assignment-2

September 13, 2023

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
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']
```

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

[4]:
```
df
```

[4]:
```
    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
```

[5]:
```
sns.__version__
```

[5]: '0.12.2'

[6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 51 entries, 0 to 50
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
```

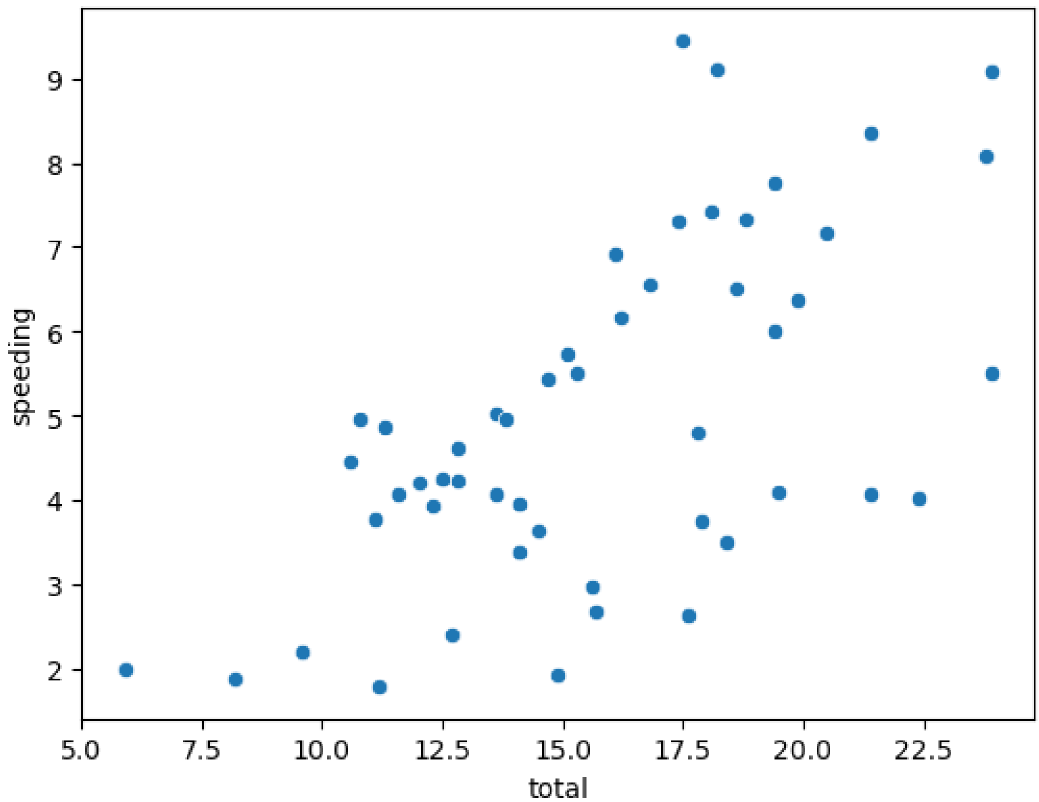
```
---  ------           --------------  -----
 0   total            51 non-null     float64
 1   speeding         51 non-null     float64
 2   alcohol          51 non-null     float64
 3   not_distracted   51 non-null     float64
 4   no_previous      51 non-null     float64
 5   ins_premium      51 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
```

[7]:
```
df.head(5)
```

[7]:
```
   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
```

[10]:
```
sns.scatterplot(x="total",y="speeding",data=df)
```

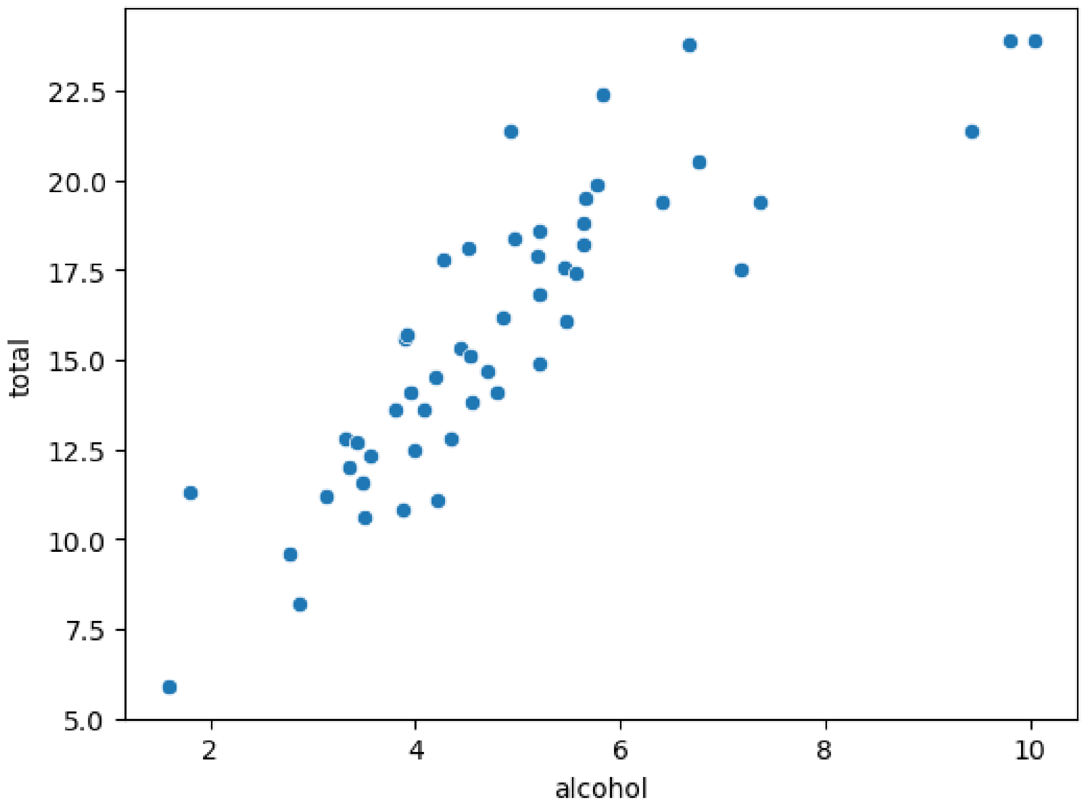
[10]:
```
<Axes: xlabel='total', ylabel='speeding'>
```



Inference:from the plot we can say that as speeding-realted cases increases total car crashes is also increasing.

