In [132…

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize']=[15,8]
import seaborn as sns
sns.set_style("whitegrid")
import datetime as dt
```

In [133…

```
#!pip install openpyxl
```

In [134…

```
data=pd.read_excel("1673872777_ausapparalsales4thqrt2020.xlsx")
```

In [135…

```
data.head()
```

Out[135…

	Date	Time	State	Group	Unit	Sales
0	2020-10-01	Morning	WA	Kids	8	20000
1	2020-10-01	Morning	WA	Men	8	20000
2	2020-10-01	Morning	WA	Women	4	10000
3	2020-10-01	Morning	WA	Seniors	15	37500
4	2020-10-01	Afternoon	WA	Kids	3	7500

In [136…

```
data.shape
```

Out[136…

```
(7560, 6)
```

In [137…

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7560 entries, 0 to 7559
Data columns (total 6 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
```

```
 0   Date    7560 non-null   datetime64[ns]
 1   Time    7560 non-null   object
 2   State   7560 non-null   object
 3   Group   7560 non-null   object
 4   Unit    7560 non-null   int64
 5   Sales   7560 non-null   int64
dtypes: datetime64[ns](1), int64(2), object(3)
memory usage: 354.5+ KB
```

In [138…

```
data.isna().sum()
```

Out[138…

```
Date     0
Time     0
State    0
Group    0
Unit     0
Sales    0
dtype: int64
```

1) Determine the states that are generating the highest revenues

In [139…

```
data['Revenue']=data['Unit']*data['Sales']
```

In [140…

```
state_groupby=data.groupby('State', sort=True)['Revenue'].sum().reset_index()
```

In [141…

```
state_groupby.sort_values('Revenue', ascending=False)
```

Out[141…

	State	Revenue
5	VIC	4433275000
0	NSW	2265295000
3	SA	1414627500
2	QLD	490462500
4	TAS	227010000
1	NT	223500000

	State	Revenue
6	WA	218537500

●● Perform descriptive statistical analysis on the data (Sales and Unit columns)

In [142...

```
data.describe()
```

Out[142...

	Unit	Sales	Revenue
count	7560.000000	7560.000000	7.560000e+03
mean	18.005423	45013.558201	1.226549e+06
std	12.901403	32253.506944	1.690744e+06
min	2.000000	5000.000000	1.000000e+04
25%	8.000000	20000.000000	1.600000e+05
50%	14.000000	35000.000000	4.900000e+05
75%	26.000000	65000.000000	1.690000e+06
max	65.000000	162500.000000	1.056250e+07

In [143...

```
data.describe(include=['int'])
```

Out[143...

	Unit	Sales	Revenue
count	7560.000000	7560.000000	7.560000e+03
mean	18.005423	45013.558201	1.226549e+06
std	12.901403	32253.506944	1.690744e+06
min	2.000000	5000.000000	1.000000e+04
25%	8.000000	20000.000000	1.600000e+05
50%	14.000000	35000.000000	4.900000e+05

	Unit	Sales	Revenue
75%	26.000000	65000.000000	1.690000e+06
max	65.000000	162500.000000	1.056250e+07

● Determine which group is generating the highest sales, and which group is generating the lowest sales.

In [144...

```
grp_sales=data.groupby('Group')['Sales'].sum().reset_index()
```

In [145...

```
grp_sales.sort_values('Sales', ascending=False)
```

Out[145...

	Group	Sales
1	Men	85750000
3	Women	85442500
0	Kids	85072500
2	Seniors	84037500

● Determine which state is generating the highest sales, and which state is generating the lowest sales.

In [146...

```
state_sales=data.groupby('State')['Sales'].sum().reset_index()
```

In [147...

```
state_sales.sort_values('Sales', ascending=False)
```

Out[147...

	State	Sales
5	VIC	105565000
0	NSW	74970000
3	SA	58857500

	State	Sales
2	QLD	33417500
4	TAS	22760000
1	NT	22580000
6	WA	22152500

In [148…

```
data['year']=data['Date'].dt.year
data['month']=data['Date'].dt.month
data['week']=data['Date'].dt.isocalendar().week
data['Quarter']=data['Date'].dt.quarter
data['month_name']=data['Date'].dt.month_name()
data['day'] = data['Date'].dt.day
```

In [149…

```
data.tail()
```

Out[149…

	Date	Time	State	Group	Unit	Sales	Revenue	year	month	week	Quarter	month_name	day
7555	2020-12-30	Afternoon	TAS	Seniors	14	35000	490000	2020	12	53	4	December	30
7556	2020-12-30	Evening	TAS	Kids	15	37500	562500	2020	12	53	4	December	30
7557	2020-12-30	Evening	TAS	Men	15	37500	562500	2020	12	53	4	December	30
7558	2020-12-30	Evening	TAS	Women	11	27500	302500	2020	12	53	4	December	30
7559	2020-12-30	Evening	TAS	Seniors	13	32500	422500	2020	12	53	4	December	30

In [150…

```
weekly_sales = data.groupby('week')['Sales'].mean().reset_index().sort_values('week')
```

