In [1]:

```
#Vikram Radhakrishnan, 15 Feb, 2020
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
sns.set(color_codes=True)
df=pd.read_csv('Mcdonald.csv')
%matplotlib inline
```

In [2]:

```
df.head(1) # Browsing through the format of the file imported
```

Out[2]:

	Category	Item	Serving Size	Calories	Calories from Fat	Total Fat	Total Fat (% Daily Value)	Saturated Fat	Saturated Fat (% Daily Value)	Trans Fat	...
0	Breakfast	Egg McMuffin	4.8 oz (136 g)	300	120	13.0	20	5.0	25	0.0	...

1 rows × 24 columns

Q1 : Plot graphically which food categories have the highest and lowest varieties.

In [3]:

```
a=df.Category.value_counts()
Horz=a.keys()
Vert=a.values
fig_dims = (12, 3)
fig, ax = plt.subplots(figsize=fig_dims)
sns.barplot(Horz,Vert)
print("ANSWER 1: INFERENCE:From the figure, we see the coffee & Tea Cateogry has the
highest number of varieties \n and the Salads category has the lowest ")
```

```
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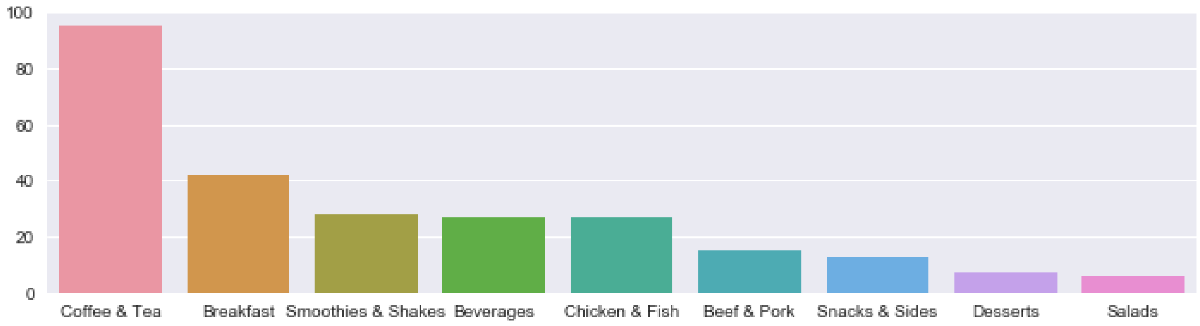


Q2 : Which all variables have an outlier?

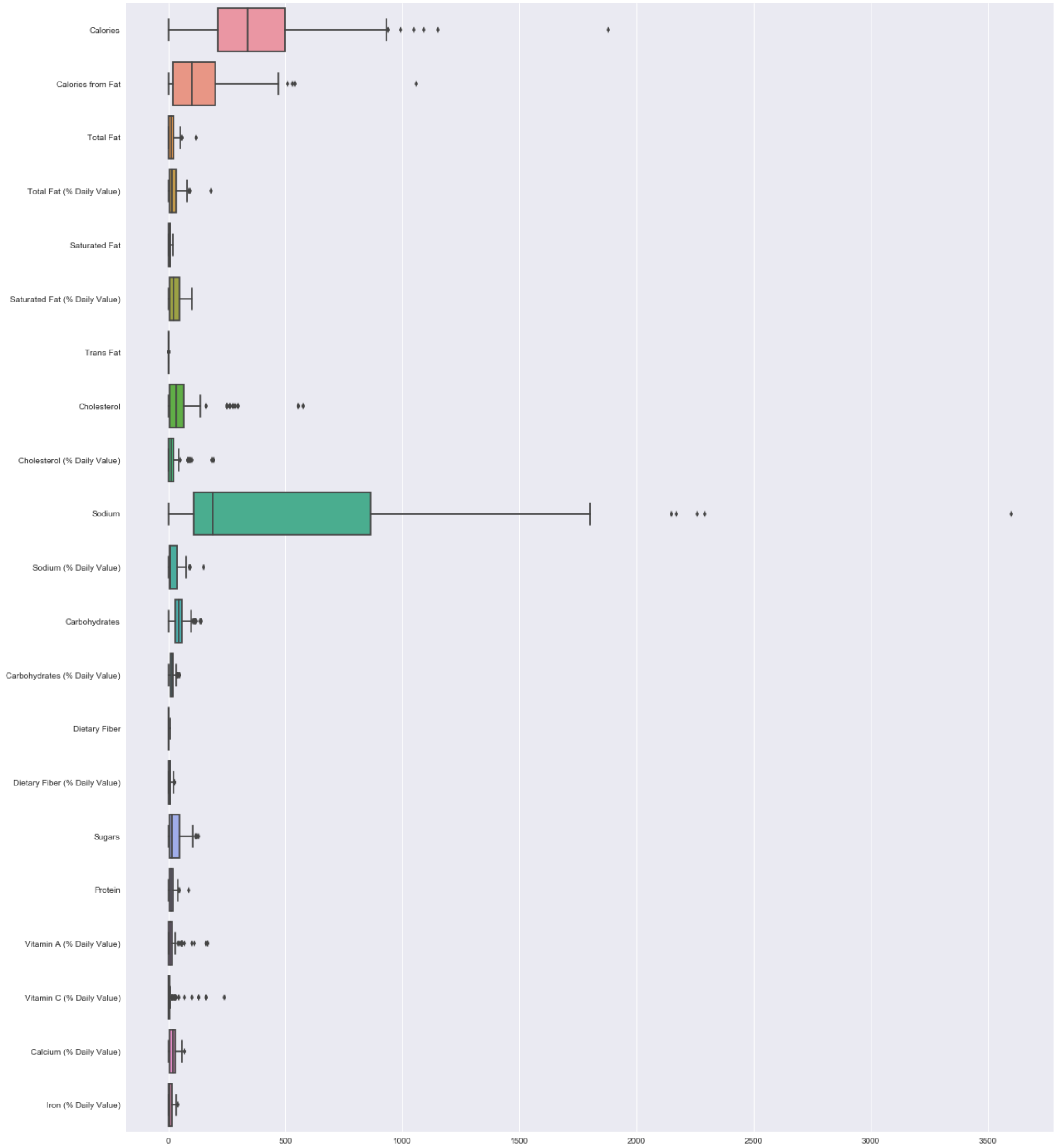
In [4]:

```
outlier_headings=[]
headers=df.columns[3:]
for i in headers:
    Q1=df[i].quantile(0.25)
    Q3=df[i].quantile(0.75)
    IQR=Q3-Q1
    upper=Q3+(1.5*IQR)
    lower=Q1-(1.5*IQR)
    if (df[i].min()<lower) or (df[i].max()>upper):
        print(i,"-Outlier")
        outlier_headings.append(i)
```

```
Calories -Outlier
Calories from Fat -Outlier
Total Fat -Outlier
Total Fat (% Daily Value) -Outlier
Trans Fat -Outlier
Cholesterol -Outlier
Cholesterol (% Daily Value) -Outlier
Sodium -Outlier
Sodium (% Daily Value) -Outlier
Carbohydrates -Outlier
Carbohydrates (% Daily Value) -Outlier
Dietary Fiber (% Daily Value) -Outlier
Sugars -Outlier
Protein -Outlier
Vitamin A (% Daily Value) -Outlier
Vitamin C (% Daily Value) -Outlier
Calcium (% Daily Value) -Outlier
Iron (% Daily Value) -Outlier
```

```
In [65]: dfc=df.drop(['Category','Item','Serving Size'],axis=1) # Drop non-numeric columns
         fig, ax = plt.subplots(figsize=(20,25))
         sns.boxplot(data=dfc,orient="h")
```

```
Out[65]: <matplotlib.axes._subplots.AxesSubplot at 0x2661eda4630>
```



Q3 : Which variables have the Highest correlation. Plot them and find out the value ?

In [6]:

```
# Question no 3 - Solution:
a=df.columns # Store the column heads separately
a
```

Out[6]:

```
Index(['Category', 'Item', 'Serving Size', 'Calories', 'Calories from Fat',
       'Total Fat', 'Total Fat (% Daily Value)', 'Saturated Fat',
       'Saturated Fat (% Daily Value)', 'Trans Fat', 'Cholesterol',
       'Cholesterol (% Daily Value)', 'Sodium', 'Sodium (% Daily Value)',
       'Carbohydrates', 'Carbohydrates (% Daily Value)', 'Dietary Fiber',
       'Dietary Fiber (% Daily Value)', 'Sugars', 'Protein',
       'Vitamin A (% Daily Value)', 'Vitamin C (% Daily Value)',
       'Calcium (% Daily Value)', 'Iron (% Daily Value)'],
      dtype='object')
```

In [38]:

```
corre=df[['Calories', 'Calories from Fat','Total Fat','Total Fat (% Daily Value)',
'Saturated Fat',
       'Saturated Fat (% Daily Value)', 'Trans Fat', 'Cholesterol',
       'Cholesterol (% Daily Value)', 'Sodium', 'Sodium (% Daily Value)',
       'Carbohydrates', 'Carbohydrates (% Daily Value)', 'Dietary Fiber',
       'Dietary Fiber (% Daily Value)', 'Sugars', 'Protein',
       'Vitamin A (% Daily Value)', 'Vitamin C (% Daily Value)',
       'Calcium (% Daily Value)', 'Iron (% Daily Value)']].corr()
```

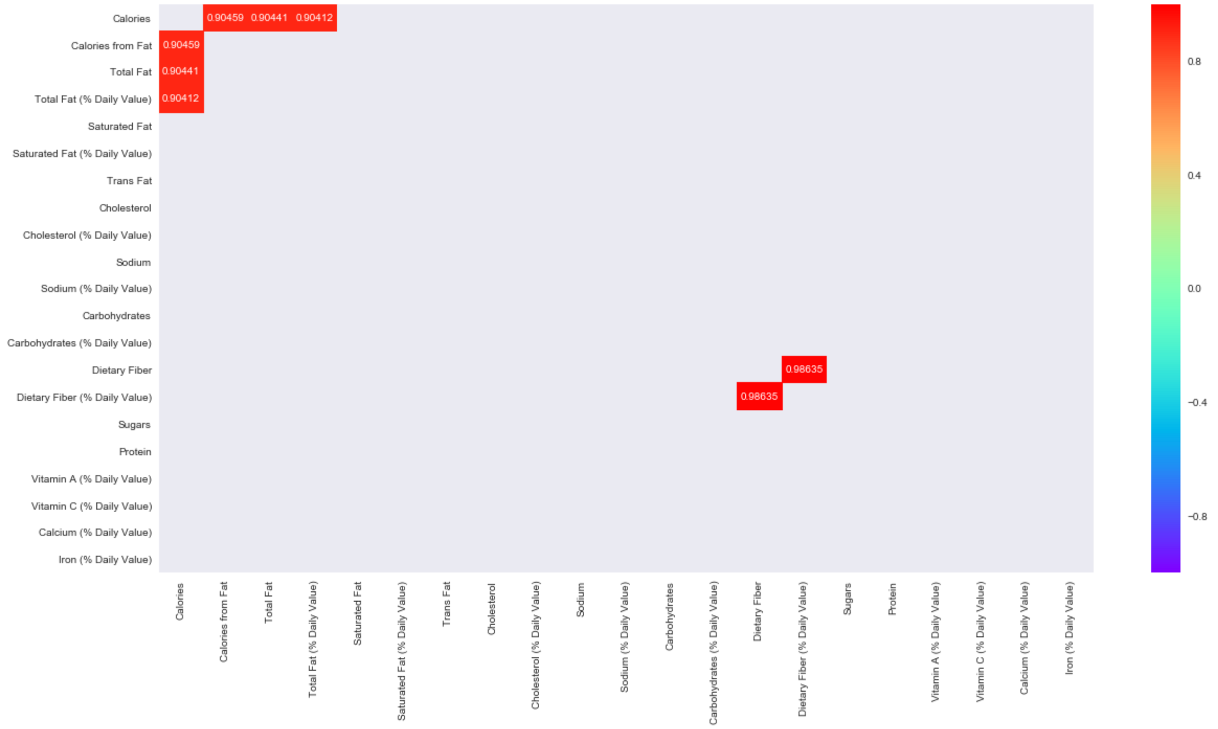
In [39]:

```
fig_dims = (20, 10)
fig, ax = plt.subplots(figsize=fig_dims)

threshold=0.90 # This is a self chosen threshold value to show only values that have
high correlation
sns.heatmap(corre[(corre>threshold) & (corre<0.99)],annot=True, cmap='rainbow',vmin=
-1,vmax=1,fmt=".5f") # Ignore the self correlation values by using 0.99 as a limit
```

Out[39]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x2661ae62f60>
```



In [40]:

```
x=(corre[(corre>threshold) & (corre<1)])
rowcoldex=x.keys()
for i in range(0,21):
    for j in range(0,21):
        if ((x.iloc[i,j]>threshold) & (x.iloc[i,j]<0.99) or(x.iloc[i,j]>-threshold)
& (x.iloc[i,j]<-0.99) ): # covers both positive and negative correlation
            print("There is strong correlation between : ", rowcoldex[i], "&",rowcol
dex[j],"\n")
#x.columns
```

```
There is strong correlation between :  Calories & Calories from Fat

There is strong correlation between :  Calories & Total Fat

There is strong correlation between :  Calories & Total Fat (% Daily Value)

There is strong correlation between :  Calories from Fat & Calories

There is strong correlation between :  Total Fat & Calories

There is strong correlation between :  Total Fat (% Daily Value) & Calories

There is strong correlation between :  Dietary Fiber & Dietary Fiber (% Daily Valu
e)

There is strong correlation between :  Dietary Fiber (% Daily Value) & Dietary Fibe
r
```

Q4 : Which category contributes to the maximum % of Cholesterol in a diet (% daily value)?

