In [172]:
```python
# load Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import os
```

In [173]:
```python
# read and preview data
df = pd.read_csv('2013_Data.csv')
df.head()
```

Out[173]:

	psraid	sample	lang	state	cregion	usr	form	sex	q1	marital	...	birth_hisp	race	inc	ql1a	ql2hh	qc1	qc2hh	zipcode	weight	standwt
0	100004	1	1	36	1	S	2	1	2	2	...		1	6.0		2			14624	2.59375	0.847977
1	100019	1	1	12	3	S	2	2	3	3	...		1	3.0		3			34471	2.68750	0.878627
2	100035	1	1	36	1	S	1	2	3	1	...	1	1	3.0	2				13126	5.40625	1.767470
3	100040	1	1	21	3	R	2	2	3	1	...		1	NaN		2			40353	4.06250	1.328157
4	100041	1	1	34	1	S	2	2	3	5	...		1	3.0		3			7026	1.43750	0.469963

5 rows × 134 columns

In [153]:
```python
# Isolates Facebook Data
df_facebook = df[['inc','marital','sex','q1','q2c','q2j','q11d','sns2e','age']]
```

In [154]:
```python
# Removes Data with Blanks
IndexesToRemove = []
def clean_data(df, smcol):
    index = 0
    sm_index = 0
    for column in df[smcol]:
        if column == " ":
            IndexesToRemove.append(sm_index)
            sm_index += 1
        else:
            sm_index += 1
    WithoutDuplicates = []
    [WithoutDuplicates.append(x) for x in IndexesToRemove if x not in WithoutDuplicates]
    df = df.drop(df.index[WithoutDuplicates])
    IndexesToRemove.clear()
    return df
```

In [155]:
```python
# Controlling For external Factors part 1
df_fb = clean_data(df_facebook,'sns2e')
print(df_fb['marital'].value_counts())
sum = df_fb['marital'].value_counts().sum()

# breakdown of Marital Status Within the Dataframe
print(str(round((496/sum), 2)) + " Are Married")
print(str(round((217/sum), 2)) + " Never Been Married")
print(str(round((95/sum), 2)) + " Divorced")
print(str(round((78/sum), 2)) + " Living With Partner")
print(str(round((48/sum), 2)) + " Widowed")
print(str(round((2/sum), 2)) + " NA")
```

```
1    496
6    217
3     95
2     78
5     48
4     24
9      2
Name: marital, dtype: int64
0.52 Are Married
0.23 Never Been Married
0.1 Divorced
0.08 Living With Partner
0.05 Widowed
0.0 NA
```

In [156]:
```python
# Makes Seperate Dataframes According to How Much a User uses Facebook
import collections
def snsCategories(df,val,sns):
    return df.loc[df[sns] == val]
several = snsCategories(df_fb,"1","sns2e")
onceaday = snsCategories(df_fb,"2","sns2e")
threetofive = snsCategories(df_fb,"3","sns2e")
onetotwo = snsCategories(df_fb,"4","sns2e")
everyfewweeks = snsCategories(df_fb,"5","sns2e")
lessoften = snsCategories(df_fb,"6","sns2e")
```

In [157]:
```python
# Breaks down Each Usage Category by age demographics
early_several = several.query("age>=18" and "age<=34")
earlymiddle_several = several.query("age>=35" and "age<=44")
middle_several = several.query("age>=45" and "age<=64")
late_several = several.query("age>=65")
severalbyage = [early_several, earlymiddle_several, middle_several, late_several]
severalbyage[0]
```

Out[157]:

	inc	marital	sex	q1	q2c	q2j	q11d	sns2e	age
62	NaN	6	1	3	3	2	1	1	18
101	9.0	6	2	2	4	4	2	1	18
114	3.0	6	2	4	2	3	2	1	30
172	1.0	2	2	4	2	3	2	1	25
210	5.0	6	1	2	4	4	3	1	23
...	...	...	...	...	...	...	...	...	...
1751	1.0	6	2	2	1	3	1	1	28
1784	2.0	1	2	3	3	2	2	1	29
1786	7.0	6	1	2	1	2	4	1	19
1793	6.0	6	2	2	2	4	1	1	25
1795	6.0	6	2	3	3	4	2	1	21

