**#Data pre-processing**

I have renamed the column of store id to store num and merged the stores, products, and transactions into one final data. I have removed null values, and zeroes in Spend, HHS, and units sold. Dropped the Oral hygiene products since it was said not needed. Extracted the year month day from date format, and factorized the description, category, and subcategory variables for analysis.

Table

Description automatically generated

**#Visualizations**

Chart, histogram

Description automatically generated Chart, histogram

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Chart

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Chart

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**Models:**

m3 <- lmer(log(SPEND) ~ DISPLAY\*SEGMENT+ FEATURE\*SEGMENT+ TPR\_ONLY\*SEGMENT+ DISPLAY\*CATEGORY+ FEATURE\*CATEGORY+ TPR\_ONLY\*CATEGORY+DISPLAY+ FEATURE + TPR\_ONLY+DESCRIPTION+(1|STORE\_NUM)+PRICE+UNITS, data=snack\_chain.data, REML=FALSE)

m4 <- lmer(log(UNITS) ~ DISPLAY+ FEATURE + TPR\_ONLY+(1|STORE\_NUM)+PRICE+DESCRIPTION, data=snack\_chain.data, REML=FALSE)

m5 <- lmer(log(HHS) ~ DISPLAY+ FEATURE + TPR\_ONLY+(1|STORE\_NUM), data=snack\_chain.data, REML=FALSE)

stargazer(m3,m4,m5, type="text", single.row=TRUE)

A close-up of a document

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Table

Description automatically generated

**1)**Product display increases product sales by 27.9%, with being featured calculating 5.8%, and TPR decreases product sales by 12.5%

Product display increases unit sales by 52.8%, with being featured calculating to 38.4%, and TPR decreases the unit sales by 7.3%

No: of purchasing households increase with product display by 72.6%, being featured to by 59.1%, and TPR by 15.1%

**2)**When categories are displayed, cold cereals product sales reduced by 22.1% in comparison to bag snacks while frozen pizza sales increased by 8.7% relative to bag snacks. Scale segment sales were reduced by 1.7% and the value segment increased by 10.9% with respect to Mainstream segment when displayed.

When a product is an in-store circular, cold cereal sales decreased by 22.1%, and frozen pizza sales increased by 8.7% when compared to bag snacks. Also, segment upscale sales decreased by 15.8%, and increased by 12.3% with respect to mainstream segment sales when featured in the circular.

When products are in temporary price reduction, the cold cereal category reduces the product sales by 0.7% which is almost negligible and increases the sales of frozen pizza by 18.7% when compared to bag snacks. The upscale segment decreased by 4%, and 8.8% for the value segment when compared to the mainstream segment.

**3)Five most price elastic products:**

hny bn ots hny rstd- increase the sales by 101%

gm honey nut cheerios-increases the sales by 100%

gm cheerios- increase the sales by 112%

frozen pizza-increase sales by 95%

bite-size mini wheat-increase sales by 99%

**Five Least price elastic products:**

mksl dutch pretzels- decrease the sales by 80%

mksl pretzel sticks- decrease the sales by 101%

mksl mini twist pretzels- decrease the sales by 73%

frsc 4 cheese pizza- decrease the sales by 59%

crust suprm pizza- decrease the sales by 52%

**4)As a retailer, I would lower the price of the below products so that sales would increase**

**Product sales:**

mksl dutch pretzels- decrease the product sales by 80%

mksl pretzel sticks- decrease the product sales by 101%

mksl mini twist pretzels- decrease the product sales by 73%

frsc 4 cheese pizza- decrease the product sales by 59%

crust suprm pizza- decrease the product sales by 52%

**UNIT SALES:**

RLDGD BRAIDED HNY WHT- decrease unit sales by 167%

PRETZEL STICKS-decrease unit sales by 140%

TWIST PRETZELS-- decrease unit sales by 143%

SHURGD PRETZEL RODS- - decrease unit sales by 150%

SNYDR PRETZEL RODS- decrease unit sales by 169%