Overview

Congruent	Incongruent
12.079	19.278
16.791	18.741
9.564	21.214
8.63	15.687
14.669	22.803
12.238	20.878
14.692	24.572
8.987	17.394
9.401	20.762
14.48	26.282
22.328	24.524
15.298	18.644
15.073	17.51
16.929	20.33
18.2	35.255
12.13	22.158
18.495	25.139
10.639	20.429
11.344	17.425
12.369	34.288
12.944	23.894
14.233	17.96
19.71	22.058
16.004	21.157

Note: Congruent implies color names matched their respective colors, Incongruent implies the color names did not match their respective colors

Independent Variable: Whether Congruent or Incongruent word sets were used

Dependent Variable: Amount of time (in seconds) taken by participants to complete the task

Summary of basic statistics:

Sample size (Congruent and Incongruent):	24	
Mean of completion times (Congruent):	14.05113	
Mean of completion times (Incongruent):	22.01592	
Median completion time (Congruent):	14.3565	
Median completion time (Incongruent):	21.0175	
Standard Deviation of completion times (Congruent):		3.484416
Standard Deviation of completion times (Incongruent):		4.696055

Null Hypothesis: H(0) = μ(a) = μ(b)

The population mean without intervention will be equal to the population mean with the intervention, meaning the intervention will have no effect.

μ represents the mean, (a) represents without intervention, (b) represents with intervention

The intervention in this experiment is the use of incongruent word sets

Proposed alternate hypothesis: H(1) = μ(a) < μ(b)

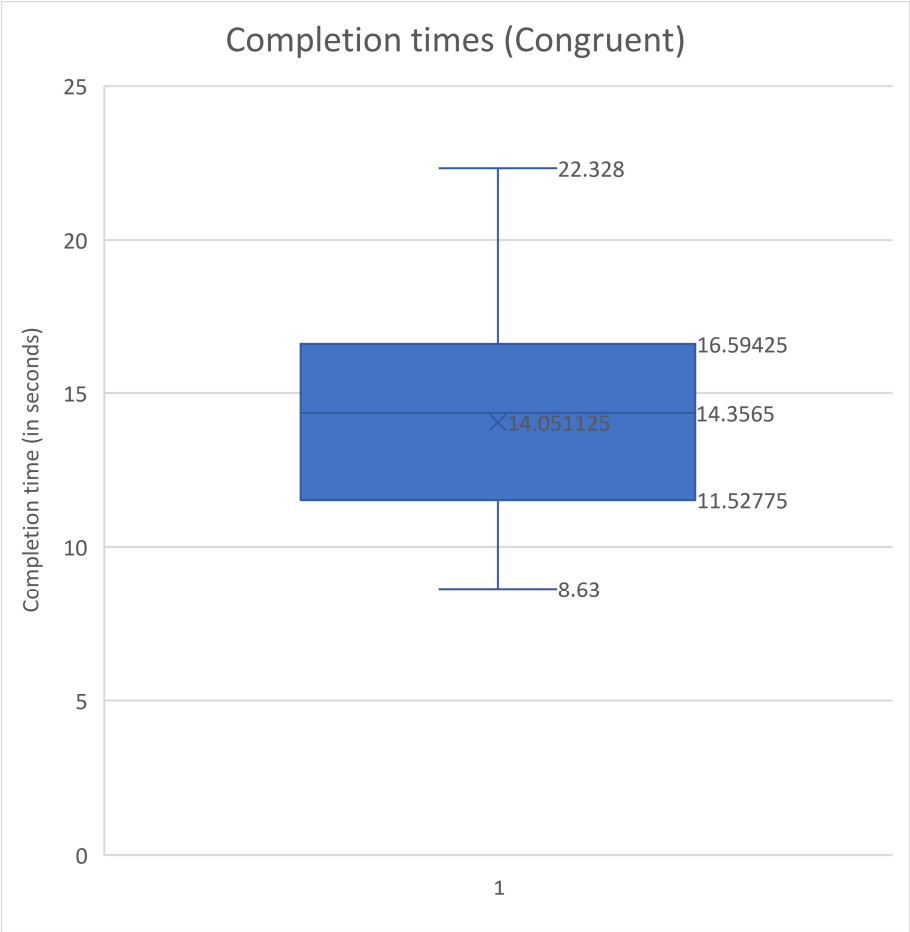
The population mean without intervention will be less than the population mean with the intervention, and this will not be a chance occurrence.