148 rows × 9 columns

In [158]:
```python
# Breaks down Each Usage Category by age demographics
early_onceaday = onceaday.query("age>=18" and "age<=34")
earlymiddle_onceaday = onceaday.query("age>=35" and "age<=44")
middle_onceaday = onceaday.query("age>=45" and "age<=64")
late_onceaday = onceaday.query("age>=65")
onceadaybyage =[early_onceaday, earlymiddle_onceaday, middle_onceaday, late_onceaday]
onceadaybyage[1].describe()
```

Out[158]:

	inc	marital	sex	q1	q2c	q2j	q11d	age
count	103.000000	113.000000	113.000000	113.000000	113.000000	113.000000	113.000000	113.000000
mean	5.135922	3.115044	1.433628	2.575221	2.221239	3.274336	2.920354	30.743363
std	2.364146	2.266811	0.497783	1.015991	0.903708	0.956629	1.225777	7.737638
min	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	18.000000
25%	3.000000	1.000000	1.000000	2.000000	2.000000	3.000000	2.000000	24.000000
50%	5.000000	2.000000	1.000000	3.000000	2.000000	3.000000	3.000000	30.000000
75%	7.000000	6.000000	2.000000	3.000000	3.000000	4.000000	4.000000	37.000000
max	9.000000	6.000000	2.000000	5.000000	4.000000	8.000000	8.000000	44.000000

In [159]:
```python
# Breaks down Each Usage Category by age demographics
early_threetofive = threetofive.query("age>=18" and "age<=34")
earlymiddle_threetofive = threetofive.query("age>=35" and "age<=44")
middle_threetofive = threetofive.query("age>=45" and "age<=64")
late_threetofive = threetofive.query("age>=65")
threetofivebyage =[early_threetofive, earlymiddle_threetofive, middle_threetofive, late_threetofive]
threetofivebyage[0].describe()
```

Out[159]:

	inc	marital	sex	q1	q2c	q2j	q11d	age
count	27.000000	33.000000	33.000000	33.000000	33.000000	33.000000	33.000000	33.000000
mean	4.074074	4.030303	1.515152	2.606061	2.090909	2.757576	2.848485	24.818182
std	2.479546	2.242834	0.507519	1.197377	0.722999	0.791766	1.481579	5.071086
min	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	18.000000
25%	2.000000	2.000000	1.000000	2.000000	2.000000	2.000000	2.000000	21.000000
50%	4.000000	6.000000	2.000000	3.000000	2.000000	3.000000	2.000000	23.000000
75%	6.000000	6.000000	2.000000	3.000000	3.000000	3.000000	4.000000	29.000000
max	9.000000	6.000000	2.000000	5.000000	3.000000	4.000000	9.000000	34.000000

In [160]:
```python
# Breaks down Each Usage Category by age demographics
early_onetotwo = onetotwo.query("age>=18" and "age<=34")
earlymiddle_onetotwo = onetotwo.query("age>=35" and "age<=44")
middle_onetotwo = onetotwo.query("age>=45" and "age<=64")
late_onetotwo = onetotwo.query("age>=65")
onceadaybyage =[early_onetotwo, earlymiddle_onetotwo, middle_onetotwo, late_onetotwo]
onceadaybyage[0]
```

