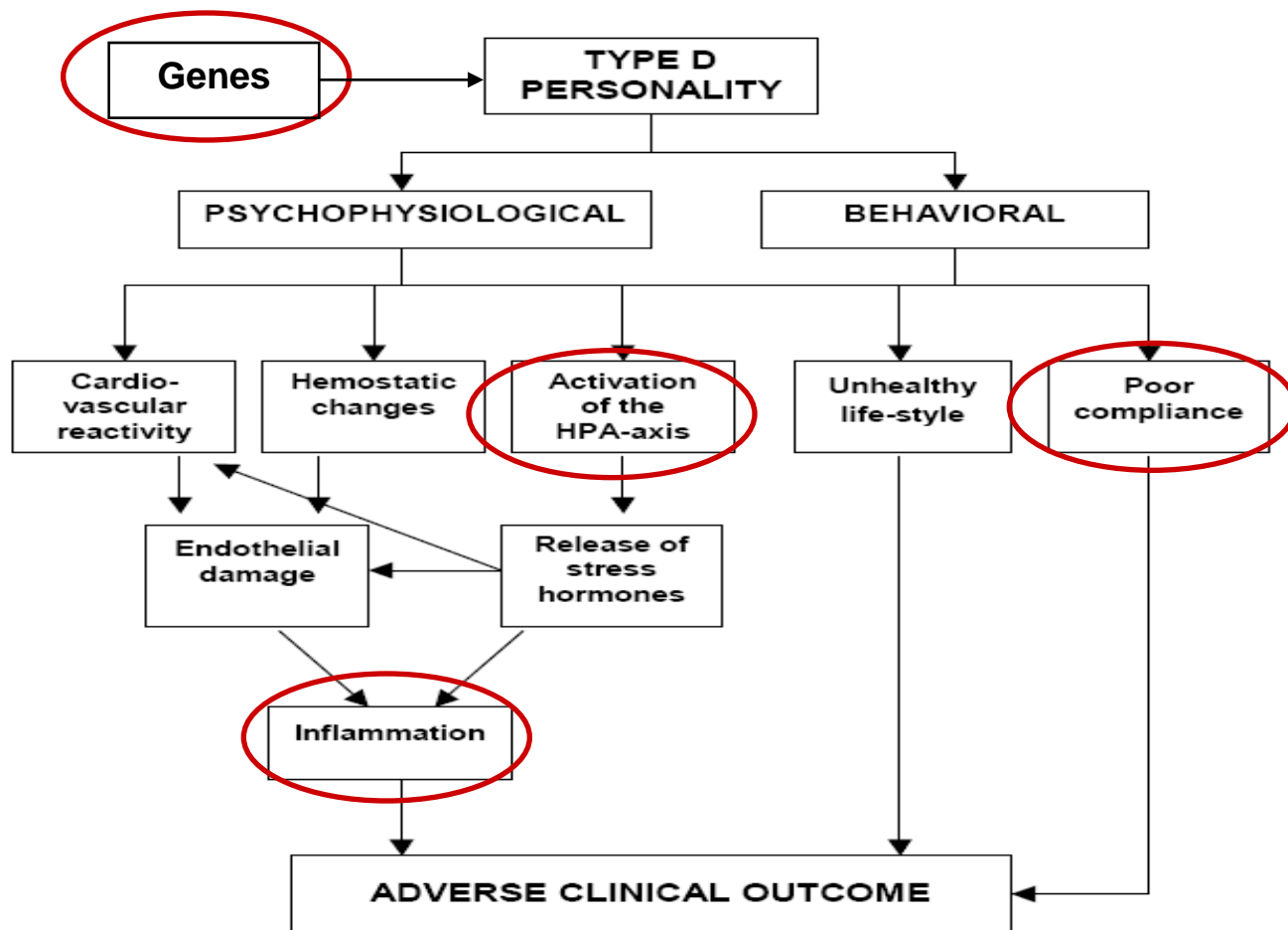


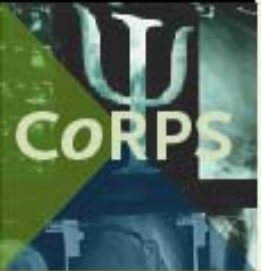
# Overview

- The nature of Type D personality
- Impact of Type D across heart diseases
- Type D and cardiac rehabilitation
- **Mechanisms**
- Conclusions



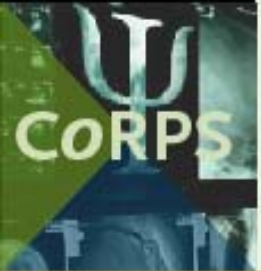
# Mechanisms





# Overview

- The nature of Type D personality
- Impact of Type D across heart diseases
- Type D and cardiac rehabilitation
- Mechanisms
- **Conclusions**



# Take home message...

## Type D patients:

- Benefit from CR in terms of improved health status
- Still report poorer health status than non-Type D patients
- Mixed/little evidence of changeability in Type D caseness – probably not way forward
- Type D patients are high-risk
- Intervention trials are needed, but in the meantime...



## Tips for dealing with Type D patients in clinical practice

- ✓ Refer Type D patients to CR – they benefit
- ✓ Know who they are – screen with the DS14
- ✓ Establish a good rapport with patients and partners
- ✓ Look at body language and non-verbal cues
- ✓ Check if their medication and general treatment can be optimized further
- ✓ Referral to mental health professional if available



# Type D or not Type D?



Pedersen SS and Denollet J.  
Is Type personality here to stay? Emerging  
evidence across cardiovascular disease  
patient groups.  
*Current Cardiology Reviews* 2006;2:205-13

Pedersen SS, Kupper N, Denollet J.  
Psychological factors and heart disease  
(Chapter 35). *The ESC Textbook of  
Cardiovascular Medicine, 2nd ed.*  
(Eds. J Camm, T Lüscher P Serruys).  
Oxford University Press 2009

**E-mail: [s.s.pedersen@uvt.nl](mailto:s.s.pedersen@uvt.nl)**