

sms_randomization

Kevin M Grieco

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```
set.seed(20180304)

#Load Data "voterListRandomization"
voter_list <- read_dta("C:/Users/levs/Dropbox/01_work/01_research_projects/Elections_SL/election_data/S

#subset the data to one observation per VRC
vrc_list <- voter_list[!duplicated(voter_list$VRCNumber),]

#Generate blocking variables
block.out <- block(data = vrc_list, n.tr = 4, id.vars = "VRCNumber",
block.vars = c("VRCPhoneShare", "VRCMaleShare", "VRCPopulation"), algorithm = "randGreedy",
verbose=TRUE)

## Blocking group 1
#Assign to treatment within blocks and print assignment
assign.out <- assignment(block.out)

# Extract treatment status for each unit

vrc_list$Z1 <- as.numeric(is.element(vrc_list$VRCNumber,
as.numeric(as.character(unlist(assign.out$assg[[1]]["Treatment 1"])))))) #Extract Treatment 1

vrc_list$Z2 <- as.numeric(is.element(vrc_list$VRCNumber,
as.numeric(as.character(unlist(assign.out$assg[[1]]["Treatment 2"])))))) # Extract Treatment 2

vrc_list$Z3 <- as.numeric(is.element(vrc_list$VRCNumber,
as.numeric(as.character(unlist(assign.out$assg[[1]]["Treatment 3"])))))) #Extract Treatment 3

vrc_list$Z4 <- as.numeric(is.element(vrc_list$VRCNumber,
as.numeric(as.character(unlist(assign.out$assg[[1]]["Treatment 4"])))))) #Extract Treatment 4

# creates a vector of block IDs
vrc_list$block <- createBlockIDs(block.out, vrc_list, id.var = "VRCNumber")
```

Balance

```
#limit dataset to necessary variables
balance <- vrc_list %>% select(district, VRCNumber, VRCPhoneShare,
VRCMaleShare, VRCPopulation, Z1,Z2,Z3,Z4,block)

#calcualte mean for each blocking variable in each treatment condition

fun1 <- function(x){
```

```

pop<- mean(balance[x == 1,]$VRCPopulation)

phone <- mean(balance[x == 1,]$VRCPHONEShare)

male <- mean(balance[x == 1,]$VRCMaleShare)

return(c(pop, phone, male))
}

#is treatment a predictor of blocking covariates? saved objects are summary of regression
reg_pop <- summary(lm(VRCPopulation ~ Z1 + Z2 + Z3 + Z4, data = balance))
reg_phone <- summary(lm(VRCPHONEShare ~ Z1 + Z2 + Z3 + Z4, data = balance))
reg_male <- summary(lm(VRCMaleShare ~ Z1 + Z2 + Z3 + Z4, data = balance))

#extract f-statistic from above regressions
f_stat <- c(reg_pop$fstatistic[1], reg_phone$fstatistic[1], reg_male$fstatistic[1])

#calculate corresponding pvalue
## reg_pop$fstatistic[1] = f-statistic, reg_pop$fstatistic[2] = df1, reg_pop$fstatistic[3] = df2
pval_pop <- 1-pf(reg_pop$fstatistic[1],reg_pop$fstatistic[2],reg_pop$fstatistic[3])
pval_phone <- 1-pf(reg_phone$fstatistic[1],reg_phone$fstatistic[2],reg_phone$fstatistic[3])
pval_male <- 1-pf(reg_male$fstatistic[1],reg_male$fstatistic[2],reg_male$fstatistic[3])

#pval in vector
pval <- c(pval_pop, pval_phone, pval_male)

#create dataframe with means, f-statistics, and corresponding pvalue for each blocking variables
dta <- data.frame(
  fun1(x = balance$Z1), #calculates means for each variable for treatment 1
  fun1(x = balance$Z2), #calculates means for each variable for treatment 2
  fun1(x = balance$Z3), #calculates means for each variable for treatment 3
  fun1(x = balance$Z4), #calculates means for each variable for treatment 4
  f_stat,
  pval
)

#rename columns
colnames(dta) <- c("T1", "T2", "T3", "T4", "f_stat", "pval")

#rename rows
row.names(dta) <- c("VRC Population", "VRC Phone Share", "VRC Male Share")

#print table
dta

```

```

##           T1           T2           T3           T4           f_stat
## VRC Population  987.1486068  993.6253870  996.3827160  982.3839009  0.03121038
## VRC Phone Share   0.3474643   0.3559039   0.3516749   0.3453118  0.09267856
## VRC Male Share   0.4639527   0.4640826   0.4635383   0.4631768  0.02138802
##           pval
## VRC Population  0.9925868
## VRC Phone Share 0.9640908
## VRC Male Share  0.9957573

```

Assignments Printed

assign.out