Out[160]:

	inc	marital	sex	q1	q2c	q2j	q11d	sns2e	age
135	4.0	4	2	3	1	3	4	4	27
145	6.0	4	1	2	3	4	4	4	30
180	6.0	1	1	2	2	4	2	4	34
420	3.0	1	1	2	1	4	2	4	28
430	1.0	6	2	4	1	2	3	4	29
761	6.0	6	2	3	2	4	1	4	30
982	3.0	6	1	4	1	4	4	4	21
1003	8.0	1	1	2	1	3	2	4	25
1014	3.0	6	2	3	3	3	2	4	21
1117	1.0	1	1	5	1	2	4	4	24
1146	2.0	6	1	2	4	3	3	4	20
1177	6.0	1	1	3	2	4	4	4	33
1184	8.0	1	2	1	2	2	2	4	29
1214	8.0	1	2	2	1	1	2	4	32
1227	7.0	6	1	2	4	4	4	4	26
1238	4.0	6	1	4	2	3	2	4	30
1333	7.0	1	2	3	2	4	8	4	31
1406	2.0	6	2	2	2	3	4	4	21
1407	8.0	1	1	4	4	4	3	4	18
1414	2.0	6	1	3	2	2	2	4	29
1440	6.0	1	2	3	1	2	2	4	30
1451	2.0	6	1	4	1	2	1	4	32
1572	6.0	3	1	4	1	1	2	4	29
1656	5.0	1	1	2	2	3	2	4	30
1713	NaN	6	1	2	1	1	3	4	21
1716	1.0	1	1	4	2	1	2	4	27
1743	NaN	6	2	2	2	3	1	4	18

In [161]:
```python
# Breaks down Each Usage Category by age demographics
early_everyfewweeks = everyfewweeks.query("age>=18" and "age<=34")
earlymiddle_everyfewweeks = everyfewweeks.query("age>=35" and "age<=44")
middle_everyfewweeks = everyfewweeks.query("age>=45" and "age<=64")
late_everyfewweeks = everyfewweeks.query("age>=65")
everyfewweeksbyage =[early_everyfewweeks, earlymiddle_everyfewweeks, middle_everyfewweeks, late_everyfewweeks]
everyfewweeksbyage[0]
```

Out[161]:

	inc	marital	sex	q1	q2c	q2j	q11d	sns2e	age
87	5.0	6	2	3	1	2	4	5	30
915	2.0	6	1	4	2	2	2	5	20
1124	3.0	1	2	2	2	3	3	5	26
1164	9.0	6	1	1	4	4	4	5	25
1176	6.0	6	2	1	1	3	2	5	19
1182	NaN	6	1	2	3	3	4	5	21
1245	7.0	6	1	2	3	3	4	5	23
1324	1.0	6	1	3	3	4	3	5	21
1345	6.0	1	2	3	3	4	4	5	28
1460	NaN	6	2	1	3	4	2	5	23
1478	6.0	2	1	2	3	3	3	5	27
1486	6.0	1	1	2	4	4	4	5	29
1634	7.0	1	2	1	1	2	3	5	30
1724	2.0	3	2	4	1	2	4	5	34
1774	NaN	6	1	1	2	4	3	5	19

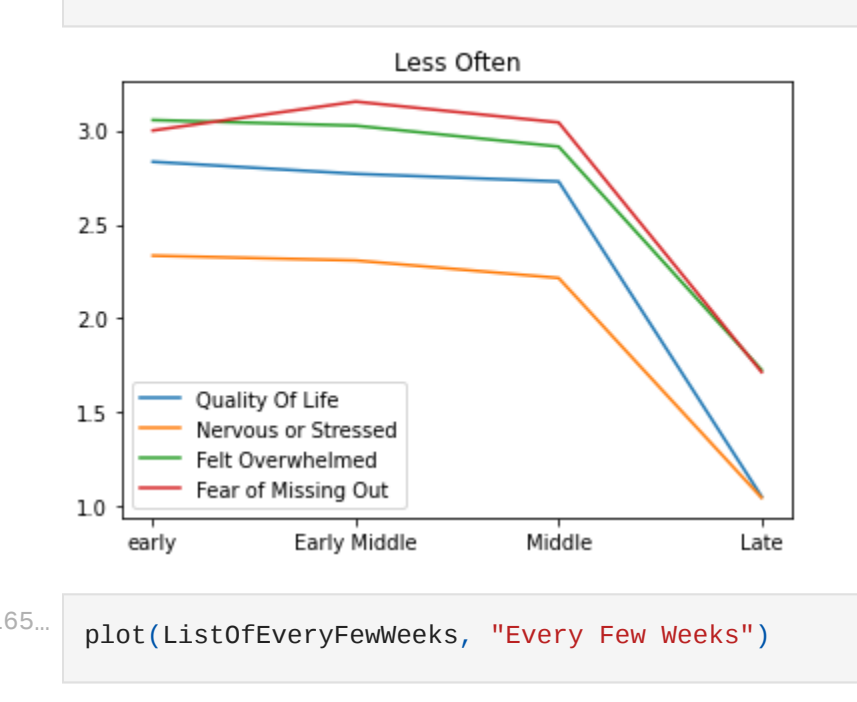
In [162]:
```python
# Breaks down Each Usage Category by age demographics
early_lessoften = lessoften.query("age>=18" and "age<=34")
earlymiddle_lessoften = lessoften.query("age>=35" and "age<=44")
middle_lessoften = lessoften.query("age>=45" and "age<=64")
late_lessoften = lessoften.query("age>=65")
lessoftenbyage =[early_lessoften, earlymiddle_lessoften, middle_lessoften, late_lessoften]
lessoftenbyage[0]
```

