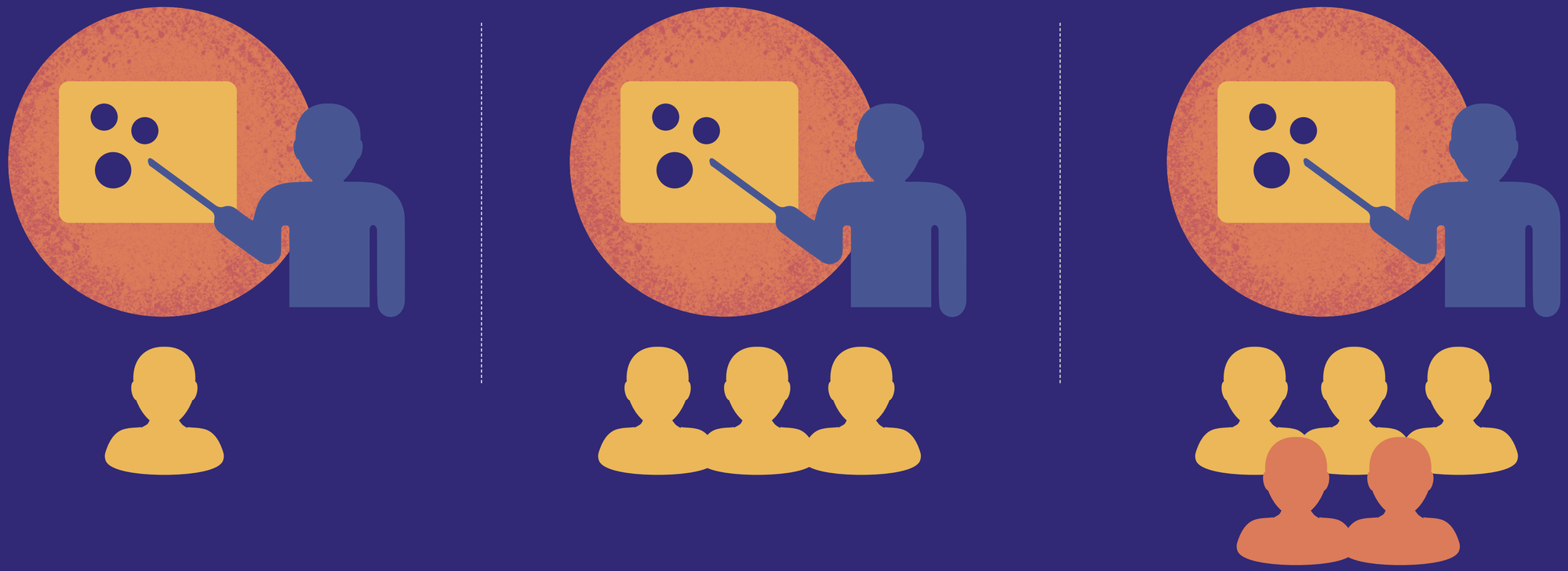
WE ALL COUNT

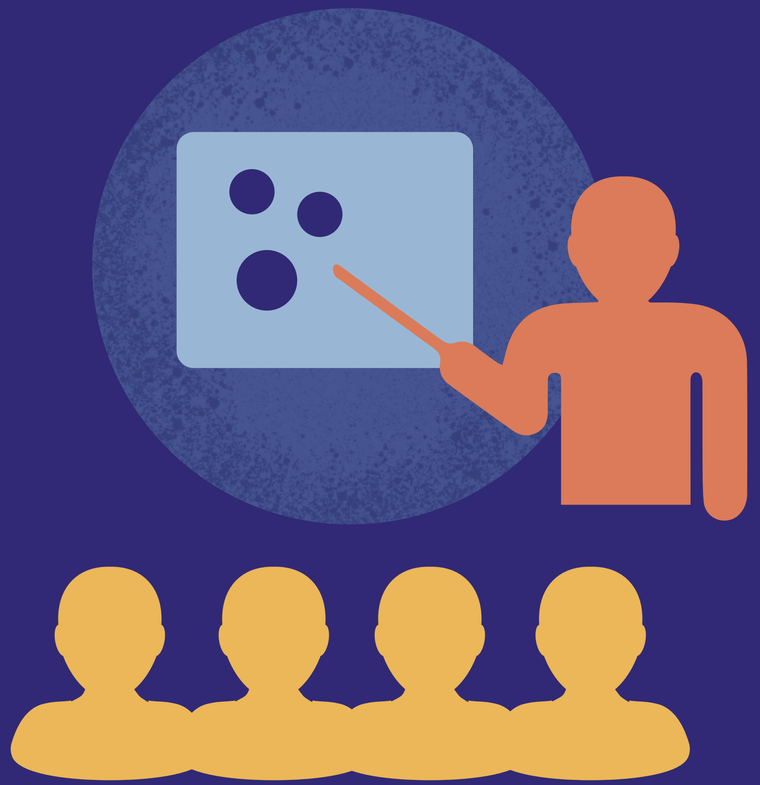
project for equity in data science

What is the average size classroom?

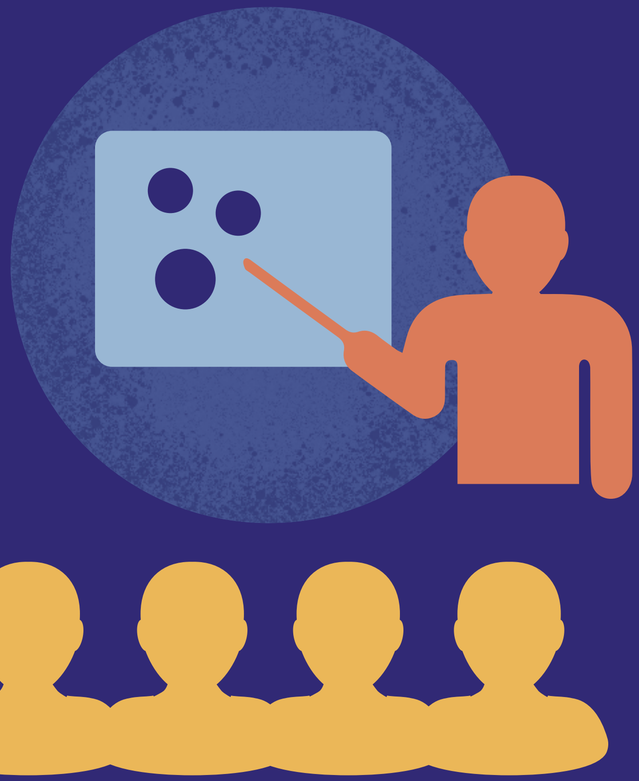


The average classroom is 3 students per class.

The average classroom is 4 students per class.



Both are correct.



Teacher Perspective

1 + 3 + 5 = 9

9/3 = 3

Student Perspective

1 + 3 + 3 + 3 + 5 + 5 + 5 + 5 + 5 = 35

35/9 = 4

WeAllCount.com

Heather Krause, PStat

@datassist

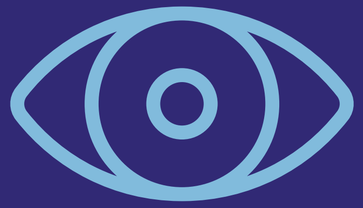
Feminist Data Analysis

Step by step processes to avoid racism, sexism, homophobia and more in data and analysis.

Feminist Data Analysis:

Locus of Power

+

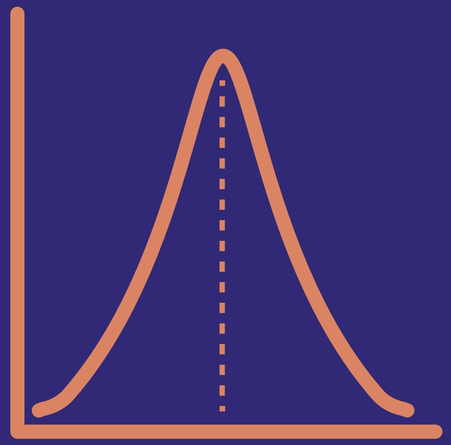


World View

+

Unit of Analysis

+



Assumed ‘Normal’

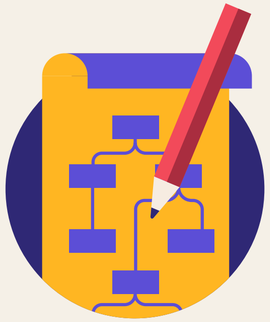
“I refuse to accept the idea that we can simply shoehorn women into a global economy that is exploiting them and then celebrate it as women’s economic empowerment.”

