Snack Shack Data Visualization Notebook

November 24, 2025

Importing Libraries

[34]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from wordcloud import WordCloud
```

Importing Data

[35]:
```
df = pd.read_csv("Snack_Shack_Food_Survey_Final.csv")
```

Understanding Data

[36]:
```
df.head()
```

[36]:

	Submission Date	Age Group	Gender	What's your favorite baked item?	What's your favorite Cheese Chips?	What's your favorite Salted Snack?	What's your favorite Sweet Treat?	What's your favorite Energy Drink?	What's your favorite Soda	What's your favorite Water?
0	30-Jul-25	41-50	Female	Honey Bun Cheese Bread	Tiggaz	St Marys Banana Chips	Snickers	Lucozade	Pepsi	Wata Water
1	30-Jul-25	41-50	Male	Honey Bun Cinnamon Roll	Doritos	St Marys Banana Chips	Granola Bar	Lucozade	Pepsi	876 Water
2	30-Jul-25	30 - 40	Female	Honey Bun Donut	Cheese Krunches	Soldanza Plantain Chips	Granola Bar	Redbull	Pepsi	Wata Water
3	29-Jul-25	30 - 40	Male	National Spice Bun	Doritos	Soldanza Banana Chips	Oreo	Redbull		
4	29-Jul-25	Over 51	Male	National Spice Bun	Cheese Krunches	St Marys Banana Chips	Oreo	NaN		

```
3                    Ting                  Wata Water
4                Bigga Soda                Wata Water

  What's your favorite Cup Soup? What's your favorite Juice / Drink  \
0              Cup Soup Chicken                                 NaN
1               Cup Soup Shrimp                             Tropics
2              Cup Soup Chicken      iGrace Aloe Vera Drink Mango
3              Cup Soup Chicken                             Tropics
4              Cup Soup Chicken                             Tropics

  What's your favorite Cup Porridge? What's your favorite Cereal?  \
0                 Cornmeal Porridge               Frosted Flakes
1                   Banana Porridge               Frosted Flakes
2                 Cornmeal Porridge                  Raisin Bran
3                   Banana Porridge               Frosted Flakes
4                  Oatmeal Porridge                  Corn Flakes

  What's your favorite KISS Treat? What's your favorite Sandwich Biscuit?  \
0                 Kiss Strawberry           Strawberry Sandwich biscuit
1                  Kiss Chocolate                       Duplex Chocolate
2                 Kiss Strawberry                       Duplex Chocolate
3                  Kiss Chocolate           Strawberry Sandwich biscuit
4                     Kiss Orange                       Duplex Chocolate

  What's your favorite Flavored Water? What's your favorite Nuts Snack?  \
0                    Wata Cran Water                           Sun Mix
1                    Wata Cran Water                      Fruit & Nut
2                    Wata Cran Water                      Fruit & Nut
3               Ocean Spray Cran Water                           Sun Mix
4                    Wata Cran Water                    Sales Peanuts

                       Snack or Juice Suggestions
0                                             NaN
1                                             NaN
2  Tropical Rhythm , more snacks without high sug…
3                                             NaN
4                                  Double 7 drink
```

[37]:
```
df.tail()
```

[37]:
```
   Submission Date Age Group  Gender What's your favorite baked item?  \
28       28-Jul-25   30 - 40  Female               National Spice Bun
29       28-Jul-25     41-50  Female          Honey Bun Cinnamon Roll
30       28-Jul-25   30 - 40  Female               National Spice Bun
31       28-Jul-25   30 - 40  Female             National Spice Bulla
32       28-Jul-25   30 - 40  Female           Honey Bun Cheese Bread
```

```
   What's your favorite Cheese Chips? What's your favorite Salted Snack?  \
28                            Doritos              St Marys Banana Chips
29                        Cheezy Voltz       Soldanza Ripe Plantain Chips
30                        Cheezy Voltz              Soldanza Banana Chips
31                              Tiggaz                        Club Social
32                             Cheetos              Soldanza Banana Chips

   What's your favorite Sweet Treat? What's your favorite Energy Drink?  \
28                              Oreo                             Lucozade
29                              Oreo                             Lucozade
30                              Oreo                             Lucozade
31                             Catch                             Lucozade
32                              Oreo                             Lucozade

