A Look at the Weights: PID

This is currently set up to look at the weights for pew4, kpop at b = .5, and kpop + mf=T at b=2 (optimal biasbound ratio choices) all with pid included

1. Check Mean Weights in Pew4 Strata:

- Age
- Female
- Special Interaction: if white = race x educ x region, if notwhite = race x region

Table 1: Mean Weight Across Age Bucket

Age Bucket	Pew4	KPOP	KPOP+MF	Pew4-KPOP	Pew4 - KPOP+MF
18 to 35	0.79481	0.78681	0.79481	-0.00800	0
36 to 50	0.69199	0.72167	0.69199	0.02969	0
51 to 64	1.37828	1.40583	1.37828	0.02756	0
65+	5.18328	4.73191	5.18328	-0.45138	0

Table 2: Mean Weight Across Gender

Female	Pew4	KPOP	KPOP+MF	Pew4 - KPOP	Pew4 - KPOP+MF
Female	1.07605	1.07491	1.07605	-0.00114	0
Male	0.93188	0.93290	0.93188	0.00102	0

A Slightly Closer Look at How the Mean Weights within strata diverge

KPOP vs Pew4

Below just outputs a quick summary of the differences between the KPOP weights and the Pew4 weights for each different strata

```
summary(mean_comp_age$diff_kbal)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## -0.451377 -0.118847  0.009776 -0.100534  0.028089  0.029688
```

```
summary(mean_comp_female$diff_kbal)
```

```
##       Min.    1st Qu.     Median       Mean    3rd Qu.       Max.
## -0.0011410 -0.0006002 -0.0000595 -0.0000595  0.0004813  0.0010220
```

```
summary(mean_comp_interaction$diff_kbal)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## -9.60313 -0.06590  0.02372 -0.45791  0.08842  0.17989
```

KPOP+MF vs Pew4

Below just outputs a quick summary of the differences between the KPOP+MF weights and the Pew4 weights

Table 3: Mean Weight Across Interaction

Interaction	Pew4	KPOP	KPOP+MF	Pew4 - KPOP	Pew4 - KPOP+MF
Midwest, Black	1.57885	1.64617	1.79434	0.06732	0.21549
Midwest, Hispanic	0.74012	0.68290	0.56004	-0.05721	-0.18008
Midwest, Other	0.74814	0.86388	1.24021	0.11574	0.49206
Midwest, White, 2-year	0.94298	0.92096	0.80532	-0.02202	-0.13765
Midwest, White, 4-year	0.79176	0.82522	0.65383	0.03346	-0.13792
Midwest, White, High school graduate	1.45991	1.42952	1.36185	-0.03038	-0.09806
Midwest, White, No HS	4.06137	0.87057	3.29036	-3.19080	-0.77101
Midwest, White, Post-grad	0.41775	0.51224	0.41974	0.09449	0.00199
Midwest, White, Some college	1.55279	1.73268	1.77274	0.17989	0.21995
Northeast, Black	1.37889	1.04405	0.97273	-0.33484	-0.40616
Northeast, Hispanic	0.77557	0.78539	0.97031	0.00982	0.19474
Northeast, Other	0.90090	0.85793	0.77042	-0.04297	-0.13049
Northeast, White, 2-year	1.19365	1.20763	0.80953	0.01398	-0.38412
Northeast, White, 4-year	0.86266	0.83742	0.76912	-0.02524	-0.09354
Northeast, White, High school graduate	1.77990	1.92813	1.78639	0.14823	0.00649
Northeast, White, No HS	1.93449	1.78160	6.97302	-0.15289	5.03853
Northeast, White, Post-grad	0.53945	0.51414	0.50141	-0.02532	-0.03805
Northeast, White, Some college	1.47510	1.55797	1.35798	0.08288	-0.11712
South, Black	1.30731	1.35388	1.36324	0.04657	0.05593
South, Hispanic	0.84179	0.70239	0.71821	-0.13940	-0.12358
South, Other	0.79509	0.73613	0.84088	-0.05896	0.04579
South, White, 2-year	0.74281	0.80500	0.93278	0.06219	0.18997
South, White, 4-year	0.54396	0.66079	0.56118	0.11683	0.01722
South, White, High school graduate	1.55049	1.64120	1.36655	0.09072	-0.18394
South, White, No HS	4.75511	0.82351	3.49870	-3.93160	-1.25641
South, White, Post-grad	0.42869	0.48143	0.40437	0.05274	-0.02432
South, White, Some college	1.25237	1.34837	1.41472	0.09600	0.16236
West, Black	0.99268	1.08033	0.99338	0.08765	0.00070
West, Hispanic	0.94426	0.85755	1.02432	-0.08672	0.08006
West, Other	1.39502	1.05052	1.00508	-0.34449	-0.38993
West, White, 2-year	1.10827	0.96177	0.88000	-0.14650	-0.22828
West, White, 4-year	0.54200	0.62101	0.67536	0.07901	0.13336
West, White, High school graduate	1.45160	1.56225	1.71486	0.11064	0.26325
West, White, No HS	10.22434	0.62120	1.77787	-9.60313	-8.44647
West, White, Post-grad	0.47500	0.53966	0.59066	0.06466	0.11566
West, White, Some college	1.79974	1.95459	1.69288	0.15485	-0.10686

```
summary(mean_comp_age$diff_mf)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       0       0       0       0       0       0
```

```
summary(mean_comp_female$diff_mf)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##       0       0       0       0       0       0
```

```r
summary(mean_comp_interaction$diff_mf)
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## -8.44647 -0.14846 -0.03118 -0.16723  0.12009  5.03853
```

