21bit0481-asst-2-1

September 13, 2023

[34]:
```
import seaborn as sns
import matplotlib.pyplot as plt
```

[3]:
```
df=sns.load_dataset('car_crashes')
df
```

[3]:

	total	speeding	alcohol	not_distracted	no_previous	ins_premium	\
0	18.8	7.332	5.640	18.048	15.040	784.55	
1	18.1	7.421	4.525	16.290	17.014	1053.48	
2	18.6	6.510	5.208	15.624	17.856	899.47	
3	22.4	4.032	5.824	21.056	21.280	827.34	
4	12.0	4.200	3.360	10.920	10.680	878.41	
5	13.6	5.032	3.808	10.744	12.920	835.50	
6	10.8	4.968	3.888	9.396	8.856	1068.73	
7	16.2	6.156	4.860	14.094	16.038	1137.87	
8	5.9	2.006	1.593	5.900	5.900	1273.89	
9	17.9	3.759	5.191	16.468	16.826	1160.13	
10	15.6	2.964	3.900	14.820	14.508	913.15	
11	17.5	9.450	7.175	14.350	15.225	861.18	
12	15.3	5.508	4.437	13.005	14.994	641.96	
13	12.8	4.608	4.352	12.032	12.288	803.11	
14	14.5	3.625	4.205	13.775	13.775	710.46	
15	15.7	2.669	3.925	15.229	13.659	649.06	
16	17.8	4.806	4.272	13.706	15.130	780.45	
17	21.4	4.066	4.922	16.692	16.264	872.51	
18	20.5	7.175	6.765	14.965	20.090	1281.55	
19	15.1	5.738	4.530	13.137	12.684	661.88	
20	12.5	4.250	4.000	8.875	12.375	1048.78	
21	8.2	1.886	2.870	7.134	6.560	1011.14	
22	14.1	3.384	3.948	13.395	10.857	1110.61	
23	9.6	2.208	2.784	8.448	8.448	777.18	
24	17.6	2.640	5.456	1.760	17.600	896.07	
25	16.1	6.923	5.474	14.812	13.524	790.32	
26	21.4	8.346	9.416	17.976	18.190	816.21	
27	14.9	1.937	5.215	13.857	13.410	732.28	
28	14.7	5.439	4.704	13.965	14.553	1029.87	
29	11.6	4.060	3.480	10.092	9.628	746.54	

30	11.2	1.792	3.136	9.632	8.736	1301.52
31	18.4	3.496	4.968	12.328	18.032	869.85
32	12.3	3.936	3.567	10.824	9.840	1234.31
33	16.8	6.552	5.208	15.792	13.608	708.24
34	23.9	5.497	10.038	23.661	20.554	688.75
35	14.1	3.948	4.794	13.959	11.562	697.73
36	19.9	6.368	5.771	18.308	18.706	881.51
37	12.8	4.224	3.328	8.576	11.520	804.71
38	18.2	9.100	5.642	17.472	16.016	905.99
39	11.1	3.774	4.218	10.212	8.769	1148.99
40	23.9	9.082	9.799	22.944	19.359	858.97
41	19.4	6.014	6.402	19.012	16.684	669.31
42	19.5	4.095	5.655	15.990	15.795	767.91
43	19.4	7.760	7.372	17.654	16.878	1004.75
44	11.3	4.859	1.808	9.944	10.848	809.38
45	13.6	4.080	4.080	13.056	12.920	716.20
46	12.7	2.413	3.429	11.049	11.176	768.95
47	10.6	4.452	3.498	8.692	9.116	890.03
48	23.8	8.092	6.664	23.086	20.706	992.61
49	13.8	4.968	4.554	5.382	11.592	670.31
50	17.4	7.308	5.568	14.094	15.660	791.14

	ins_losses	abbrev
0	145.08	AL
1	133.93	AK
2	110.35	AZ
3	142.39	AR
4	165.63	CA
5	139.91	CO
6	167.02	CT
7	151.48	DE
8	136.05	DC
9	144.18	FL
10	142.80	GA
11	120.92	HI
12	82.75	ID
13	139.15	IL
14	108.92	IN
15	114.47	IA
16	133.80	KS
17	137.13	KY
18	194.78	LA
19	96.57	ME
20	192.70	MD
21	135.63	MA
22	152.26	MI
23	133.35	MN

```
24      155.77     MS
25      144.45     MO
26       85.15     MT
27      114.82     NE
28      138.71     NV
29      120.21     NH
30      159.85     NJ
31      120.75     NM
32      150.01     NY
33      127.82     NC
34      109.72     ND
35      133.52     OH
36      178.86     OK
37      104.61     OR
38      153.86     PA
39      148.58     RI
40      116.29     SC
41       96.87     SD
42      155.57     TN
43      156.83     TX
44      109.48     UT
45      109.61     VT
46      153.72     VA
47      111.62     WA
48      152.56     WV
49      106.62     WI
50      122.04     WY
```

