

Two-Sample t-Test Report: Teaching Method and Score Improvement

Section 2. Dataset Structure (PROC CONTENTS)

The CONTENTS Procedure

<i>Data Set Name</i>	STAT1.GERMAN	<i>Observations</i>	28
<i>Member Type</i>	DATA	<i>Variables</i>	6
<i>Engine</i>	V9	<i>Indexes</i>	0
<i>Created</i>	01/13/2026 04:02:43	<i>Observation Length</i>	48
<i>Last Modified</i>	01/13/2026 04:02:43	<i>Deleted Observations</i>	0
<i>Protection</i>		<i>Compressed</i>	NO
<i>Data Set Type</i>		<i>Sorted</i>	NO
<i>Label</i>			
<i>Data Representation</i>	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
<i>Encoding</i>	utf-8 Unicode (UTF-8)		

<i>Engine/Host Dependent Information</i>	
<i>Data Set Page Size</i>	131072
<i>Number of Data Set Pages</i>	1
<i>First Data Page</i>	1
<i>Max Obs per Page</i>	2722
<i>Obs in First Data Page</i>	28
<i>Number of Data Set Repairs</i>	0
<i>Filename</i>	/home/u64046684/EST142/data/german.sas7bdat
<i>Release Created</i>	9.0401M8
<i>Host Created</i>	Linux
<i>Inode Number</i>	15035401734
<i>Access Permission</i>	rw-r--r--
<i>Owner Name</i>	u64046684
<i>File Size</i>	256KB
<i>File Size (bytes)</i>	262144

<i>Variables in Creation Order</i>			
#	Variable	Type	Len
1	ID	Num	8
2	Pre	Num	8
3	Retain	Num	8
4	Group	Char	9
5	Gender	Char	6
6	Change	Num	8

Listing 1. First 10 Records (for review)

metadata and data structure

<i>ID</i>	<i>Pre</i>	<i>Retain</i>	<i>Group</i>	<i>Gender</i>	<i>Change</i>
101	56.41	89.19	Treatment	Male	32.78
103	66.67	86.49	Treatment	Male	19.82
105	58.97	56.76	Treatment	Male	-2.21
107	79.49	62.16	Treatment	Male	-17.33
110	46.15	56.76	Treatment	Male	10.61
112	58.97	59.46	Treatment	Male	0.49
121	56.41	75.68	Treatment	Male	19.27
104	71.79	81.08	Treatment	Female	9.29
109	51.28	75.68	Treatment	Female	24.4
115	71.79	81.08	Treatment	Female	9.29

descriptive statistics for 'change' by group(control vs Treatment)

The MEANS Procedure

Analysis Variable : Change								
Group	N		Mean	Median	Std Dev	Std Error	Lower Quartile	Upper Quartile
	Obs	N						
Control	13	13	6.97	6.72	8.62	2.39	1.59	14.70
Treatment	15	15	11.36	9.29	14.85	3.84	0.49	24.40

Group is the classification variable (Control vs Treatment). Change is the analysis variable.

