Husband Wife Arguments Analytics

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

import warnings
warnings.filterwarnings('ignore')

df = pd.read_csv('husband_wife_arguments.csv')

df.head()
```

```
   Argument ID        Date  Duration (minutes)              Topic  \
0            1  2024-01-05                  43  Parenting Styles   
1            2  2024-02-05                  24  Parenting Styles   
2            3  2024-02-27                  25  Money Management   
3            4  2024-02-07                  20   Time Management   
4            5  2024-01-26                   7      Future Goals   
```

```
  Emotional Tone       Resolution Type Mood Swing  \
0   Disappointed         No Resolution       Mild   
1        Annoyed            Compromise     Severe   
2        Annoyed         No Resolution   Moderate   
3          Angry  Resolution Discussed   Moderate   
4     Frustrated  Resolution Discussed       Mild   

                                               Notes  
0  Discussed parenting styles for 43 minutes. Emo...  
1  Discussed parenting styles for 24 minutes. Emo...  
2  Discussed money management for 25 minutes. Emo...  
3  Discussed time management for 20 minutes. Emot...  
4  Discussed future goals for 7 minutes. Emotiona...  
```

```
df.tail()
```

```
      Argument ID        Date  Duration (minutes)                 
Topic  \
1495         1496  2024-01-02                  43   Parenting Styles   

1496         1497  2024-01-15                  22   Money Management   

1497         1498  2024-01-21                  16  Social Activities   

1498         1499  2024-01-26                  12  Social Activities   

1499         1500  2024-02-22                  51    Time Management   


     Emotional Tone       Resolution Type Mood Swing  \
1495           Calm            Compromise       Mild   
1496     Supportive               Apology        NaN   
1497          Happy  Resolution Discussed       Mild   
1498        Annoyed            Compromise       Mild   
1499           Calm         No Resolution        NaN   

                                                  Notes  
1495  Discussed parenting styles for 43 minutes. Emo...  
1496  Discussed money management for 22 minutes. Emo...  
1497  Discussed social activities for 16 minutes. Em...  
1498  Discussed social activities for 12 minutes. Em...  
1499  Discussed time management for 51 minutes. Emot...  
```

```
df.shape
```

```
(1500, 8)
```

```
df.columns
```

```
Index(['Argument ID', 'Date', 'Duration (minutes)', 'Topic',
'Emotional Tone',
       'Resolution Type', 'Mood Swing', 'Notes'],
      dtype='object')

df = df.drop('Argument ID', axis = 1)

df.duplicated().sum()

0

df.isnull().sum()

Date                    0
Duration (minutes)      0
Topic                   0
Emotional Tone          0
Resolution Type         0
Mood Swing            336
Notes                   0
dtype: int64

df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1500 entries, 0 to 1499
Data columns (total 7 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   Date                1500 non-null   object
 1   Duration (minutes)  1500 non-null   int64 
 2   Topic               1500 non-null   object
 3   Emotional Tone      1500 non-null   object
 4   Resolution Type     1500 non-null   object
 5   Mood Swing          1164 non-null   object
 6   Notes               1500 non-null   object
dtypes: int64(1), object(6)
memory usage: 82.2+ KB

df.describe()

       Duration (minutes)
count         1500.000000
mean            32.763333
std             16.379607
min              5.000000
25%             18.000000
50%             33.000000
75%             47.000000
max             60.000000
```

```
df['Mood Swing'].fillna('Cant Say', inplace=True)

df.nunique()

Date                       61
Duration (minutes)         56
Topic                       8
Emotional Tone              8
Resolution Type             4
Mood Swing                  4
Notes                    1484
dtype: int64

object_columns = df.select_dtypes(include=['object']).columns
print("Object type columns:")
print(object_columns)

numerical_columns = df.select_dtypes(include=['int64',
'float64']).columns
print("\nNumerical type columns:")
print(numerical_columns)

Object type columns:
Index(['Date', 'Topic', 'Emotional Tone', 'Resolution Type', 'Mood
Swing',
       'Notes'],
      dtype='object')

Numerical type columns:
Index(['Duration (minutes)'], dtype='object')

def classify_features(df):
    categorical_features = []
    non_categorical_features = []
    discrete_features = []
    continuous_features = []

    for column in df.columns:
        if df[column].dtype == 'object':
            if df[column].nunique() < 10:
                categorical_features.append(column)
            else:
                non_categorical_features.append(column)
        elif df[column].dtype in ['int64', 'float64']:
            if df[column].nunique() < 10:
                discrete_features.append(column)
            else:
                continuous_features.append(column)

    return categorical_features, non_categorical_features,
discrete_features, continuous_features
```

```
categorical, non_categorical, discrete, continuous =
classify_features(df)

print("Categorical Features:", categorical)
print("Non-Categorical Features:", non_categorical)
print("Discrete Features:", discrete)
print("Continuous Features:", continuous)
```

```
Categorical Features: ['Topic', 'Emotional Tone', 'Resolution Type',
'Mood Swing']
Non-Categorical Features: ['Date', 'Notes']
Discrete Features: []
Continuous Features: ['Duration (minutes)']
```

```
for i in categorical:
    print(i)
    print(df[i].unique())
    print()
```

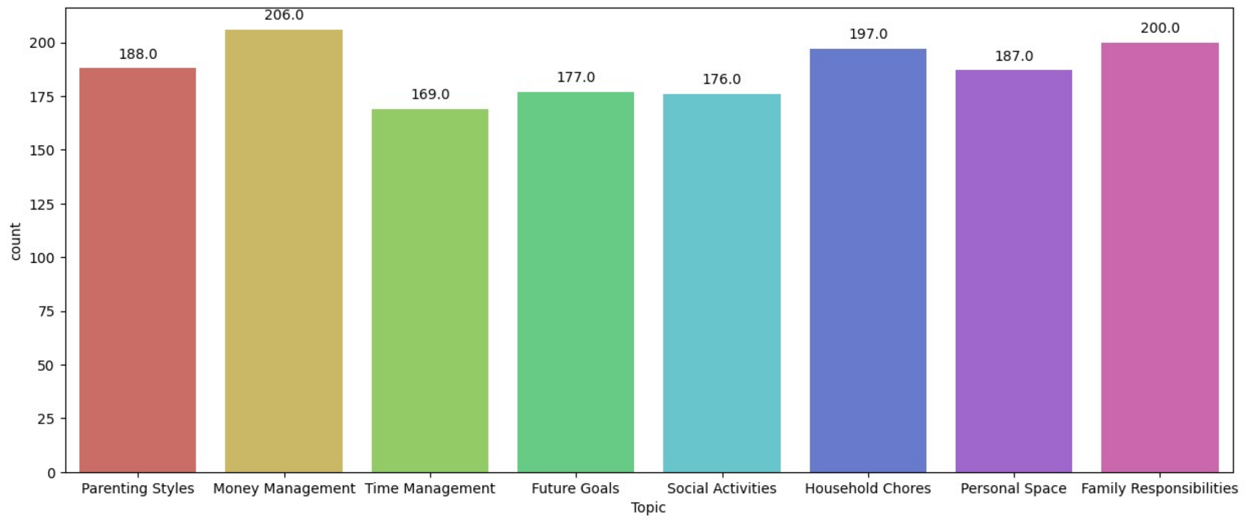
```
Topic
['Parenting Styles' 'Money Management' 'Time Management' 'Future
Goals'
 'Social Activities' 'Household Chores' 'Personal Space'
 'Family Responsibilities']

Emotional Tone
['Disappointed' 'Annoyed' 'Angry' 'Frustrated' 'Happy' 'Supportive'
'Calm'
 'Hurt']

Resolution Type
['No Resolution' 'Compromise' 'Resolution Discussed' 'Apology']

Mood Swing
['Mild' 'Severe' 'Moderate' 'Cant Say']
```

```
for i in categorical:
    print(i)
    print(df[i].value_counts())
    print()
```

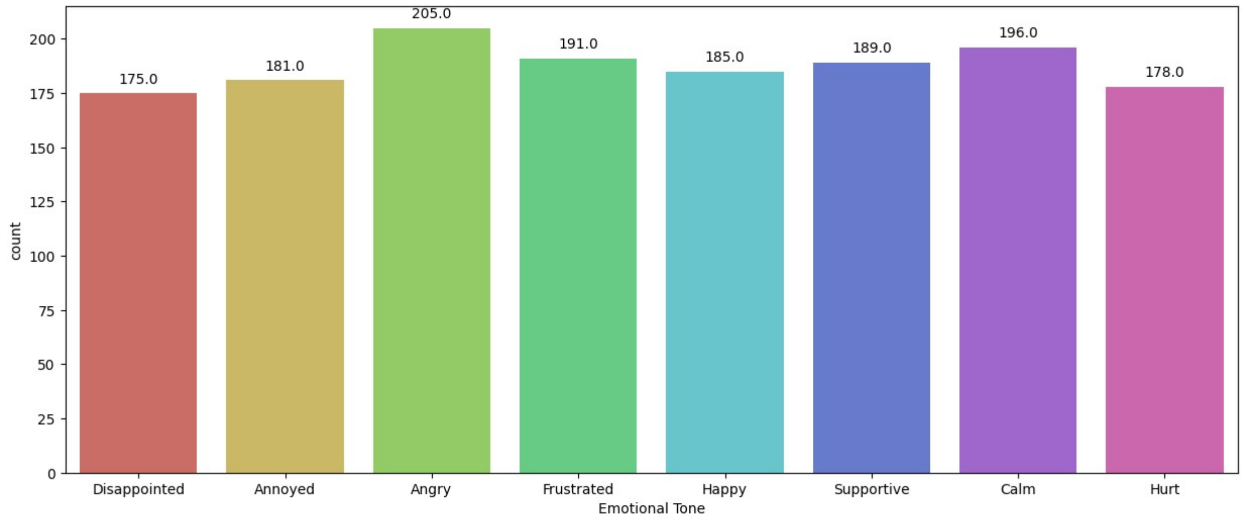
```
Topic
Topic
Money Management           206
Family Responsibilities    200
Household Chores           197
Parenting Styles           188
Personal Space             187
Future Goals               177
Social Activities          176
```

```
Time Management            169
Name: count, dtype: int64

Emotional Tone
Emotional Tone
Angry           205
Calm            196
Frustrated      191
Supportive      189
Happy           185
Annoyed         181
Hurt            178
Disappointed    175
Name: count, dtype: int64

Resolution Type
Resolution Type
Apology                 386
Compromise              374
Resolution Discussed    373
No Resolution           367
Name: count, dtype: int64

