assignment-2-8-sep

September 13, 2023

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[ ]:
```
# Step 1: Import necessary libraries
import seaborn as sns
import matplotlib.pyplot as plt
```

[ ]:
```
print(sns.get_dataset_names())
```

```
['anagrams', 'anscombe', 'attention', 'brain_networks', 'car_crashes',
'diamonds', 'dots', 'dowjones', 'exercise', 'flights', 'fmri', 'geyser', 'glue',
'healthexp', 'iris', 'mpg', 'penguins', 'planets', 'seaice', 'taxis', 'tips',
'titanic']
```

[ ]:
```
# Step 2: Load the car crashes dataset
df=sns.load_dataset('car_crashes')
df
```

[ ]:

	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
```

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

[ ]:
```
   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
```

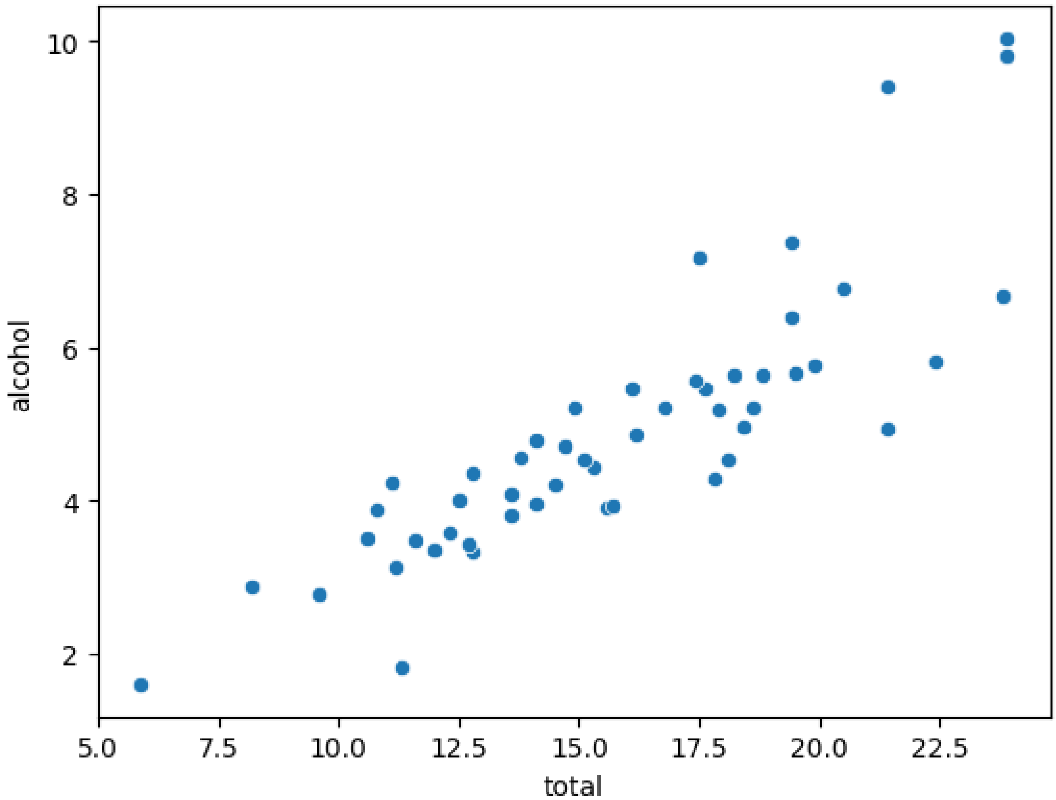
```
   ins_losses abbrev
0      145.08     AL
1      133.93     AK
2      110.35     AZ
3      142.39     AR