[11]:
```
sns.scatterplot(x="alcohol",y="total",data=df)
```

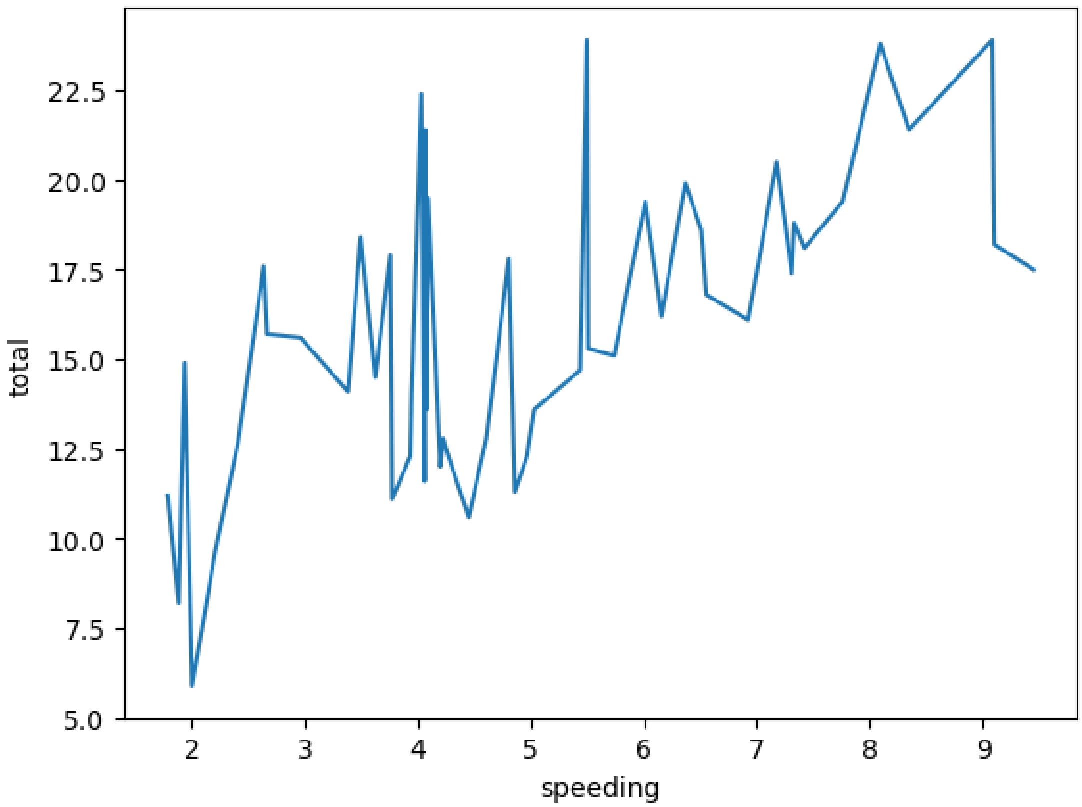
[11]: <Axes: xlabel='alcohol', ylabel='total'>



Inference:from the plot we can say that as alcohol-realted cases increases total car crashes is also increasing.

[20]:
```
sns.lineplot(x="speeding",y="total",data=df,errorbar=None)
```

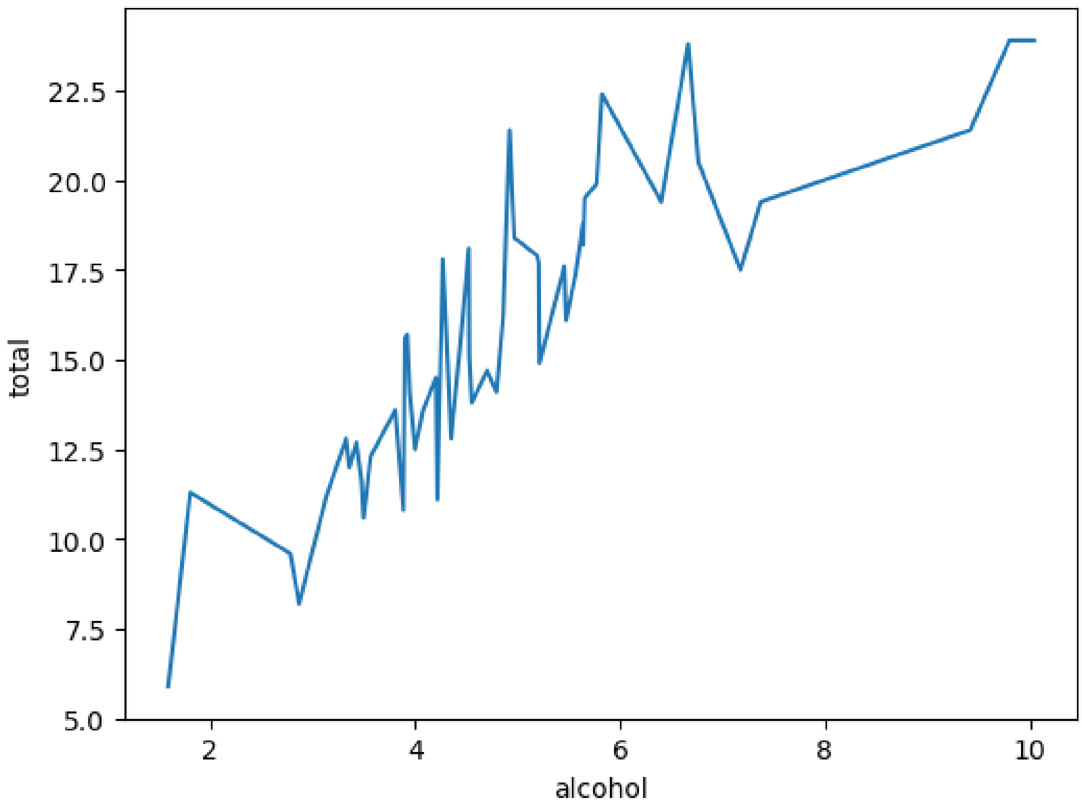
[20]: `<Axes: xlabel='speeding', ylabel='total'>`



Inference:it appears that as the frequency of speeding incidents increases, there is a corresponding increase in the total number of car crashes.

