

# Personality, chronic defensive coping and S100B – new insights into the brain-heart link: The SABPA prospective cohort study

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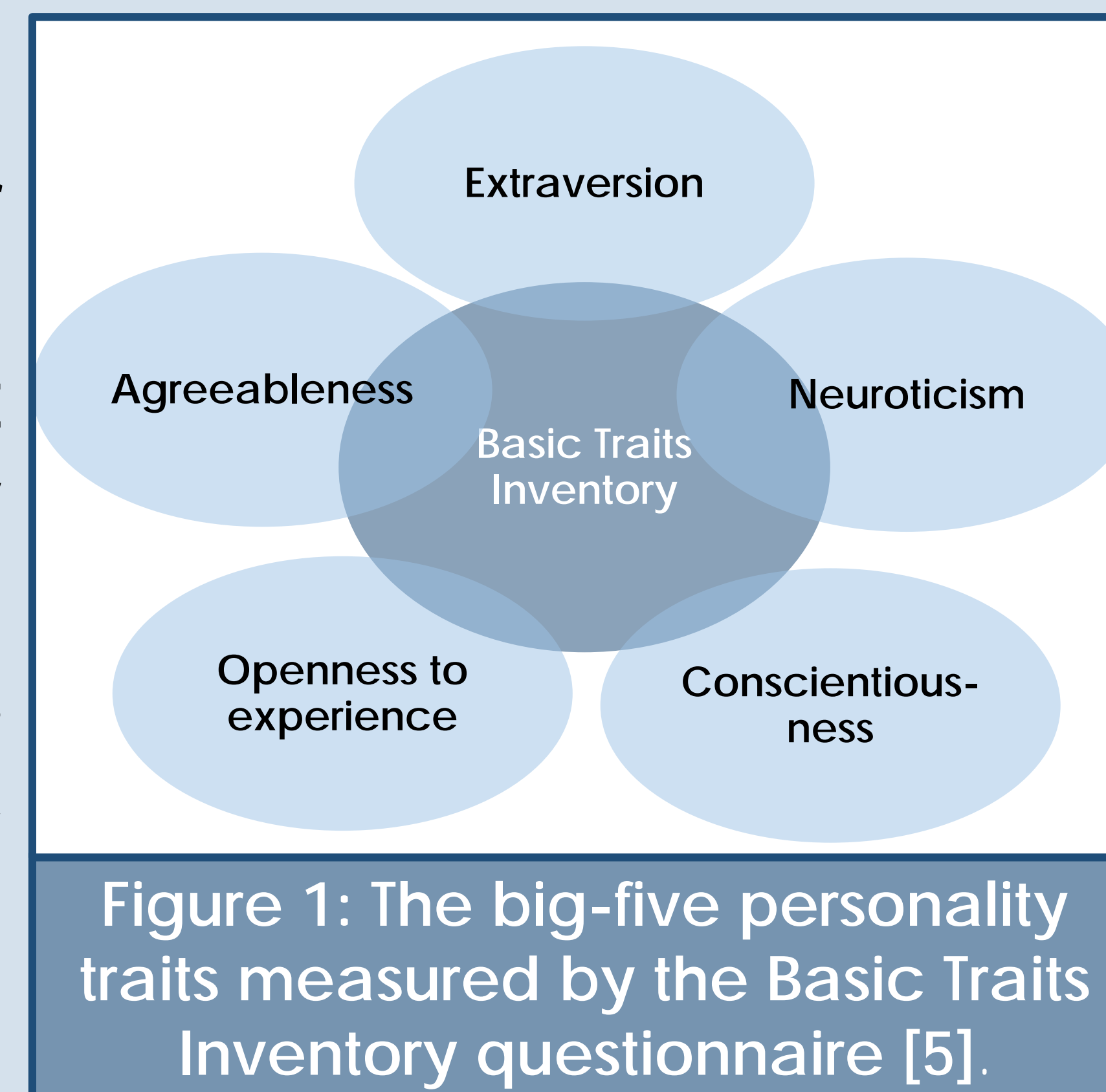


## Background and Aim

Defensive coping (DefS) was associated with poorer cardiac health [1-4]. Personality traits such as neuroticism (characterised by affective instability, depression and anxiety) and low conscientiousness [5-6] may rather explain an ineffectiveness of DefS [7-8] and cardiac ischaemia [9], as reflected through S100 calcium-binding protein B (S100B) [10-13] and cardiac troponin T (cTnT) [3,14] release. We therefore aimed to investigate associations between personality traits and 3-year changes in S100B and cTnT in a DefS bi-ethnic gender cohort.

