



Removing the Noise and Telling a Story with Data Visualization

MSU Extension Reporting and Evaluation



Norma Lundeen
Planning and Reporting Manager



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Learning Objectives

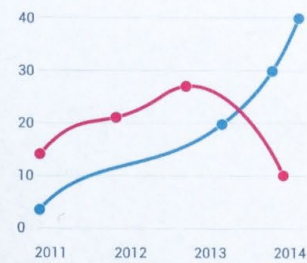
- To identify how to transform evaluation results into compelling visual narratives that resonate with your audience.
- To be able to practice creating high -quality graphs, charts, and infographics.
- To produce professional -grade visual displays to communicate your message to partners and stakeholders.





Morris Charts

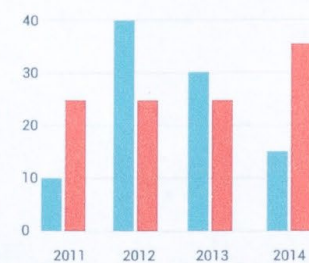
Line Chart



Area Chart



Bar Chart

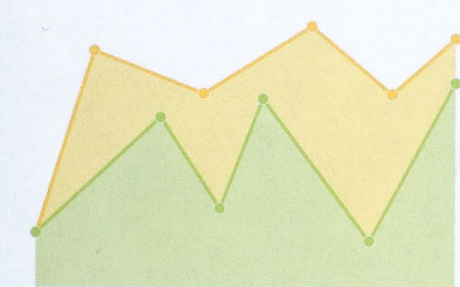


Donut Chart

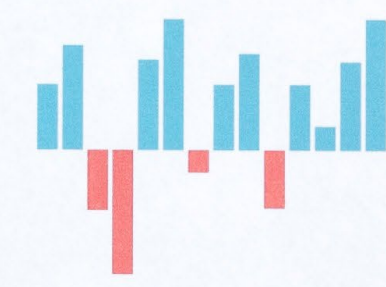


Sparkline Charts

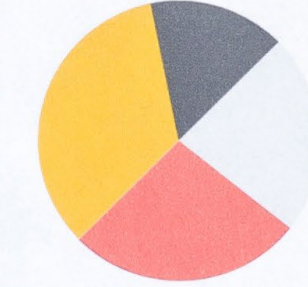
Line Chart



Bar Chart



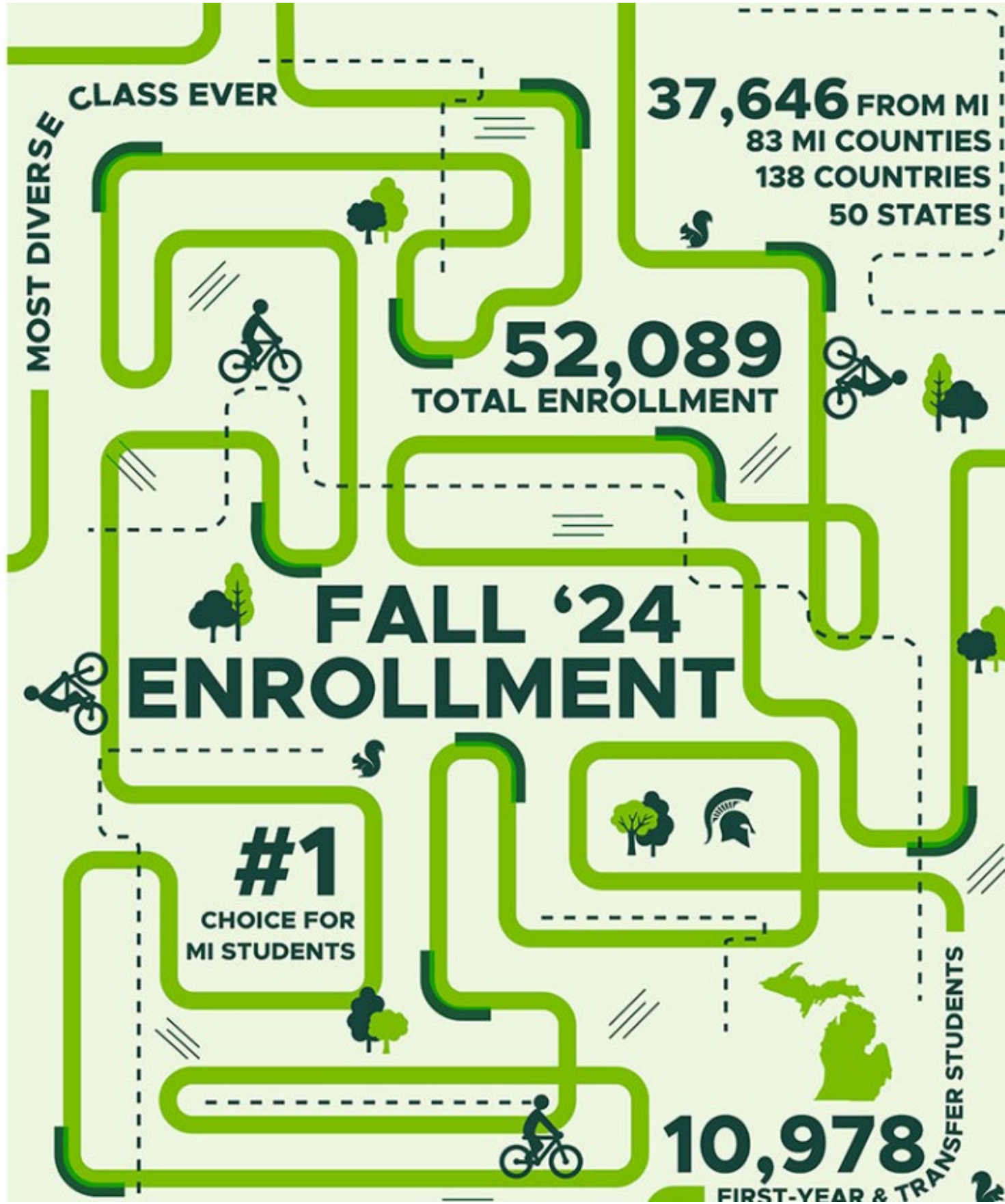
Pie Chart



Easy Pie Charts



91% of
Consumers prefer
Interactive and
Visual Content



This

That

BUILDING NEW AND BETTER MARKETS FOR U.S. AGRICULTURE

NIFA works to develop new markets that are fair, competitive, distributed and resilient. This includes processing and distribution capacity, local and regional food systems, organic and emerging opportunities, safeguarding animal and plant health, regional rural development centers, and enhanced funding for the Farm and Ranch Stress Assistance Network.

In 2023, NIFA accomplished enhancing market opportunities in several ways. The agency invested more than \$54 million across several programs, ranging from Agricultural Risk Management Education and Small Business Innovation Research and Technology Transfer (SBIR/STTR) to AFRI education and workforce development programs, which specifically targets underserved communities and small and medium meat and poultry processors. These efforts include innovations to add food supply resilience in times of market stress and agricultural workforce training.

Through SBIR/STTR, the agency invested \$13.9 million in 14 Phase III awards to commercialize technologies that would benefit small- and mid-sized meat and poultry processing facilities. These grants, made to small businesses from California to Iowa to North Carolina, funded research in monitoring and improving complex processes, worker safety and food safety.

As part of a new Urban, Indoor and Emerging Agriculture (UIE) competitive grant program in March 2023, NIFA announced funding of more than \$9.4 million for research, education and Extension work to solve key problems of urban, indoor and emerging agricultural systems.


And last year, NIFA invested nearly \$28 million to support projects to help connect farmers, ranchers and others in agriculture-related occupation to stress assistance programs, with the goal of increasing behavioral health awareness as well as positive outcomes for agricultural workers and their families.

Or

California Farm to School Incubator Grant Program Evaluation: 2024 Progress Report

By the Numbers


2022 Grant Program Investments and Reach




70%
of California's counties received grant funds.




84%
of schools served by the program are Title I schools.




42%
of California food producer grantees are BIPOC



94%
of California food producer grantees are small to midsize



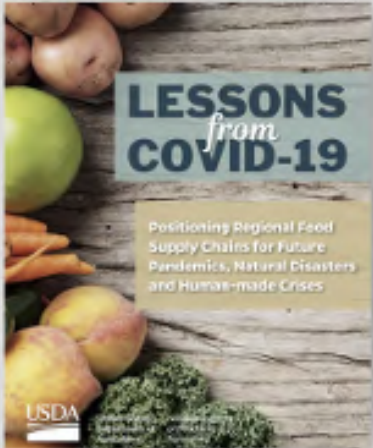
62%
of California food producer grantees are women



71%
of students served by the grant program are eligible for free or reduced price meals



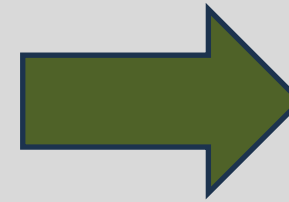
100%
of food producer grantees use or plan to use climate smart agricultural practices.



Why Data Visualization?

Identify
Patterns

Detect
Outliers



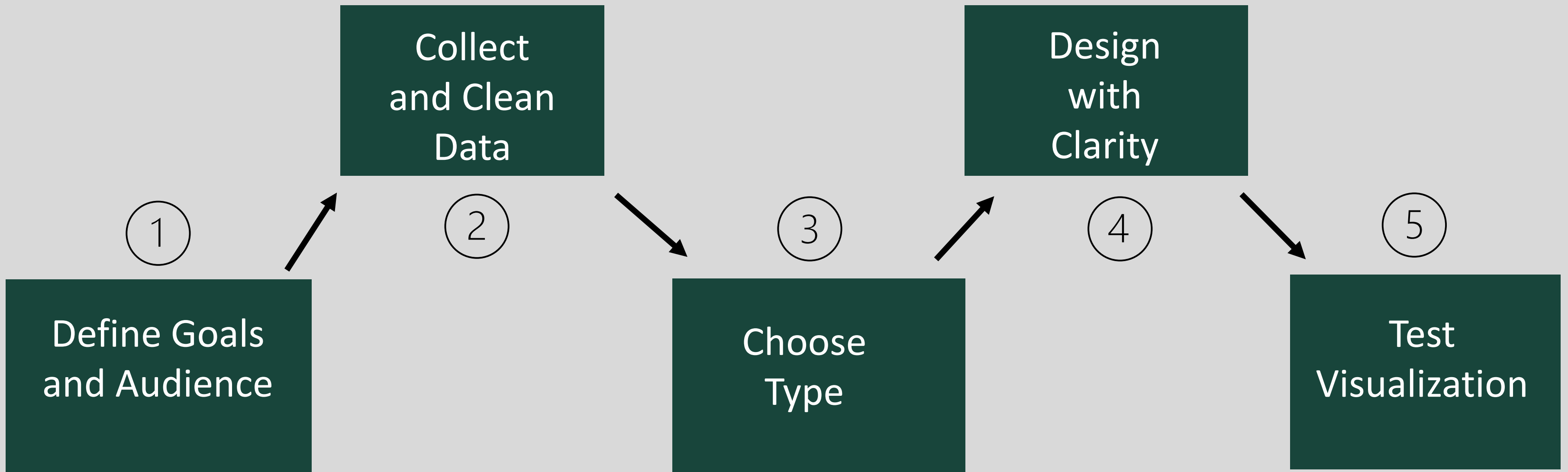
Share
Information

Make
Decisions



“Data visualization lets teams translate information into a visual context, making things easier for the human brain to understand.”

Data Visualization Steps



Core Principles of Data Visualization

Keep it Simple

Don't need to show all the data

- Break up into small chunks

Reduce

Reduce the clutter

Stick to consistent color scheme

Integrate

Integrate text

- Label clearly
- Start bar or column at zero
- Include annotations if needed

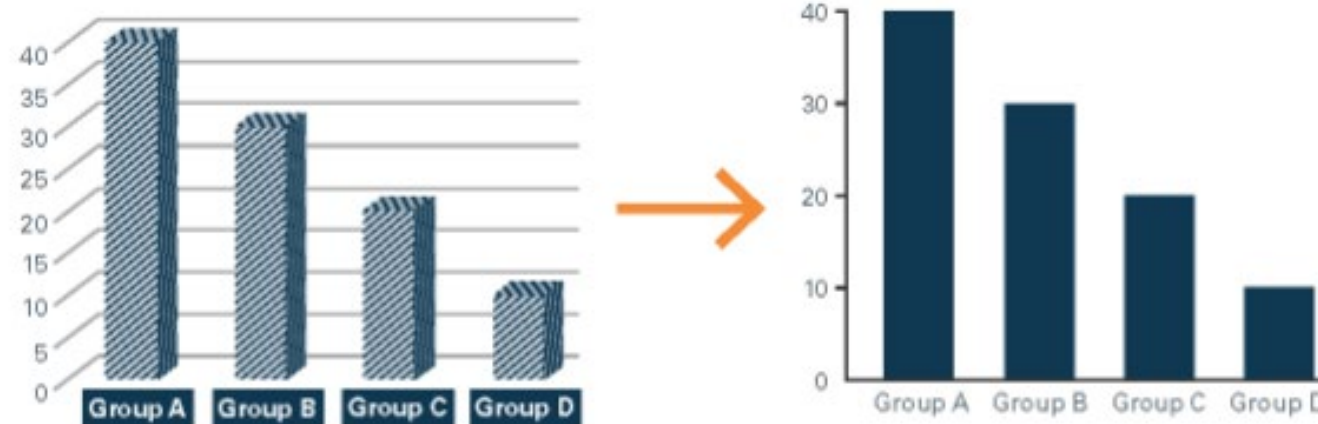


Tableau Public



Microsoft Power BI



Google Charts



Canva



Data Visualization Tools

easelly

Easelly

datavisual

Datavisual



Piktochart



Excel

Canva Design spotlight Business Education Plans and pricing Learn

Free > Design anything and bring your ideas to life. No cost, just creativity.