[16]:
```
sns.lineplot(x="alcohol",y="total",data=df,errorbar=None)
```

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

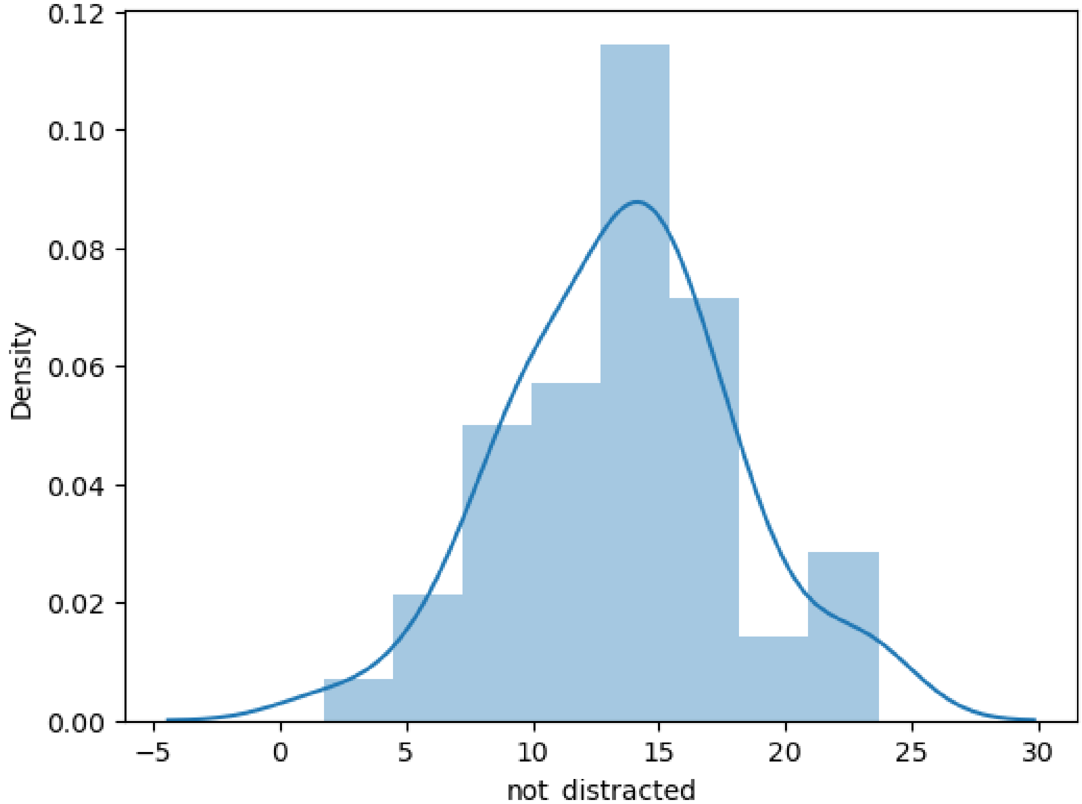


Inference:it appears that as the frequency of alcohol incidents increases, there is a corresponding increase in the total number of car crashes.

[22]:
```
sns.distplot(df['not_distracted'])
```

```
C:\Users\Vishal Gupta\AppData\Local\Temp\ipykernel_4508\1313687340.py: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['not_distracted'])
```

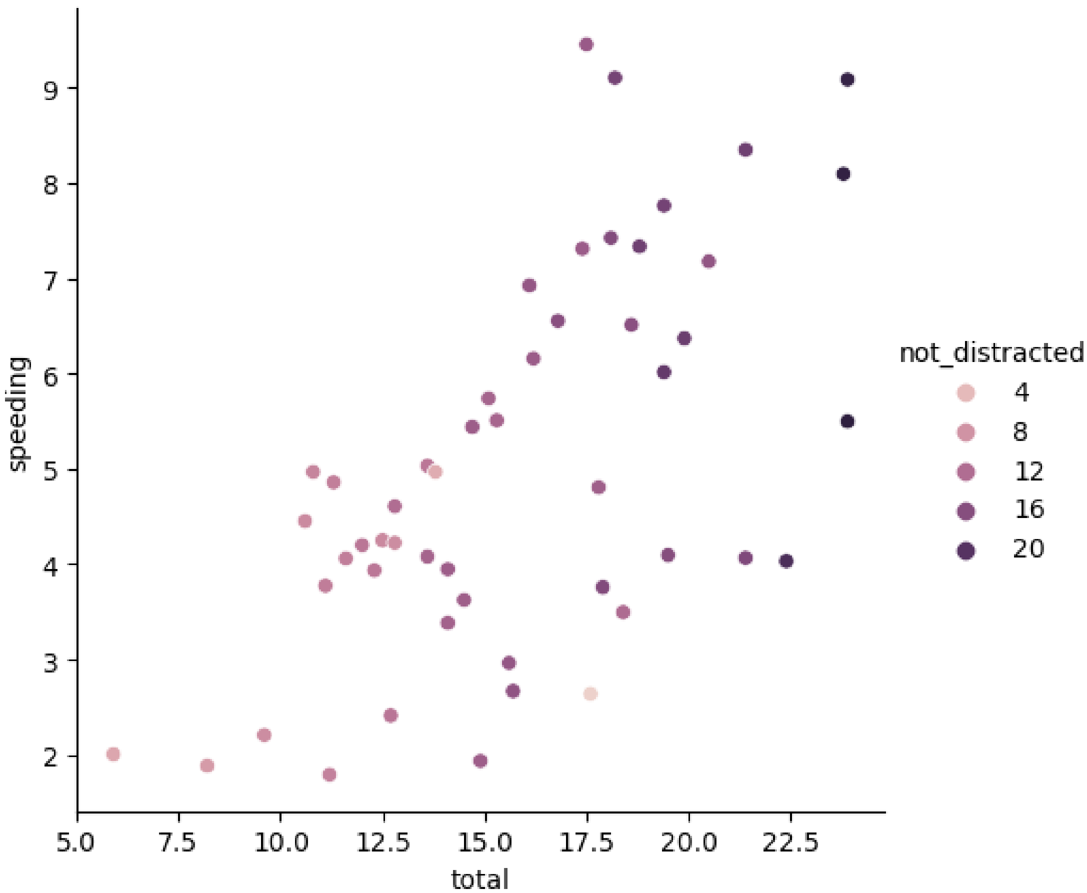
[22]:
```
<Axes: xlabel='not_distracted', ylabel='Density'>
```



Inference:It is evident that the majority of observations cluster around a central value, forming a unimodal distribution.

[24]:
```
sns.relplot(x="total",y="speeding",data=df,hue="not_distracted")
```

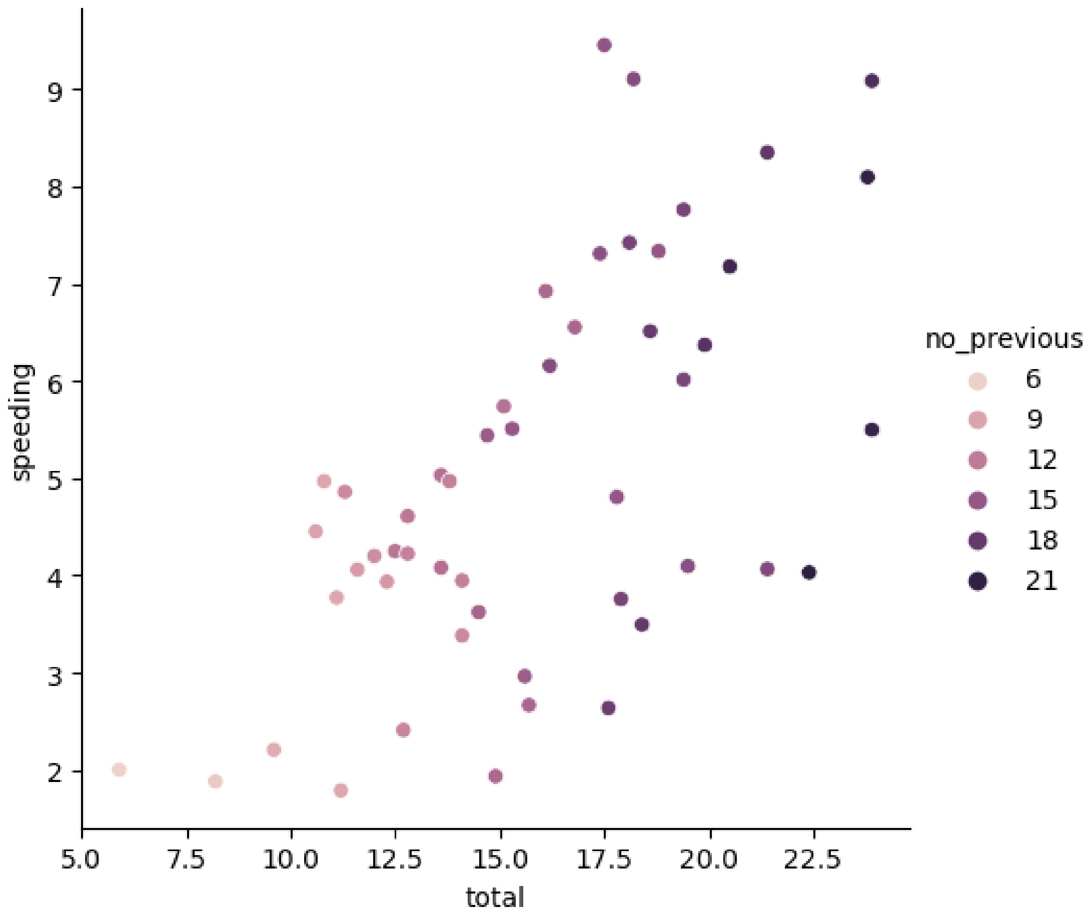
[24]: <seaborn.axisgrid.FacetGrid at 0x14b697ead10>



