

SARV SANDILYA 21BEC2429

jupyter Assignment 2 Last Checkpoint: 2 minutes ago Trusted JupyterLab Python 3 (ipykernel)

```
[1]: !pip install seaborn
Requirement already satisfied: seaborn in c:\python311\lib\site-packages (0.12.2)
Requirement already satisfied: numpy!=1.24.0,>=1.17 in c:\python311\lib\site-packages (from seaborn) (1.25.2)
Requirement already satisfied: pandas>=0.25 in c:\python311\lib\site-packages (from seaborn) (2.1.0)
Requirement already satisfied: matplotlib!=3.6.1,>=3.1 in c:\python311\lib\site-packages (from seaborn) (3.7.3)
Requirement already satisfied: contourpy>1.0.1 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.1.0)
Requirement already satisfied: cycler>0.10 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (0.11.0)
Requirement already satisfied: fonttools>4.22.0 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (4.42.1)
Requirement already satisfied: kiwisolver>1.0.1 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (1.4.5)
Requirement already satisfied: packaging>20.0 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (23.1)
Requirement already satisfied: pillow>6.2.0 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (10.0.0)
Requirement already satisfied: pyparsing>2.3.1 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (3.1.1)
Requirement already satisfied: python-dateutil>2.7 in c:\python311\lib\site-packages (from matplotlib!=3.6.1,>=3.1->seaborn) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\python311\lib\site-packages (from pandas>=0.25->seaborn) (2023.3.post1)
Requirement already satisfied: tzdata>=2022.1 in c:\python311\lib\site-packages (from pandas>=0.25->seaborn) (2023.3)
Requirement already satisfied: six>=1.5 in c:\python311\lib\site-packages (from python-dateutil>2.7->matplotlib!=3.6.1,>=3.1->seaborn) (1.16.0)

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

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

[4]: df
[4]:   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
  5    13.6      5.032     3.808        10.744      12.920     835.50     139.91     CO
  6    10.8      4.968     3.888        9.396      8.856     1068.73     167.02     CT
  7    16.2      6.156     4.860        14.094      16.038     1137.87     151.48     DE
  8    5.9       2.006     1.593        5.900      5.900     1273.89     136.05     DC
  9    17.9      3.759     5.191        16.468      16.826     1160.13     144.18     FL
 10   15.6      2.964     3.900        14.820      14.508     913.15     142.80     GA
 11   17.5      9.450     7.175        14.350      15.225     861.18     120.92     HI
 12   15.3      5.508     4.437        13.005      14.994     641.96     82.75     ID
 13   12.8      4.608     4.352        12.032      12.288     803.11     139.15     IL
 14   14.5      3.625     4.205        13.775      13.775     710.46     108.92     IN
 15   15.7      2.669     3.925        15.229      13.659     649.06     114.47     IA
 16   17.8      4.806     4.272        13.706      15.130     780.45     133.80     KS
 17   21.4      4.066     4.922        16.692      16.264     872.51     137.13     KY
 18   20.5      7.175     6.765        14.965      20.090     1281.55     194.78     LA
 19   15.1      5.738     4.530        13.137      12.684     661.88     96.57     ME
 20   12.5      4.250     4.000        8.875      12.375     1048.78     192.70     MD
 21   8.2       1.886     2.870        7.134      6.560     1011.14     135.63     MA
 22   14.1      3.384     3.948        13.395      10.857     1110.61     152.26     MI
 23   9.6       2.208     2.784        8.448      8.448     777.18     133.35     MN
 24   17.6      2.640     5.456        1.760      17.600     896.07     155.77     MS
 25   16.1      6.923     5.474        14.812      13.524     790.32     144.45     MO
 26   21.4      8.346     9.416        17.976      18.190     816.21     85.15     MT
 27   14.9      1.937     5.215        13.857      13.410     732.28     114.82     NE
 28   14.7      5.439     4.704        13.965      14.553     1029.87     138.71     NV
 29   11.6      4.060     3.480        10.092      9.628     746.54     120.21     NH
 30   11.2      1.792     3.136        9.632      8.736     1301.52     159.85     NJ
 31   18.4      3.496     4.968        12.328      18.032     869.85     120.75     NM
 32   12.3      3.936     3.567        10.824      9.840     1234.31     150.01     NY
 33   16.8      6.552     5.208        15.792      13.608     708.24     127.82     NC
 34   23.9      5.497     10.038       23.661      20.554     688.75     109.72     ND
 35   14.1      3.948     4.794        13.959      11.562     697.73     133.52     OH
 36   19.9      6.368     5.771        18.308      18.706     881.51     178.86     OK
 37   12.8      4.224     3.328        8.576      11.520     804.71     104.61     OR
 38   18.2      9.100     5.642        17.472      16.016     905.99     153.86     PA
 39   11.1      3.774     4.218        10.212      8.769     1148.99     148.58     RI
 40   23.9      9.082     9.799        22.944      19.359     858.97     116.29     SC
 41   19.4      6.014     6.402        19.012      16.684     669.31     96.87     SD
 42   19.5      4.095     5.655        15.990      15.795     767.91     155.57     TN
```