Out[162]:

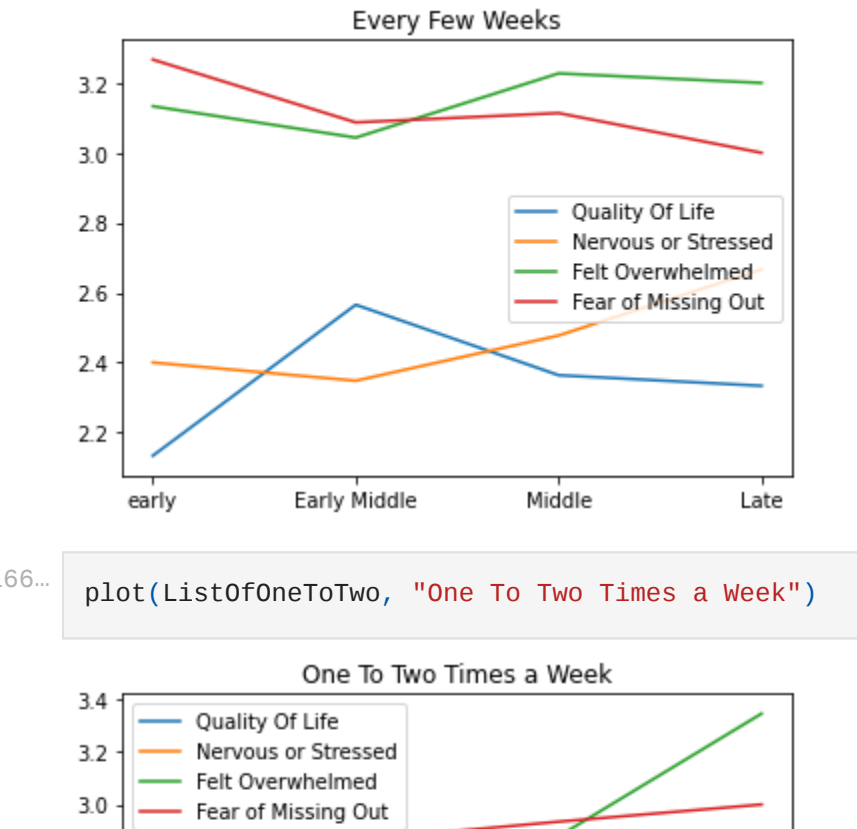
	inc	marital	sex	q1	q2c	q2j	q11d	sns2e	age
64	2.0	6	1	2	4	1	4	6	33
158	5.0	1	2	4	4	4	4	6	27
1010	5.0	1	1	2	3	3	4	6	33
1022	8.0	4	1	3	2	2	2	6	32
1087	2.0	1	1	3	1	4	4	6	27
1165	NaN	6	2	3	2	2	2	6	18
1200	6.0	6	1	3	2	3	3	6	30
1217	2.0	1	1	2	1	4	2	6	28
1247	2.0	2	1	4	3	3	4	6	28
1289	4.0	1	2	4	1	3	3	6	26
1297	5.0	6	1	4	4	4	4	6	23
1409	5.0	1	1	2	3	4	3	6	30
1470	4.0	6	2	3	1	2	3	6	20
1540	6.0	1	1	3	1	2	2	6	33
1541	8.0	1	2	1	2	4	1	6	28
1639	NaN	6	1	2	4	3	2	6	28
1655	NaN	1	1	4	1	4	3	6	28
1785	4.0	1	1	2	3	3	4	6	26

