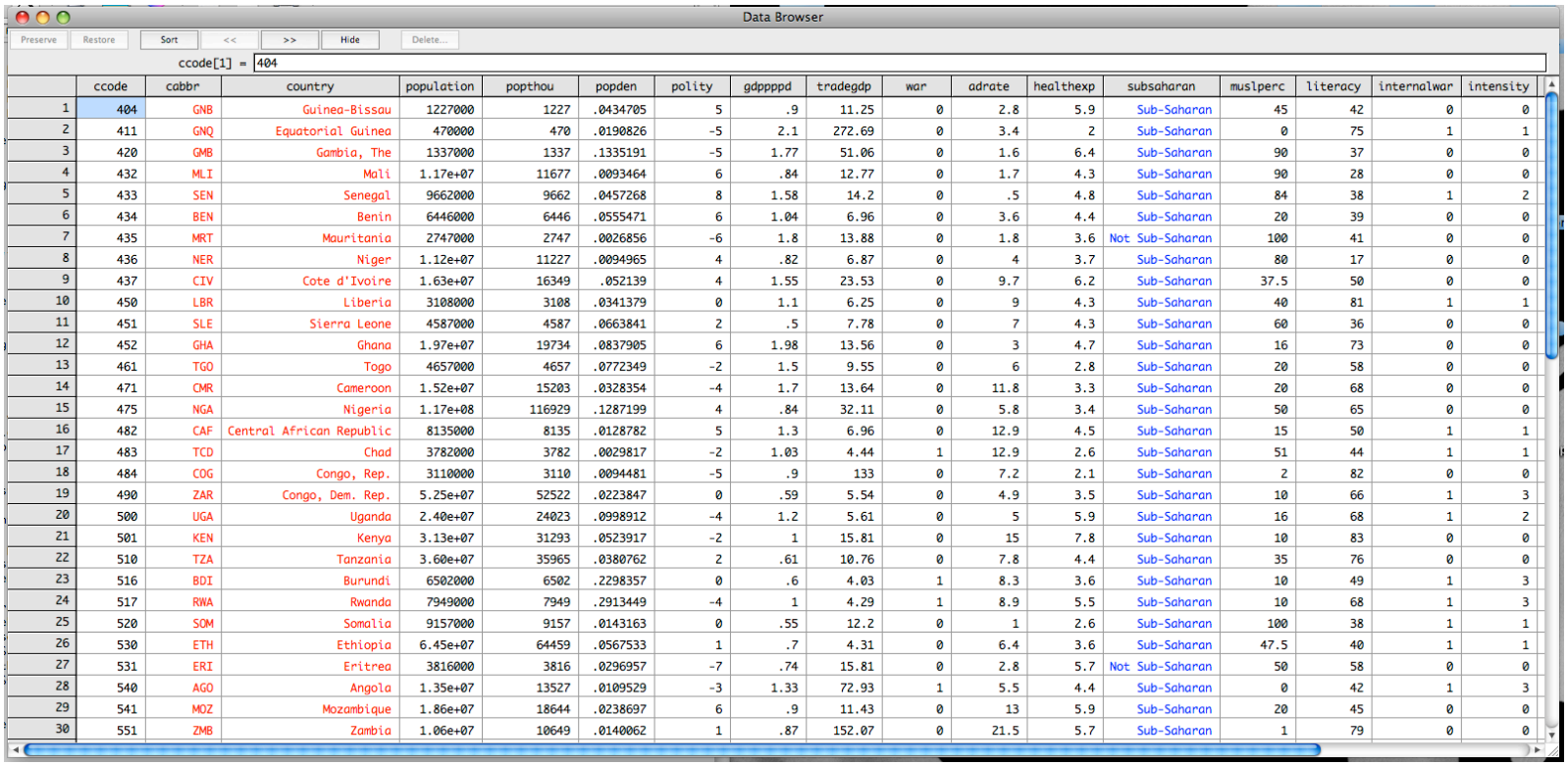
PLSC 502 – Autumn 2022
Descriptive Graphics

September 8, 2022

Why Plot?

- Know your data.
- Catch mistakes.
- Learn something...

Example: Africa, 2001

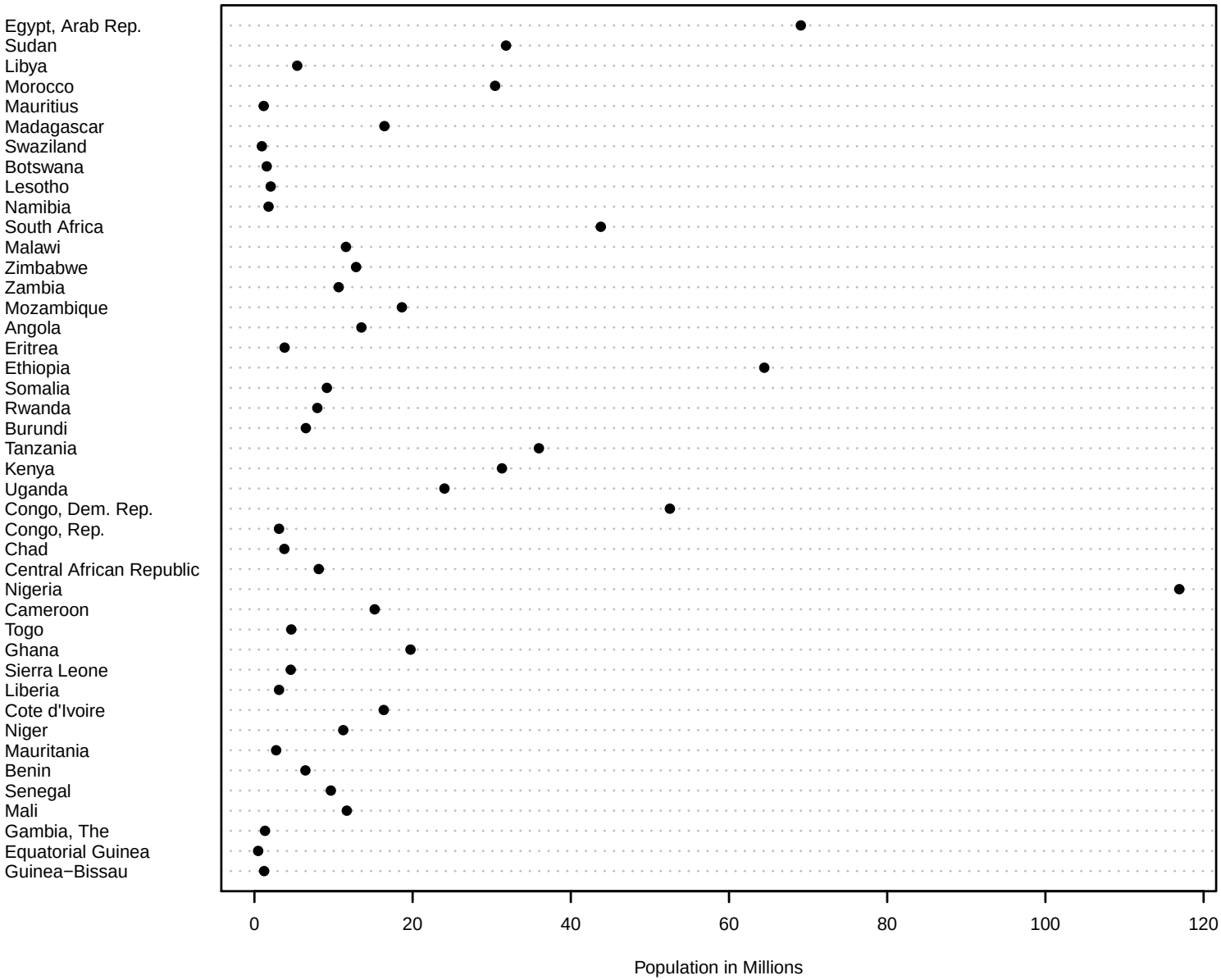


	ccode	cabbr	country	population	popthou	popden	polity	gdppppd	tradegdp	war	adrate	healthexp	subsaharan	muslperc	literacy	internalwar	intensity
1	404	GNB	Guinea-Bissau	1227000	1227	.0434705	5	.9	11.25	0	2.8	5.9	Sub-Saharan	45	42	0	0
2	411	GNQ	Equatorial Guinea	470000	470	.0190826	-5	2.1	272.69	0	3.4	2	Sub-Saharan	0	75	1	1
3	420	GMB	Gambia, The	1337000	1337	.1335191	-5	1.77	51.06	0	1.6	6.4	Sub-Saharan	90	37	0	0
4	432	MLI	Mali	1.17e+07	11677	.0093464	6	.84	12.77	0	1.7	4.3	Sub-Saharan	90	28	0	0
5	433	SEN	Senegal	9662000	9662	.0457268	8	1.58	14.2	0	.5	4.8	Sub-Saharan	84	38	1	2
6	434	BEN	Benin	6446000	6446	.0555471	6	1.04	6.96	0	3.6	4.4	Sub-Saharan	20	39	0	0
7	435	MRT	Mauritania	2747000	2747	.0026856	-6	1.8	13.88	0	1.8	3.6	Not Sub-Saharan	100	41	0	0
8	436	NER	Niger	1.12e+07	11227	.0094965	4	.82	6.87	0	4	3.7	Sub-Saharan	80	17	0	0
9	437	CIV	Cote d'Ivoire	1.63e+07	16349	.052139	4	1.55	23.53	0	9.7	6.2	Sub-Saharan	37.5	50	0	0
10	450	LBR	Liberia	3108000	3108	.0341379	0	1.1	6.25	0	9	4.3	Sub-Saharan	40	81	1	1
11	451	SLE	Sierra Leone	4587000	4587	.0663841	2	.5	7.78	0	7	4.3	Sub-Saharan	60	36	0	0
12	452	GHA	Ghana	1.97e+07	19734	.0837905	6	1.98	13.56	0	3	4.7	Sub-Saharan	16	73	0	0
13	461	TGO	Togo	4657000	4657	.0772349	-2	1.5	9.55	0	6	2.8	Sub-Saharan	20	58	0	0
14	471	CMR	Cameroon	1.52e+07	15203	.0328354	-4	1.7	13.64	0	11.8	3.3	Sub-Saharan	20	68	0	0
15	475	NGA	Nigeria	1.17e+08	116929	.1287199	4	.84	32.11	0	5.8	3.4	Sub-Saharan	50	65	0	0
16	482	CAF	Central African Republic	8135000	8135	.0128782	5	1.3	6.96	0	12.9	4.5	Sub-Saharan	15	50	1	1
17	483	TCD	Chad	3782000	3782	.0029817	-2	1.03	4.44	1	12.9	2.6	Sub-Saharan	51	44	1	1
18	484	COG	Congo, Rep.	3110000	3110	.0094481	-5	.9	133	0	7.2	2.1	Sub-Saharan	2	82	0	0
19	490	ZAR	Congo, Dem. Rep.	5.25e+07	52522	.0223847	0	.59	5.54	0	4.9	3.5	Sub-Saharan	10	66	1	3
20	500	UGA	Uganda	2.40e+07	24023	.0998912	-4	1.2	5.61	0	5	5.9	Sub-Saharan	16	68	1	2
21	501	KEN	Kenya	3.13e+07	31293	.0523917	-2	1	15.81	0	15	7.8	Sub-Saharan	10	83	0	0
22	510	TZA	Tanzania	3.60e+07	35965	.0380762	2	.61	10.76	0	7.8	4.4	Sub-Saharan	35	76	0	0
23	516	BDI	Burundi	6502000	6502	.2298357	0	.6	4.03	1	8.3	3.6	Sub-Saharan	10	49	1	3
24	517	RWA	Rwanda	7949000	7949	.2913449	-4	1	4.29	1	8.9	5.5	Sub-Saharan	10	68	1	3
25	520	SOM	Somalia	9157000	9157	.0143163	0	.55	12.2	0	1	2.6	Sub-Saharan	100	38	1	1
26	530	ETH	Ethiopia	6.45e+07	64459	.0567533	1	.7	4.31	0	6.4	3.6	Sub-Saharan	47.5	40	1	1
27	531	ERI	Eritrea	3816000	3816	.0296957	-7	.74	15.81	0	2.8	5.7	Not Sub-Saharan	50	58	0	0
28	540	AGO	Angola	1.35e+07	13527	.0109529	-3	1.33	72.93	1	5.5	4.4	Sub-Saharan	0	42	1	3
29	541	MOZ	Mozambique	1.86e+07	18644	.0238697	6	.9	11.43	0	13	5.9	Sub-Saharan	20	45	0	0
30	551	ZMB	Zambia	1.06e+07	10649	.0140062	1	.87	152.07	0	21.5	5.7	Sub-Saharan	1	79	0	0

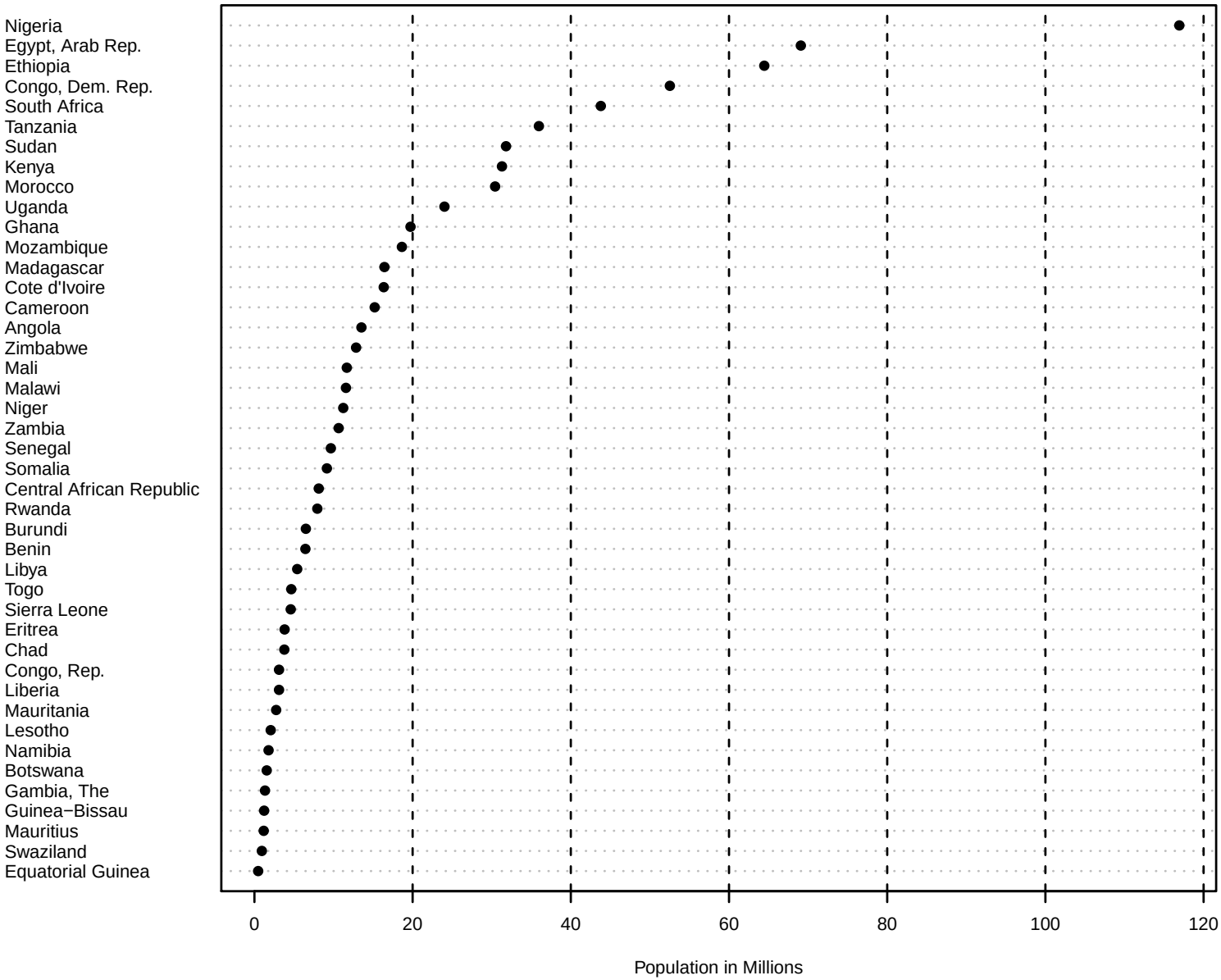
Example: Africa, 2001

```
    ccode           cabbr                        country     population          popthou
Min.   :404.0   AGO    : 1   Angola                  : 1   Min.   :   470000   Min.   :   470
1st Qu.:451.5   BDI    : 1   Benin                   : 1   1st Qu.:  3446000   1st Qu.:  3446
Median :510.0   BEN    : 1   Botswana                : 1   Median :  9662000   Median :  9662
Mean   :509.5   BWA    : 1   Burundi                 : 1   Mean   : 17390256   Mean   : 17390
3rd Qu.:556.5   CAF    : 1   Cameroon                : 1   3rd Qu.: 19189000   3rd Qu.: 19189
Max.   :651.0   CIV    : 1   Central African Republic: 1   Max.   :116929000   Max.   :116929
                (Other):37   (Other)                 :37
    popden             polity           gdppppd          tradegdp           war
Min.   :0.002228   Min.   :-9.0000   Min.   : 0.500   Min.   :  4.030   Min.   :0.0000
1st Qu.:0.013442   1st Qu.:-4.5000   1st Qu.: 0.855   1st Qu.:  7.645   1st Qu.:0.0000
Median :0.035707   Median : 0.0000   Median : 1.200   Median : 13.560   Median :0.0000
Mean   :0.064279   Mean   : 0.5116   Mean   : 2.159   Mean   : 30.493   Mean   :0.1163
3rd Qu.:0.068302   3rd Qu.: 5.5000   3rd Qu.: 2.040   3rd Qu.: 30.010   3rd Qu.:0.0000
Max.   :0.574020   Max.   :10.0000   Max.   :10.800   Max.   :272.690   Max.   :1.0000

    adrate          healthexp              subsaharan    muslperc         literacy
Min.   : 0.100   Min.   :2.000   Not Sub-Saharan: 6   Min.   :  0.00   Min.   :17.00
1st Qu.: 2.700   1st Qu.:3.450   Sub-Saharan    :37   1st Qu.: 10.00   1st Qu.:43.00
Median : 6.000   Median :4.400                        Median : 20.00   Median :61.00
Mean   : 9.365   Mean   :4.598                        Mean   : 35.96   Mean   :60.07
3rd Qu.:12.900   3rd Qu.:5.800                        3rd Qu.: 55.50   3rd Qu.:78.50
Max.   :38.800   Max.   :8.600                        Max.   :100.00   Max.   :89.00

 internalwar       intensity
Min.   :0.0000   Min.   :0.0000
1st Qu.:0.0000   1st Qu.:0.0000
Median :0.0000   Median :0.0000
Mean   :0.3023   Mean   :0.5814
3rd Qu.:1.0000   3rd Qu.:1.0000
Max.   :1.0000   Max.   :3.0000
```