   What's your favorite Soda What's your favorite Water?  \
28                     Pepsi       Catherines Peak Water
29                      Ting       Catherines Peak Water
30                     Pepsi                   876 Water
31                      Ting       Catherines Peak Water
32                      Ting                  Wata Water

   What's your favorite Cup Soup? What's your favorite Juice / Drink  \
28               Cup Soup Chicken                             Tropics
29                Cup Soup Shrimp  Grace Aloe Vera Drink Pomegranate
30                  Cup Soup Beef                             Tropics
31               Cup Soup Chicken  Grace Aloe Vera Drink Pomegranate
32               Cup Soup Chicken                             Tropics

   What's your favorite Cup Porridge? What's your favorite Cereal?  \
28                  Cornmeal Porridge               Frosted Flakes
29                   Oatmeal Porridge                  Raisin Bran
30                                NaN               Frosted Flakes
31                  Cornmeal Porridge               Frosted Flakes
32                  Cornmeal Porridge               Frosted Flakes

   What's your favorite KISS Treat? What's your favorite Sandwich Biscuit?  \
28                   Kiss Chocolate             Chocolate Sandwich biscuit
29                  Kiss Strawberry                       Duplex Chocolate
30                   Kiss Chocolate                       Duplex Chocolate
31                  Kiss Strawberry                       Duplex Chocolate
32                      Kiss Orange            Strawberry Sandwich biscuit

   What's your favorite Flavored Water? What's your favorite Nuts Snack?  \
28               Ocean Spray Cran Water                           Sun Mix
29               Ocean Spray Cran Water                            Cashew
30               Ocean Spray Cran Water                            Cashew
31                      Wata Cran Water                            Cashew
```

```
32                    Wata Cran Water                       Fruit & Nut

          Snack or Juice Suggestions
28      Jalapeño Kettle cooked chips
29  Cheese it extra toasted crackers
30                               NaN
31                               NaN
32                               NaN
```

[38]:
```
df.columns
```

[38]:
```
Index(['Submission Date', 'Age Group', 'Gender',
       'What's your favorite baked item?',
       'What's your favorite Cheese Chips?',
       'What's your favorite Salted Snack?',
       'What's your favorite Sweet Treat?',
       'What's your favorite Energy Drink?', 'What's your favorite Soda',
       'What's your favorite Water?', 'What's your favorite Cup Soup?',
       'What's your favorite Juice / Drink',
       'What's your favorite Cup Porridge?', 'What's your favorite Cereal?',
       'What's your favorite KISS Treat?',
       'What's your favorite Sandwich Biscuit?',
       'What's your favorite Flavored Water?',
       'What's your favorite Nuts Snack?', 'Snack or Juice Suggestions'],
      dtype='object')
```

[39]:
```
df.shape
```

[39]:
```
(33, 19)
```

[40]:
```
duplicate_count = df.duplicated().sum()
print(f"Number of duplicate rows: {duplicate_count}")
```

```
Number of duplicate rows: 0
```

[41]:
```
df.isnull().sum()
```

[41]:
```
Submission Date                          0
Age Group                                0
Gender                                   0
What's your favorite baked item?         2
What's your favorite Cheese Chips?       0
What's your favorite Salted Snack?       0
What's your favorite Sweet Treat?        0
What's your favorite Energy Drink?       4
What's your favorite Soda                1
What's your favorite Water?              1
What's your favorite Cup Soup?           5
```

