

1. Answer the following questions regarding the canonical correlations.

a. Test the null hypothesis that the canonical correlations are all equal to zero. Give your test statistic, d.f., and p-value.

Table below shows significant canonical correlation coefficient, Wilk's λ statistics, test statistics, degrees of freedom, and p-values. The null hypothesis states that the first 8 canonical correlations out of 19 correlations are equal to zero based on p-value.

#Wilk's Lambda Test

```
cc_mm = cc(music, hobbies_interests)
wilks_mm = ccaWilks(music, hobbies_interests, cc_mm)
round(wilks_mm, 2)
```

##		WilksL	F	df1	df2	p
##	[1,]	0.06	3.21	608	10482.67	0.00
##	[2,]	0.13	2.49	558	10000.08	0.00
##	[3,]	0.21	2.08	510	9513.34	0.00
##	[4,]	0.29	1.82	464	9022.12	0.00
##	[5,]	0.37	1.60	420	8526.00	0.00
##	[6,]	0.43	1.49	378	8024.53	0.00
##	[7,]	0.50	1.38	338	7517.19	0.00
##	[8,]	0.56	1.27	300	7003.38	0.00
##	[9,]	0.63	1.17	264	6482.39	0.03
##	[10,]	0.69	1.06	230	5953.43	0.26
##	[11,]	0.75	0.95	198	5415.59	0.68
##	[12,]	0.81	0.82	168	4867.84	0.96
##	[13,]	0.86	0.71	140	4309.02	1.00
##	[14,]	0.89	0.65	114	3737.85	1.00
##	[15,]	0.93	0.56	90	3152.99	1.00
##	[16,]	0.95	0.50	68	2553.10	1.00
##	[17,]	0.97	0.36	48	1937.03	1.00
##	[18,]	0.98	0.34	30	1304.00	1.00
##	[19,]	0.99	0.31	14	653.00	0.99

b. How many significant canonical variates are there?

There are 8 significant canonical variates.

c. Present the first two canonical correlations (Cancor)?

```
library(yacca)
c2 = cca(hobbies_interests,music)
c2
## Canonical Correlation Analysis
##
## Canonical Correlations:
##      CV 1      CV 2      CV 3      CV 4      CV 5      CV 6      CV
7
```

0.73310410 0.60630173 0.51924975 0.46988302 0.38561624 0.36567119 d. What can you conclude from the above analyses?

From the above analysis, there is a relationship between hobbies and music. History is the most important value in Hobbies and music in music.

2. Answer the following questions regarding the canonical variates.

a. Give the formulae for the first canonical variate for the hobbies_interests and music variables.

In order to increase overlapping variance, which is 0.73, then we need to take into account what are ways that we could decrease 27% of error. That means, what are other hobbies we might need to include, or some music we should include, maybe some instrumental. 73% is cancel for the first variate, when we are comparing the hobbies interests to the music variables within the first variate.

Canonical Variate Coefficients:			
X Vars:		Y Vars:	
	CV 1		CV 1
History	0.172749150	Music	-0.01562241
Psychology	0.002125842	Slow.songs.or.fast.songs	-0.01322202
Politics	-0.002310111	Dance	-0.06624628
Mathematics	-0.047144486	Folk	0.05324425
Physics	0.120232697	Country	0.03057841
Internet	-0.077974365	Classical.music	0.29708481
PC	-0.041706964	Musical	0.01336652
Economy.Management	0.005014450	Pop	-0.16910909
Biology	-0.019825147	Rock	0.02995350
Chemistry	-0.067927310	Metal.or.Hardrock	0.02201227
Reading	0.118641213	Punk	0.02668992
Geography	-0.006950079	Hiphop..Rap	-0.13743338
Foreign.languages	0.077365531	Reggae..Ska	0.04113529
Medicine	0.032505202	Swing..Jazz	0.18372228
Law	0.007091897	Rock.n.roll	-0.05969345
Cars	-0.102899297	Alternative	0.18844613
Art.exhibitions	0.281843295	Latino	-0.09332992
Religion	0.036877052	Techno..Trance	-0.03643442
Countryside..outdoors	0.033218928	Opera	0.22067889
Dancing	-0.188697927		
Musical.instruments	0.209544568		
Writing	-0.054164761		
Passive.sport	-0.006289547		
Active.sport	-0.055515407		
Gardening	0.024066410		
Celebrities	-0.111101445		
Shopping	-0.162427967		
Science.and.technology	0.211793168		
Theatre	0.097878365		
Fun.with.friends	0.013056913		
Adrenaline.sports	-0.079666650		
Pets	-0.050524154		

b. Give the correlations between the first canonical variate for hobbies_interests and the music variables.

```

## Y Vars:
##
## Music 0.05748834
## Slow.songs.or.fast.songs -0.18510350
## Dance -0.38749621
## Folk 0.38178244
## Country 0.25568618
## Classical.music 0.76319684
## Musical 0.25721542
## Pop -0.43751181
## Rock 0.35701104
## Metal.or.Hardrock 0.37875199
## Punk 0.29228065
## Hiphop..Rap -0.45282608
## Reggae..Ska 0.10692618
## Swing..Jazz 0.54369432
## Rock.n.roll 0.36417364
## Alternative 0.59611787
## Latino -0.07093147
## Techno..Trance -0.20765156
## Opera 0.65959492

## X Vars:
##
## History 0.46221429
## Psychology 0.25979316
## Politics 0.20744422
## Mathematics 0.10592829
## Physics 0.25990474
## Internet -0.16869551
## PC 0.02187078
## Economy.Management -0.13229445
## Biology 0.13118878
## Chemistry 0.07097934
## Reading 0.49882401
## Geography 0.20030543
## Foreign.languages 0.26757344
## Medicine 0.14914547
## Law 0.04932124
## Cars -0.20389353
## Art.exhibitions 0.59570392
## Religion 0.33755228
## Countryside..outdoors 0.23038461
## Dancing -0.11930085
## Musical.instruments 0.49261678
## Writing 0.33707600
## Passive.sport -0.11724919
## Active.sport -0.15457963
## Gardening 0.08370508
## Celebrities -0.38491574
## Shopping -0.34901957
## Science.and.technology 0.29319546
## Theatre 0.49997655
## Fun.with.friends -0.04567797
## Adrenaline.sports -0.12035347
## Pets -0.11924072

```

Canonical Variate Adequacies (Fraction of Total Variance Explained by Each CV, Within Sets):

```

X Vars:
CV 1 CV 2 CV 3 CV 4 CV 5
0.07725556 0.08491983 0.06052654 0.04945809 0.02419494 0.01111111
CV 11 CV 12 CV 13 CV 14 CV 15
0.02695972 0.03316732 0.01970271 0.02405938 0.02334322 0.01111111

Y Vars:
CV 1 CV 2 CV 3 CV 4 CV 5
0.16202745 0.09977382 0.09445758 0.06542668 0.03840190 0.01111111
CV 11 CV 12 CV 13 CV 14 CV 15
0.02695972 0.03316732 0.01970271 0.02405938 0.02334322 0.01111111

```

7% of the variance is explained within the first variant using 19 musical factors, 16% of the y variance is explained by hobbies.

c. What can you conclude from the above analyses?

History provides the most information for hobbies, and music for music variable. Stem fields like chemistry, Biology have strong relationship, and Country music, classical music have strong relationship. We can say that there is an association between writing and classical music.