In [151…

```
weekly_sales
```

Out[151…

	week	Sales
0	40	44776.785714
1	41	45922.619048

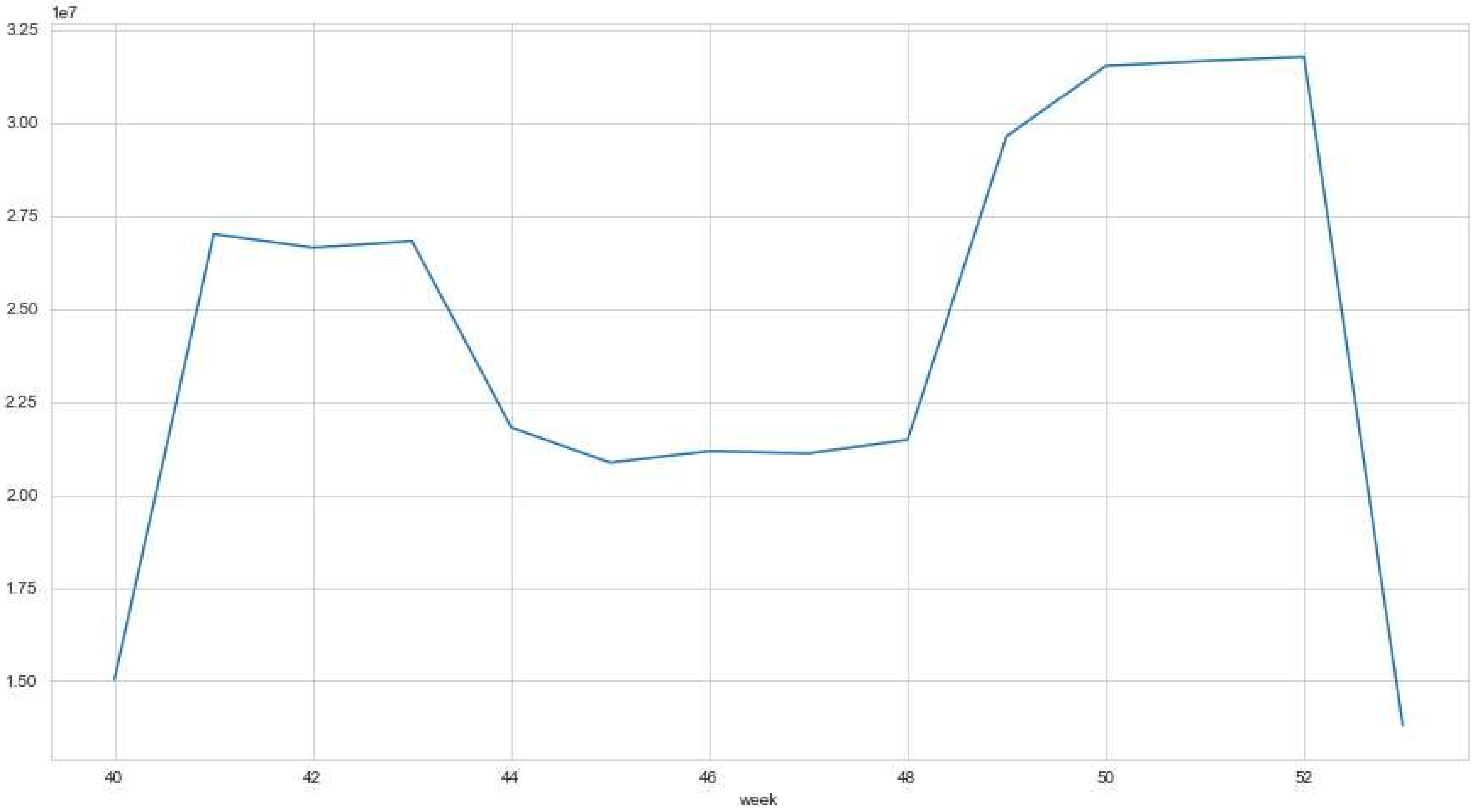
	week	Sales
2	42	45306.122449
3	43	45603.741497
4	44	43268.849206
5	45	35484.693878
6	46	36007.653061
7	47	35905.612245
8	48	36526.360544
9	49	50378.401361
10	50	53613.945578
11	51	53835.034014
12	52	54030.612245
13	53	54732.142857

In [152…

```
data.groupby('week')['Sales'].sum().plot()
```

Out[152…

```
<AxesSubplot:xlabel='week'>
```



In [153…

```
monthly_sales = data.groupby('month')['Sales'].sum().reset_index().sort_values('month')
```

In [154…

```
monthly_sales
```

Out[154…

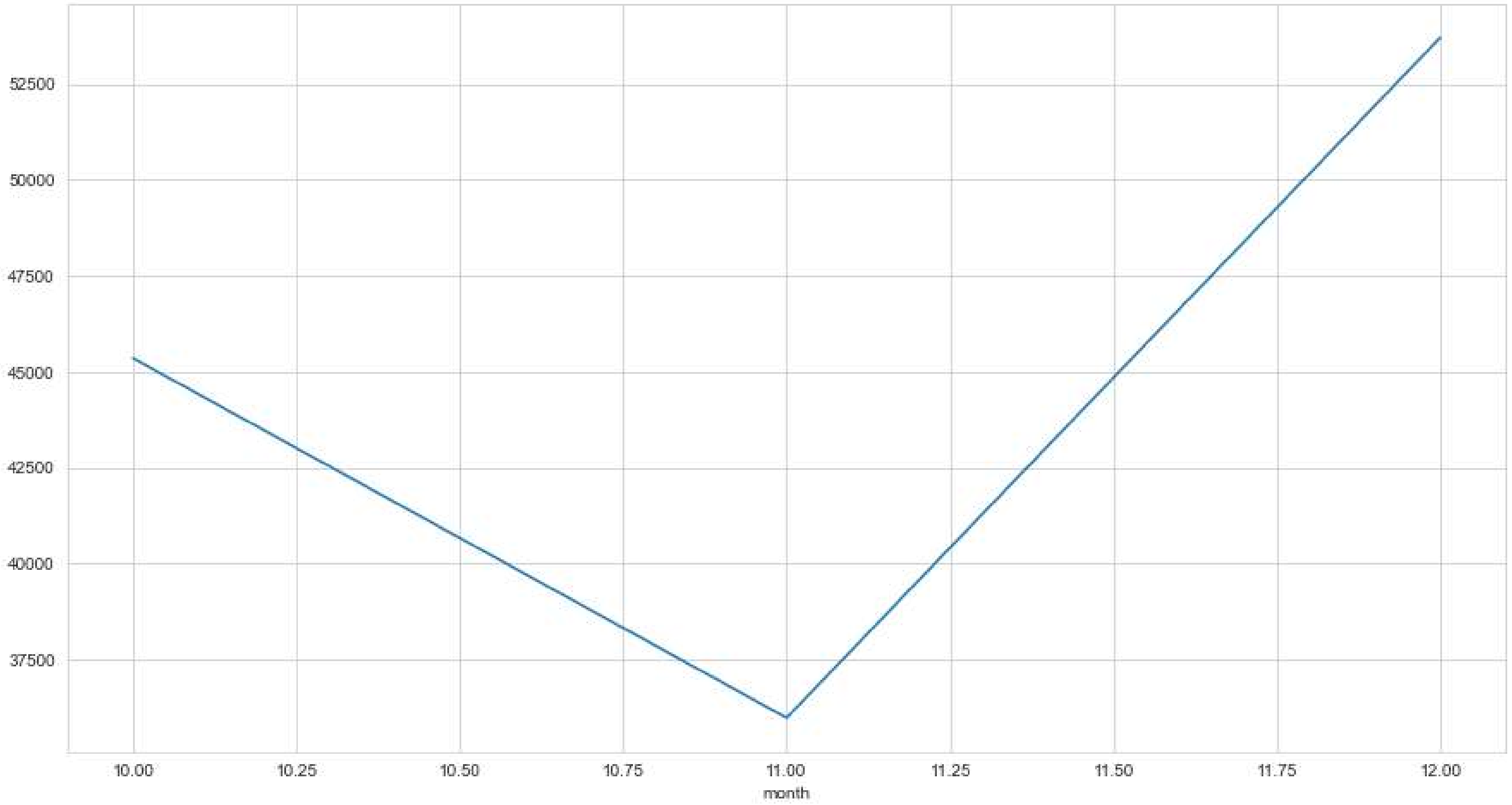
	month	Sales
0	10	114290000
1	11	90682500
2	12	135330000