In [163]:
```python
# Compiled By Converting each query to csv and copying the mean values
ListOfLessOften = [[2.833333333,2.333333333,3.055555556,3],
                   [2.769230769,2.307692308,3.025641026,3.153846154],
                   [2.728571429,2.214285714,2.914285714,3.042857143],
                   [1.050030525,1.043907845,1.724632997,1.71344607]]
ListOfEveryFewWeeks = [[2.133333333,2.4,3.133333333,3.266666667],
                       [2.565217391,2.347826087,3.043478261,3.086956522],
                       [2.363636364,2.477272727,3.227272727,3.113636364],
                       [2.333333333,2.666666667,3.2,3]]
ListOfOneToTwo = [[2.851851852,1.888888889,2.814814815,2.777777778],
                  [2.865384615,1.846153846,2.634615385,2.865384615],
                  [2.694444444,2.101851852,2.87962963,2.935185185],
                  [2.53125,2.875,3.34375,3]]
ListOfThreeToFive = [[2.606060606,2.090909091,2.757575758,2.848484848],
                     [2.469387755,2.224489796,2.93877551,2.816326531],
                     [2.61627907,2.244186047,3.023255814,2.709302326],
                     [2.2,2.4,3.2,3]]
ListOfOnceADay = [[2.578947368,2.276315789,3.342105263,2.894736842],
                  [2.575221239,2.221238938,3.274336283,2.920353982],
                  [2.597014925,2.323383085,3.213930348,2.895522388],
                  [2.423076923,2.653846154,3.346153846,2.730769231]]
ListOfSeveralADay = [[2.459459459,2.283783784,3.067567568,2.641891892],
                     [2.479262673,2.253456221,3.059907834,2.728110599],
                     [2.542319749,2.250783699,3.059561129,2.796238245],
                     [2.542857143,2.285714286,3.171428571,3]]
```

