Program Summary - TTest Analysis.sas

Execution Environment

Author:	u63416198
File:	/home/u63416198/TTest Analysis.sas
SAS Platform:	Linux LIN X64 3.10.0-1062.12.1.el7.x86_64
SAS Host:	ODAWS01-USW2-2.ODA.SAS.COM
SAS Version:	9.04.01M7P08062020
SAS Locale:	en_US
Submission Time:	11/9/2023, 4:08:04 PM
Browser Host:	99.226.249.234
User Agent:	Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/118.0.0.0 Safari/537.36
Application Server:	ODAMID00-USW2-2.ODA.SAS.COM

Code: TTest Analysis.sas

```
FILENAME REFFILE '/home/u63416198/sasuser.v94/File BIRTH(1).xlsx';

PROC IMPORT DATAFILE=REFFILE
    DBMS=XLSX
    OUT=WORK.Birth;
    GETNAMES=YES;
    SHEET="Birth";
RUN;

                                            /* Parameters for the test*/
/*
-Null Hypothesis = (h=0)
-Alternative Hypothesis = (h=1)
-Alpha = 0.05 is used in the code as the metric of significance to achieve 95% Confidence interval level
-Only the variables that have up to 2 levels have been used in these tests
*/

/*Test-1*/
/*Hypothesis (h=0): Mothers smoking does not affect infant weight*/
/*Alternate Hypothesis (h=1): Mothers smoking affects the weight of an infant*/

PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
TITLE "EFFECT OF MOTHER SMOKING ON INFANT'S WEIGHT";
CLASS MOMSMOKE;
VAR WEIGHT;
RUN;
/*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0004 < 0.05, which means the var
- confidence interval (226.5 256.4)
- For the hypothesis comparing Smoking Mother and Infant Weight, t-value = 0.0001 and p-value = 0.0004

The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two cate

/*Test-2*/
/*Hypothesis (h=0): The gender of the baby does not affect its weight*/
/*Alternative Hypothesis (h=1): The gender of the baby affects its weight*/

PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
TITLE "GENDER AND WEIGHT";
CLASS boy;
VAR WEIGHT;
RUN;
/*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0001 < 0.05, which means the var
- confidence interval (-126.6 -106.8)
- For the hypothesis comparing a  Baby Boy and Infant Weight, t-value = -23.18 and p-value = 0.0001

The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two cate

/*Test-3*/
/*Hypothesis (h=0): A mother's marital status does not affect the weight of their infant*/
/*Alternative Hypothesis (h=1): A mother's marital status affects the weight of their infant*/

PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
TITLE "MOTHER'S MARITAL STATUS AND INFANT'S WEIGHT";
CLASS MARRIED;
VAR WEIGHT;
RUN;

/*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0001 < 0.05, which means the var
- confidence interval (-202.4 -180.2)
```

```
- For the hypothesis comparing a  Baby Boy and Infant Weight, t-value = -33.88 and p-value = 0.0001

The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two cate
```