In [155…

```
data.groupby('month')['Sales'].mean().plot()
```

Out[155…

```
<AxesSubplot:xlabel='month'>
```



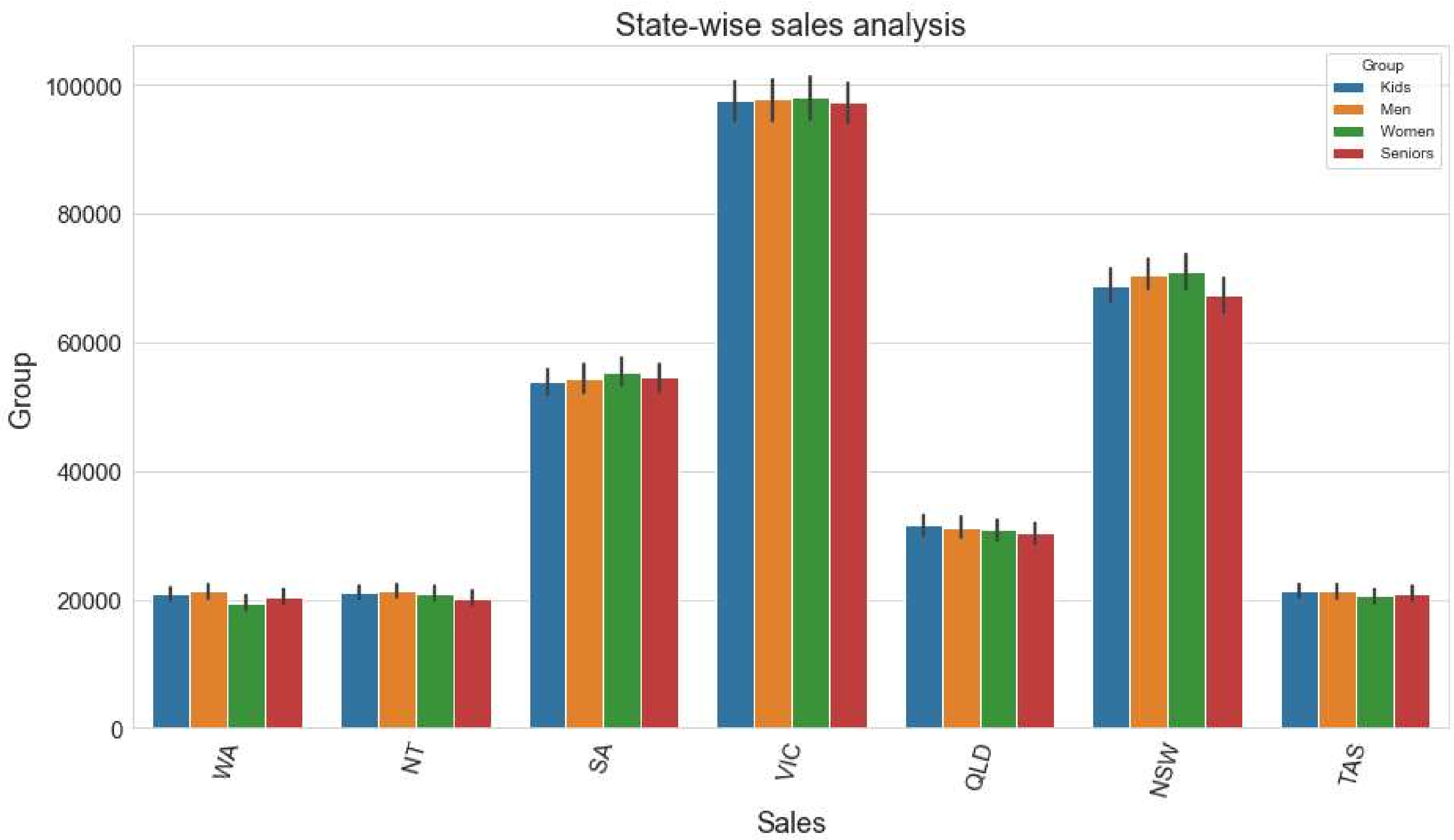
3. Data Visualization

In [156…

```
plt.xticks(rotation=75, fontsize=15)
plt.ylabel('Group', fontsize=18)
plt.yticks(fontsize=15)
plt.xlabel('Sales', fontsize=18)
plt.title('State-wise sales analysis', fontsize=20)
sns.barplot(data=data, y='Sales', x='State', hue='Group')
```

Out[156…

```
<AxesSubplot:title={'center':'State-wise sales analysis'}, xlabel='Sales', ylabel='Group'>
```

