Chapter. 01

[비주얼코딩] 코딩없이 하는 데이터 분석 SAS

06. 회귀분석

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직장인을 위한 데이터 분석

강사. 최윤진

Chapter. 06

코딩 없이 하는 데이터 분석 SAS
06. 회귀분석

I 데이터

http://bit.ly/vc-sas-ad

변수	변수 설명
TV	TV 광고비
radio	라디오 광고비
newspaper	신문 광고비
sales	매출액

I 회귀분석

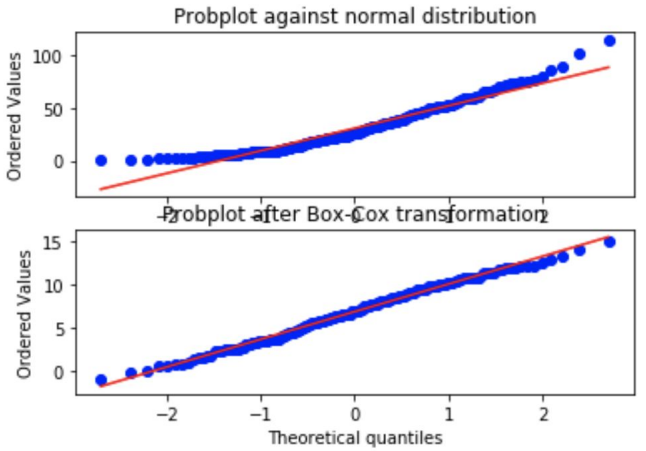
```
[ ]
import statsmodels.formula.api as sm
model1 = sm.ols(formula="sales~TV+radio+newspaper", data=df).fit()
#sales~TV+radio+newspaper
print(model1.summary())
```

```
                            OLS Regression Results
==============================================================================
Dep. Variable:                  sales   R-squared:                       0.897
Model:                            OLS   Adj. R-squared:                  0.896
Method:                 Least Squares   F-statistic:                     570.3
Date:                Tue, 10 Mar 2020   Prob (F-statistic):           1.58e-96
Time:                        06:24:46   Log-Likelihood:                -386.18
No. Observations:                 200   AIC:                             780.4
Df Residuals:                     196   BIC:                             793.6
Df Model:                           3
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept      2.9389      0.312      9.422      0.000       2.324       3.554
TV             0.0458      0.001     32.809      0.000       0.043       0.049
radio          0.1885      0.009     21.893      0.000       0.172       0.206
newspaper     -0.0010      0.006     -0.177      0.860      -0.013       0.011
==============================================================================
Omnibus:                       60.414   Durbin-Watson:                   2.084
Prob(Omnibus):                  0.000   Jarque-Bera (JB):              151.241
Skew:                          -1.327   Prob(JB):                     1.44e-33
Kurtosis:                       6.332   Cond. No.                         454.
==============================================================================
```

```
[ ]
import matplotlib.pyplot as plt

fig = plt.figure()
ax1 = fig.add_subplot(211)
x = df['newspaper']
prob = stats.probplot(x, dist=stats.norm, plot=ax1)
ax1.set_xlabel('')
ax1.set_title('Probplot against normal distribution')
#We now use boxcox to transform the data so it's closest to normal:
ax2 = fig.add_subplot(212)
df['newspaper'], _ = stats.boxcox(x)
prob = stats.probplot(df['newspaper'], dist=stats.norm, plot=ax2)
ax2.set_title('Probplot after Box-Cox transformation')

plt.show()
```