4      165.63     CA
```

[ ]:
```
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
```

[ ]:
```
# 1. scatterplot
sns.scatterplot(x="total", y="alcohol", data=df)
```

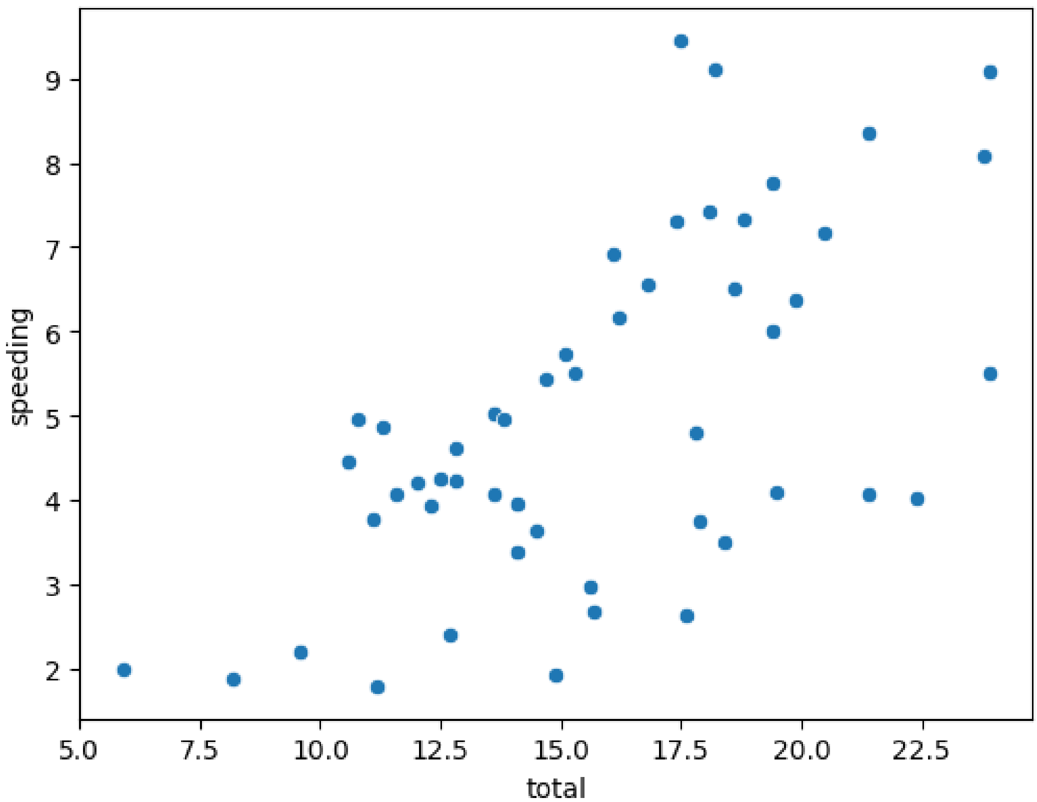
[ ]:
```
<Axes: xlabel='total', ylabel='alcohol'>
```



Inference : It indicating that as the total number of car crashes increases, alcohol consumption tends to be higher in those areas.

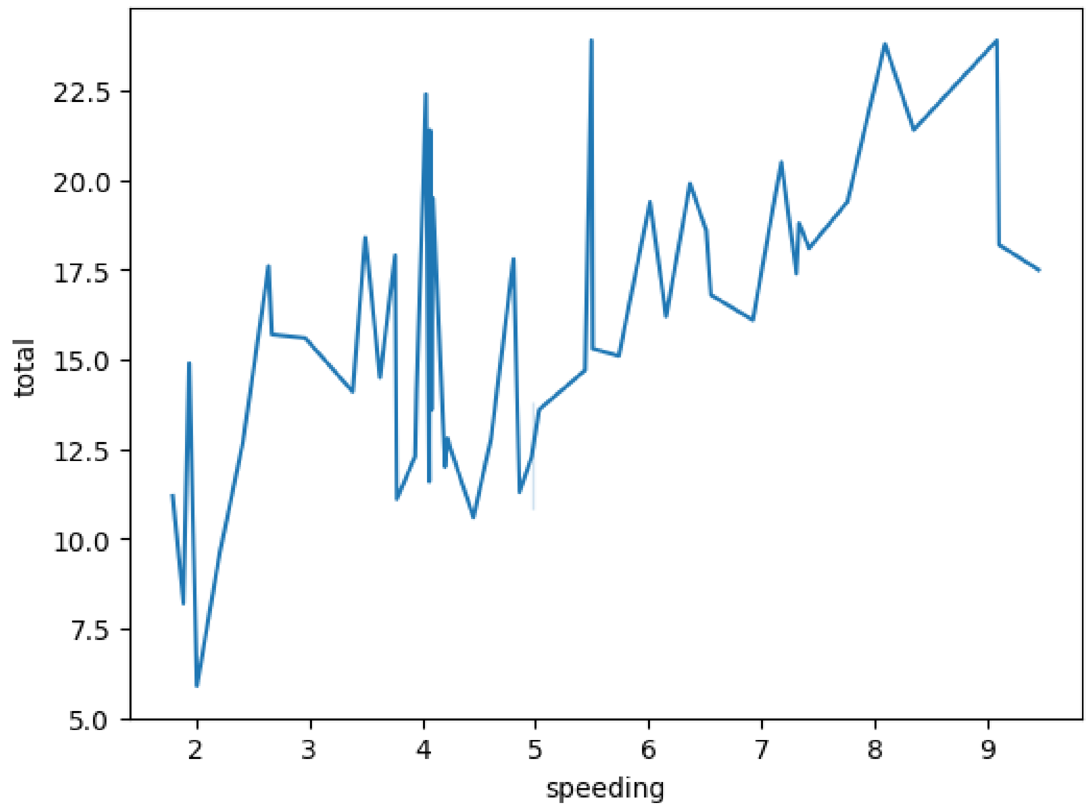
[ ]:
```
# 1. scatterplot
sns.scatterplot(x="total", y="speeding", data=df)
```

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



[ ]:
```
# 2.Lineplot of total vs. speeding
sns.lineplot(x="speeding", y="total", data=df)
```

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

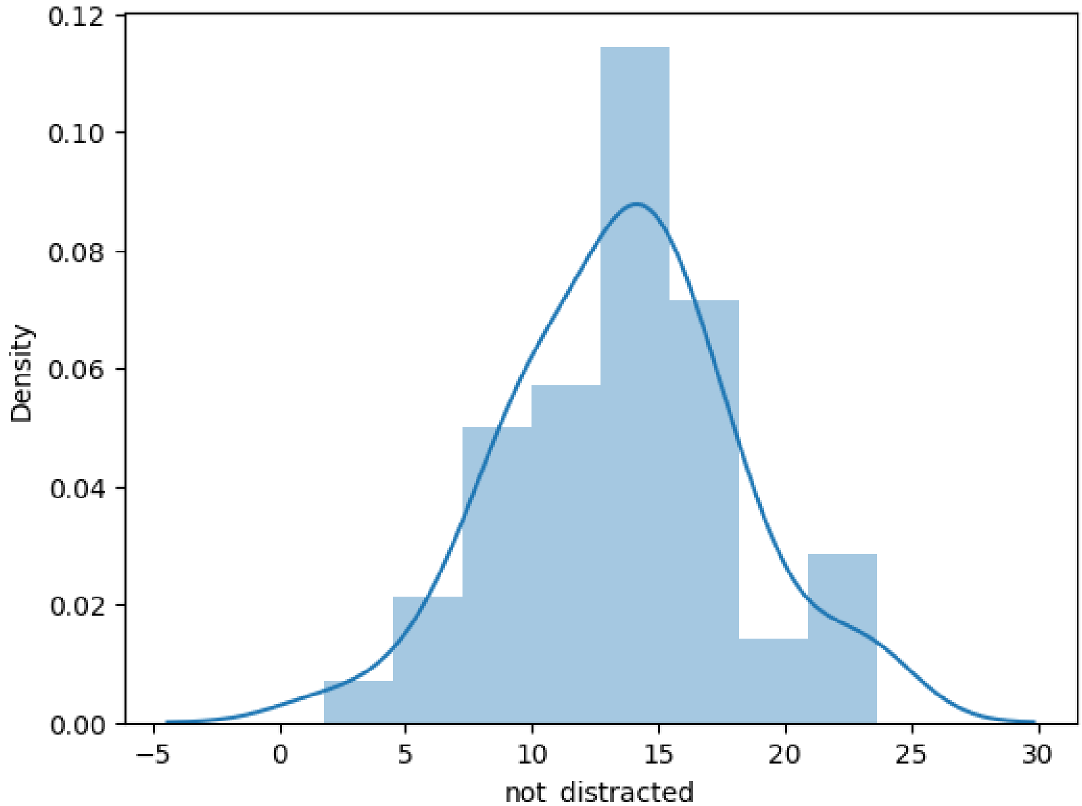


The total number of crashes increases with speeding, but the relationship is not linear.

[ ]:
```
# 3.Distplot
sns.distplot(df["not_distracted"])
```