2. Check Correlations

```r
#2. Check correlations w pew4 and kbal
cor(weights_LA$pew4_wt, weights_LA$k_wt)
```

```
## [1] 0.77662
```

```r
cor(weights_LA$pew4_wt, weights_LA$k_mf_wt)
```

```
## [1] 0.7193329
```

3. Check Balance on Strata/Outcome

Below, we can take a look at what balance the weights produce on the strata used in pew4. It's best to poke around to see the outputs directly in the .Rdm file, but I've also printed out the results. As expected we get essentially perfect balance on female and age using kpop+mf and pew4. For now, I've outputted the difference in the weighted estimate using each different weighting scheme and the target CCES (weighted). Of course, since pew4 was make to rake on the strata in question, it gets essentially perfect balance on these strata and is not displayed.

```r
#need survey designs here
#3. Check balance on means and any interactions used in pew4

#Balance on mean of female, age and interaction
check_bal <- function(variable, pew4, kbal, kbal_mf) {
    bal_p4 = as.matrix(svymean(~pew4$variables[,variable], pew4, na.rm = TRUE))
    bal_k = as.matrix(svymean(~kbal$variables[,variable], kbal, na.rm = TRUE))
    bal_kmf = as.matrix(svymean(~kbal_mf$variables[,variable], kbal_mf, na.rm = TRUE))
    bal_CCES = as.matrix(svymean(~cces_awt$variables[,variable], cces_awt, na.rm = TRUE))

    rownames(bal_CCES) <- sub('.*\\]', '', rownames(bal_CCES))
    rownames(bal_kmf) <- sub('.*\\]', '', rownames(bal_CCES))
    rownames(bal_k) <- sub('.*\\]', '', rownames(bal_CCES))
    rownames(bal_p4) <- sub('.*\\]', '', rownames(bal_CCES))


    difference = list(diff_p4 = round(bal_CCES[,1] - bal_p4[,1], 5),
                      diff_k = round(bal_CCES[,1]- bal_k[,1],5),
                      diff_kmf = round(bal_CCES[,1] - bal_kmf[,1],5))
    return(list(mean_diff = difference,
                bal_p4 = bal_p4,
                bal_k = bal_k,
                bal_kmf = bal_kmf,
                bal_CCES = bal_CCES))
}

outcome_bal <- check_bal("recode_vote_2016", pew4 = pew_lwt_4_pid,
```

```
                          kbal = kbal_wt_b.5x, kbal_mf = kbal_mf_wt_b2x)
female_bal <- check_bal("recode_female", pew4 = pew_lwt_4_pid,
                          kbal = kbal_wt_b.5x, kbal_mf = kbal_mf_wt_b2x)
age_bal <- check_bal("recode_age_bucket",pew4 = pew_lwt_4_pid,
                          kbal = kbal_wt_b.5x, kbal_mf = kbal_mf_wt_b2x)
interaction_bal <- check_bal("recode_race_educ_reg",pew4 = pew_lwt_4_pid,
                          kbal = kbal_wt_b.5x, kbal_mf = kbal_mf_wt_b2x)
```

