Canonical Correlation Analysis

Complete cases used: 649
Set 1 variables: G1, G2, G3, absences
Set 2 variables: age, Medu, Fedu, traveltime, studytime, failures, famrel, freetime, goout, Dalc, Walc, health

Canonical roots:

canonical_function	canonical_correlation	squared_canonical_correlation	eigenvalue	percent_of_total_eigenvalue	cumulative_percent
Function 1	0.5342699	0.28544432	0.39947106	79.349255	79.34925
Function 2	0.2425069	0.05880960	0.06248428	12.411615	91.76087
Function 3	0.1613560	0.02603576	0.02673174	5.309881	97.07075
Function 4	0.1205509	0.01453253	0.01474684	2.929249	100.00000

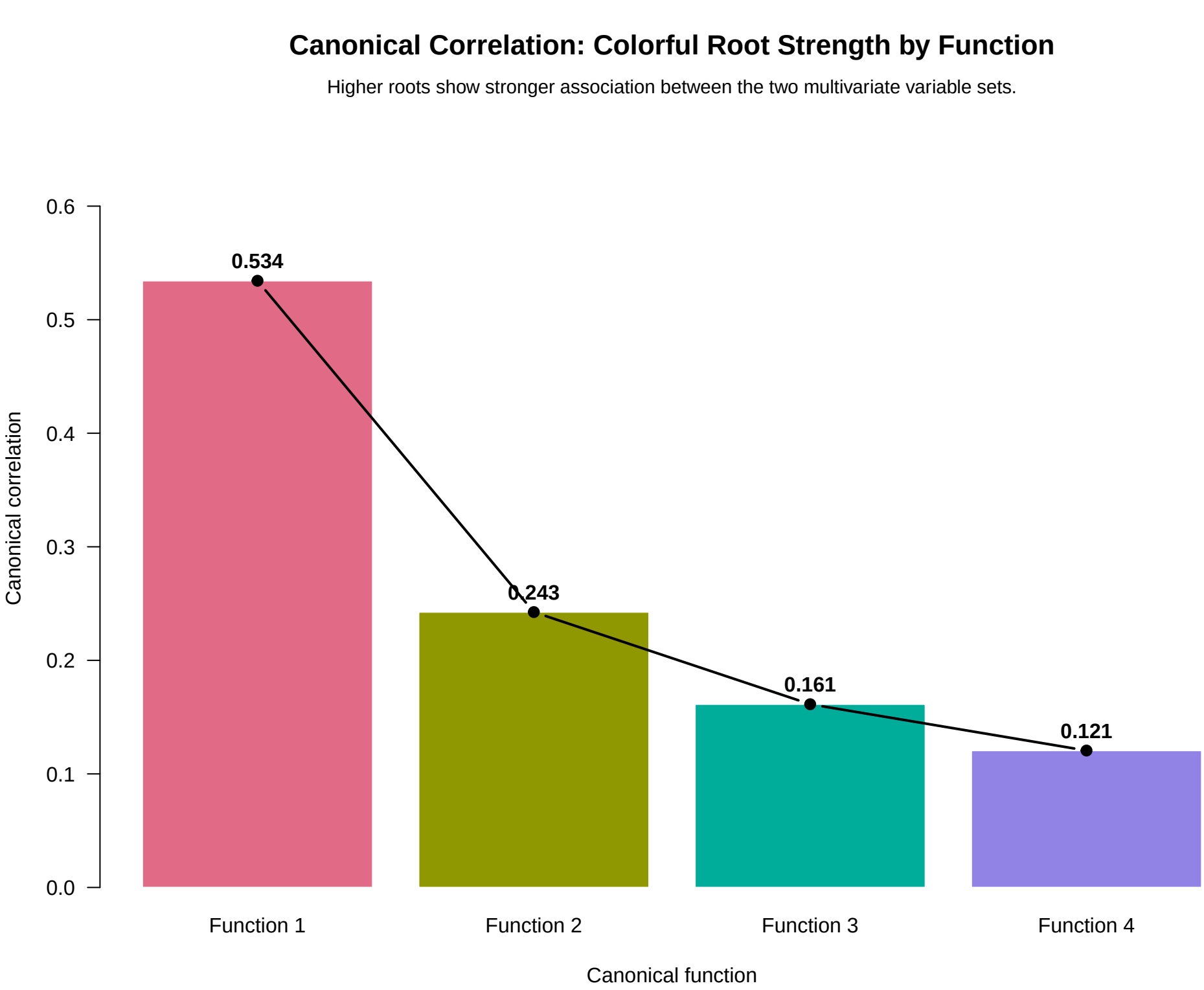
Wilks Lambda dimension tests:

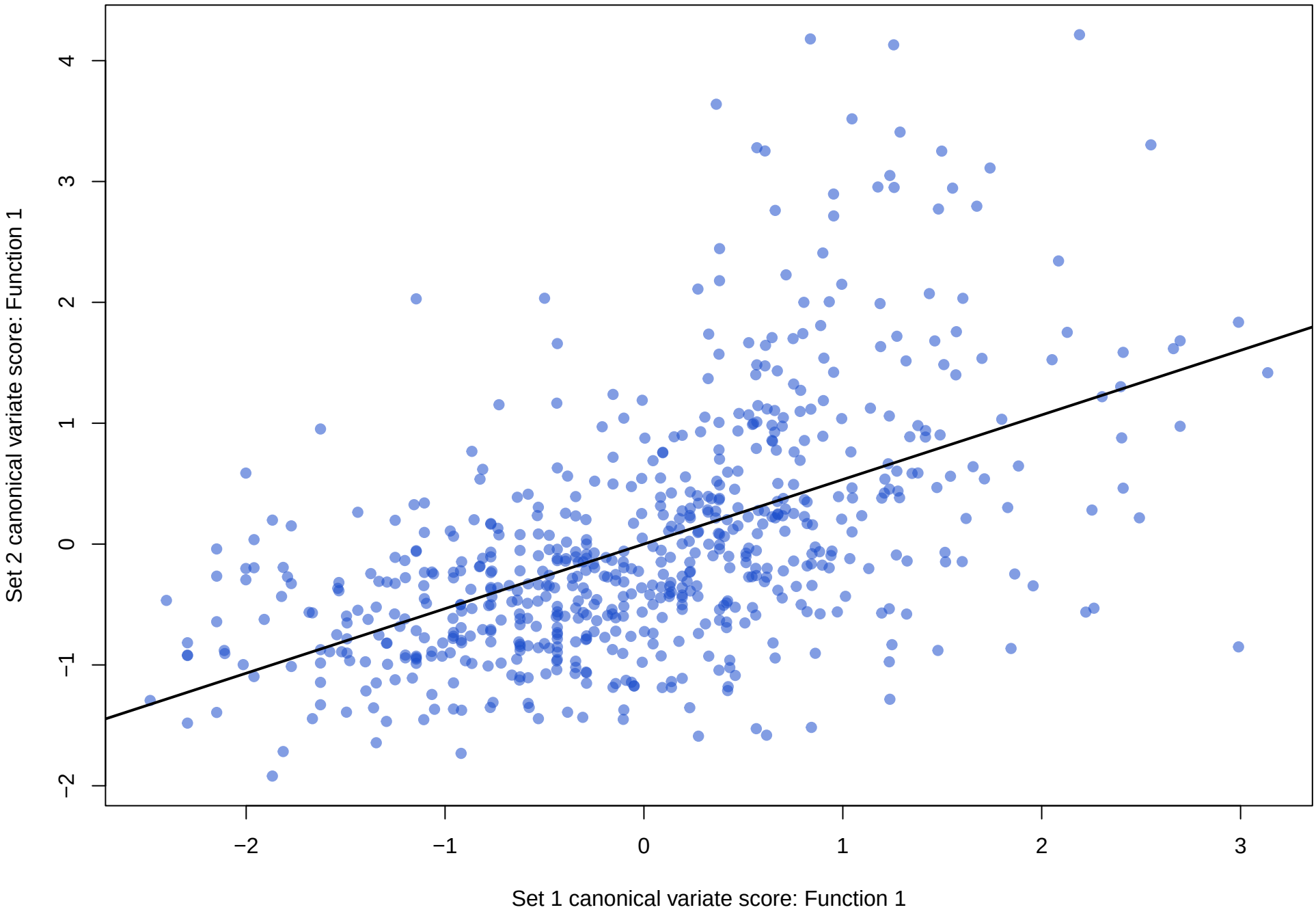
roots_tested	wilks_lambda	chi_square_bartlett	df	p_value	decision_alpha_0_05	method_note
1 to 4	0.6455039	279.924516	48	1.730497e−34	Significant relationship remains	Bartlett chi−square approximation for canonical dimension reduction
2 to 4	0.9033640	64.992178	33	7.374274e−04	Significant relationship remains	Bartlett chi−square approximation for canonical dimension reduction
3 to 4	0.9598101	26.232194	20	1.582794e−01	Not significant at alpha 0.05	Bartlett chi−square approximation for canonical dimension reduction
4 to 4	0.9854675	9.361742	9	4.045742e−01	Not significant at alpha 0.05	Bartlett chi−square approximation for canonical dimension reduction