[4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51 entries, 0 to 50
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   total           51 non-null     float64
 1   speeding        51 non-null     float64
 2   alcohol         51 non-null     float64
 3   not_distracted  51 non-null     float64
 4   no_previous     51 non-null     float64
 5   ins_premium     51 non-null     float64
 6   ins_losses      51 non-null     float64
 7   abbrev          51 non-null     object
dtypes: float64(7), object(1)
memory usage: 3.3+ KB
```

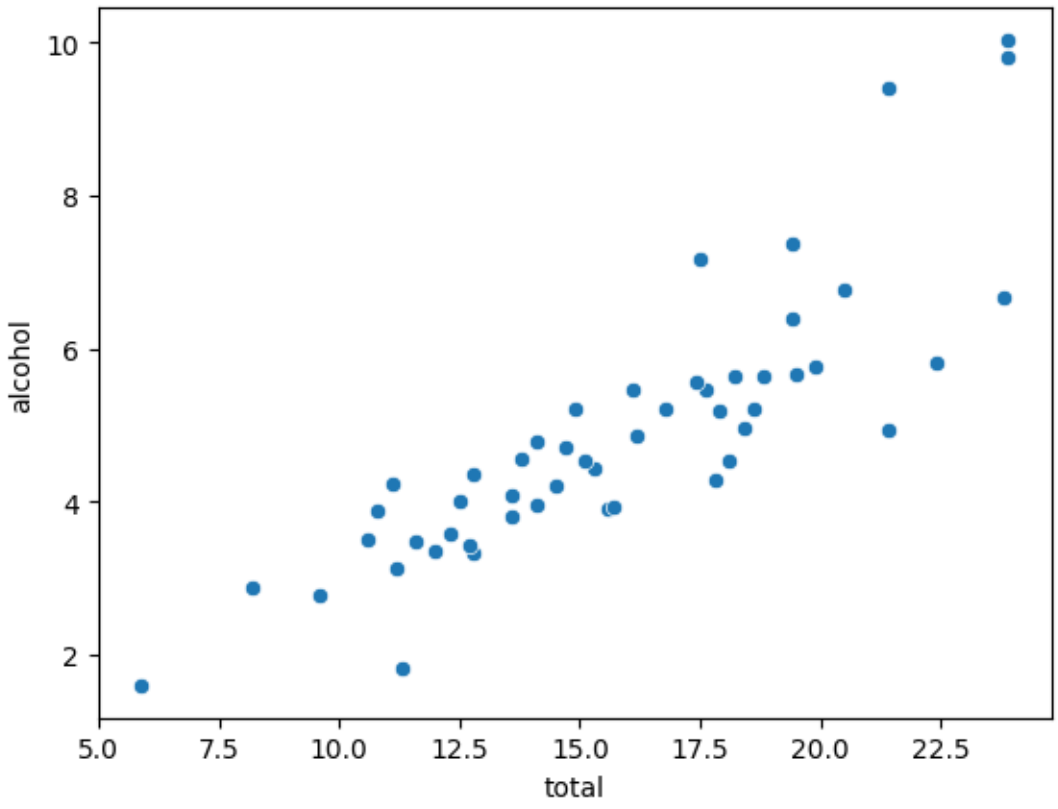
[5]:
```
df.head(5)
```

[5]:

	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_losses	abbrev
0	18.8	7.332	5.640	18.048	15.040	784.55	145.08	AL
1	18.1	7.421	4.525	16.290	17.014	1053.48	133.93	AK
2	18.6	6.510	5.208	15.624	17.856	899.47	110.35	AZ
3	22.4	4.032	5.824	21.056	21.280	827.34	142.39	AR
4	12.0	4.200	3.360	10.920	10.680	878.41	165.63	CA

[6]:
```
sns.scatterplot(x='total',y='alcohol',data=df)
```

[6]:
```
<Axes: xlabel='total', ylabel='alcohol'>
```

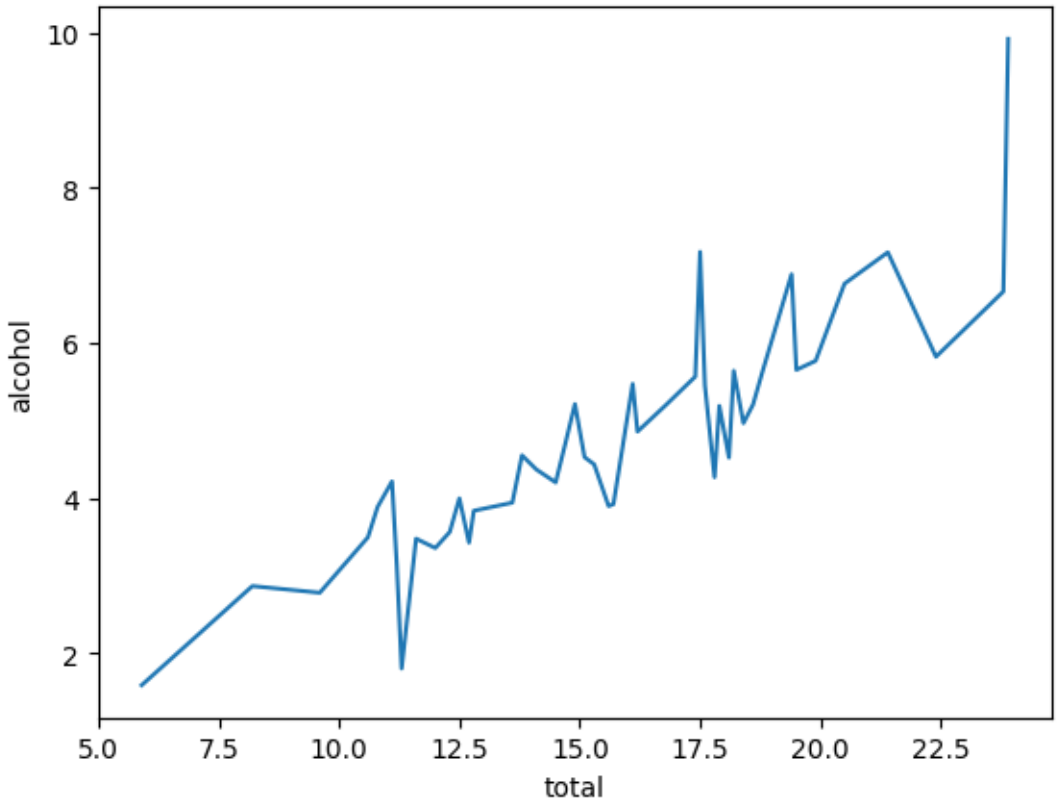


[7]:
```
#Inference: from the plot we can say that the total car crashes increases with␣
↪the increase in alcohol consumption.
```

[8]:
```
sns.lineplot(x='total',y='alcohol',data=df,ci=None)
```

```
<ipython-input-8-9720dd68e387>:1: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effect.