```
What's your favorite Juice / Drink          2
What's your favorite Cup Porridge?          6
What's your favorite Cereal?                4
What's your favorite KISS Treat?            3
What's your favorite Sandwich Biscuit?      0
What's your favorite Flavored Water?        0
What's your favorite Nuts Snack?            2
Snack or Juice Suggestions                 16
dtype: int64
```

Data Cleaning and Preparation

[42]:
```
#changing column names
df.columns = ['Submission Date', 'Age Group', 'Gender', 'Baked Items', 'Cheese␣
 ↪Chips', 'Salted Snacks', 'Sweet Treat',
              'Energy Drink', 'Soda', 'Water', 'Cup Soup', 'Juice/Drink', 'Cup␣
 ↪Porridge', 'Cereal','KISS Treat',
              'Sandwich Biscuit', 'Flavored Water', 'Nuts Snack','Suggestions']
```

[43]:
```
df.columns
```

[43]:
```
Index(['Submission Date', 'Age Group', 'Gender', 'Baked Items', 'Cheese Chips',
       'Salted Snacks', 'Sweet Treat', 'Energy Drink', 'Soda', 'Water',
       'Cup Soup', 'Juice/Drink', 'Cup Porridge', 'Cereal', 'KISS Treat',
       'Sandwich Biscuit', 'Flavored Water', 'Nuts Snack', 'Suggestions'],
      dtype='object')
```

[44]:
```
#keeping null values
def keep_null_values(value):
    if pd.isna(value):
        return "null"
    else:
        return value
```

[45]:
```
#applying Keep_null_values function
for col in df.columns:
    df[col] = df[col].apply(keep_null_values)
```

[46]:
```
print(df.apply(lambda col: col.unique()))
```

```
Submission Date                    [30-Jul-25, 29-Jul-25, 28-Jul-25]
Age Group                       [41-50, 30 - 40, Over 51, Under 30]
Gender                                                 [Female, Male]
Baked Items          [Honey Bun Cheese Bread, Honey Bun Cinnamon Ro…
Cheese Chips         [Tiggaz, Doritos, Cheese Krunches, Cheetos, Na…
Salted Snacks        [St Marys Banana Chips, Soldanza Plantain Chip…
Sweet Treat          [Snickers, Granola Bar, Oreo, Chips Ahoy, Catc…
Energy Drink                        [Lucozade, Redbull, null, Boom]
Soda                       [Pepsi, Ting, Bigga Soda, null, D&G Soda]
```

```
Water                [Wata Water, 876 Water, Catherines Peak Water,…
Cup Soup             [Cup Soup Chicken, Cup Soup Shrimp, null, Cup …
Juice/Drink          [null, Tropics, iGrace Aloe Vera Drink Mango, …
Cup Porridge         [Cornmeal Porridge, Banana Porridge, Oatmeal P…
Cereal               [Frosted Flakes, Raisin Bran, Corn Flakes, Fro…
KISS Treat           [Kiss Strawberry, Kiss Chocolate, Kiss Orange,…
Sandwich Biscuit     [Strawberry Sandwich biscuit, Duplex Chocolate…
Flavored Water              [Wata Cran Water, Ocean Spray Cran Water]
Nuts Snack           [Sun Mix, Fruit & Nut, Sales Peanuts, Cashew, …
Suggestions          [null, Tropical Rhythm , more snacks without h…
dtype: object
```

[47]:
```
df['Cup Soup'].unique()
```

[47]:
```
array(['Cup Soup Chicken', 'Cup Soup Shrimp', 'null', 'Cup Soup Beef'],
      dtype=object)
```

[48]:
```
def cup_soup_item(item):
    if item not in ['Cup Soup Shrimp','Cup Soup Beef','Cup Soup Chicken']:
        return 'null'
    else:
        return item
```

[49]:
```
df['Cup Soup'] = df['Cup Soup'].apply(cup_soup_item)
```

[50]:
```
df['Cup Soup'].unique()
```

[50]:
```
array(['Cup Soup Chicken', 'Cup Soup Shrimp', 'null', 'Cup Soup Beef'],
      dtype=object)
```

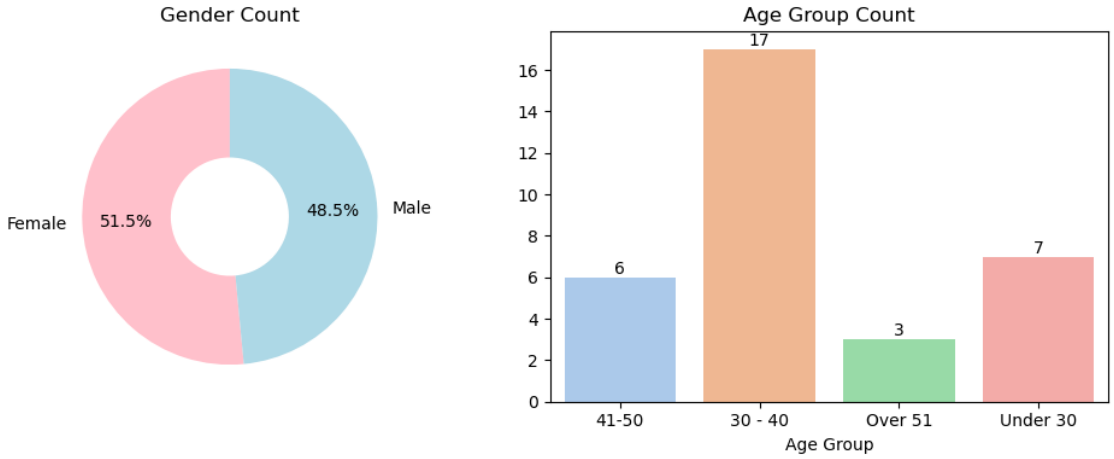
[51]:
```
df_item = df.drop(columns=['Age Group', 'Gender','Submission␣
 ↪Date','Suggestions'])
df_item.columns
```

[51]:
```
Index(['Baked Items', 'Cheese Chips', 'Salted Snacks', 'Sweet Treat',
       'Energy Drink', 'Soda', 'Water', 'Cup Soup', 'Juice/Drink',
       'Cup Porridge', 'Cereal', 'KISS Treat', 'Sandwich Biscuit',
       'Flavored Water', 'Nuts Snack'],
      dtype='object')
```

0.1 Visualizations

[52]:
```
fig = plt.figure(figsize=(10,4))