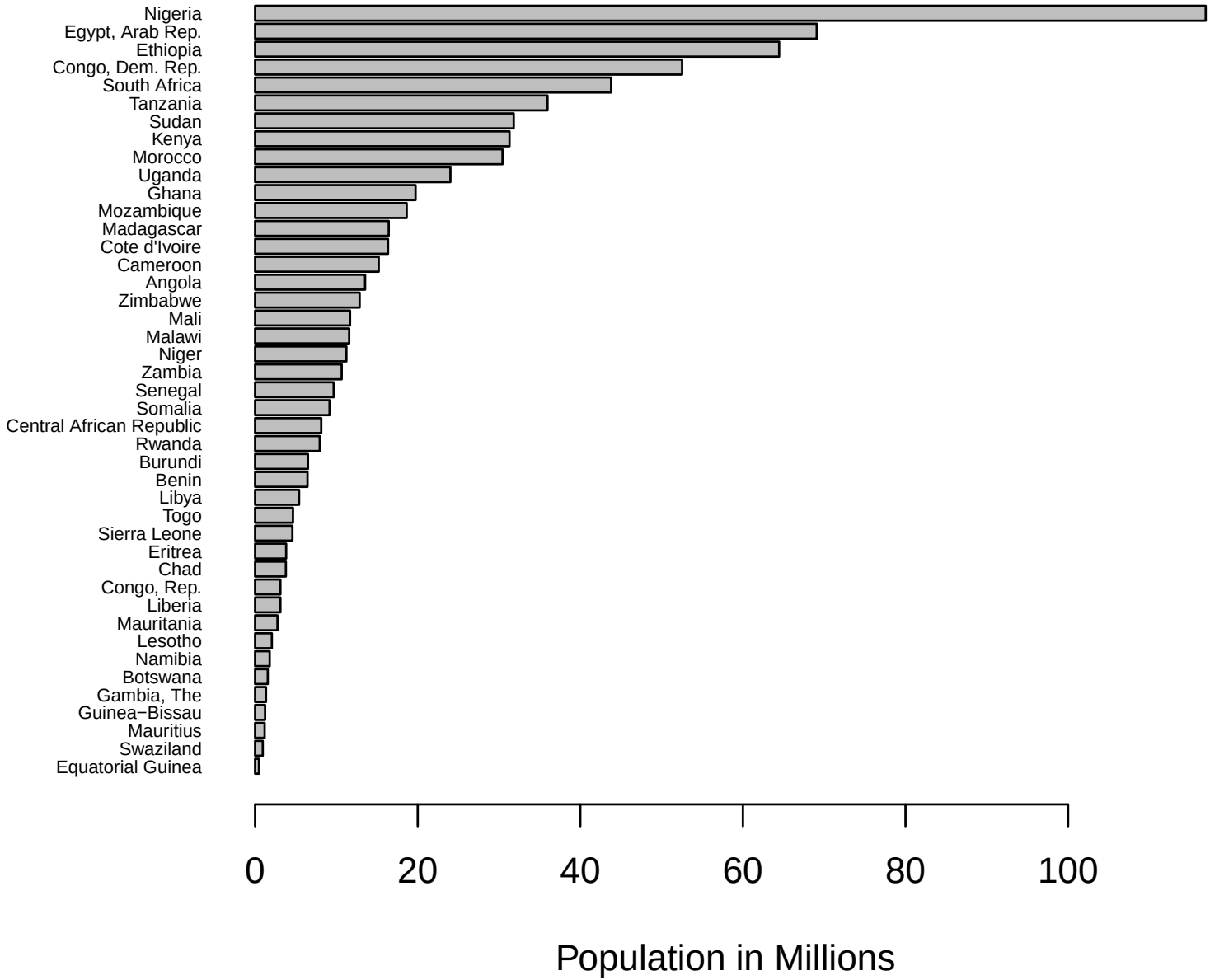
The Dotchart



The Dotchart, Sorted

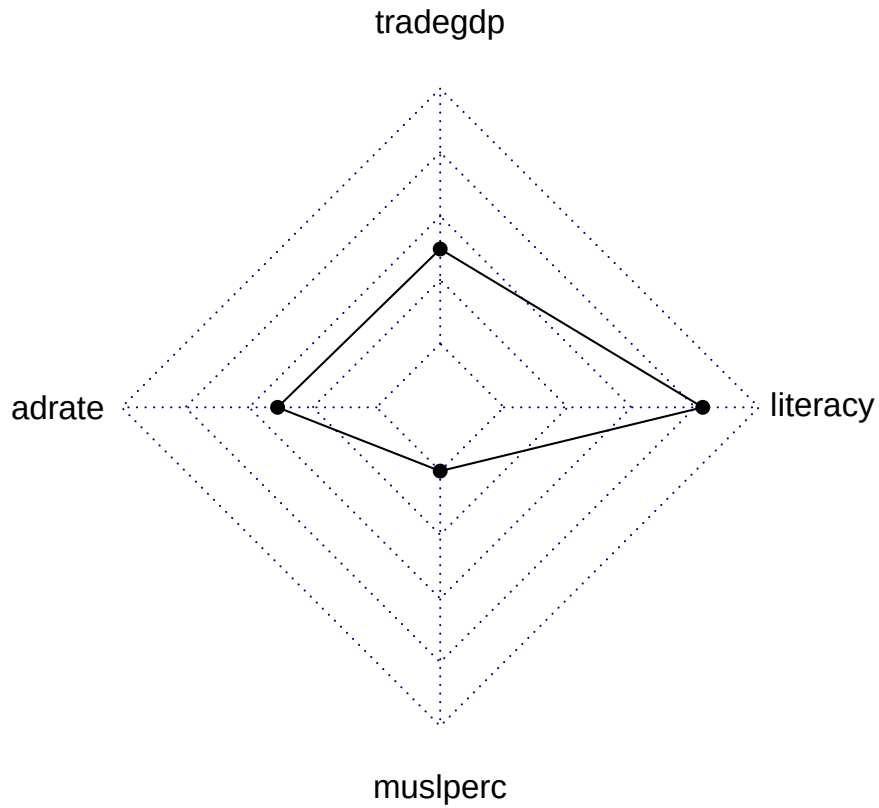


The Barchart, Sorted



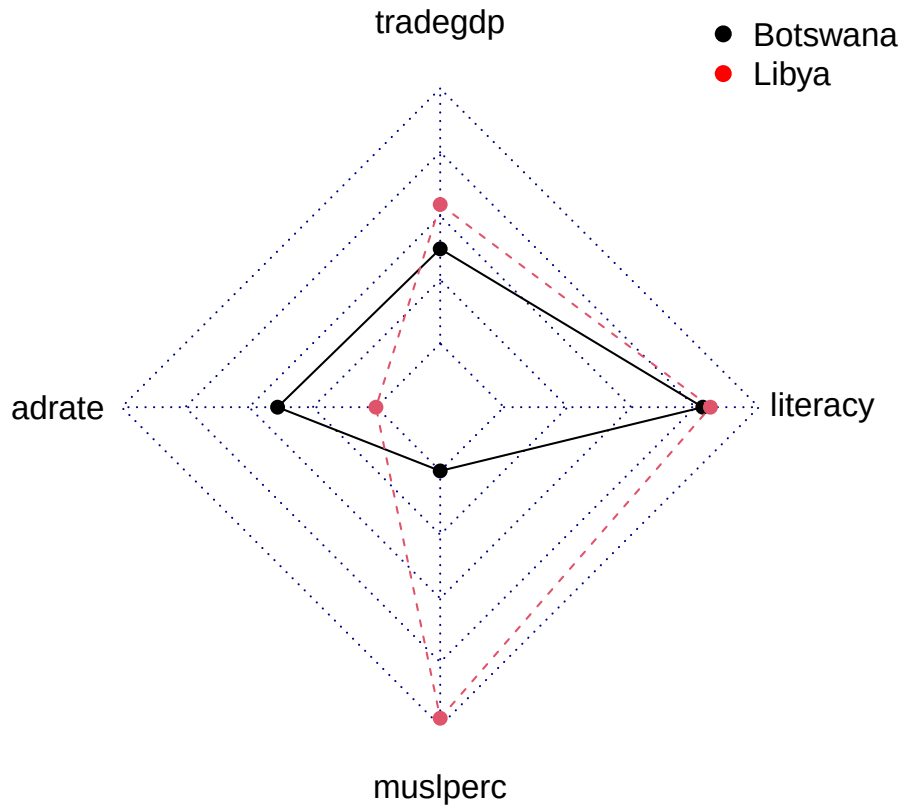
“Spiderplots” / Radar Plots / etc.

Radar Chart: Botswana

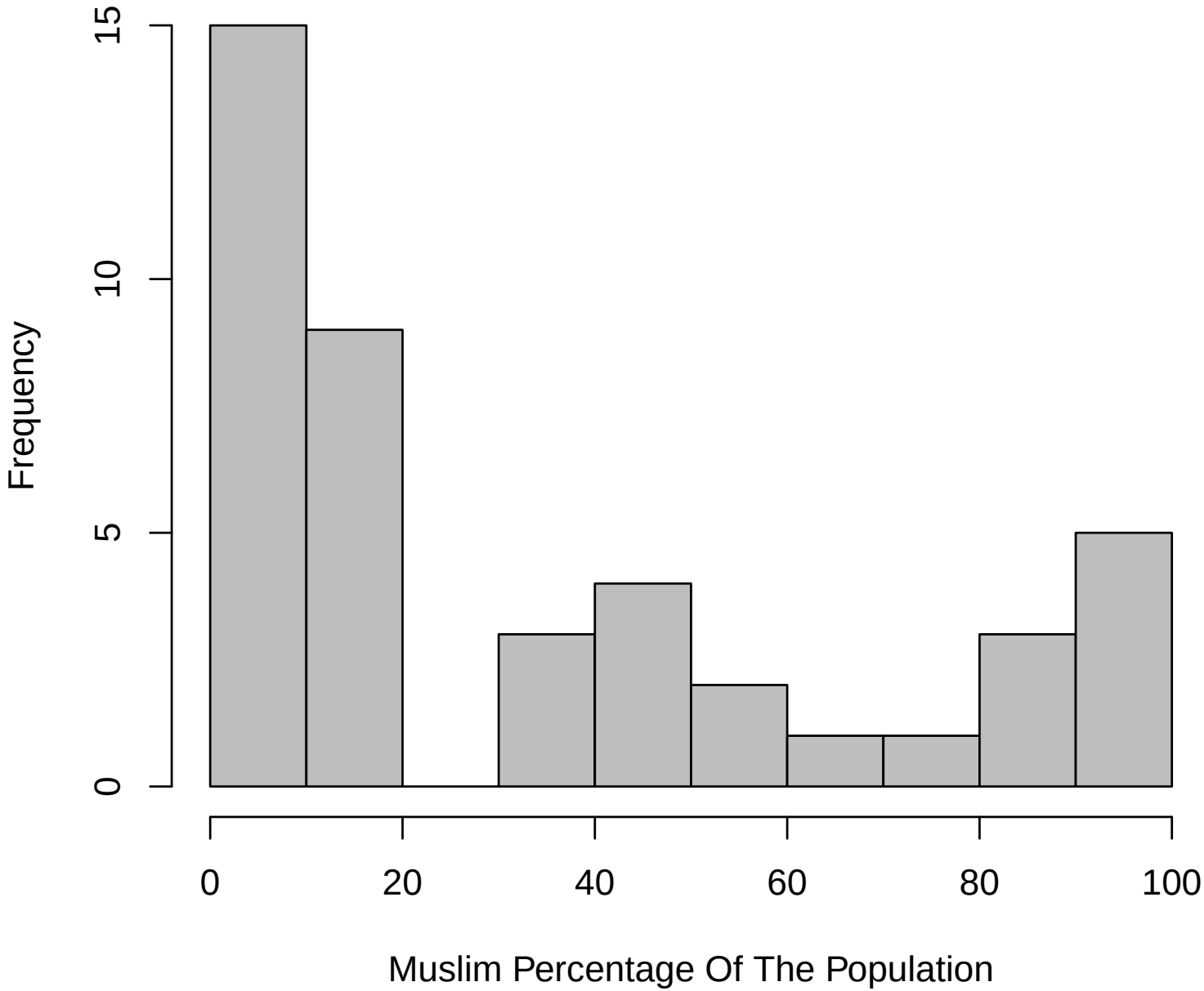


“Spiderplots” / Radar Plots / etc. (cont’d)