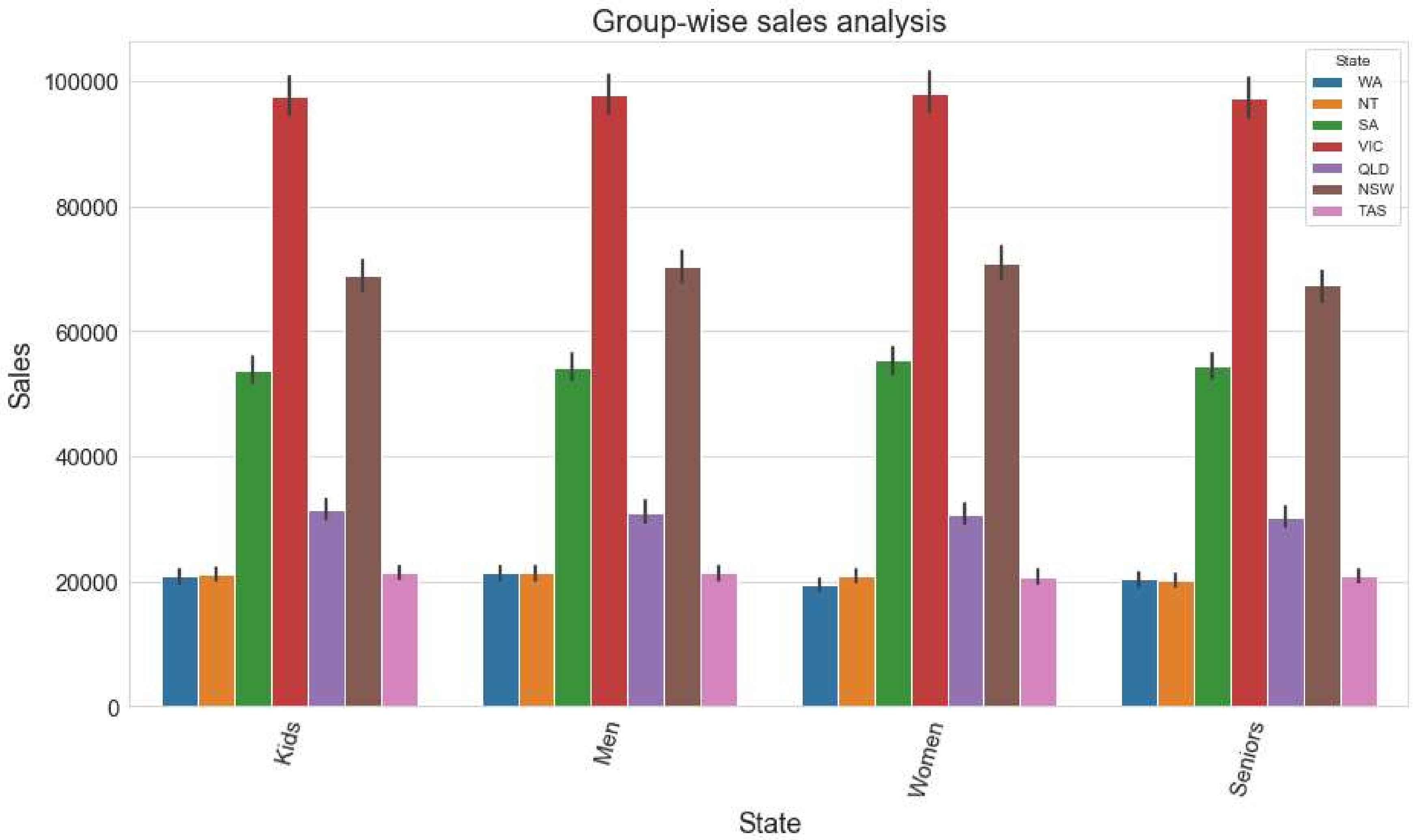


In [157…

```
plt.xticks(rotation=75, fontsize=15)
plt.ylabel('Sales', fontsize=18)
plt.yticks(fontsize=15)
plt.xlabel('State', fontsize=18)
plt.title('Group-wise sales analysis', fontsize=20)
sns.barplot(data=data, y='Sales', hue='State', x='Group')
```

Out[157…

```
<AxesSubplot:title={'center':'Group-wise sales analysis'}, xlabel='State', ylabel='Sales'>
```