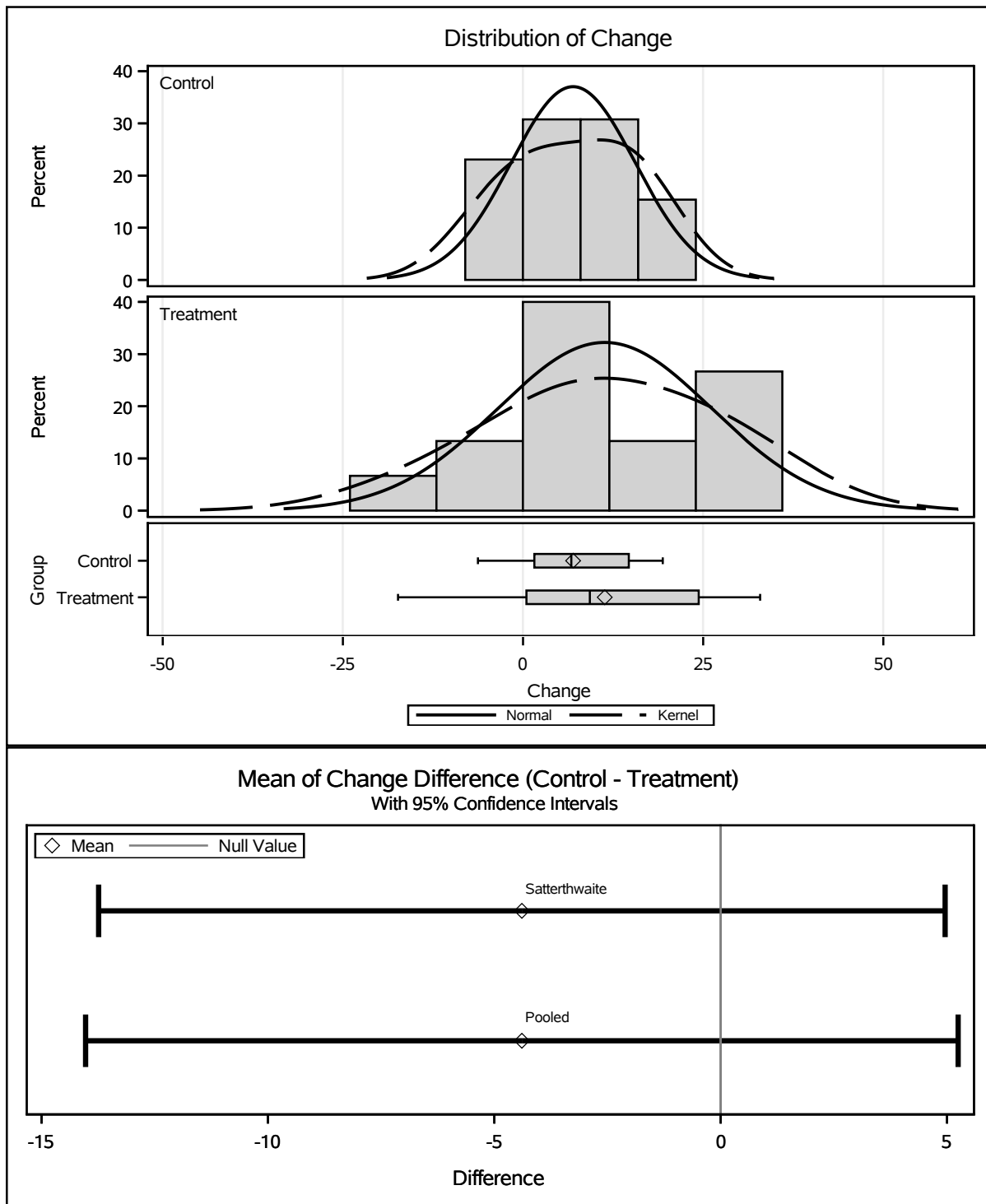
two sample ttest: mean change (Treatment Vs Control)**The TTEST Procedure****Variable: Change**