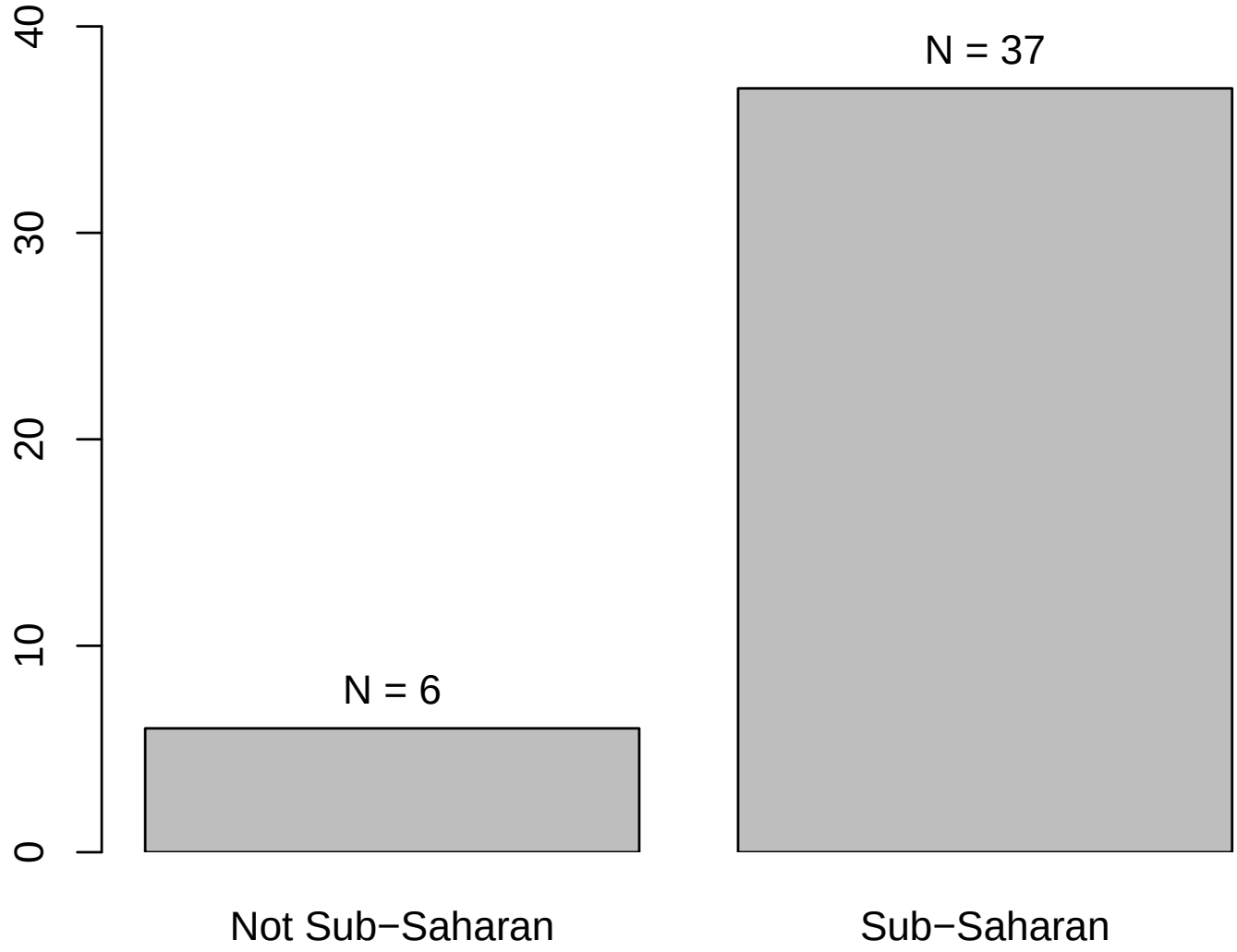
Radar Chart: Botswana and Libya



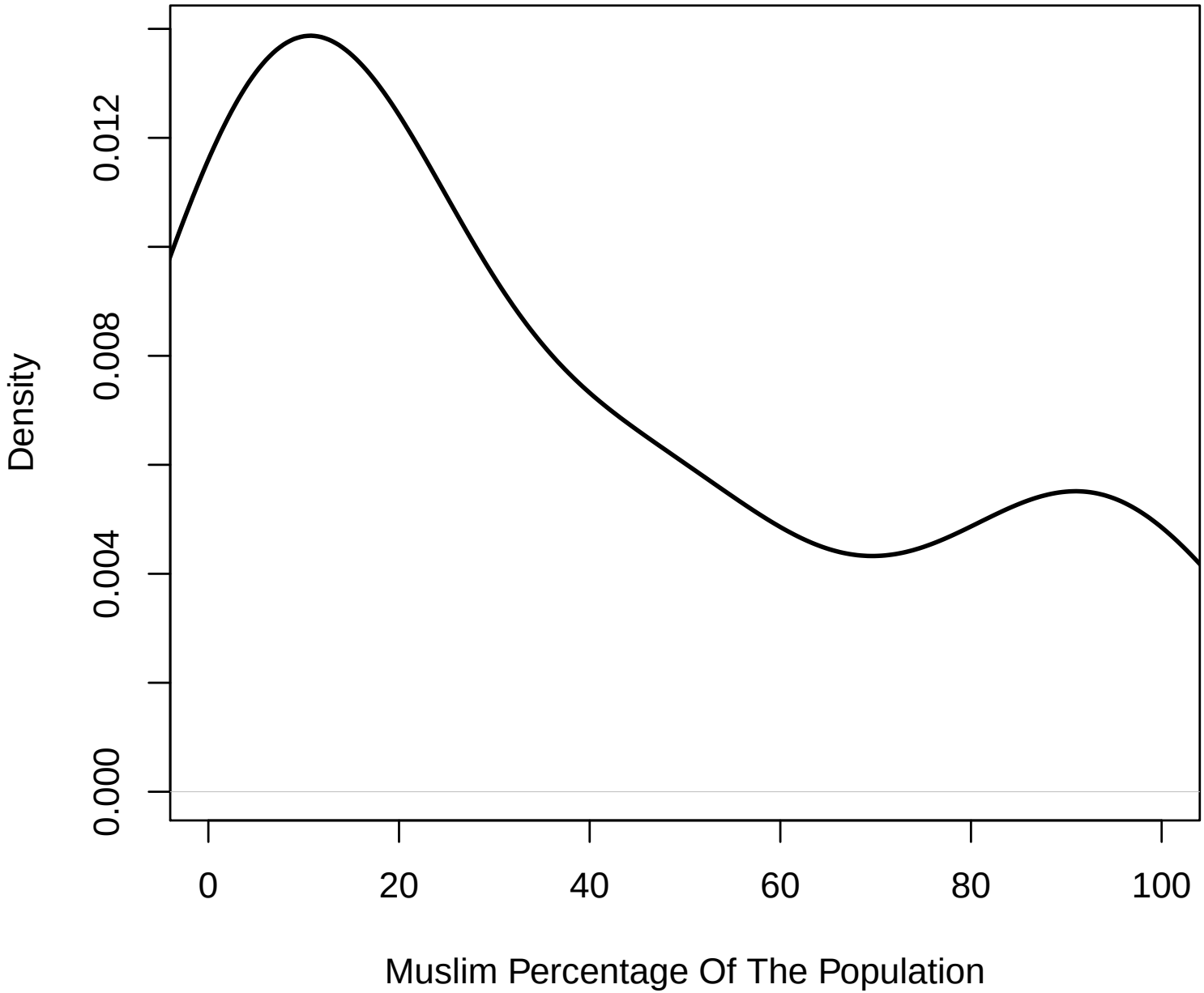
The Histogram



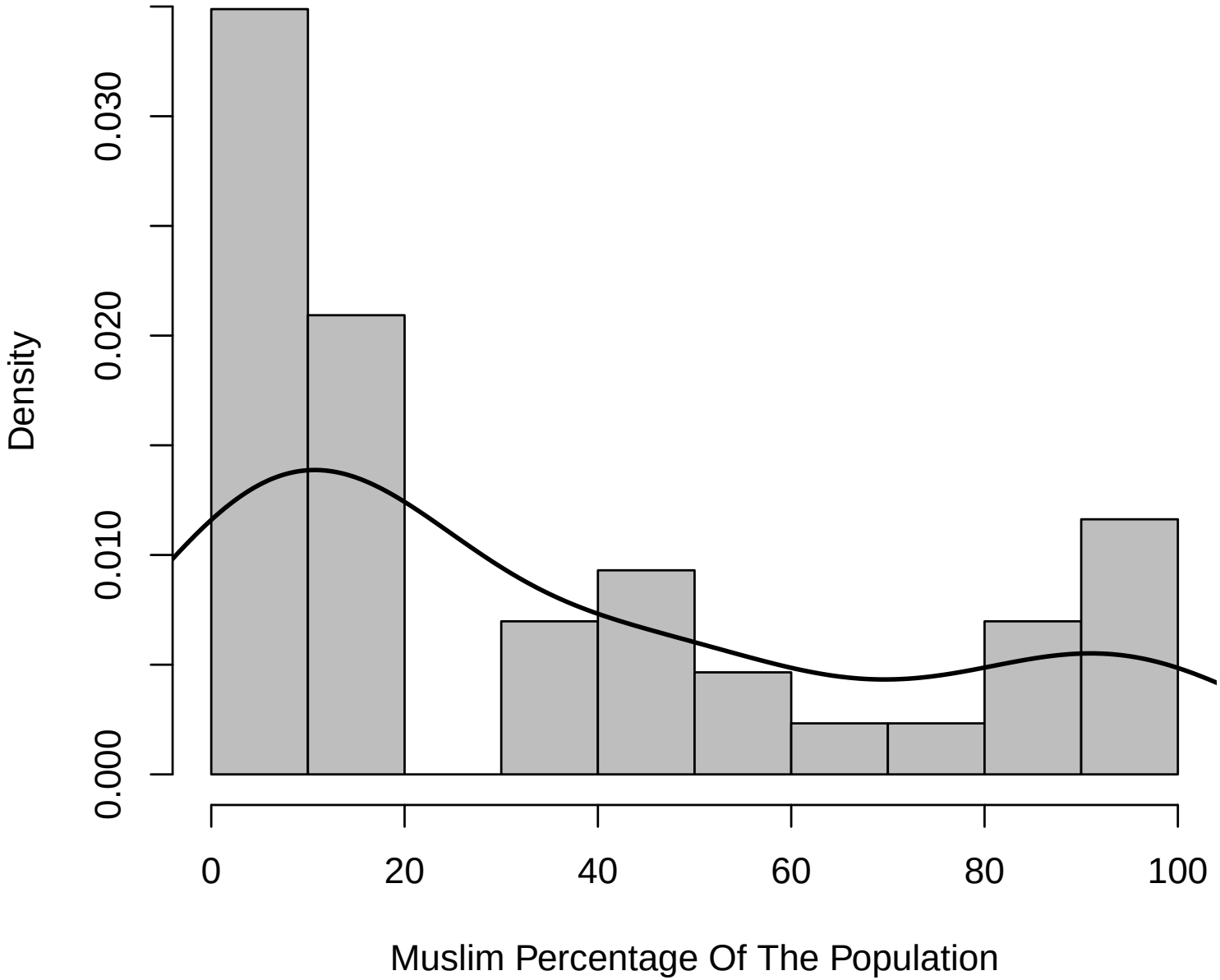
Another Histogram



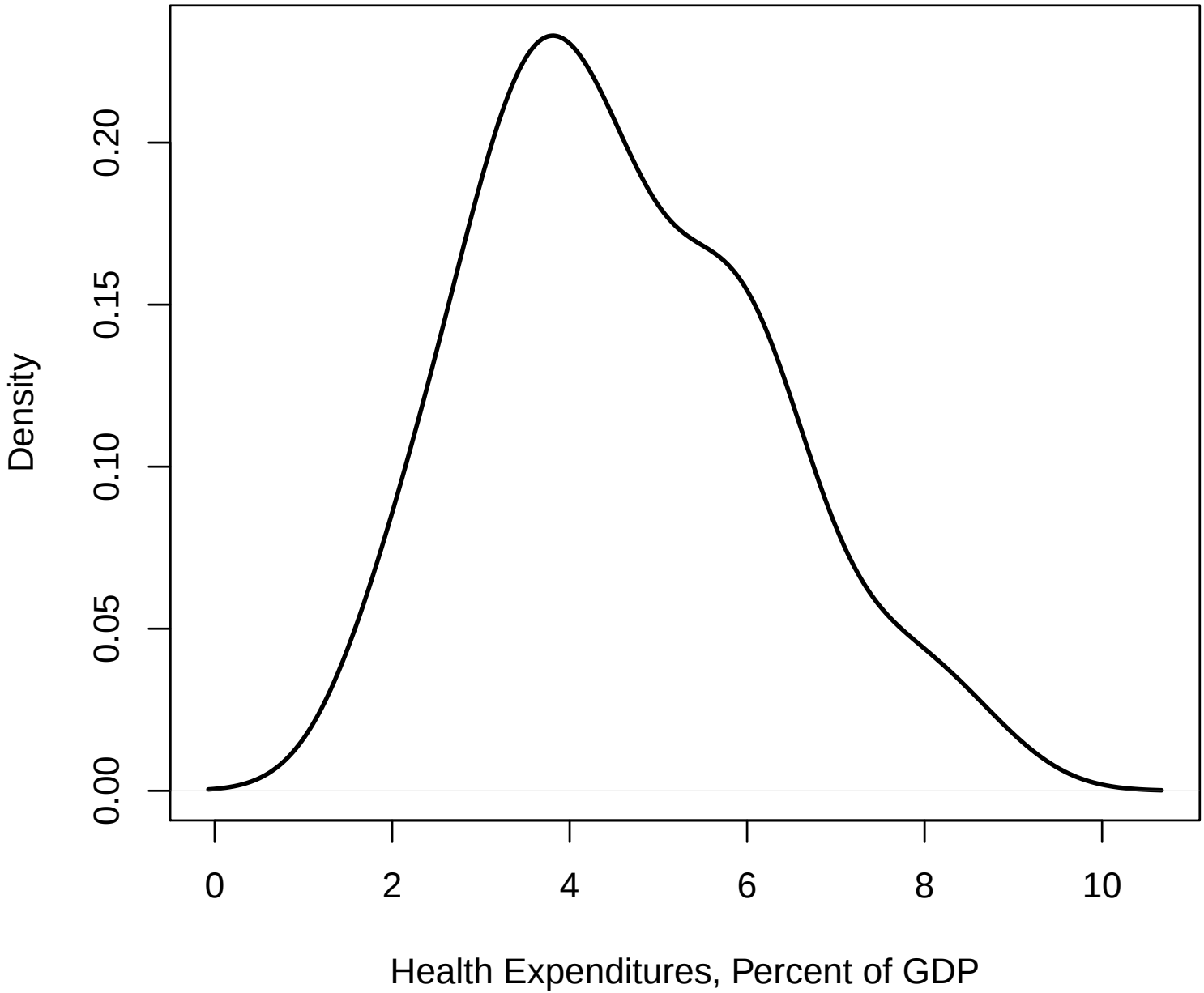
Kernel Density Plot



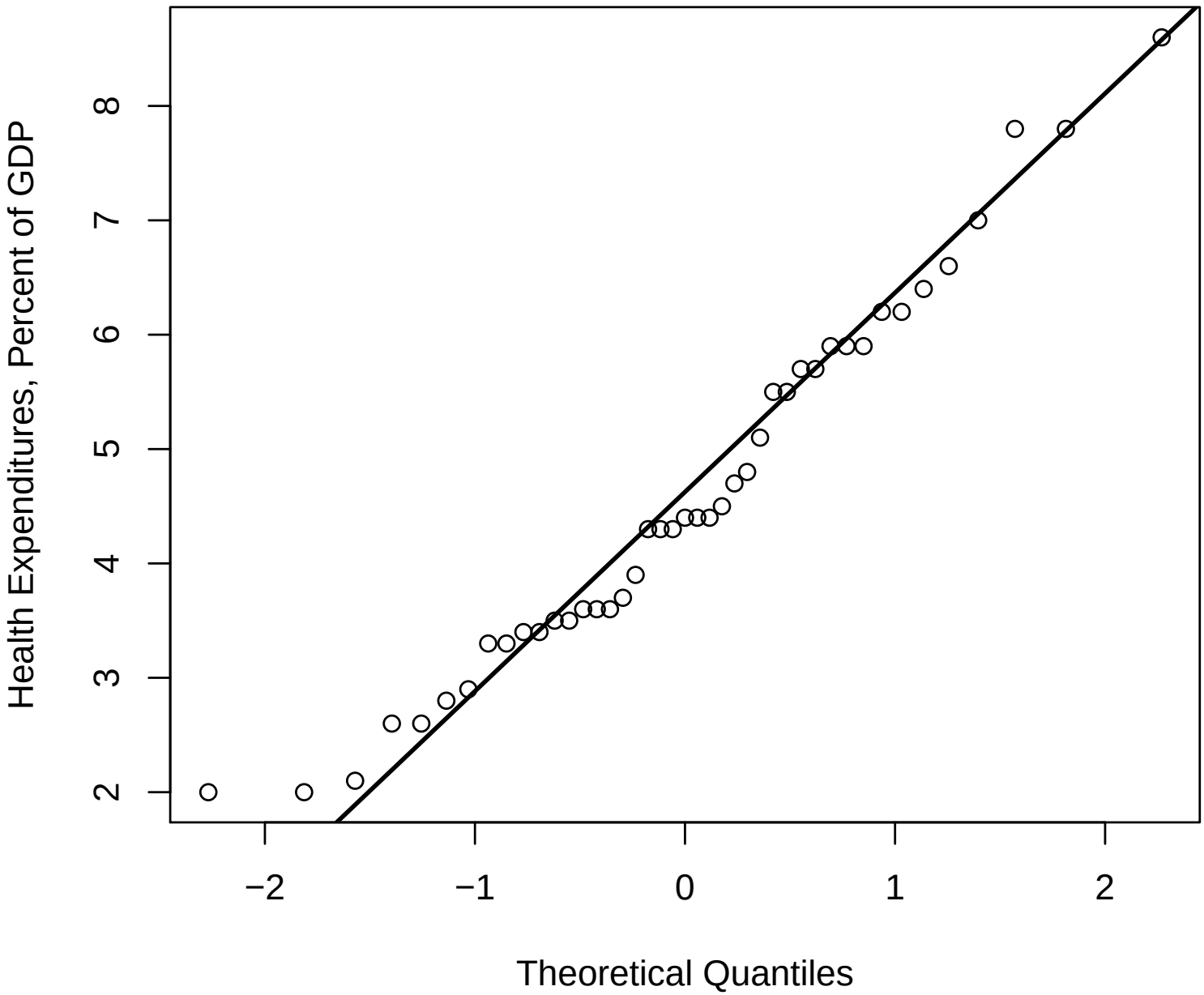
Combined Plot



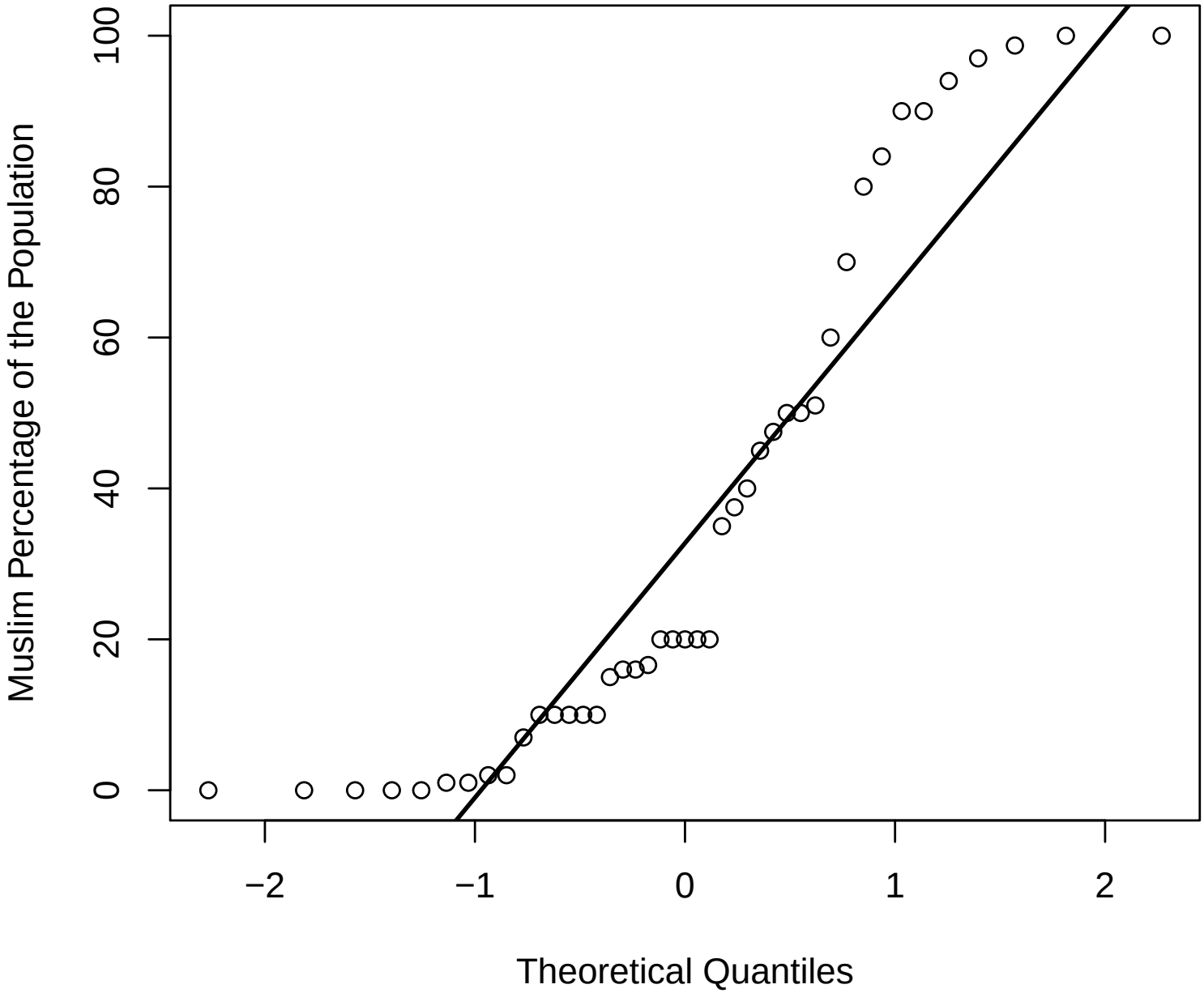
Density Plot: Health Expenditures