Mood Swing
Mood Swing
Mild        403
Severe      396
Moderate    365
Cant Say    336
Name: count, dtype: int64
```

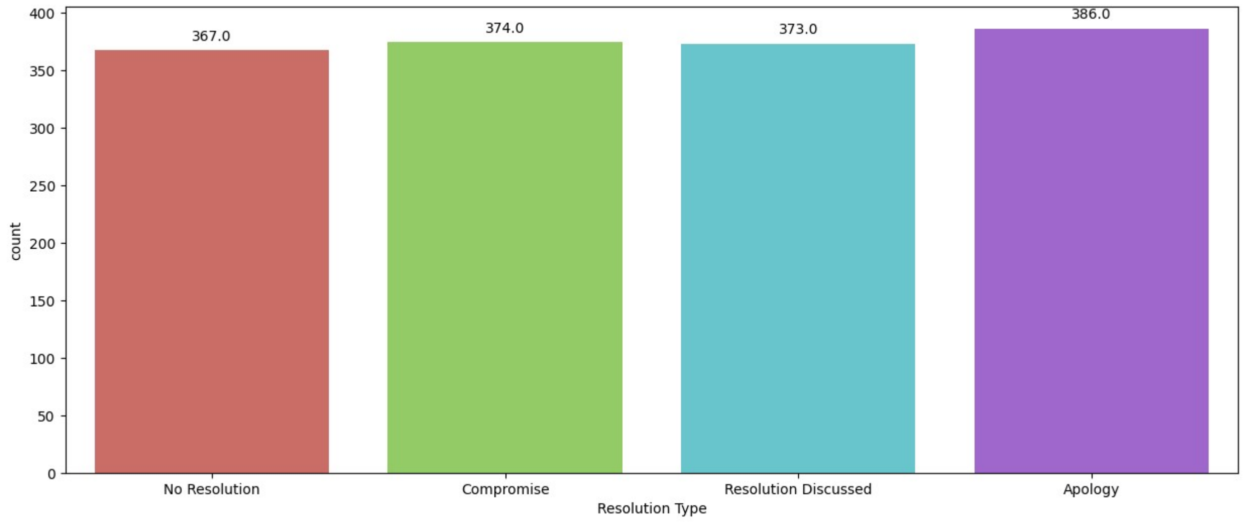
```python
for i in categorical:
    plt.figure(figsize=(15, 6))
    ax = sns.countplot(x=i, data=df, palette='hls')

    for p in ax.patches:
        height = p.get_height()
        ax.annotate(f'{height}',
                    xy=(p.get_x() + p.get_width() / 2., height),
                    xytext=(0, 10),
                    textcoords='offset points',
                    ha='center', va='center')

    plt.show()
```



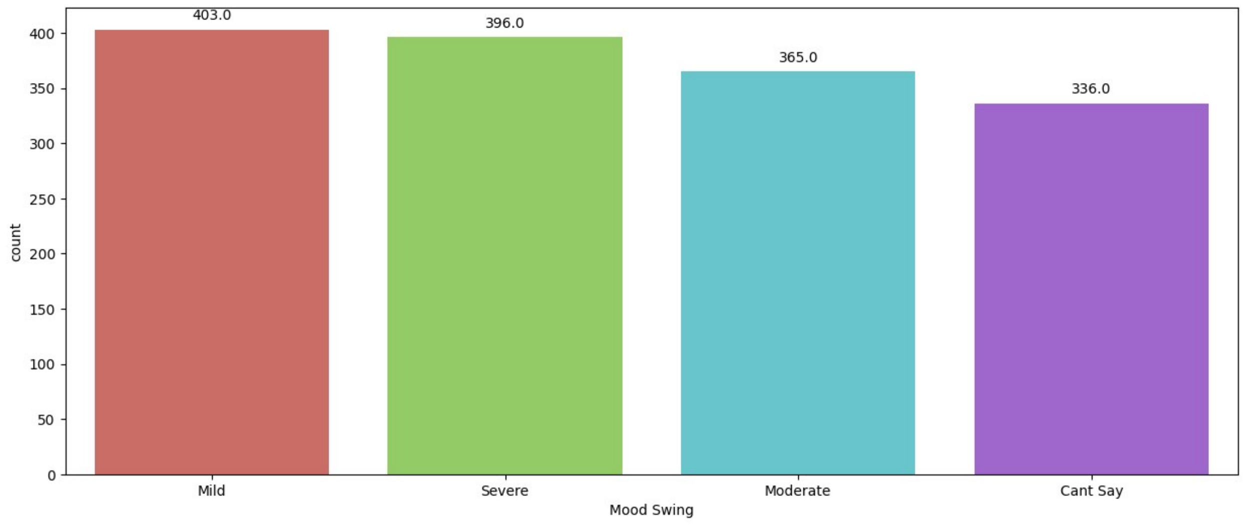
188.0
206.0
169.0
177.0
176.0
197.0
187.0
200.0
count
Parenting Styles
Money Management
Time Management
Future Goals
Social Activities
Household Chores
Personal Space
Family Responsibilities
Topic



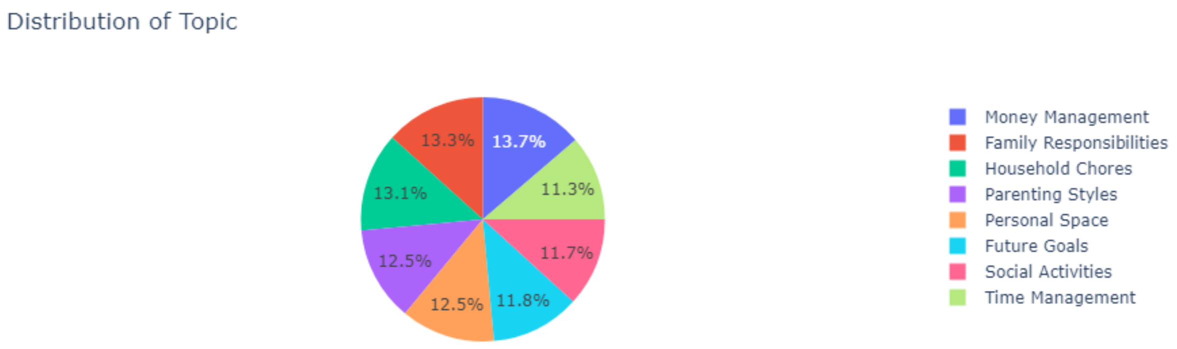
175.0
181.0
205.0
191.0
185.0
189.0
196.0
178.0
count
Disappointed
Annoyed
Angry
Frustrated
Happy
Supportive
Calm
Hurt
Emotional Tone



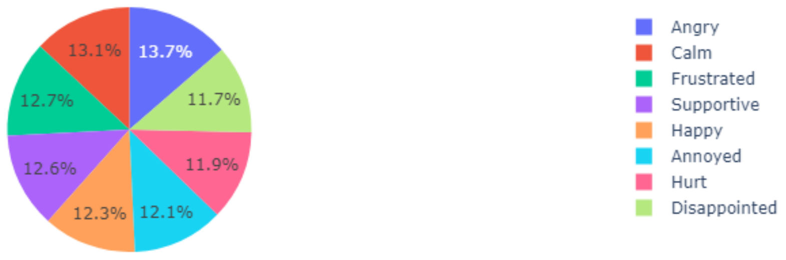
367.0
374.0
373.0
386.0
count
No Resolution
Compromise
Resolution Discussed
Apology
Resolution Type



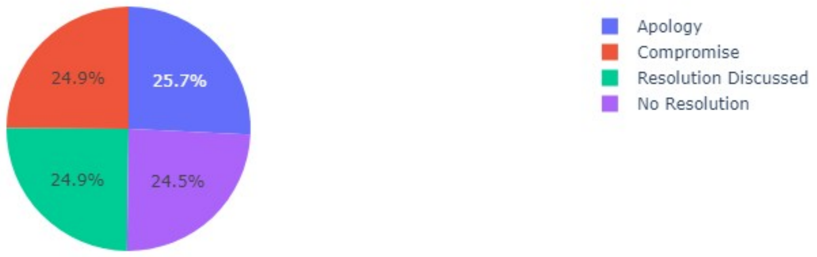
```python
import plotly.express as px