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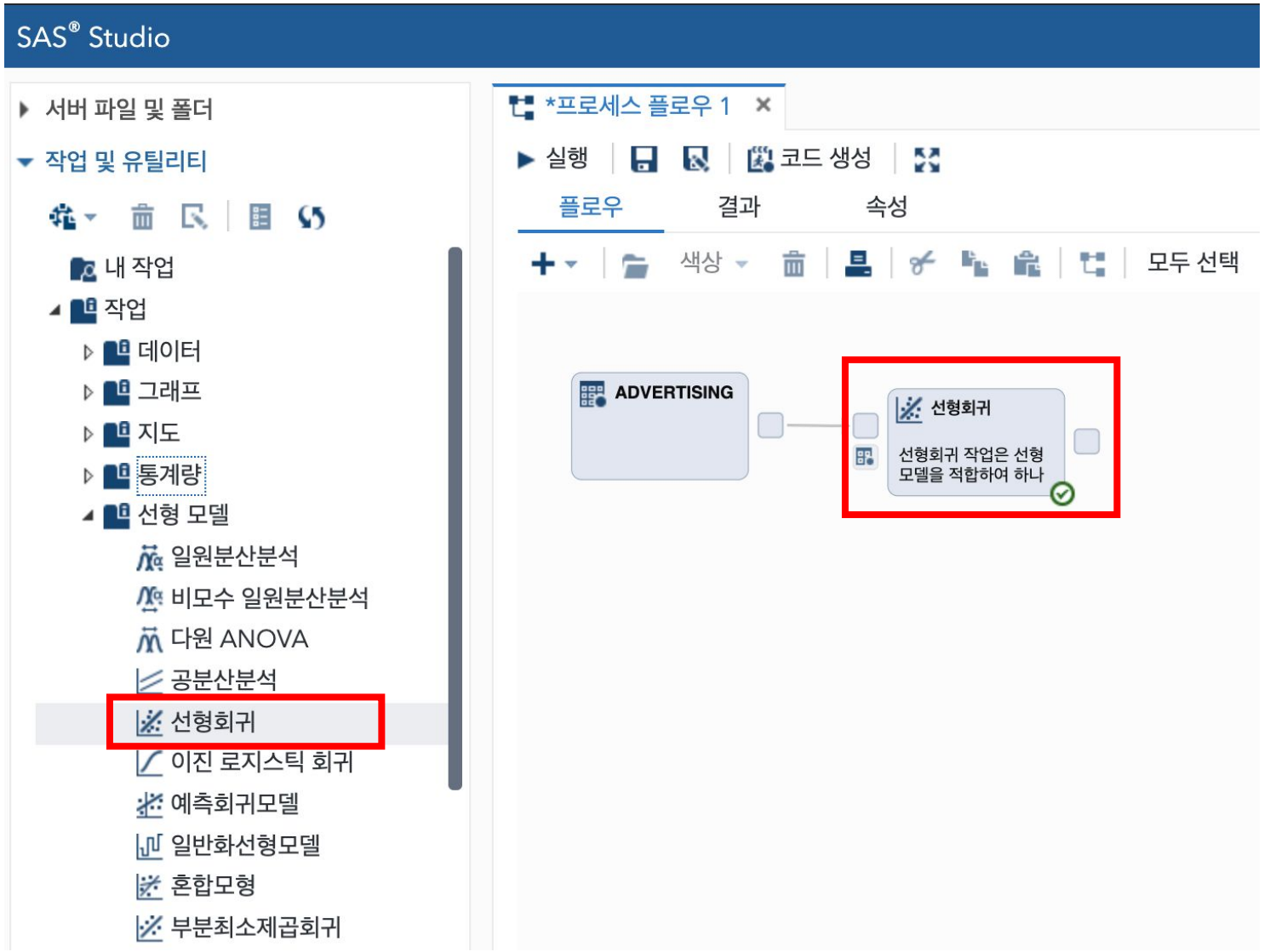