```
<ipython-input-10-0f037b766c6e>:2: 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["not_distracted"])
```

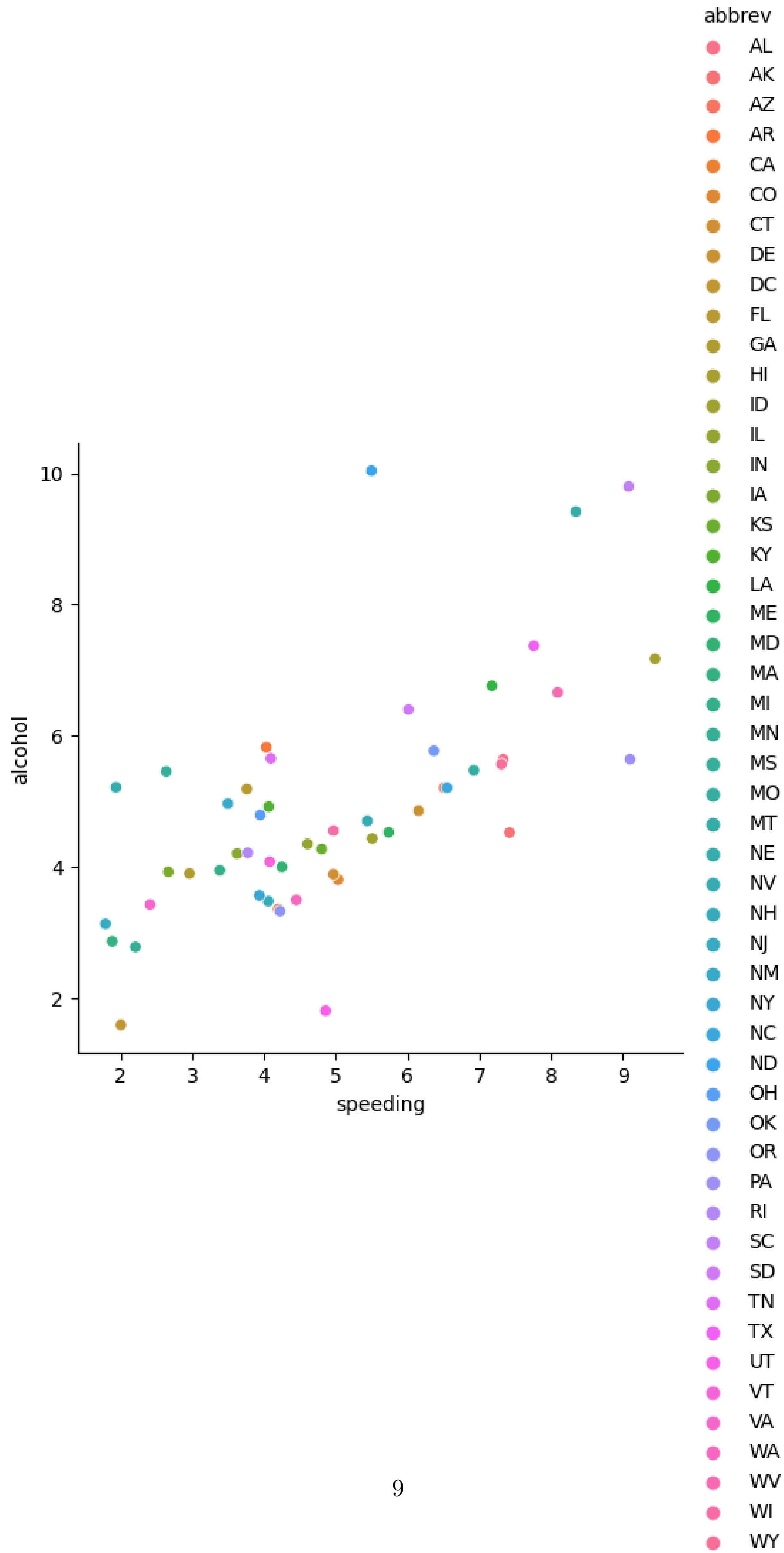
[ ]:
```
<Axes: xlabel='not_distracted', ylabel='Density'>
```



The distribution of not_distracted is bimodal, meaning that there are two distinct peaks

[ ]:
```python
# 4.Relplot
sns.relplot(x="speeding", y="alcohol", hue="abbrev", data=df)
```

[ ]: <seaborn.axisgrid.FacetGrid at 0x7be17fbb7820>


abbrev
AL
AK
AZ
AR
CA
CO
CT
DE
DC
FL
GA
HI
ID
IL
IN
IA
KS
KY
LA
ME
MD
MA
MI
MN
MS
MO
MT
NE
NV
NH
NJ
NM
NY
NC
ND
OH
OK
OR
PA
RI
SC
SD
TN