In [158…

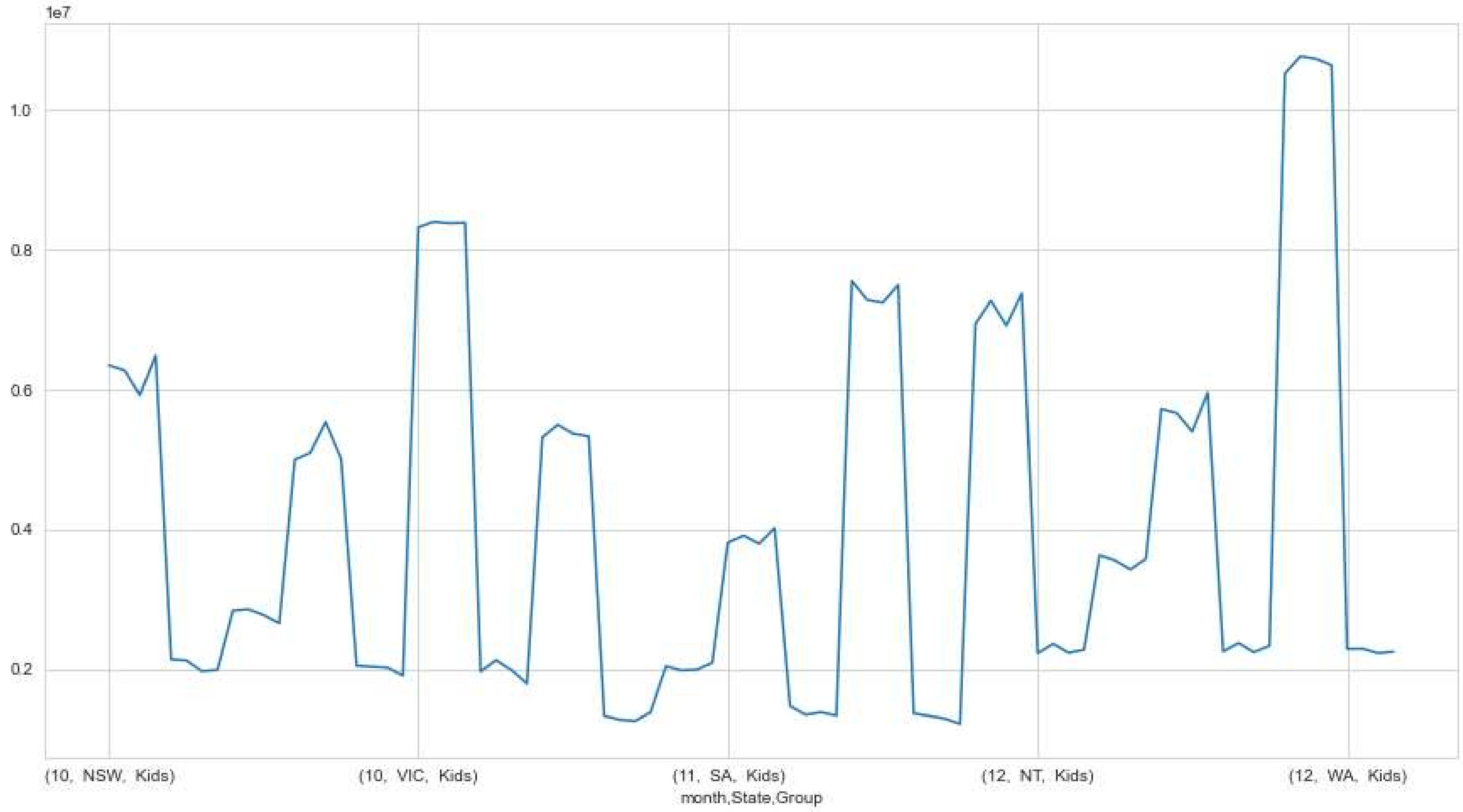
```
state_grp_sales = data.groupby(['month','State','Group'])['Sales'].sum()
```

In [171…

```
state_grp_sales.plot()
```

Out[171…

```
<AxesSubplot:xlabel='month,State,Group'>
```



○ Time-of-the-day analysis

In [160…

```
time_grp = data.groupby('Time')['Sales'].mean().reset_index()
```

In [161…

```
time_grp.sort_values('Sales', ascending=False)
```

Out[161…

	Time	Sales
2	Morning	45320.436508
0	Afternoon	45241.071429

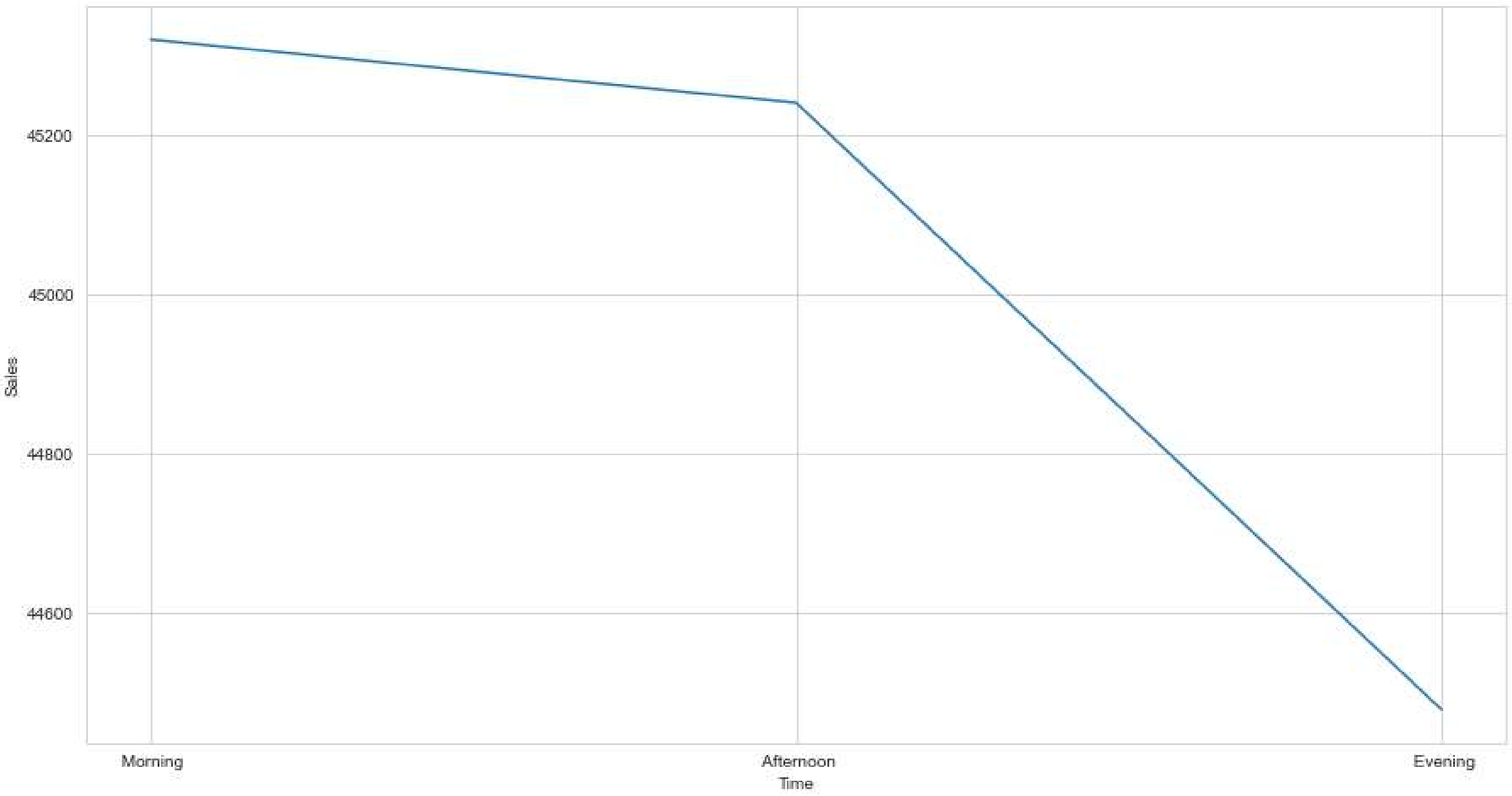
	Time	Sales
1	Evening	44479.166667

In [162…

```
sns.lineplot(data = time_grp.sort_values('Sales', ascending=False), x='Time', y='Sales')
```