Inference: The x-axis represents the total number of car crashes, and the y-axis represents the number of speeding-related car crashes while being not distracted.

[26]:
```
sns.relplot(x="total",y="speeding",data=df,hue="no_previous")
```

[26]: <seaborn.axisgrid.FacetGrid at 0x14b6a9fac50>



Inference: The x-axis represents the total number of car crashes, and the y-axis represents the number of speeding-related car crashes while having no records of previous crashes.

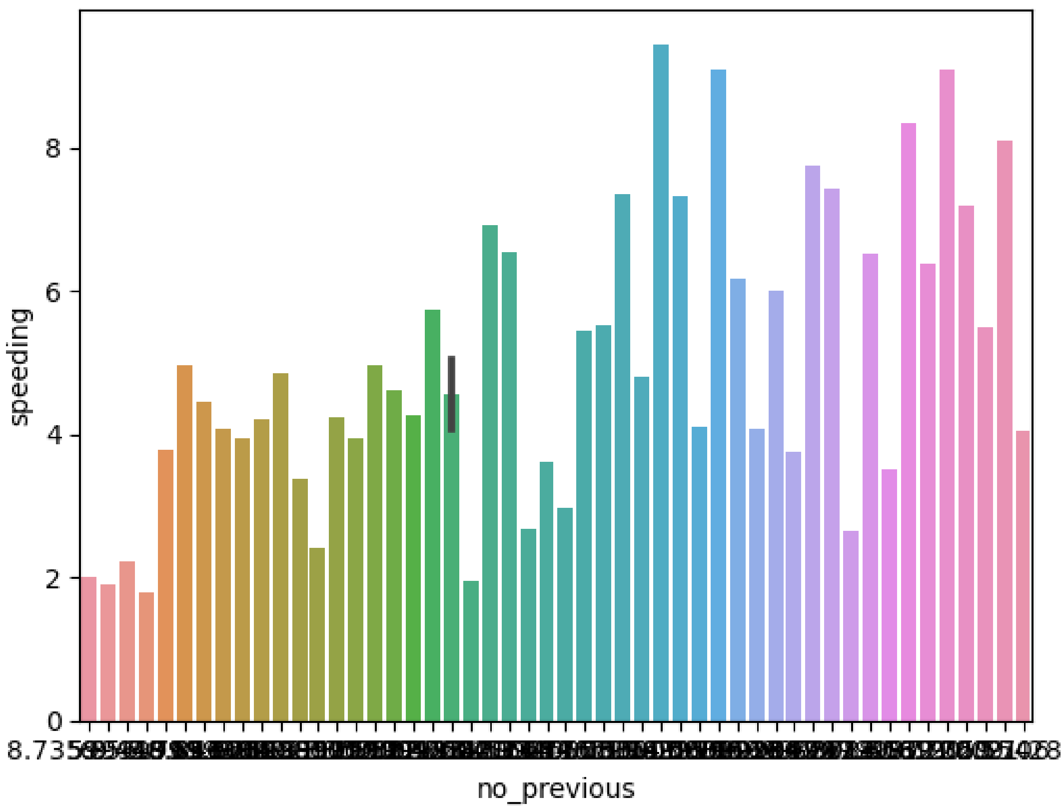
[28]:
```
df["no_previous"].value_counts()
```

[28]:
```
12.920    2
15.040    1
16.016    1
14.553    1
9.628     1
8.736     1
18.032    1
9.840     1
13.608    1
20.554    1
11.562    1
18.706    1
11.520    1
```

```
8.769     1
18.190    1
19.359    1
16.684    1
15.795    1
16.878    1
10.848    1
11.176    1
9.116     1
20.706    1
11.592    1
13.410    1
13.524    1
17.014    1
17.600    1
17.856    1
21.280    1
10.680    1
8.856     1
16.038    1
5.900     1
16.826    1
14.508    1
15.225    1
14.994    1
12.288    1
13.775    1
13.659    1
15.130    1
16.264    1
20.090    1
12.684    1
12.375    1
6.560     1
10.857    1
8.448     1
15.660    1
Name: no_previous, dtype: int64
```