for i in categorical:
    counts = df[i].value_counts()
    fig = px.pie(counts, values=counts.values, names=counts.index,
title=f'Distribution of {i}')
    fig.show()
```



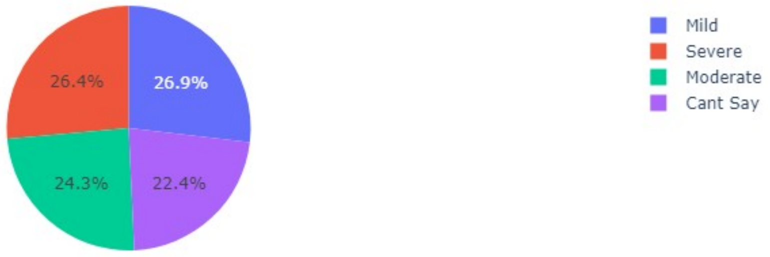
Distribution of Emotional Tone



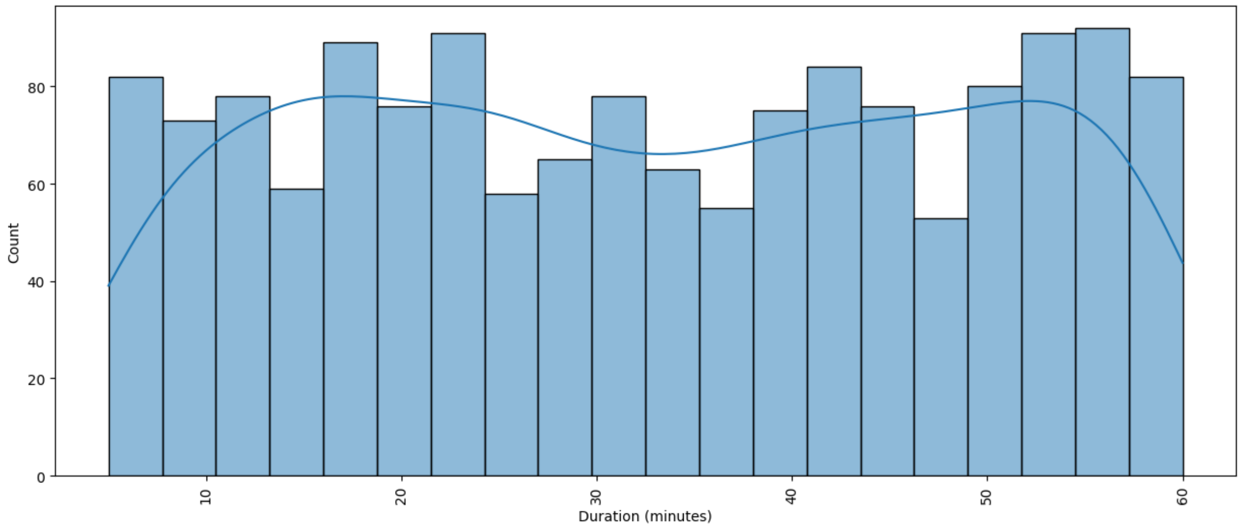
Distribution of Resolution Type



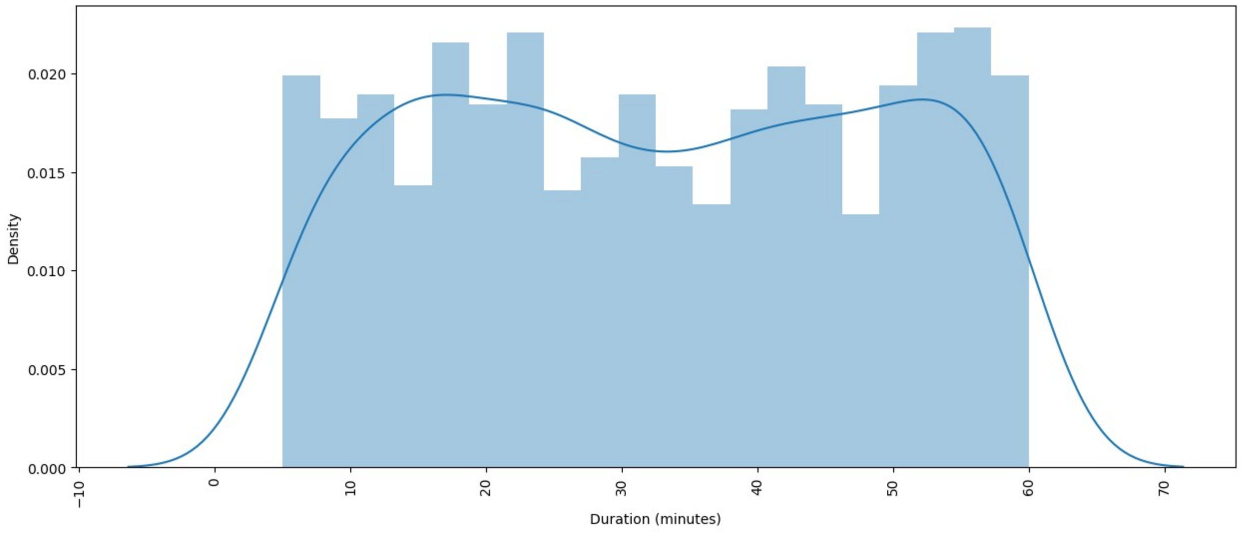
Distribution of Mood Swing



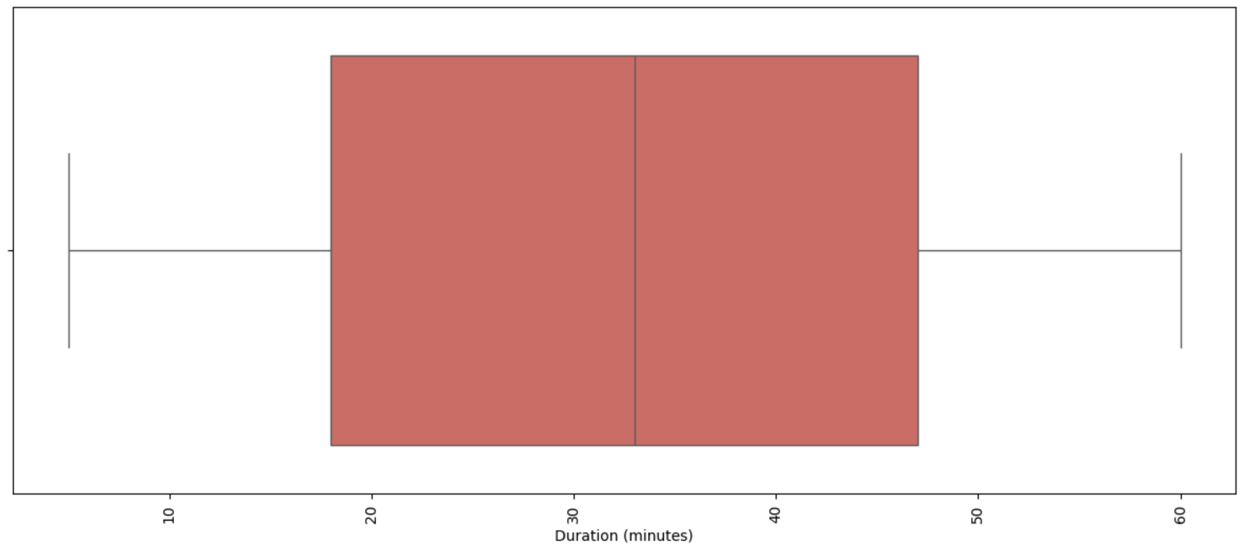
```python
for i in continuous:
    plt.figure(figsize=(15,6))
    sns.histplot(df[i], bins = 20, kde = True, palette='hls')
    plt.xticks(rotation = 90)
    plt.show()
```



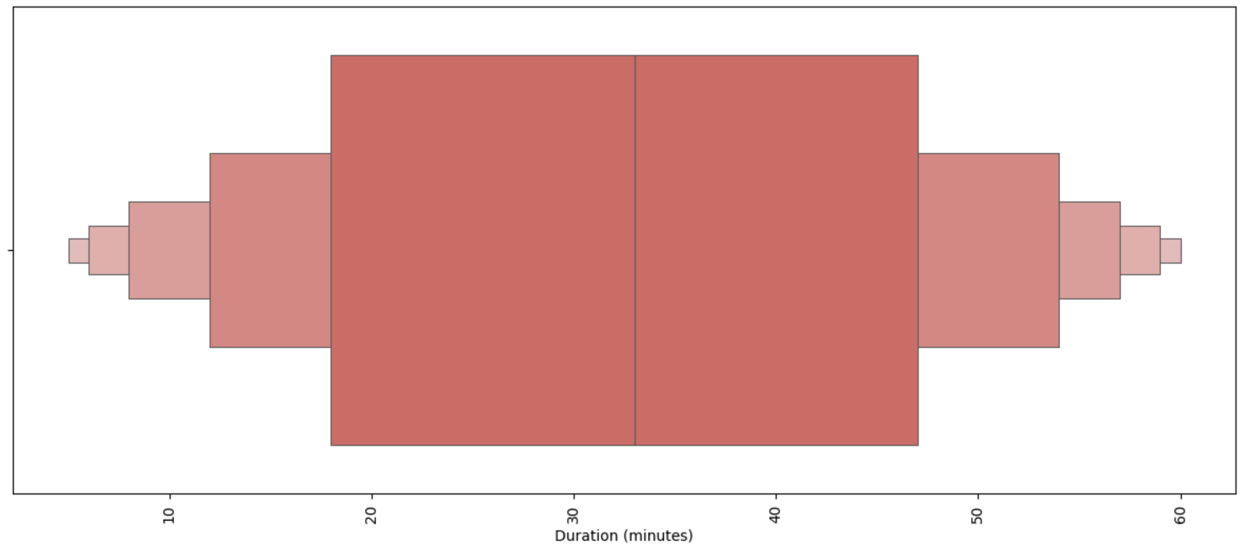
```
for i in continuous:
    plt.figure(figsize=(15,6))
    sns.distplot(df[i], bins = 20, kde = True)
    plt.xticks(rotation = 90)
    plt.show()
```



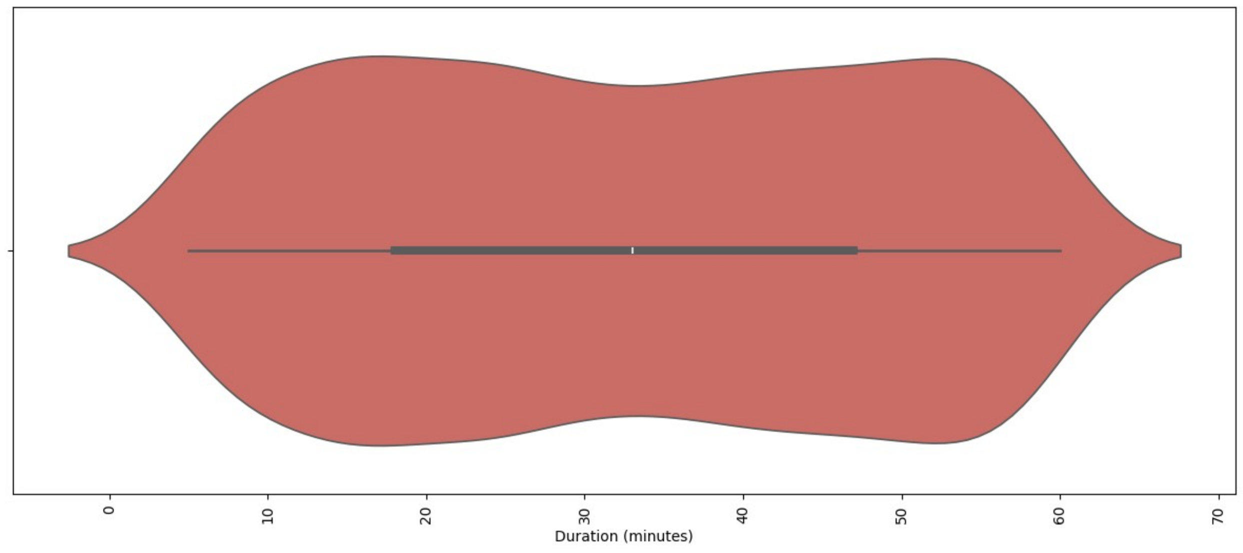
```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.boxplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```



