R-driven Power BI: Demo notes

We will start from a fresh Power BI Desktop file.

Importing data

From a *csv* file:

- Get Data > Text/CSV
- Browse to your file

From an R Script:

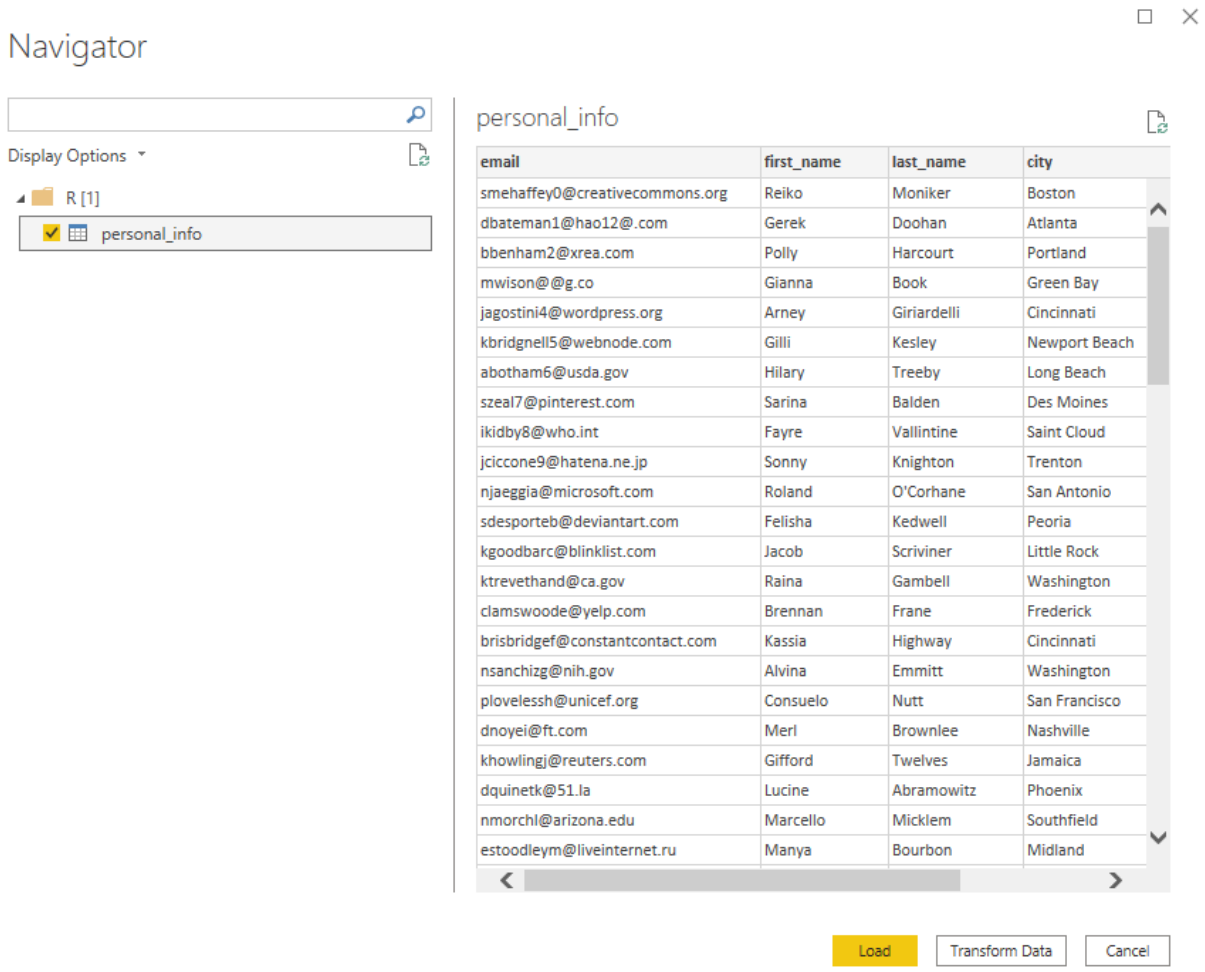
- Get Data > More > R Script.
- A script box will appear. Read in the file. We will import a *csv* file, but this is a great way to read in API data.

```
library(tidyverse)

personal_info <-
read_csv('https://raw.githubusercontent.com/stringfestdata/satrday-r-power-bi/main/data/personal_info.csv')

personal_info
```

- From here you can check on the data frame you want and load it in.



Viewing relationships

One of Power BI's most celebrated features is its relational data modeler. Select "Model" view and confirm that Power BI has automatically-detected a one-to-one relationship between `contestants` and `personal_info` using the `email` column.

- Click
- Browse to your file

Data profiling and ETL

Power BI also has an in-built ETL and data profiling tool called Power Query. This is another place where R scripts can be used.

- Go to Home > Transform data
- Select the `contestants` table
- Go to View and check on the Data Preview options
- We can see that some of our columns contain missing values. Power BI does not have a statistically-informed method to handle missing values, so this could be another use case. We will look at using regular expressions.

Checking for invalid email addresses

- Keep the `contestants` table selected
- Go to Transform > Run R script
- As the script mentions, dataset is the de facto name of this data frame.
- Run the following script. Power BI does best when you assign the results to a brand-new data frame name.

```
is_email <- function(x) {

  grepl("\\<[A-Z0-9._%+-]+@[A-Z0-9.-]+\\.[A-Z]{2,}\\>",
as.character(x), ignore.case=TRUE)

}


output <- dataset

output$is_valid_email <- is_email(output$email)
```

- You will see the resulting script and table name in the Applied Steps menu

Performing the paired-samples t-test

- We are going to end up with a table containing the "tidied" results of the test, so it's best to duplicate the query so we have a second table (thus not impacting the original data)
- We'll run the paired samples t-test and put the results into a table:

```
library(tidymodels)

contestants_t <- tidy(t.test(dataset$pre, dataset$post, paired = TRUE, rm.na = TRUE))
```

- The results are now in the table.

Inserting a visualization

Go to Home > Close & Apply to exit out of Power Query. We will now insert some visualizations into the report.

- We can insert a Table or Multi-row Card to insert the model parameters if we'd like. Drag one of these visualizations to the report and check on the fields you want to include.
- Power BI includes many common visualizations, but not everything. There are some great add-ins to make more custom visualizations, but why not use R? Choose R from the visualization menu.
- As you click on different fields, they will be added to the `dataset` data frame to plot.

```
library(tidyverse)
library(CGPfunctions)

dataset %>%
  na.omit() %>%
  group_by(cohort) %>%
  summarise(pre = round(mean(pre), 0), post = round(mean(post), 0)) %>%
```

```
  pivot_longer(cols = c(pre, post), names_to = 'period', values_to = 'score')
%>%
  newggslopegraph(period, score, cohort,
                  Title = 'Pre vs post scores by cohort',
                  SubTitle = 'for satRday Columbus :)',
                  DataTextSize = 4,
                  Caption = '',
                  WiderLabels = TRUE,
                  DataLabelPadding = .01)
```

- You can open the script in RStudio here and then run the visualization
- Remove the plot title by going to the paint icon to the right and checking off "Title."

Making the visualization interactive

By default, as we interact with one field in the Power BI report, all other instances of that field change.

For example, we can insert a table in the report counting the number of emails that are valid and invalid. As we click on the rows, our visualization is altered.