## Methods

The study forms part of the prospective Sympathetic activity and Ambulatory Blood Pressure in Africans (SABPA) study [15] and included a South African bi-ethnic gender cohort of teachers (n=338) which was follow-up after 3-years. Beta-blocker users and cases with a history of myocardial infarction, stroke and left ventricular hypertrophy at baseline were excluded, and those lost at follow-up. Coping (Coping Strategy Indicator) [16] and personality [Basic Traits Inventory (Figure 1)] scores [5] were determined. Ambulatory blood pressure, 10-lead ECG and fasting serum samples were obtained for the analyses of S100B, cTnT and N-terminal pro-brain natriuretic peptide [electrochemiluminescence immunoassay on the Cobas e411<sup>®</sup> (Roche, Basel, Switzerland)].



## Results and Discussion

Table 1: General and clinical characteristics of a defensive coping bi-ethnic South African teachers' cohort at baseline.

	DefS blacks (n=118)	DefS whites (n=144)
Age (years)	44.16 ± 7.33*	47.76 ± 9.19
Cotinine (ng/mL)	21.79 ± 46.38	17.80 ± 62.06
Gamma glutamyl transferase (U/L)	40.76 (27.49; 74.43)**	18.50 (12.50; 29.50)
S100B (µg/L)	0.05 (0.04; 0.07)**	0.04 (0.03; 0.05)
cTnT (pg/mL)	4.00 (2.99; 5.45)*	4.96 (3.34; 7.47)
NT-proBNP (pg/mL)	29.00 (16.81; 50.66)	35.01 (21.38; 51.63)
ECG RaVL (mV)	0.25 (0.15; 0.43)*	0.17 (0.08; 0.35)

Where: DefS, defensive coping; S100B, S100 calcium-binding protein; cTnT, cardiac troponin T; NT-proBNP, N-terminal pro-brain natriuretic peptide; RaVL, R-wave of the aVL lead. \*p<0.05; \*\*p<0.001

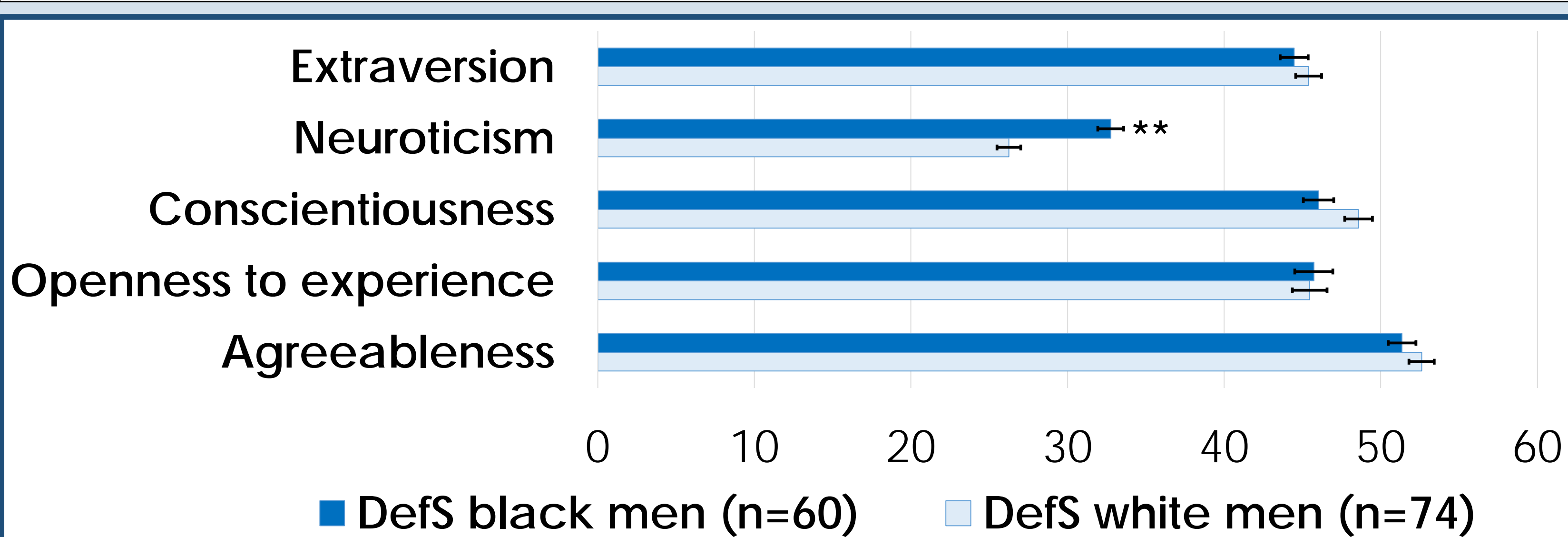


Figure 2: Adjusted comparisons between personality trait scores in defensive coping (DefS) black men vs. DefS white men. *a-priori* covariates included age, cotinine and gamma glutamyl transferase. \*\*p<0.001