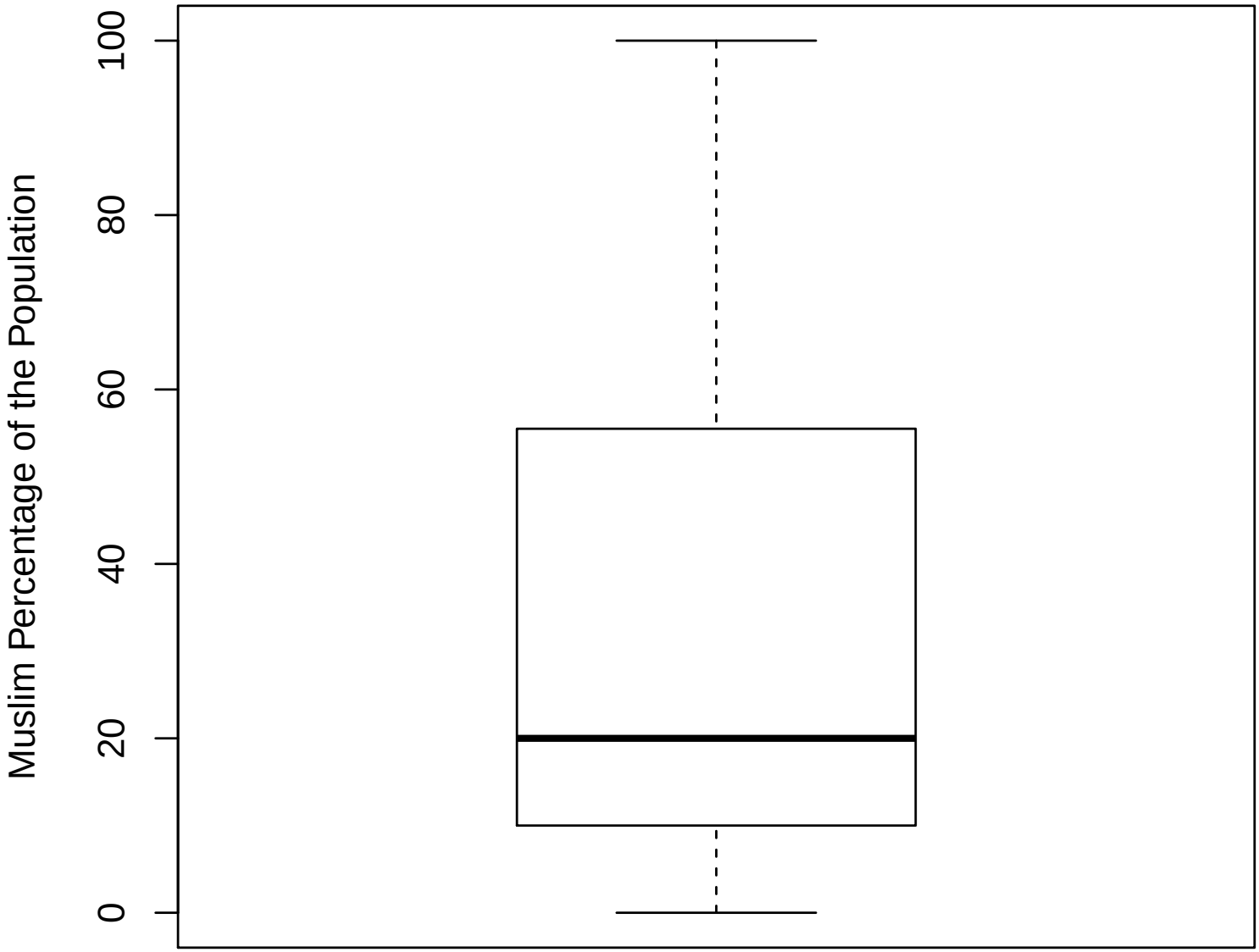
Q-Q Plot: Health Expenditures



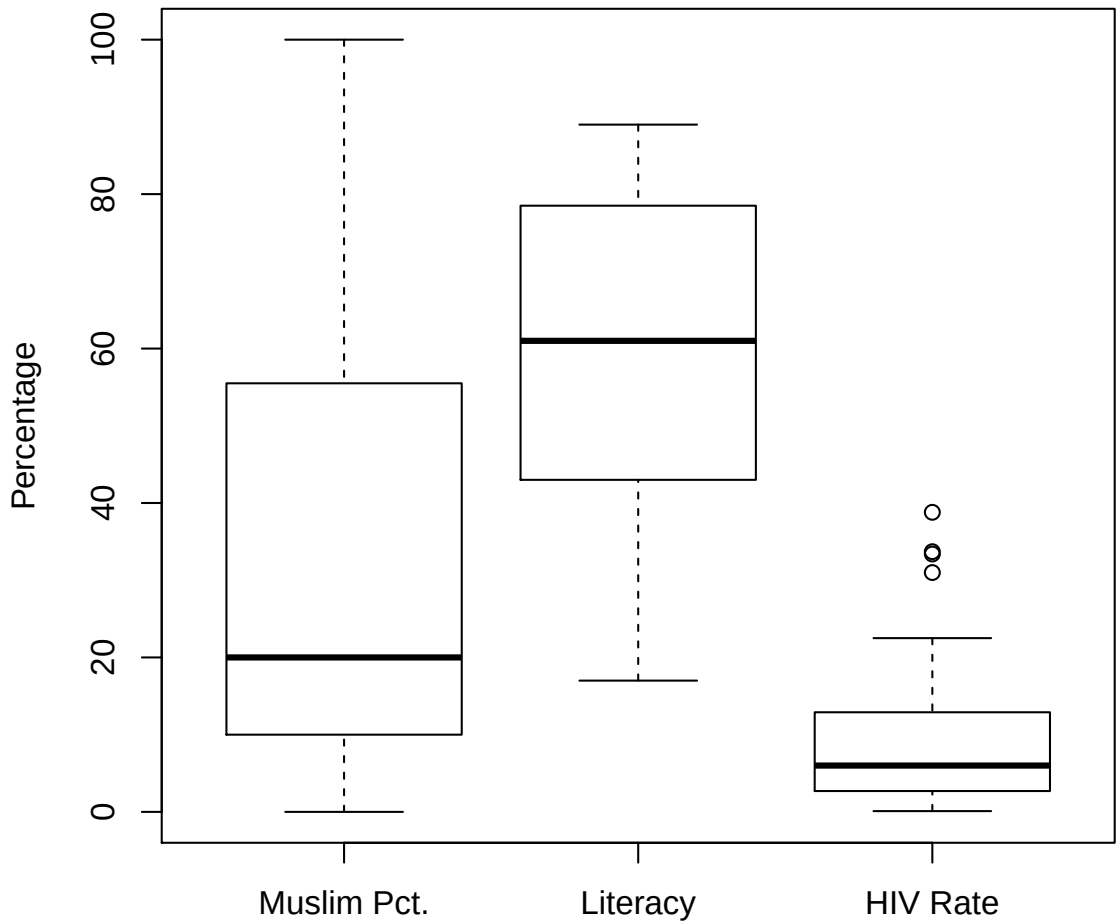
Q-Q Plot: Muslim Percentage



Boxplot: Muslim Percentage



Boxplot: Muslim Percentage, Literacy, and HIV Prevalence



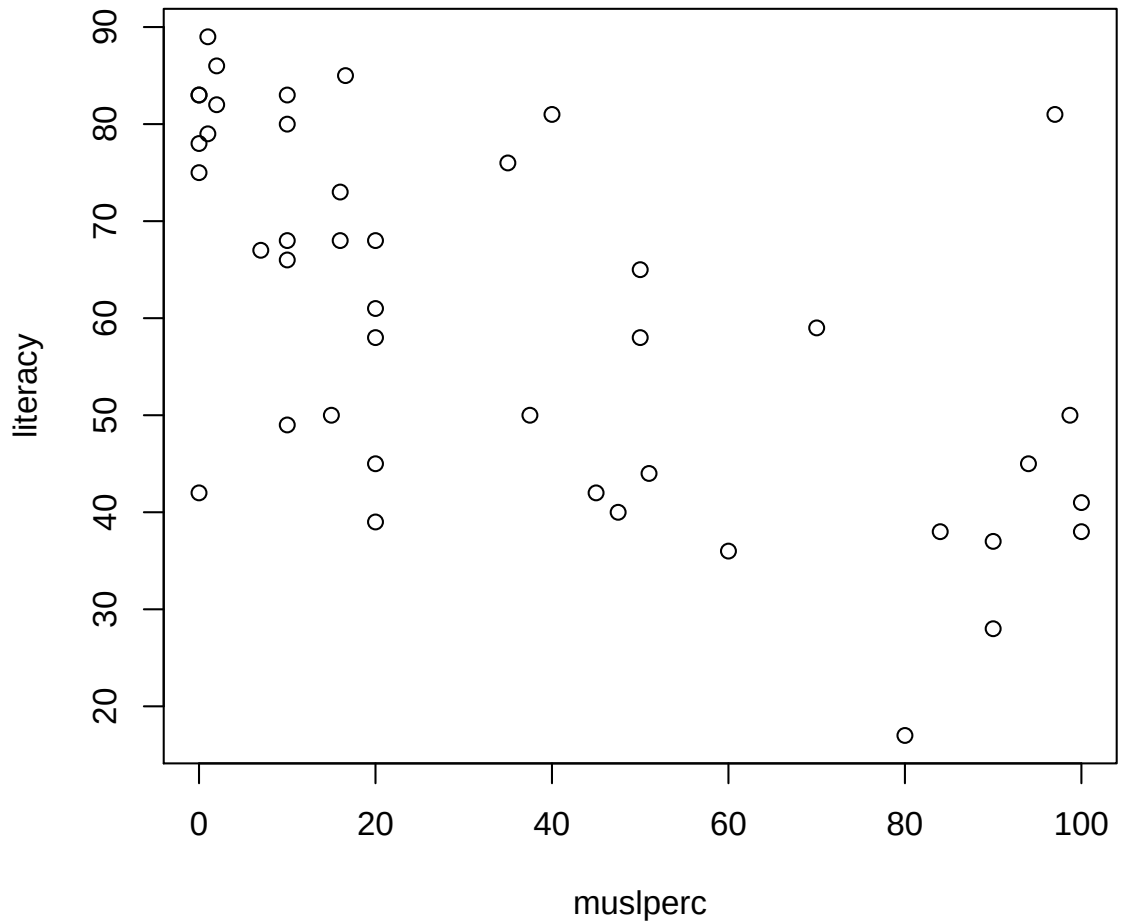
Other Univariate Graphics

- *Stripplots* (or *stripcharts*)
- *Pie charts*
- "Donut" plots
- "Stem and leaf" plots