#Plot 1
gender_count = df['Gender'].value_counts().reset_index(name='Count')
labels = gender_count['Gender']
colors = ['pink' if label=='Female' else 'lightblue' for label in labels]
```

```
ax1 = plt.subplot(1,2,1)
ax1.pie(gender_count['Count'],
    labels=gender_count['Gender'],
    colors=colors,
    startangle=90,
    autopct='%1.1f%%',
    textprops = {'fontsize':10},
    pctdistance=0.7,
    wedgeprops=dict(width=0.6))
ax1.set_title('Gender Count', fontsize=12)

#Plot 2
ax2 = plt.subplot(1,2,2)
sns.countplot(data=df, x='Age Group', palette='pastel', ax=ax2)
ax2.set_title('Age Group Count')
ax2.set_ylabel('')
for c in ax2.containers:
    ax2.bar_label(c, label_type='edge')

plt.tight_layout()
plt.show()
```

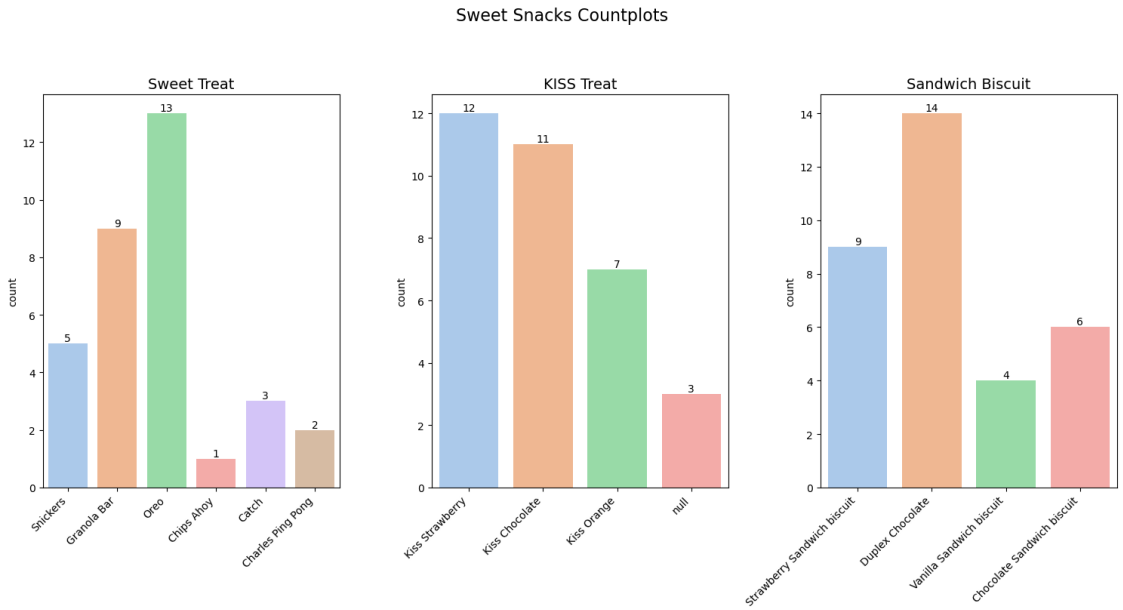


[ ]:
```
# Categorize columns into groups
sweets = ['Sweet Treat', 'KISS Treat', 'Sandwich Biscuit']
drinks = ['Energy Drink', 'Soda', 'Water', 'Juice/Drink', 'Flavored Water']
snacks = ['Cheese Chips', 'Salted Snacks', 'Nuts Snack', 'Baked Items']
mixed_snacks = ['Cup Soup', 'Cup Porridge', 'Cereal']

