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In [1]: import numpy as np

In [2]: import pandas as pd

In [4]: import matplotlib.pyplot as plt

In [9]: pip install statsmodels

Requirement already satisfied: statsmodels in c:\users\acer\anaconda3\lib\site-packages (0.12.2)
Requirement already satisfied: numpy>=1.15 in c:\users\acer\anaconda3\lib\site-packages (from statsmodels) (1.20.1)
Requirement already satisfied: scipy>=1.1 in c:\users\acer\anaconda3\lib\site-packages (from statsmodels) (1.6.2)
Requirement already satisfied: pandas>=0.21 in c:\users\acer\anaconda3\lib\site-packages (from statsmodels) (1.2.4)
Requirement already satisfied: patsy>=0.5 in c:\users\acer\anaconda3\lib\site-packages (from statsmodels) (0.5.1)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\acer\anaconda3\lib\site-packages (from pandas>=0.21->statsmodels) (2.8.1)
Requirement already satisfied: pytz>=2017.3 in c:\users\acer\anaconda3\lib\site-packages (from pandas>=0.21->statsmodels) (2021.1)
Requirement already satisfied: six in c:\users\acer\anaconda3\lib\site-packages (from patsy>=0.5->statsmodels) (1.15.0)
Note: you may need to restart the kernel to use updated packages.

In [11]: import statsmodels.api as sm

In [26]: df=pd.read_excel("C:\Users\acer\Downloads\Consumer Spending by Generation.xlsx")

In [27]: df

Out[27]:
```

	% of Spending	Category	Description	End Age	Generation (Generation Details)	Generation	Color Order	Start Age	Year Born	
0	0.238	Restaurants	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
1	0.217	Groceries	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
2	0.108	Gasoline	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
3	0.030	Pharmacies	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
4	0.045	Furniture/Building	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
5	0.185	Elec/Hobbies/Clothing	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
6	0.177	General/Misc	Millennials were born between 1981 and 1997_...	38		Millennials	Millennials	Millennials	22	1981-1997
7	0.177	Restaurants	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
8	0.253	Groceries	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
9	0.097	Gasoline	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
10	0.029	Pharmacies	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
11	0.073	Furniture/Building	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
12	0.168	Elec/Hobbies/Clothing	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
13	0.203	General/Misc	Generation Xers were born between 1965 and 198...	54	Generation X	Generation X	Generation X	39	1965-1980	
14	0.135	Restaurants	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
15	0.272	Groceries	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
16	0.085	Gasoline	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
17	0.037	Pharmacies	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
18	0.100	Furniture/Building	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
19	0.147	Elec/Hobbies/Clothing	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
20	0.223	General/Misc	Baby Boomers were born between 1946 and 1964_...	73	Baby Boomers	Baby Boomers	Baby Boomers	55	1946-1964	
21	0.128	Restaurants	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
22	0.304	Groceries	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
23	0.067	Gasoline	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
24	0.064	Pharmacies	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
25	0.094	Furniture/Building	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
26	0.118	Elec/Hobbies/Clothing	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	
27	0.225	General/Misc	The traditionalist generation was born before ...	38	Traditionalists	Traditionalists	Traditionalists	22	1945 and before	

```
In [28]: df.shape

Out[28]: (28, 9)

In [29]: df.dtypes

Out[29]: % of Spending          float64
Category              object
Description            object
End Age               int64
Generation (Generation Details)  object
Generation            object
Color Order           object
Start Age             int64
Year Born            object
dtype: object

In [30]: df.info

Out[30]: <bound method DataFrame.info of % of Spending          Category \
0          0.238          Restaurants          38
1          0.217          Groceries          38
2          0.108          Gasoline          38
3          0.030          Pharmacies          38
4          0.045          Furniture/Building          38
5          0.185          Elec/Hobbies/Clothing          38
6          0.177          General/Misc          38
7          0.177          Restaurants          54
8          0.253          Groceries          54
9          0.097          Gasoline          54
10         0.029          Pharmacies          54
11         0.073          Furniture/Building          54
12         0.168          Elec/Hobbies/Clothing          54
13         0.203          General/Misc          54
14         0.135          Restaurants          73
15         0.272          Groceries          73
16         0.085          Gasoline          73
17         0.037          Pharmacies          73
18         0.100          Furniture/Building          73
19         0.147          Elec/Hobbies/Clothing          73
20         0.223          General/Misc          73
21         0.128          Restaurants          38
22         0.304          Groceries          38
23         0.067          Gasoline          38
24         0.064          Pharmacies          38
25         0.094          Furniture/Building          38
26         0.118          Elec/Hobbies/Clothing          38
27         0.225          General/Misc          38