  sns.lineplot(x='total',y='alcohol',data=df,ci=None)
```

[8]:
```
<Axes: xlabel='total', ylabel='alcohol'>
```



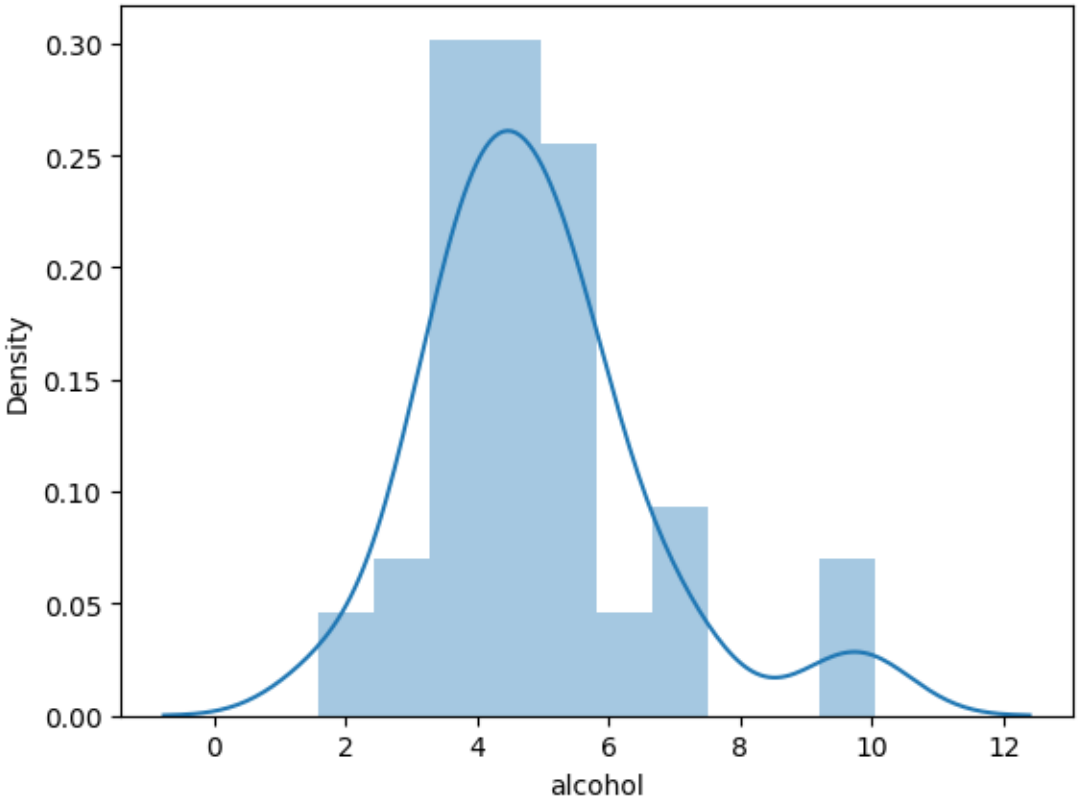
[9]:
```
#Inference: from the plot we can say that the total car crashes increases with␣
↪the increse in alcohol consumption.
```

[10]:
```
sns.distplot(df['alcohol'])
```

```
<ipython-input-10-570de8ff0310>:1: UserWarning:

`distplot` is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `displot` (a figure-level function with
similar flexibility) or `histplot` (an axes-level function for histograms).
```

```
For a guide to updating your code to use the new functions, please see
https://gist.github.com/mwaskom/de44147ed2974457ad6372750bbe5751

  sns.distplot(df['alcohol'])
```

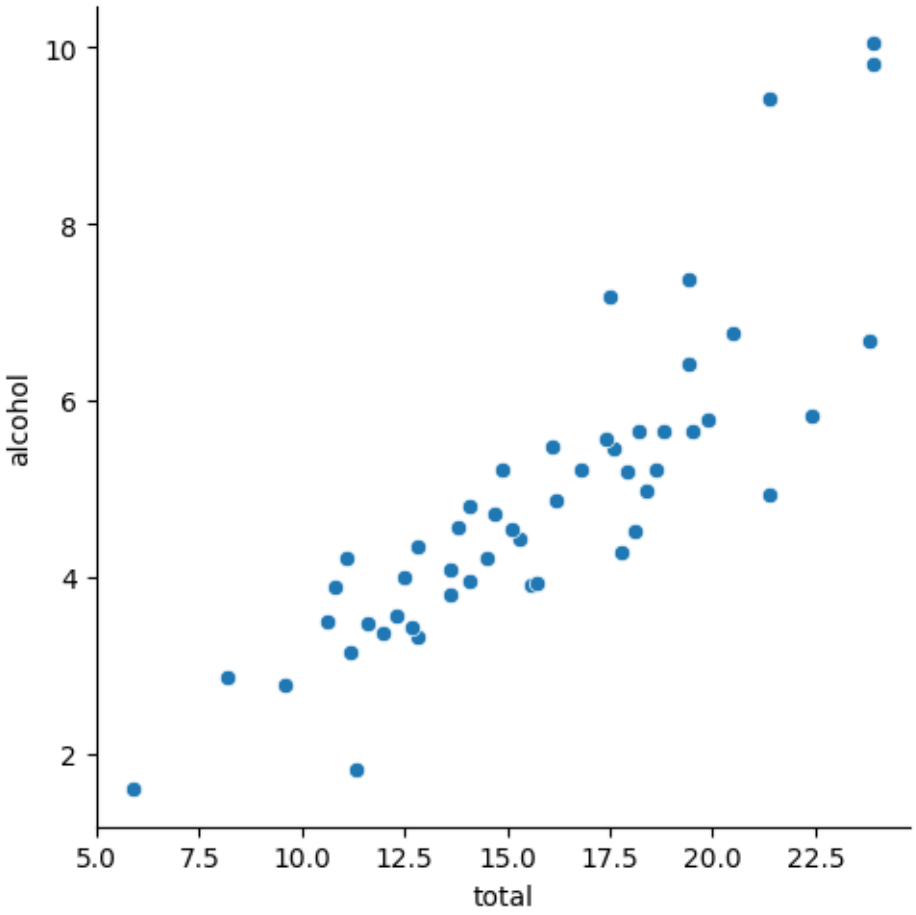
[10]:
```
<Axes: xlabel='alcohol', ylabel='Density'>
```



[11]:
```
#Inference: from the plot we can say that the maximum 0.30 leads to the mode of␣
↪the distribution.
```

[12]:
```
sns.relplot(x="total",y="alcohol",data=df)
```

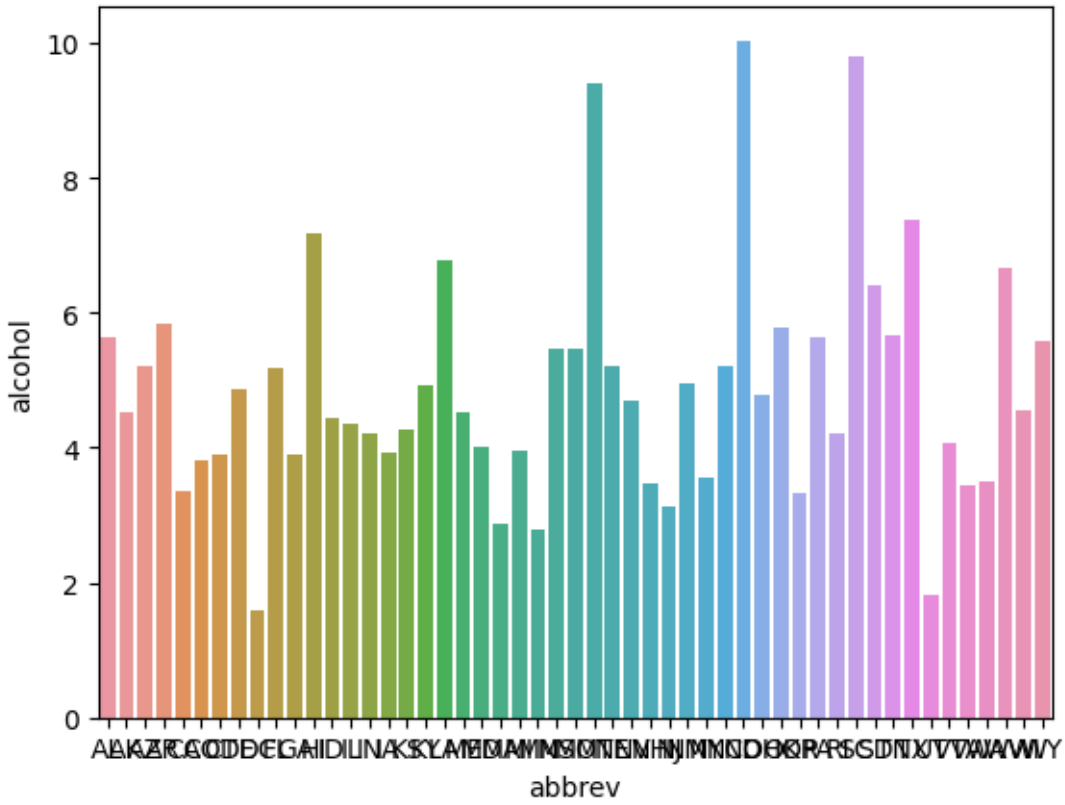
[12]:
```
<seaborn.axisgrid.FacetGrid at 0x7bdeec54ceb0>
```



[13]:
```
sns.barplot(data=df,x="abbrev",y="alcohol",ci=None)
```