Out[162…

```
<AxesSubplot:xlabel='Time', ylabel='Sales'>
```



In [163…

```
daily_sales_chart = data.groupby(['day','State','Group'])['Sales'].sum().reset_index()
```

In [164…

```
weekly_sales_chart = data.groupby(['week','State','Group'])['Sales'].sum().reset_index()
```

In [165…

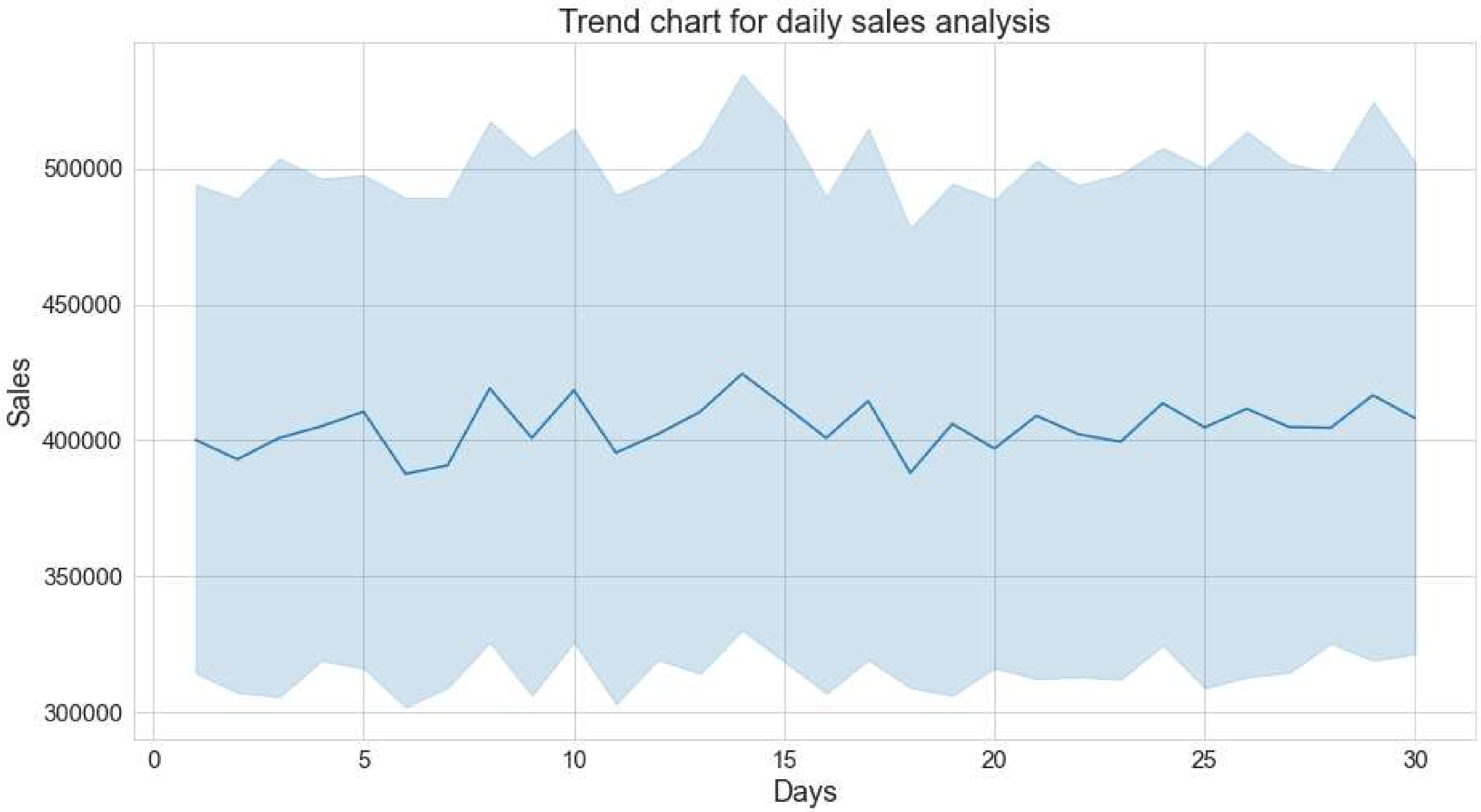
```
monthly_sales_chart = data.groupby(['month','State','Group'])['Sales'].sum().reset_index()
```

In [166…

```
plt.xticks(fontsize=15)
plt.ylabel('Sales', fontsize=18)
plt.yticks(fontsize=15)
plt.xlabel('Days', fontsize=18)
plt.title('Trend chart for daily sales analysis', fontsize=20)
sns.lineplot(daily_sales_chart,x='day', y='Sales')
```

Out[166…

```
<AxesSubplot:title={'center':'Trend chart for daily sales analysis'}, xlabel='Days', ylabel='Sales'>
```