Log: TTest Analysis.sas

Notes (6)

```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
68
69         FILENAME REFFILE '/home/u63416198/sasuser.v94/File BIRTH(1).xlsx';
70
71         PROC IMPORT DATAFILE=REFFILE
72         DBMS=XLSX
73         OUT=WORK.Birth;
74         GETNAMES=YES;
75         SHEET="Birth";
76         RUN;

NOTE: The import data set has 50000 observations and 10 variables.
NOTE: WORK.BIRTH data set was successfully created.
NOTE: PROCEDURE IMPORT used (Total process time):
      real time           3.63 seconds
      user cpu time       3.62 seconds
      system cpu time     0.01 seconds
      memory              4650.71k
      OS Memory           28920.00k
      Timestamp           11/09/2023 09:07:59 PM
      Step Count                        73  Switch Count  2
      Page Faults                       0
      Page Reclaims                     911
      Page Swaps                        0
      Voluntary Context Switches        29
      Involuntary Context Switches      4
      Block Input Operations            4264
      Block Output Operations           12208


77
78                                                        /* Parameters for the test*/
79         /*
80         -Null Hypothesis = (h=0)
81         -Alternative Hypothesis = (h=1)
82         -Alpha = 0.05 is used in the code as the metric of significance to achieve 95% Confidence interval level
83         -Only the variables that have up to 2 levels have been used in these tests
84         */
85
86         /*Test-1*/
87         /*Hypothesis (h=0): Mothers smoking does not affect infant weight*/
88         /*Alternate Hypothesis (h=1): Mothers smoking affects the weight of an infant*/
89
90         PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
91         TITLE "EFFECT OF MOTHER SMOKING ON INFANT'S WEIGHT";
92         CLASS MOMSMOKE;
93         VAR WEIGHT;
94         RUN;

NOTE: PROCEDURE TTEST used (Total process time):
      real time           1.89 seconds
      user cpu time       1.13 seconds
      system cpu time     0.27 seconds
      memory              24996.29k
      OS Memory           47080.00k
      Timestamp           11/09/2023 09:08:01 PM
      Step Count                        74  Switch Count  113
      Page Faults                       0
      Page Reclaims                     53709
      Page Swaps                        0
      Voluntary Context Switches        9972
      Involuntary Context Switches      363
      Block Input Operations            0
      Block Output Operations           121392


95         /*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0004 < 0.05, which means the varianl
95       !  are unequal
96         - confidence interval (226.5 256.4)
97         - For the hypothesis comparing Smoking Mother and Infant Weight, t-value = 0.0001 and p-value = 0.0004
98
99         The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two categori
99       !  are significantly different*/
100
101        /*Test-2*/
102        /*Hypothesis (h=0): The gender of the baby does not affect its weight*/
103        /*Alternative Hypothesis (h=1): The gender of the baby affects its weight*/
```

```
104
105         PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
106         TITLE "GENDER AND WEIGHT";
107         CLASS boy;
108         VAR WEIGHT;
109         RUN;

NOTE: PROCEDURE TTEST used (Total process time):
      real time           1.39 seconds
      user cpu time       0.89 seconds
      system cpu time     0.22 seconds
      memory              17271.96k
      OS Memory           48520.00k
      Timestamp           11/09/2023 09:08:03 PM
      Step Count                        75  Switch Count  111
      Page Faults                       0
      Page Reclaims                     50645
      Page Swaps                        0
      Voluntary Context Switches        9597
      Involuntary Context Switches      3
      Block Input Operations            0
      Block Output Operations           86928


110         /*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0001 < 0.05, which means the varianc
110       !  are unequal
111         - confidence interval (-126.6 -106.8)
112         - For the hypothesis comparing a  Baby Boy and Infant Weight, t-value = -23.18 and p-value = 0.0001
113
114         The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two categori
114       !  are significantly different*/
115
116         /*Test-3*/
117         /*Hypothesis (h=0): A mother's marital status does not affect the weight of their infant*/
118         /*Alternative Hypothesis (h=1): A mother's marital status affects the weight of their infant*/
119
120         PROC ttest DATA = WORK.BIRTH SIDES=2 ALPHA= 0.05 H0=0;
121         TITLE "MOTHER'S MARITAL STATUS AND INFANT'S WEIGHT";
122         CLASS MARRIED;
123         VAR WEIGHT;
124         RUN;

NOTE: PROCEDURE TTEST used (Total process time):
      real time           1.51 seconds
      user cpu time       1.02 seconds
      system cpu time     0.24 seconds
      memory              17058.81k
      OS Memory           48772.00k
      Timestamp           11/09/2023 09:08:04 PM
      Step Count                        76  Switch Count  111
      Page Faults                       0
      Page Reclaims                     51492
      Page Swaps                        0
      Voluntary Context Switches        9980
      Involuntary Context Switches      3
      Block Input Operations            0
      Block Output Operations           106168


125
126         /*Analysis: We are going to use Satterthwaite pool or result since the p-value = 0.0001 < 0.05, which means the varianc
126       !  are unequal
127         - confidence interval (-202.4 -180.2)
128         - For the hypothesis comparing a  Baby Boy and Infant Weight, t-value = -33.88 and p-value = 0.0001
129
130         The conclusion is to reject the null hypothesis and accept the alternative hypothesis as the weight of the two categori
130       !  are significantly different*/
131
132
133
134         OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
144
```

Results: TTest Analysis.sas

EFFECT OF MOTHER SMOKING ON INFANT'S WEIGHT

The TTEST Procedure

Variable: Weight (Weight)