```
<ipython-input-13-455bd05d1ba9>:1: FutureWarning:

The `ci` parameter is deprecated. Use `errorbar=None` for the same effect.

  sns.barplot(data=df,x="abbrev",y="alcohol",ci=None)
```

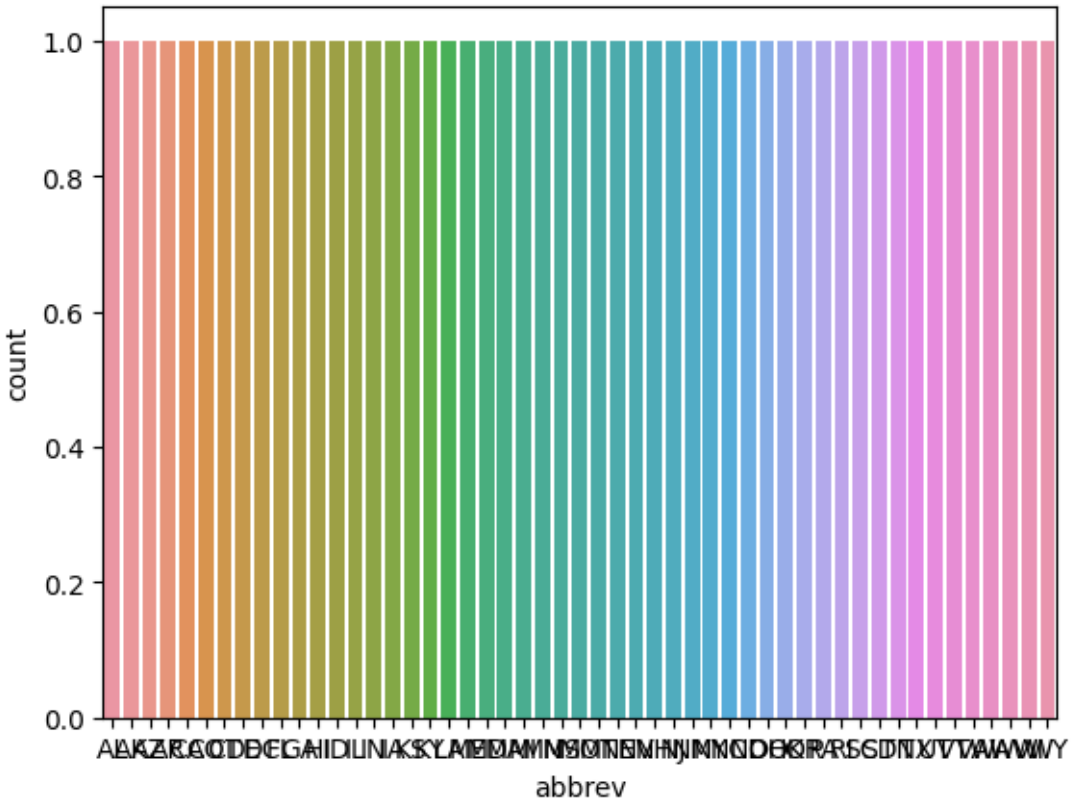
[13]:
```
<Axes: xlabel='abbrev', ylabel='alcohol'>
```



[14]:
```
#inference: from the plot to compare the average percentage of alcohol-related␣
↪crashes across different states, represented by their abbreviations on the␣
↪x-axis.
```

[15]:
```
sns.countplot(data=df,x="abbrev")
```

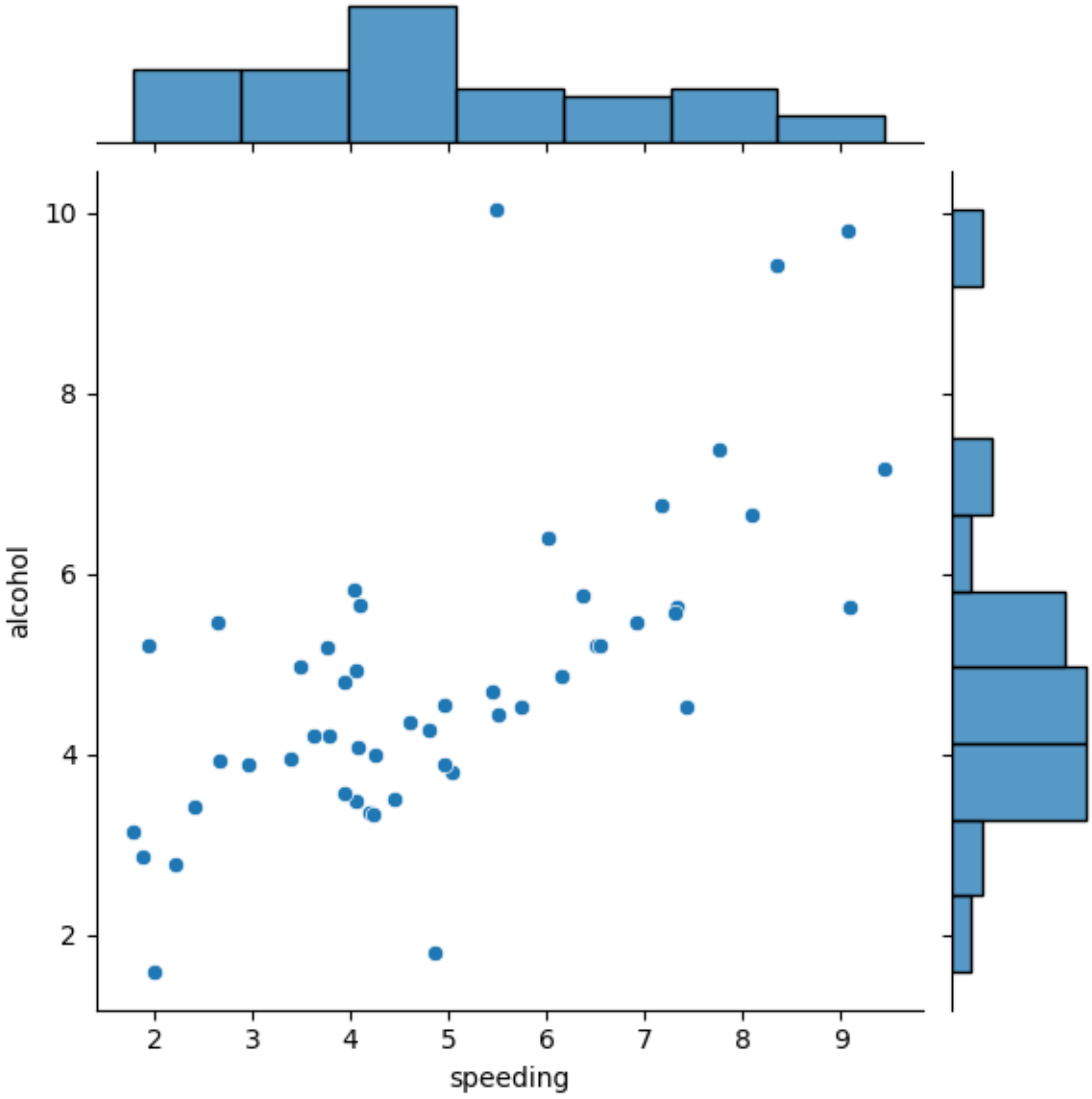
[15]: <Axes: xlabel='abbrev', ylabel='count'>



[16]:
```
#inference: from the plot we can say that there is no variations in the␣
↪frequency distribution
```

[17]:
```
sns.jointplot(data=df,x="speeding",y="alcohol")
```