43	19.4	7.760	7.372	17.654	16.878	1004.75	156.83	TX
44	11.3	4.859	1.808	9.944	10.848	809.38	109.48	UT
45	13.6	4.080	4.080	13.056	12.920	716.20	109.61	VT
46	12.7	2.413	3.429	11.049	11.176	768.95	153.72	VA
47	10.6	4.452	3.498	8.692	9.116	890.03	111.62	WA
48	23.8	8.092	6.664	23.086	20.706	992.61	152.56	WV
49	13.8	4.968	4.554	5.382	11.592	670.31	106.62	WI
50	17.4	7.308	5.568	14.094	15.660	791.14	122.04	WY

```
[5]: 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.isnull().sum()
```

```
total          0
speeding      0
alcohol        0
not_distracted 0
no_previous   0
ins_premium   0
ins_losses    0
abbrev        0
dtype: int64
```

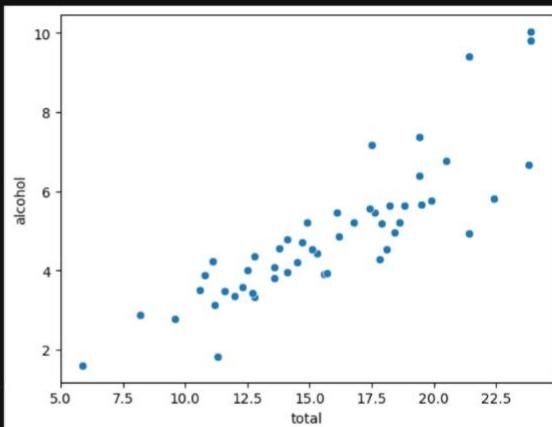
```
[8]: df.tail(5)
```

	total	speeding	alcohol	not_distracted	no_previous	ins_premium	ins_losses	abbrev
46	12.7	2.413	3.429	11.049	11.176	768.95	153.72	VA
47	10.6	4.452	3.498	8.692	9.116	890.03	111.62	WA
48	23.8	8.092	6.664	23.086	20.706	992.61	152.56	WV
49	13.8	4.968	4.554	5.382	11.592	670.31	106.62	WI
50	17.4	7.308	5.568	14.094	15.660	791.14	122.04	WY

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

```
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDType) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDType) instead
  if pd.api.types.is_categorical_dtype(vector):
```

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

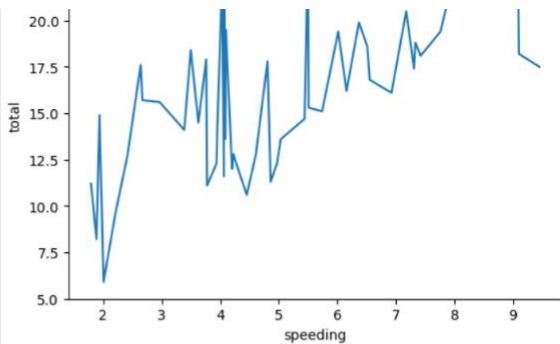


```
[10]: sns.lineplot(x="speeding",y="total",data=df,errorbar=None)
```

```
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDType) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDType) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
C:\Python311\Lib\site-packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

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

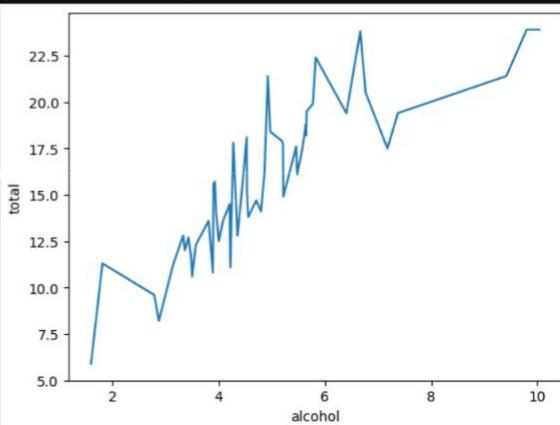