Mathematical symbols for the alternate hypothesis are the same as for the null hypothesis

Proposed statistical test: Paired T-Test assuming Gaussian distributions, unknown population standard deviation, and a sample size of less than 30

Distribution - Congruent

Congruent
12.079
16.791
9.564
8.63
14.669
12.238
14.692
8.987
9.401
14.48
22.328
15.298
15.073
16.929
18.2
12.13
18.495
10.639
11.344
12.369
12.944
14.233
19.71
16.004



Mean:
14.05113
Mean is within IQR

Max:
22.328

Q3:
16.59425

Q2/Median:
14.3565

Q1:
11.52775

Min:
8.63

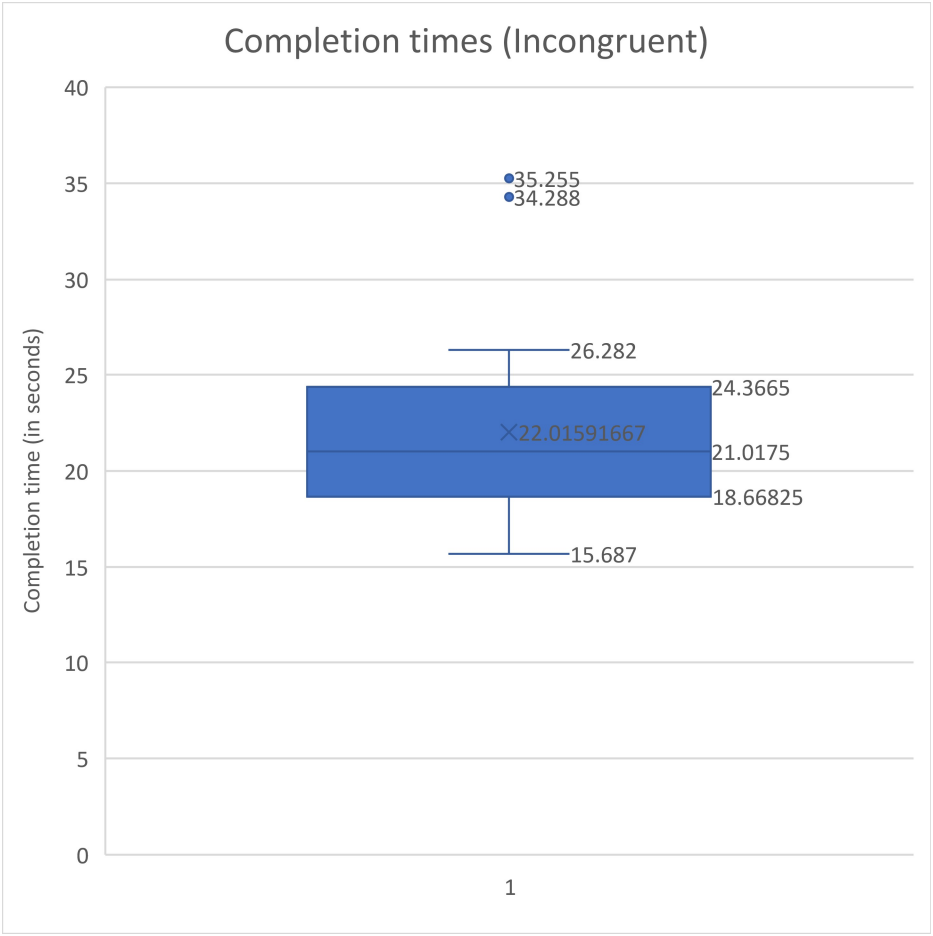
IQR:
5.0665

This boxplot shows a slightly narrower interquartile range than for the Incongruent scores.

There are no outliers on this chart.

Distribution - Incongruent

Incongruent
19.278
18.741
21.214
15.687
22.803
20.878
24.572
17.394
20.762
26.282
24.524
18.644
17.51
20.33
35.255
22.158
25.139
20.429
17.425
34.288
23.894
17.96
22.058
21.157



Mean:
22.01592
Mean is within IQR

Max:
26.282

Q3:
24.3665

Q2/Median:
21.0175

Q1:
18.66825

Min:
15.687

IQR:
5.69825

In this boxplot, the mean and IQR are higher than for the Congruent scores.

Also note that there are two outliers: 34.288 seconds and 35.255 seconds

Overall, there appears to be a slightly wider distribution of scores when Incongruent words are used.

Paired T-Test results

Congruent	Incongruent
12.079	19.278
16.791	18.741
9.564	21.214
8.63	15.687
14.669	22.803
12.238	20.878
14.692	24.572
8.987	17.394
9.401	20.762
14.48	26.282
22.328	24.524
15.298	18.644
15.073	17.51
16.929	20.33
18.2	35.255
12.13	22.158
18.495	25.139
10.639	20.429
11.344	17.425
12.369	34.288
12.944	23.894
14.233	17.96
19.71	22.058
16.004	21.157

t-Test: Paired Two Sample for Means

	Congruent	*Incongruent*
Mean	14.051125	22.01591667
Variance	12.66902907	23.01175704
Observations	24	24
Pearson Correlation	0.351819527	
Hypothesized Mean	**0**	
df	23	
t Stat	**-8.020706944**	
P(T<=t) one-tail	2.0515E-08	
t Critical one-tail	1.713871528	
P(T<=t) two-tail	**4.103E-08**	
t Critical two-tail	2.06865761	

The absolute value of the t-statistic (8.02) is greater than the two-tail p-value (4.103E-08).

Therefore, we can reject the null hypothesis that the difference in means will be 0.

We can reject the null hypothesis that the intervention will have no effect.