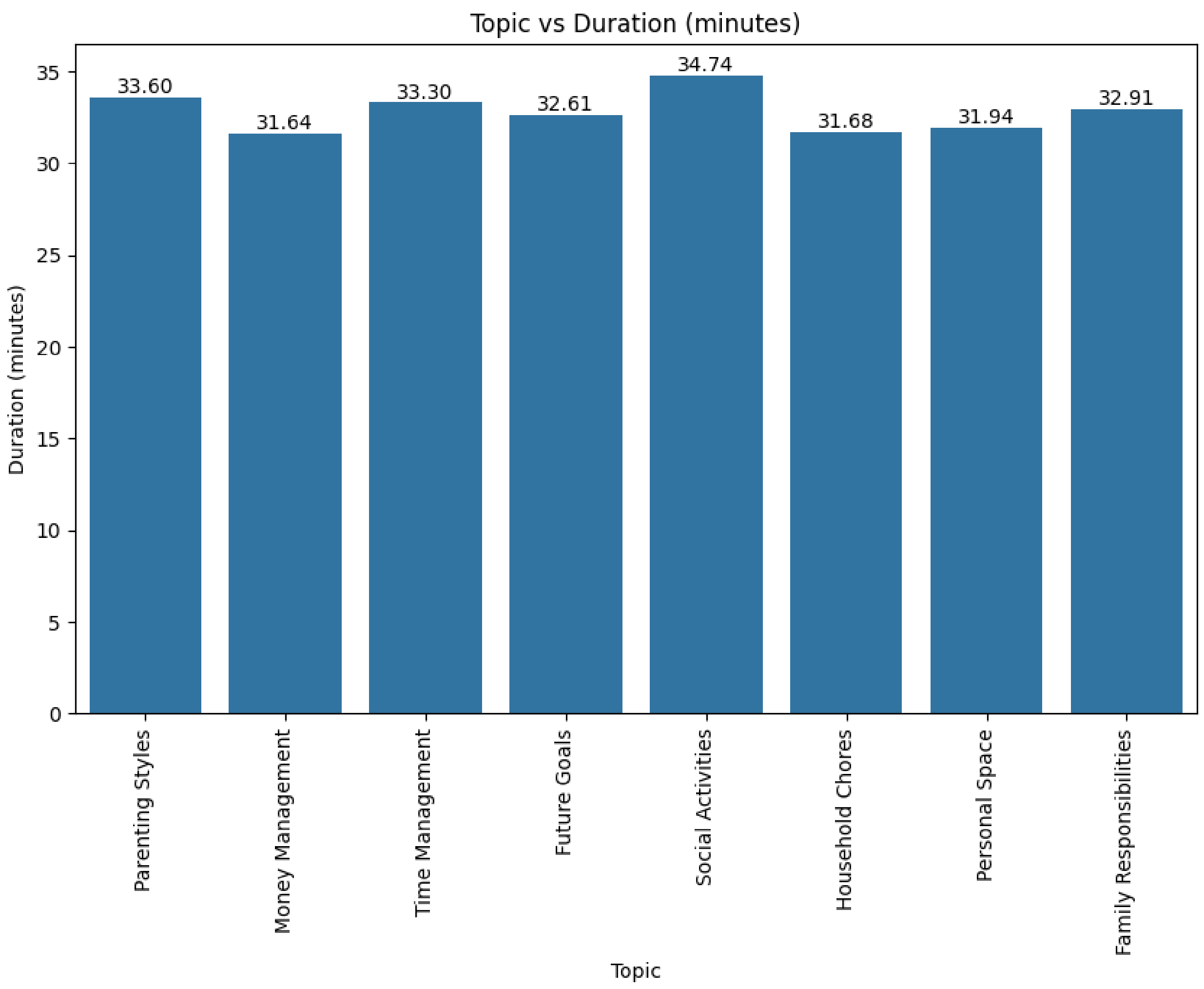
```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.boxenplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```

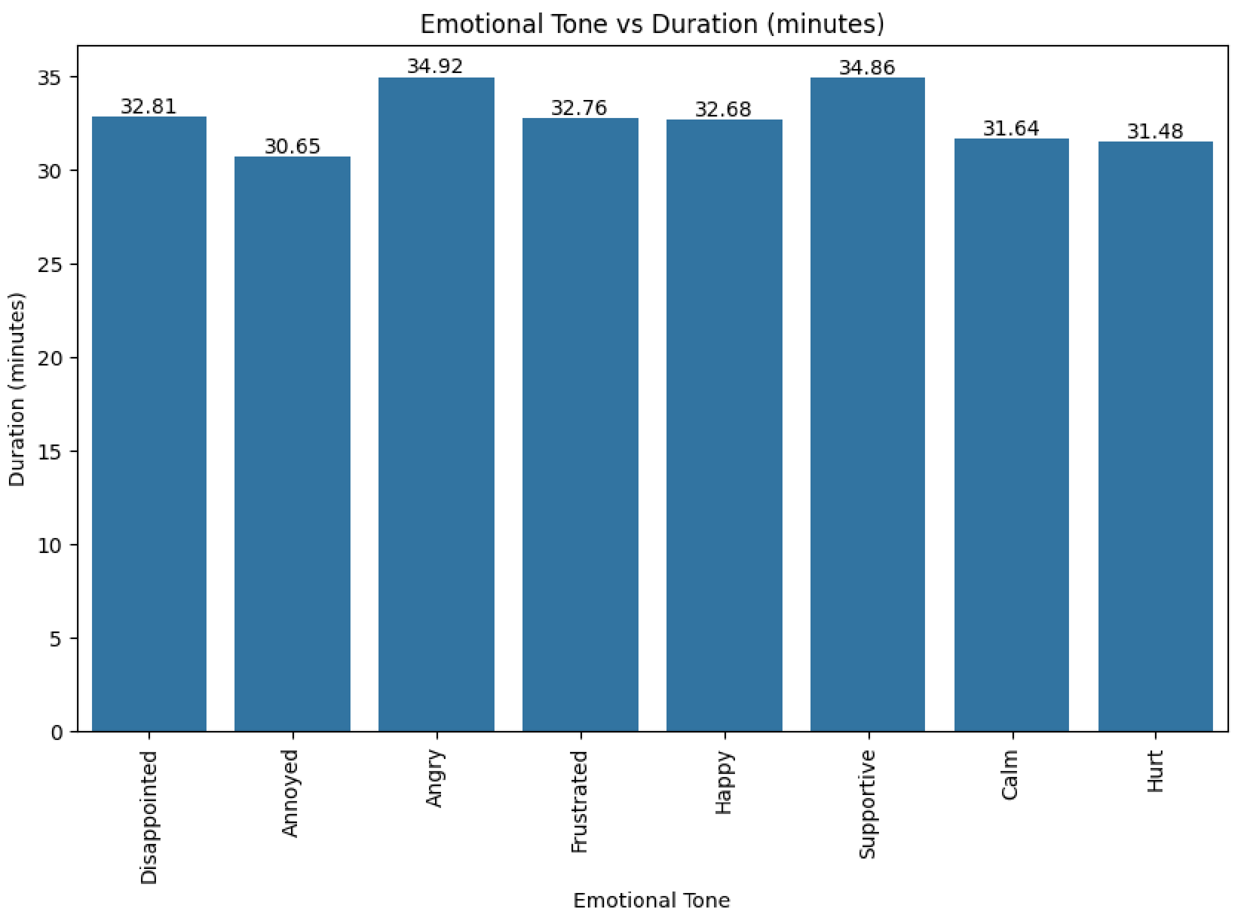


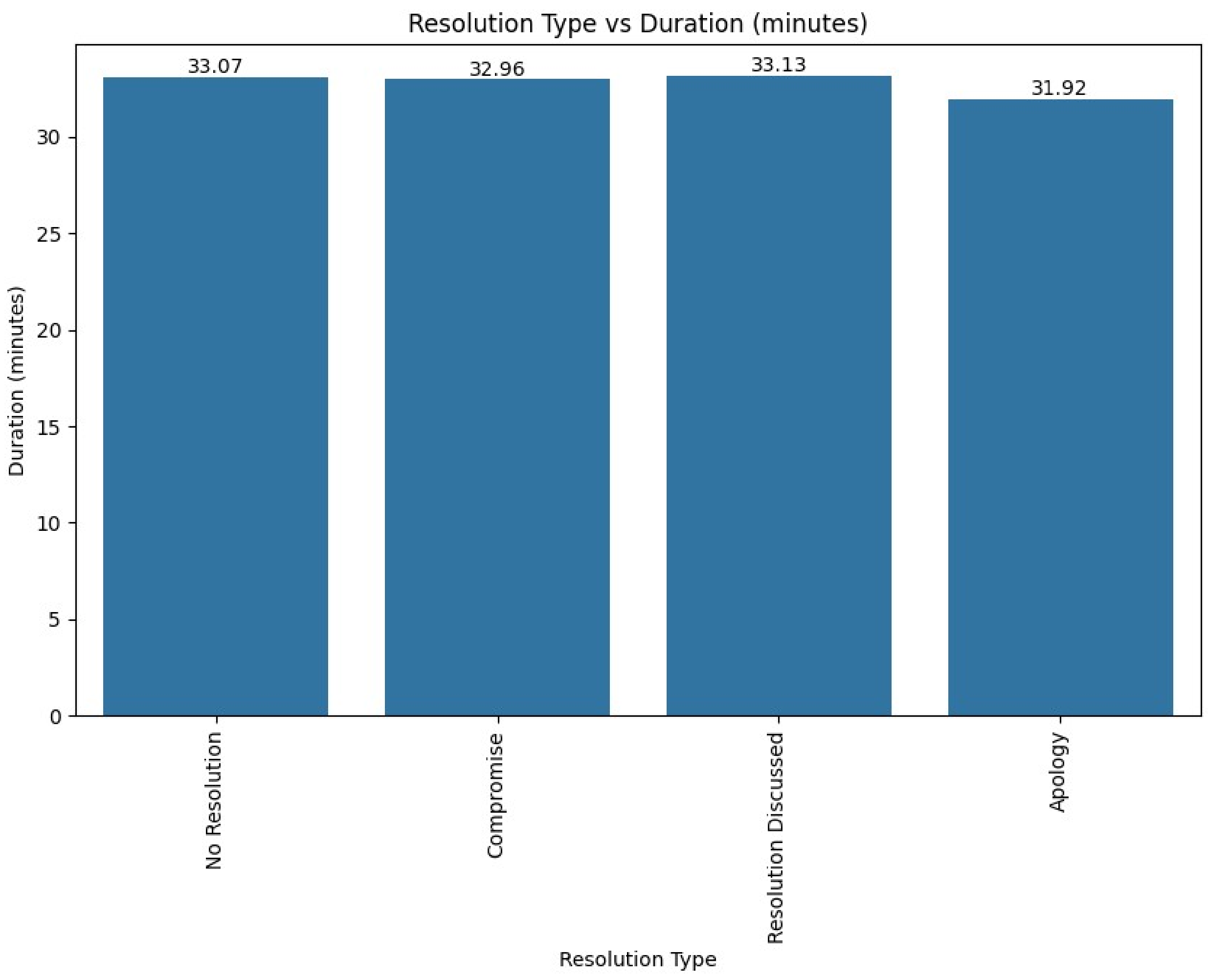
```
for i in continuous:
    plt.figure(figsize=(15, 6))
    sns.violinplot(x=i, data=df, palette='hls')
    plt.xticks(rotation=90)
    plt.show()
```



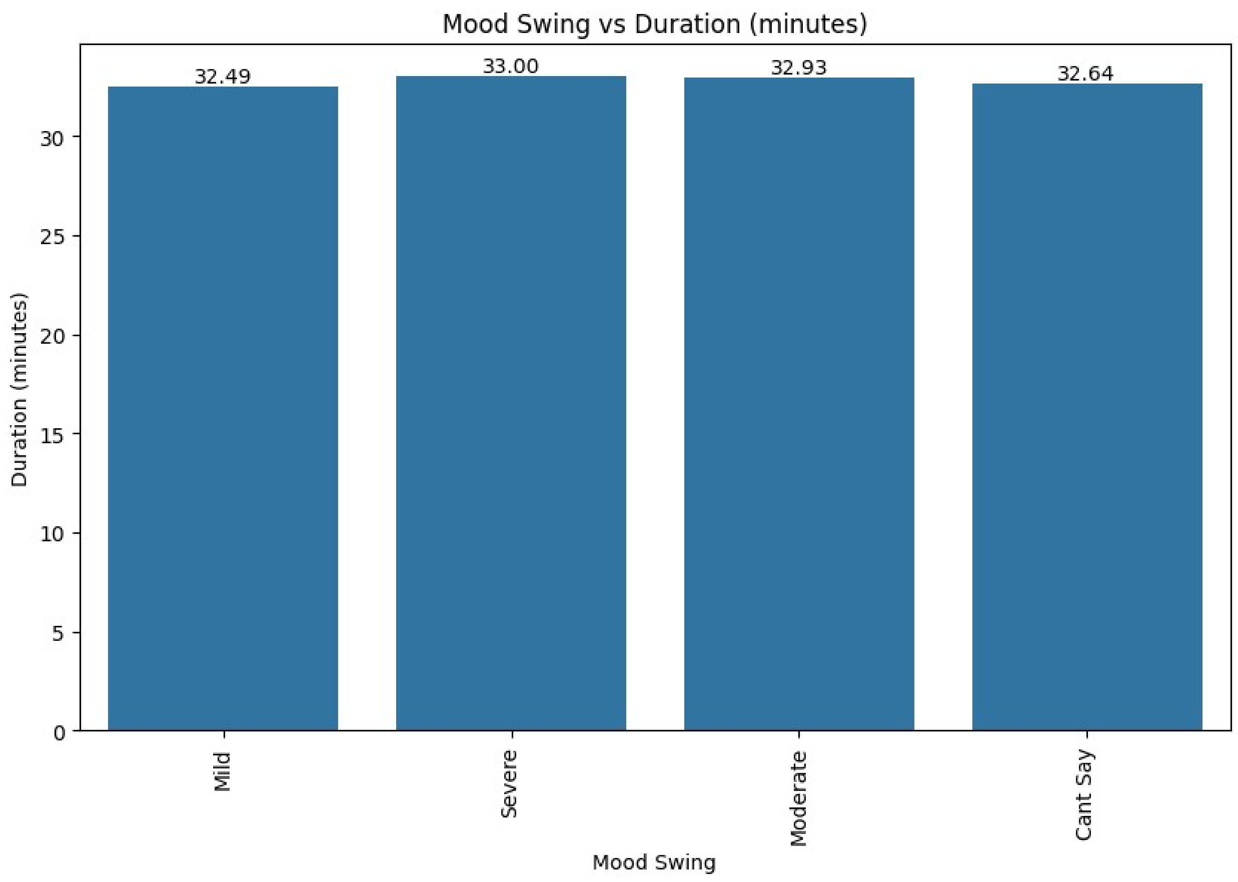
```
for dis in categorical:
    for cont in continuous:
        plt.figure(figsize=(10, 6))
        ax = sns.barplot(data=df, x=dis, y=cont, ci=None)
        plt.title(f'{dis} vs {cont}')