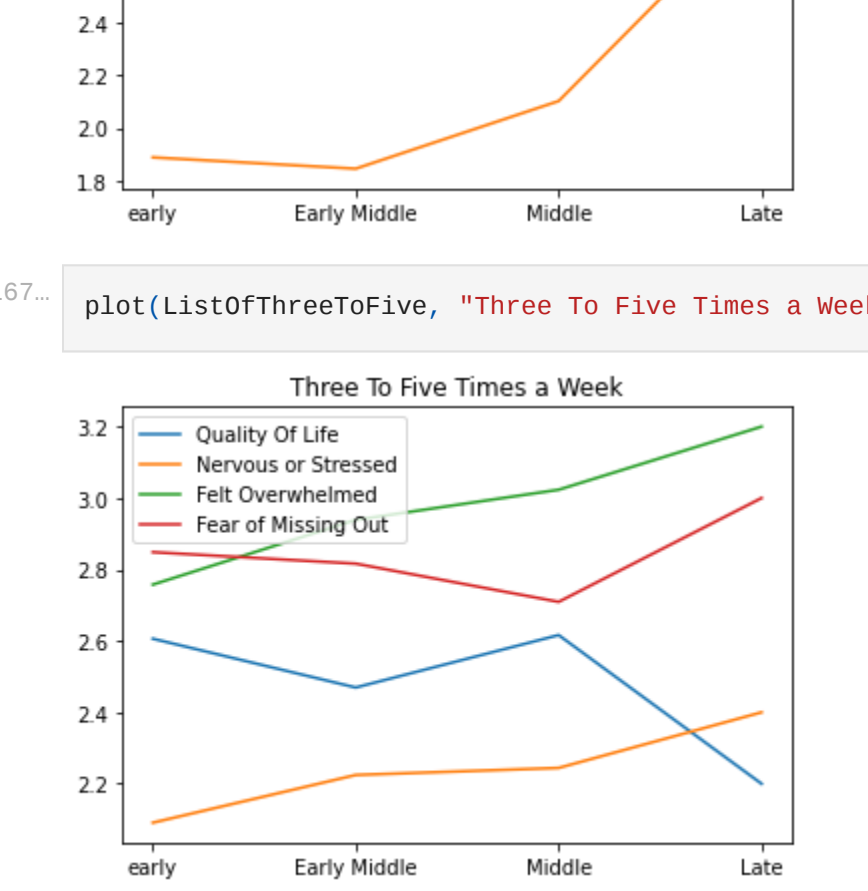
In [164]:
```python
# Plots Data
def plot(category,title):
    LOC = ["early", "Early Middle", "Middle", "Late"]
    qol = [row[0] for row in category]
    nervous = [row[1] for row in category]
    difficulties = [row[2] for row in category]
    fomo = [row[3] for row in category]
    plt.plot(LOC,qol,label = "Quality Of Life")
    #qol 1 (excellent) - 5 (poor)
    plt.plot(LOC, nervous, label = "Nervous or Stressed")
    plt.plot(LOC, difficulties, label = "Felt Overwhelmed")
    plt.plot(LOC, fomo, label = "Fear of Missing Out")
    # 1 (frequent) - 5 (never)
    plt.legend()
    plt.title(title)
plot(ListOfLessOften, "Less Often")
```



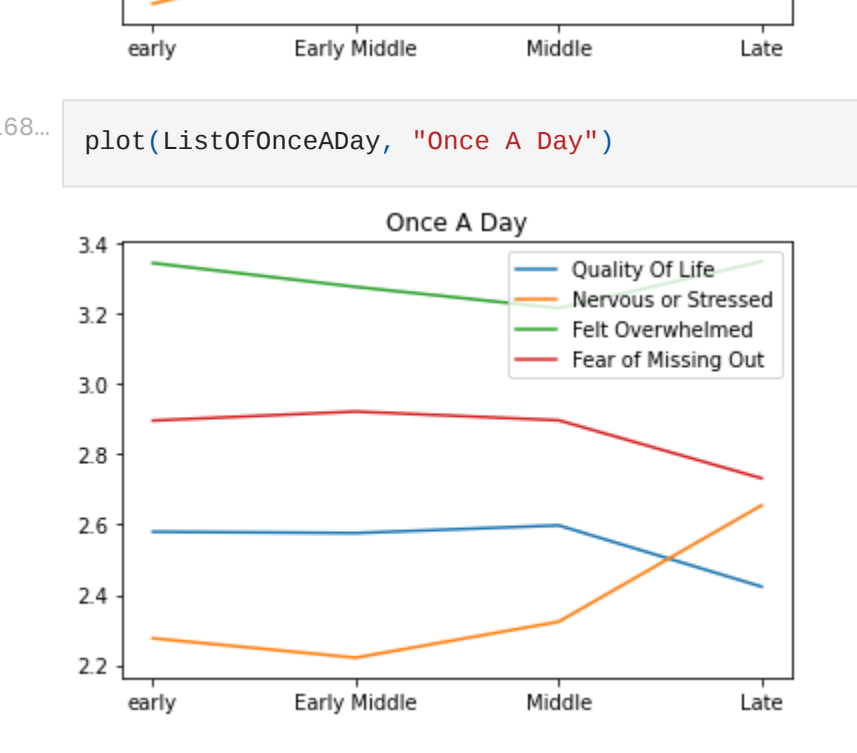
In [165]:
```python
plot(ListOfEveryFewWeeks, "Every Few Weeks")
```