categories = {
    "sweets": sweets,
```

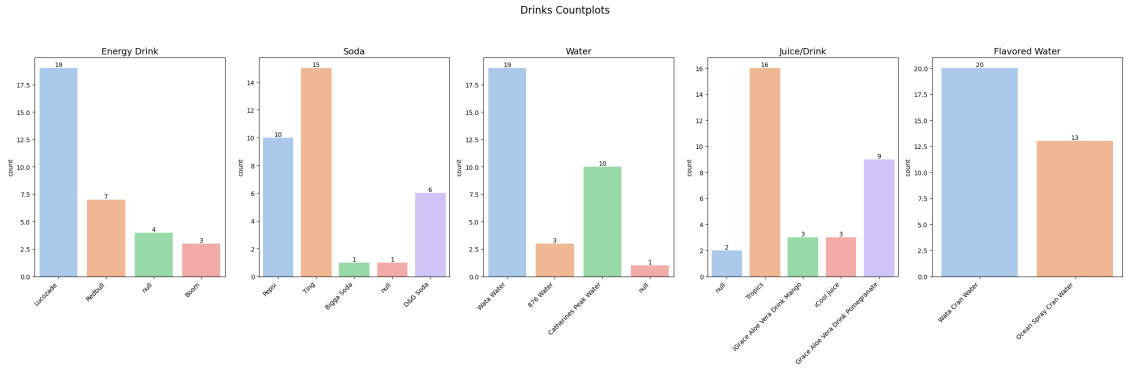
```
    "drinks": drinks,
    "snacks": snacks,
    "mixed_snacks": mixed_snacks
}
```

[57]:
```
def plot_category(category_col, title, df):
    n = len(category_col)