— Winnie Byanyima, Executive Director,
Oxfam International

Sources of bias can be identified in each step of the data life cycle.

Funding

Motivation



Project Design

Data Collection & Sourcing

Analysis

Interpretation

Comunication & Distribution

Funding

The source of funding impacts the actual outcomes of RCTS.

Column

The dark side of education research: widespread bias

Johns Hopkins study finds that insider research shows 70 percent more benefits to students than independent research

Proof Points

Column by **JILL BARSHAY**

March 18, 2019

MIMI ONUOHA

The Library of Missing Datasets

Questions for Funding Step:

Who is funding this research?

What research is not being funded?

How would I design, conduct, analyze this data if I was independently wealthy?

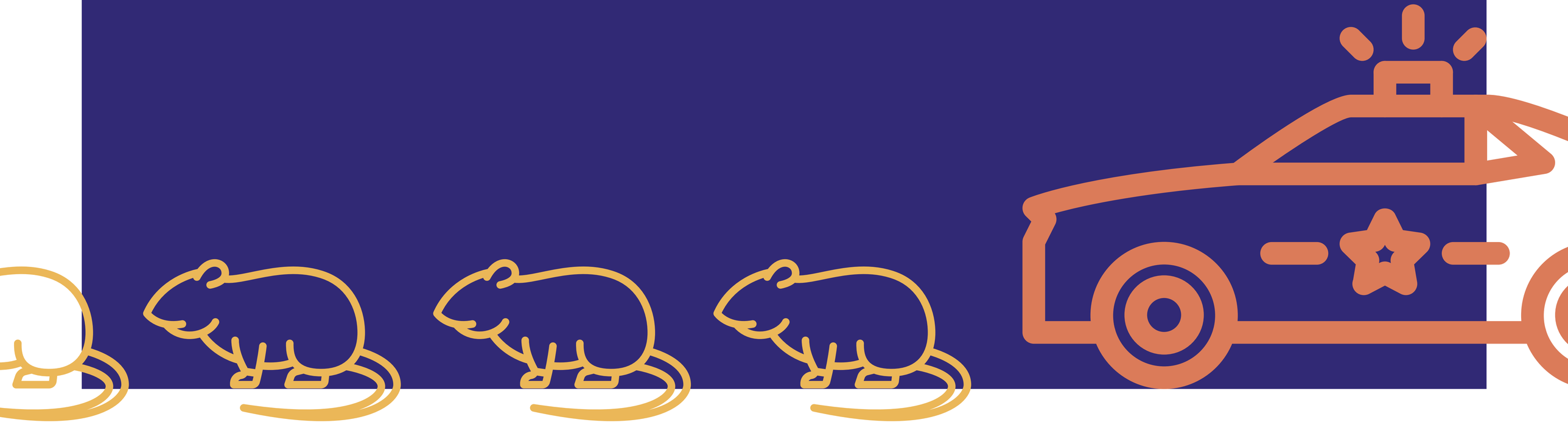
What are the demographic profile of the funders compared with humans that will contribute data to this project?

Motivation

Why is this data project being done?

Tension between explicit purpose (understand if this works) and implicit purpose (have a good report for the annual general meeting).

NYC & Rats



Question for Motivation Step:

What is the stated purpose of this data project?

What are the other hidden purposes behind this data?

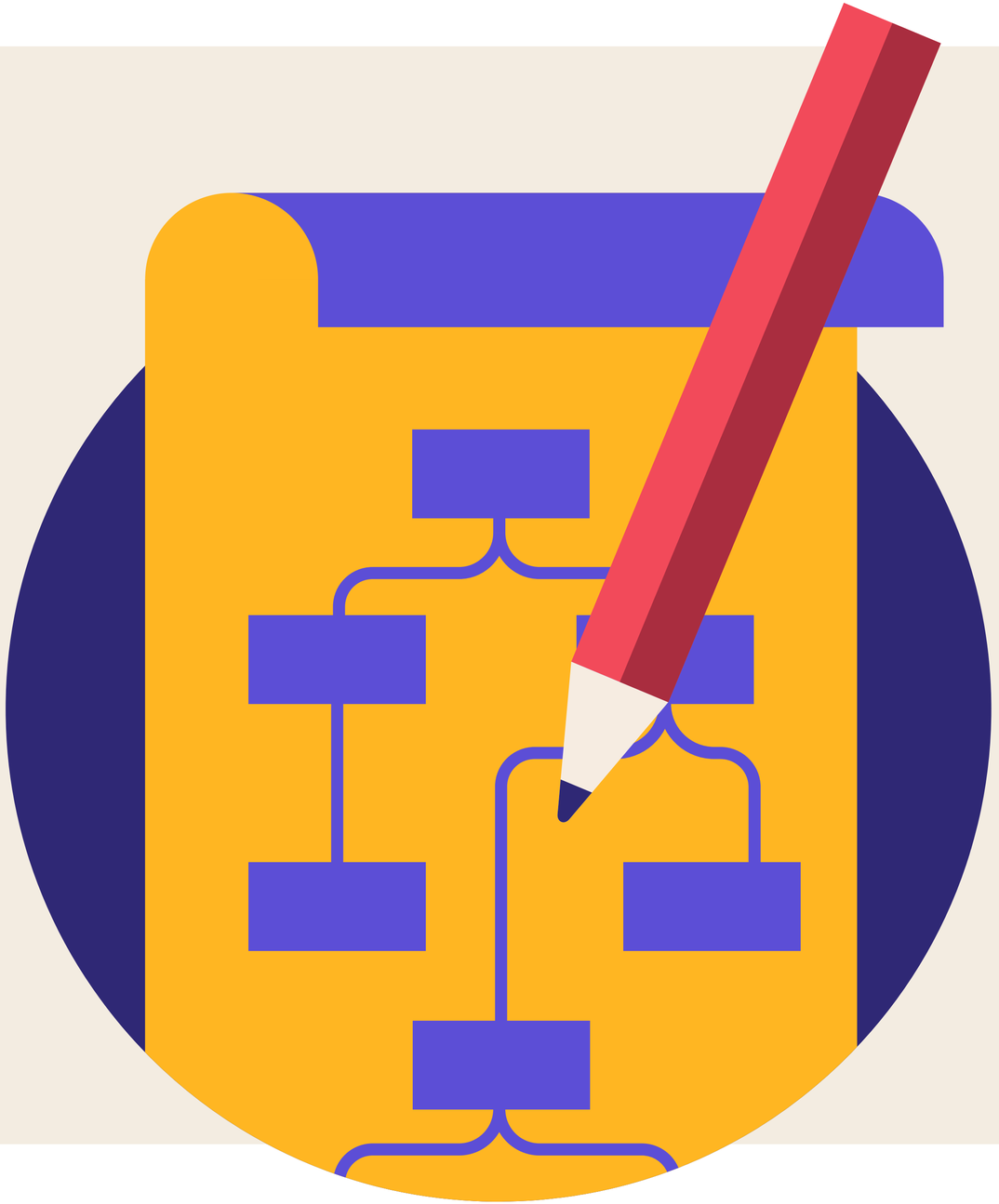
Who stands to benefit from this data project?

Who stands to lose from this data project?

Who wants to know what?

How could we align the explicit and implicit purpose?