[31]:
```
sns.barplot(data=df,x="no_previous",y="speeding")
```

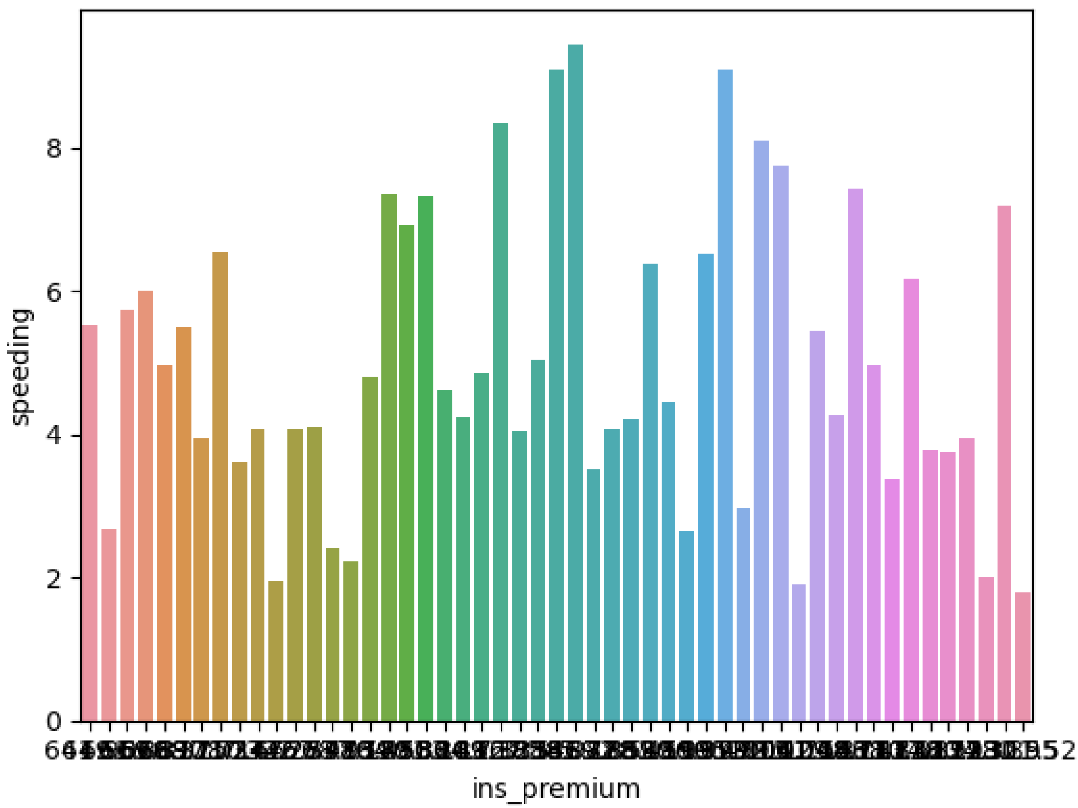
[31]:
```
<Axes: xlabel='no_previous', ylabel='speeding'>
```



Inference: It's evident that the number of speeding-related car crashes tends to be higher for cases with 'no_previous' car crashes

[33]:
```
sns.barplot(data=df,x="ins_premium",y="speeding")
```

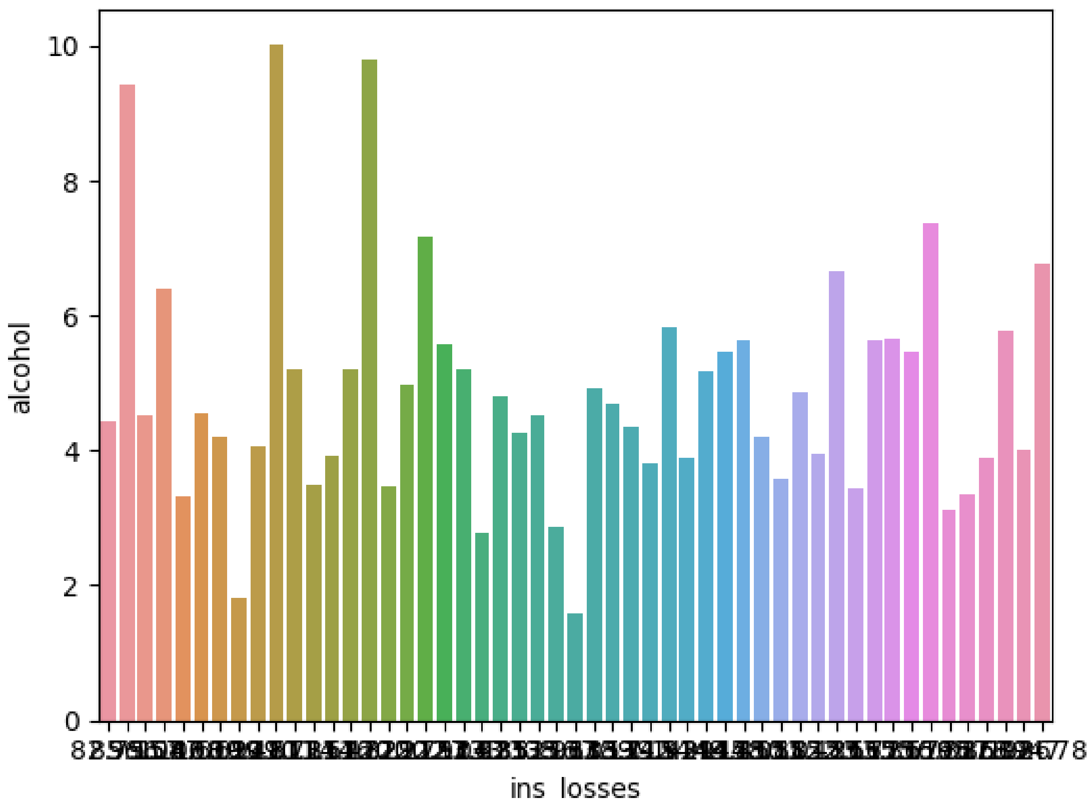
[33]: <Axes: xlabel='ins_premium', ylabel='speeding'>



Inference:The plot compares the number of car crashes involving speeding ('speeding') across different levels of insurance premiums ('ins_premium').Some premium levels have higher numbers of such crashes, while others have lower numbers.

[34]:
```
sns.barplot(data=df,x="ins_losses",y="alcohol")
```

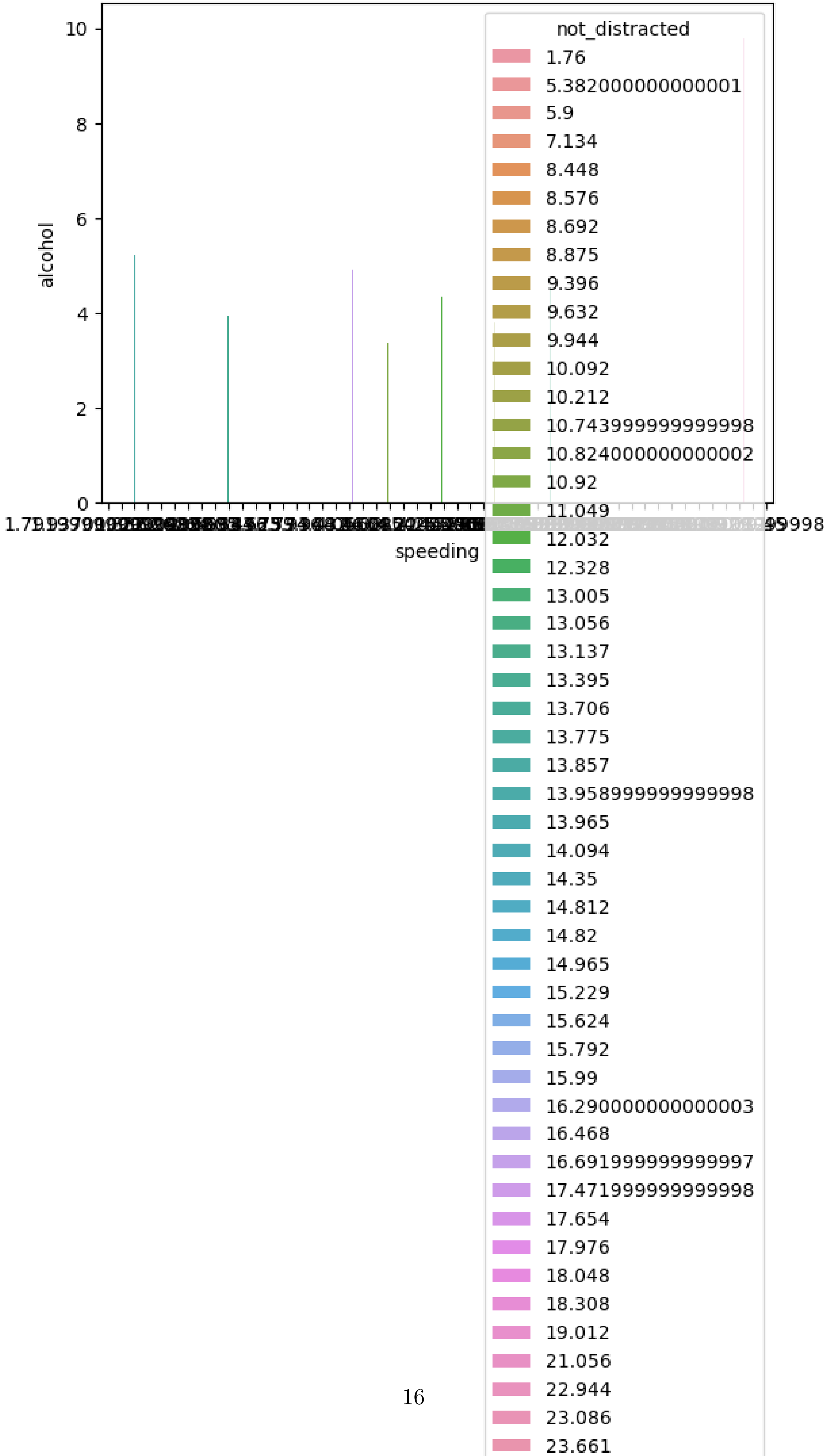
[34]: `<Axes: xlabel='ins_losses', ylabel='alcohol'>`