TX
UT
VT
VA
WA
WV
WI
WY
10
8
6
4
2
alcohol
2
3
4
5
6
7
8
9
speeding

Here is a positive correlation between speeding and alcohol, but the relationship varies by state abbreviation.

[ ]:
```
df["abbrev"].value_counts()
```

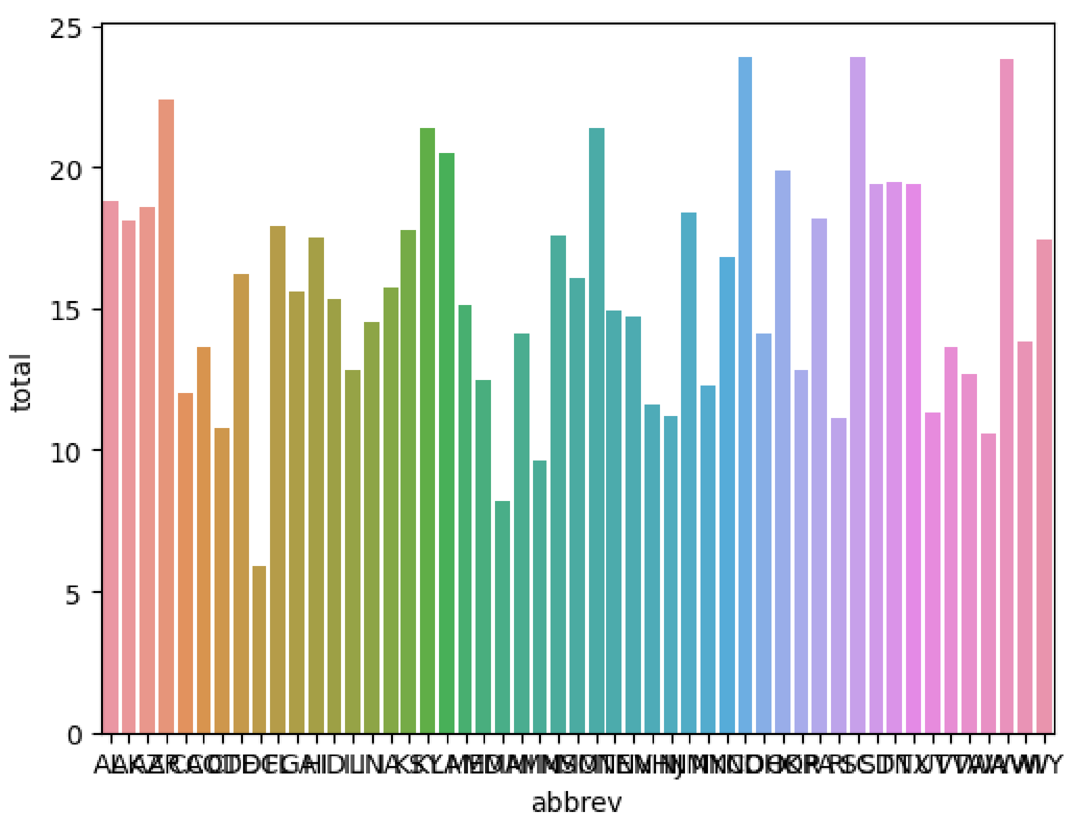
[ ]:
```
AL    1
PA    1
NV    1
NH    1
NJ    1
NM    1
NY    1
NC    1
ND    1
OH    1
OK    1
OR    1
RI    1
MT    1
SC    1
SD    1
TN    1
TX    1
UT    1
VT    1
VA    1
WA    1
WV    1
WI    1
NE    1
MO    1
AK    1
ID    1
AZ    1
AR    1
CA    1
CO    1
CT    1
DE    1
DC    1
FL    1
GA    1
HI    1
IL    1
MS    1
```