        for p in ax.patches:
            height = p.get_height()
            ax.annotate(f'{height:.2f}', (p.get_x() + p.get_width() /
2., height),
                        ha='center', va='bottom', fontsize=10,
color='black', rotation=0)
        plt.xticks(rotation = 90)
        plt.show()
```


Topic vs Duration (minutes)
Duration (minutes)
Topic
0
5
10
15
20
25
30
35
33.60
31.64
33.30
32.61
34.74
31.68
31.94
32.91
Parenting Styles
Money Management
Time Management
Future Goals
Social Activities
Household Chores
Personal Space
Family Responsibilities

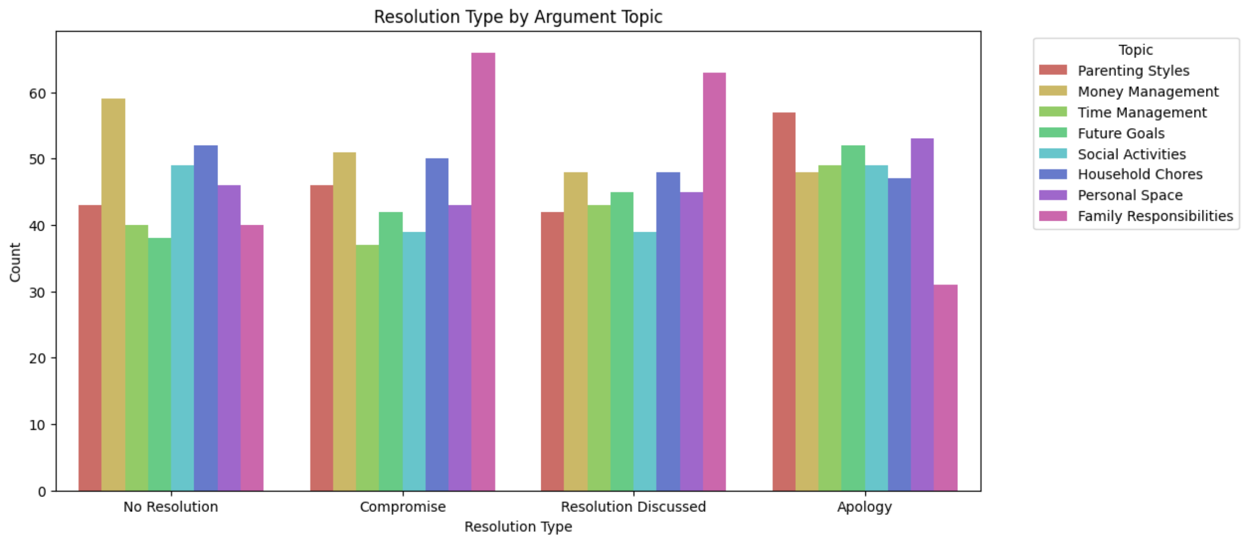

Emotional Tone vs Duration (minutes)
Duration (minutes)
Emotional Tone
0
5
10
15
20
25
30
35
Disappointed
Annoyed
Angry
Frustrated
Happy
Supportive
Calm
Hurt
32.81
30.65
34.92
32.76
32.68
34.86
31.64
31.48



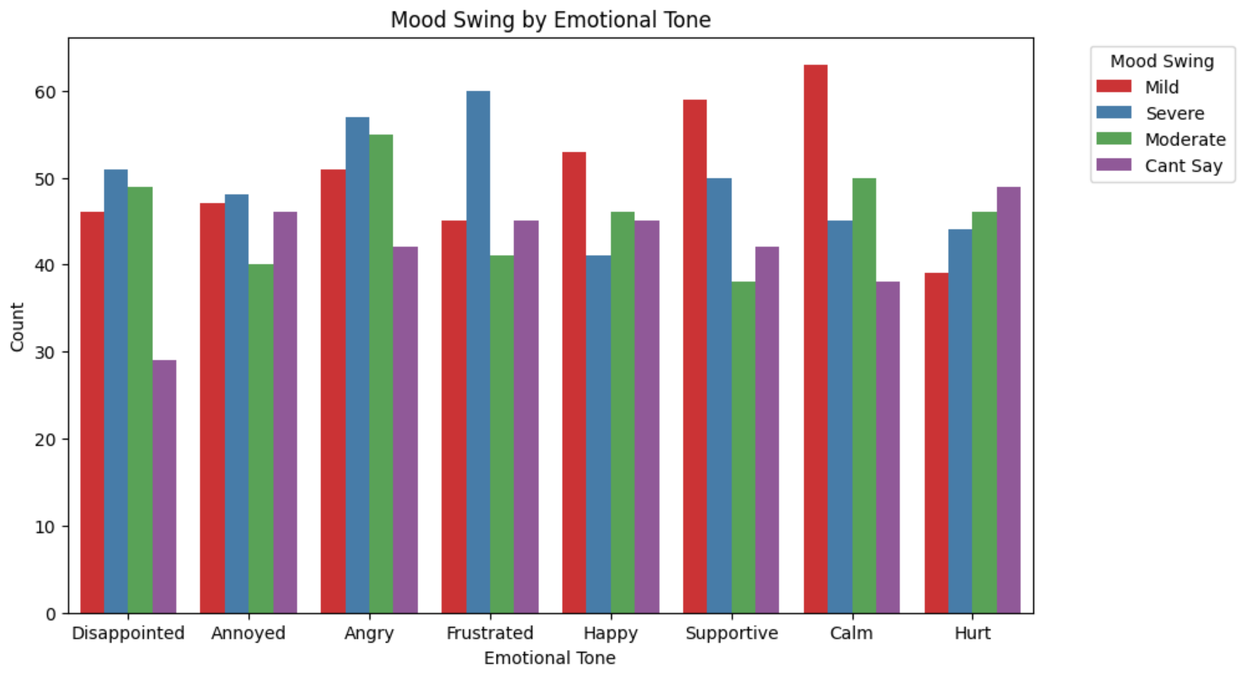
Resolution Type vs Duration (minutes)
Duration (minutes)
Resolution Type
No Resolution
Compromise
Resolution Discussed
Apology
33.07
32.96
33.13
31.92
0
5
10
15
20
25
30



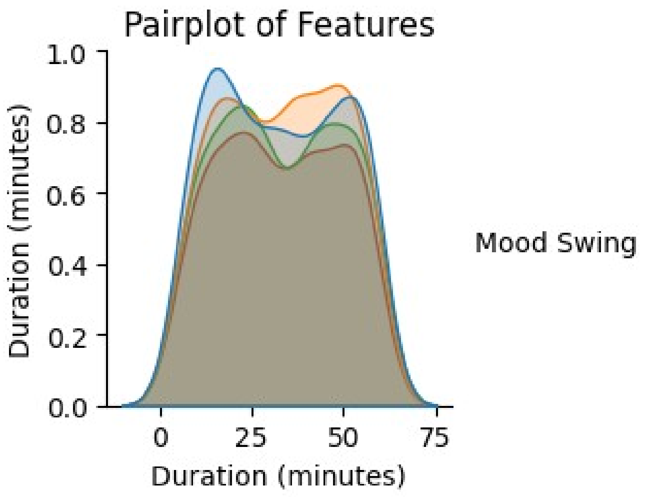
```
plt.figure(figsize=(12, 6))
sns.countplot(x='Resolution Type', hue='Topic', data=df,
palette="hls")
plt.title('Resolution Type by Argument Topic')
plt.xlabel('Resolution Type')
plt.ylabel('Count')
plt.legend(title='Topic', bbox_to_anchor=(1.05, 1), loc='upper left')
plt.show()
```



```
plt.figure(figsize=(10, 6))
sns.countplot(x='Emotional Tone', hue='Mood Swing', data=df,
palette="Set1")
plt.title('Mood Swing by Emotional Tone')
plt.xlabel('Emotional Tone')
plt.ylabel('Count')
plt.legend(title='Mood Swing', bbox_to_anchor=(1.05, 1), loc='upper
left')
plt.show()
```

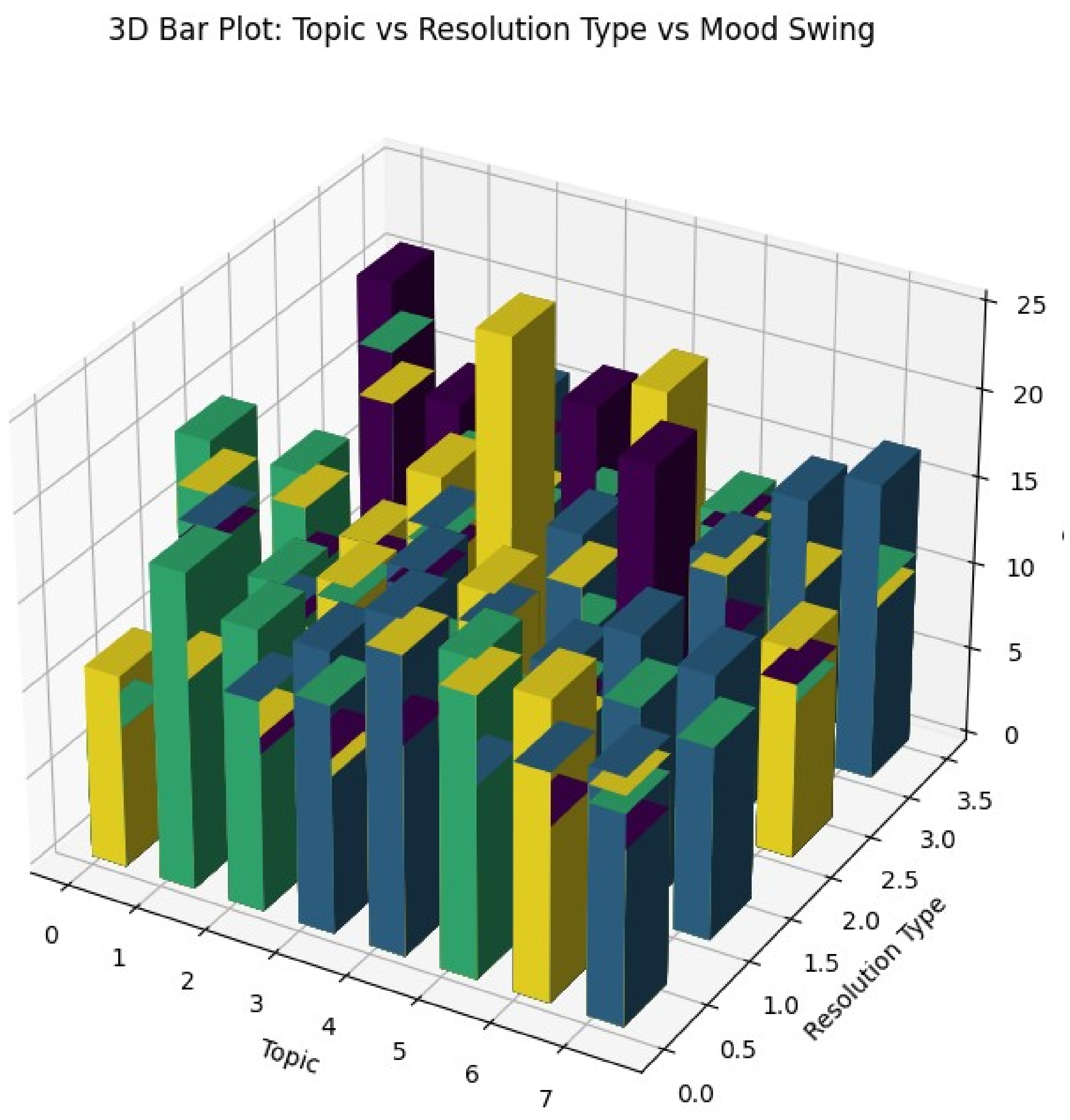