Inference: Some insurance loss levels have higher percentages of alcohol-impaired drivers, while others have lower percentages.

[35]:
```
sns.barplot(data=df,x="speeding",y="alcohol",hue="not_distracted")
```

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

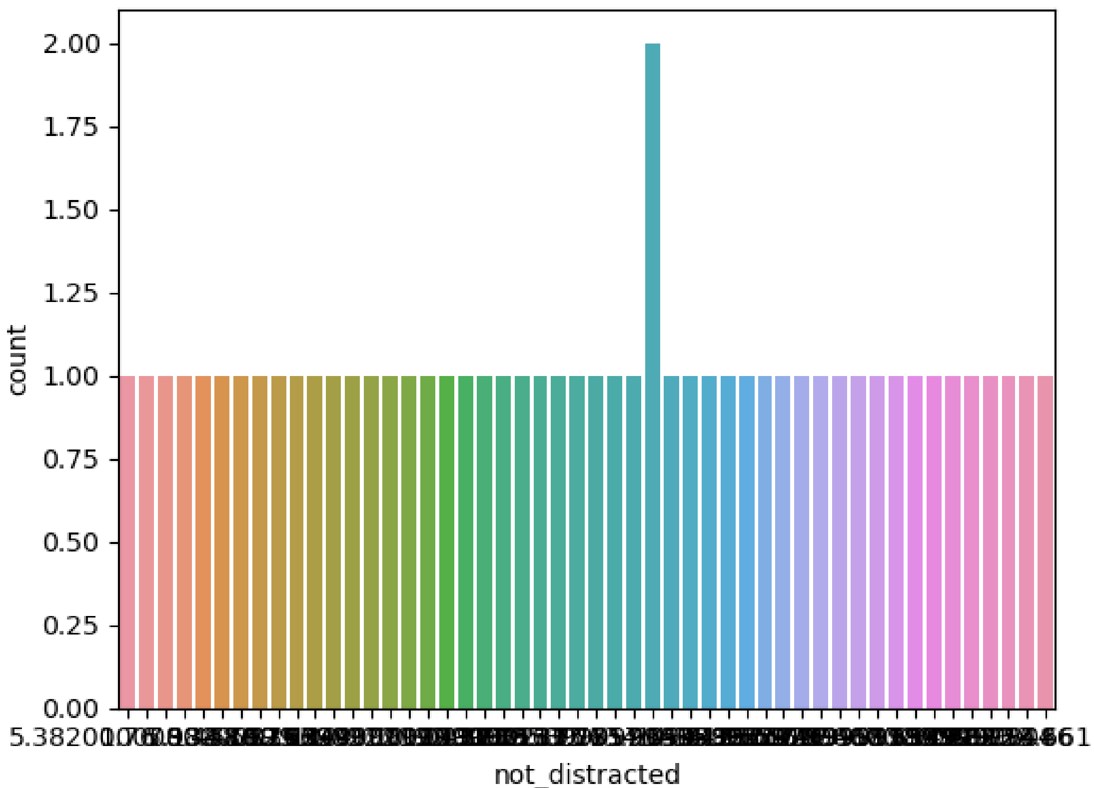


alcohol
speeding
not_distracted
1.76
5.382000000000001
5.9
7.134
8.448
8.576
8.692
8.875
9.396
9.632
9.944
10.092
10.212
10.743999999999998
10.824000000000002
10.92
11.049
12.032
12.328
13.005
13.056
13.137
13.395
13.706
13.775
13.857
13.958999999999998
13.965
14.094
14.35
14.812
14.82
14.965
15.229
15.624
15.792
15.99
16.290000000000003
16.468
16.691999999999997
17.471999999999998
17.654
17.976
18.048
18.308
19.012
21.056
22.944
23.086
23.661

Inference:These variations suggest that driver distraction and impairment by alcohol may play roles in different levels of road safety incidents.