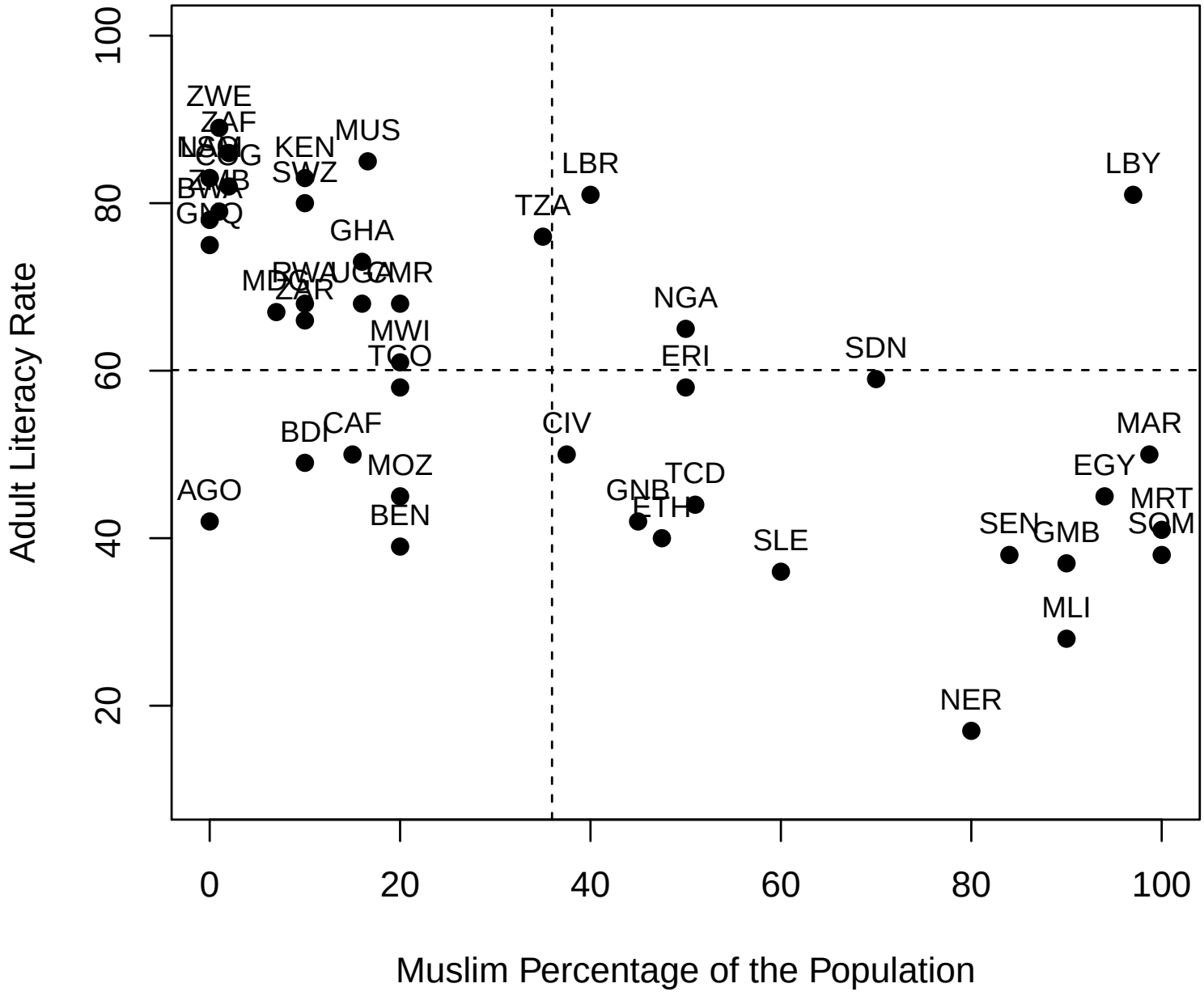
Bivariate and Multivariate Plots

Continuous Data: Scatterplots

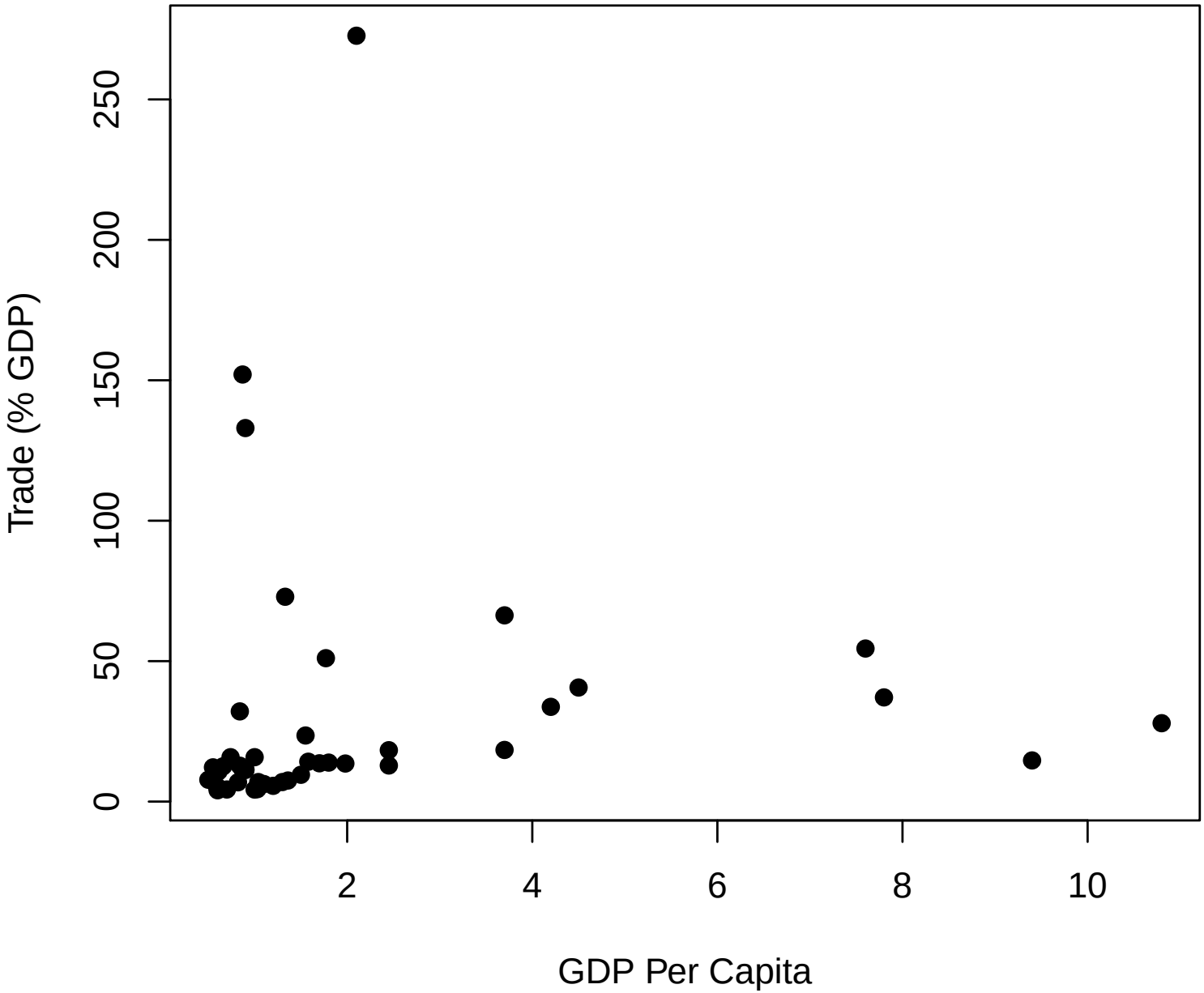
```
> with(Africa, plot(muslperc,literacy))
```