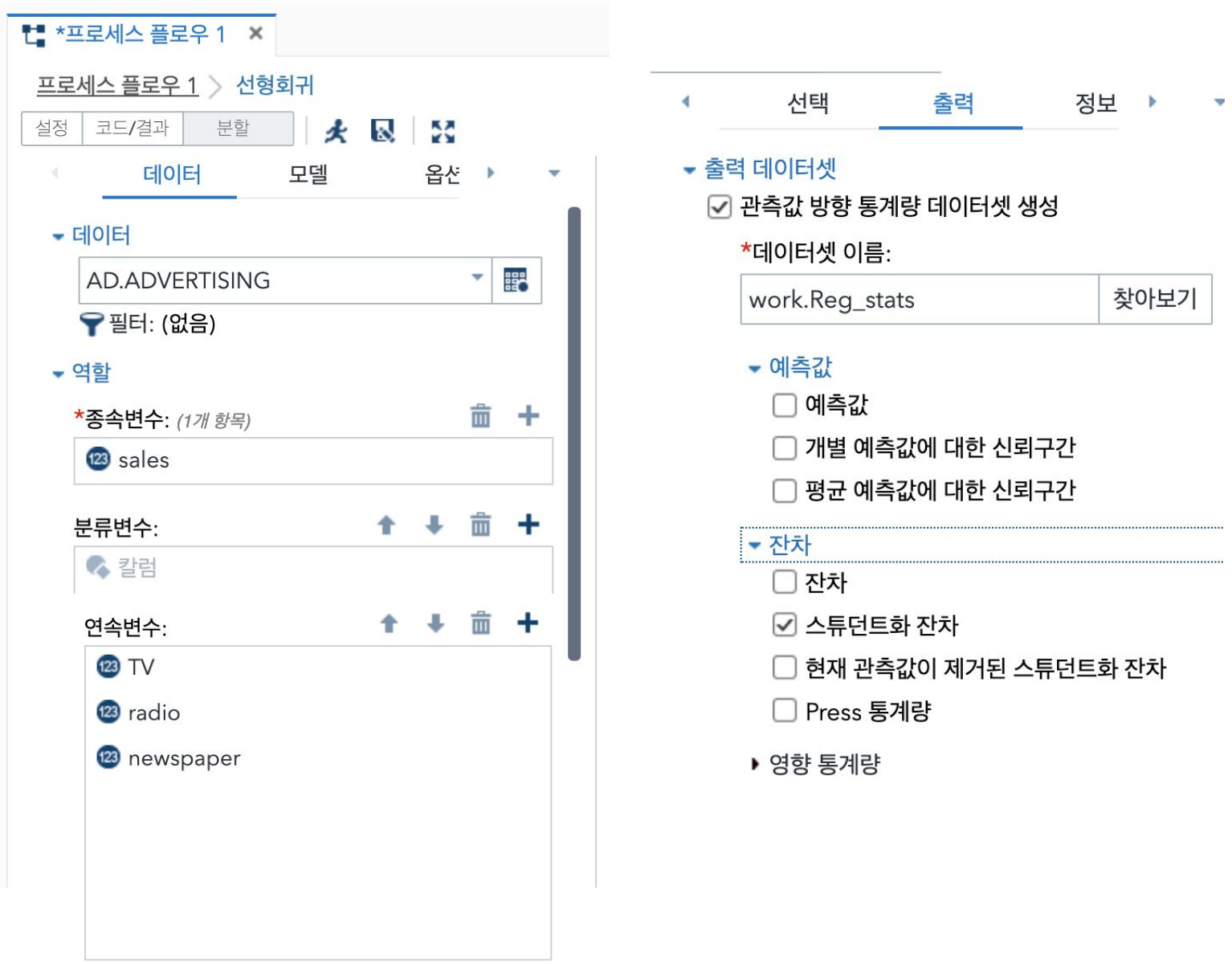
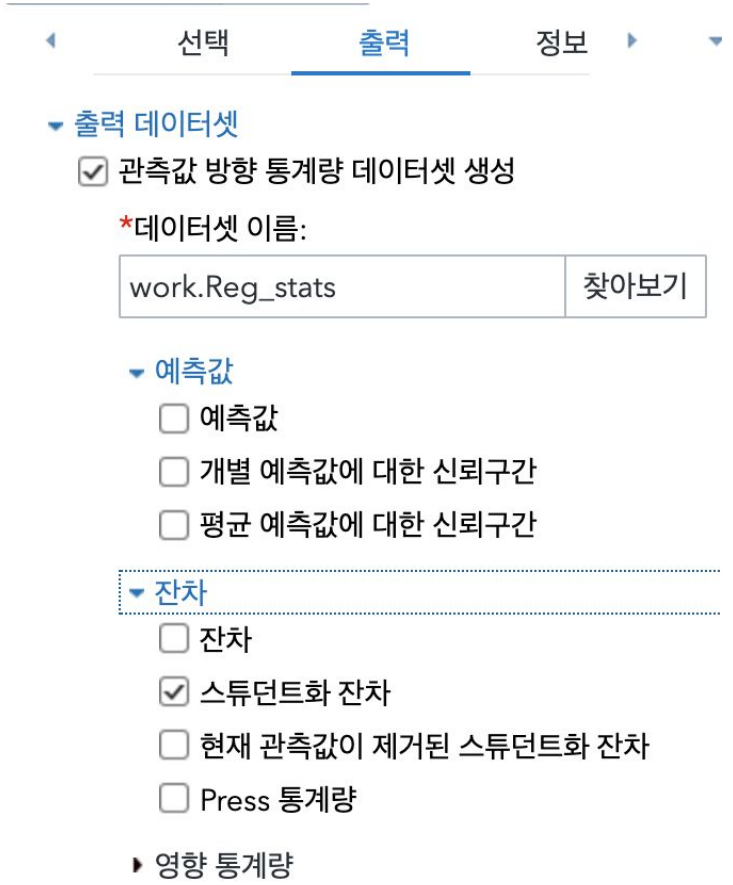
I 회귀분석