Redundancy table:

canonical_function	canonical_correlation_squared	set1_variance_extracted_by_own_variate	set2_variance_extracted_by_own_variate	set1_redundancy_explained_by_set2	set2_redundancy_explained_by_set1
Function 1	0.28544432	0.67855066	0.15450637	0.1936884304	0.044102965
Function 2	0.05880960	0.20563862	0.09476824	0.0120935259	0.005573282
Function 3	0.02603576	0.07953460	0.10852688	0.0020707439	0.002825580
Function 4	0.01453253	0.03627611	0.09412314	0.0005271836	0.001367847

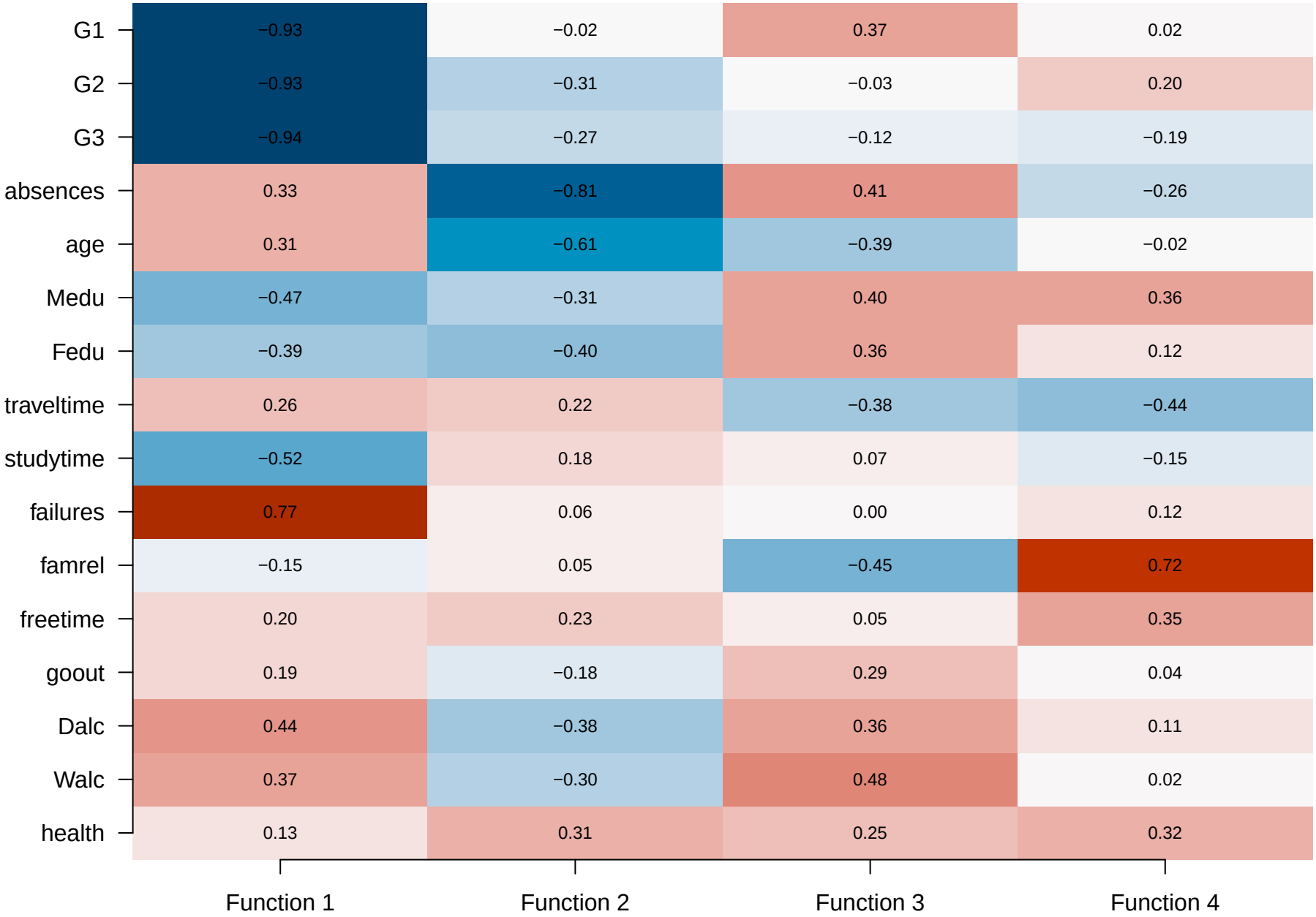
Interpretation note:
Canonical correlation forms paired linear composites from two variable sets and correlates each pair.