[41]:
```python
sns.countplot(x="not_distracted",data=df)
```

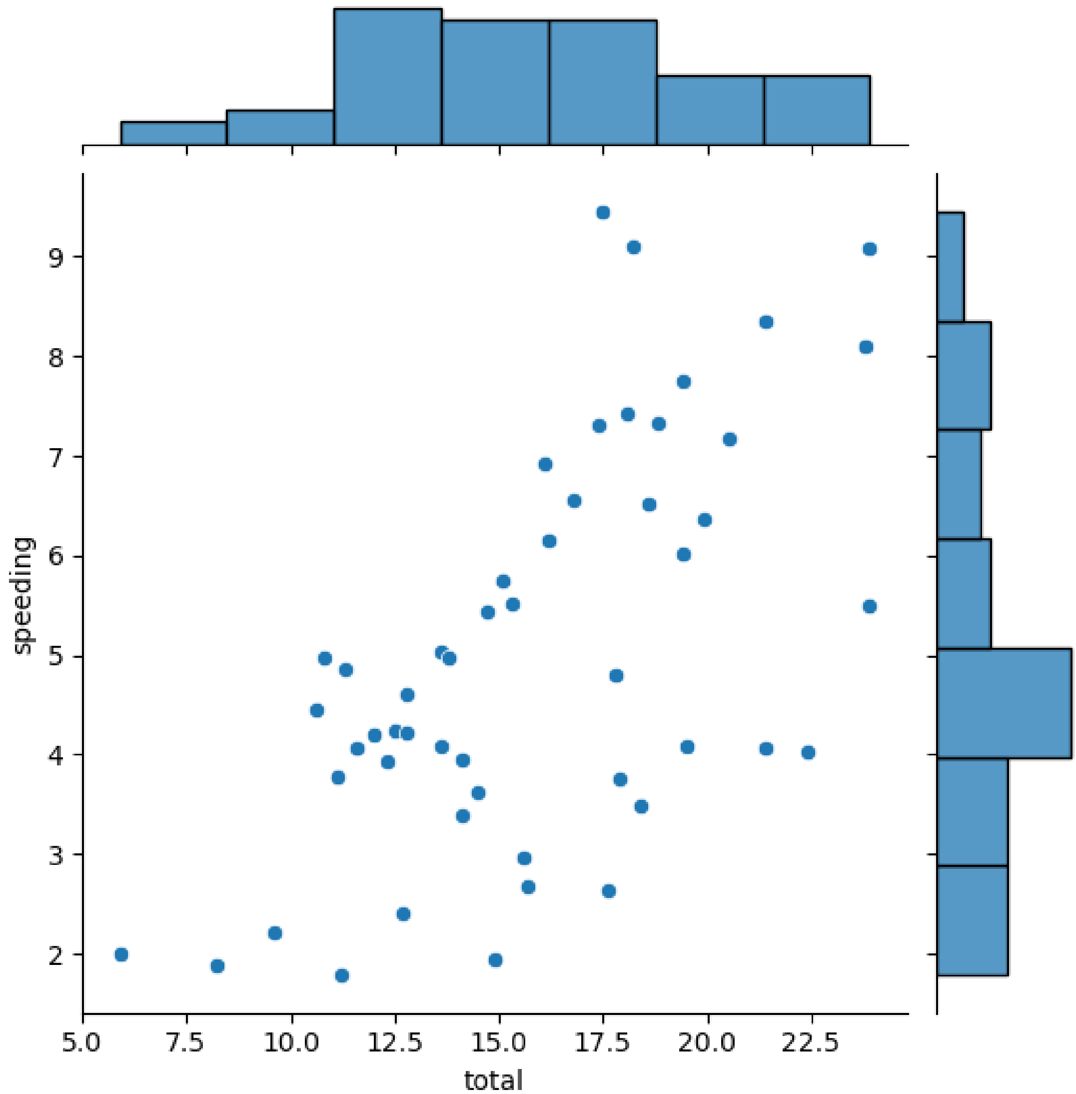
[41]:
```
<Axes: xlabel='not_distracted', ylabel='count'>
```



Inference: In the dataset under consideration, a significant portion of drivers were reported as being non-distracted during the recorded incidents.

[44]:
```python
sns.jointplot(x="total",y="speeding",data=df)
```

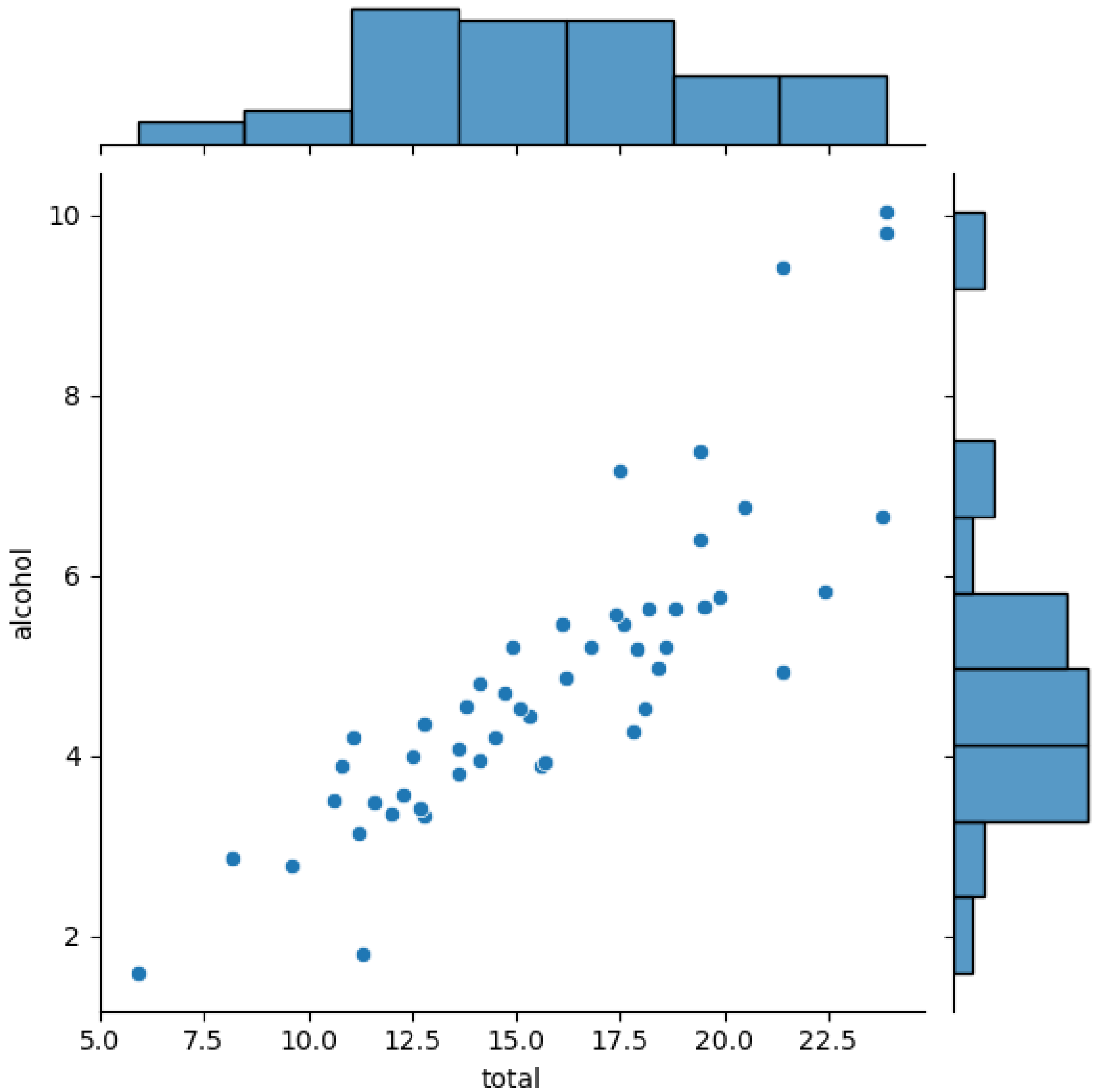
[44]:
```
<seaborn.axisgrid.JointGrid at 0x14b71c3af50>
```



Inference:As the total number of car crashes increases, there tends to be an increase in the number of speeding-related car crashes.