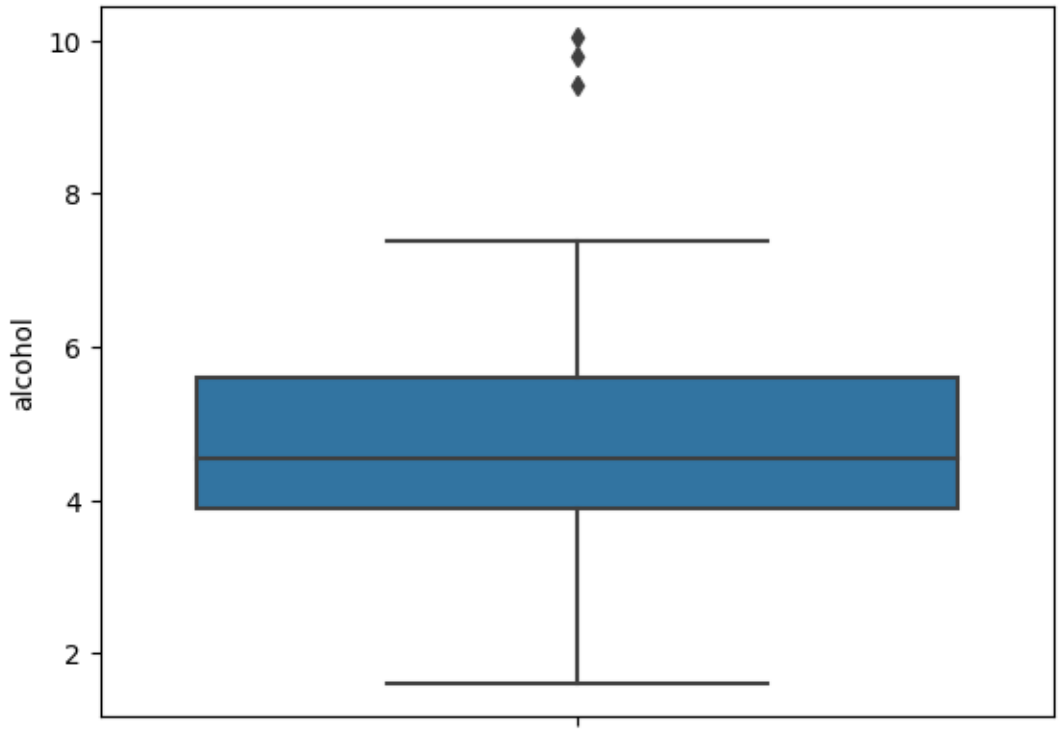
[17]: <seaborn.axisgrid.JointGrid at 0x7bdea564ae00>



[18]:
```
#inference: from the plot we can say the relation between speeding and alcohol␣
↪in car crashes
```

[19]:
```
sns.boxplot(y="alcohol",data=df)
```

[19]: <Axes: ylabel='alcohol'>



[20]:
```
"""inference: from the plot we can see how it is representing:
-The interquartile range (IQR).
-The bottom edge of the box represents the first quartile (Q1)
-The top edge of the box represents the third quartile (Q3)"""
```

[20]:
```
'inference: from the plot we can see how it is representing:\n-The interquartile
range (IQR).\n-The bottom edge of the box represents the first quartile
(Q1)\n-The top edge of the box represents the third quartile (Q3)'
```

[21]:
```
corr=df.corr()
corr
```