```
##
## Assignments:
##
##      Treatment 1 Treatment 2 Treatment 3 Treatment 4 Max Distance
## 1      1131      7149      6071      14069      0.0964451
## 2      1206      10209      9148      10224      0.1094599
## 3      11130     3056      13205     14083      0.1155804
## 4      3069      1203      13057     10221      0.1357893
## 5      13200     12050     3146      1217      0.1415288
## 6      10122     13052     13041     2073      0.1452795
## 7      6091      6086      12046     12048      0.1473149
## 8      3054      13053     7103      2035      0.1525039
## 9      1125      10267     7155      13045      0.1535230
## 10     6076      7098      11228     7112      0.1549384
## 11     13188     13186     10266     8002      0.1550716
## 12     10086     9150      7105      9145      0.1564556
## 13     12034     6062      2058      3084      0.1587723
## 14     13190     8082      9137      2061      0.1588798
## 15     3088      3081      2063      11185     0.1615111
## 16     11121     7076      11128     11126     0.1621209
## 17     13195     13054     6060      11236     0.1654685
## 18     8017      2053      1112      8034      0.1670436
## 19     11172     10125     4122      10160     0.1674996
## 20     10108     7096      8135      10100     0.1676882
## 21     13215     9130      12052     8063      0.1695040
## 22     13189     10228     2027      3135      0.1705997
## 23     8137      4116      11215     10227     0.1714181
## 24     7111      10233     2057      13046     0.1723400
## 25     11226     13048     10218     11167     0.1741015
## 26     10124     8084      10234     10235     0.1766973
## 27     2025      1193      13042     10214     0.1795863
## 28     10252     4175      11028     4176      0.1803864
## 29     10111     10092     4087      9154      0.1837469
## 30     5097      11222     1213      4069      0.1872517
## 31     1214      7225      1113      13037     0.1886334
## 32     5103      3131      9140      2056      0.1886384
## 33     14081     3070      10186     1205      0.1896802
## 34     8130      11136     7175      13210     0.1897272
## 35     11133     10239     7164      3066      0.1909539
## 36     10217     2074      10116     6064      0.1921124
## 37     10219     8070      10170     10215     0.1948111
## 38     5109      9134      13049     2044      0.1954624
## 39     2247      4162      2245      2238      0.1961115
## 40     10178     2071      13069     4097      0.1975452
## 41     6094      3143      13064     14078     0.1980724
## 42     10236     3074      6061      2040      0.1984383
## 43     10183     13197     10246     8081      0.1992577
## 44     3087      2033      3080      7145      0.2080337
## 45     2031      12043     13055     2012      0.2096470
```

## 46	7222	3099	8029	3144	0.2205715
## 47	4117	8021	4103	3091	0.2241541
## 48	1118	8079	4101	10090	0.2244347
## 49	4065	8071	4062	14088	0.2276389
## 50	10126	9126	2041	13062	0.2291341
## 51	13076	2067	2050	11135	0.2319154
## 52	10200	8126	8129	4098	0.2345522
## 53	8033	5105	3093	2072	0.2353779
## 54	4088	13051	1121	13071	0.2364597
## 55	4074	1186	6066	3077	0.2384713
## 56	11122	3149	3075	1195	0.2411193
## 57	11235	12036	3063	6092	0.2414605
## 58	11050	4136	4161	2270	0.2426480
## 59	10264	11214	7116	7147	0.2457416
## 60	13047	8011	4100	10157	0.2468942
## 61	12049	3094	12040	2045	