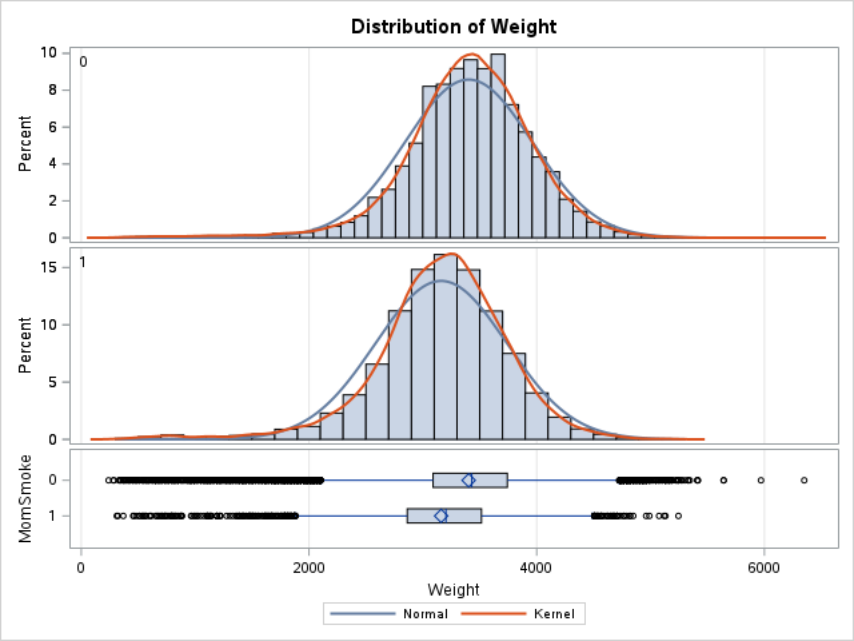
MomSmoke	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		43467	3402.3	558.0	2.6766	240.0	6350.0
1		6533	3160.9	576.8	7.1358	312.0	5245.0
Diff (1-2)	Pooled		241.5	560.5	7.4376		
Diff (1-2)	Satterthwaite		241.5		7.6213		

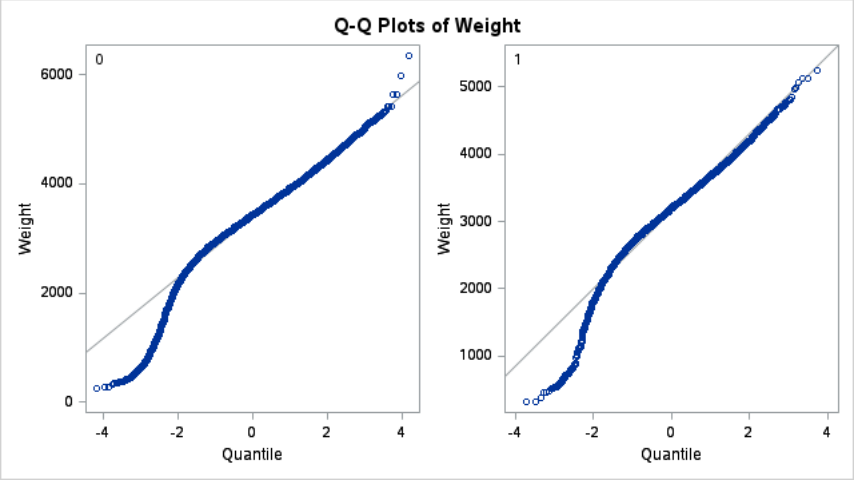
MomSmoke	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0		3402.3	3397.1	3407.6	558.0	554.3	561.8
1		3160.9	3146.9	3174.8	576.8	567.0	586.8

MomSmoke	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
Diff (1-2)	Pooled	241.5	226.9	256.0	560.5	557.1	564.0
Diff (1-2)	Satterthwaite	241.5	226.5	256.4			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	49998	32.46	<.0001
Satterthwaite	Unequal	8474.1	31.68	<.0001

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	6532	43466	1.07	0.0004





GENDER AND WEIGHT

The TTEST Procedure

Variable: Weight (Weight)