```
<ipython-input-21-7d5195e2bf4d>:1: FutureWarning: The default value of
numeric_only in DataFrame.corr is deprecated. In a future version, it will
default to False. Select only valid columns or specify the value of numeric_only
to silence this warning.
  corr=df.corr()
```

[21]:

	total	speeding	alcohol	not_distracted	no_previous	\
total	1.000000	0.611548	0.852613	0.827560	0.956179	
speeding	0.611548	1.000000	0.669719	0.588010	0.571976	
alcohol	0.852613	0.669719	1.000000	0.732816	0.783520	
not_distracted	0.827560	0.588010	0.732816	1.000000	0.747307	

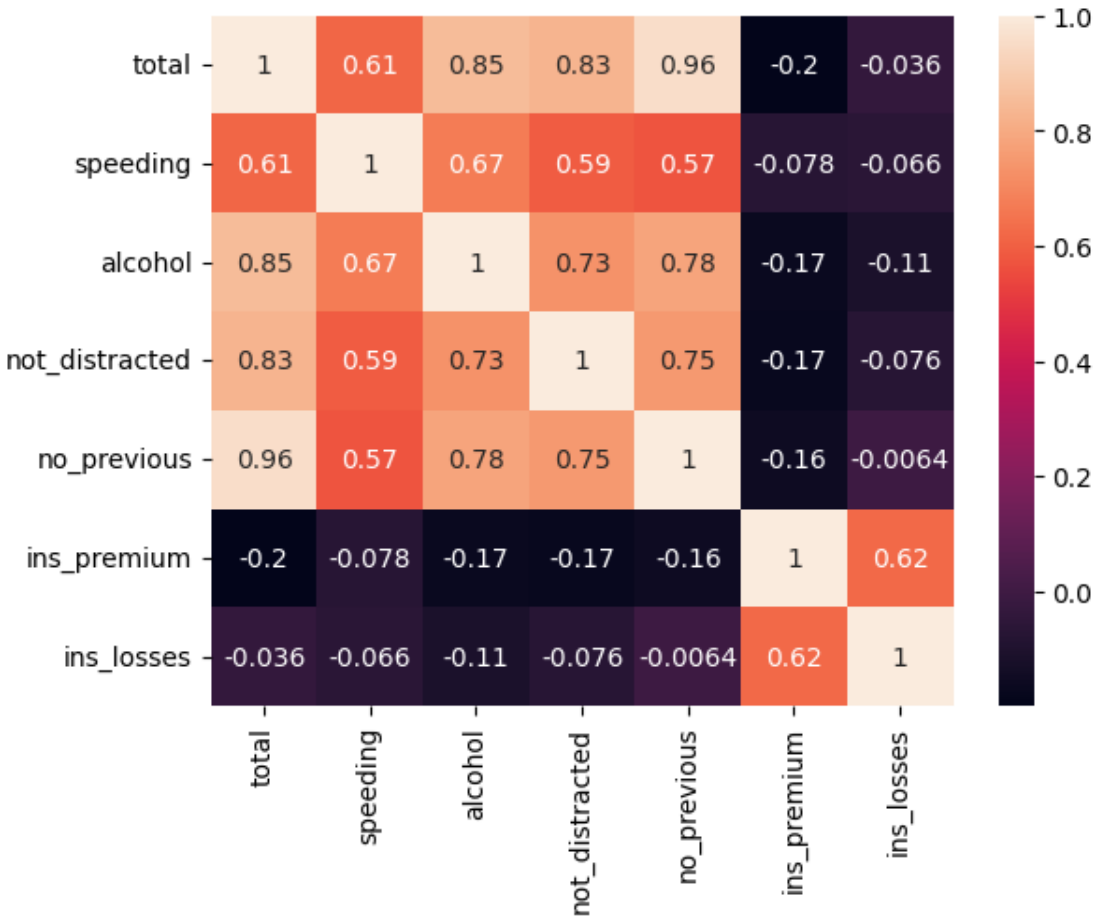
```
no_previous     0.956179  0.571976  0.783520        0.747307     1.000000
ins_premium    -0.199702 -0.077675 -0.170612       -0.174856    -0.156895
ins_losses     -0.036011 -0.065928 -0.112547       -0.075970    -0.006359