Pro > Unlock premium content, more powerful design tools, and AI features.

Teams > Transform teamwork, grow your brand and simplify workflows.

Enterprise > Empower your organization with an all-in-one workplace solution.

Education > A powerful, free tool for classrooms, districts and students.

Not-for-profit > Canva Pro is free for all registered nonprofits. Apply today.

1 2 3 4

< What's your nonprofit organization?

Type of nonprofit

Choose nonprofit type

Registered nonprofit organization

1 2 3 4

< What's your nonprofit organization?

We'll search to see if it's on a list of organizations already verified.

Type of nonprofit

Michigan State University Extension

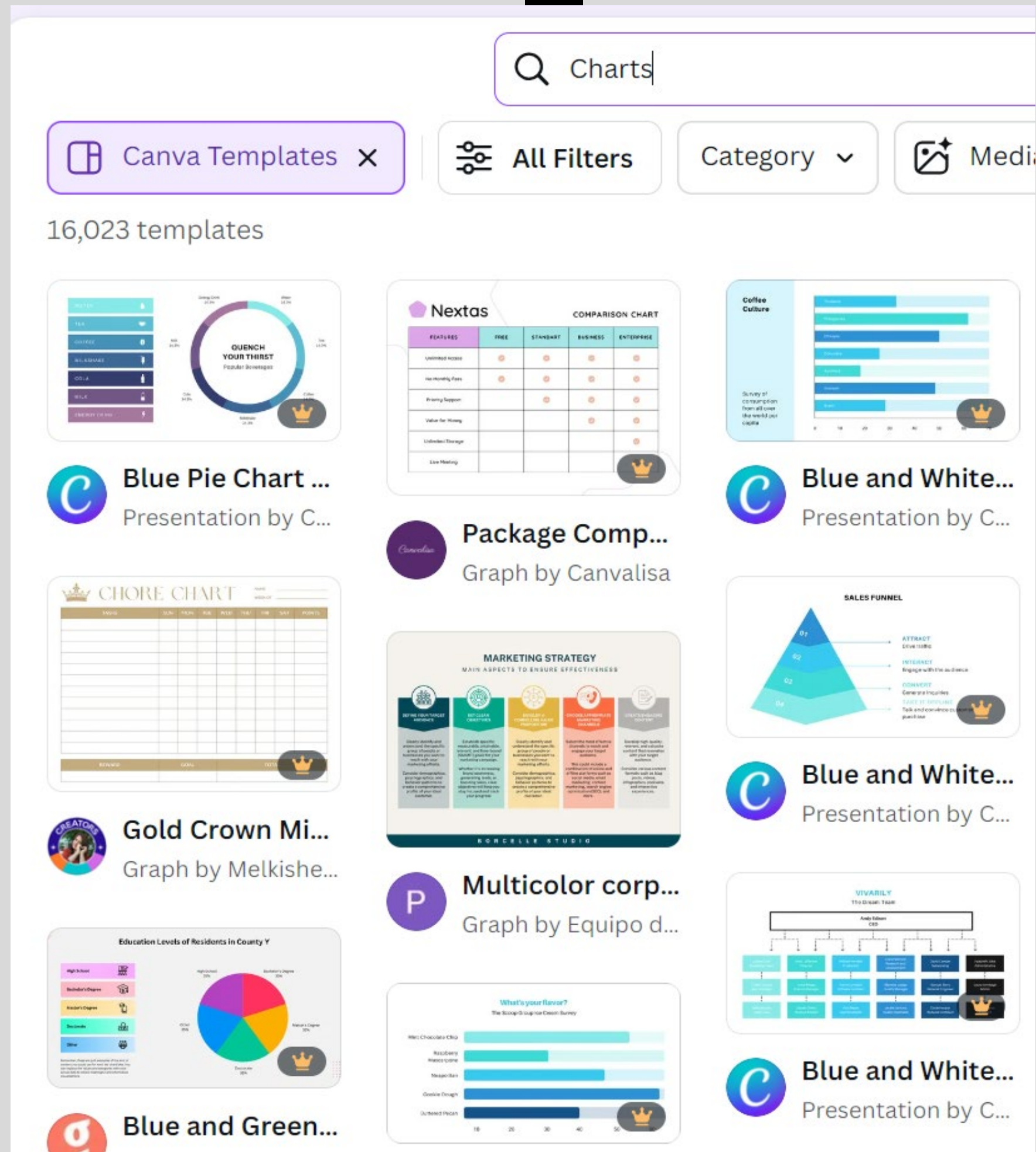
Michigan State University Extension

38-6005984

Canva

Step 1 Choose a Template

Step 2 Select and Customize Chart Type



Template Search:

- Data visualization
- Charts
- Infographic

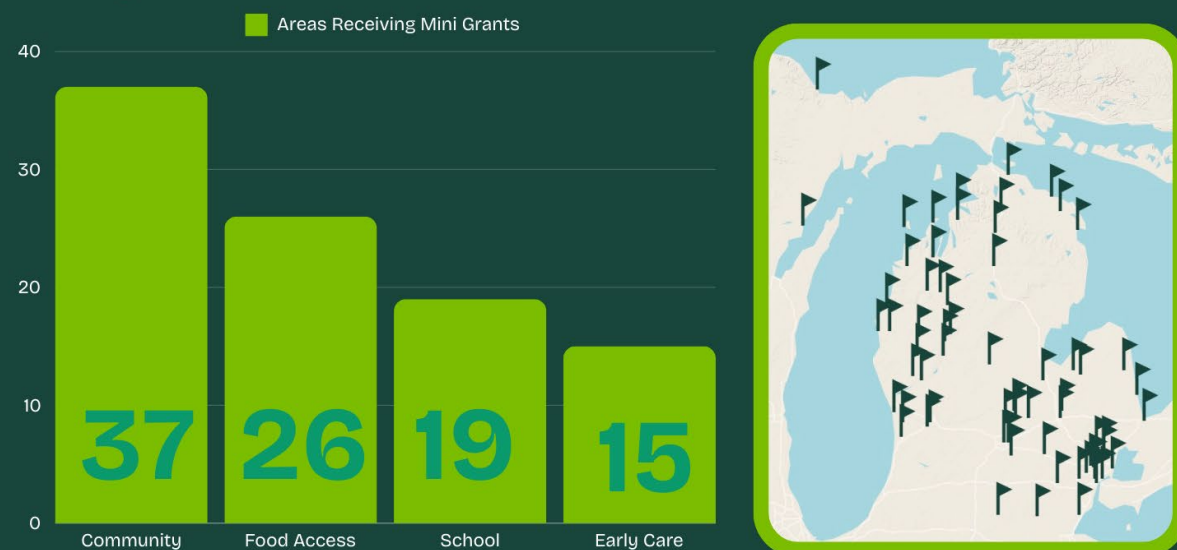
FY24 SNAP-Ed PSE Mini Grants

24 CNI/SNAP-Ed Coaches

\$68,158 Total Spent

98 Applications received

94 Mini grants funded



1. Infographics

- Timeline Infographics

Statistical Infographics

2. Charts and Graphs

- Pie Charts
- Bar and Column Charts
- Line Graphs

3. Dashboards

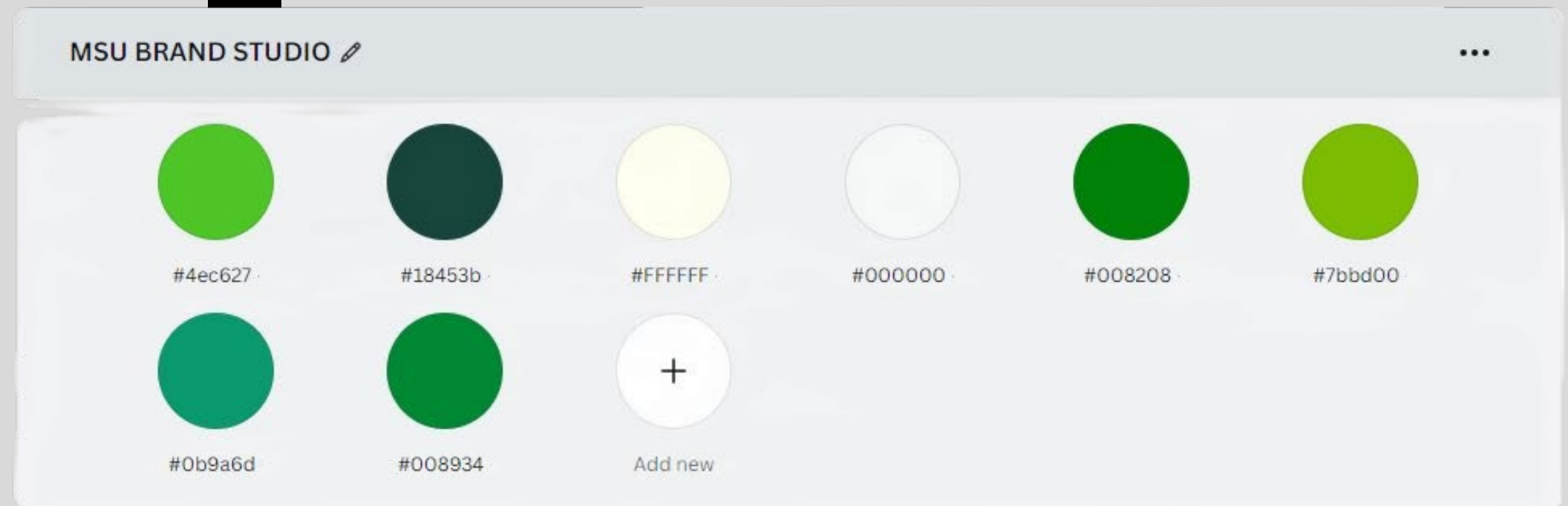
4. Mind Maps and Flow Charts

5. Comparison Template

Canva

Step 3 Adjust Layout and Design

Step 4 Download and Share



<https://www.canr.msu.edu/anrcom/branding-design/tools>

Colour Contrast Analyser (CCA)

Use TPGi's free colour contrast checker to optimize your content - including text and visual elements - for individuals with color-blindness or low vision impairments. Current version 3.5.3

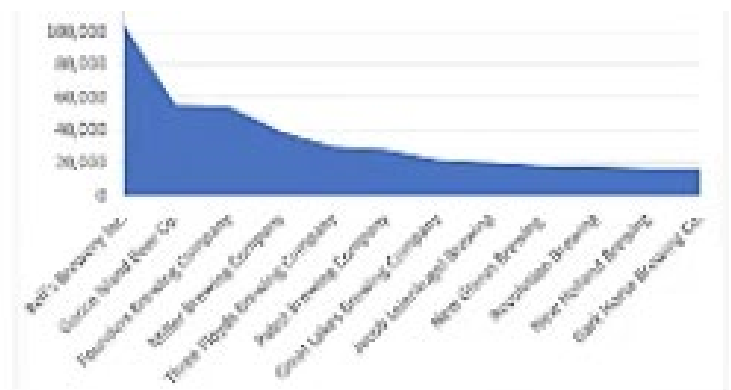
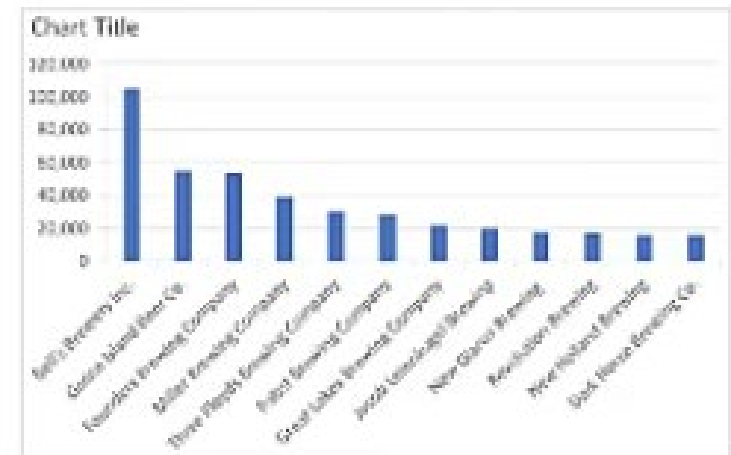
[Windows >](#) [Mac >](#)

A screenshot of the Colour Contrast Analyser (CCA) tool interface. The window title is "Colour Contrast Analyser (CCA)". It shows the "Foreground colour" set to #18453B and the "Background colour" set to #FFFFFF (white). A "Sample preview" section shows the text "example text showing contrast" on a white background. The "WCAG 2.1 results" section shows a "Contrast ratio" of 10.8:1 and lists three categories: "1.4.3 Contrast (Minimum) (AA)", "1.4.6 Contrast (Enhanced) (AAA)", and "1.4.11 Non-text Contrast (AA)", all of which show a "Pass" status for both regular and large text.

Excel and PowerPoint

Explore your data

Case #	Gender	Race	Hispanic/Latino?	Parent/has college degree?	First/first launch	High school degree	Student ID	HS Grad year	Completed college admission
1488	Male	American Indian or Alaskan Native	Yes	Yes	Yes	Western High School		2008	
2836	Female	American Indian or Alaskan Native	Yes	Yes	Yes	Western High School		2008	
496	Male	American Indian or Alaskan Native	No	Yes	Yes	Eastern High School		2008	
1333	Female	American Indian or Alaskan Native	No	Yes	Yes	Outer High School		2007	
1455	Female	American Indian or Alaskan Native	Yes	No	No	Outer High School		2008	
1745	Male	American Indian or Alaskan Native	Yes	Yes	Yes	Outer High School		2007	
2457	Female	American Indian or Alaskan Native	No	Yes	Yes	Outer High School		2008	
2537	Male	American Indian or Alaskan Native	No	No	No	Outer High School		2005	
3333	Female	American Indian or Alaskan Native	No	No	No	Outer High School		2007	Yes
813	Female	Asian	No	No	No	Western High School		2008	Yes
813	Male	Asian	No	No	No	Western High School		2007	
1648	Female	Asian	No	Yes	Yes	Western High School		2007	
2296	Male	Asian	Yes	Yes	Yes	Western High School		2008	
2516	Male	Asian	Yes	No	No	Western High School		2007	
2758	Male	Asian	No	Yes	Yes	Western High School		2007	
3125	Female	Asian	Yes	Yes	Yes	Southern Voc Center		2007	
2403	Male	Asian	Yes	Yes	Yes	Eastern High School		2007	
4627	Female	Asian	Yes	Yes	Yes	Eastern High School		2008	Yes
31	Male	Asian	No	Yes	Yes	Outer High School		2008	
437	Female	Asian	No	No	No	Outer High School		2007	
438	Female	Asian	No	Yes	Yes	Outer High School		2007	
439	Female	Asian	Yes	No	No	Outer High School		2008	
437	Male	Asian	No	Yes	Yes	Outer High School		2008	
532	Female	Asian	No	Yes	Yes	Outer High School		2007	
531	Male	Asian	No	No	No	Outer High School		2006	Yes
722	Male	Asian	No	Yes	Yes	Outer High School		2005	Yes

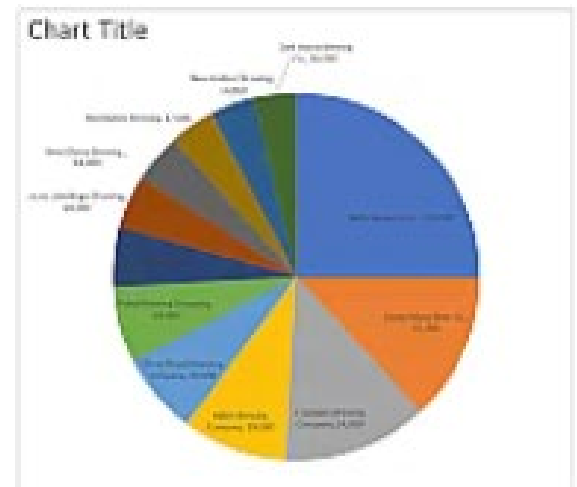
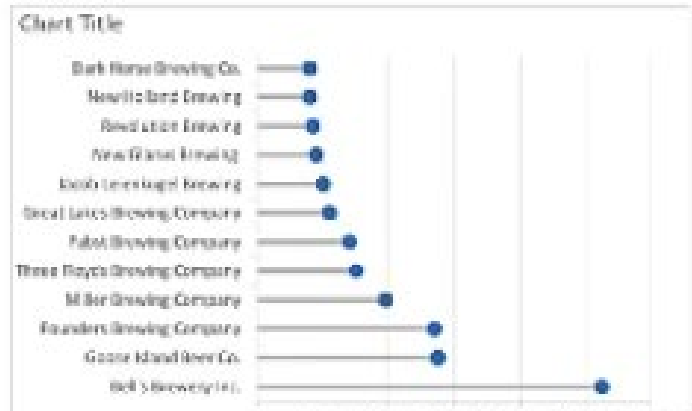


		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middle school or lower	4	.9	.9	.
	High school	23	5.0	5.1	6.
	Undergraduate	83	17.9	18.6	24.
	Bachelor's	149	32.1	33.3	57.
	Master's	136	29.3	30.4	88.
	PhD or higher	47	10.1	10.5	98.
	No answer	5			
Total		447			
Missing	System	17			
Total		464			

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.785 ^a	16	.002
Likelihood Ratio	35.288	16	.004
Linear-by-Linear Association	7.456	1	.006
N of Valid Cases	35		

a. 25 cells (100.0%) have expected count less than 5. The minimum expected count is .71



4-Step Visualization Process

from Stephanie Evergreen

EVERGREEN DATA 4 STEP VISUALIZATION PROCESS
StephanieEvergreen.com * Hey@StephanieEvergreen.com

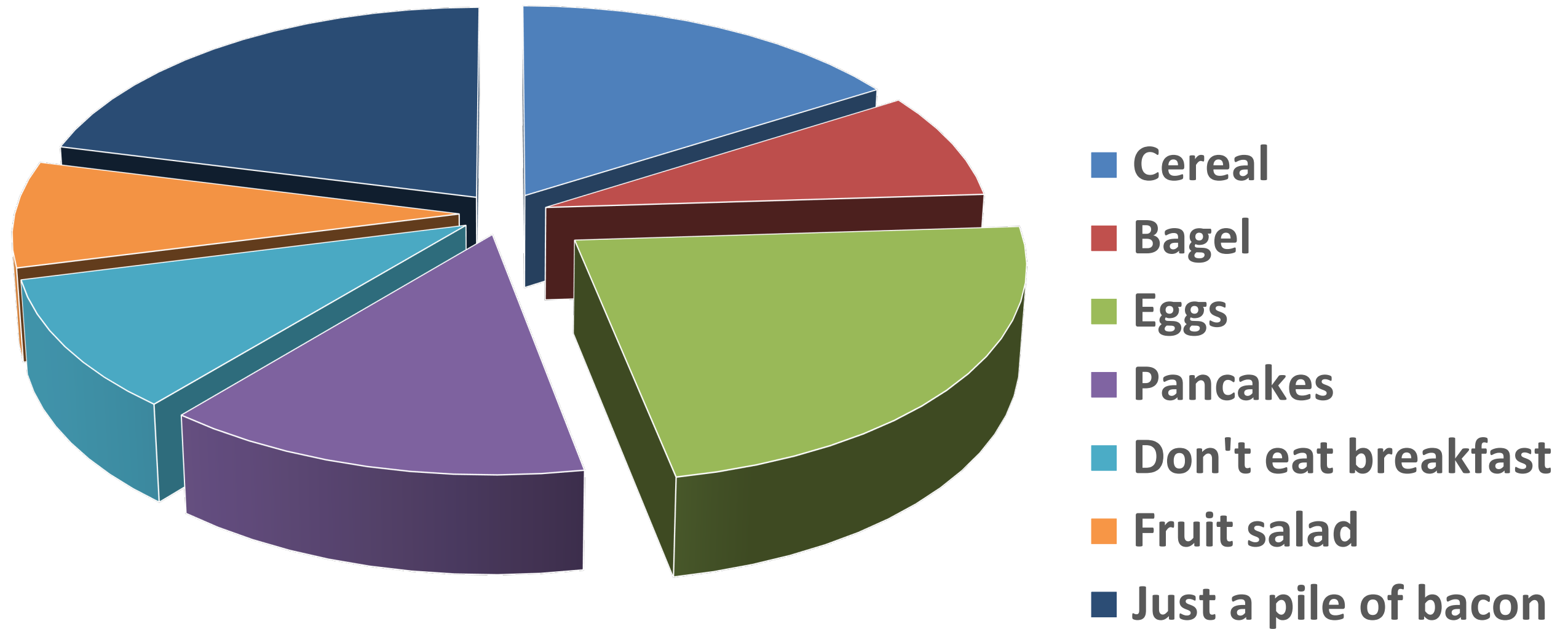
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2. **WHO IS THE AUDIENCE & HOW WILL THIS BE DELIVERED TO THEM?**
Describe their data needs & literacy. List the software & platforms.

3. **WHAT IS THE BEST CHART TYPE?** Sketch it below.

4. **HOW CAN YOU SHARPEN THE POINT?** Add emphasis above.

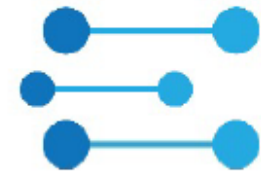
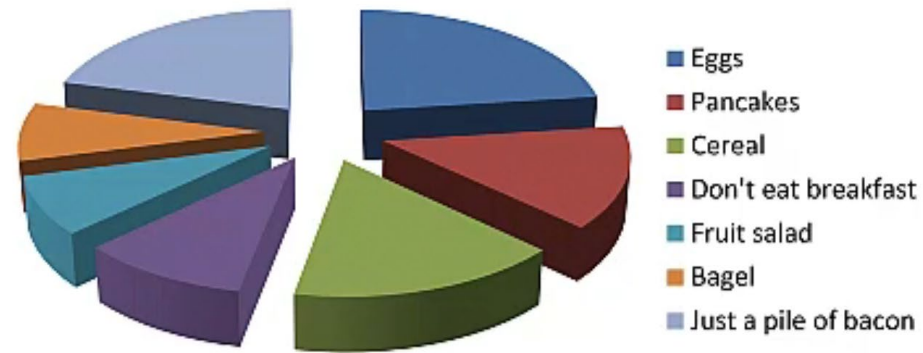
Attendee Breakfast Preferences



4-Step Visualization Process

from Stephanie Evergreen

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Attendee breakfast preferences focus on protein, but a significant number don't eat breakfast at all

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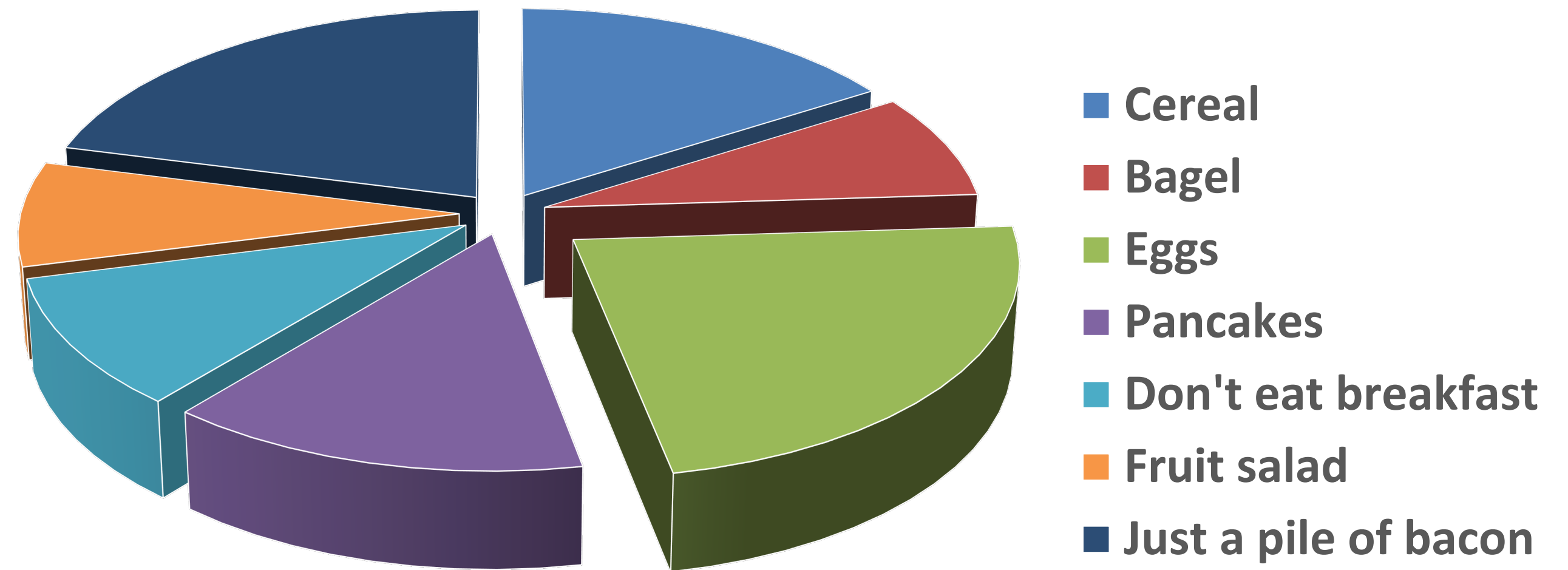
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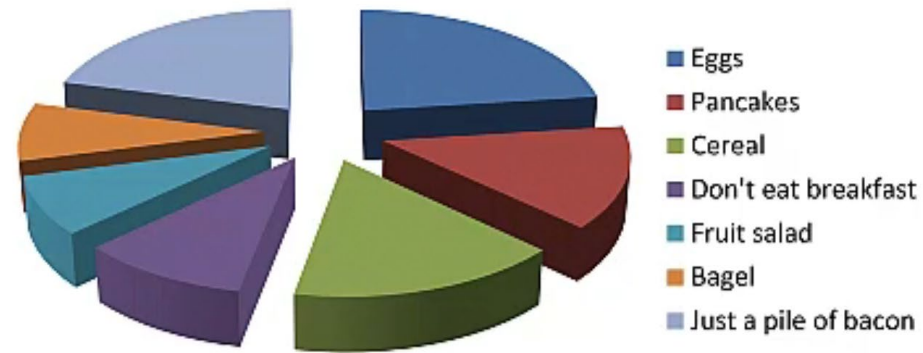
One in ten fellow attendees **do not consume** adequate energy for their first meal of the day.



4-Step Visualization Process

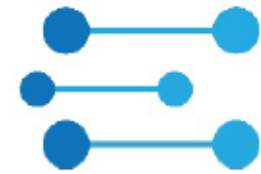
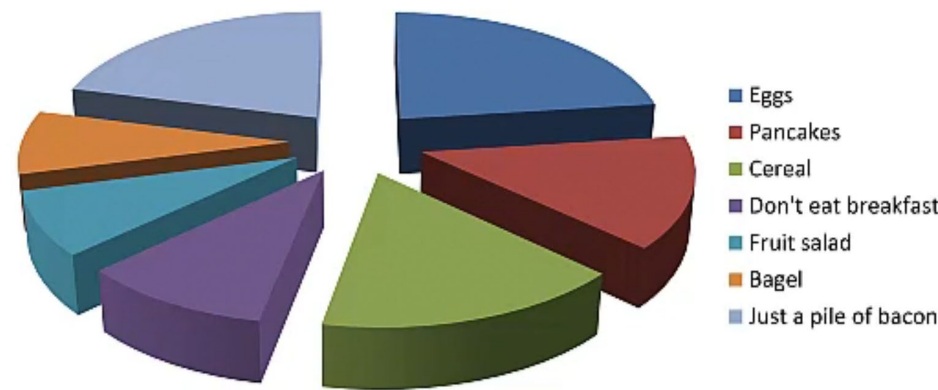
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4. **HOW CAN YOU SHARPEN THE POINT?** Add emphasis above.

When a
Single
Number is
Important

Big Number

23%

Icon Array



Pie/Donut



Quantitative Chart Chooser
by Dr. Stephanie Evergreen

When there
are Parts of
A Whole

Don't Visualize



Pie/Donut



Bar/Column



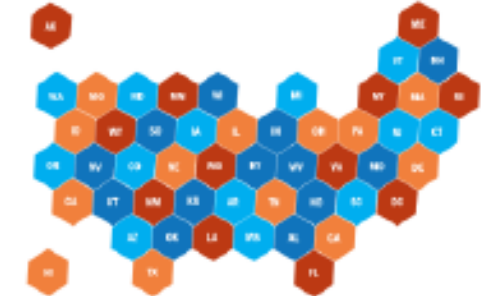
Lollipop



Tree Map

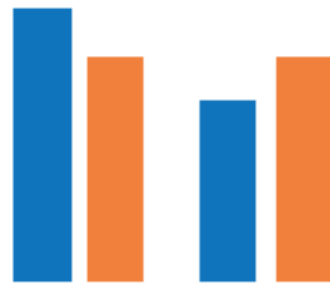


Map



How 2 +
Numbers
are Alike
or Not

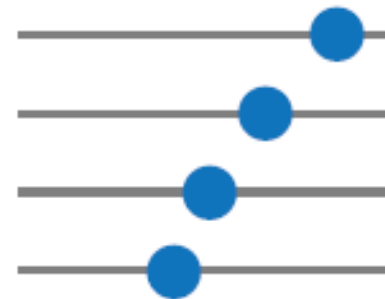
Clustered



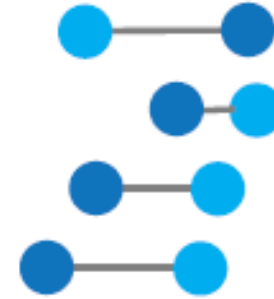
Back-to-Back



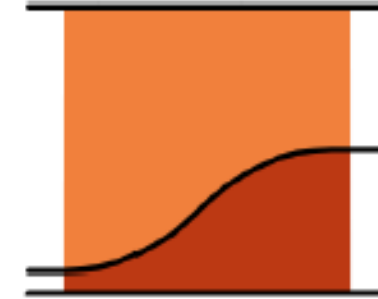
Dot Plot



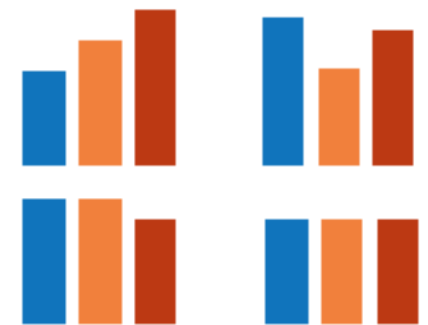
Dumbbell Dot



Proportion Plot



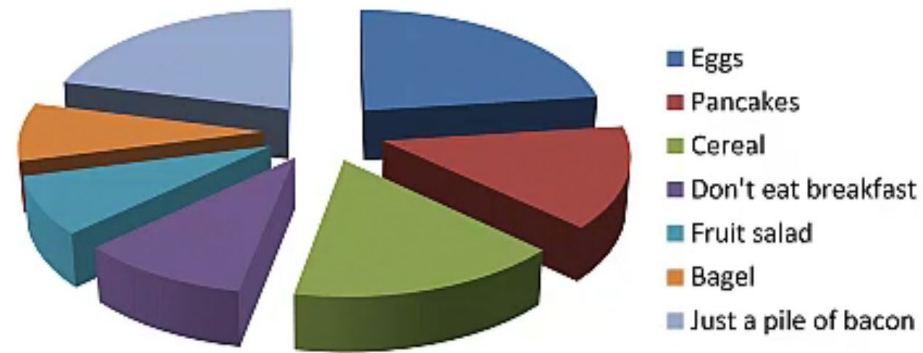
Small Multiples



4-Step Visualization Process

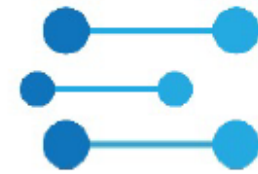
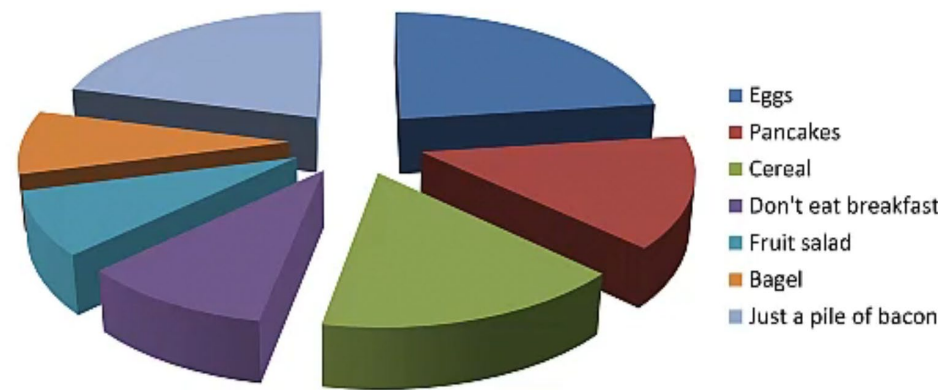
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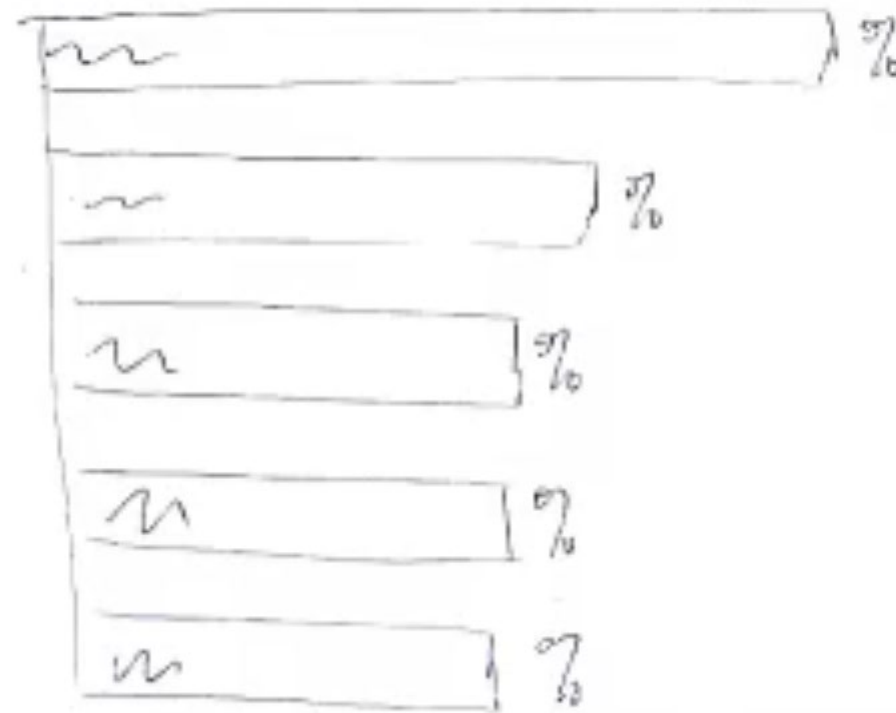
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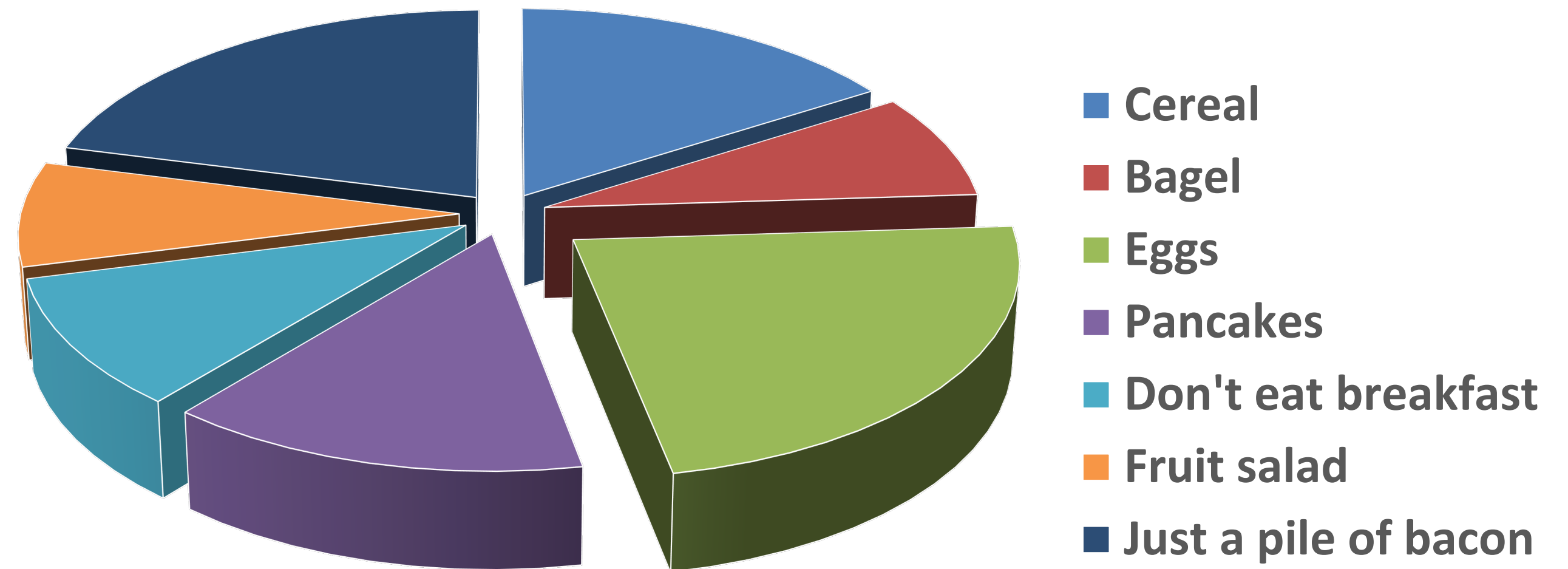
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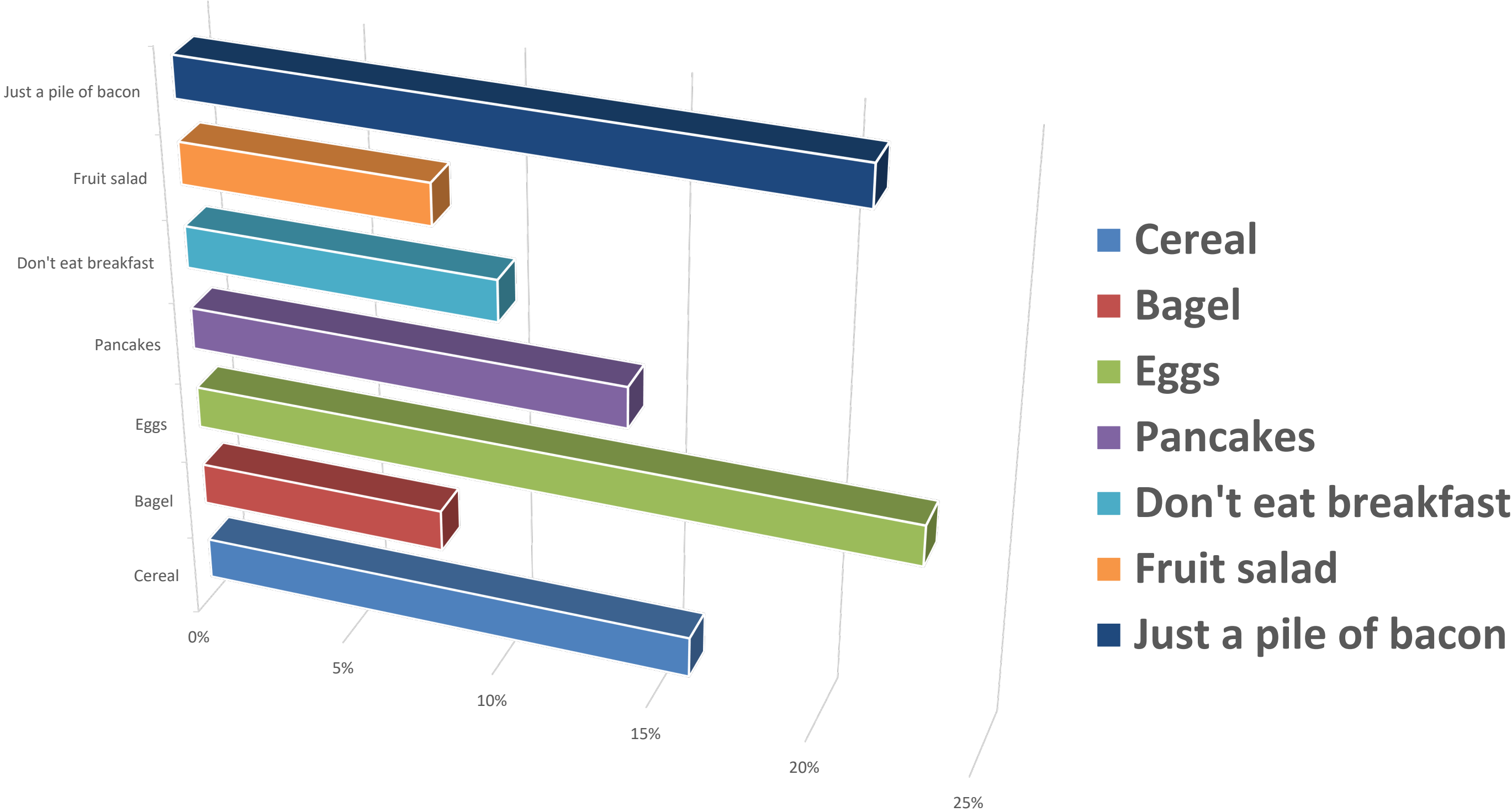
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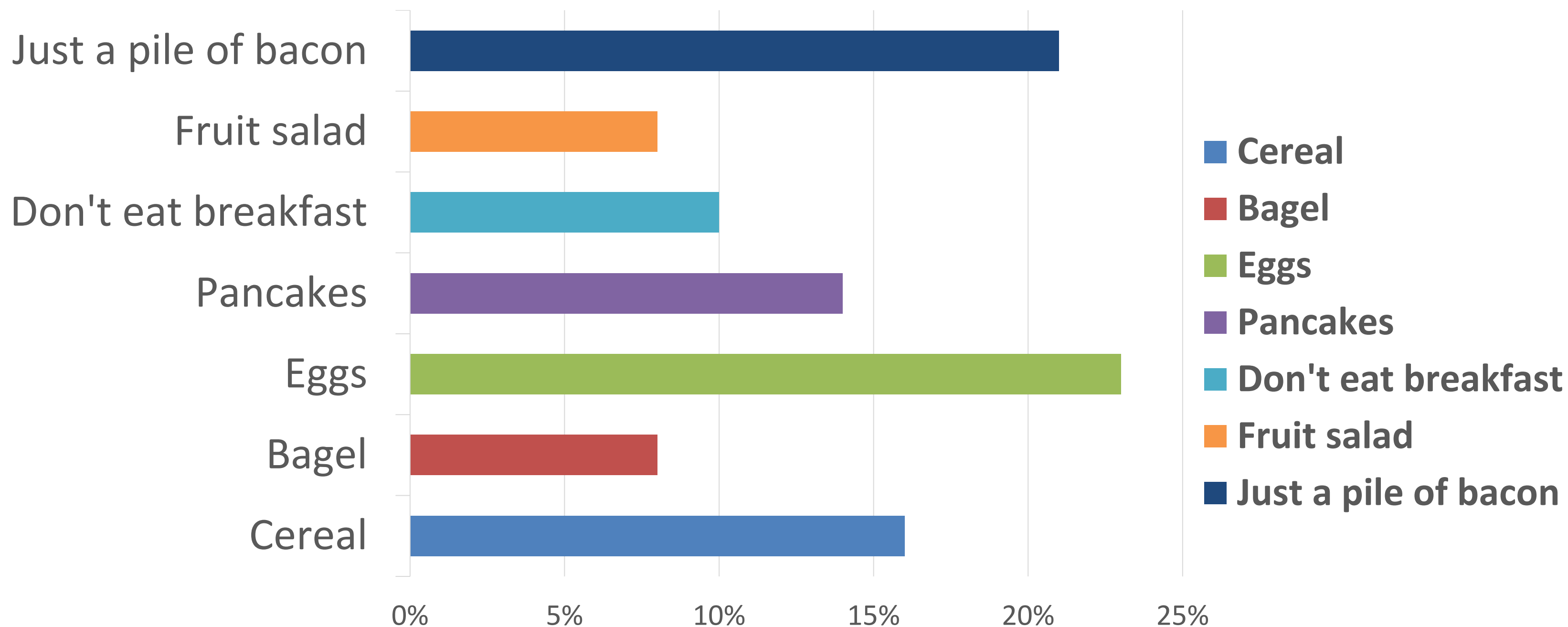
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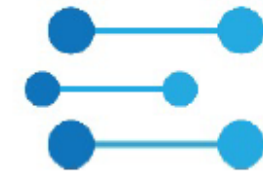
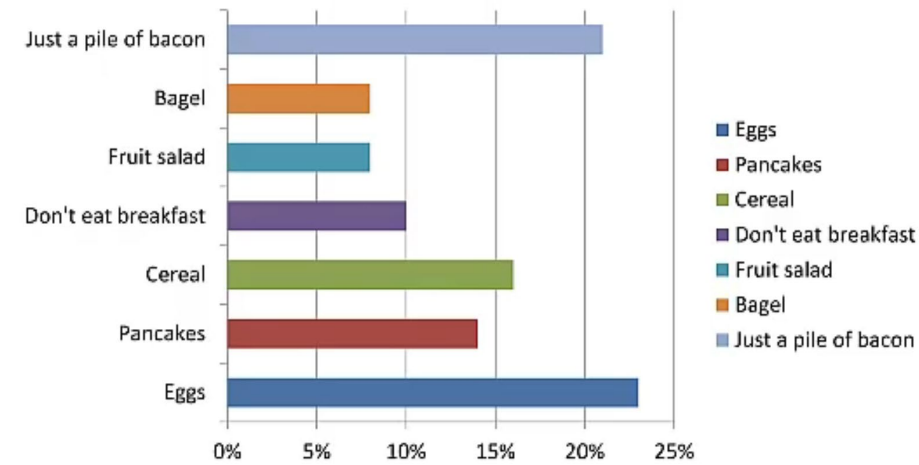


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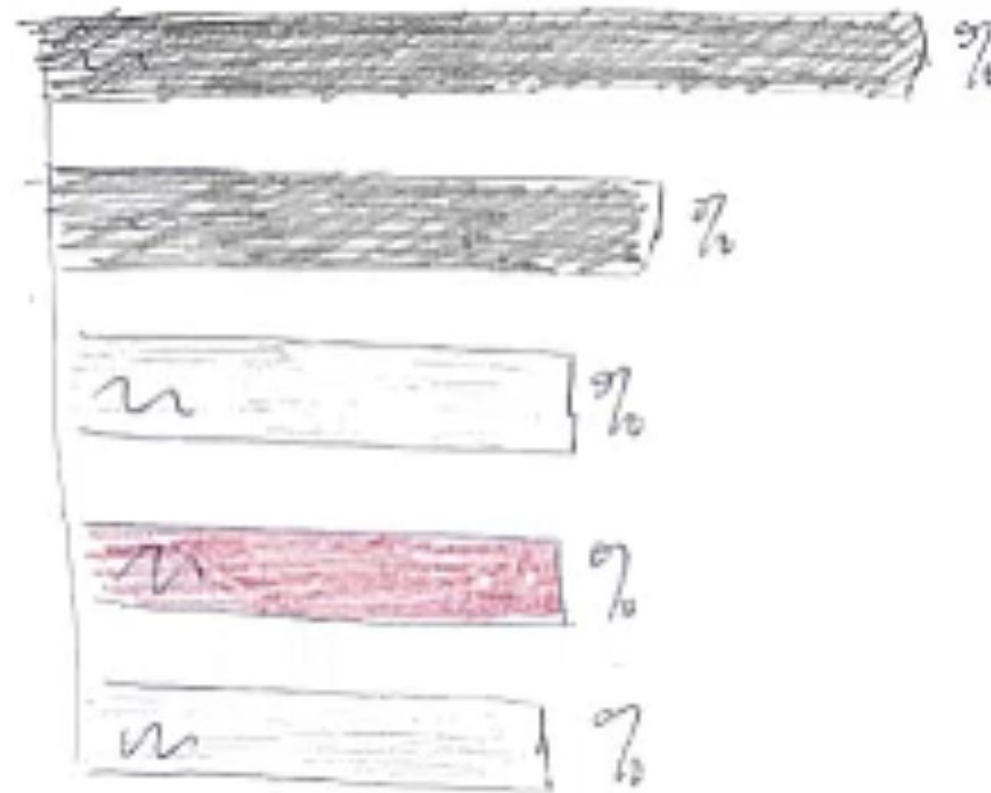
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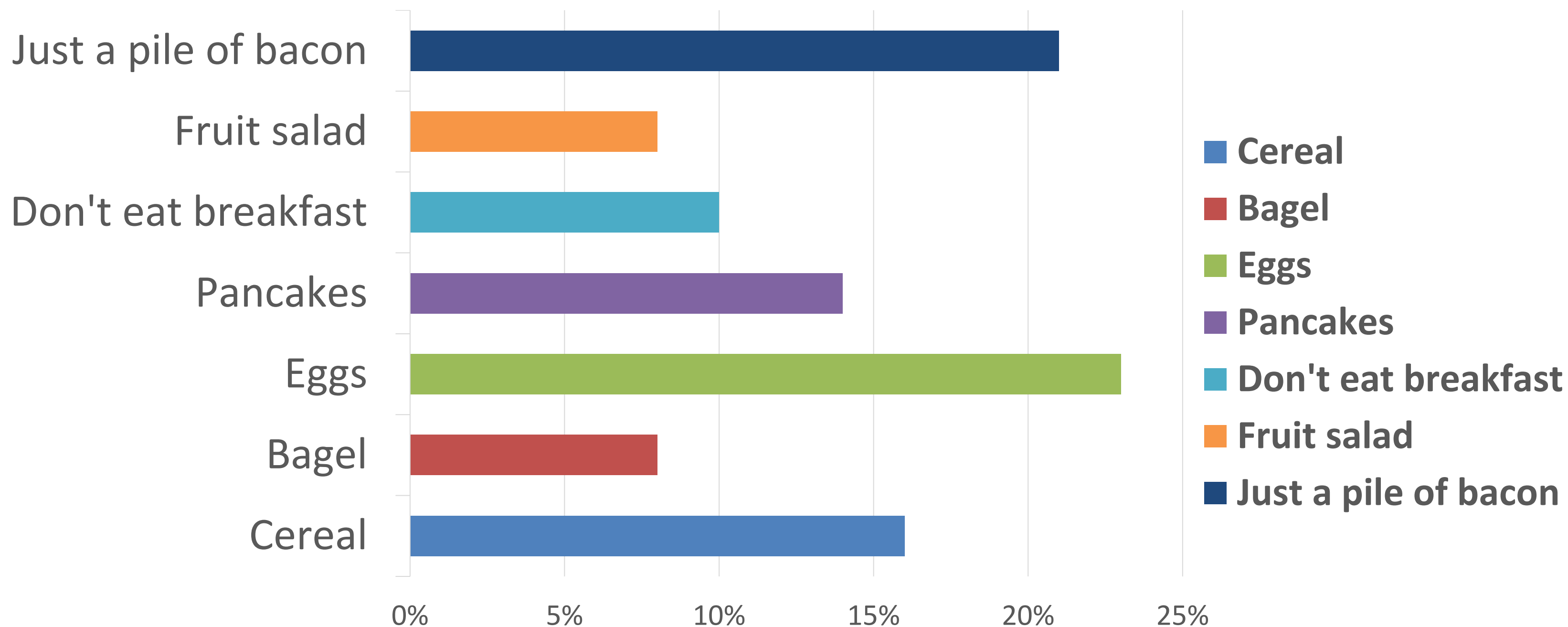
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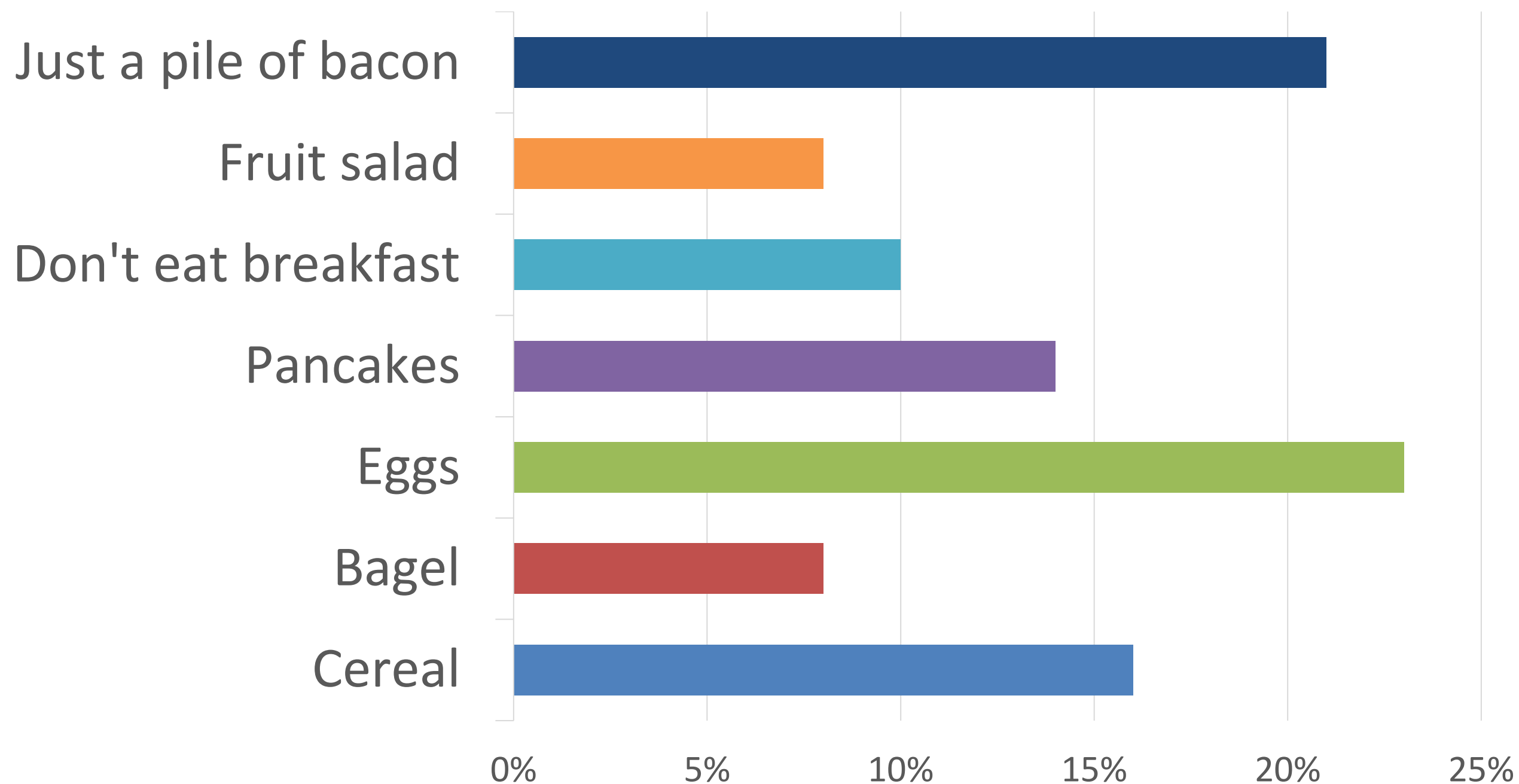
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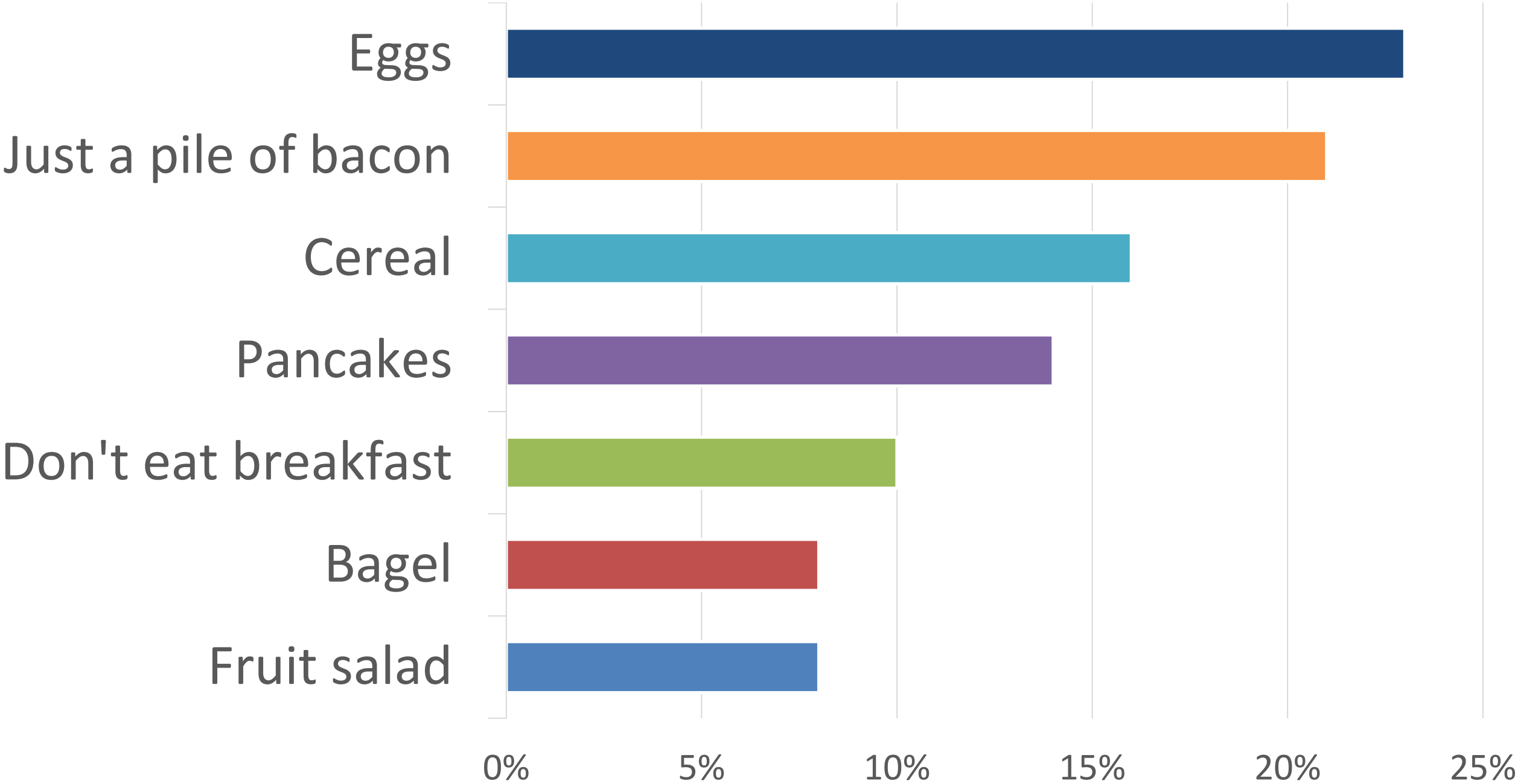
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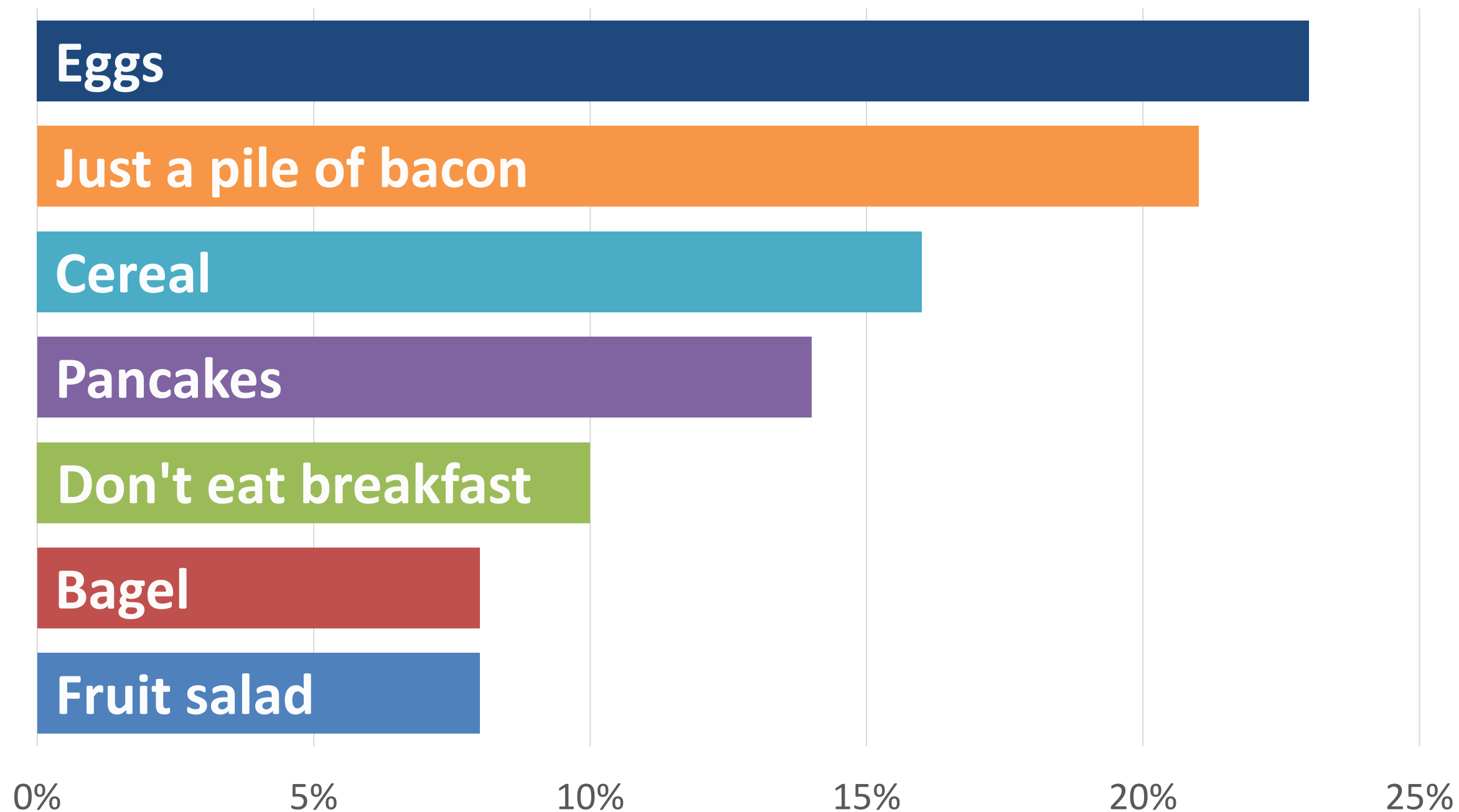
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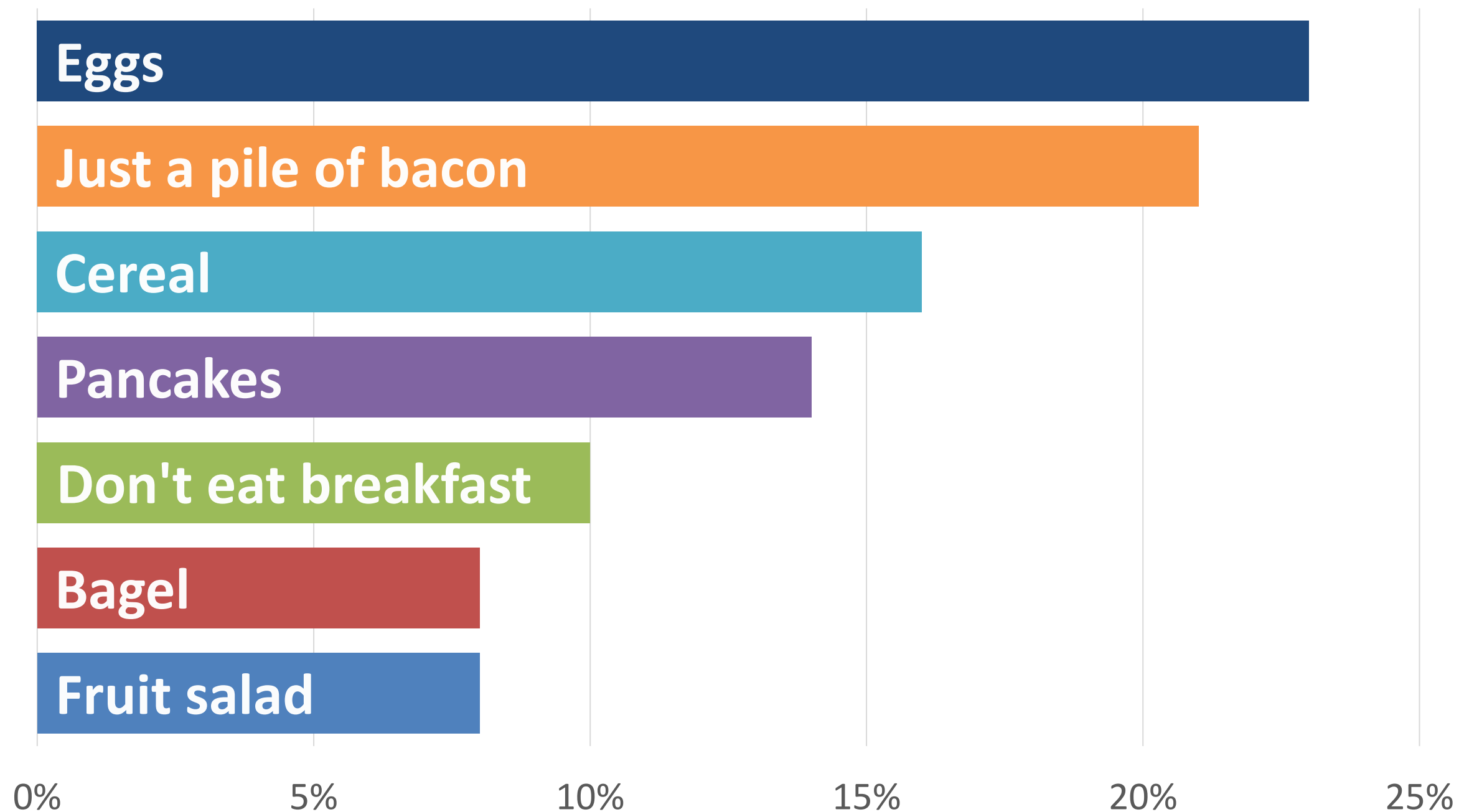
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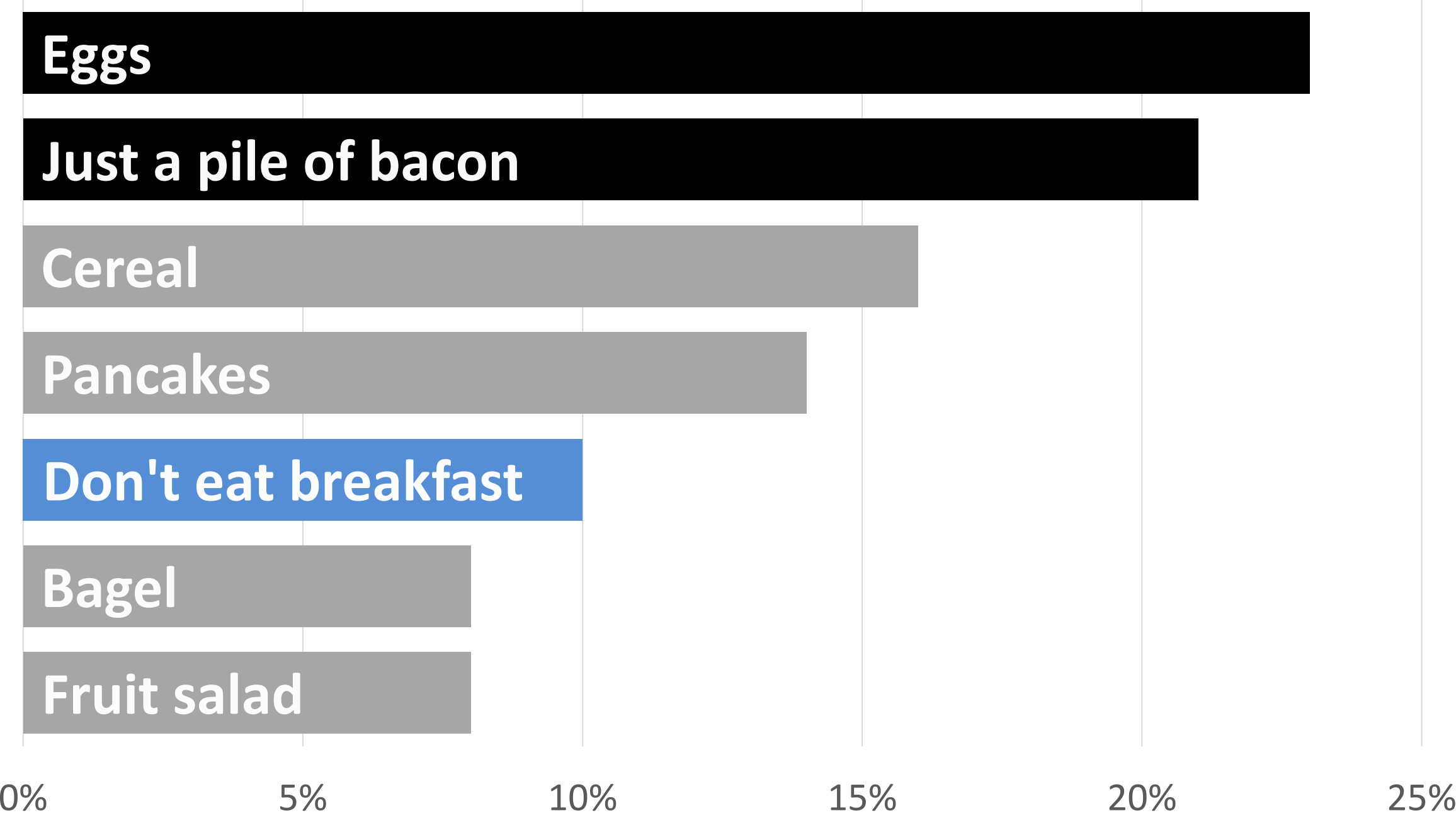
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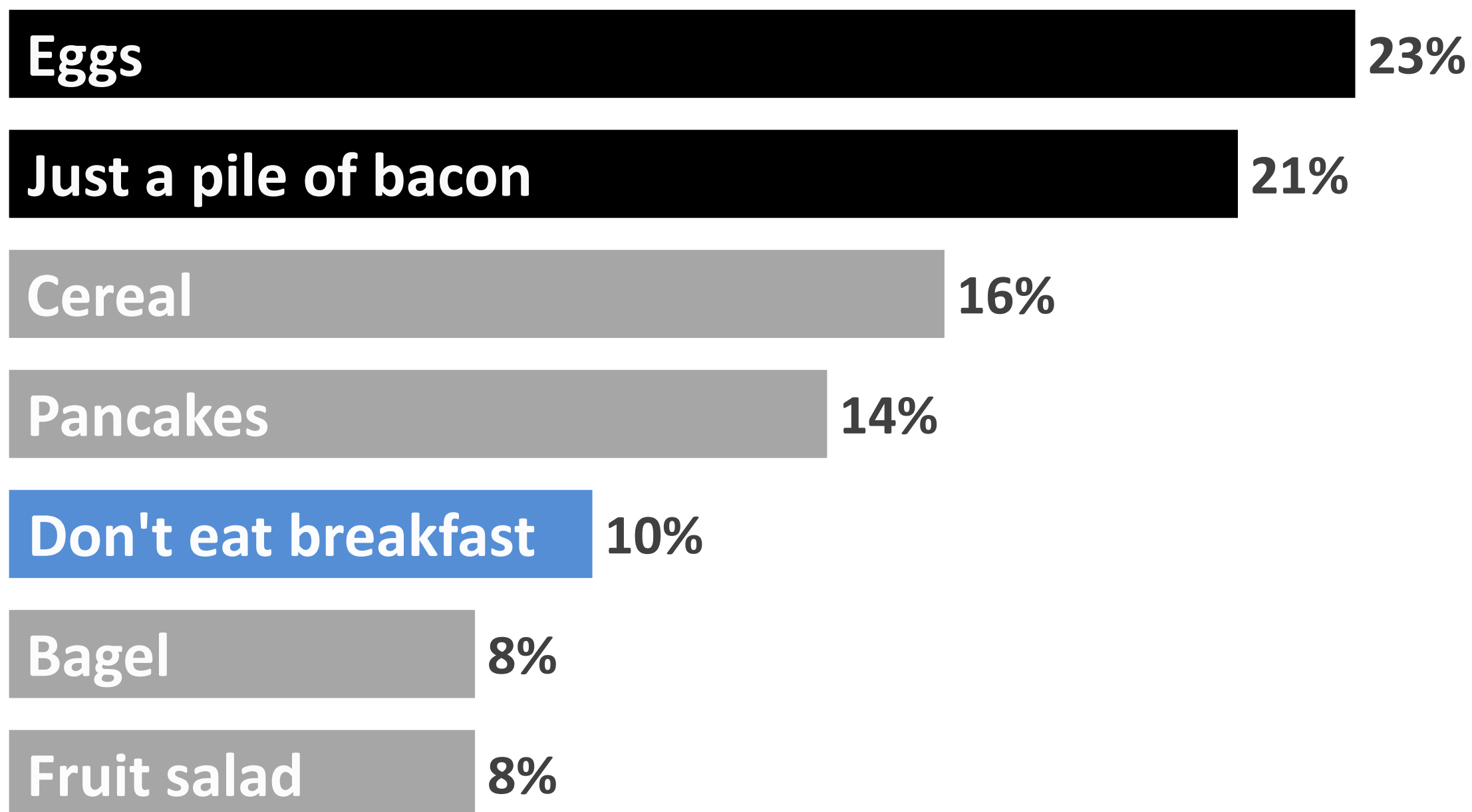
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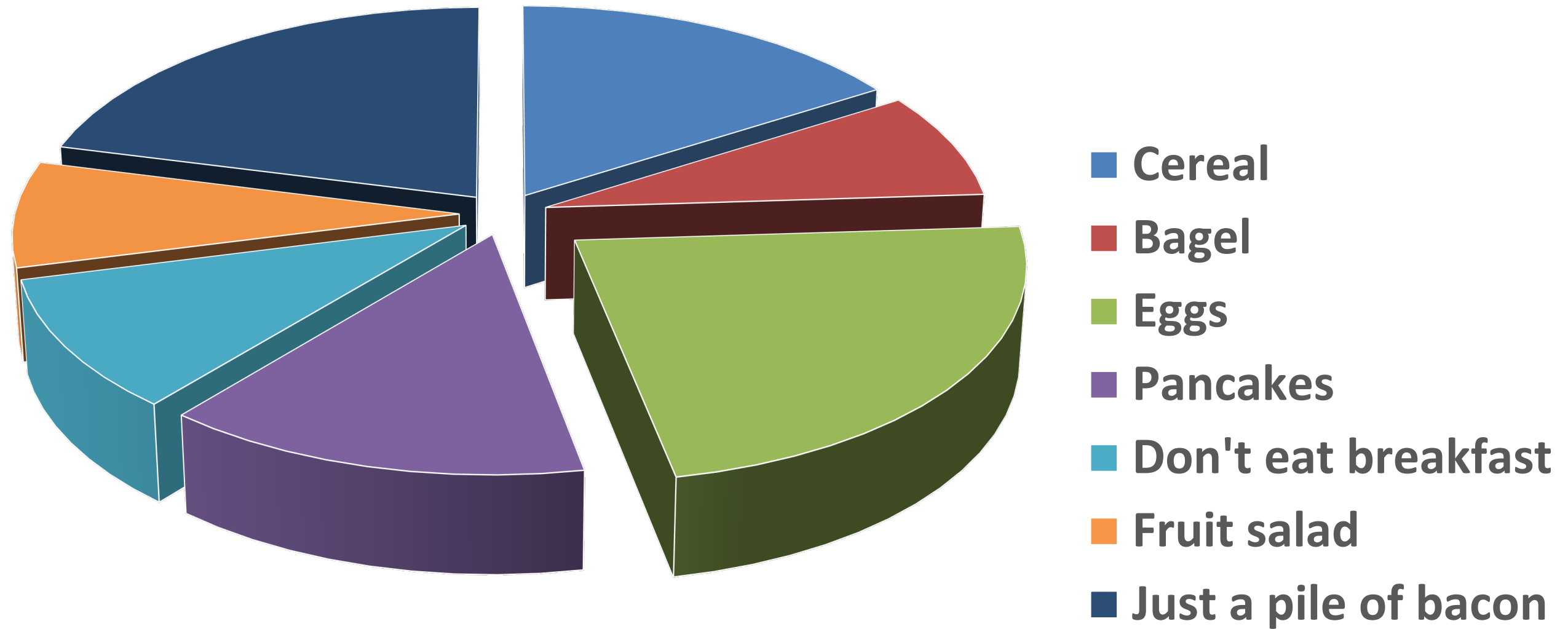


Breakfast preferences focus on **protein**.

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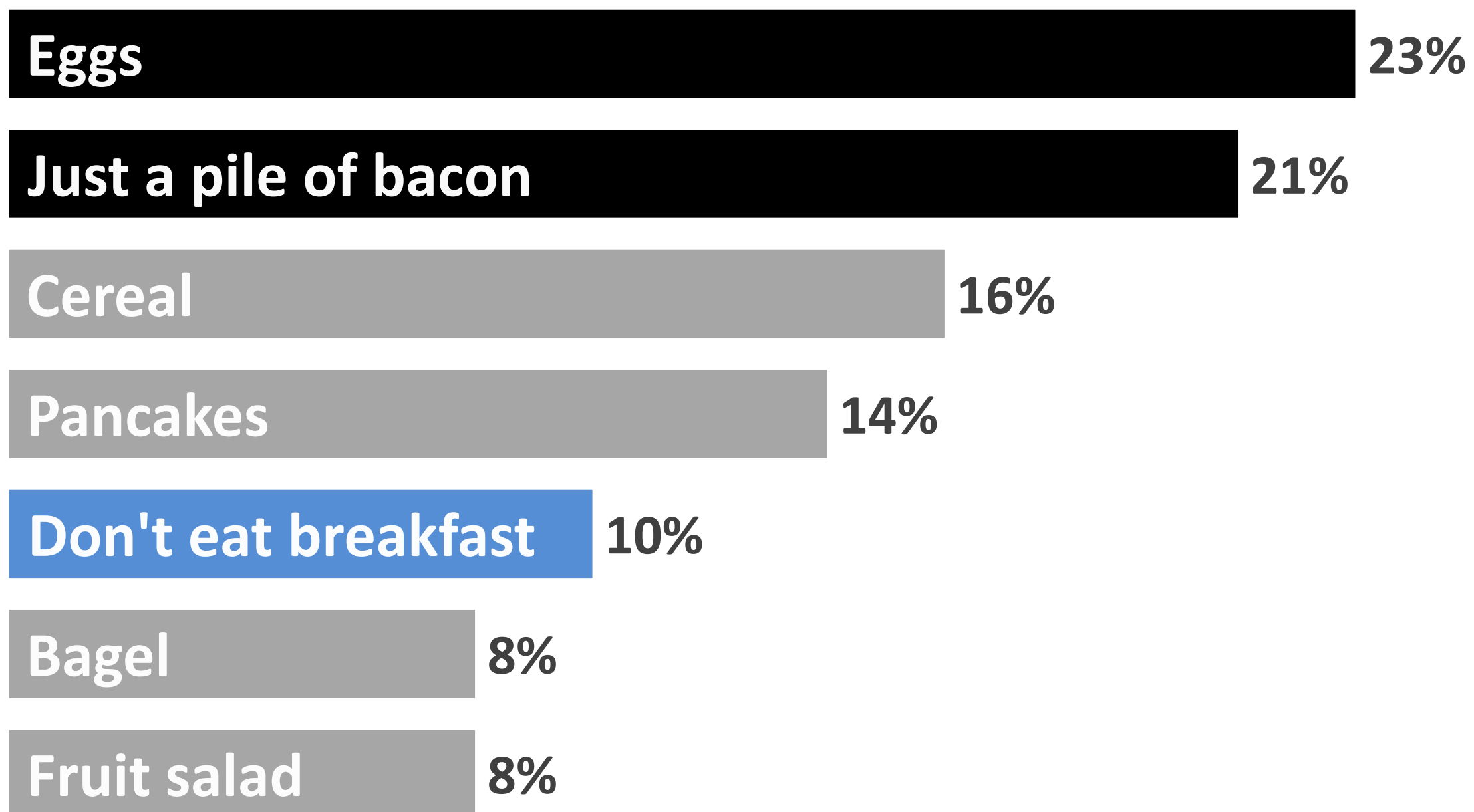


