

Supplementary material

Supplementary Table 1: Personality characteristics for high and low scoring on each of the three Tridimensional Personality Questionnaire (TPQ) dimensions, novelty seeking (NS), harm avoidance (HA), and reward dependence (RD), and four corresponding subscales.

TPQ Dimension	Low	High	Items (n)
NS	Deliberate and reserved	Risk taking and impulsive	33
NS1	Stoic rigidity	Increased exploratory excitability	8
NS2	Reflection	Impulsive	8
NS3	Reserved	Extravagant	7
NS4	Regimented	Disorderly	10
HA	Carefree and confident	Cautious and worried	34
HA1	Uninhibited optimism	Increased anticipatory worry	10
HA2	Confident	Increased fear of uncertainty	7
HA3	Gregarious	Shy with strangers	7
HA4	Vigorous	Increased fatigability and asthenia	10
RD	Detached and independent	Sentimental and social	29
RD1	Insensitive	Sentimental	5
RD2	Irresolute	Persistent	8
RD3	Detached	Attached	11
RD4	Independent	Dependent	5

Table adapted from Cloninger et al. (1987)

Supplementary Table 2: The characteristics of junior, senior amateur (amateur), and senior professional (professional) South African rugby players without a previous suspected or diagnosed concussion (control), with a minimum of one suspected or diagnosed concussion (case), and case participants with one or more diagnosed concussions (case diagnosed).

	Control	Case	p value ^a	Case (diagnosed)	p value ^b
Junior					
n	57	50		37	
Age (years)	16.6 ± 1.1 (57)	16.4 ± 1.5 (50)	0.389	16.1 ± 1.5 (37)	0.058
Height (m)	1.80 ± 0.09 (56)	1.78 ± 0.09 (50)	0.116	1.78 ± 0.08 (37)	0.202
Weight (kg)	83.0 ± 12.2 (55)	78.3 ± 16.1 (47)	0.093	78.3 ± 16.9 (34)	0.128
BMI (kg/m ²)	25.6 ± 3.2 (55)	24.5 ± 3.6 (47)	0.129	24.4 ± 3.7 (34)	0.118
Rugby exposure (years)	8.9 ± 2.6 (57)	9.0 ± 2.8 (50)	0.897	8.6 ± 2.9 (37)	0.588
Amateur					
n	69	76		60	
Age (years)	21.4 ± 5.3 (69)	21.8 ± 3.3 (76)	0.679	21.4 ± 2.7 (60)	0.966

Height (m)	1.81 ± 0.09 (68)	1.82 ± 0.07 (75)	0.250	1.82 ± 0.07 (60)	0.233
Weight (kg)	92.5 ± 14.7 (66)	93.0 ± 12.3 (75)	0.824	93.2 ± 13.3 (59)	0.777
BMI (kg/m ²)	28.2 ± 3.3 (66)	28.2 ± 2.9 (74)	0.595	27.9 ± 2.9 (59)	0.549
Rugby exposure (years)	11.9 ± 3.8 (68)	12.3 ± 3.6 (76)	0.588	12.6 ± 3.6 (60)	0.315

Professional

n	16	41		37	
Age (years)	24.2 ± 3.6 (16)	24.7 ± 3.6 (41)	0.661	24.5 ± 3.7 (37)	0.766
Height (m)	1.84 ± 0.06 (16)	1.87 ± 0.08 (41)	0.229	1.86 ± 0.08 (37)	0.299
Weight (kg)	99.8 ± 12.4 (16)	104.0 ± 14.0 (41)	0.296	103.9 ± 14.1 (37)	0.318
BMI (kg/m ²)	29.4 ± 2.7 (16)	29.8 ± 3.2 (41)	0.705	29.8 ± 3.2 (37)	0.644
Rugby exposure (years)	15.2 ± 4.9 (15)	12.1 ± 6.4 (40)	0.091	11.8 ± 6.4 (36)	0.071

Data are expressed as the mean ± standard deviation with the number of participants (n) in parenthesis. Unadjusted p values for ^acontrol versus case and ^bcontrol versus case (diagnosed). Statistical significant differences (p<0.05) between control and case groups are displayed in bold. BMI: Body Mass Index.