0.2476281
## 62	2277	10011	4191	2261	0.2487521
## 63	8018	8026	1190	10185	0.2499980
## 64	13065	13193	4113	10107	0.2553813
## 65	4090	10162	8116	11219	0.2556362
## 66	10201	1204	1207	7106	0.2568644
## 67	10169	4068	10087	2011	0.2573262
## 68	5081	3079	13207	11221	0.2577462
## 69	10226	4110	11138	13050	0.2587513
## 70	4099	8073	9133	10176	0.2593717
## 71	14066	3089	6079	7094	0.2598571
## 72	3107	10207	13068	11218	0.2629240
## 73	2060	11229	8032	5091	0.2632253
## 74	13218	3098	1211	3068	0.2648851
## 75	11040	11046	7081	13206	0.2663931
## 76	10158	2036	2048	10175	0.2672040
## 77	10117	13078	10197	7218	0.2683230
## 78	8085	13213	8083	3105	0.2695738
## 79	4072	9136	10094	10114	0.2704070
## 80	4102	11237	13063	5088	0.2704813
## 81	4105	3085	10247	6065	0.2731491
## 82	12056	10192	1212	13066	0.2731686
## 83	15033	4145	1120	2002	0.2736898
## 84	7113	7165	13209	13216	0.2751591
## 85	13058	9125	8072	10088	0.2778902
## 86	3071	13208	11225	14071	0.2783009
## 87	10174	9147	9143	9139	0.2786052
## 88	4153	2319	2333	2280	0.2794014
## 89	10118	4091	2039	10243	0.2797389
## 90	9124	1179	1201	10182	0.2800383
## 91	10241	10225	2059	10085	0.2839027
## 92	13187	10196	13202	2075	0.2852951
## 93	2257	10014	2301	4147	0.2867163
## 94	8013	8125	10238	10091	0.2877466
## 95	11188	13198	3060	1192	0.2878864
## 96	10101	7176	10191	11124	0.2888930
## 97	4195	4151	10270	2297	0.2916302
## 98	3138	4060	2305	7150	0.2940693
## 99	7173	3061	3142	3133	0.2960033

## 100	14062	11123	2014	10179	0.2964518
## 101	10263	13067	1127	14074	0.2978025
## 102	11238	10006	13077	10202	0.3003747
## 103	2286	11187	10261	10258	0.3017041
## 104	4093	3102	4115	4121	0.3033854
## 105	2062	7097	2026	12033	0.3051139
## 106	3064	11131	2010	6093	0.3059043
## 107	3103	10229	10119	13059	0.3088424
## 108	10216	2047	2052	4095	0.3098834
## 109	1196	1188	1181	2303	0.3104017
## 110	11227	7223	3057	8012	0.3122160
## 111	1123	11169	2042	3083	0.3131520
## 112	10159	10173	9138	10123	0.3158356
## 113	9153	4126	6067	2028	0.3161191
## 114	4157	2307	4154	11039	0.3168810
## 115	7088	10010	2329	11045	0.3189543
## 116	9132	4067	10105	4084	0.3211638
## 117	7219	16021	16022	10184	0.3223709
## 118	10242	10172	10161	10199	0.3227732
## 119	5082	5108	6063	5104	0.3234473
## 120	11117	14061	4124	10232	0.3235383
## 121	4164	2335	2316	2276	0.3276897
## 122	6082	7104	2078	2055	0.3287520
## 123	8019	1126	10231	12051	0.3301878
## 124	8035	1216	2049	2054	0.3304330
## 125	4092	13217	10171	9142	0.3310569
## 126	6084	7228	2051	7233	0.3334354
## 127	6080	13075	2262	15039	0.3350864
## 128	15054	16066	16026	16033	0.3351368
## 129	7143	4129	4127	6072	0.3355861
## 130	3090	10154	3072	4131	0.3364930
## 131	2273	7083	2249	10249	0.3365701
## 132	8078	4123	4070	9146	0.3397603
## 133	2237	2283	4150	10259	0.3408226
## 134	6077	11119	12054	10180	0.3416532
## 135	6085	12039	5099	6075	0.3434849
## 136	10250	4149	4160	4140	0.3437085
## 137	13212	11217	10181	7077	0.3457172
## 138	13056	5090	8133	12045	0.3520523
## 139	4133	10251	11036	11034	0.3527018
## 140	10203	7109	14067	10095	0.3587544
## 141	10115	3145	3130	3062	0.3592728
## 142	11051	4086	11038	11037	0.3597245
## 143	10165	9127	10002	10166	0.3609023
## 144	8030	4125	7169	13072	0.3611168
## 145	8027	10106	1210	2005	0.3618881
## 146	2279	2334	2300	2242	0.3625468
## 147	4165	2282	4173	2289	0.3626908
## 148	7166	7159	7174	1208	0.3642137
## 149	1115	6090	3092	12042	0.3648449
## 150	11176	8118	