Description      End Age \
0  Millennials were born between 1981 and 1997_...      38
1  Millennials were born between 1981 and 1997_...      38
2  Millennials were born between 1981 and 1997_...      38
3  Millennials were born between 1981 and 1997_...      38
4  Millennials were born between 1981 and 1997_...      38
5  Millennials were born between 1981 and 1997_...      38
6  Millennials were born between 1981 and 1997_...      38
7  Generation Xers were born between 1965 and 198...      54
8  Generation Xers were born between 1965 and 198...      54
9  Generation Xers were born between 1965 and 198...      54
10 Generation Xers were born between 1965 and 198...      54
11 Generation Xers were born between 1965 and 198...      54
12 Generation Xers were born between 1965 and 198...      54
13 Generation Xers were born between 1965 and 198...      54
14 Baby Boomers were born between 1946 and 1964_...      73
15 Baby Boomers were born between 1946 and 1964_...      73
16 Baby Boomers were born between 1946 and 1964_...      73
17 Baby Boomers were born between 1946 and 1964_...      73
18 Baby Boomers were born between 1946 and 1964_...      73
19 Baby Boomers were born between 1946 and 1964_...      73
20 Baby Boomers were born between 1946 and 1964_...      73
21 The traditionalist generation was born before ...      38
22 The traditionalist generation was born before ...      38
23 The traditionalist generation was born before ...      38
24 The traditionalist generation was born before ...      38
25 The traditionalist generation was born before ...      38
26 The traditionalist generation was born before ...      38
27 The traditionalist generation was born before ...      38

Generation (Generation Details)      Generation      Color Order \
0          Millennials          Millennials          Millennials
1          Millennials          Millennials          Millennials
2          Millennials          Millennials          Millennials
3          Millennials          Millennials          Millennials
4          Millennials          Millennials          Millennials
5          Millennials          Millennials          Millennials
6          Millennials          Millennials          Millennials
7          Generation X          Generation X          Generation X
8          Generation X          Generation X          Generation X
9          Generation X          Generation X          Generation X
10         Generation X          Generation X          Generation X
11         Generation X          Generation X          Generation X
12         Generation X          Generation X          Generation X
13         Generation X          Generation X          Generation X
14         Baby Boomers          Baby Boomers          Baby Boomers
15         Baby Boomers          Baby Boomers          Baby Boomers
16         Baby Boomers          Baby Boomers          Baby Boomers
17         Baby Boomers          Baby Boomers          Baby Boomers
18         Baby Boomers          Baby Boomers          Baby Boomers
19         Baby Boomers          Baby Boomers          Baby Boomers
20         Baby Boomers          Baby Boomers          Baby Boomers
21         Traditionalists        Traditionalists        Traditionalists
22         Traditionalists        Traditionalists        Traditionalists
23         Traditionalists        Traditionalists        Traditionalists
24         Traditionalists        Traditionalists        Traditionalists
25         Traditionalists        Traditionalists        Traditionalists
26         Traditionalists        Traditionalists        Traditionalists
27         Traditionalists        Traditionalists        Traditionalists

Start Age      Year Born
0          22      1981-1997
1          22      1981-1997
2          22      1981-1997
3          22      1981-1997
4          22      1981-1997
5          22      1981-1997
6          22      1981-1997
7          39      1965-1980
8          39      1965-1980
9          39      1965-1980
10         39      1965-1980
11         39      1965-1980
12         39      1965-1980
13         39      1965-1980
14         55      1946-1964
15         55      1946-1964
16         55      1946-1964
17         55      1946-1964
18         55      1946-1964
19         55      1946-1964
20         55      1946-1964
21         22      1945 and before
22         22      1945 and before
23         22      1945 and before
24         22      1945 and before
25         22      1945 and before
26         22      1945 and before
27         22      1945 and before >