```
sns.pairplot(df, hue='Mood Swing', vars=['Duration (minutes)'])
plt.title('Pairplot of Features')
plt.show()
```



```
from mpl_toolkits.mplot3d import Axes3D

df['Topic_code'] = df['Topic'].astype('category').cat.codes
df['Resolution_code'] = df['Resolution
Type'].astype('category').cat.codes
df['Mood_code'] = df['Mood Swing'].astype('category').cat.codes

agg_df = df.groupby(['Topic', 'Resolution Type', 'Mood
Swing']).size().reset_index(name='Count')

agg_df

                       Topic       Resolution Type Mood Swing  Count
0    Family Responsibilities               Apology   Cant Say      4
1    Family Responsibilities               Apology       Mild      8
2    Family Responsibilities               Apology   Moderate      8
3    Family Responsibilities               Apology     Severe     11
4    Family Responsibilities            Compromise   Cant Say     14
..                       ...                   ...        ...    ...
123          Time Management         No Resolution     Severe     12
124          Time Management  Resolution Discussed   Cant Say      5
125          Time Management  Resolution Discussed       Mild     17
126          Time Management  Resolution Discussed   Moderate     11
127          Time Management  Resolution Discussed     Severe     10

[128 rows x 4 columns]

agg_df['Topic_code'] = agg_df['Topic'].astype('category').cat.codes
agg_df['Resolution_code'] = agg_df['Resolution
Type'].astype('category').cat.codes
```

```
agg_df['Mood_code'] = agg_df['Mood
Swing'].astype('category').cat.codes

fig = plt.figure(figsize=(10, 8))
ax = fig.add_subplot(111, projection='3d')

x = agg_df['Topic_code']
y = agg_df['Resolution_code']
z = np.zeros(len(agg_df))

dx = dy = 0.5
dz = agg_df['Count']

ax.bar3d(x, y, z, dx, dy, dz, shade=True,
color=plt.cm.viridis(agg_df['Mood_code'] / max(agg_df['Mood_code'])))

ax.set_xlabel('Topic')
ax.set_ylabel('Resolution Type')
ax.set_zlabel('Count')
ax.set_title('3D Bar Plot: Topic vs Resolution Type vs Mood Swing')

plt.show()
```



```
df

             Date  Duration (minutes)              Topic Emotional Tone  \
0      2024-01-05                  43   Parenting Styles   Disappointed

1      2024-02-05                  24   Parenting Styles        Annoyed

2      2024-02-27                  25   Money Management        Annoyed

3      2024-02-07                  20    Time Management          Angry
```

```
4     2024-01-26                    7        Future Goals     Frustrated

...          ...                  ...                 ...            ...

1495  2024-01-02                   43   Parenting Styles            Calm

1496  2024-01-15                   22   Money Management      Supportive

1497  2024-01-21                   16  Social Activities           Happy

1498  2024-01-26                   12  Social Activities         Annoyed

1499  2024-02-22                   51    Time Management            Calm


           Resolution Type Mood Swing  \
0            No Resolution       Mild
1               Compromise     Severe
2            No Resolution   Moderate
3     Resolution Discussed   Moderate
4     Resolution Discussed       Mild
...                    ...        ...
1495            Compromise       Mild
1496               Apology   Cant Say
1497  Resolution Discussed       Mild
1498            Compromise       Mild
1499         No Resolution   Cant Say

                                                  Notes  Topic_code  \
0     Discussed parenting styles for 43 minutes. Emo...           4
1     Discussed parenting styles for 24 minutes. Emo...           4
2     Discussed money management for 25 minutes. Emo...           3
3     Discussed time management for 20 minutes. Emot...           7
4     Discussed future goals for 7 minutes. Emotiona...           1
...                                                 ...         ...
1495  Discussed parenting styles for 43 minutes. Emo...           4
1496  Discussed money management for 22 minutes. Emo...           3
1497  Discussed social activities for 16 minutes. Em...           6
1498  Discussed social activities for 12 minutes. Em...           6
1499  Discussed time management for 51 minutes. Emot...           7

      Resolution_code  Mood_code
0                   2          1
1                   1          3
2                   2          2
3                   3          2
4                   3          1
...               ...        ...
1495                1          1
1496                0          0
```

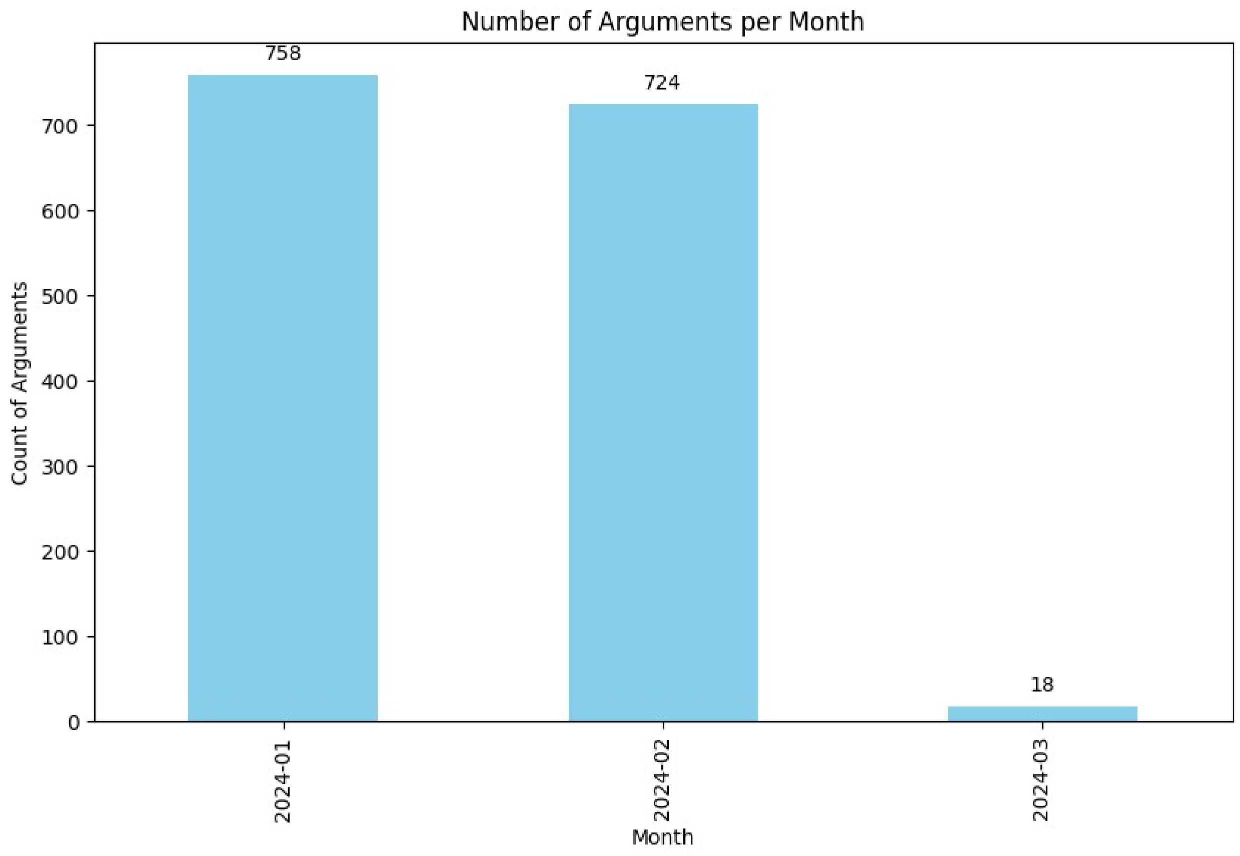
```
1497                3          1
1498                1          1
1499                2          0

[1500 rows x 10 columns]
```

```
df['Date'] = pd.to_datetime(df['Date'])

df['Year'] = df['Date'].dt.year
df['Month'] = df['Date'].dt.month
df['Day'] = df['Date'].dt.day
df['DayOfWeek'] = df['Date'].dt.dayofweek
df['IsWeekend'] = df['DayOfWeek'].apply(lambda x: 1 if x >= 5 else 0)


df
```

```
           Date  Duration (minutes)              Topic Emotional Tone  
\
0    2024-01-05                  43   Parenting Styles   Disappointed

1    2024-02-05                  24   Parenting Styles        Annoyed

2    2024-02-27                  25   Money Management        Annoyed

3    2024-02-07                  20    Time Management          Angry

4    2024-01-26                   7       Future Goals     Frustrated

...         ...                 ...                ...            ...