I 회귀분석



I 회귀분석



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==============================================================================
```

Model: MODEL1
Dependent Variable: sales

Number of Observations Read	200
Number of Observations Used	200

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	4860.32349	1620.10783	570.27	<.0001
Error	196	556.82526	2.84095		
Corrected Total	199	5417.14875			

Root MSE	1.68551	R-Square	0.8972
Dependent Mean	14.02250	Adj R-Sq	0.8956
Coeff Var	12.02004		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.93889	0.31191	9.42	<.0001
TV	1	0.04576	0.00139	32.81	<.0001
radio	1	0.18853	0.00861	21.89	<.0001
newspaper	1	-0.00104	0.00587	-0.18	0.8599

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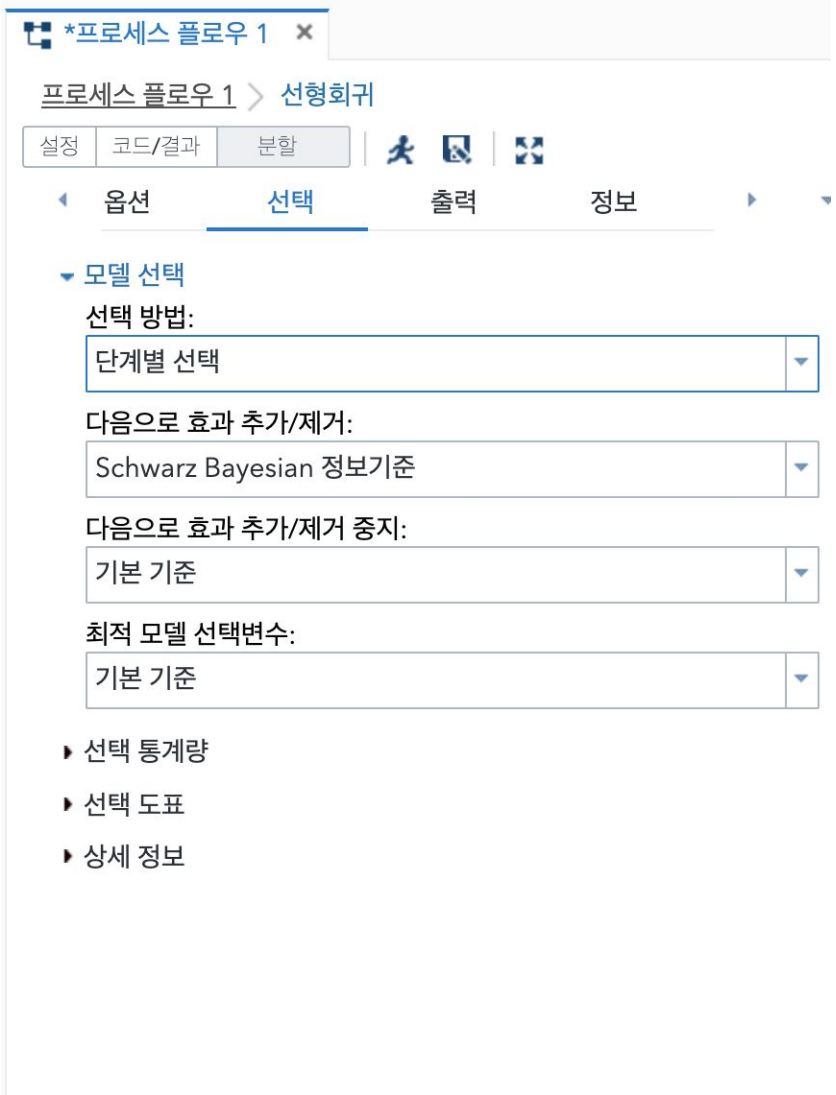

Parameter Estimates

Parameter	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	2.921100	0.294490	9.92	<.0001
TV	1	0.045755	0.001390	32.91	<.0001
radio	1	0.187994	0.008040	23.38	<.0001