```
IN     1
IA     1
KS     1
KY     1
LA     1
ME     1
MD     1
MA     1
MI     1
MN     1
WY     1
Name: abbrev, dtype: int64
```

[ ]:
```python
# 5.Barplot
sns.barplot(data=df,x="abbrev",y="total",ci=None)
```

```
<ipython-input-13-15f1a0469e23>:2: FutureWarning:

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

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

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

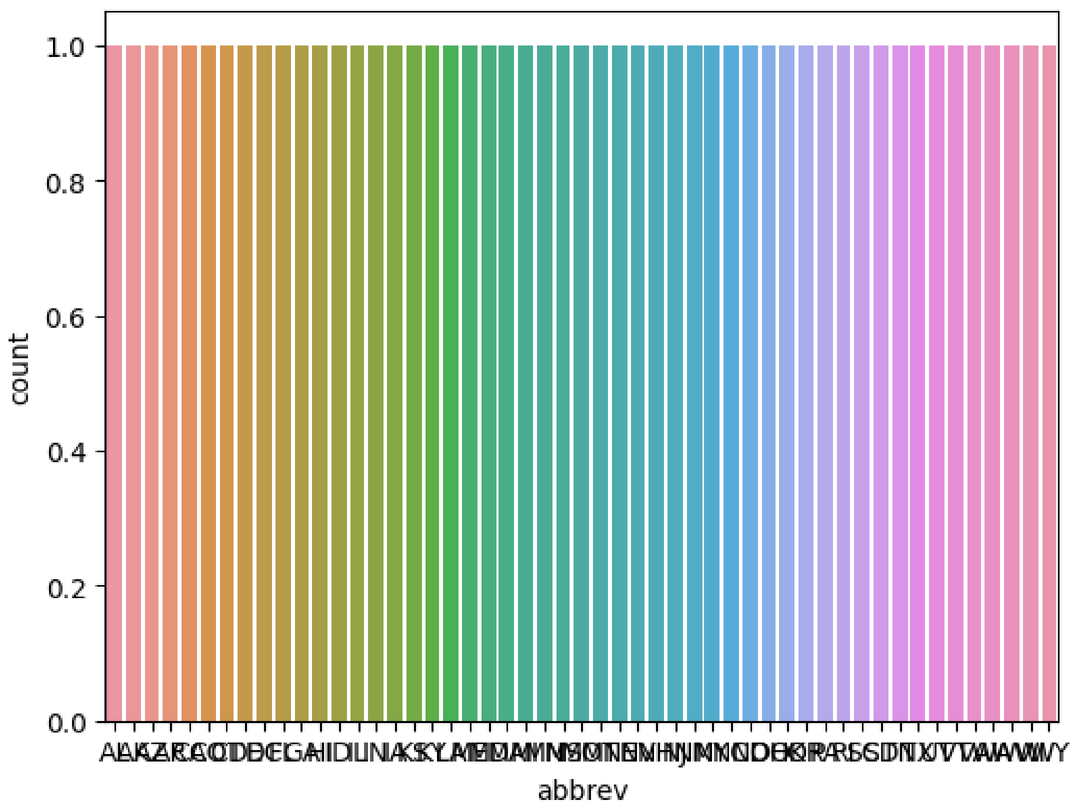


Inference

- The state with the most total crashes is CA, followed by TX and FL.
- The state with the fewest total crashes is WY, followed by ND and SD.