1495 2024-01-02                  43   Parenting Styles           Calm

1496 2024-01-15                  22   Money Management     Supportive

1497 2024-01-21                  16  Social Activities          Happy

1498 2024-01-26                  12  Social Activities        Annoyed

1499 2024-02-22                  51    Time Management           Calm


           Resolution Type Mood Swing  \
0            No Resolution       Mild
1               Compromise     Severe
2            No Resolution   Moderate
3     Resolution Discussed   Moderate
4     Resolution Discussed       Mild
...                    ...        ...
1495            Compromise       Mild
1496               Apology   Cant Say
```

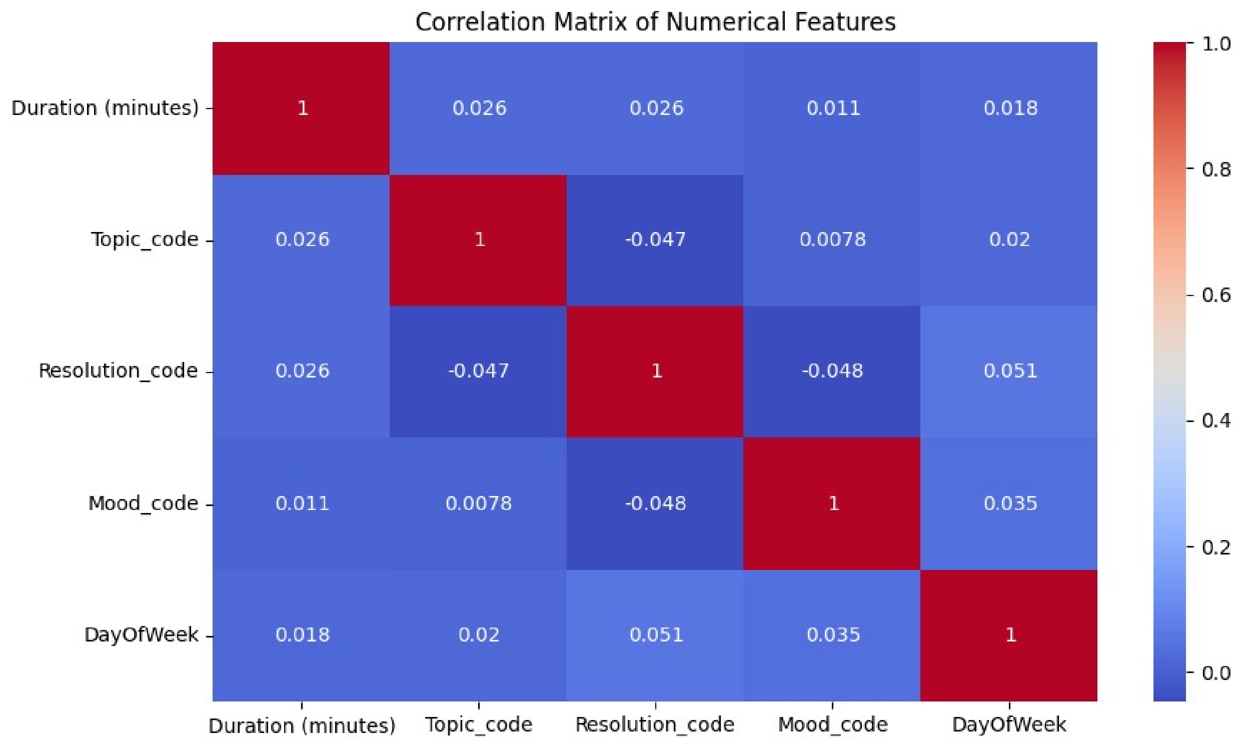
```
1497  Resolution Discussed       Mild
1498            Compromise       Mild
1499         No Resolution   Cant Say

                                                  Notes  Topic_code  \
0     Discussed parenting styles for 43 minutes. Emo...           4
1     Discussed parenting styles for 24 minutes. Emo...           4
2     Discussed money management for 25 minutes. Emo...           3
3     Discussed time management for 20 minutes. Emot...           7
4     Discussed future goals for 7 minutes. Emotiona...           1
...                                                 ...         ...
1495  Discussed parenting styles for 43 minutes. Emo...           4
1496  Discussed money management for 22 minutes. Emo...           3
1497  Discussed social activities for 16 minutes. Em...           6
1498  Discussed social activities for 12 minutes. Em...           6
1499  Discussed time management for 51 minutes. Emot...           7

      Resolution_code  Mood_code  Year  Month  Day  DayOfWeek
IsWeekend
0                   2          1  2024      1    5          4
0
1                   1          3  2024      2    5          0
0
2                   2          2  2024      2   27          1
0
3                   3          2  2024      2    7          2
0
4                   3          1  2024      1   26          4
0
...               ...        ...   ...    ...  ...        ...         .
..
1495                1          1  2024      1    2          1
0
1496                0          0  2024      1   15          0
0
1497                3          1  2024      1   21          6
1
1498                1          1  2024      1   26          4
0
1499                2          0  2024      2   22          3
0

[1500 rows x 15 columns]
```

```
monthly_counts = df.groupby(df['Date'].dt.to_period("M")).size()

ax = monthly_counts.plot(kind='bar', figsize=(10, 6), color='skyblue')

plt.title('Number of Arguments per Month')
plt.ylabel('Count of Arguments')
plt.xlabel('Month')

for p in ax.patches:
    ax.annotate(str(p.get_height()), (p.get_x() + p.get_width() / 2.,
p.get_height()),
                ha='center', va='center', xytext=(0, 10),
textcoords='offset points')

plt.show()
```

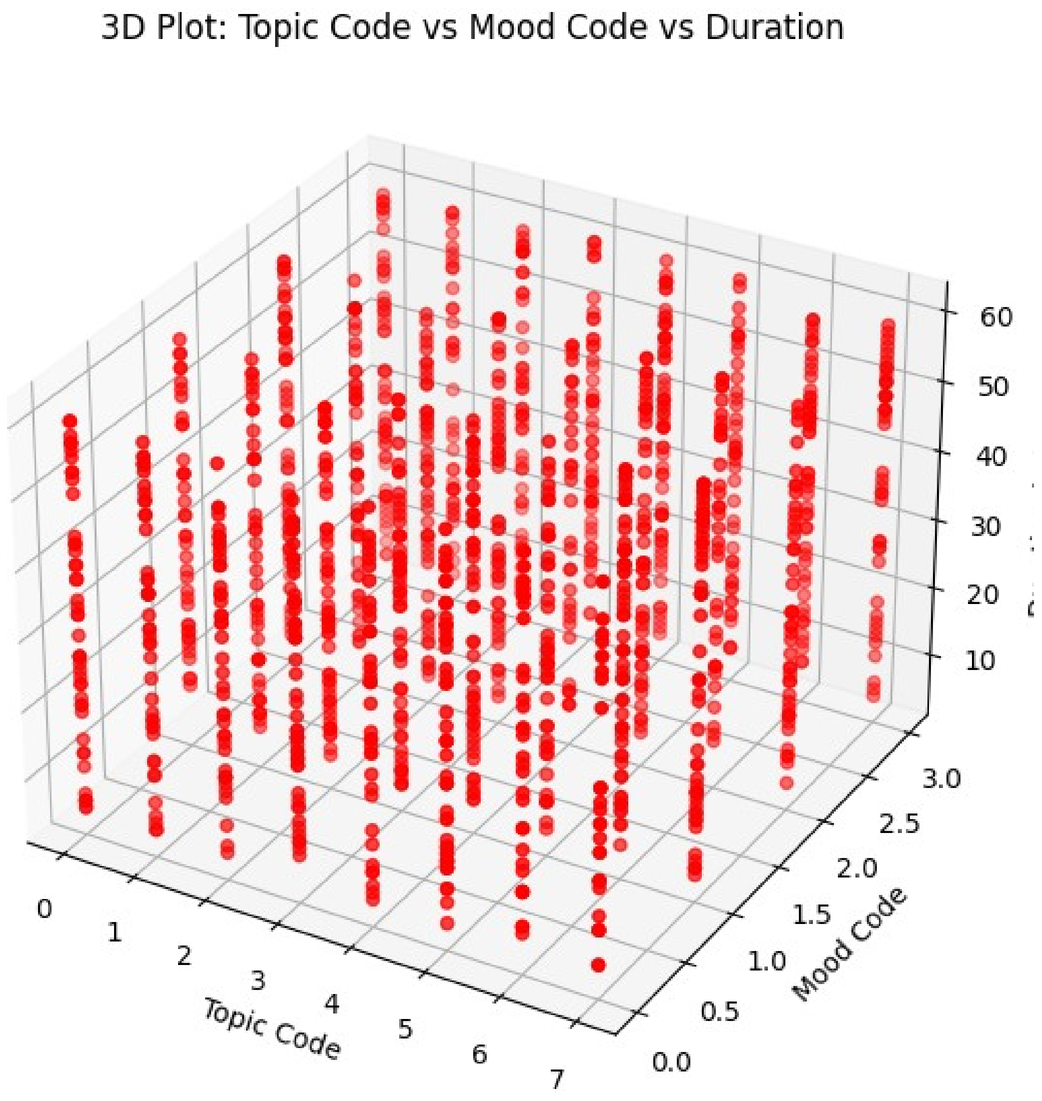


```
df.columns

Index(['Date', 'Duration (minutes)', 'Topic', 'Emotional Tone',
       'Resolution Type', 'Mood Swing', 'Notes', 'Topic_code',
       'Resolution_code', 'Mood_code', 'Year', 'Month', 'Day',
'DayOfWeek',
       'IsWeekend'],
      dtype='object')