In [31]: df.columns

Out[31]: Index(['% of Spending', 'Category', 'Description', 'End Age',
      'Generation (Generation Details)', 'Generation', 'Color Order',
      'Start Age', 'Year Born'],
      dtype='object')

In [39]: y=df["% of Spending"]

In [40]: y

Out[40]: 0          0.238
1          0.217
2          0.108
3          0.030
4          0.045
5          0.185
6          0.177
7          0.177
8          0.253
9          0.097
10         0.029
11         0.073
12         0.168
13         0.203
14         0.135
15         0.272
16         0.085
17         0.037
18         0.100
19         0.147
20         0.223
21         0.128
22         0.304
23         0.067
24         0.064
25         0.094
26         0.118
27         0.225
Name: % of Spending, dtype: float64

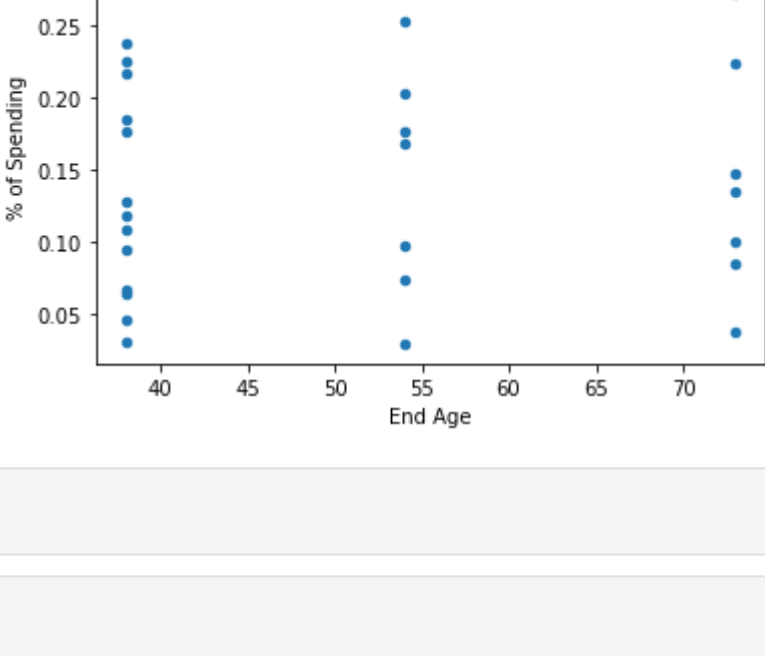
In [50]: x=df["End Age"]

In [51]: x

Out[51]: 0          38
1          38
2          38
3          38
4          38
5          38
6          38
7          54
8          54
9          54
10         54
11         54
12         54
13         54
14         73
15         73
16         73
17         73
18         73
19         73
20         73
21         38
22         38
23         38
24         38
25         38
26         38
27         38
Name: End Age, dtype: int64

In [63]: df.plot(x="End Age",y="% of Spending",kind='scatter')

Out[63]: <AxesSubplot: xlabel='End Age', ylabel='% of Spending'>
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In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [53]: x = sm.add_constant(x)

In [54]: mod=sm.OLS(y,x)

In [55]: res = mod.fit()

In [56]: print(res.summary())

OLS Regression Results
=====
Dep. Variable:          % of Spending      R-squared:                0.000
Model:                  OLS              Adj. R-squared:           -0.038
Method:                 Least Squares     F-statistic:             1.333e-05
Date:                   Mon, 12 Jul 2021   Prob (F-statistic):       0.997
Time:                   18:43:10           Log-Likelihood:          32.062
No. Observations:       28               AIC:                    -60.12
DF Residuals:           26               BIC:                    -57.46
DF Model:               1
Covariance Type:        nonrobust
=====
coef    std err          t      P>|t|      [0.025   0.975]
-----
const          0.1430         0.055         2.587   0.016   0.029   0.257
End Age    -3.826e-06         0.001        -0.004   0.997   -0.002   0.002
=====
Omnibus:                    2.512   Durbin-Watson:           1.608
Prob(Omnibus):              0.295   Jarque-Bera (JB):         1.483
Skew:                      0.279   Prob(JB):                 0.476
Kurtosis:                   2.020   Cond. No.                 193.
=====

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

In [ ]:

In [ ]:

In [ ]:
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