10089	10112	0.3650879
## 151	16016	16028	16154	16174	0.3685495
## 152	2253	2321	10004	4168	0.3688716
## 153	3078	8022	15032	3095	0.3784363

## 154	3129	12035	4132	14059	0.3876320
## 155	4172	10255	2331	2323	0.3884787
## 156	15109	16027	16061	16058	0.3885600
## 157	1183	4079	2265	7151	0.3893398
## 158	11183	9128	10244	3147	0.3947991
## 159	2004	7148	2009	12055	0.3961100
## 160	16155	15100	16024	16202	0.3982803
## 161	8075	1119	8127	8074	0.3984285
## 162	10008	11049	2296	2302	0.3988587
## 163	12038	1187	13194	12037	0.3995190
## 164	7230	11170	3132	3104	0.3998955
## 165	13199	4112	4059	8065	0.4007469
## 166	2294	2306	15028	2317	0.4043969
## 167	6070	7154	12044	3101	0.4062931
## 168	3082	5101	4108	5107	0.4151507
## 169	10190	8023	11125	10198	0.4151637
## 170	4170	11042	4192	4193	0.4183343
## 171	2043	2029	3108	4096	0.4221993
## 172	2298	2313	4177	2285	0.4233548
## 173	10022	7231	7114	8138	0.4234073
## 174	11189	11173	11171	11178	0.4236156
## 175	7102	14072	9131	11231	0.4255115
## 176	13044	4058	2013	2030	0.4256627
## 177	13214	4146	4142	7075	0.4268306
## 178	9151	10220	10212	8128	0.4300929
## 179	10155	1191	4120	13061	0.4335172
## 180	4071	10104	10177	10156	0.4336147
## 181	8016	4130	2065	1114	0.4344966
## 182	2324	11047	4167	4141	0.4352924
## 183	6068	3100	8069	11139	0.4369312
## 184	16178	16173	16166	15037	0.4427879
## 185	5084	4128	11234	5092	0.4453933
## 186	10237	8009	8014	11116	0.4477041
## 187	4135	10005	4144	2244	0.4544233
## 188	5106	6069	3134	6078	0.4595411
## 189	7110	6081	2037	1116	0.4622431
## 190	1184	1200	14085	2006	0.4634997
## 191	4134	2311	2295	13192	0.4705572
## 192	8080	8115	8067	11180	0.4713198
## 193	13074	7073	4075	15031	0.4839718
## 194	4106	5083	7213	7212	0.4846140
## 195	3096	13070	3059	10084	0.4860237
## 196	3055	4104	10205	11233	0.4867896
## 197	2256	4156	11029	2252	0.4882887
## 198	8020	14073	11168	14079	0.4885621
## 199	4083	8139	4076	3053	0.4912020
## 200	2337	2320	10253	2023	0.4914899
## 201	3065	11230	3067	2064	0.4943664
## 202	2290	10120	2068	10195	0.4977002
## 203	4155	2309	2254	10009	0.4989756
## 204	8006	12053	11115	4066	0.5016849
## 205	2017	13203	3073	2016	0.5037660
## 206	13043	8120	8028	2015	0.5046017
## 207	8076	10093	6073	4089	0.5049684

## 208	10257	2024	2318	11181	0.5063118
## 209	16031	16175	15053	16162	0.5119646
## 210	7089	4139	2246	2281	0.5164940
## 211	2032	2046	4064	5089	0.5192087
## 212	7226	6089	5087	10262	0.5193452
## 213	8124	6074	7108	11132	0.5209105
## 214	7229	5080	10206	1209	0.5220846
## 215	16065	15110	16198	16182	0.5232407
## 216	4094	4073	2019	4174	0.5332590
## 217	10194	11232	14075	1117	0.5347430
## 218	8077	11118	7115	11216	0.5404316
## 219	9129	10096	10164	11175	0.5502156
## 220	7220	4119	12047	2020	0.5575742
## 221	10230	7221	8119	10222	0.5577504
## 222	8136	10102	9135	4148	0.5695935
## 223	15023	15055	16030	15019	0.5701166
## 224	4190	2326	2264	4152	0.5716937
## 225	10021	3097	10248	5068	0.5845677
## 226	4082	1182	4111	1197	0.5923582
## 227	10110	11030	7217	4085	0.6049577
## 228	10213	2327	1180	10003	0.6052426
## 229	15056	15018	15046	15052	0.6188408
## 230	4061	7216	7092	2299	0.6222694
## 231	11224	13185	10223	1194	0.6291679
## 232	15021	16039	15106	16037	0.6305626
## 233	6083	8024	11182	10163	0.6306269
## 234	5085	5067	4107	5100	0.6307391
## 235	16168	16041	16064	16206	0.6324790
## 236	10210	7087	4143	8131	0.6437288
## 237	16035	16176	16160	16171	0.6511455
## 238	