Attendee Breakfast Preferences

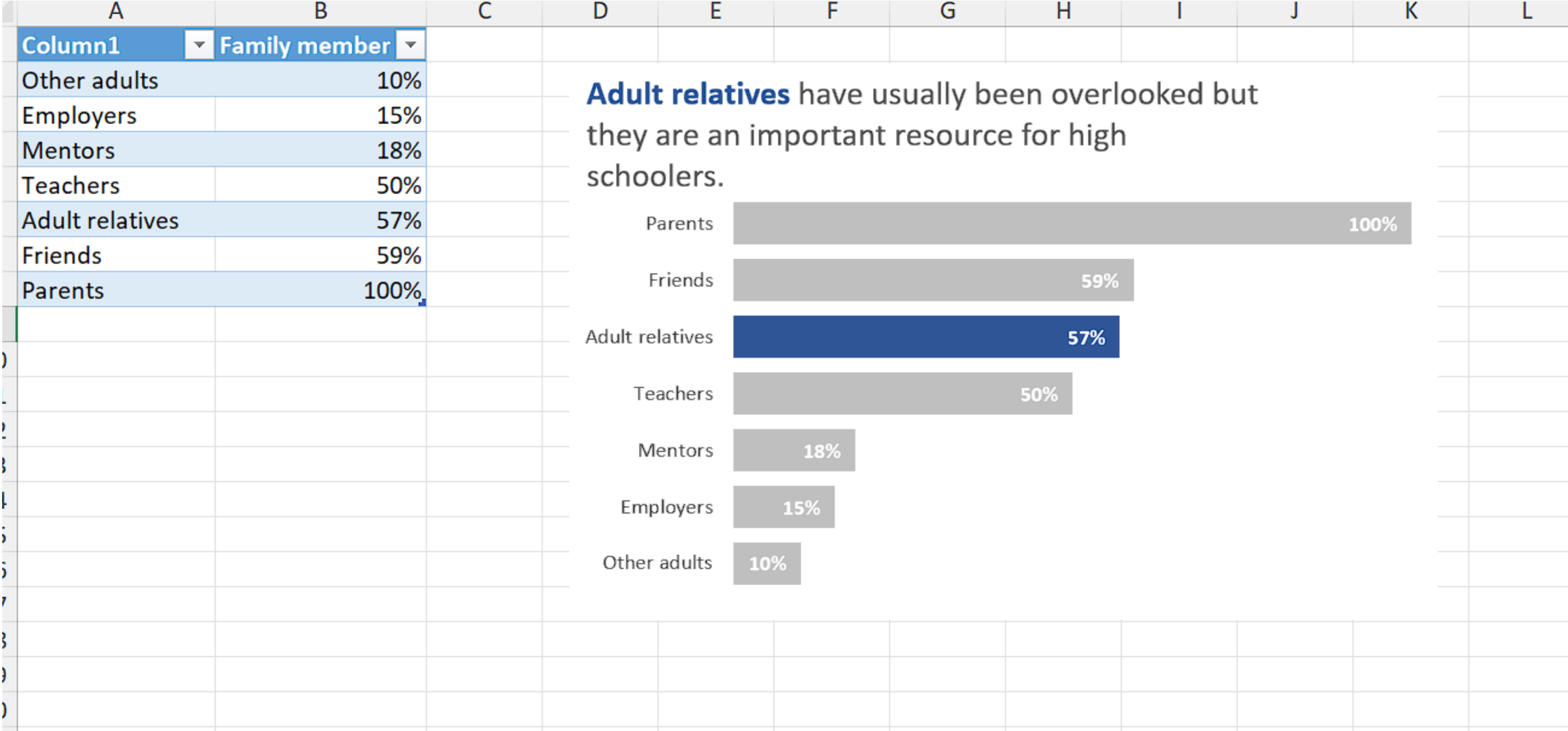


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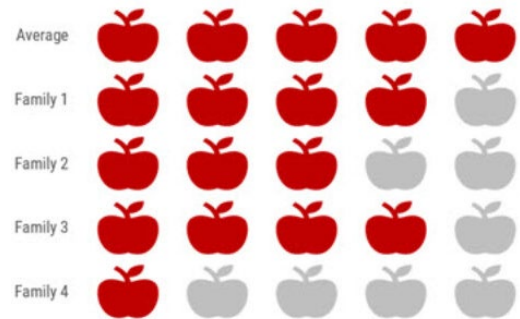
Example in Excel



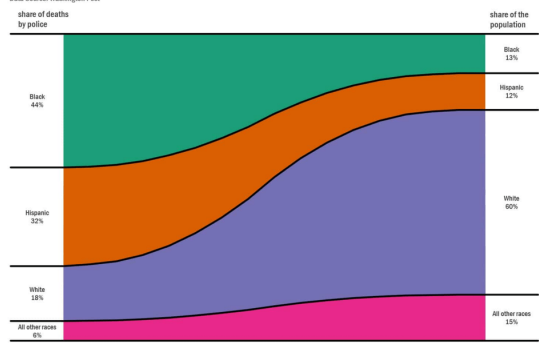
Additional Instruction Guides for Excel



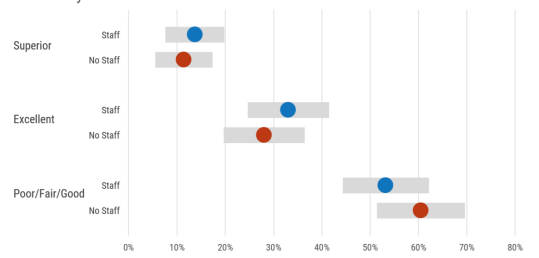
Program families need more support to meet the average recommended fruit and vegetable consumption per day.



Black and Hispanic people are disproportionately killed by police officers. If the justice system had no bias, the shares on both sides of the chart would be the same.



Satisfaction scores related to visits with **staff** versus **no staff** were nearly identical.



MSU Resources

PRE-REQUISITES

- Must be an MSU faculty, research staff or graduate student
- Have research requirements defined

CHARGES

- Depends on complexity of development

Center for Statistical Training and Consulting (CSAT)

- Advise on creation of statistical graphics (including interactive)

ITS Analytics and Data Solutions

- Tableau, R and Python visualization support

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Science Communication Guide

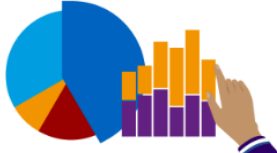
Resources to support the MSU science community in effectively sharing research with the academic, scientific, and public audiences.

Search this Guide

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 - Poster Sessions
 - Data Visualization**
 - Introduction
 - Data Visualization Tools
 - Accessibility
 - Data Visualization Examples
 - Library Resources
- Public Outreach
- Managing Your Online Presence
- Research Impact
- Citation Management
- Popular Science Books

Introduction

Data visualization is a common and effective tool for communicating science to both experts and non-experts in a variety of formats including scientific papers, presentations, and posters. How data is represented in visualizations can dramatically affect how science is understood. When creating visualizations, scientists should consider the type of data, the underlying research question, and the intended audience in order to best communicate their findings.



For more information on best practices in data visualization see:

- Ten Simple Rules for Better Figures
- [DataViz Cheatsheet](#)
A quick guide to data visualization best practices by PolicyViz

Data Visualization Tools

There are countless data visualization tools available. However, you may be interested in getting started with one of these popular tools:

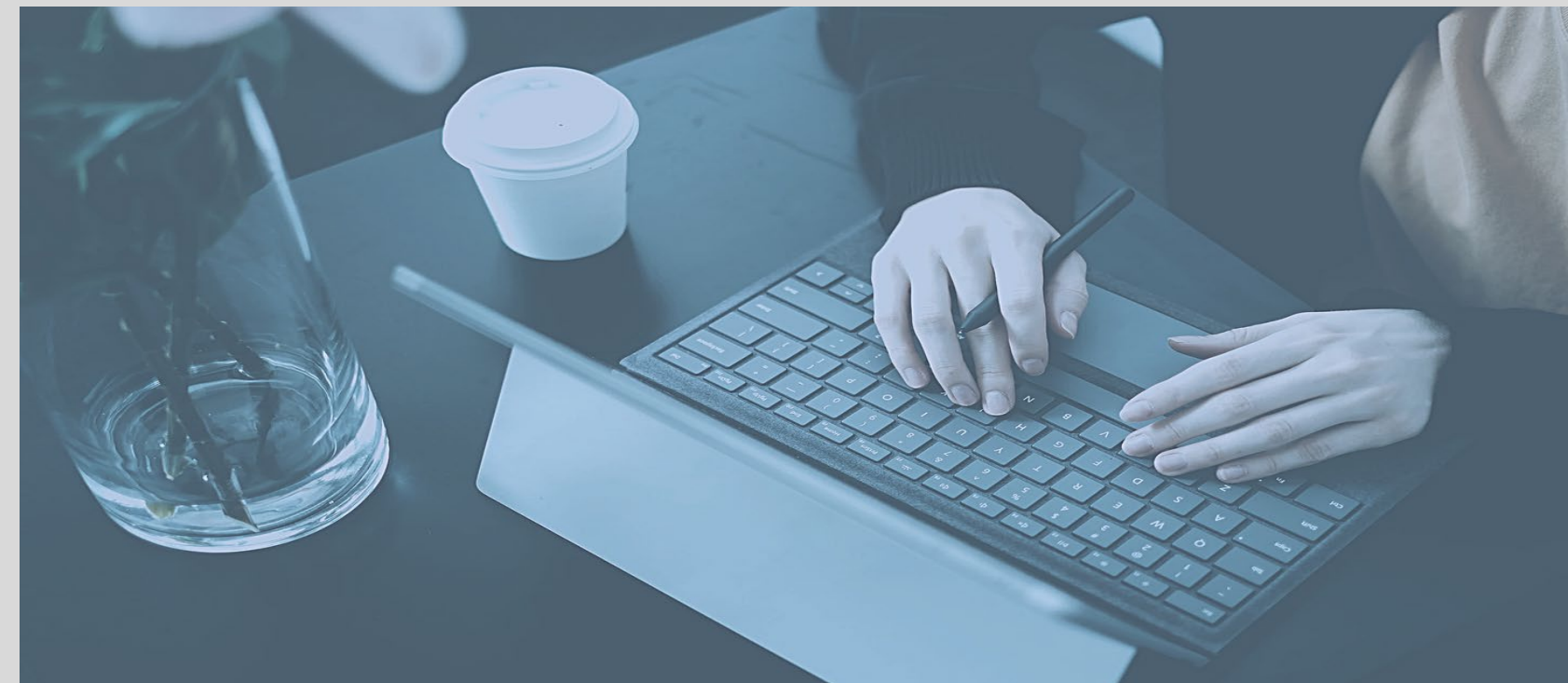
- Excel
- Tableau
- Plotly
- Visualization libraries for programming languages like R and Python

More Question?

Contact us

■ Norma Lundeen
nlundeen@msu.edu

■ Dawn Earnesty, PhD
Wilcoxd4@msu.edu





Thanks

What questions do you have for us?