data test;

input trt$ adg;

cards; run;

a 4.2865

a 3.9560

a 3.7496

a 3.9074

a 4.1956

a 4.1474

a 3.5761

a 3.8555

a 4.0816

a 3.8178

a 3.7961

a 4.1058

a 3.8615

a 4.1635

a 4.4385

a 4.0624

a 3.3828

a 3.8310

a 4.1731

a 3.9378

a 3.5030

a 3.9633

a 4.1853

a 3.8472

a 3.9777

a 4.6403

a 3.7772

a 3.9164

a 4.0112

a 3.9897

a 4.0715

a 3.7243

a 3.9354

a 4.0633

a 3.6789

a 3.8079

a 4.1907

a 3.9474

a 3.9428

a 3.4495

b 3.9135

b 3.7531

b 4.1233

b 4.2409

b 3.7417

b 3.9651

b 3.8196

b 3.6533

b 3.6707

b 3.8923

b 4.1039

b 4.1226

b 3.8714

b 3.7804

b 4.2459

b 3.8481

b 4.2101

b 3.9058

b 4.0901

b 4.2089

b 4.1728

b 3.9917

b 3.9151

b 3.8156

b 4.0623

b 4.0838

b 4.1759

b 4.0514

b 4.1468

b 4.3226

b 4.3057

b 4.0798

b 4.0963

b 3.7963

b 4.0018

b 4.2310

b 4.1656

b 3.8964

b 4.0202

b 3.9014

run;

title "Original Data and Observed Difference";

proc iml;

use test;

read all var{adg} where (trt='a') into a; /\*allocate trt1 to vector a\*/

print a;

read all var{adg} where (trt='b') into b; /\*allocate trt2 to vector b\*/

print b;

out1=mean(a);

print out1;

out2=mean(b);

print out2;

obsdiff=mean(a)-mean(b); /\*compute difference between means of trt1 and trt2\*/

print obsdiff[label="Observed Difference between Treatment Means"];

call randseed(12345); /\*random number seed\*/

combdata=a//b; /\*stack data from a and b into single vector\*/

print combdata[label="Stacked Data for Resampling t-test"];

N1=nrow(a); N=N1+nrow(b); /\*define row numbers in vectors a and b\*/

print N1;

print N;

reps=999; /\*define number of resamples\*/

probdist=j(reps,1); /\*define vector to hold resample results\*/

do k = 1 to reps;

m = sample(combdata, N, "Replace"); /\* resample the data \*/

probdist[k] = mean(m[1:N1]) - mean(m[(N1+1):N]); /\* compute difference of means \*/

end;

title "Histogram of Mean Differences"; /\*create histogram of resampled differences\*/

refline = "refline " + char(obsdiff) + " / axis=x lineattrs=(color=red)";

call Histogram(probdist) other=refline;

pval = ((1 + sum(abs(probdist) >= abs(obsdiff)))/(reps+1))/2;

title "Resampling Results";

print pval[label="Resampling Test P-Value (One-Tailed Test)"];

%macro ttest;

%global obsdiff;

print obsdiff;

%if obsdiff>=0 %then %do;

proc ttest data=test sides=L; class trt; var adg;

run;

%end;

%else %do;

proc ttest data=test sides=L; class trt; var adg;

run;

%end;

%mend ttest;

title "Standard t-Test Results Using Original Data (One-Tailed Test)";

%ttest

quit;