10099	7214	10168	9149	0.6523093
## 239	2272	2236	10271	2248	0.6535622
## 240	15048	7079	15036	7107	0.6649510
## 241	1220	7095	14063	11134	0.6692514
## 242	2239	10020	4063	4163	0.6695663
## 243	13039	4078	13073	13038	0.6732695
## 244	15104	15040	16038	15025	0.6740850
## 245	10256	2312	8123	2250	0.6790521
## 246	16043	16179	15102	16029	0.6864413
## 247	1129	1130	1219	1122	0.6923877
## 248	13060	2315	10103	10097	0.7028338
## 249	2038	5093	11223	5086	0.7203338
## 250	16068	16207	16199	16034	0.7247078
## 251	11127	5079	7232	2066	0.7298189
## 252	8008	2008	3140	7101	0.7306185
## 253	5096	4118	9141	10121	0.7394402
## 254	10167	11184	11177	11174	0.7476307
## 255	8068	10265	8121	4137	0.7479198
## 256	15099	15035	16157	16201	0.7641214
## 257	16063	16036	15103	16040	0.7714164
## 258	16150	16020	16059	16042	0.7743845
## 259	3076	10007	2293	2022	0.7793055
## 260	10268	8117	10187	7085	0.7847031
## 261	2292	2251	2287	15063	0.7854546

## 262	11035	2021	7086	10269	0.7882319
## 263	2007	1185	14082	14086	0.7935534
## 264	10245	13201	10013	10153	0.7968765
## 265	15061	15017	16144	16180	0.7986529
## 266	15027	15041	15051	15022	0.8010721
## 267	3141	1218	10109	11220	0.8048791
## 268	7099	11120	6088	2291	0.8197625
## 269	7091	7141	7090	14070	0.8200657
## 270	8007	10204	2070	3086	0.8206308
## 271	13191	10113	15038	15034	0.8229433
## 272	2267	2241	2336	2243	0.8363779
## 273	4194	7084	2240	10211	0.8377749
## 274	8010	1128	8025	14080	0.8509528
## 275	3137	15029	8005	3139	0.8568923
## 276	11137	7227	2077	5102	0.8785104
## 277	11052	10254	2271	4158	0.8890087
## 278	5095	13196	7142	2034	0.9057502
## 279	1199	2003	4081	4138	0.9202190
## 280	7080	13204	15060	15050	0.9324423
## 281	11048	2325	2269	11033	0.9334567
## 282	2076	10208	8031	2069	1.0161949
## 283	2328	2322	4169	2259	1.0312127
## 284	1189	5094	10189	3109	1.0317923
## 285	15043	2268	10260	16025	1.0515429
## 286	11044	16062	4080	14065	1.0537998
## 287	15098	16197	16181	16204	1.0608023
## 288	16067	2304	15059	15042	1.0718646
## 289	7224	10098	15062	12041	1.0843221
## 290	3136	2275	2018	8001	1.1587786
## 291	6087	2330	14068	14056	1.1817979
## 292	10016	11027	16195	16151	1.1822294
## 293	9155	7093	2308	13040	1.1887574
## 294	7144	3148	7100	14076	1.2111516
## 295	10193	2284	11043	4178	1.2527990
## 296	15020	16158	15057	15024	1.2561800
## 297	9152	10001	7074	7078	1.2723608
## 298	16164	16161	16023	16167	1.3037449
## 299	15105	8003	16200	14058	1.3254440
## 300	2255	11041	2314	10012	1.3335081
## 301	11031	10188	8004	1111	1.4412129
## 302	7146	1215	3058	1221	1.4544292
## 303	10019	4077	11186	1202	1.4734098
## 304	16177	16196	16019	16149	1.4988482
## 305	15030	15058	8064	8066	1.5016930
## 306	2310	3150	16153	8122	1.5053055
## 307	15095	15101	16017	16145	1.5176662
## 308	2258	4159	2263	2260	1.5892509
## 309	10240	5098	7215	9144	1.6017227
## 310	16159	16152	16018	16172	1.6223264
## 311	2288	2266	14064	2001	1.6860368
## 312	2332	2274	2278	13211	1.7465781
## 313	4166	10015	10018	3106	1.8938219
## 314	15026	16163	7082	15044	1.8971726
## 315	15108	15107	15097	15045	1.9164162

##	316	16165	16169	4171	16147	2.0336835
##	317	8015	15096	16146	16205	2.0586008
##	318	11032	16060	16156	16032	2.0664057
##	319	14057	14077	14087	14060	2.5196163
##	320	10017	11179	4114	8132	2.7293938
##	321	4109	1198	11129	12057	3.6969358
##	322	8134	15047	16203	16170	4.3355593
##	323	NA	NA	15049	NA	4.5716734
##	324	1124	16148	1222	14084	4.6075825