[ ]:
```
#6.countplot
sns.countplot(x='abbrev', data=df)
```

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



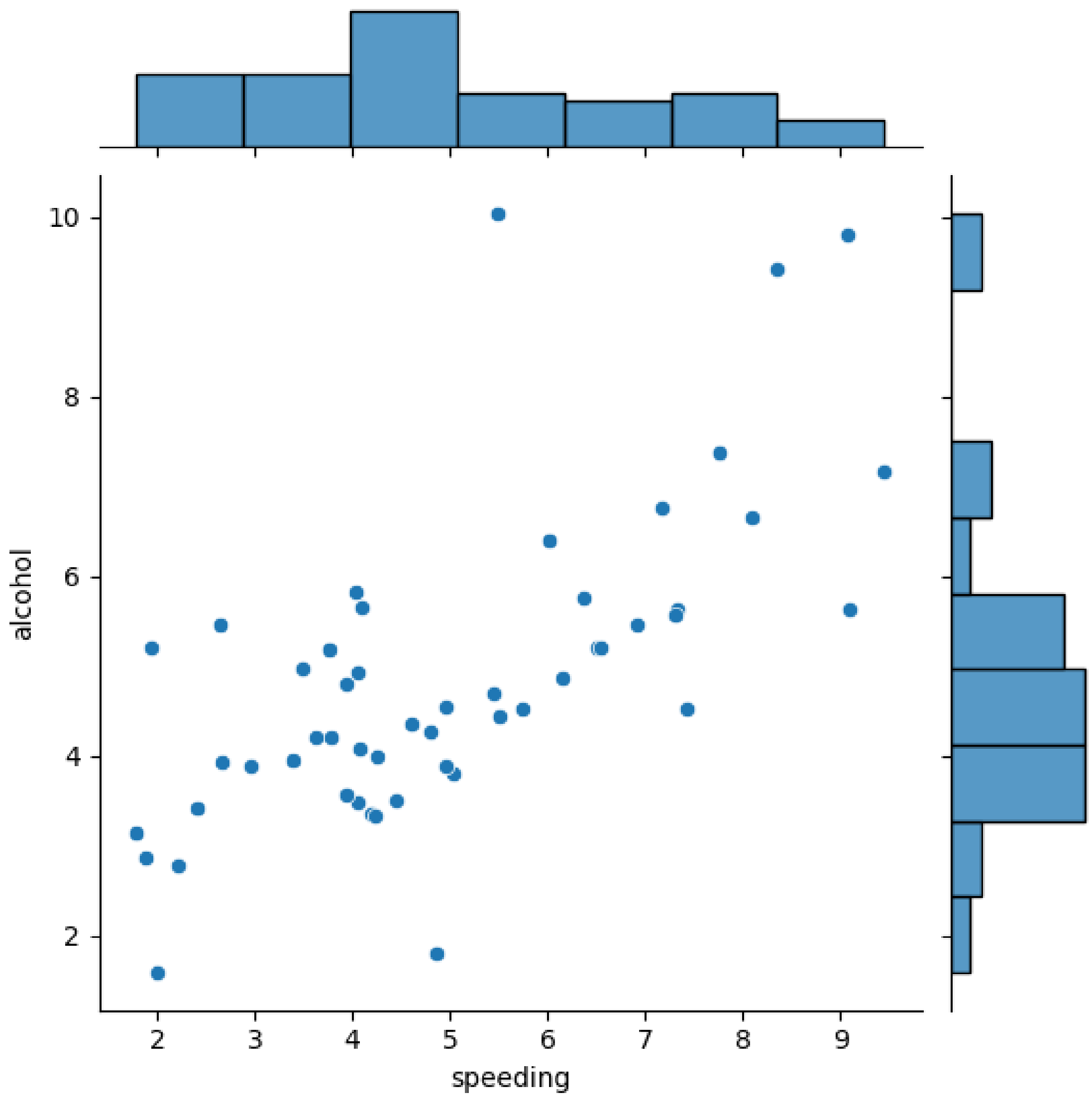
[ ]:
```
len(df['abbrev'].unique())
```

[ ]: 51

Inference: There are 51 states in this dataset.

[ ]:
```
# 7.Jointplot of speeding and alcohol
sns.jointplot(x="speeding", y="alcohol", data=df)
```