```
[11]: sns.lineplot(x="alcohol",y="total",data=df,errorbar=None)
```

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

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



```
[12]: sns.distplot(df['no_previous'])
```

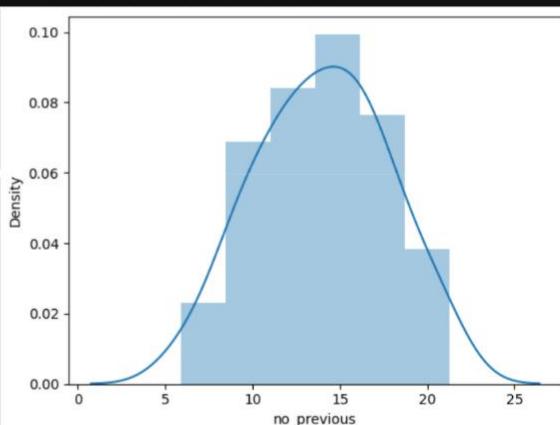
```
C:\Users\spars\AppData\Local\Temp\ipykernel_16164\3156560930.py:1: UserWarning:
'distplot' is a deprecated function and will be removed in seaborn v0.14.0.

Please adapt your code to use either `distplot` (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['no_previous'])
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

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

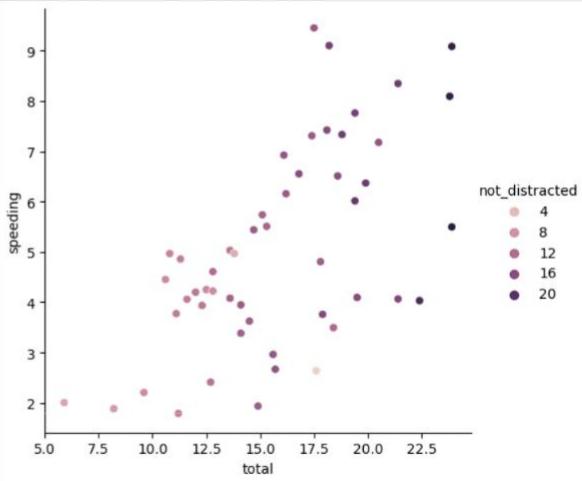


```
[13]: sns.relplot(x="total",y="speeding",data=df,hue="not_distracted")
```

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
```

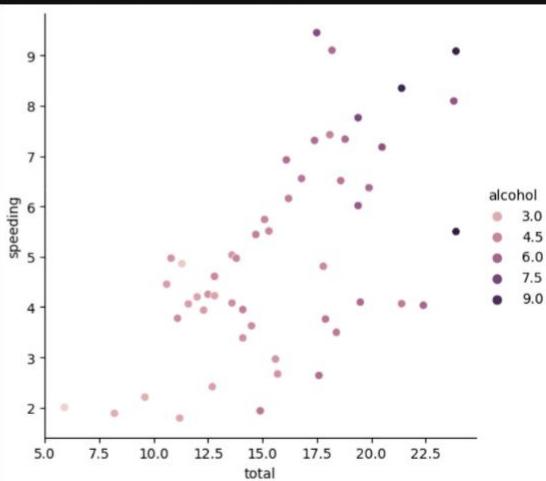
```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
nstance(dtype, CategoricalDType) instead  
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
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    if pd.api.types.is_categorical_dtype(vector):  
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isि  
nstance(dtype, CategoricalDType) instead  
    if pd.api.types.is_categorical_dtype(vector):
```