                ins_premium  ins_losses
total             -0.199702   -0.036011
speeding          -0.077675   -0.065928
alcohol           -0.170612   -0.112547
not_distracted    -0.174856   -0.075970
no_previous       -0.156895   -0.006359
ins_premium        1.000000    0.623116
ins_losses         0.623116    1.000000
```

[22]:
```
"""#inference:
>0.5 - highly correlated
<0.5 - less correlated"""
```

[22]:
```
'#inference:\n>0.5 - highly correlated\n<0.5 - less correlated'
```

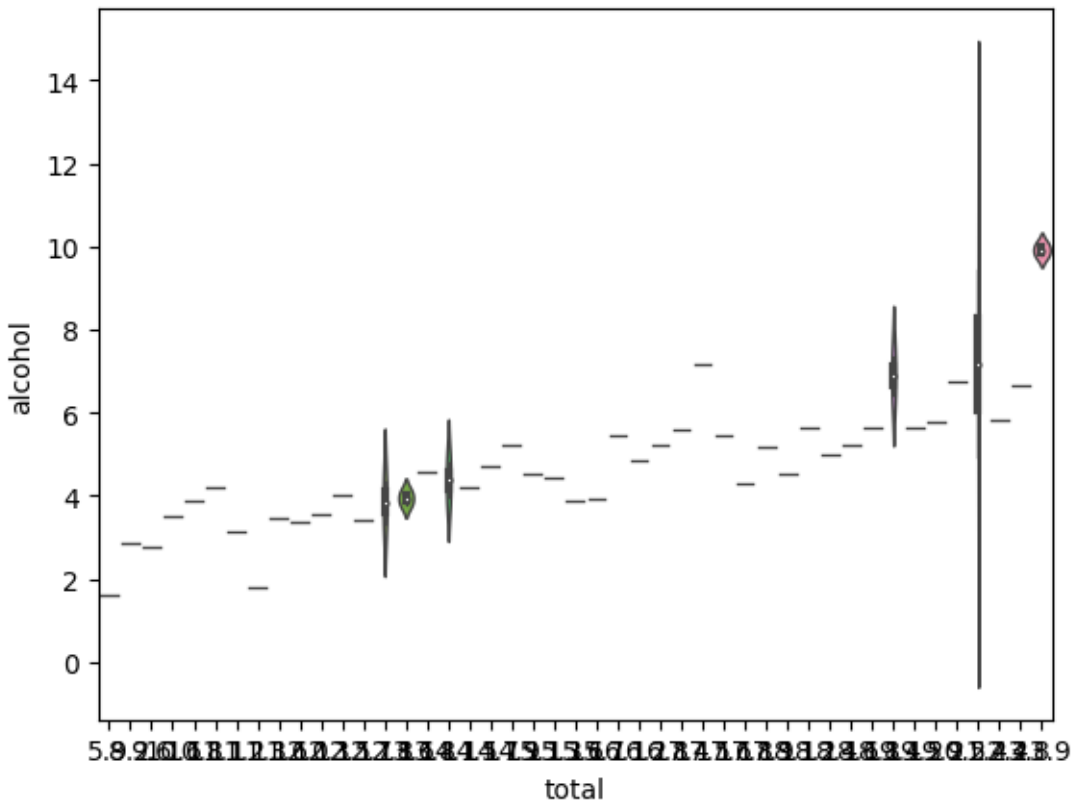
[23]:
```
sns.heatmap(corr,annot=True)
```

[23]:
```
<Axes: >
```



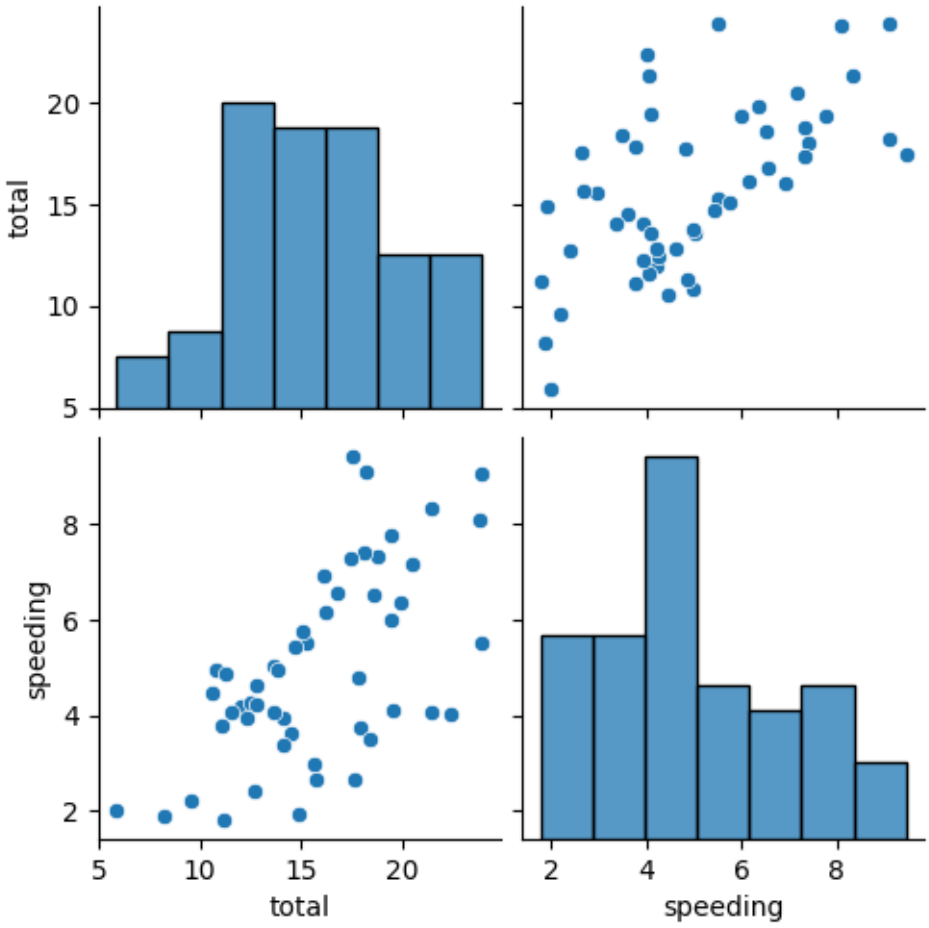
[24]:
```
sns.violinplot(data=df,x='total',y='alcohol',inner='box',width=0.8,linewidth=1)
```

[24]: <Axes: xlabel='total', ylabel='alcohol'>



[28]:
```
sns.pairplot(data=df, vars=["total", "speeding"])
```

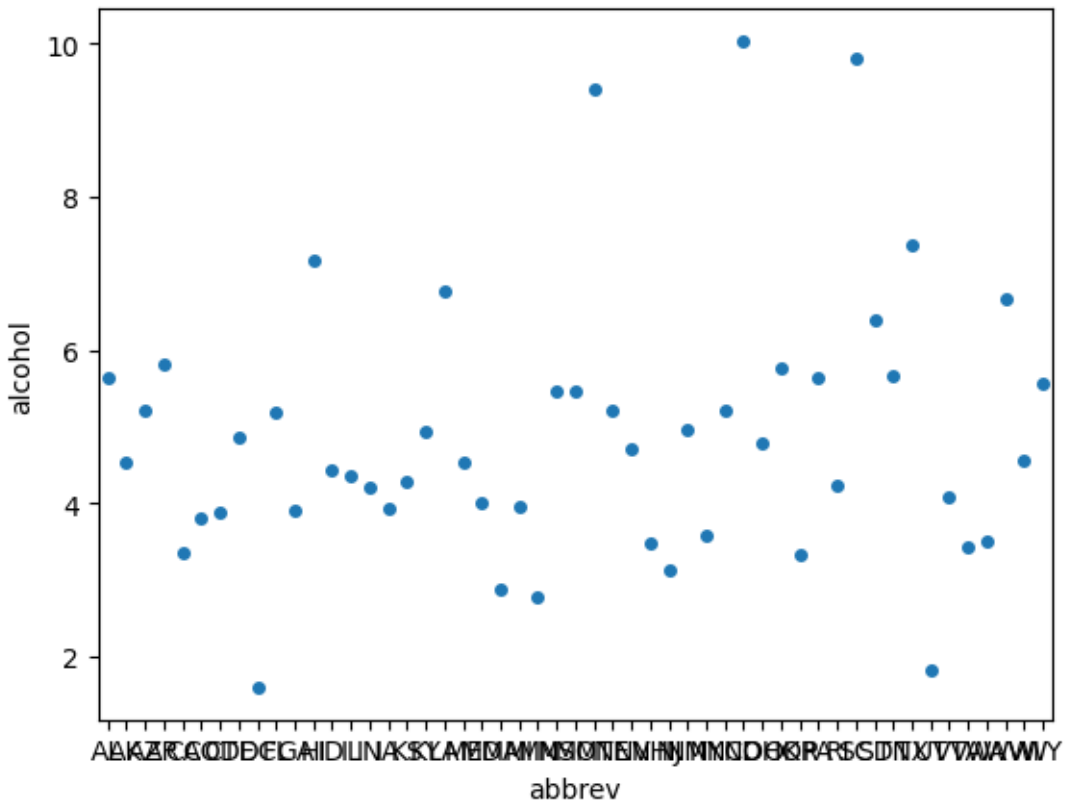
[28]: <seaborn.axisgrid.PairGrid at 0x7bdea1d5afe0>