How does Regular Kbal do? (with b =.25xncol)

Here just compare the weighted mean estimates using the kpop weights to the CCES target means across the pew4 strata.

```
#these objects specifically show the difference in means between the weighted CCES target and
#the different weighting schemes, to see the actual numbers check out the balance objects

female_bal$mean_diff$diff_k
```

```
##   Female     Male
##  0.00054 -0.00054
```

```
age_bal$mean_diff$diff_k
```

```
## 18 to 35 36 to 50 51 to 64      65+
##  0.00350 -0.00969 -0.00578  0.01197
```

```
interaction_bal$mean_diff$diff_k
```

```
##                          Midwest, Black
##                                -0.00097
##                       Midwest, Hispanic
##                                 0.00039
##                          Midwest, Other
##                                -0.00179
##                  Midwest, White, 2-year
##                                 0.00049
##                  Midwest, White, 4-year
##                                -0.00152
##   Midwest, White, High school graduate
##                                 0.00133
##                   Midwest, White, No HS
##                                 0.00923
##              Midwest, White, Post-grad
##                                -0.00410
##           Midwest, White, Some college
##                                -0.00512
##                         Northeast, Black
##                                 0.00484
##                     Northeast, Hispanic
##                                -0.00013
##                         Northeast, Other
##                                 0.00058
##                Northeast, White, 2-year
##                                -0.00018
##                Northeast, White, 4-year
```

```
##                                0.00096
## Northeast, White, High school graduate
##                               -0.00415
##                Northeast, White, No HS
##                                0.00052
##            Northeast, White, Post-grad
##                                0.00099
##         Northeast, White, Some college
##                               -0.00164
##                            South, Black
##                               -0.00229
##                          South, Hispanic
##                                0.00403
##                            South, Other
##                                0.00145
##                    South, White, 2-year
##                               -0.00201
##                    South, White, 4-year
##                               -0.01008
##     South, White, High school graduate
##                               -0.00437
##                     South, White, No HS
##                                0.01517
##                 South, White, Post-grad
##                               -0.00323
##              South, White, Some college
##                               -0.00430
##                             West, Black
##                               -0.00093
##                           West, Hispanic
##                                0.00234
##                             West, Other
##                                0.00615
##                     West, White, 2-year
##                                0.00233
##                     West, White, 4-year
##                               -0.00472
##      West, White, High school graduate
##                               -0.00283
##                      West, White, No HS
##                                0.00926
##                  West, White, Post-grad
##                               -0.00234
##               West, White, Some college
##                               -0.00336
```

How does Kbal+MF do? (with b =.25xncol)