```
[13]: <seaborn.axisgrid.FacetGrid at 0x12ab84bd6d0>
```



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

```
[14]: <seaborn.axisgrid.FacetGrid at 0x12ab8664e10>
```



```
[15]: df["no previous"].value_counts()
```

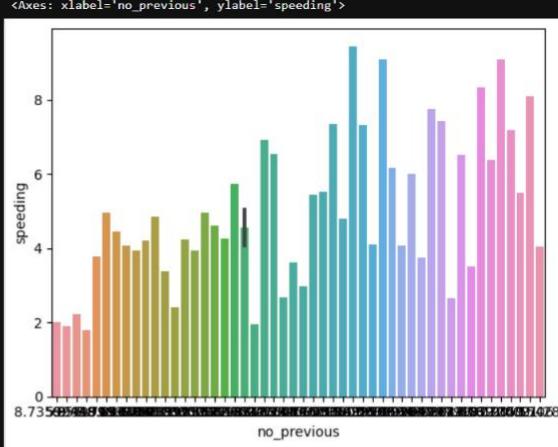
```
[15]: no_previous  
      12.920    2  
      15.040    1  
      16.016    1
```

```
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: count, dtype: int64
```

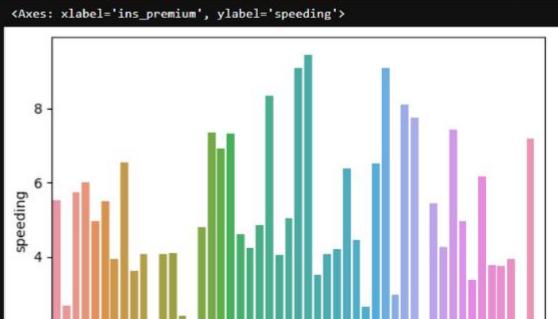
```
[16]: sns.barplot(data=df,x="no_previous",y="speeding")
```

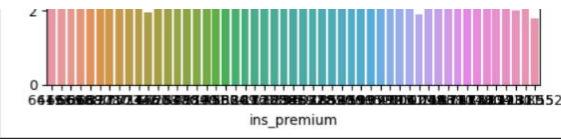
```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
        if pd.api.types.is_categorical_dtype(vector):
[16]: <Axes: xlabel='no_previous', ylabel='speeding'>
```



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

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
    if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
        if pd.api.types.is_categorical_dtype(vector):
[17]: <Axes: xlabel='ins_premium', ylabel='speeding'>
```

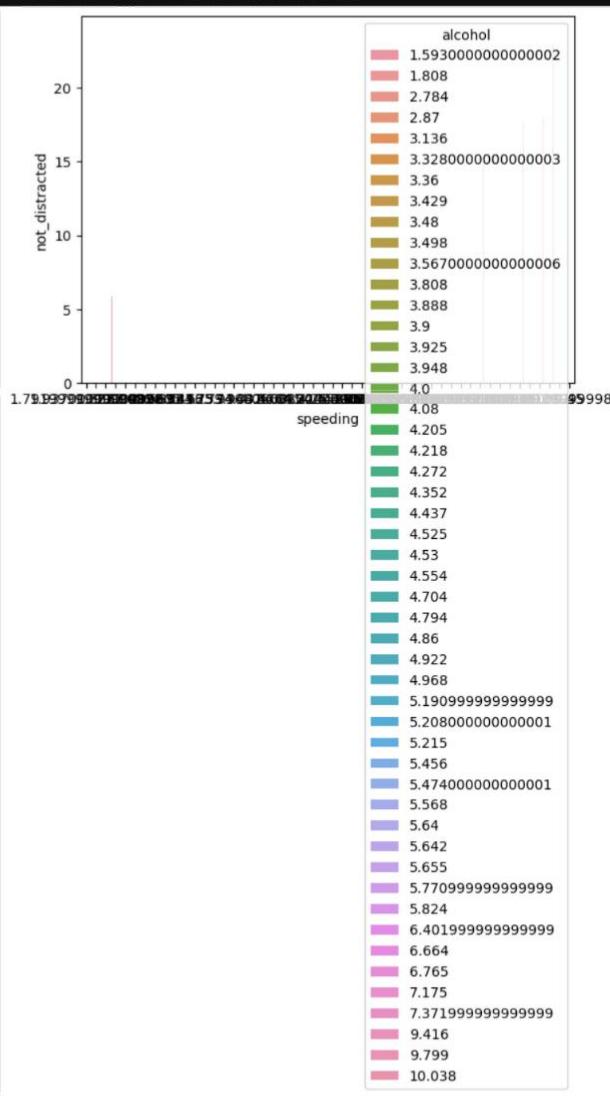




```
[18]: sns.barplot(data=df,x="speeding",y="not_distracted",hue="alcohol")
```