[45]:
```
sns.jointplot(x="total",y="alcohol",data=df)
```

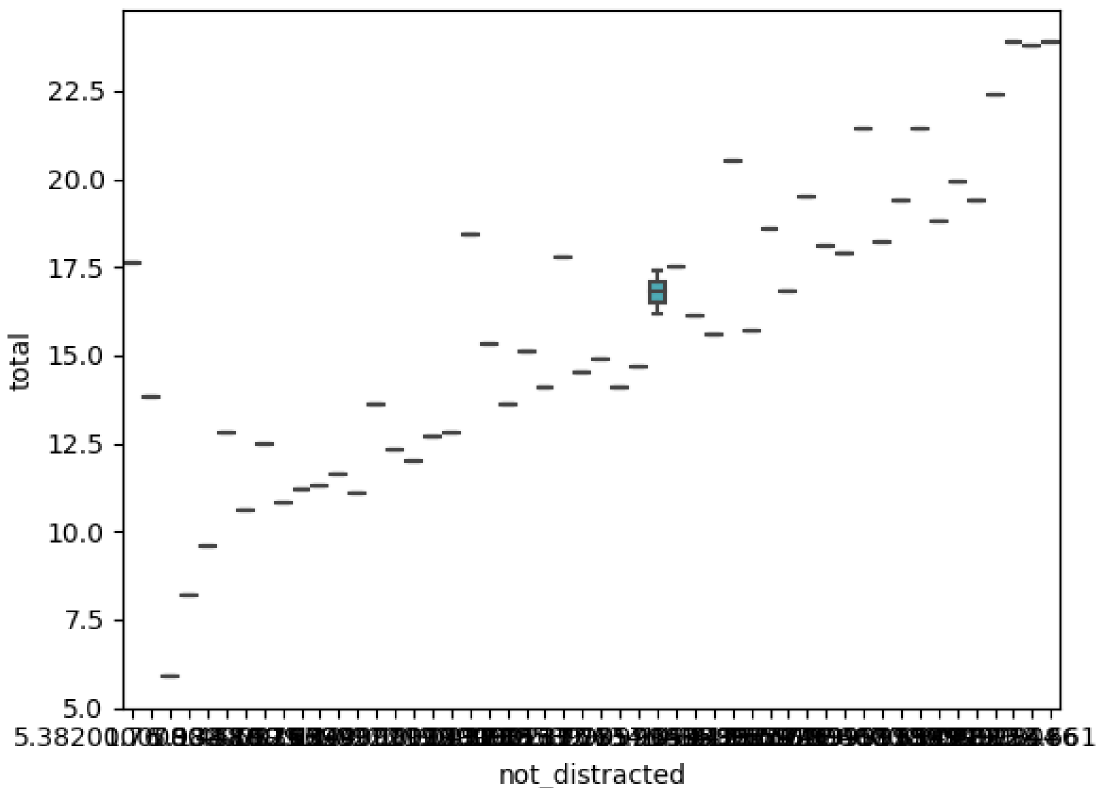
[45]: <seaborn.axisgrid.JointGrid at 0x14b71d8e1d0>



Inference: As the total number of car crashes increases, there tends to be an increase in the number of alcohol-related car crashes.

[46]:
```
sns.boxplot(x="not_distracted",y="total",data=df)
```

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



Inference:The plot compares the distribution of the total number of car crashes ('total') across 'not_distracted' drivers.

[47]:
```
corr = df.corr()
```

```
C:\Users\Vishal Gupta\AppData\Local\Temp\ipykernel_4508\658818363.py: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()
```

[48]:
```
corr
```

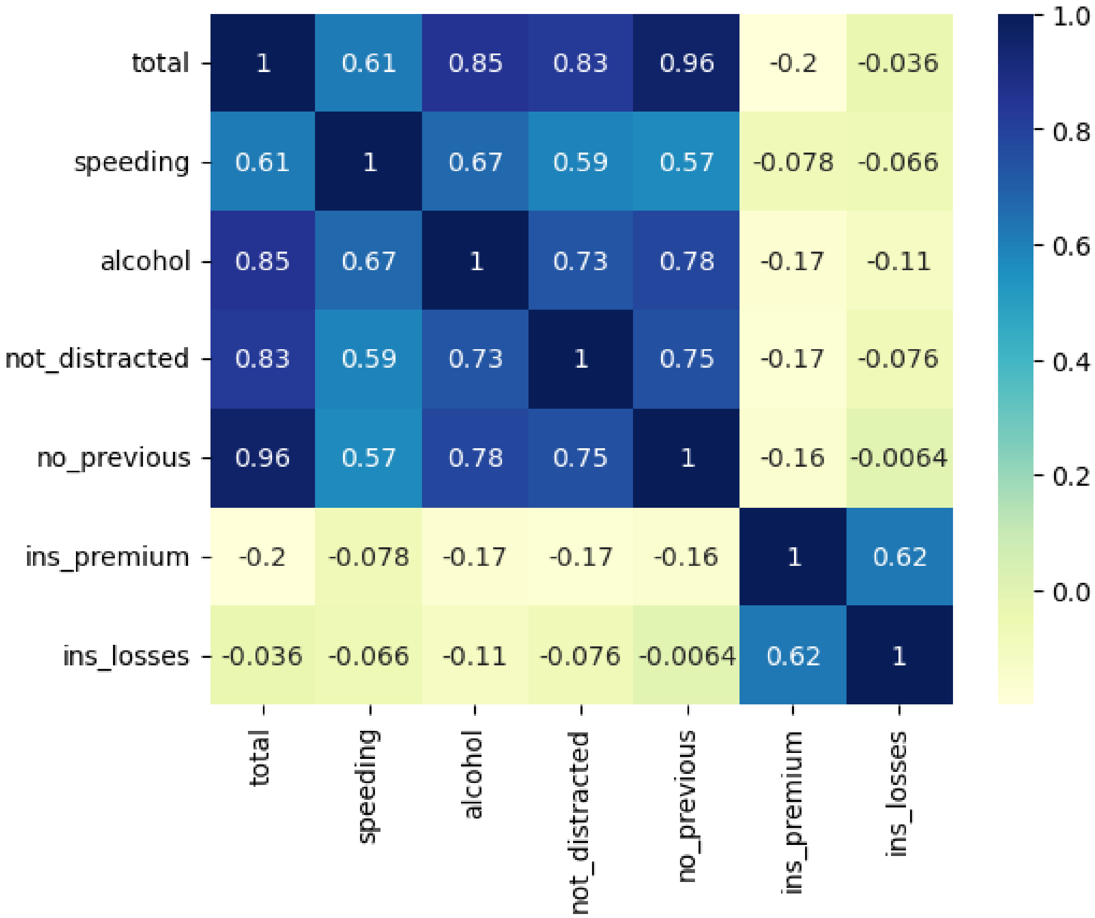
[48]:

	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
```

[49]:
```
sns.heatmap(corr,annot=True,cmap="YlGnBu")
```

[49]: <Axes: >



Inference:Warmer colors (shades of blue in this case) indicate positive correlations, while cooler colors (shades of green in this case) indicate negative correlations.

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