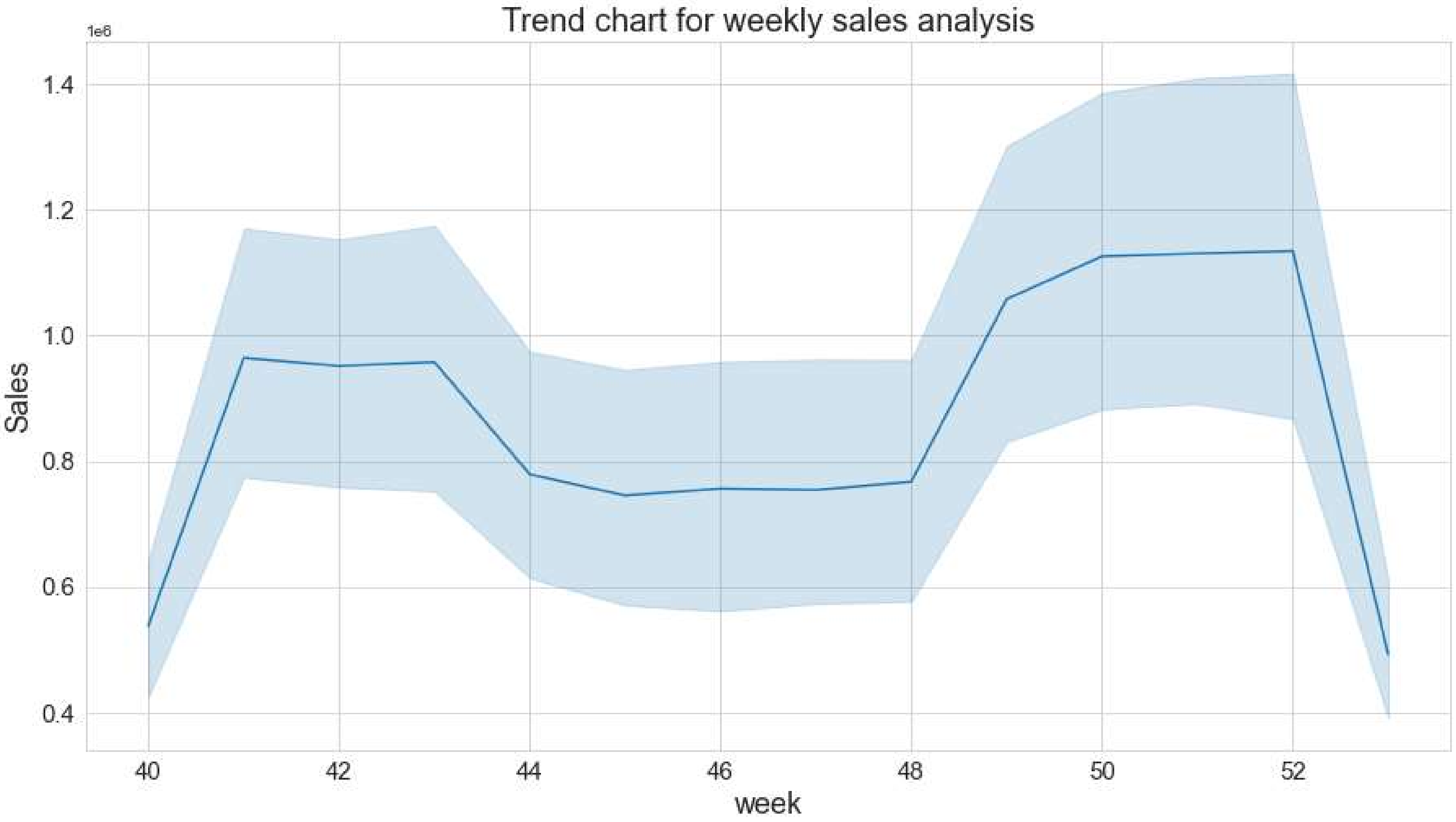


In [167…

```
plt.xticks(fontsize=15)
plt.ylabel('Sales', fontsize=18)
plt.yticks(fontsize=15)
plt.xlabel('week', fontsize=18)
plt.title('Trend chart for weekly sales analysis', fontsize=20)
sns.lineplot(weekly_sales_chart, x='week', y='Sales')
```

Out[167…

```
<AxesSubplot:title={'center':'Trend chart for weekly sales analysis'}, xlabel='week', ylabel='Sales'>
```