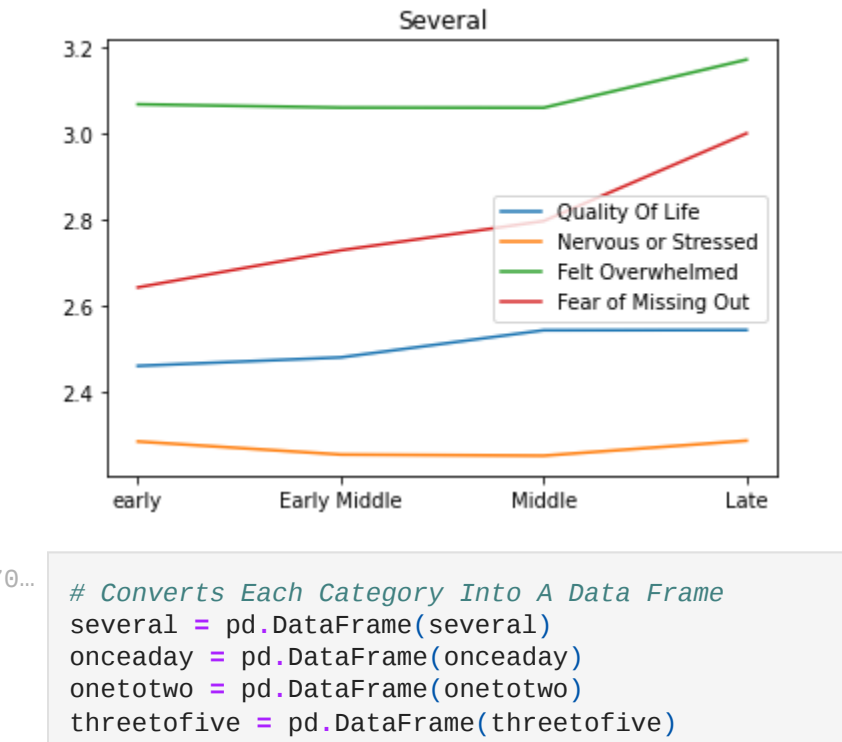
In [166]:
```python
plot(ListOfOneToTwo, "One To Two Times a Week")
```



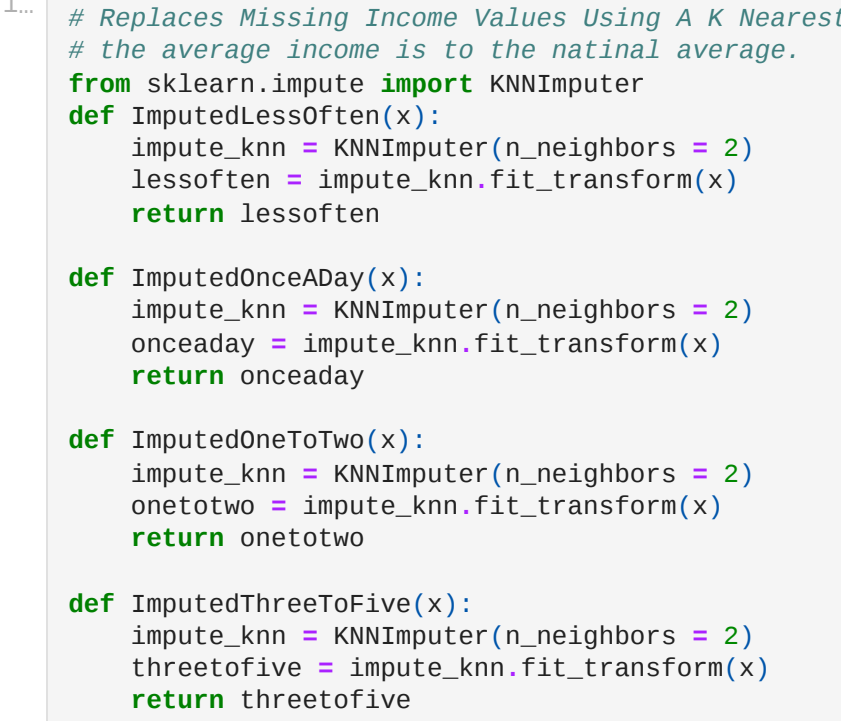
In [167]:
```python
plot(ListOfThreeToFive, "Three To Five Times a Week")
```