In [41]:

```
Bfast=df[df['Category']=='Breakfast']
Bfast['Cholesterol (% Daily Value)'].mean()
```

Out[41]:

```
50.95238095238095
```

In [42]:

```
categori=df.Category.unique()
```

In [43]:

```
dict={}
for i in categori:
        cat=df[df['Category']==i]
        print("The total calories in ", i, "due to cholestrol is : ", cat['Cholester
ol (% Daily Value)'].mean())
        dict[i]=cat['Cholesterol (% Daily Value)'].mean()
```

```
The total calories in  Breakfast due to cholestrol is :  50.95238095238095
The total calories in  Beef & Pork due to cholestrol is :  28.933333333333334
The total calories in  Chicken & Fish due to cholestrol is :  25.22222222222222
The total calories in  Salads due to cholestrol is :  17.333333333333332
The total calories in  Snacks & Sides due to cholestrol is :  6.230769230769231
The total calories in  Desserts due to cholestrol is :  4.857142857142857
The total calories in  Beverages due to cholestrol is :  0.18518518518518517
The total calories in  Coffee & Tea due to cholestrol is :  9.378947368421052
The total calories in  Smoothies & Shakes due to cholestrol is :  14.71428571428571
4
```

In [44]:

```
dict
```

Out[44]:

```
{'Beef & Pork': 28.933333333333334,
 'Beverages': 0.18518518518518517,
 'Breakfast': 50.95238095238095,
 'Chicken & Fish': 25.22222222222222,
 'Coffee & Tea': 9.378947368421052,
 'Desserts': 4.857142857142857,
 'Salads': 17.333333333333332,
 'Smoothies & Shakes': 14.714285714285714,
 'Snacks & Sides': 6.230769230769231}
```

In [45]:

```
dict.items()
foodframe=pd.DataFrame([dict])
```

In [46]:

```
foodframe
```

Out[46]:

	Beef & Pork	Beverages	Breakfast	Chicken & Fish	Coffee & Tea	Desserts	Salads	Smoothies & Shakes	Sn & S
0	28.933333	0.185185	50.952381	25.222222	9.378947	4.857143	17.333333	14.714286	6.23

In [47]:

```
maxcal=foodframe.iloc[0].max()
```

In [48]:

```
maxcal
```

Out[48]:

```
50.952380952380949
```

In [49]:

```
food=foodframe.transpose()
```

In [50]:

```
a=food[food[0]==maxcal].index[0]
```

```
In [51]: print("\n The maximum calories by percentage is provided by the category :",a, "and
          has a average value of :",maxcal,"\n\n")

          The maximum calories by percentage is provided by the category : Breakfast and has
         a average value of : 50.9523809524
```

Q5 : Which item contributes maximum to the Sodium intake?

```
In [66]: it=df.groupby(['Item']).sum() # Groups by Item, and sums up the values of each item

In [53]: maxsod=it['Sodium'].max() # Gets the value with maximum sodium
         print(maxsod)

         3600

In [54]: sodiumitem=it[it['Sodium']==maxsod] # Finds out the item which has max sodium value

In [55]: m=sodiumitem.reset_index() # Helps easy picking of 'Item' later

In [56]: m.keys() # Get the headings, alternatively one can use columns

Out[56]: Index(['Item', 'Calories', 'Calories from Fat', 'Total Fat',
                'Total Fat (% Daily Value)', 'Saturated Fat',
                'Saturated Fat (% Daily Value)', 'Trans Fat', 'Cholesterol',
                'Cholesterol (% Daily Value)', 'Sodium', 'Sodium (% Daily Value)',
                'Carbohydrates', 'Carbohydrates (% Daily Value)', 'Dietary Fiber',
                'Dietary Fiber (% Daily Value)', 'Sugars', 'Protein',
                'Vitamin A (% Daily Value)', 'Vitamin C (% Daily Value)',
                'Calcium (% Daily Value)', 'Iron (% Daily Value)'],
               dtype='object')

In [57]: sodmax=m['Item'][0] # Gets the item name from the table

In [58]: print("The item with maximum sodium contribution is : ", sodmax)

         The item with maximum sodium contribution is :  Chicken McNuggets (40 piece)
```

Q6.Which 4 food items contains the most amount of Saturated Fat?

```
In [59]: it=df.groupby(['Item']).sum()

In [60]: maxsatfat=it.sort_values('Saturated Fat').tail(4).reset_index()
```

In [61]:

```
print("\n\n The 4 items with most saturated fat are :\n\n ******************************* \n\n", maxsatfat['Item'].loc[0],", \n\n",maxsatfat['Item'].loc[1],",\n\n",maxsatfat['Item'].loc[2],",\n\n",maxsatfat['Item'].loc[3],"\n\n *******************************")
```

```
 The 4 items with most saturated fat are :

 *******************************

 Frappé Chocolate Chip (Large) ,

 McFlurry with M&M’s Candies (Medium) ,

 Chicken McNuggets (40 piece) ,

 Big Breakfast with Hotcakes (Large Biscuit)

 *******************************
```