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
instance(dtype, CategoricalDtype) instead
    if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
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    if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
instance(dtype, CategoricalDtype) instead
    if pd.api.types.is_categorical_dtype(vector):
```

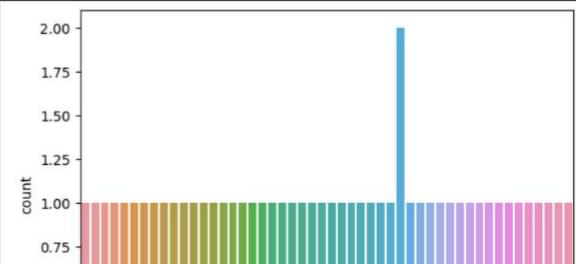
```
[18]: <Axes: xlabel='speeding', ylabel='not_distracted'>
```

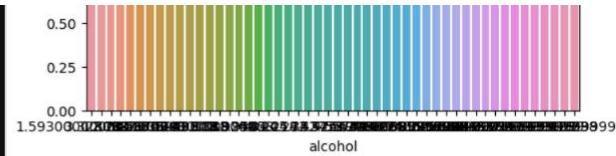


```
[19]: sns.countplot(x="alcohol",data=df)
```

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
instance(dtype, CategoricalDtype) instead
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
instance(dtype, CategoricalDtype) instead
    if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use is
instance(dtype, CategoricalDtype) instead
    if pd.api.types.is_categorical_dtype(vector):
```

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

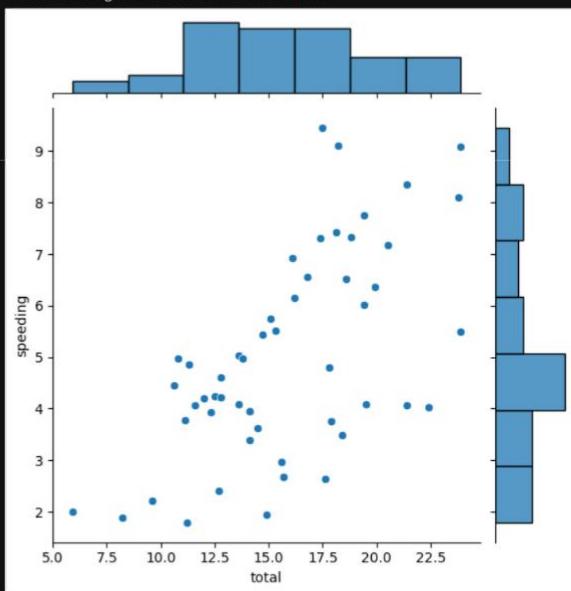




```
[20]: sns.jointplot(x="total", y="speeding", data=df)
```

```
C:\Python311\Lib\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
C:\Python311\Lib\site-packages\seaborn_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\Lib\site-packages\seaborn_oldcore.py:1119: FutureWarning: use_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

```
[20]: <seaborn.axisgrid.JointGrid at 0x12abdc71090>
```



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

```
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_categorical_dtype is deprecated and will be removed in a future version. Use isinstance(dtype, CategoricalDtype) instead
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  if pd.api.types.is_categorical_dtype(vector):
C:\Python311\lib\site-packages\seaborn\_oldcore.py:1498: FutureWarning: is_inf_as_na option is deprecated and will be removed in a future version. Convert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

```
[21]: <seaborn.axisgrid.JointGrid at 0x12abd7d8b50>
```