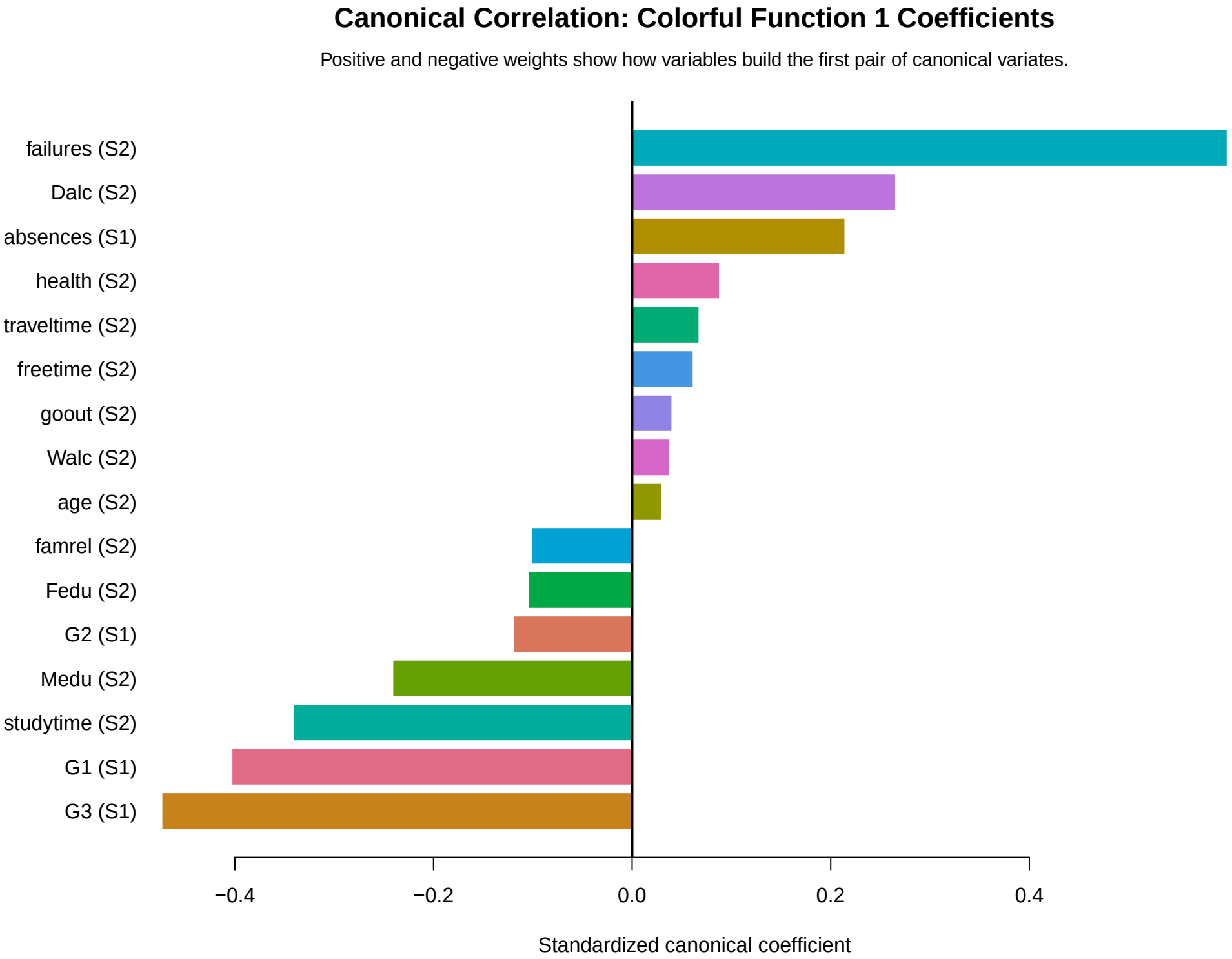

Canonical Correlation: Colorful Root Strength by Function
Higher roots show stronger association between the two multivariate variable sets.
Canonical correlation
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.534
0.243
0.161
0.121
Function 1
Function 2
Function 3
Function 4
Canonical function

