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ST 511 Lab
HW 2

2.13

a)
fishoil mean: 6.57
regular oil mean: -1.14

fishoil std dev: 5.86
regular oil std dev: 3.18

b) Pooled std dev estimate: 4.71

c) Standard Error: 2.52

d)
Degrees of freedom: 12
97th percentile with 12 d.f.: 2.179

e) 95% confidence interval from 2.22 to 13.2

f) t-statistic: 3.06

g) one-sided p-value: 0.006

2.14

t-statistic: 3.0621
two-sided p-value: 0.01308
one-sided p-value: 0.006

data: fishoil and regular
t = 3.0621, df = 9.264, p-value = 0.01308
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
  2.039893 13.388678
sample estimates:
mean of x mean of y
 6.571429 -1.142857

Male vs Female intelligence

Abstract

The statistical analysis shows no difference in AFQT combined scores, but does show evidence of differences in each section: men tended to have higher scores on arithmetic and math sections, while women scored higher on word knowledge and paragraph comprehension.

Statistical Analysis

The data show no evidence of a difference in overall intelligence (gauged by the AFQT combined score) in males vs females (two-sided p-value = 0.4 from a two-sample t-test).

However, when looking at specific areas of intelligence (e.g. arithmetic, writing, etc), different results are observed.

For arithmetic reasoning, the data show convincing evidence of a difference in mean score (two-sided p-value < 0.001 from a two-sample t-test). The mean score is estimated to be 1.95 points higher for men (95% confidence interval from 1.6 to 2.3).

For word knowledge, the data show suggestive but inconclusive evidence of a difference in mean score (two-sided p-value = 0.05 from a two-sample t-test). The mean score is estimated to be 0.39 points higher for women (95% confidence interval from 0.01 to 0.78).

For paragraph comprehension, the data show convincing evidence of a difference in mean score (two-sided p-value < 0.001 from a two-sample t-test). The mean score is estimated to be 2.1 points higher for women (95% confidence interval from 1.72 to 2.51).

For mathematical knowledge, the data show strong evidence of a difference in mean score (two-sided p-value = 0.007 from a two-sample t-test). The mean score is estimated to be 0.5 points higher for men (95% confidence interval from 0.13 to 0.82).

Notes

Unfortunately, the maximum points possible was not given.

The data come from the National Longitudianal Survey of Youth, U.S. Bureau of Labor Statistics, http://www.bls.gov/nls/home.htm (8 May 2008). The AFQT scores were computed from the raw component test scores using the formula for AFQT89.

Appendix

Combined Score

Welch Two Sample t-test
data: males["afqt"] and females["afqt"]
t = 0.8402, df = 11813.52, p-value = 0.4008
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.7671614 1.9180958
sample estimates:
mean of x mean of y
 187.1336 186.5581

Arithmetic

Welch Two Sample t-test
data: males["arith"] and females["arith"]
t = 10.9188, df = 11800.28, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 1.603033 2.304528
sample estimates:
mean of x mean of y
 47.99765 46.04387

Word Knowledge

Welch Two Sample t-test
data: males["word"] and females["word"]
t = -1.9272, df = 11838.76, p-value = 0.05397
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.782345272 0.006627362
sample estimates:
mean of x mean of y
 46.32667 46.71453

Paragraph Comprehension

Welch Two Sample t-test
data: males["parag"] and females["parag"]
t = -10.4871, df = 11824.75, p-value < 2.2e-16
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -2.507461 -1.717726
sample estimates:

mean of x mean of y
 45.84759 47.96018

Math Knowledge

Welch Two Sample t-test
data: males["math"] and females["math"]
t = 2.7005, df = 11842.51, p-value = 0.006932
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.1308375 0.8236248
sample estimates:
mean of x mean of y
 47.81045 47.33322