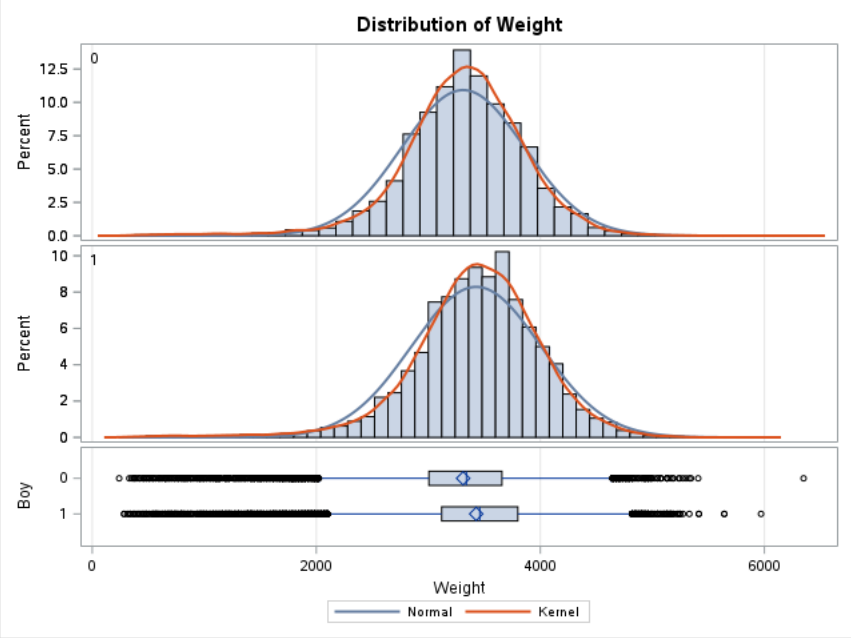
Boy	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		24208	3310.6	547.7	3.5204	240.0	6350.0
1		25792	3427.3	577.7	3.5970	284.0	5970.0
Diff (1-2)	Pooled		-116.7	563.4	5.0416		
Diff (1-2)	Satterthwaite		-116.7		5.0331		

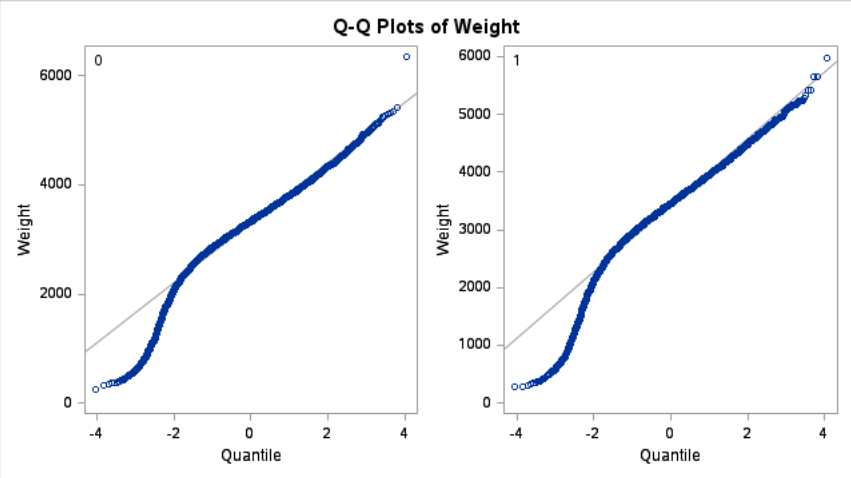
Boy	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0		3310.6	3303.7	3317.5	547.7	542.9	552.7
1		3427.3	3420.2	3434.3	577.7	572.7	582.7
Diff (1-2)	Pooled	-116.7	-126.6	-106.8	563.4	559.9	566.9
Diff (1-2)	Satterthwaite	-116.7	-126.6	-106.8			

Method	Variances	DF	t Value	Pr > |t|

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	49998	-23.15	<.0001
Satterthwaite	Unequal	49993	-23.18	<.0001

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	25791	24207	1.11	<.0001





MOTHER'S MARITAL STATUS AND INFANT'S WEIGHT

The TTEST Procedure

Variable: Weight (Weight)

Married	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
0		14369	3234.4	579.0	4.8302	284.0	6350.0
1		35631	3425.7	551.8	2.9231	240.0	5970.0
Diff (1-2)	Pooled		-191.3	559.7	5.5315		
Diff (1-2)	Satterthwaite		-191.3		5.6459		

Married	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0		3234.4	3225.0	3243.9	579.0	572.4	585.8
1		3425.7	3420.0	3431.5	551.8	547.8	555.9
Diff (1-2)	Pooled	-191.3	-202.1	-180.5	559.7	556.3	563.2
Diff (1-2)	Satterthwaite	-191.3	-202.4	-180.2			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	49998	-34.58	<.0001
Satterthwaite	Unequal	25443	-33.88	<.0001

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	14368	35630	1.10	<.0001