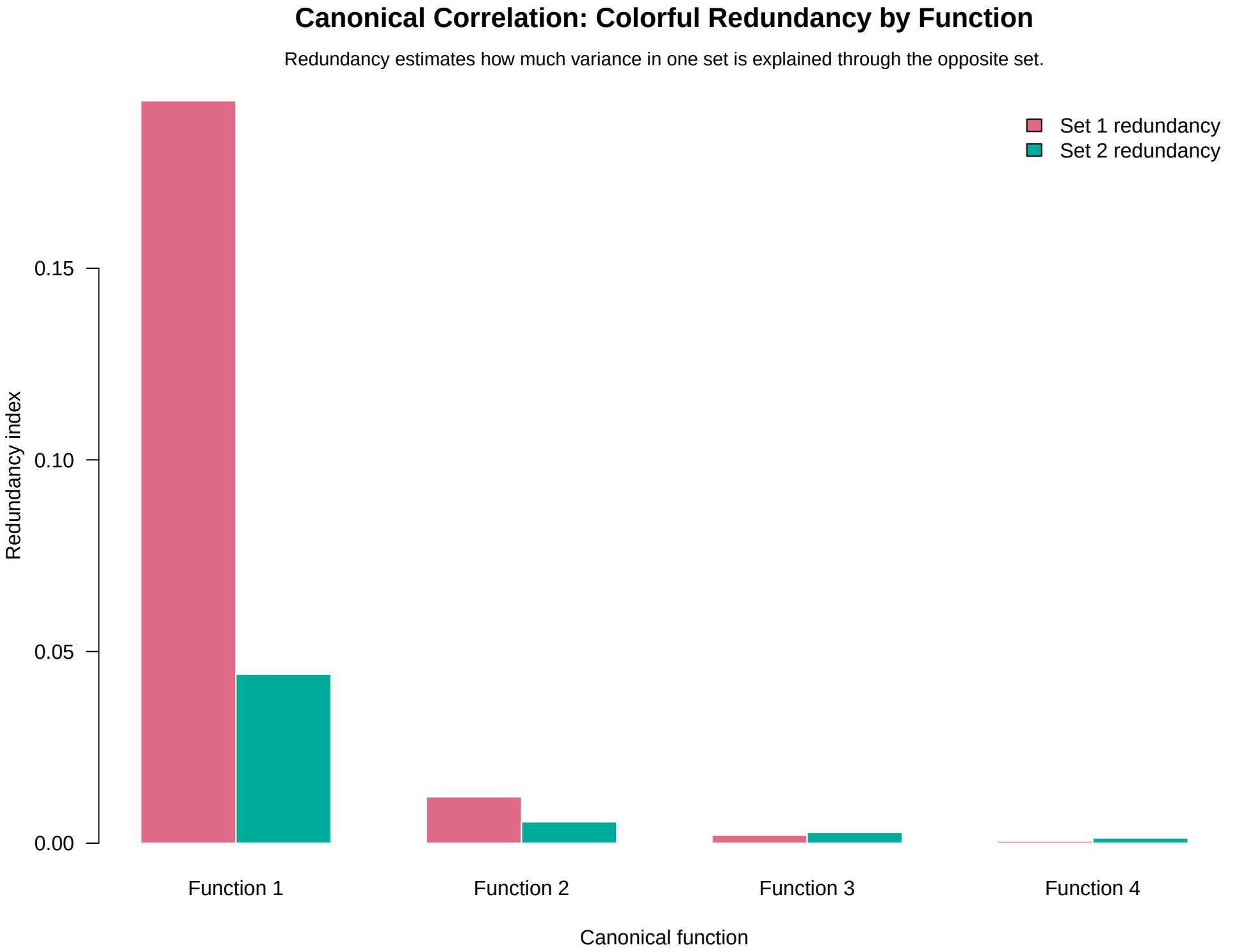

Canonical Correlation: Colorful Function 1 Scores
The plotted case scores correlate at approximately r = 0.534
Set 2 canonical variate score: Function 1
Set 1 canonical variate score: Function 1
−2
−1
0
1
2
3
4

Canonical Correlation: Colorful Structure Loadings

Loadings show how strongly each observed variable relates to its own canonical variate.




Canonical Correlation: Colorful Function 1 Coefficients
Positive and negative weights show how variables build the first pair of canonical variates.
failures (S2)
Dalc (S2)
absences (S1)
health (S2)
traveltime (S2)
freetime (S2)
goout (S2)
Walc (S2)
age (S2)
famrel (S2)
Fedu (S2)
G2 (S1)
Medu (S2)
studytime (S2)
G1 (S1)
G3 (S1)
−0.4
−0.2
0.0
0.2
0.4
Standardized canonical coefficient


Canonical Correlation: Colorful Redundancy by Function
Redundancy estimates how much variance in one set is explained through the opposite set.
Set 1 redundancy
Set 2 redundancy
Redundancy index
0.15
0.10
0.05
0.00
Function 1
Function 2
Function 3
Function 4
Canonical function