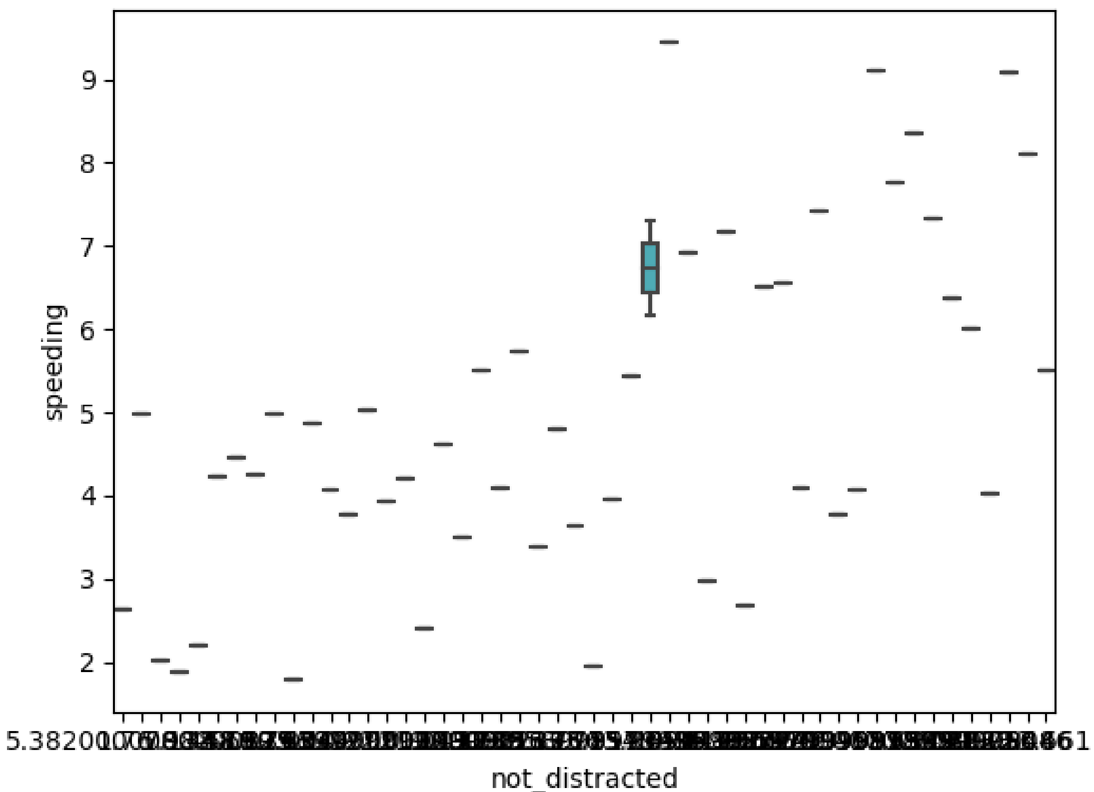
[ ]: <seaborn.axisgrid.JointGrid at 0x7be17fbb75b0>



Inference: There is a positive correlation between speeding and alcohol involvement in car crashes.

[ ]:
```
#8.Boxplot of speeding of each not_distracted category
sns.boxplot(x="not_distracted", y="speeding", data=df)
```

[ ]: <Axes: xlabel='not_distracted', ylabel='speeding'>



Inference: The median percentage of drivers involved in fatal collisions who were speeding is higher for the lower categories of not_distracted than for the higher categories. This means that states with lower percentages of drivers involved in fatal collisions who were not distracted tend to have higher percentages of drivers involved in fatal collisions who were speeding.

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

```
<ipython-input-23-7d5195e2bf4d>: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()
```

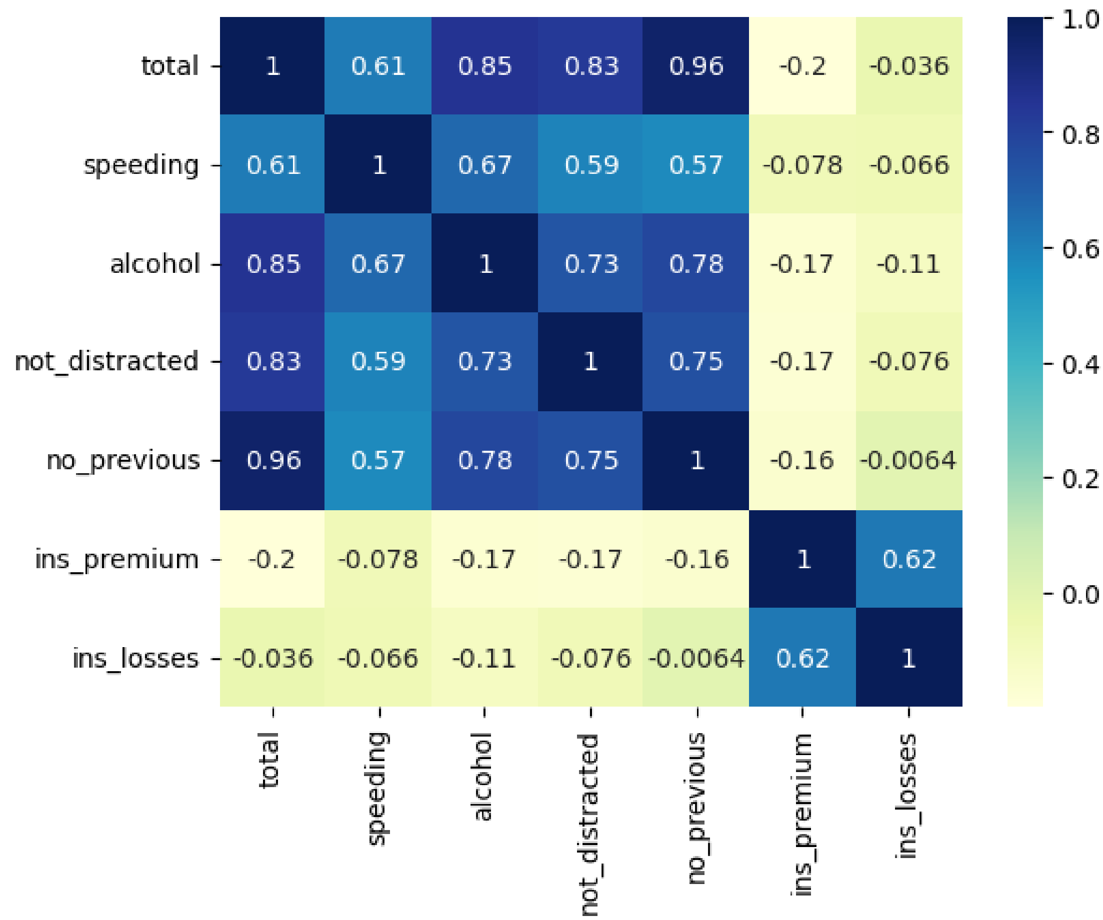
[ ]:

	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
```

[ ]:
```
#9.Heatmap
sns.heatmap(corr,annot=True,cmap="YlGnBu")
```

[ ]: <Axes: >

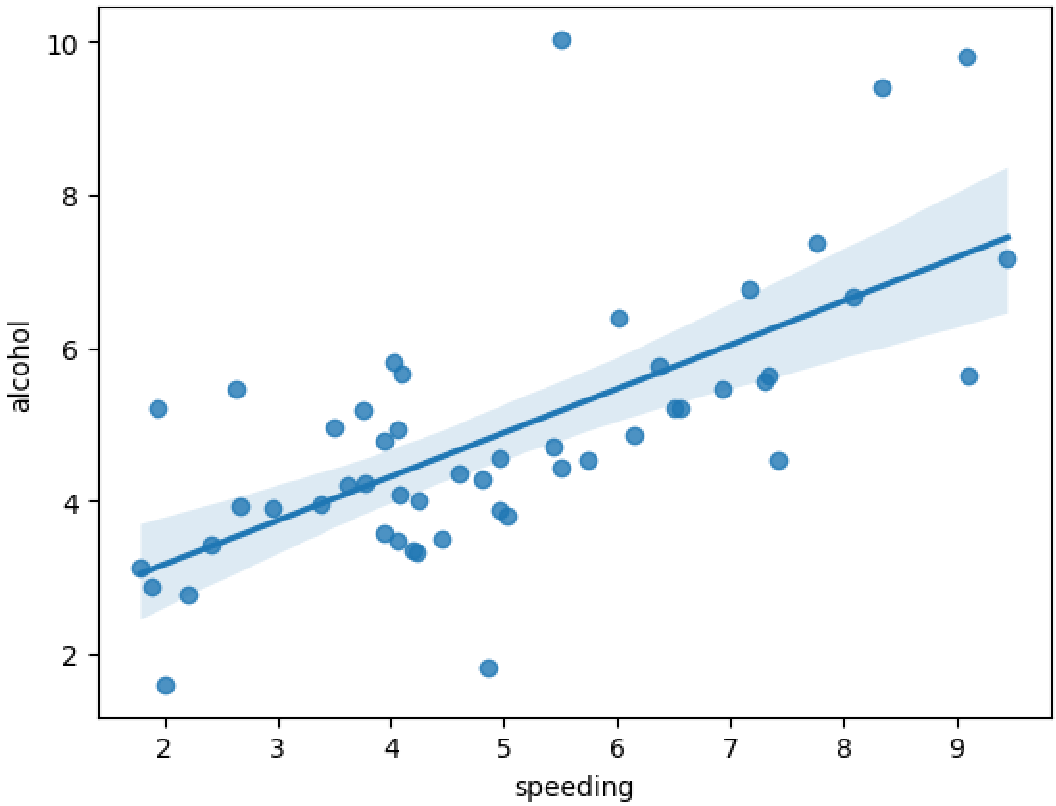


Inference: The heatmap shows that some variables have strong positive correlations, such as total and alcohol, speeding and alcohol, and ins_premium and ins_losses.

This means that these variables tend to increase or decrease together. Some variables have weak or negative correlations, such as no_previous and not_distracted, speeding and no_previous, and total and not_distracted. This means that these variables tend to have no or inverse relationship.

[ ]:
```
#10. Regression plots
sns.regplot(x='speeding', y='alcohol', data=df)
```

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



Inference: There is a positive linear relationship between speeding and alcohol involvement in car crashes. The regplot also shows the 95% confidence interval for the regression line.

[ ]:
```
```