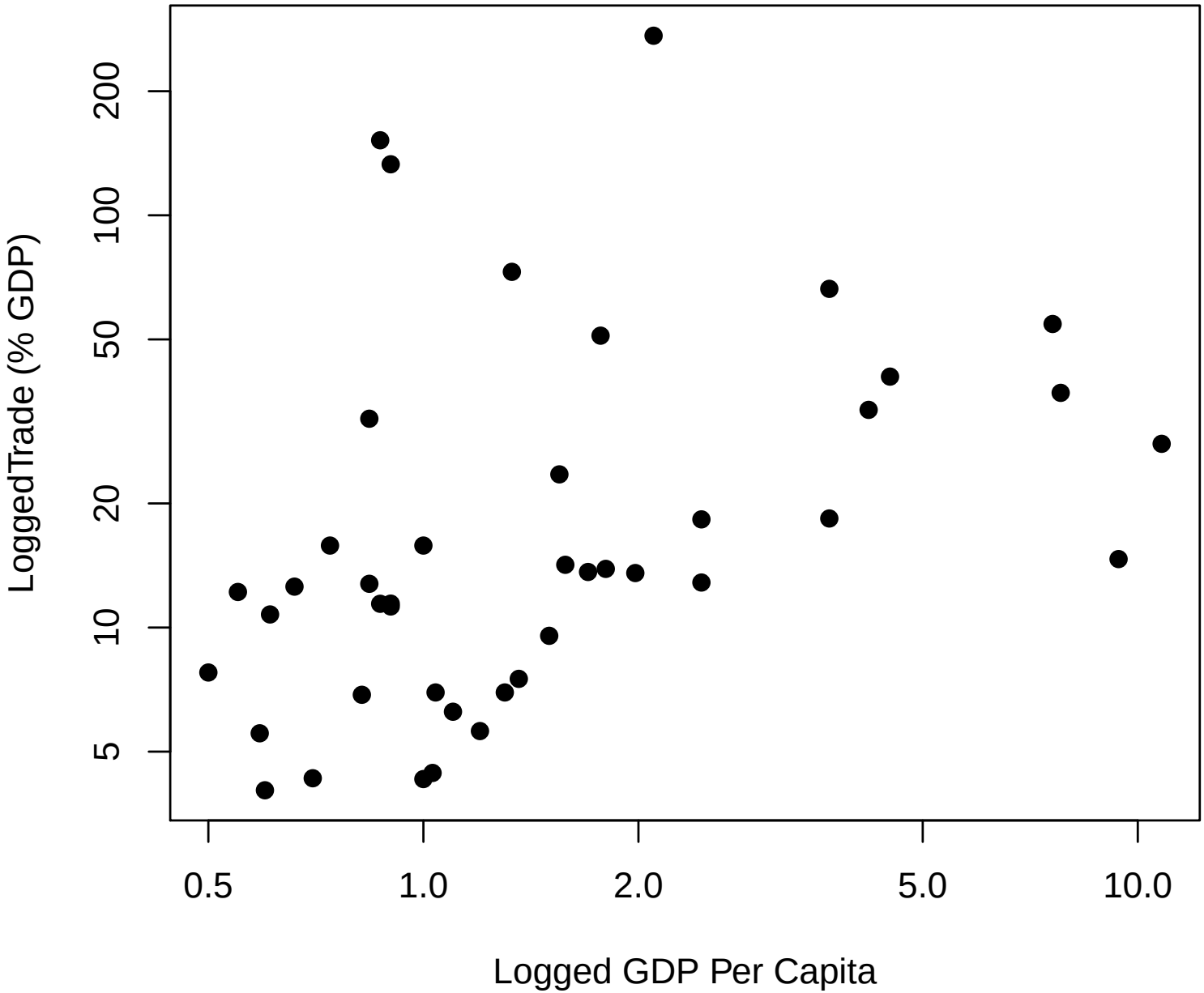
A Better Scatterplot



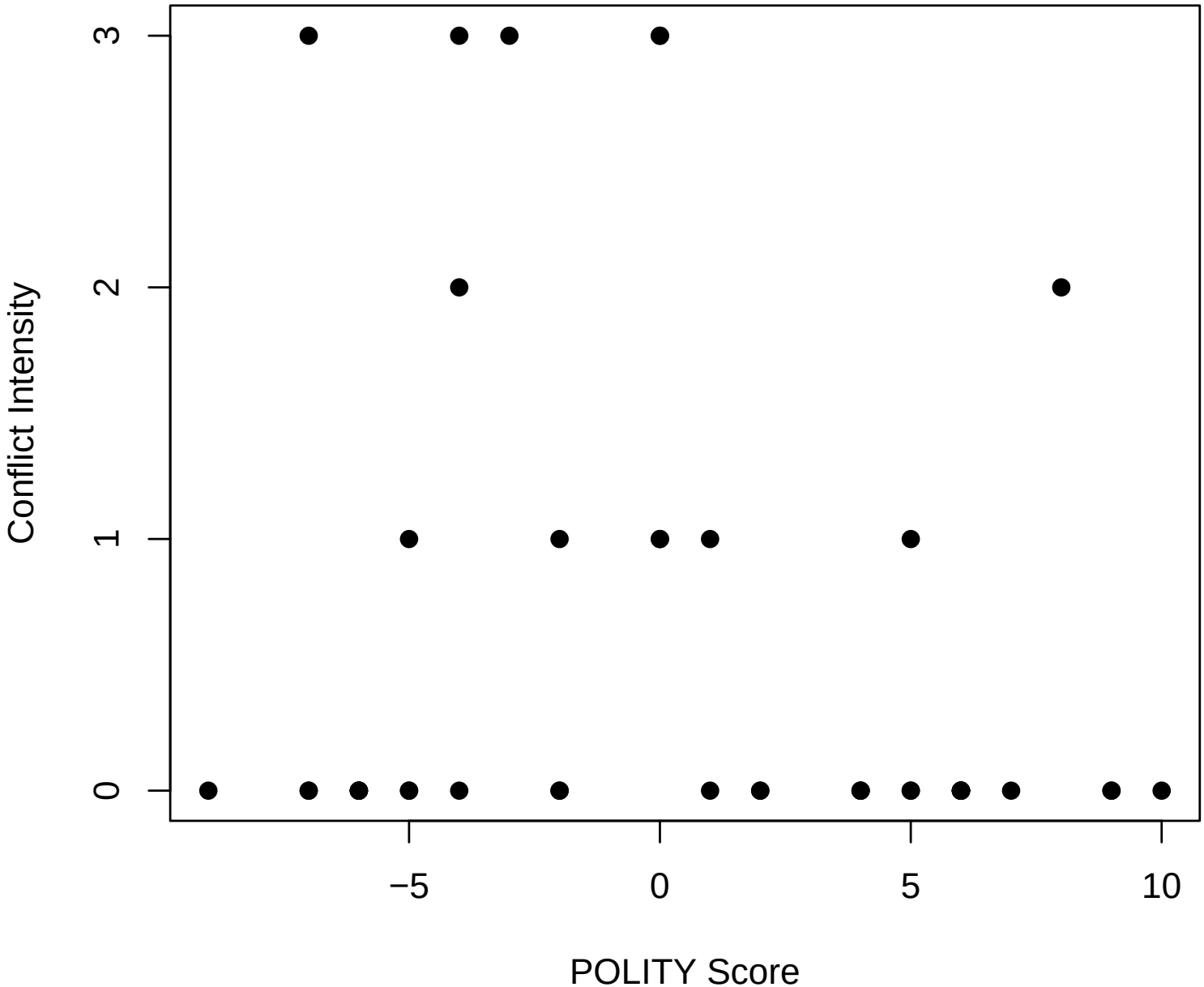
Skewed Data: Trade and GDP



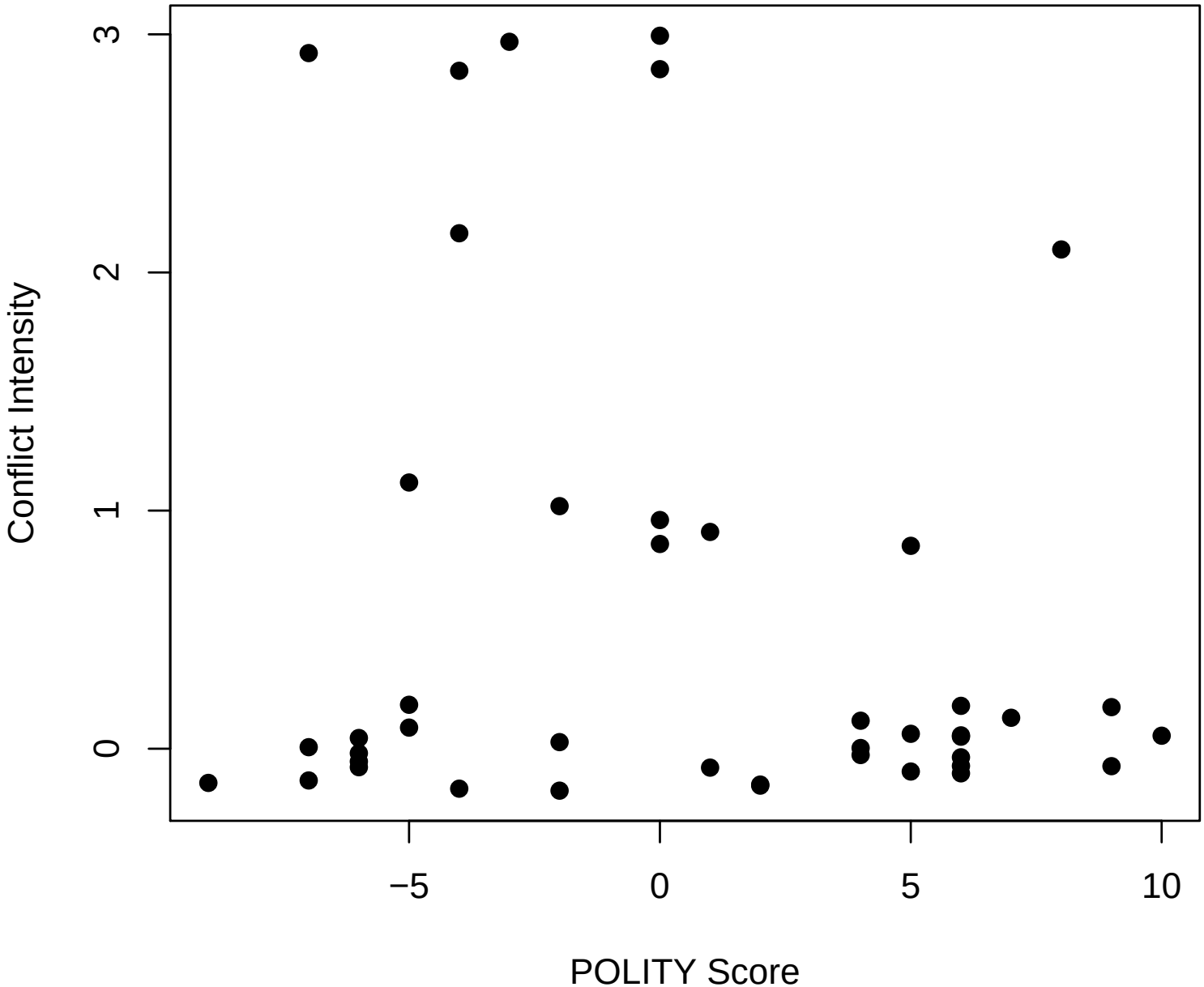
Log-Scale Axes



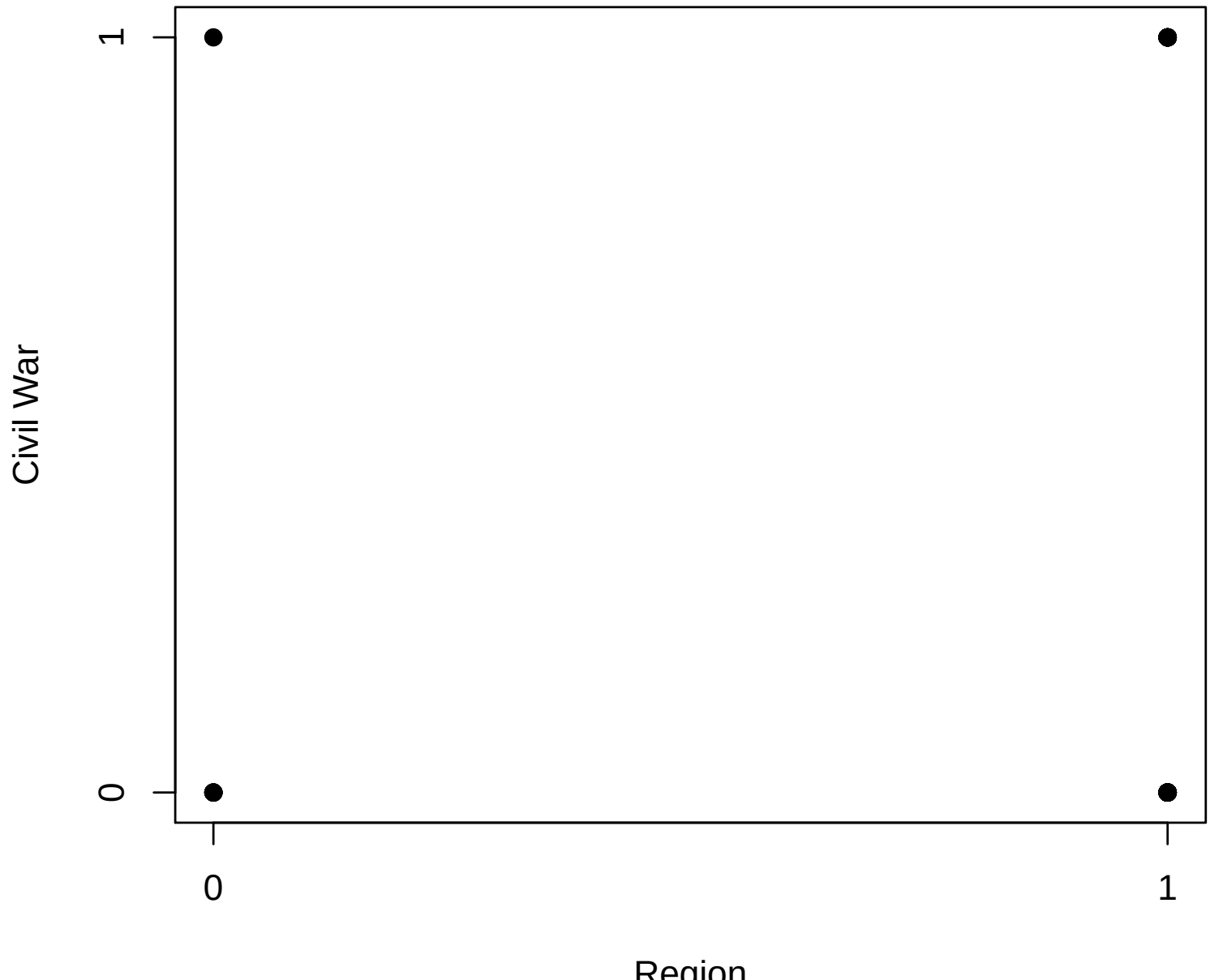
"Binned" Data: Conflict Intensity and Democracy



"Jittering" Binned Data



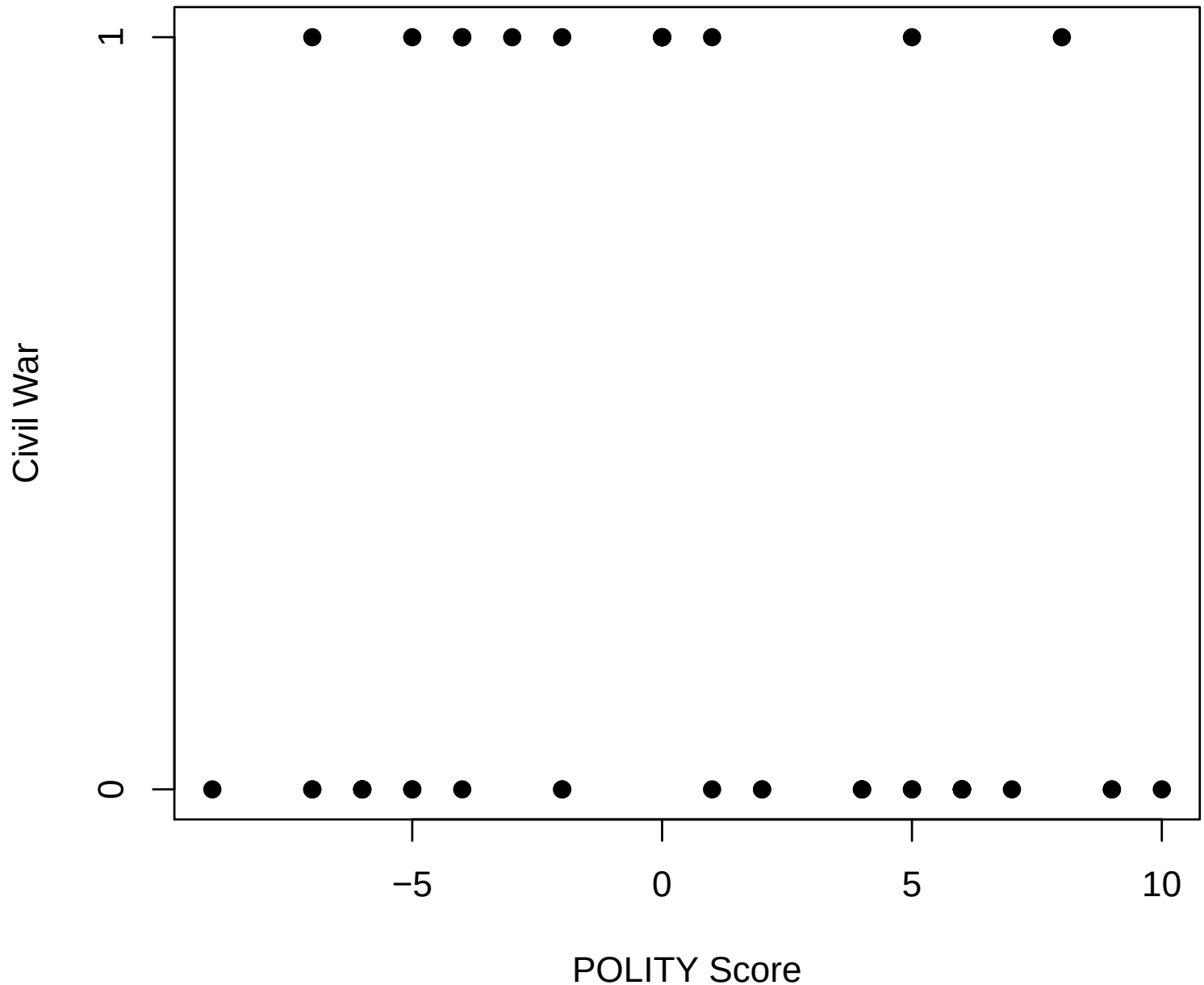
How Not To Draw A Scatterplot



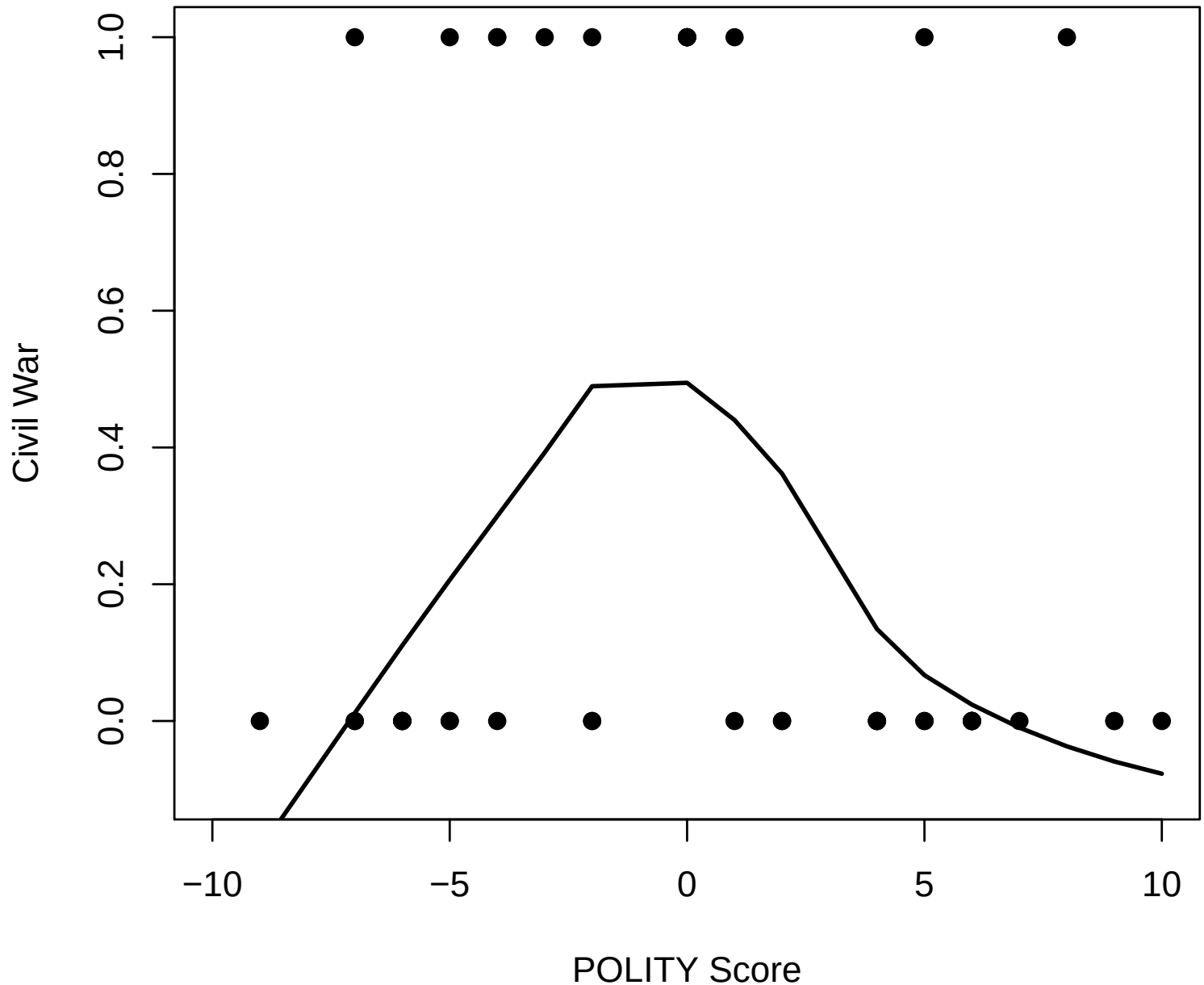
Binary Data = Tables

```
> with(Africa,
       xtabs(~subsaharan+internalwar))

                    internalwar
subsaharan            0  1
  Not Sub-Saharan     5  1
  Sub-Saharan        25 12
```