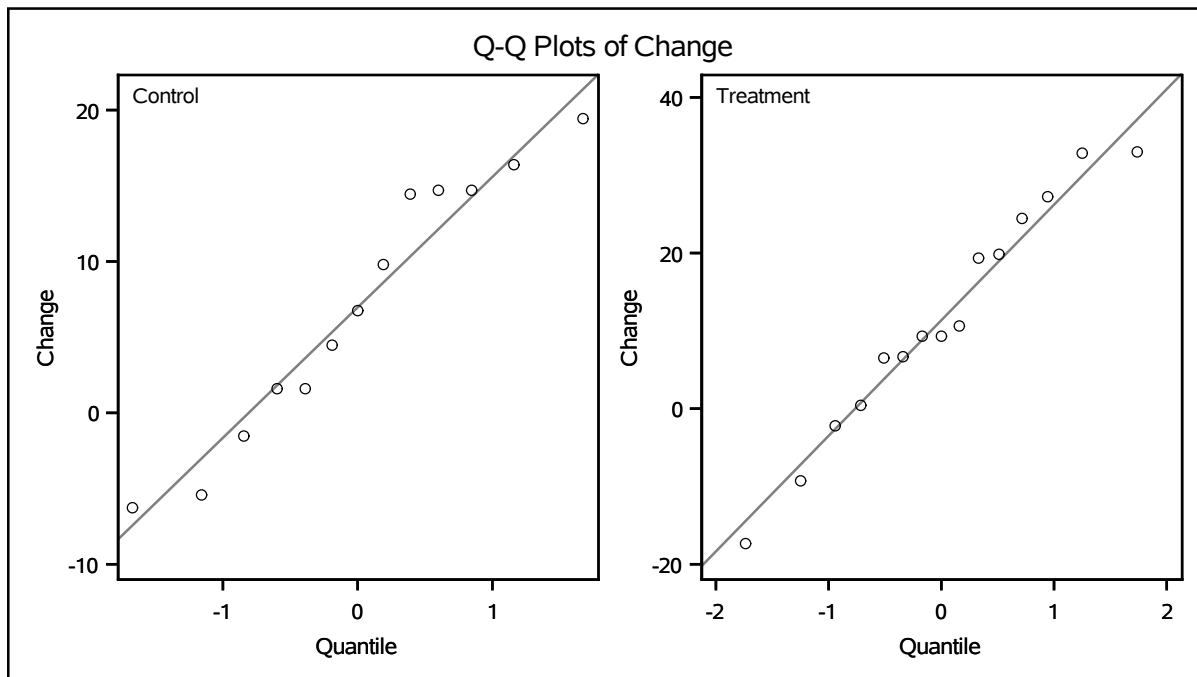
Group	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
Control		13	6.9677	8.6166	2.3898	-6.2400	19.4100
Treatment		15	11.3587	14.8535	3.8352	-17.3300	32.9200
Diff (1-2)	Pooled		-4.3910	12.3720	4.6882		
Diff (1-2)	Satterthwaite		-4.3910		4.5188		

Group	Method	Mean	95% CL Mean	Std Dev	95% CL Std Dev
Control		6.9677	1.7607 12.1747	8.6166	6.1789 14.2238
Treatment		11.3587	3.1331 19.5843	14.8535	10.8747 23.4255
Diff (1-2)	Pooled	-4.3910	-14.0276 5.2457	12.3720	9.7432 16.9550
Diff (1-2)	Satterthwaite	-4.3910	-13.7401 4.9581		

Method	Variances	DF	t Value	Pr > t
Pooled	Equal	26	-0.94	0.3576
Satterthwaite	Unequal	22.947	-0.97	0.3413

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	14	12	2.97	0.0660

two sample ttest: mean change (Treatment Vs Control)**The TTEST Procedure****Variable: Change**

two sample ttest: mean change (Treatment Vs Control)**The TTEST Procedure****Variable: Change**

the histograms for both control and treatment groups are somewhat bell-shaped and the Q-Q plots, even though the points deviates quite a bit from the reference line, they also relatively lie close to the line. Hence Normality could be said to have been met.

For checking Equality of variance, the table shows a F-value of 2.97 and P-value of 0.06. Since the p-value is greater than Alpha(0.05), we fail to reject the null hypothesis and conclude that, there is enough evidence to conclude that, the variance of the two groups are equal. Hence, we use the pooled (equal variance) for our inference. The t value (-0.97) and the P-value (0.36) indicates that, there is no significant evidence to reject the null hypothesis ($\mu_1 - \mu_2 = 0$). There, we conclude that, statistically, there is no significant evidence that proves that the two means are different and the observable difference in the summary statistics could be due to sampling. Additionally, the mean of change difference (control - treatment) with 95 percent confidence intervals has zero as a possible value which further reinforces the decision that, There is no significant evidence to say there two mean are different.