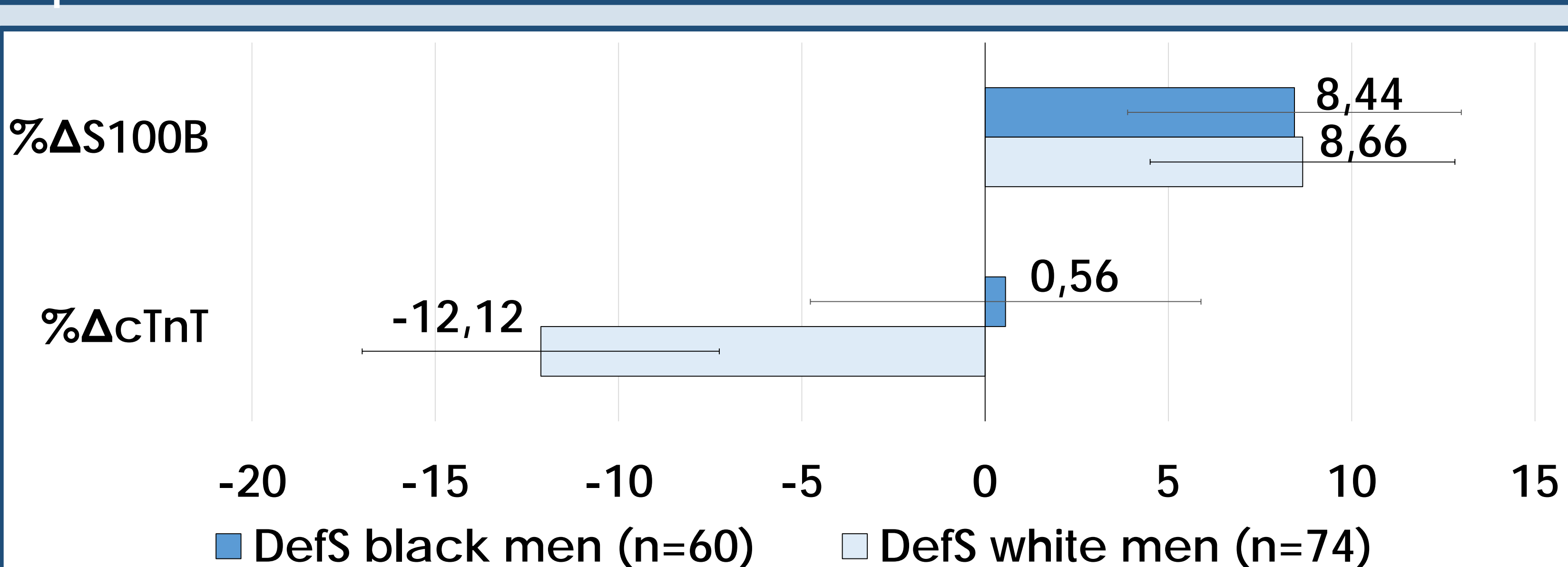


Figure 3: Adjusted mean percentage change (%Δ) comparisons in cardiac ischaemic markers between defensive coping (DefS) black men and DefS white men. *a-priori* covariates included age, cotinine and gamma glutamyl transferase.

Table 2: Multiple regression analyses indicating associations between brain-heart link markers and personality over a three-year period in a defensive coping bi-ethnic gender cohort.

	%ΔcTnT	
	DefS black men (n=53)	DefS white men (n=71)
	β (95% CI), p	β (95% CI), p
Adjusted R <sup>2</sup>	0.29	0.22
%ΔS100B	-0.30 (-0.53; -0.06), p=0.017	NS
%ΔNT-proBNP	0.49 (0.23; 0.74), p=0.001	0.22 (0.01; 0.43), p=0.048
Neuroticism	0.26 (0.03; 0.50), p=0.034	NS
Agreeableness	NS	NS
Openness to experience	NS	NS

Adjusted for age, cotinine and gamma glutamyl transferase

- Conscientiousness predicted a stress-related cTnT cut-point of ≥ 4.2 ng/L [2] in DefS black men only (Odds ratio 1.13, p=0.040).