In [168]:
```python
plot(ListOfOnceADay, "Once A Day")
```



In [169]:
```python
plot(ListOfSeveralADay, "Several")
```



In [170]:
```python
# Converts Each Category Into A Data Frame
several = pd.DataFrame(several)
onceaday = pd.DataFrame(onceaday)
onetotwo = pd.DataFrame(onetotwo)
threetofive = pd.DataFrame(threetofive)
lessoften = pd.DataFrame(lessoften)
```

In [171]:
```python
# Replaces Missing Income Values Using A K Nearest Neighbor algorithm and determines how close
# the average income is to the natinal average.
from sklearn.impute import KNNImputer
def ImputedLessOften(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    lessoften = impute_knn.fit_transform(x)
    return lessoften

def ImputedOnceADay(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    onceaday = impute_knn.fit_transform(x)
    return onceaday

def ImputedOneToTwo(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    onetotwo = impute_knn.fit_transform(x)
    return onetotwo

def ImputedThreeToFive(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    threetofive = impute_knn.fit_transform(x)
    return threetofive

def ImputedSeveral(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    several = impute_knn.fit_transform(x)
    return several
def ImputedEveryFewWeeks(x):
    impute_knn = KNNImputer(n_neighbors = 2)
    EveryFewWeeks = impute_knn.fit_transform(x)
    return EveryFewWeeks

lo = ImputedLessOften(lessoften)
oad = ImputedOnceADay(onceaday)
ott = ImputedOneToTwo(onetotwo)
ttf = ImputedThreeToFive(threetofive)
s = ImputedSeveral(several)
efw = ImputedEveryFewWeeks(everyfewweeks)
def getIncome(category):
    income = category[:, 1]
    print(np.sum(income)/len(income))
    return (np.sum(income)/len(income))

# representative of $30000
AverageIncomeCategory = 3
several_income = float(getIncome(s))
onceaday_income = float(getIncome(oad))
onetotwo_income = float(getIncome(ott))
threetofive_income = float(getIncome(ttf))
lessoften_income = float(getIncome(lo))
everyfewweeks_income = float(getIncome(efw))

def Closeness(AIC, CI):
    return CI / AIC

ClosenessSeveral = Closeness(AverageIncomeCategory,several_income)
ClosenessOAD = Closeness(AverageIncomeCategory,onceaday_income)
ClosenessOTT = Closeness(AverageIncomeCategory,onetotwo_income)
ClosenessTTF = Closeness(AverageIncomeCategory,threetofive_income)
ClosenessLO = Closeness(AverageIncomeCategory,lessoften_income)
ClosenessEFW = Closeness(AverageIncomeCategory, everyfewweeks_income)
print("Income")
print("Several Closeness To Average: " + str(ClosenessSeveral))
print("Once A Day Closeness To Average: " + str(ClosenessOAD))
print("Once To Two Day's Closeness To Average: " + str(ClosenessOTT))
print("Three To Five Day's Closeness To Average: " + str(ClosenessTTF))
print("Less Often's Closeness To Average: " + str(ClosenessLO))
print("Every Few Week's Closeness To Average: " + str(ClosenessEFW))
```

```
2.8446327683615817
2.6343612334801763
2.65
2.75
2.4578313253012047
2.4237288135593222
Income
Several Closeness To Average: 0.9482109227871939
Once A Day Closeness To Average: 0.8781204111600588
Once To Two Day's Closeness To Average: 0.8833333333333333
Three To Five Day's Closeness To Average: 0.9166666666666666
Less Often's Closeness To Average: 0.8192771084337349
Every Few Week's Closeness To Average: 0.8079096045197741
```