plt.figure(figsize=(10, 6))
sns.heatmap(df[['Duration (minutes)', 'Topic_code', 'Resolution_code',
'Mood_code', 'DayOfWeek']].corr(), annot=True, cmap='coolwarm')
```

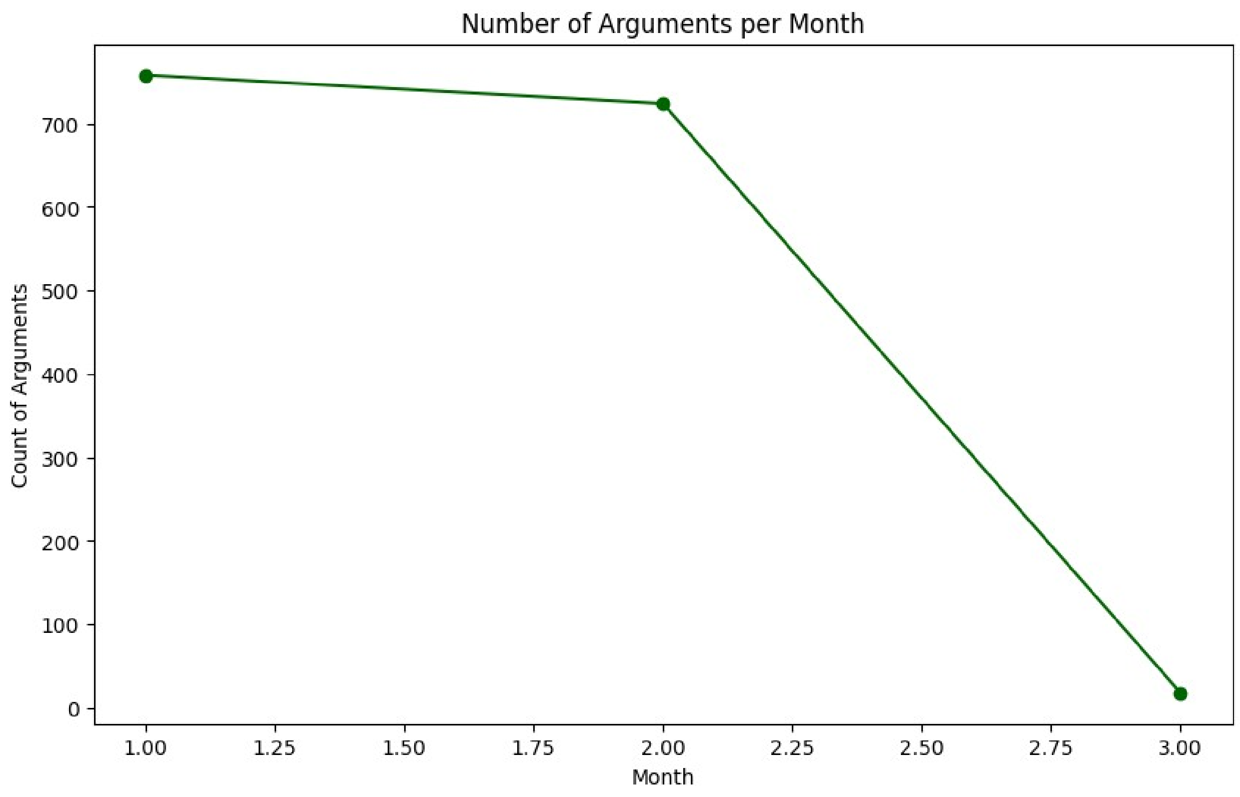
```
plt.title('Correlation Matrix of Numerical Features')
plt.show()
```



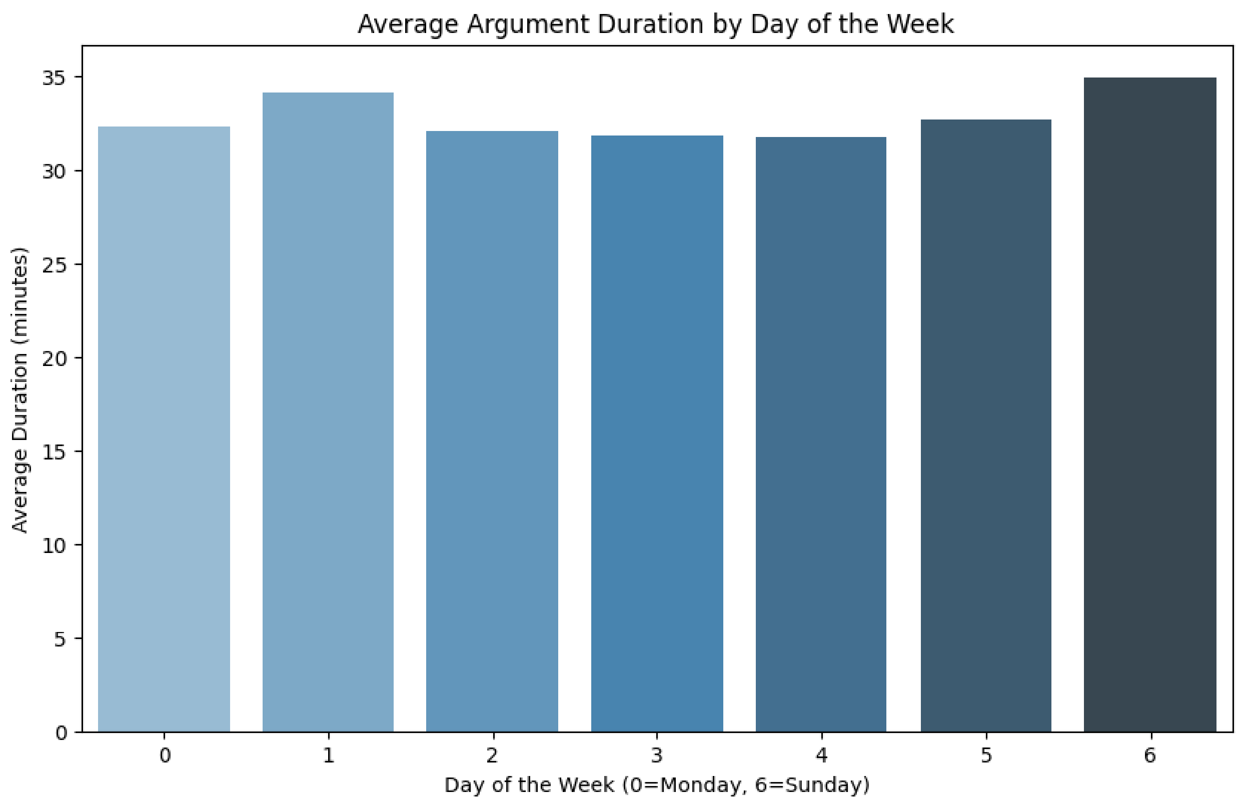
```
fig = plt.figure(figsize=(10, 7))
ax = fig.add_subplot(111, projection='3d')

ax.scatter(df['Topic_code'], df['Mood_code'], df['Duration
(minutes)'], c='r', marker='o')

ax.set_xlabel('Topic Code')
ax.set_ylabel('Mood Code')
ax.set_zlabel('Duration (minutes)')
plt.title('3D Plot: Topic Code vs Mood Code vs Duration')
plt.show()
```



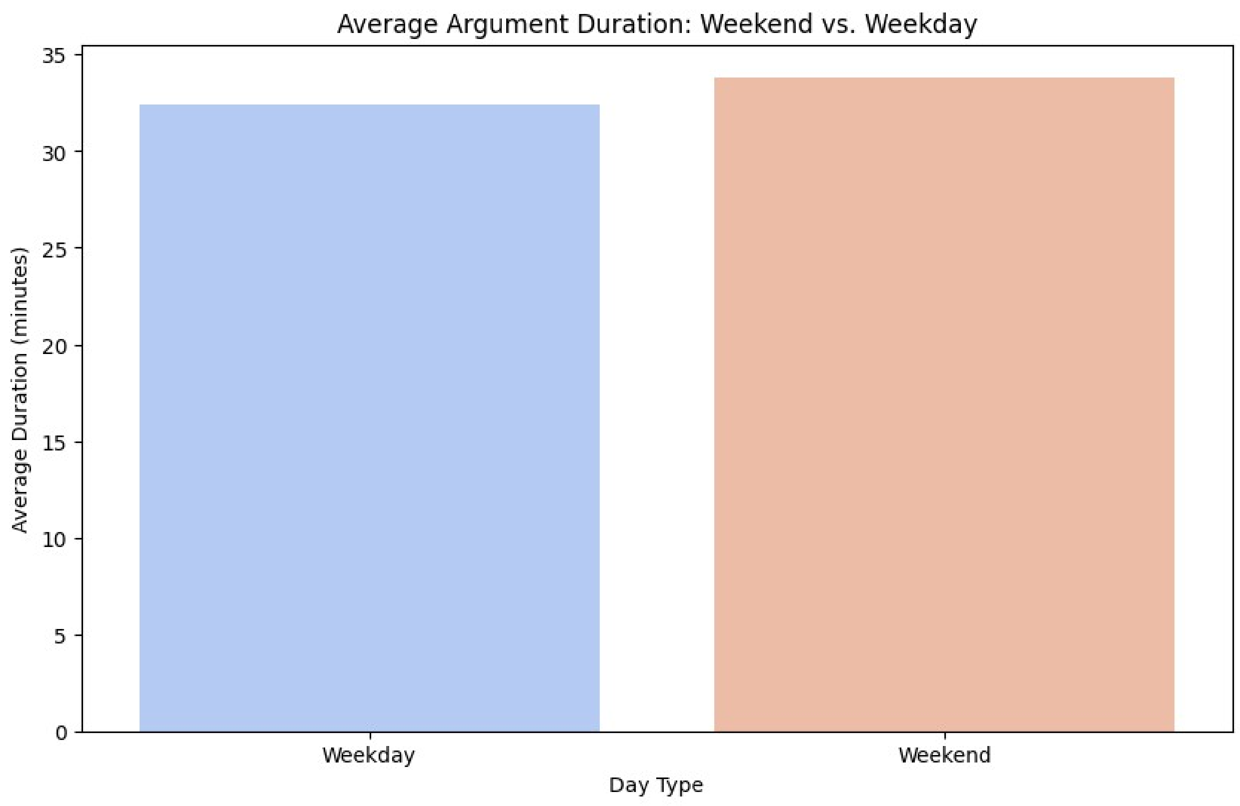
```
monthly_counts = df.groupby('Month').size()

plt.figure(figsize=(10, 6))
monthly_counts.plot(kind='line', marker='o', color='darkgreen')
plt.title('Number of Arguments per Month')
plt.ylabel('Count of Arguments')
plt.xlabel('Month')
plt.show()
```



```
plt.figure(figsize=(10, 6))
sns.barplot(x='DayOfWeek', y='Duration (minutes)', data=df, ci = None,
palette='Blues_d')
plt.title('Average Argument Duration by Day of the Week')
plt.xlabel('Day of the Week (0=Monday, 6=Sunday)')
plt.ylabel('Average Duration (minutes)')
plt.show()
```

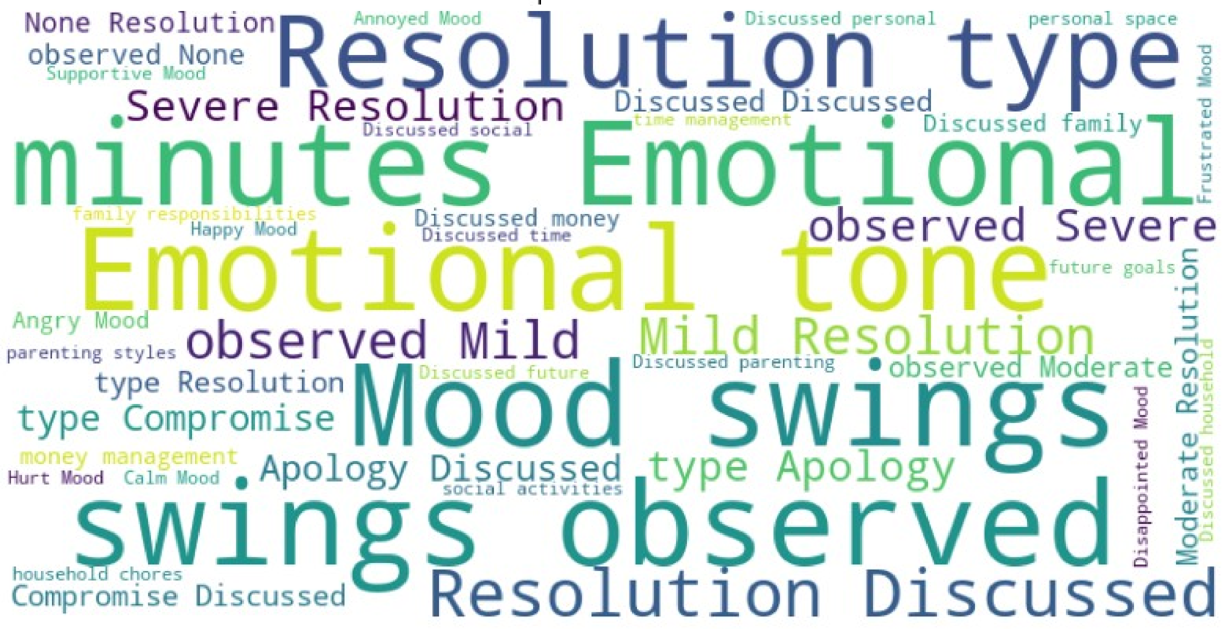


```
plt.figure(figsize=(10, 6))
sns.barplot(x='IsWeekend', y='Duration (minutes)', data=df, ci = None,
palette='coolwarm')
plt.title('Average Argument Duration: Weekend vs. Weekday')
plt.xticks([0, 1], ['Weekday', 'Weekend'])
plt.xlabel('Day Type')
plt.ylabel('Average Duration (minutes)')
plt.show()
```



```
from wordcloud import WordCloud

text = ' '.join(df['Notes'].dropna())
wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(text)

plt.figure(figsize=(10, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Most Frequent Words in Notes')
plt.show()
```

Most Frequent Words in Notes



Thanks !!!