[29]:
```
#inference: Plotting and comaparing numerical variables total and speeding
```

[30]:
```
sns.swarmplot(x="abbrev", y="alcohol", data=df)
```

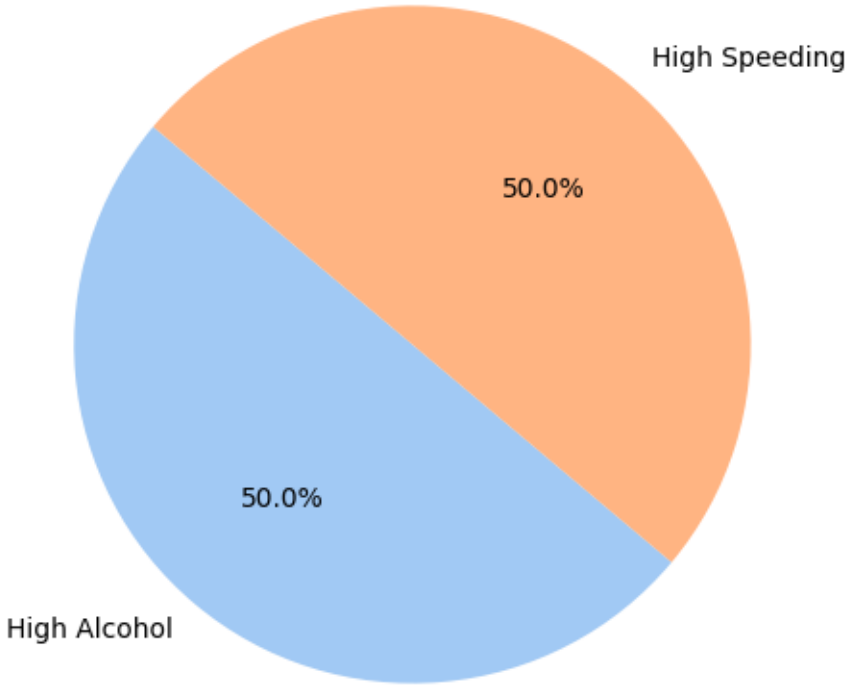
[30]:
```
<Axes: xlabel='abbrev', ylabel='alcohol'>
```



[31]:
```
#inference: the distribution of alcohol percentages over the x-axis abbrev
```

[38]:
```
high_alcohol = len(df[df['alcohol'] >= 0.08])
high_speeding = len(df[df['speeding'] >= 0.08])
categories = ['High Alcohol', 'High Speeding']
sizes = [high_alcohol, high_speeding]
plt.figure(figsize=(5, 5))
plt.pie(sizes, labels=categories, autopct='%1.1f%%', startangle=140, colors=sns.
 ↪color_palette('pastel'))
plt.axis('equal')
```

[38]:
```
(-1.099998146164224,
 1.0999997564610315,
 -1.099998146164224,
 1.0999997564610318)
```



[ ]:
```
#inference: from the plot we can say that the alcohol and speeding contribute␣
↪to half of the total
```