Here just compare the weighted mean estimates using the kpop+mf weights to the CCES target means across the pew4 strata. It's basically perfect wiht respect to female and age as expected

```
#these objects specifically show the difference in means between the weighted CCES target and
#the different weighting schemes, to see the actual numbers check out the balance objects
```

```
female_bal$mean_diff$diff_kmf
```

```
## Female   Male
##      0      0
```

```
age_bal$mean_diff$diff_kmf
```

```
## 18 to 35 36 to 50 51 to 64      65+
##        0        0        0        0
```

```
interaction_bal$mean_diff$diff_kmf
```

```
##                          Midwest, Black
##                                -0.00312
##                       Midwest, Hispanic
##                                 0.00122
##                            Midwest, Other
##                                -0.00759
##                  Midwest, White, 2-year
##                                 0.00305
##                  Midwest, White, 4-year
##                                 0.00625
##   Midwest, White, High school graduate
##                                 0.00430
##                   Midwest, White, No HS
##                                 0.00223
##               Midwest, White, Post-grad
##                                -0.00009
##            Midwest, White, Some college
##                                -0.00626
##                        Northeast, Black
##                                 0.00587
##                     Northeast, Hispanic
##                                -0.00263
##                        Northeast, Other
##                                 0.00176
##                Northeast, White, 2-year
##                                 0.00482
##                Northeast, White, 4-year
##                                 0.00356
## Northeast, White, High school graduate
##                                -0.00018
##                 Northeast, White, No HS
##                                -0.01701
##             Northeast, White, Post-grad
##                                 0.00149
##          Northeast, White, Some college
##                                 0.00232
##                            South, Black
##                                -0.00275
##                         South, Hispanic
##                                 0.00358
##                            South, Other
##                                -0.00113
##                    South, White, 2-year
```

```
##                                -0.00614
##                    South, White, 4-year
##                                -0.00149
##     South, White, High school graduate
##                                 0.00887
##                     South, White, No HS
##                                 0.00485
##                 South, White, Post-grad
##                                 0.00149
##              South, White, Some college
##                                -0.00728
##                              West, Black
##                                -0.00001
##                           West, Hispanic
##                                -0.00216
##                             West, Other
##                                 0.00696
##                     West, White, 2-year
##                                 0.00363
##                     West, White, 4-year
##                                -0.00797
##      West, White, High school graduate
##                                -0.00673
##                      West, White, No HS
##                                 0.00815
##                  West, White, Post-grad
##                                -0.00418
##               West, White, Some college
##                                 0.00232
```

How do Kbal+MF and Kbal compare to eachother on the interaction?

It's pretty hard to compare all those numbers for the many different categories of the interaction. So how different are they really? Taking the absolute difference of their absolute values, we find that only only one (of 36) category has a difference greater than 0.01. 31 categories are differeny by 0.001 or more. So generally they have very similar performance in terms of matching the CCES target margins on these categories out to the hundreth, not too bad.

```
#how different are these really?
sum(abs(abs(interaction_bal$mean_diff$diff_kmf) -
            abs(interaction_bal$mean_diff$diff_k)) >= 0.01)
```

```
## [1] 2
```

```
#increasing precision
sum(abs(abs(interaction_bal$mean_diff$diff_kmf) -
            abs(interaction_bal$mean_diff$diff_k)) >= 0.001)
```

```
## [1] 27
```

```
sum(abs(interaction_bal$mean_diff$diff_k) -
            abs(interaction_bal$mean_diff$diff_kmf) >= 0.001)
```

```
## [1] 8
```

Compare Balance on 2016 Vote Margin

```
abs(outcome_bal$mean_diff$diff_k)- abs(outcome_bal$mean_diff$diff_kmf)
```

```
##   Democrat      Other Republican
##    0.00547   -0.00115    0.00640
```

Table 4: Balance on 2016 Vote

	CCES target	Pew4	KPOP	KPOP+MF
Democrat	0.4839690	0.4994609	0.4911832	0.4822283
Other	0.0569549	0.0589623	0.0562514	0.0588025
Reublican	0.4590761	0.4415768	0.4525654	0.4589692
2party_vshare	0.9430451	0.9410377	0.9437486	0.9411975
2party_vtdiff	0.0248929	0.0578841	0.0386178	0.0232591
Dem Vote Margin	0.0263963	0.0615109	0.0409196	0.0247123