    plt.figure(figsize=(5 * n, 8))
    for i, col in enumerate(category_col, 1):
        plt.subplot(1, n, i)
        ax = sns.countplot(data=df, x=col, palette='pastel')
        plt.title(col, fontsize=14)
        plt.xticks(rotation=45, ha='right')
        plt.xlabel(" ", fontsize=16)
        for c in ax.containers:
            ax.bar_label(c,label_type='edge',fontsize=10)
    plt.suptitle(title, fontsize=16, y=1.05)
    plt.tight_layout()
    plt.show()
```

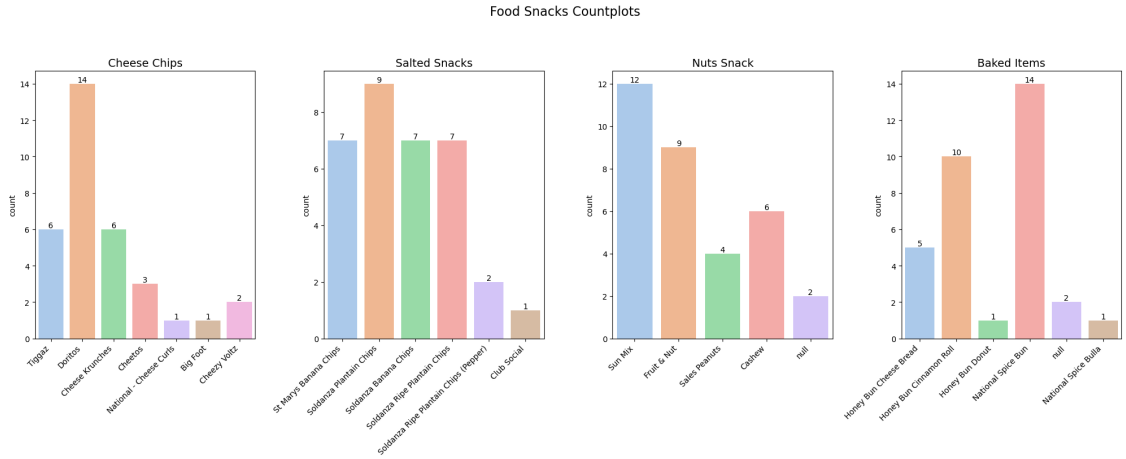
[58]:
```
# Plot for each category
plot_category(sweets, 'Sweet Snacks Countplots', df)
```



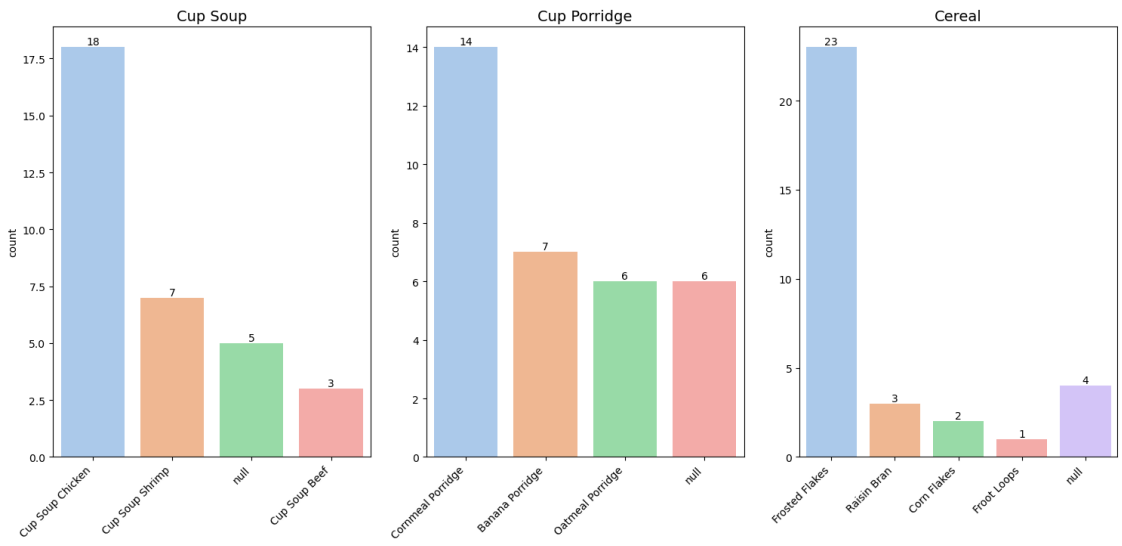
[59]:
```
plot_category(drinks, 'Drinks Countplots', df)
```



[60]:
```
plot_category(snacks, 'Food Snacks Countplots', df)
```

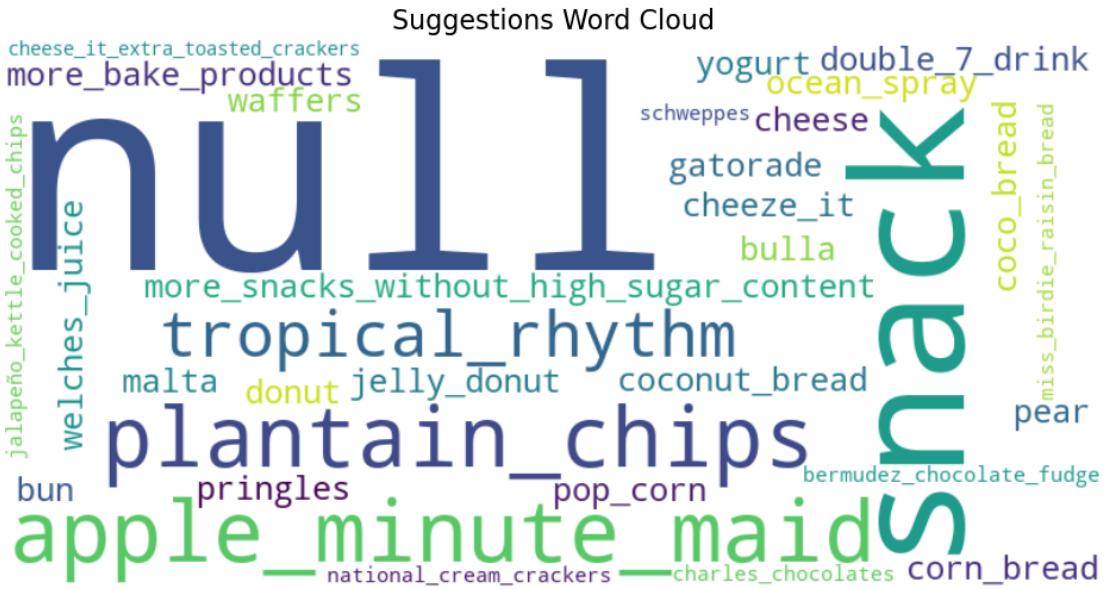


[61]:
```
plot_category(mixed_snacks, 'Mixed Snacks Countplots', df)
```



[56]:
```
df['Suggestions'] = df['Suggestions'].str.replace(r'\.*\s*(and|&)\s+', ', ',␣
↪regex=True)
df['Suggestions_list'] = df['Suggestions'].str.split(',')
df['Suggestions_list'] = df['Suggestions_list'].apply(lambda items: [item.
↪strip() for item in items])
```

[55]:
```
#Flatten all lists into one big list
all_words = [word.lower() for sublist in df['Suggestions_list'] for word in␣
↪sublist]
all_words_processed = [word.replace(' ', '_') if ' ' in word else word for word␣
↪in all_words]

#Join all words into a single string
text = ' '.join(all_words_processed)

#Create and plot the word cloud
wordcloud = WordCloud(width=800, height=400, background_color='white',␣
↪colormap='viridis').generate(text)

plt.figure(figsize=(12, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.title('Suggestions Word Cloud', fontsize=16)
plt.show()
```



0.2 Calculations

[82]:
```
all_items = [item for items in categories.values() for item in items]

item_percentages = {}

for item in all_items:
    counts = df_item[item].value_counts()
    top_2 = counts.sort_values(ascending=False).head(2)
    percentage = (top_2.sum() / df_item.shape[0]) * 100
    item_percentages[item] = percentage

average_percentage = sum(item_percentages.values()) / len(item_percentages)
print("Average percentage across all items:", round(average_percentage, 2))
```

```
Average percentage across all items: 72.73
```

[88]:
```
mixed_snacks_percentages = {}

for item in mixed_snacks:
    counts = df_item[item].value_counts()
    top_1 = counts.sort_values(ascending=False).head(1)
    percentage = (top_1.sum() / df_item.shape[0]) * 100
    mixed_snacks_percentages[item] = percentage

mixed_snacks_percentages = sum(mixed_snacks_percentages.values()) /␣
↪len(mixed_snacks_percentages)
```

```
print("Average percentage across all items:", round(mixed_snacks_percentages,␣
↪2))
```

```
Average percentage across all items: 55.56
```

0.3 Insights Found

0.3.1 The analysis will address the following key areas:

- Assessment of survey data quality and effectiveness
- Identification of preferred and less preferred snack categories among respondents
- Suggestions

Assessment of survey data quality and effectiveness The survey data was fully complete, with all respondents providing answers to every question. This high level of response completeness strengthens the reliability of the analysis and ensures that the insights generated accurately reflect the preferences and needs of the individuals who will be using the snack shack.

Identification of preferred and less preferred snack categories among respondents The survey results indicate that sweet treats, sandwich biscuits, flavored water, cheese chips, and salted snacks were the most preferred categories, with no respondents leaving these items unanswered. Across all categories, only mixed snacks had more than two null responses, highlighting a general consensus among respondents for quick and easy snack options.

Based on these insights, mixed snacks should represent a small portion of the total offerings. To optimize the selection while catering to demand:

- Offer at most the **top two items** within each major snack category, as these account for approximately 73% of all selections on average.

- For the **mixed snack category**, it is recommended to offer only the **most preferred item**, which accounts for approximately 55% of all selections on average.

Suggestions Most respondents left the suggestion field blank, indicating that the options provided were satisfactory. The few responses that were provided were extremely varied, and therefore it is recommended to continue offering the existing options.