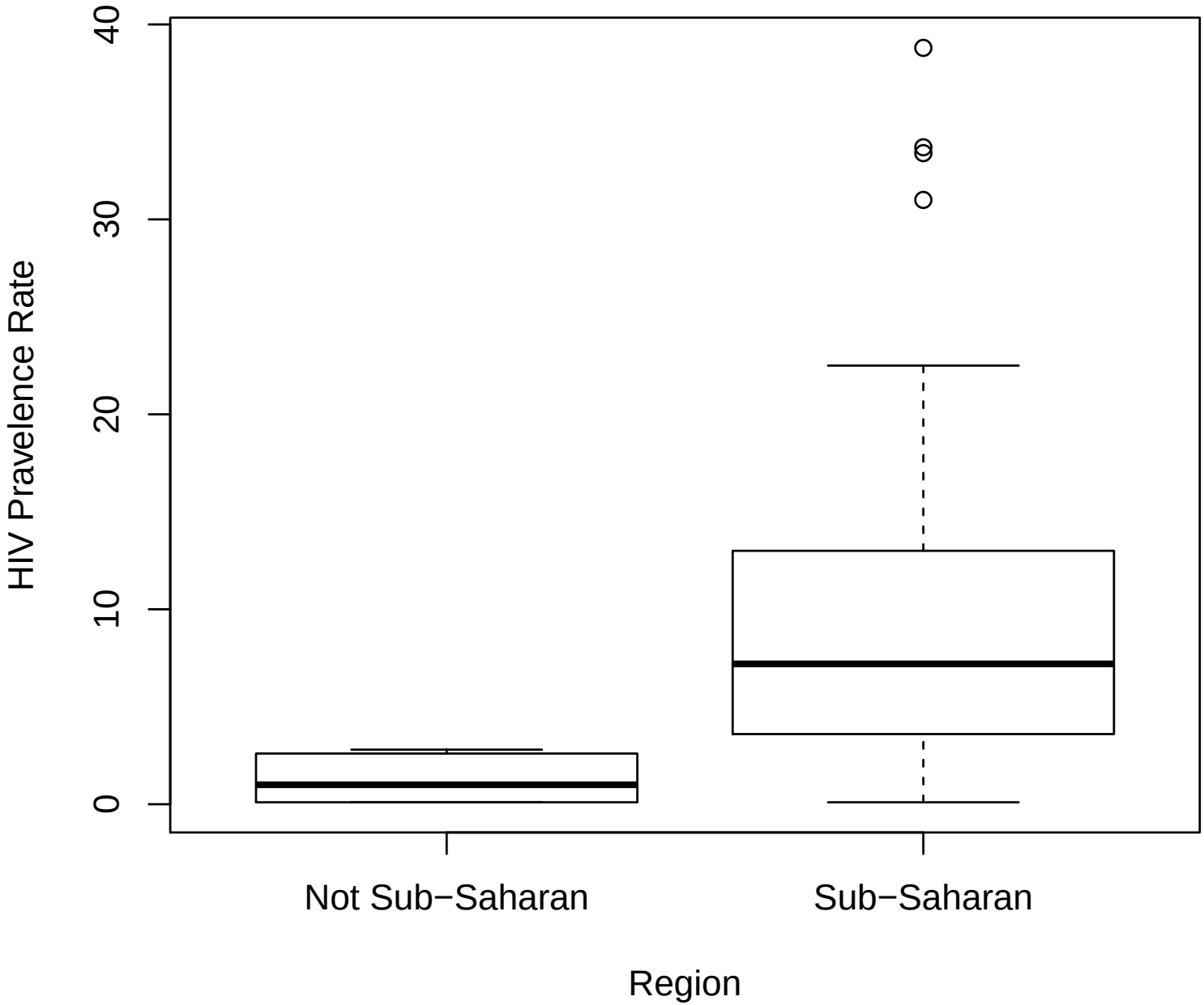
Mixed Binary-Continuous



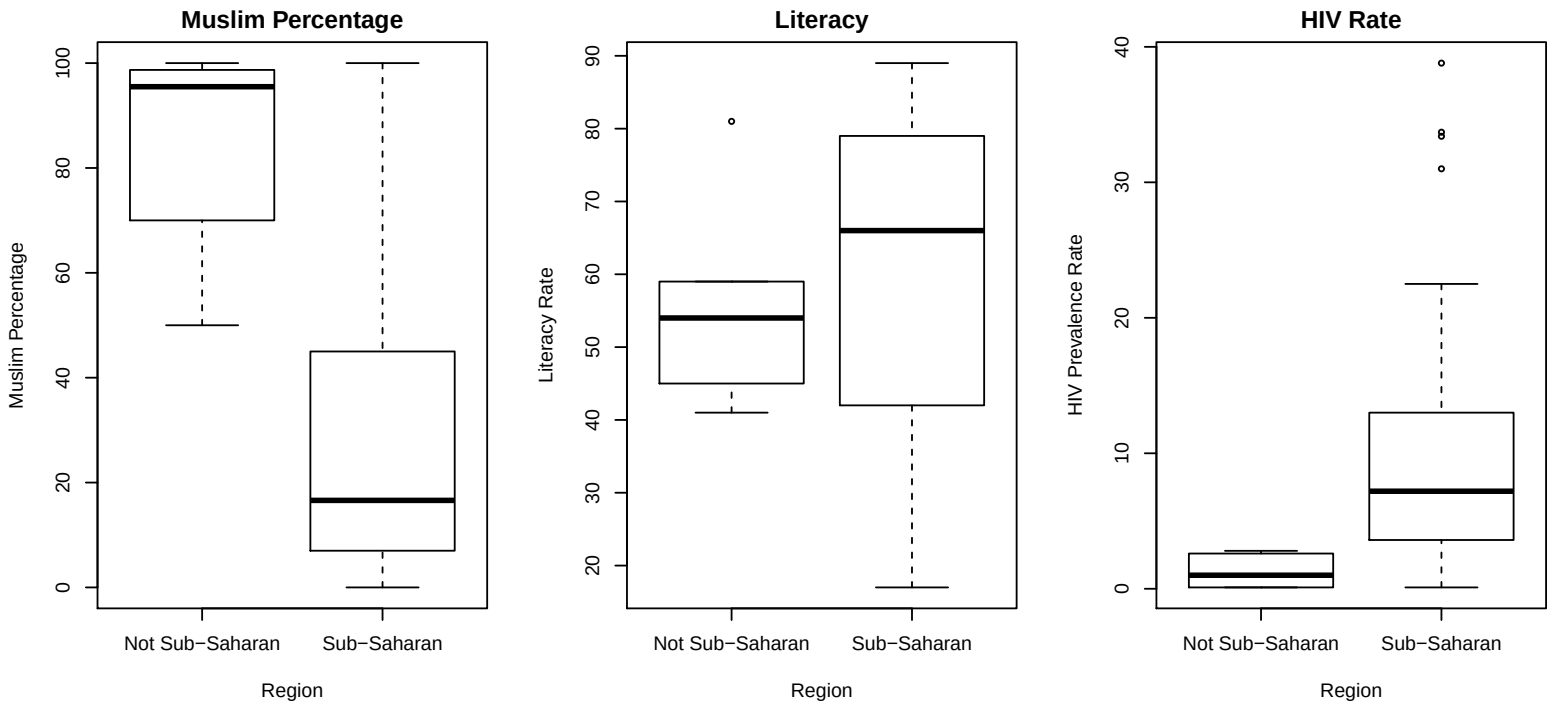
"Lowess" Smoothed Plot



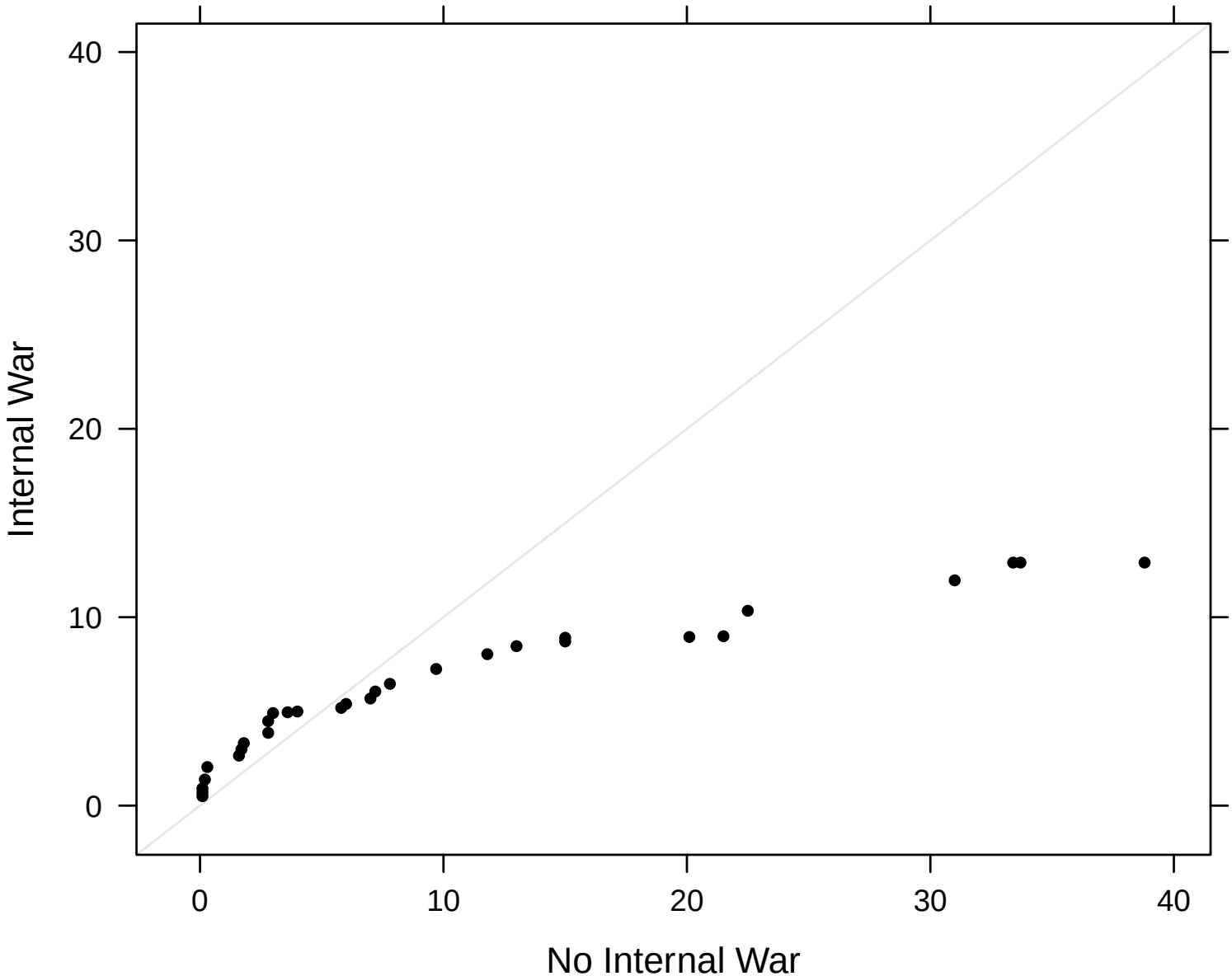
Conditioned Boxplots



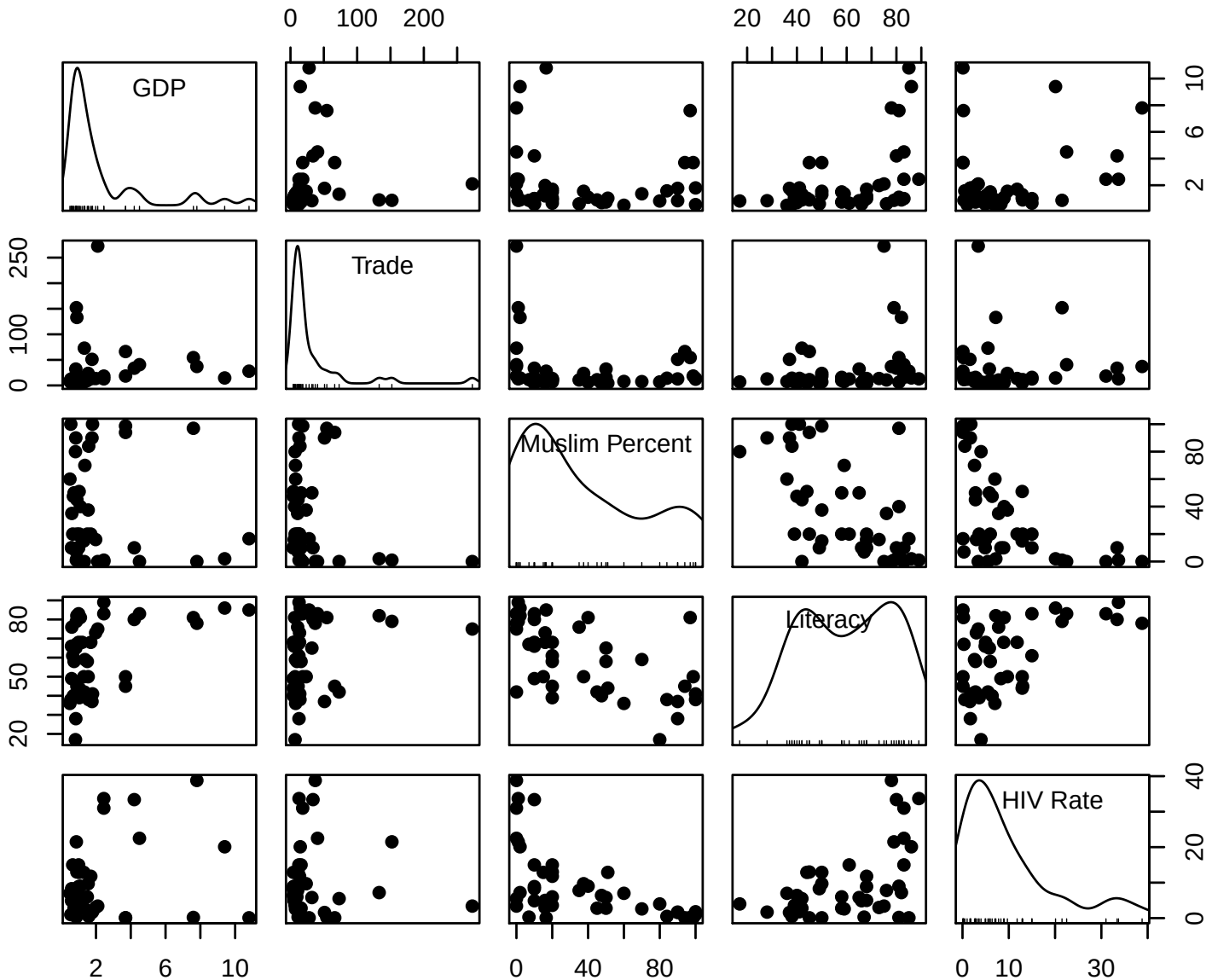
Multiple Conditioned Boxplots



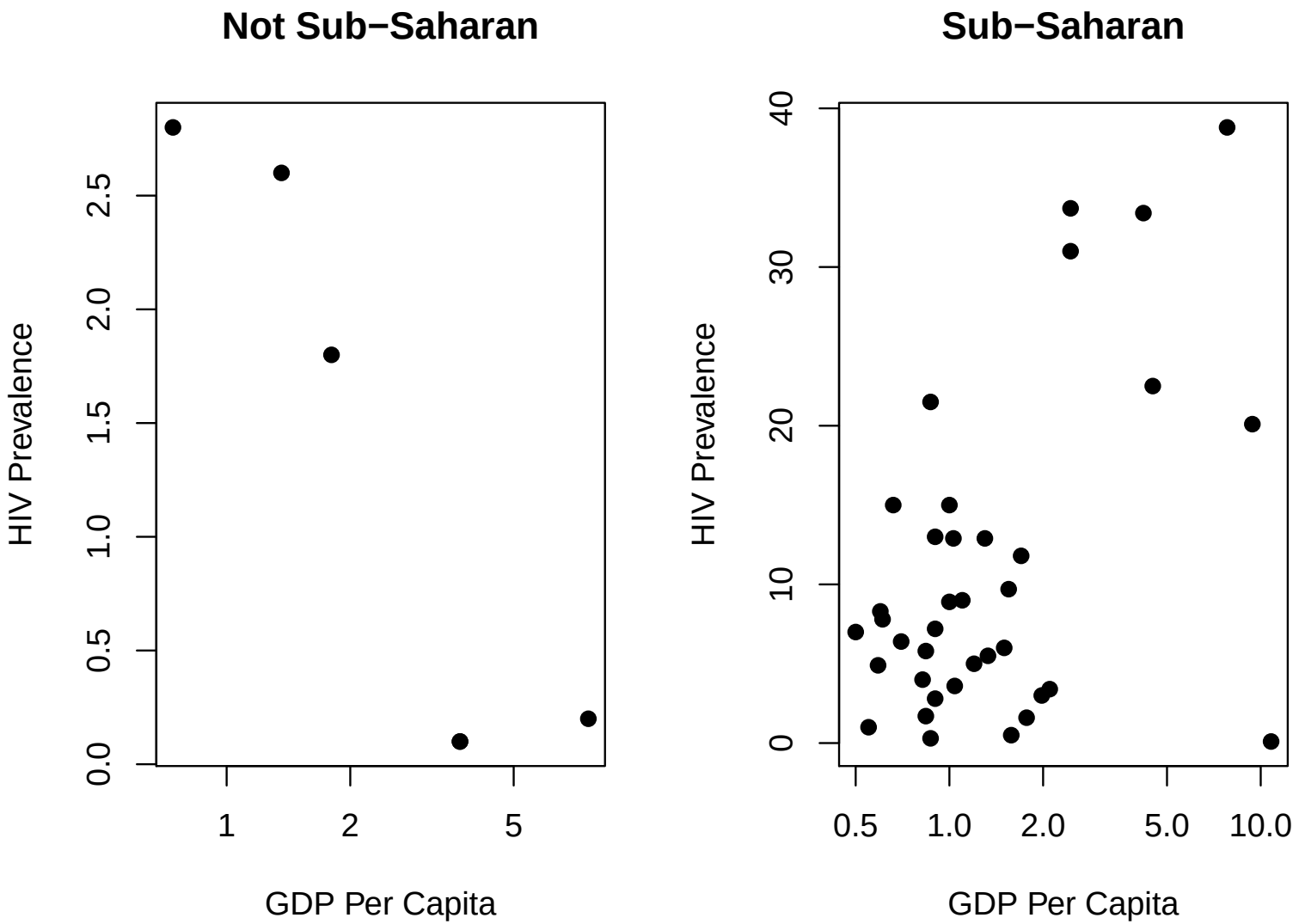