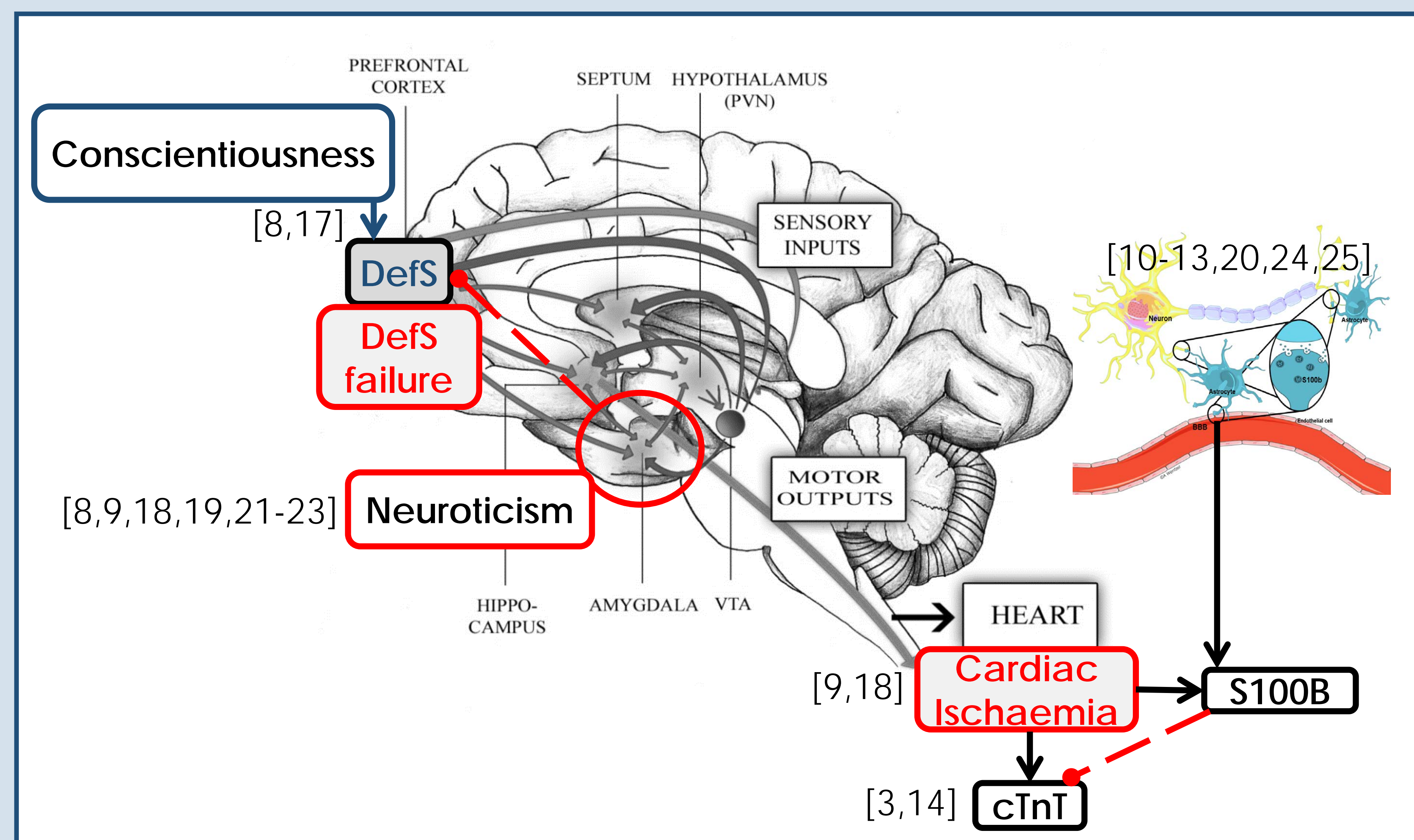


Figure 4: Potential mechanistic pathway indicating the possible contribution of personality traits to chronic defensive coping (DefS) failure and consistent raised cardiac ischaemia in black men. (Images adapted from AP Malan, 2011 & A Wentzel, 2019).

## Conclusion

Neuroticism and less conscientiousness may explain an ineffective defence response or DefS failure in a black male teachers' cohort. DefS failure and consistent raised cardiac ischaemia may accelerate ischaemic heart disease progression. However, chronic cardiac ischaemia appears to be combated, rather than enhanced by S100B.

References can be found at the back



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