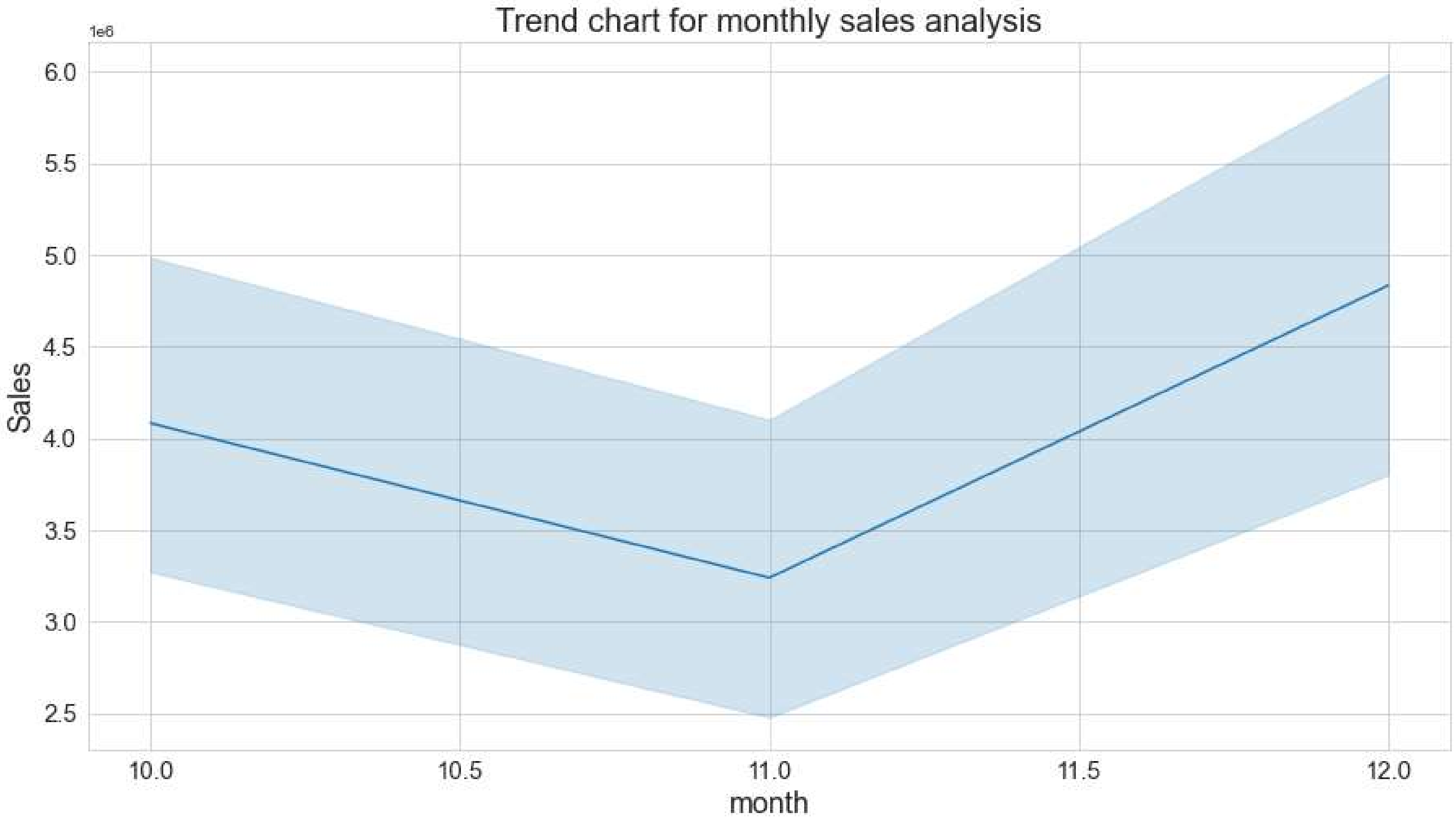


In [168…

```
plt.xticks(np.linspace(10, 12, 5), fontsize=15)
plt.ylabel('Sales', fontsize=18)
plt.yticks(fontsize=15)
plt.xlabel('month', fontsize=18)
plt.title('Trend chart for monthly sales analysis', fontsize=20)
sns.lineplot(monthly_sales_chart, x='month', y='Sales')
```

Out[168…

```
<AxesSubplot:title={'center':'Trend chart for monthly sales analysis'}, xlabel='month', ylabel='Sales'>
```

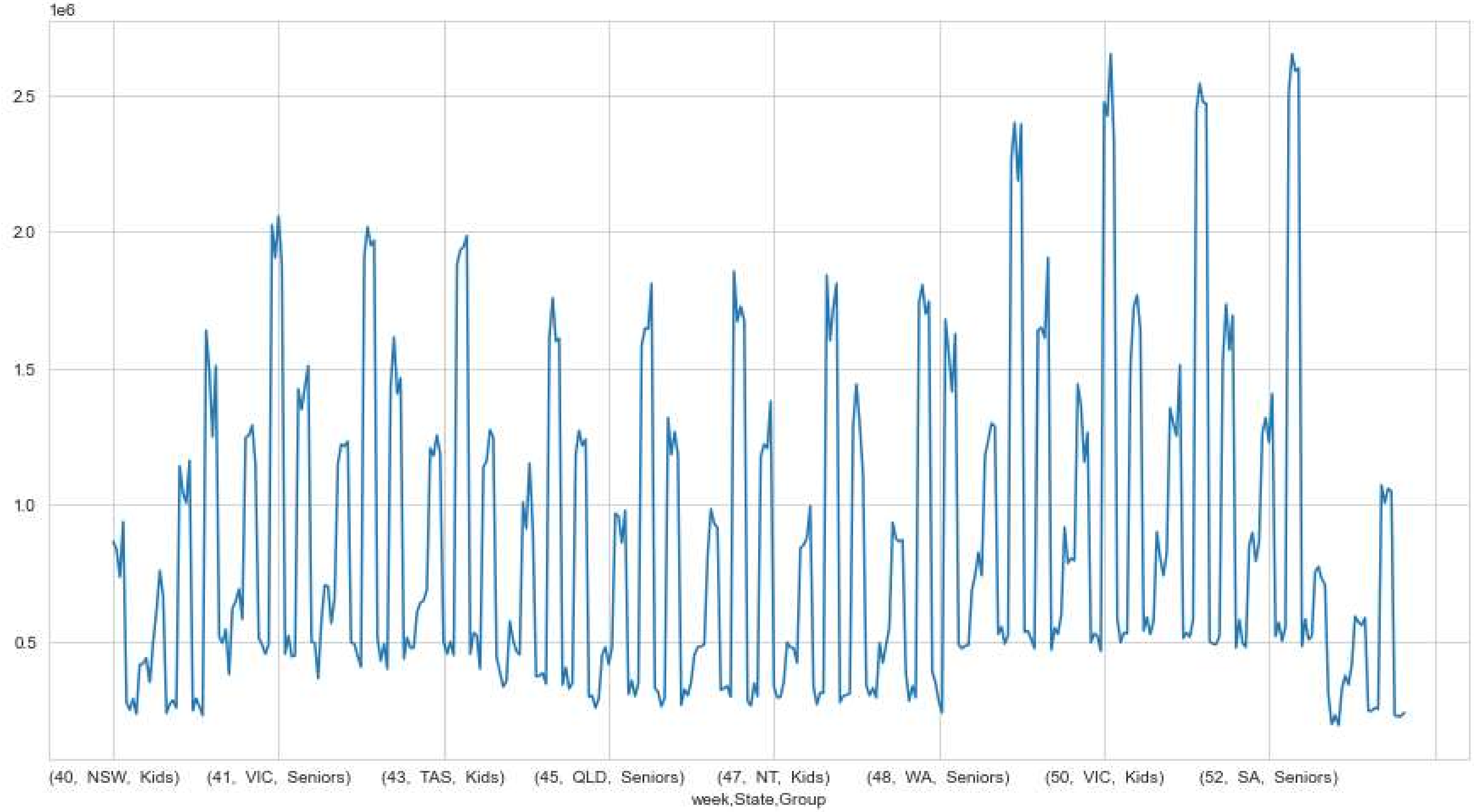


In [172…

```
data.groupby(['week','State','Group'])['Sales'].sum().plot()
```

Out[172…

```
<AxesSubplot:xlabel='week,State,Group'>
```



Conclusions

From above analysis we can observe during the month of December sales is going to high beacuse of year end also festival and holiday time

state VIC has maximum sales and Men group is having more sales than ant other group

Last 4 to 5 weeks of quarter aka 48 to 52 has we can see gradually increase in sales i.e, start of december

From time of the day analysis we seen morning time getting more sales than other times

In [ ]: