# Retail Store Product Category Sales Analysis

**Background Information**

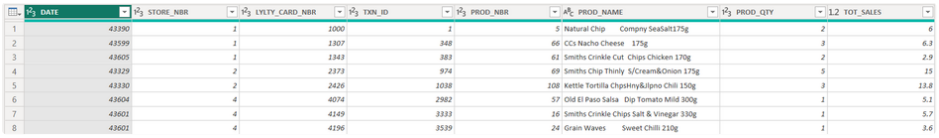
The client is a major retail store business.

As part of a consultant analytics team, we are tasked by the client to better understand the types of customers who purchase their products under the “chips” category.

dataset sourced from Quantium/TheForage

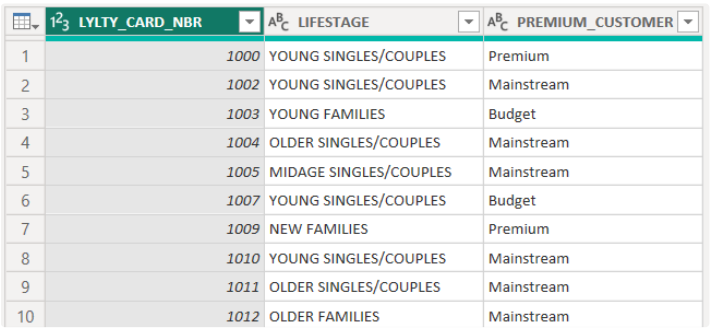
## Available Datasets

Link to Transactions data



| | DATE | STORE_NBR | LYLTY_CARD_NBR | TXN_ID | PROD_NBR | PROD_NAME | PROD_QTY | TOT_SALES |
|---|---|---|---|---|---|---|---|---|
| 1 | 43390 | 1 | 1000 | 1 | 5 | Natural Chip Compny SeaSalt175g | 2 | 6 |
| 2 | 43599 | 1 | 1307 | 348 | 66 | CCs Nacho Cheese 175g | 3 | 6.3 |
| 3 | 43605 | 1 | 1343 | 383 | 61 | Smiths Crinkle Cut Chips Chicken 170g | 2 | 2.9 |
| 4 | 43329 | 2 | 2373 | 974 | 69 | Smiths Chip Thinly S/Cream&Onion 175g | 5 | 15 |
| 5 | 43330 | 2 | 2426 | 1038 | 108 | Kettle Tortilla ChpsHny&Jlpno Chili 150g | 3 | 13.8 |
| 6 | 43604 | 4 | 4074 | 2982 | 57 | Old El Paso Salsa Dip Tomato Mild 300g | 1 | 5.1 |
| 7 | 43601 | 4 | 4149 | 3333 | 16 | Smiths Crinkle Chips Salt & Vinegar 330g | 1 | 5.7 |
| 8 | 43601 | 4 | 4196 | 3539 | 24 | Grain Waves Sweet Chilli 210g | 1 | 3.6 |

Link to Purchase Behaviour data



| | LYLTY_CARD_NBR | LIFESTAGE | PREMIUM_CUSTOMER |
|---|---|---|---|
| 1 | 1000 | YOUNG SINGLES/COUPLES | Premium |
| 2 | 1002 | YOUNG SINGLES/COUPLES | Mainstream |
| 3 | 1003 | YOUNG FAMILIES | Budget |
| 4 | 1004 | OLDER SINGLES/COUPLES | Mainstream |
| 5 | 1005 | MIDAGE SINGLES/COUPLES | Mainstream |
| 6 | 1007 | YOUNG SINGLES/COUPLES | Budget |
| 7 | 1009 | NEW FAMILIES | Premium |
| 8 | 1010 | YOUNG SINGLES/COUPLES | Mainstream |
| 9 | 1011 | OLDER SINGLES/COUPLES | Mainstream |
| 10 | 1012 | OLDER FAMILIES | Mainstream |

## Primary Objectives

1. Understand the datasets
2. Clean and prepare the datasets
3. Who spends the most on chips (total sales) by life-stage and customer category
4. What are the total number of customer transactions by life-stage and customer category
5. How many chips (quantity) are bought by life-stage and customer category
6. What is the average chip price by life-stage and customer category

## TASK 1: Understand the datasets

The following is a breakdown of the Transactions dataset with explanations

| Observation | Details |
|---|---|
| **Columns:** | • Date → *Date of transaction*<br>• STORE_NBR → *Store number*<br>• LYLTY_CARD_NBR → *Loyalty Card number*<br>• TXN_ID → *Transaction ID*<br>• PROD_NBR → *Product number* |

| | |
|---|---|
| | • PROD_NAME → *Product name*<br>• PROD_QTY → *Product quantity*<br>• TOT_SALES → *Total sales* |
| **Rows:** | A total of 264,836 rows |

The following is a breakdown of the Customer dataset with explanations

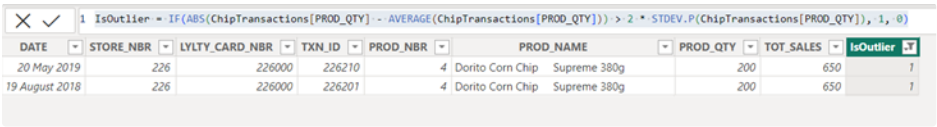
| **Observation** | **Details** |
|---|---|
| **Columns:** | • LYLTY_CARD_NBR → *Loyalty Card number*<br>• LIFESTAGE → *Life stage of customer*<br>  ◦ YOUNG SINGLES/COUPLES<br>  ◦ MIDAGE SINGLES/COUPLES<br>  ◦ OLDER SINGLES/COUPLES<br>  ◦ NEW FAMILIES<br>  ◦ YOUNG FAMILIES<br>  ◦ OLDER FAMILIES<br>  ◦ RETIREES<br>• PREMIUM_CUSTOMER → *Customer category*<br>  ◦ Budget<br>  ◦ Mainstream<br>  ◦ Premium |
| **Rows:** | A total of 72,637 rows |

## TASK 2: Clean and prepare datasets

**First - Identify outliers.**

Based on the columns only quantity (PROD_QTY) sold can have meaningful outliers. We can identify outliers by using the following DAX query:

```
IsOutlier =
  IF(
    ABS(ChipTransactions[PROD_QTY] - AVERAGE(ChipTransactions[PROD_QTY])
        ) > 2 * STDEV.P(ChipTransactions[PROD_QTY]
    ), 1, 0
  )
```




**Observation:** It appears one customer purchased 200 units of Dorito Corn Chip twice.

This is an outlier as all other single purchase quantities range between 1 and 5. This outlier needs to be removed from the dataset so it does not skew results.

Use the following power query m-code targeting the outlier transaction id to filter out the outliers

```
= Table.SelectRows(#"Filtered Rows", each [LYLTY_CARD_NBR] <> 226000)
```

**Next - Create a “TransactionPackSizes” table from Transactions table**

- In the Power BI Transform UI
  - Duplicate Transactions table/query and rename duplicate table to TransactionPackSizes
  - Rename PROD_NAME column to PACK_SIZE
  - Clean data on the PACK_SIZE column leaving only the numeric size value

**Next - Create a “Brand” column extracting product brands from PROD_NAME column**

- Duplicate PROD_NAME column and rename duplicate column to BRAND
- Observe that the brand part of the product name is usually at the start
- Also observe that some brand names or parts of brand names are abbreviated
- Use the following python script to extract only the brand part from the product names in the brand columns:

```
# 'dataset' holds the input data for this script
import pandas as pd

# Assuming 'dataset' is your DataFrame
dataset['BRAND'].replace({
    'Burger Rings.*': 'Burger Rings',
    'CCs.*|Cheetos.*': 'Cheetos',
    'Cheezels.*': 'Cheezels',
    'Cobs Popd.*': 'Cobs Popd',
    'Dorito.*': 'Doritos',
    'French Fries.*': 'French Fries',
    'Grain Waves.*|GrnWves.*': 'Grain Waves',
    'Infuzions.*|Infzns.*': 'Infuzions',
    'Kettle.*': 'Kettle',
    'Natural.*|NCC.*': 'Natural Chip Company',
    'Old.*': 'Old El Paso',
    'Pringles.*': 'Pringles',
    'Red.*|RRD.*': 'Red Rock Deli',
    'Smit.*': 'Smiths',
    'Sunbites.*|Snbts.*': 'Sunbites',
    'Thins.*': 'Thins',
    'Tos.*': 'Tostitos',
    'Twi.*': 'Twisties',
    'Ty.*': 'Tyrrells',
    'Wool.*|WW.*': 'Woolworths'
}, regex=True, inplace=True)

dataset
```

**Next - Merge customer data to transactions data**

- Create a new query (dataset) from the customer data csv file, name it “Customer Data”.
- Confirmed that there was no errors or nulls in the Customer Data dataset
- Merge Customer Data to Transactions Data using Left Outer Join (on the LYLTY_CARD_NBR column)

- Name the merged dataset “TxnCustomerData”

## TASK 1: Understand the datasets

TODO: MOVE TO ANALYSIS PART

- In the Power BI Main UI
  - On the TransactionPackSizes dataset
  - Group PACK_SIZE field and created bins (PACK_SIZE_BINs)
  - Use PACK_SIZE_BIN and TXN_ID fields to create Pack Size Histogram