Empirical Q-Q Plots



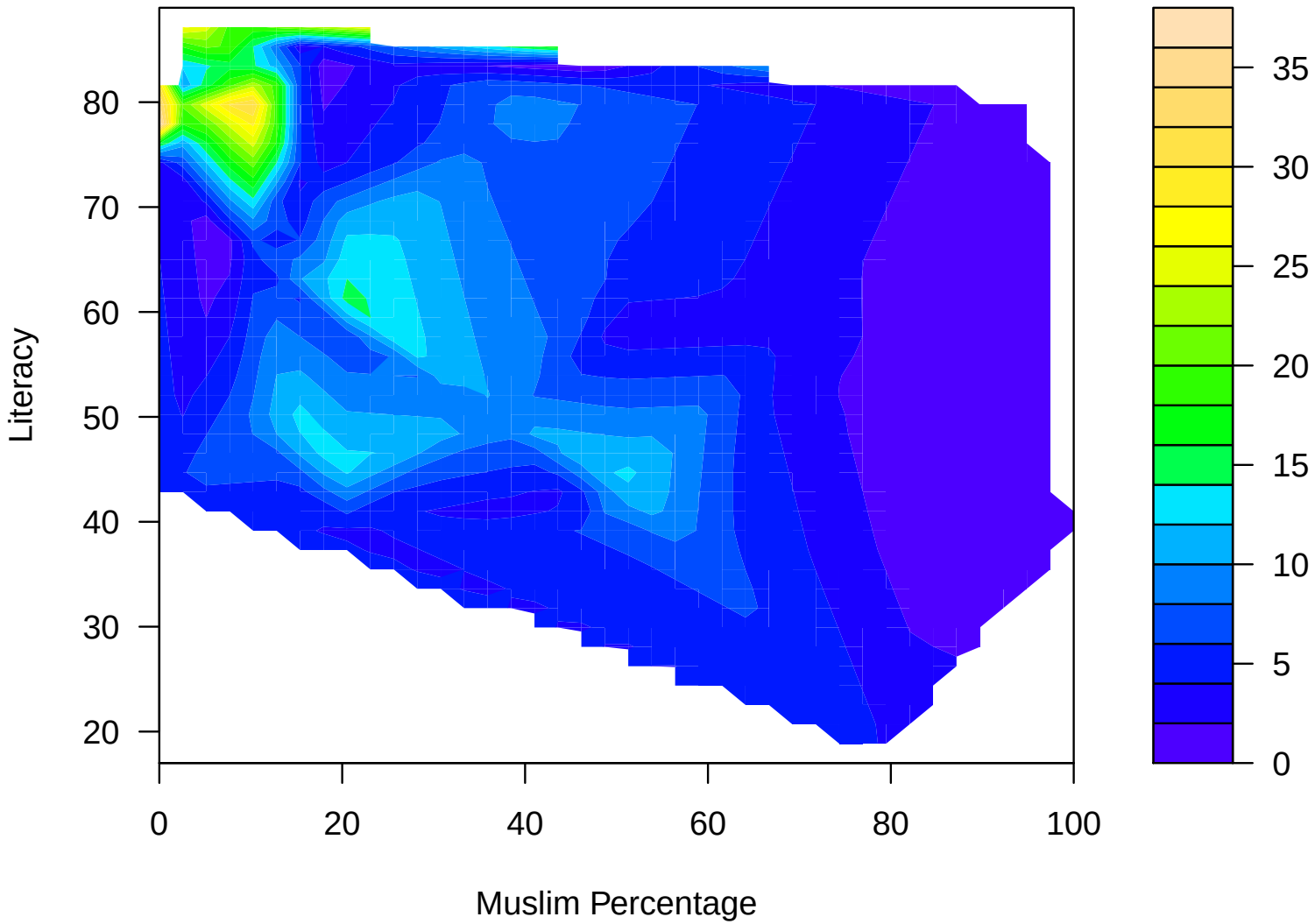
Scatterplot Matrix



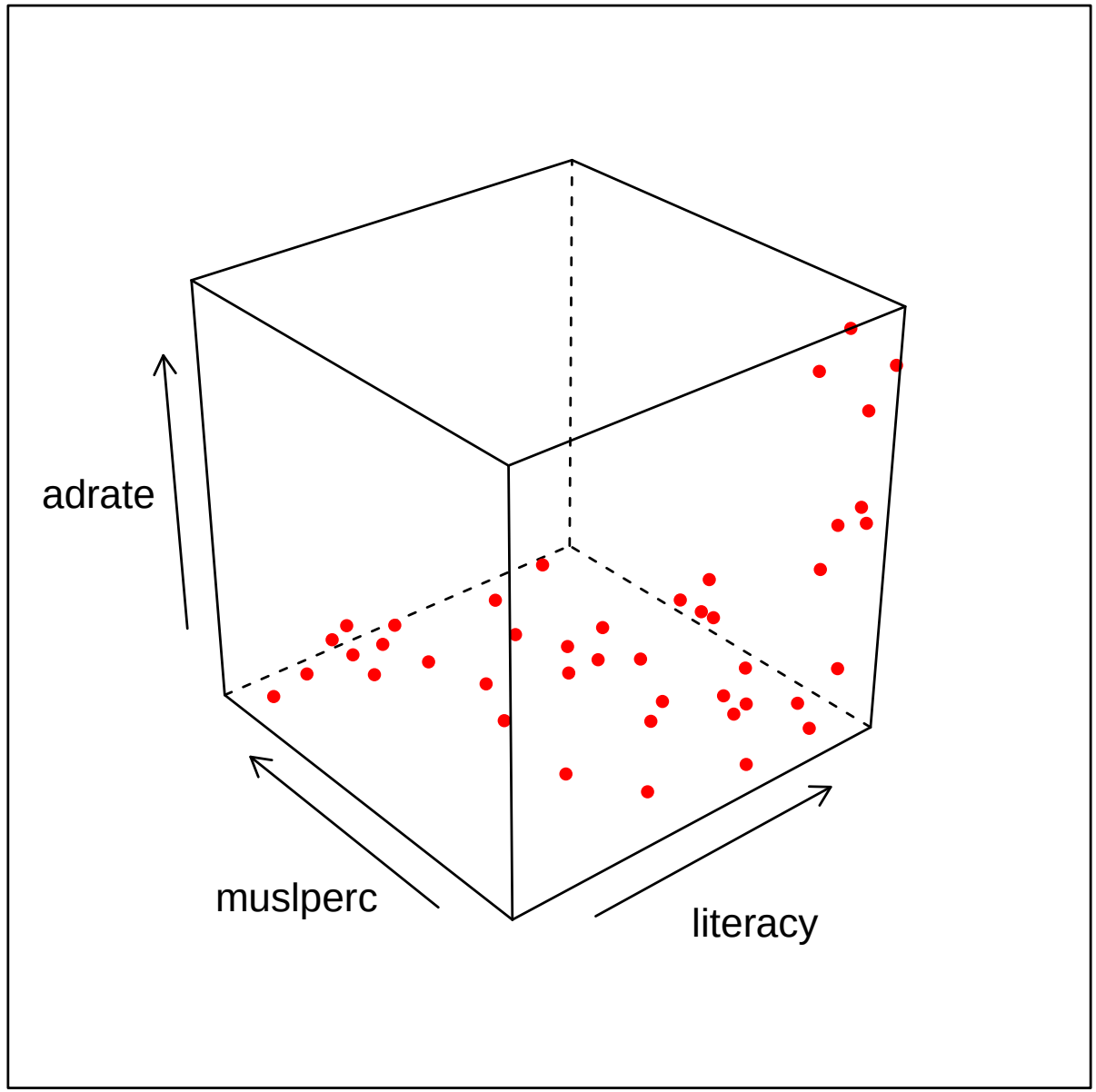
Conditional Scatterplots



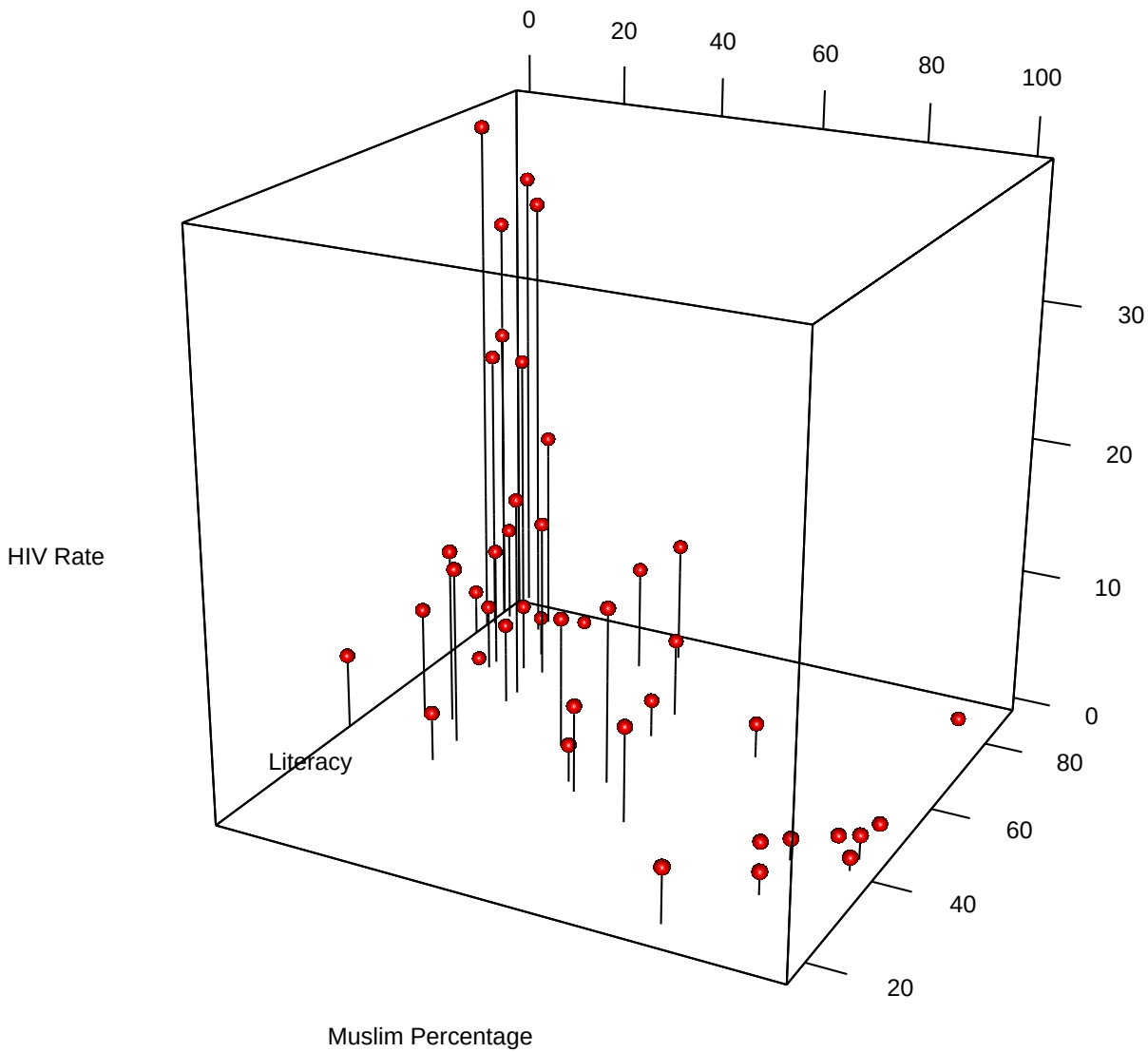
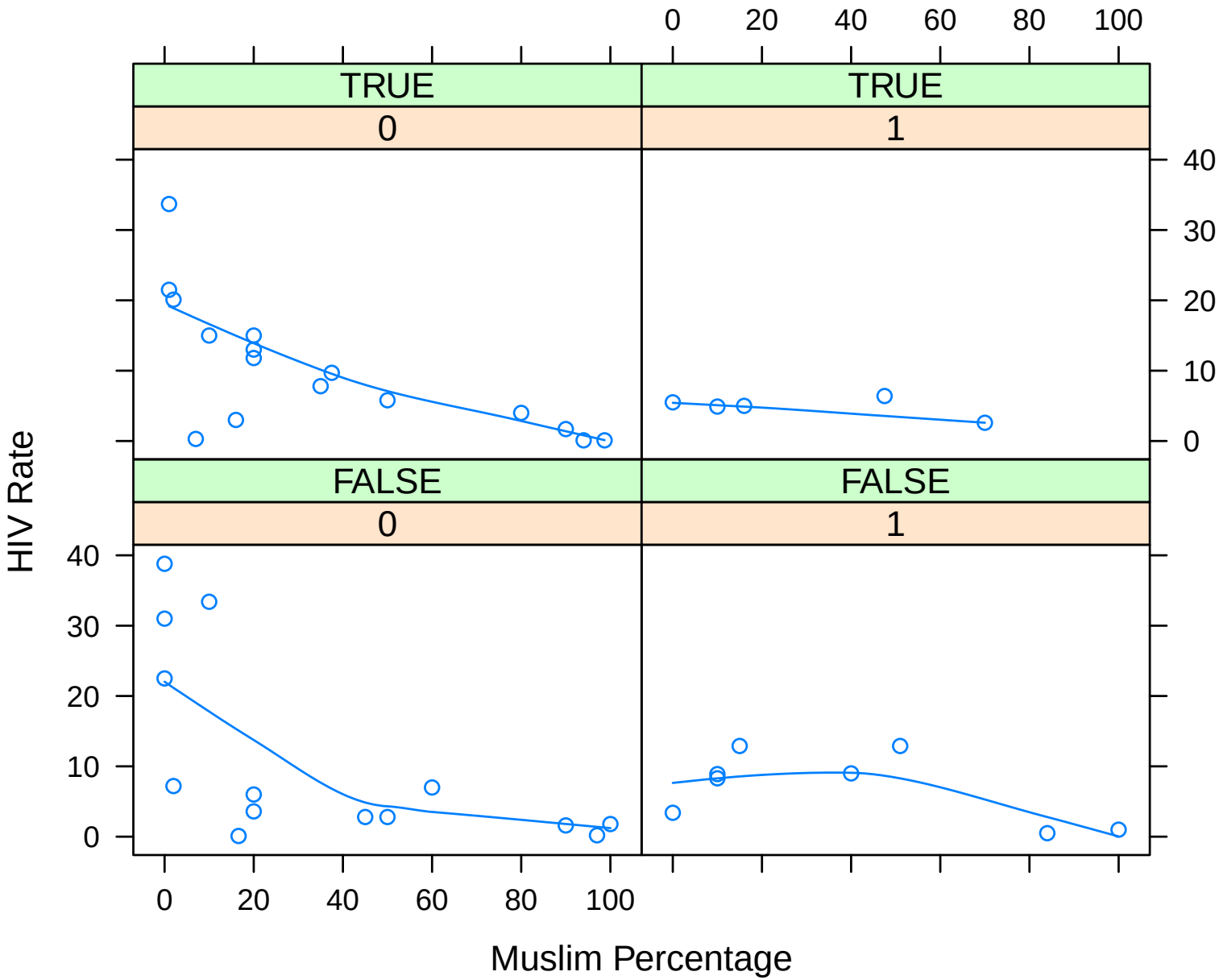
Contour Plot



"3-D" Scatterplot



Interactive 3-D Scatterplot



"Four-Way" Scatterplots