```
1          OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
68
69         *AST 503
70         Program 8
71         Zainab Akinjobi
72         Check assumptions of ANOVA;
73
74         *The response variable is weight gain;
75
76         data   mydata  ;
77
78            seed  = 17717 ;
79
80            do  diet  = 1 to  4 ;
81               do  reps  =  1 to  10  ;
82               wtgain =  1.4* diet    +   2.1* rannor(seed );
83               output;
84            end;
85            end;
86
87           *In the glm, the categorical variable is diet and dependent variable is weight gain
88            Resout is a new dataset.
89            We are going to ask for the residual using 'resid' and the mean using 'pred'
90            We are testing equal variance with Levene.
91            From the result, we fail to reject equal variance because the variances are not different enough to detect equal
91       ! variance(Levene test).
92            For the test for normality (eij), the pvalue is 0.2298 so, we will reject the null, hence the nulls are not normal.
93            The histogram does not look bell-shaped also, so the errors are not normally distributed.
94            Most of the dots on the scatter plot do not follow the line, this further depicts that the errors are not normally
94       ! distributed.
95            ;

NOTE: The data set WORK.MYDATA has 40 observations and 4 variables.
NOTE: DATA statement used (Total process time):
      real time           0.00 seconds
      user cpu time       0.00 seconds
      system cpu time     0.00 seconds
      memory              684.21k
      OS Memory           27300.00k
      Timestamp           12/13/2021 03:29:15 AM
      Step Count                        114  Switch Count  2
      Page Faults                       0
      Page Reclaims                     199
      Page Swaps                        0
      Voluntary Context Switches        9
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           272


96            proc glm  data  = mydata  ;
97            class  diet  ;
98            model  wtgain  = diet  / ss3 ;
99
100           means  diet  /  hovtest  = levene  ;
101           means  diet  / lsd  cldiff  ;
102           output  out  =resout      r = resid  p = pred  ;
103              title1  ' ANOVA for diet effect ';
104
105
106           *  resid  is  eij_hat  and  pred  is  ybar_i  ;
107
108
109           *  Test  for normality  of errors  ------  ;
110
111          *   We are using univariate on the new data set 'resout' ;
112

NOTE: The data set WORK.RESOUT has 40 observations and 6 variables.
NOTE: PROCEDURE GLM used (Total process time):
      real time           0.40 seconds
      user cpu time       0.19 seconds
      system cpu time     0.03 seconds
      memory              11082.18k
      OS Memory           35644.00k
      Timestamp           12/13/2021 03:29:16 AM
      Step Count                        115  Switch Count  5
      Page Faults                       0
      Page Reclaims                     2734
      Page Swaps                        0
      Voluntary Context Switches        1143
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           1400


113           proc univariate  data  = resout   normal plot ;
114           var  resid  ;
```

```
115          qqplot resid  ;
116          title1 ' check  for nomality ';
117
118
119

NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time           0.28 seconds
      user cpu time       0.14 seconds
      system cpu time     0.01 seconds
      memory              8391.06k
      OS Memory           40712.00k
      Timestamp           12/13/2021 03:29:16 AM
      Step Count                        116  Switch Count  1
      Page Faults                       0
      Page Reclaims                     2309
      Page Swaps                        0
      Voluntary Context Switches        315
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           528


120          proc  sgplot  data  = resout  ;
121          scatter  x = pred  y  = resid  ;
122          title1  ' Residual plot ';
123
124          run;

NOTE: PROCEDURE SGPLOT used (Total process time):
      real time           0.08 seconds
      user cpu time       0.04 seconds
      system cpu time     0.01 seconds
      memory              1345.50k
      OS Memory           35372.00k
      Timestamp           12/13/2021 03:29:16 AM
      Step Count                        117  Switch Count  2
      Page Faults                       0
      Page Reclaims                     300
      Page Swaps                        0
      Voluntary Context Switches        141
      Involuntary Context Switches      0
      Block Input Operations            0
      Block Output Operations           368

NOTE: There were 40 observations read from the data set WORK.RESOUT.

125
126
127        OPTIONS NONOTES NOSTIMER NOSOURCE NOSYNTAXCHECK;
137
```