Project Design

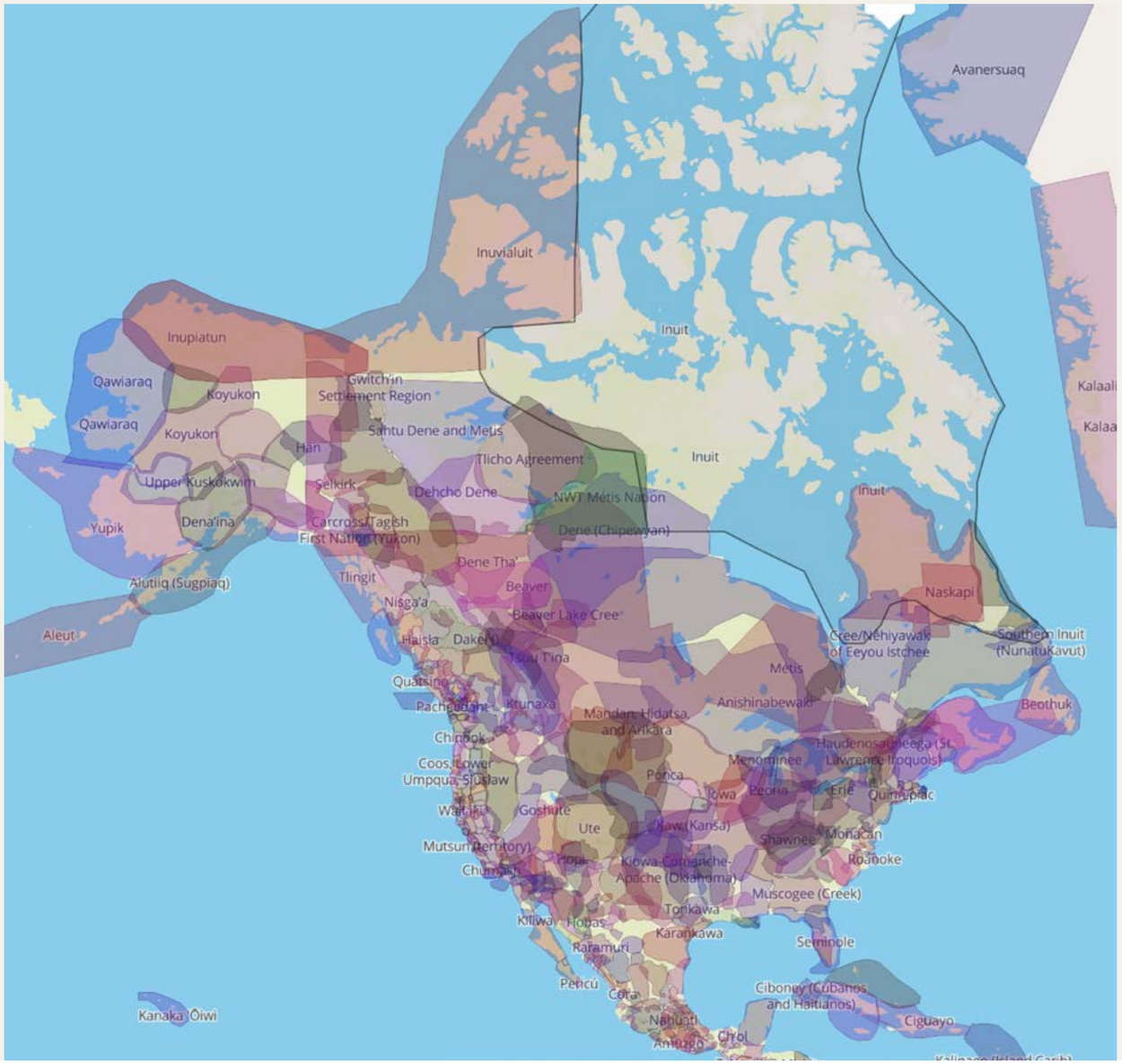


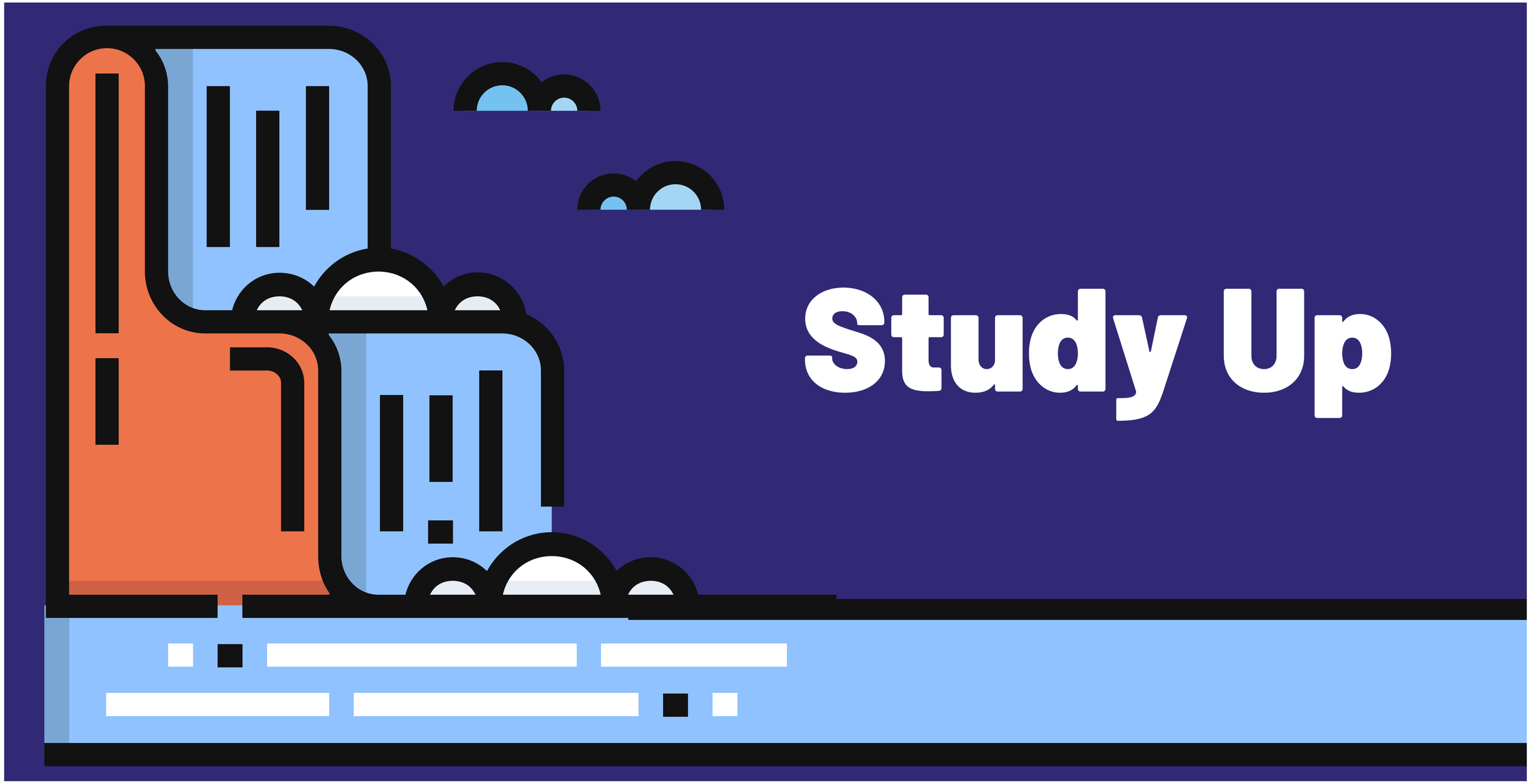
Project Design is the phase where the WHY becomes the HOW

Critical step in data equity

WHY ⋯⋯⋯⋯⋯⋯⋯⋯→ HOW

Sample design based on definitions - whose definitions?




Study Up

RCTs:
The Gold Standard
… of *What?*

Unbiased estimate of average treatment effect of the population.

We found that the population average income increased $100*

---

*What we don’t find is that a small number of people had their income increase $1000 and a big group of people had their average income decrease by $100.

Questions for Project Design Step:

Who is deciding the methods we're using in this data project?

When are results needed - how will this impact different power dynamics?

How good is our method at capturing unintended effects?

Who is benefitting the most from this design - who is this easiest for?

What level(s) are you looking at with your project design?

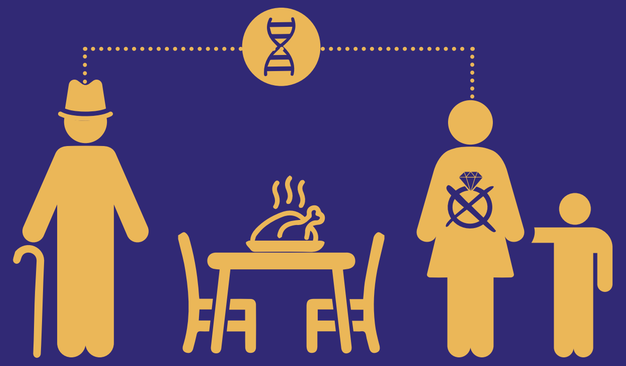
Is the method a good fit with the community of the research? (Do they both believe in linear time?)

Data Collection & Sourcing

Data Biographies at the bare minimum must accompany each dataset you are using:

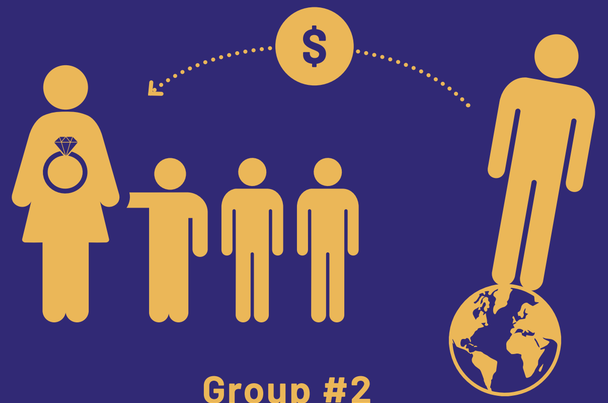
When What Who Why How Where

Who is the head of YOUR household?



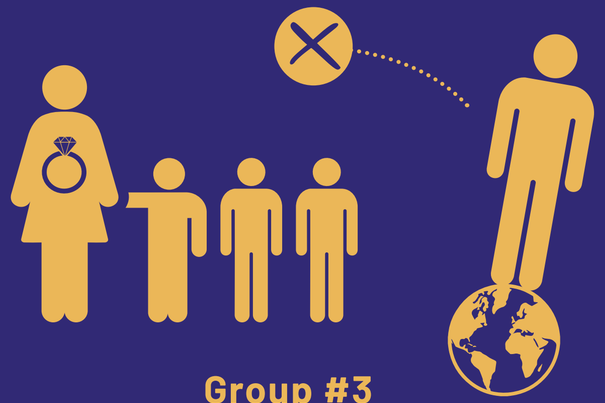
Group #1

Unmarried Mother | Her Father | Her Son



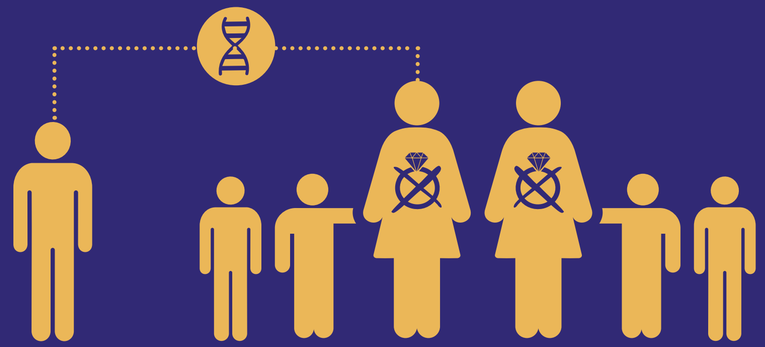
Group #2

Married Woman | Her 3 Children
Husband Lives Abroad



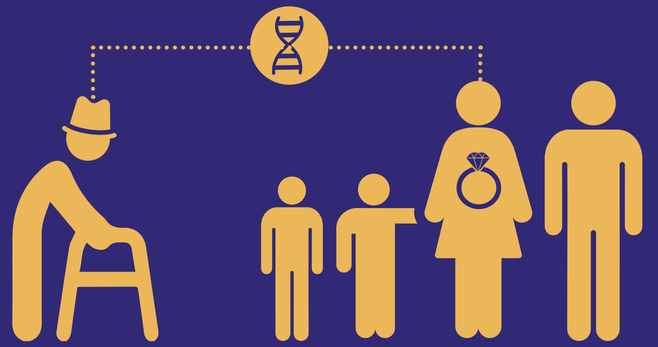
Group #3

Married Woman | Her 3 Children
Husband Lives Abroad



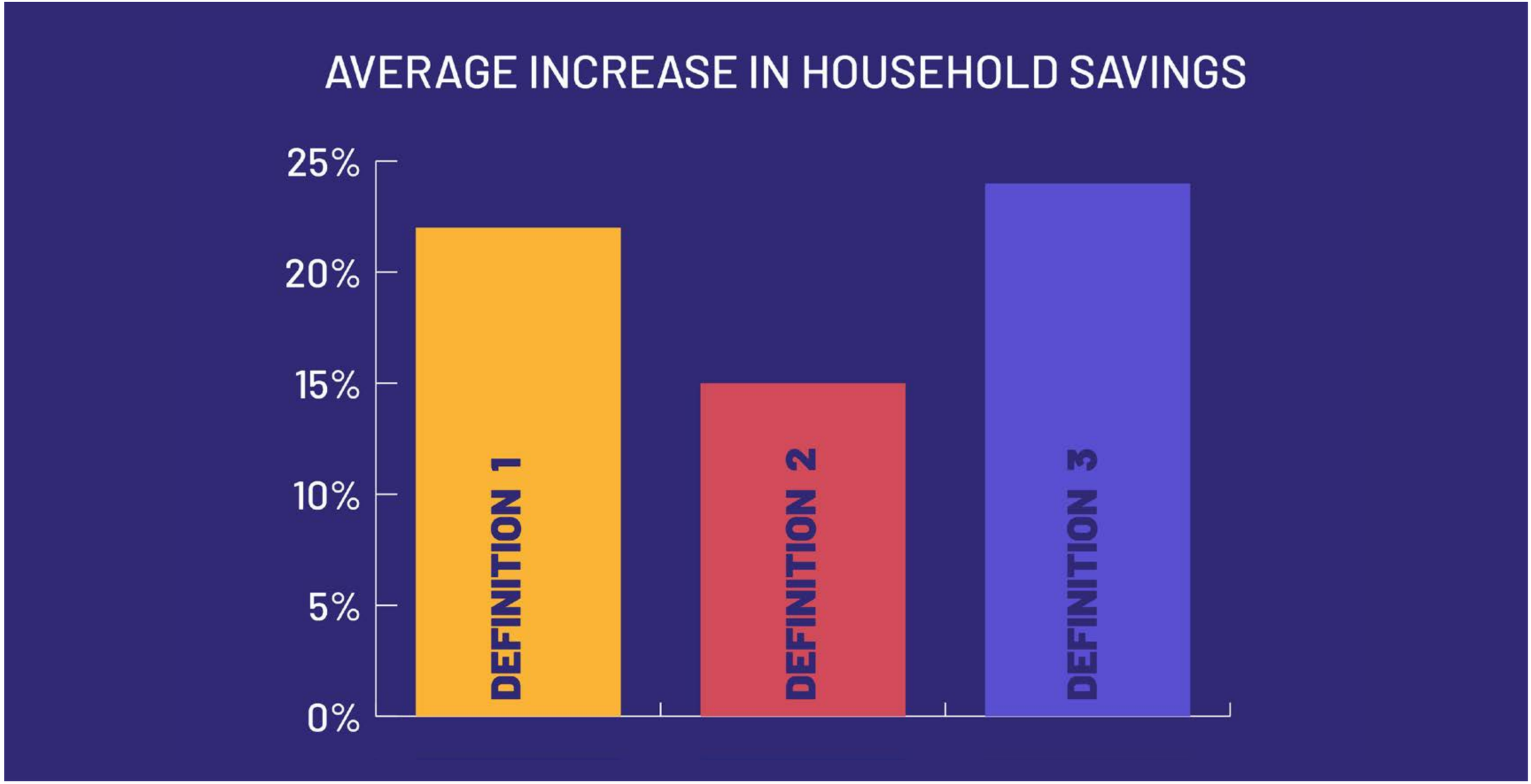
Group #4

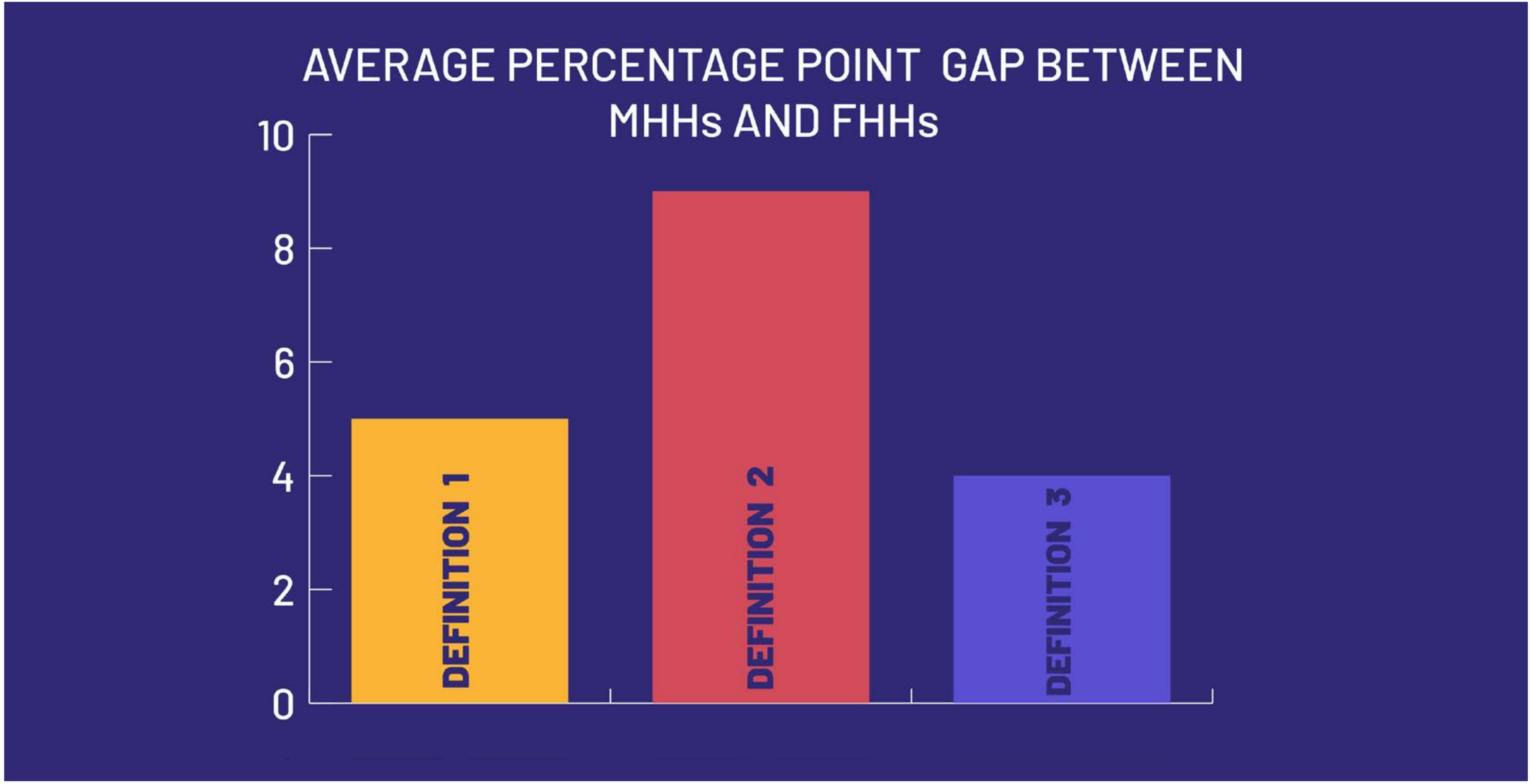
Two Unmarried Women | Their Kids | One Brother



Group #5

Disabled Father | Married Couple | Two Kids


AVERAGE INCREASE IN HOUSEHOLD SAVINGS
25%
20%
15%
10%
5%
0%
DEFINITION 1
DEFINITION 2
DEFINITION 3


AVERAGE PERCENTAGE POINT GAP BETWEEN MHHs AND FHHs
10
8
6
4
2
0
DEFINITION 1
DEFINITION 2
DEFINITION 3

Measuring social constructs (Demographics)

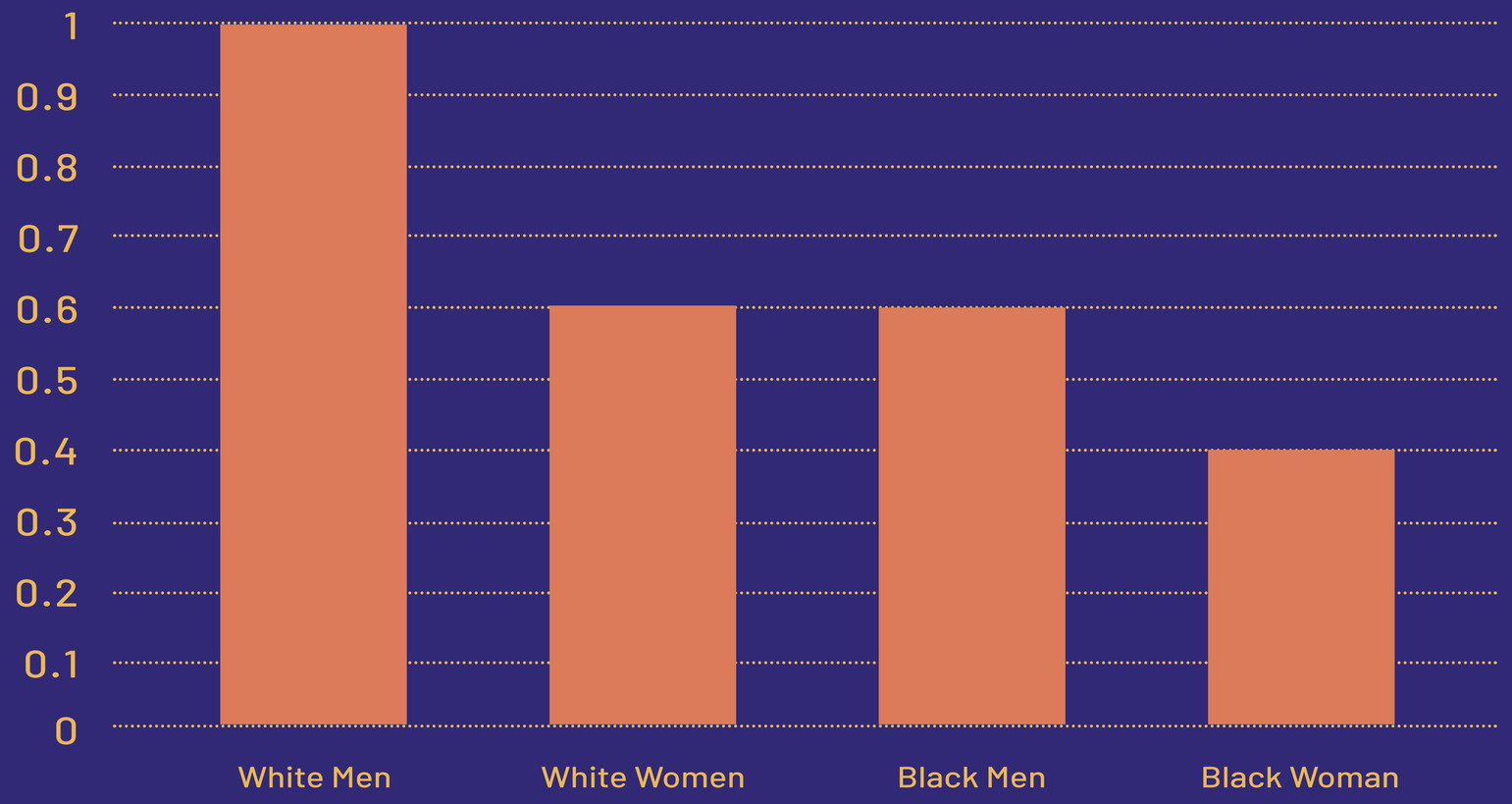
Who is constructing and how.

Which ones are fluid?

And how are you going to use this?

Additive vs Intersectional Analysis

Odds of Getting Referral (Additive)



Additive vs Intersectional Analysis

Odds of Getting Referral (Intersectional)

Who collects the data matters.

Data collected by higher status enumerators results in different results.

What counts as work?

The following six things do not count as work:

1. The cleaning, decoration and maintenance of the dwelling occupied by the household, including small repairs of a kind usually carried out by tenants as well as owners;
2. The cleaning, servicing and repair of household durables or other goods, including vehicles used for household purposes;
3. The preparation and servicing of meal;
4. The care, training and instruction of children;
5. The care of sick, infirm or old people;
6. The transcription of members of the household or their goods.

Questions for the Data Collection Step:

What are the core concepts we're measuring?

What are three different ways to measure each concept?

Who is collecting the data?

What is the burden being places on people contributing data?

Who owns the data?

Who is defining success?

If collecting from beneficiaries, can they receive the treatment without consenting? If not, is it informed consent?

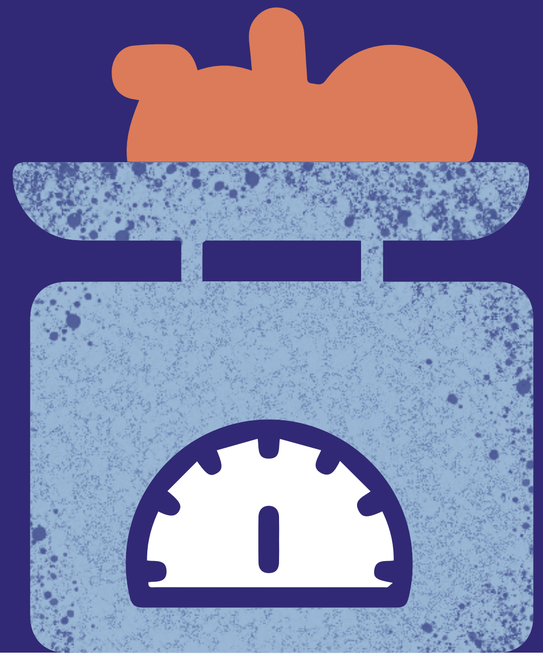
Analysis

Methods Matter

A LOT.

Chance of having a low birthweight baby is

20%



Chance of having a low birthweight baby

Ethnic
Group A

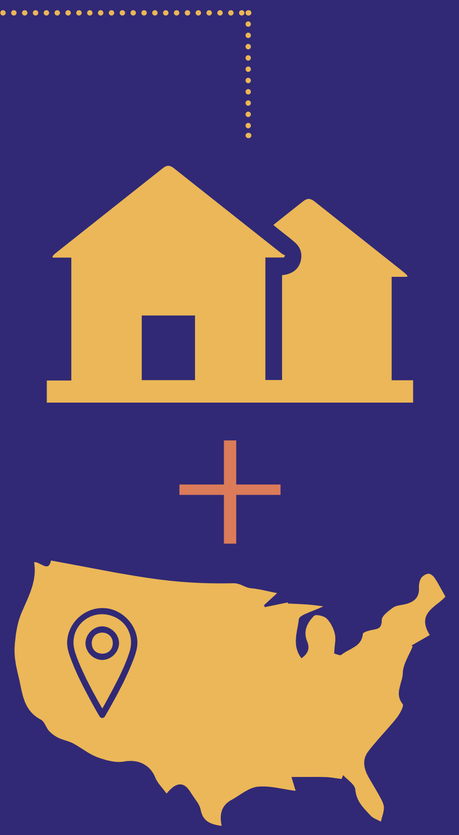
Ethnic
Group B

Chance of having a low birthweight baby when taking into account community of residence is between

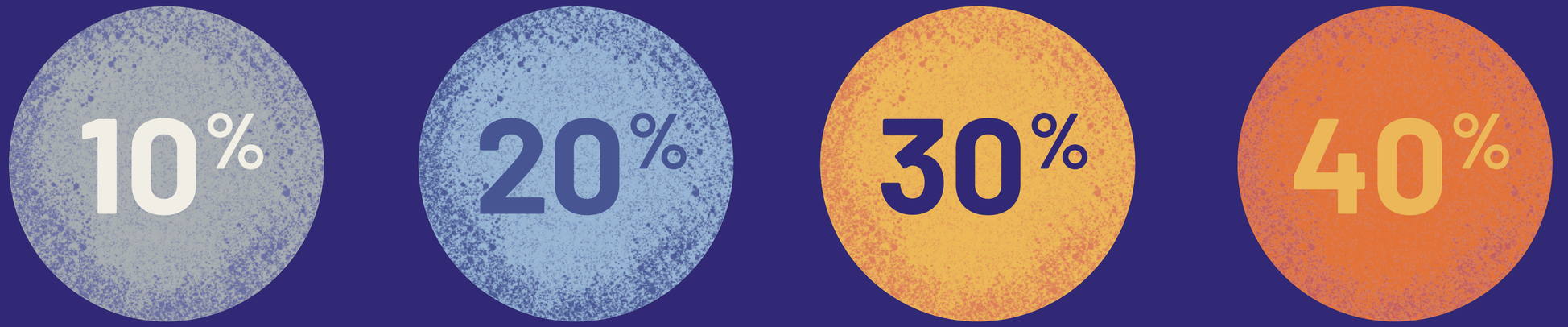
15% & 25%

Chance of having a low birthweight baby when taking into account community of residence and state of residence is between

10% & 30%



Amount related to:



Chance of having a low birthweight baby when taking into consideration community and state

Ethnic Group A: 15% & 20%

Ethnic Group B: 15% & 21%

AMOUNT RELATED TO:

Ethnicity	Chance	Individual	State	Community
0%	10%	20%	30%	40%

Contextual Variables

BIRTH WEIGHT =

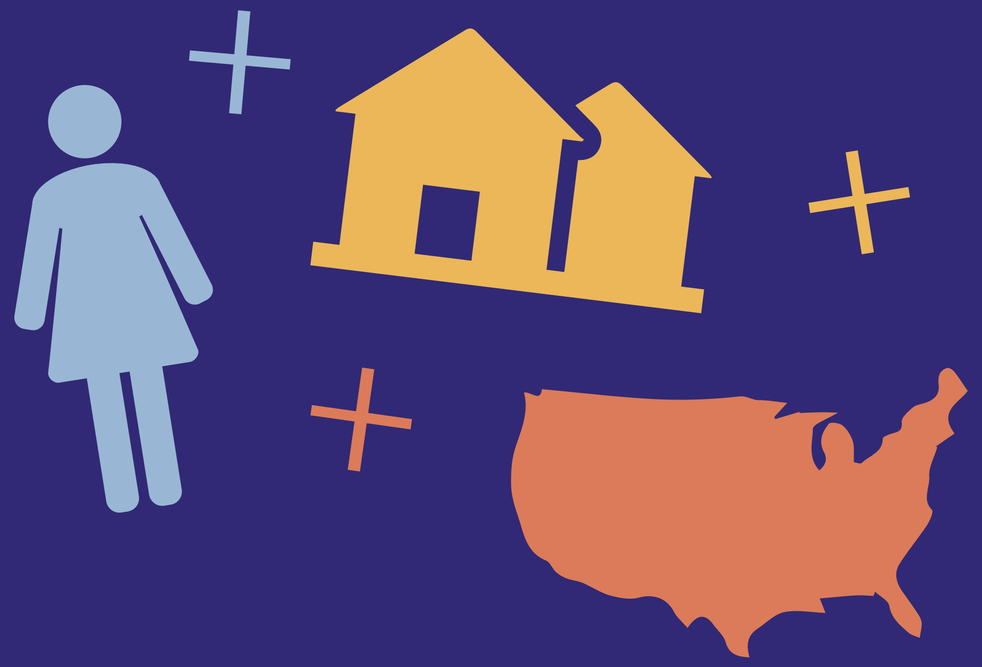
Person

Person+Ethnicity

Person+Ethnicity+Community

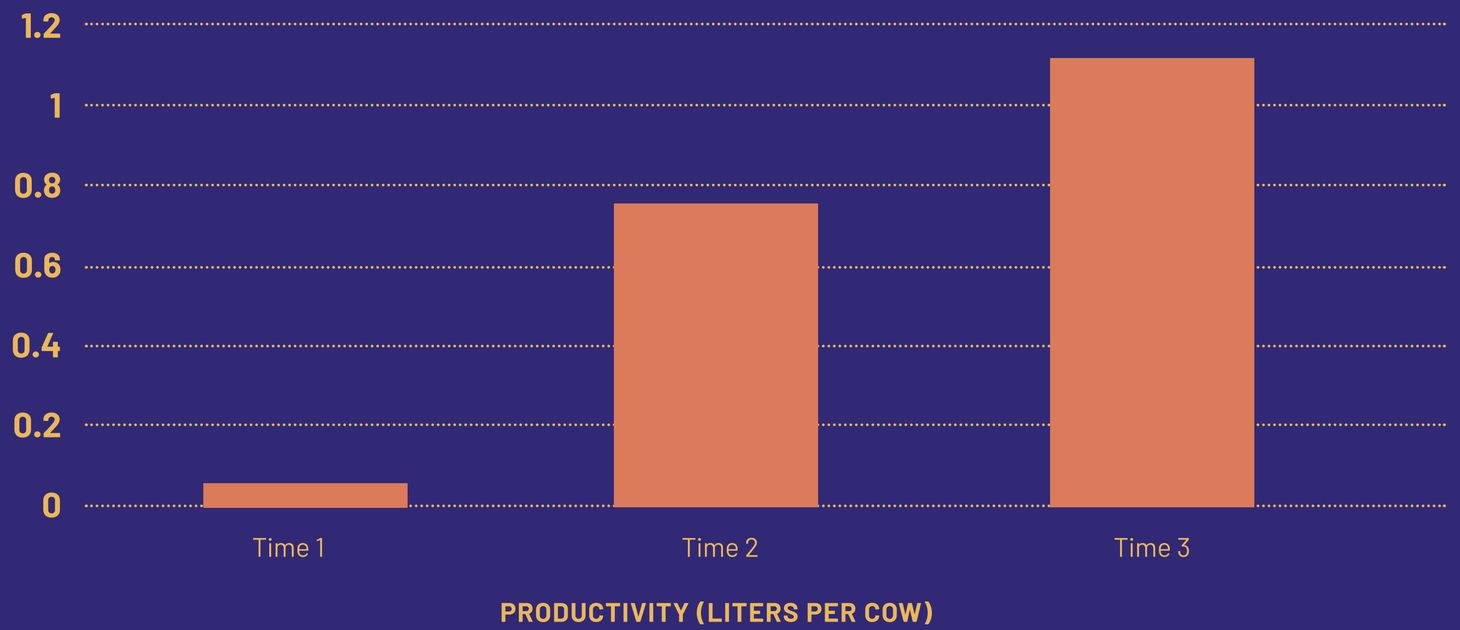
Person+Ethnicity+Community+State

Person+ Ethnicity+Community*State+C(Community)+C(State)



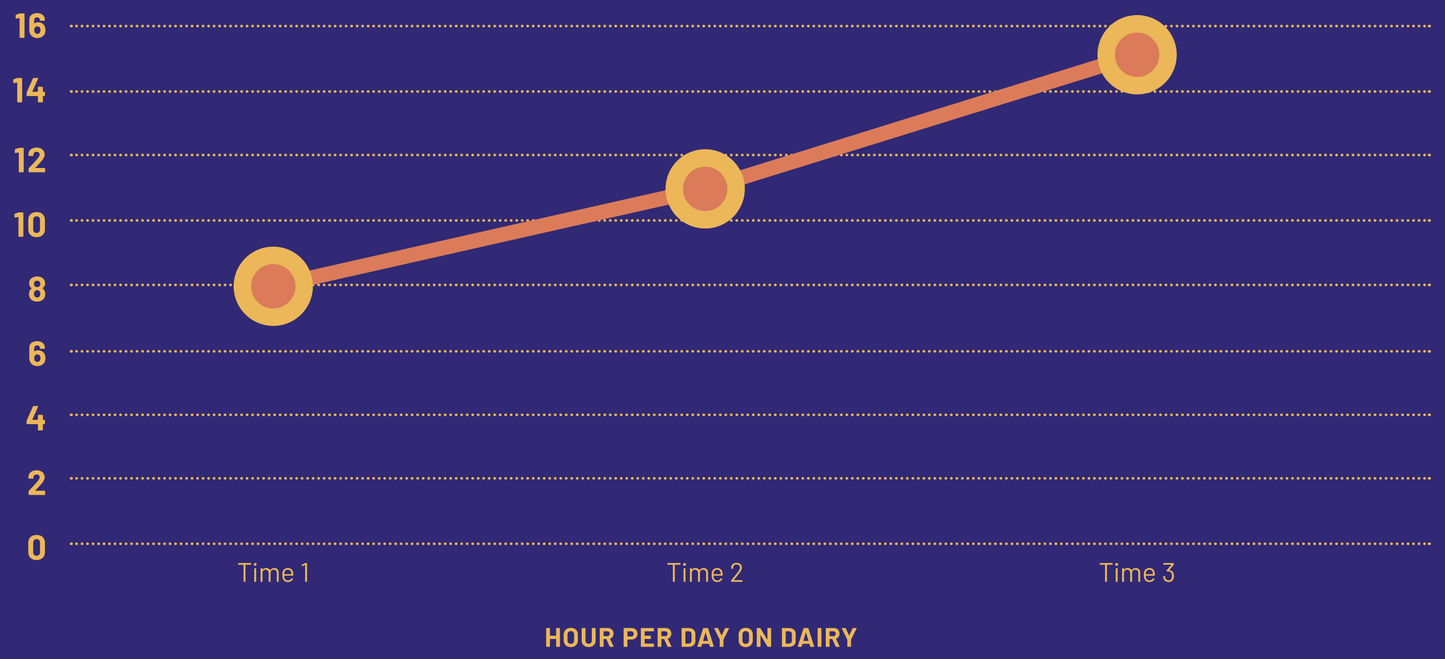
Your world view determines how you model success.

Productivity increases over time



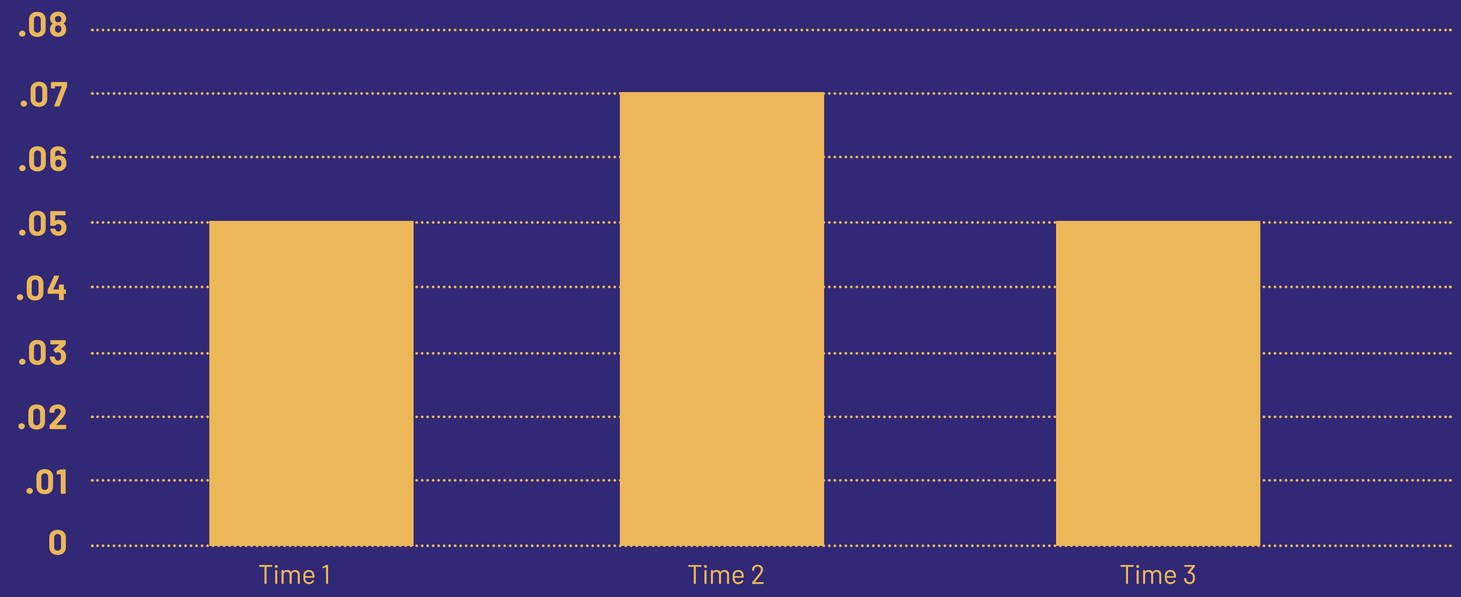
Your world view determines how you model success.

Hours of farm work increases over time



Your world view determines how you model success.

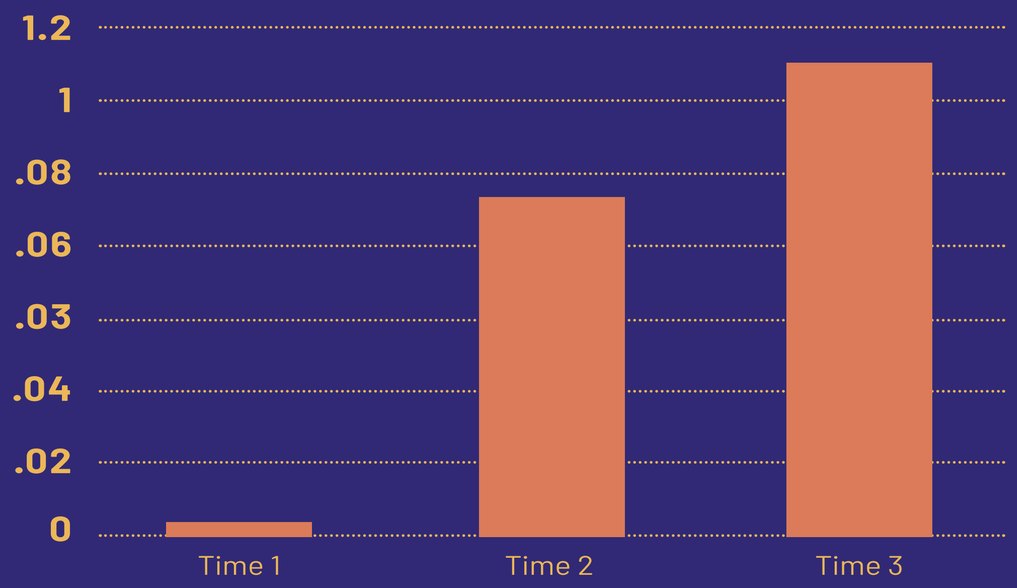
Productivity controlling for increase in work time



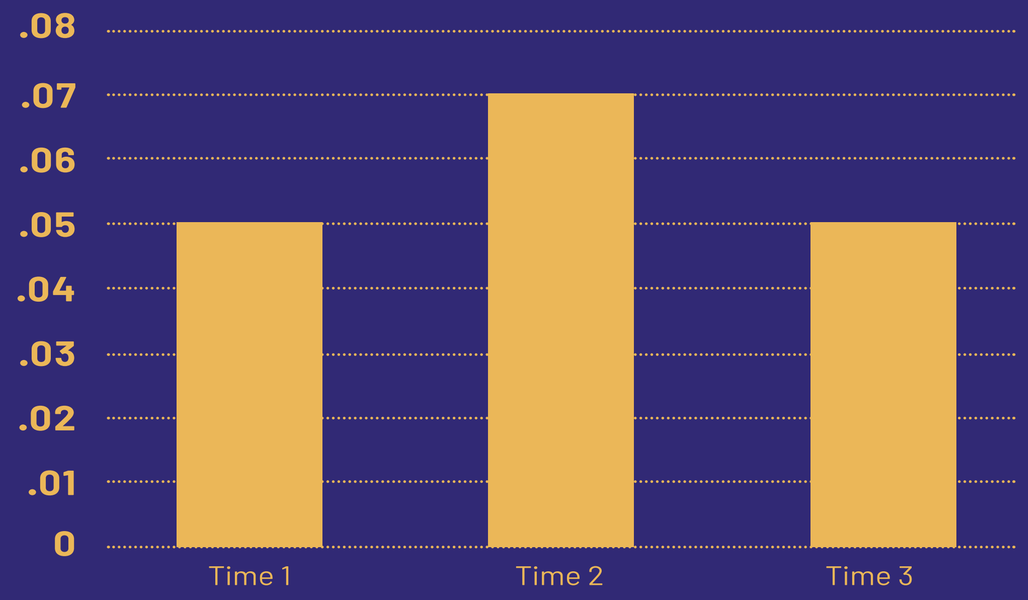
PRODUCTIVITY HOLDING HOURS STEADY

Your world view determines how you model success.

Productivity controlling for increase in work time



PRODUCTIVITY HOLDING HOURS STEADY



PRODUCTIVITY HOLDING HOURS STEADY

Questions for the Analysis Step:

How are we defining success?

Are you using biased data to set up prediction that will be biased?

What assumptions are your statistical methods making?

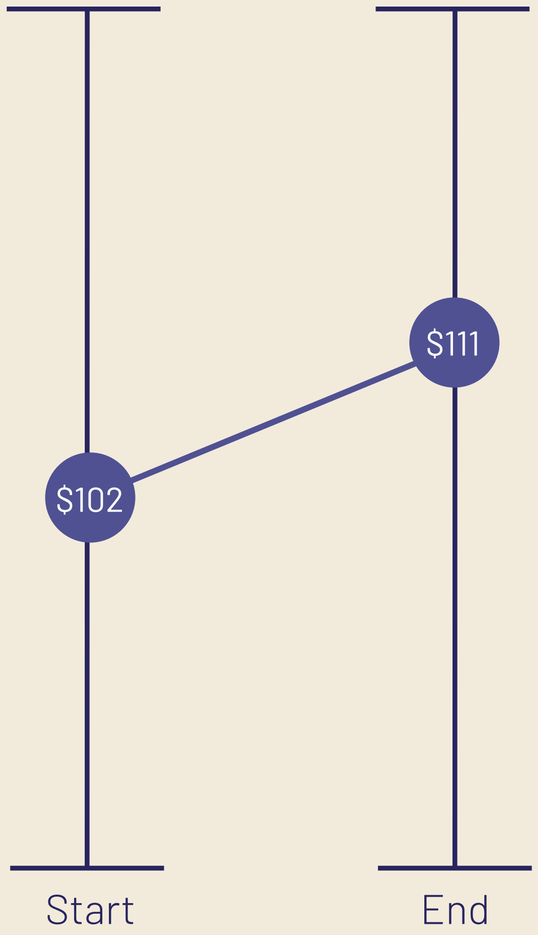
What other statistical methods could you use to ask the same questions?

What are you controlling for in your data that might be based only on your world view?

What are you not controlling for that might be important to the cultural setting you're in?

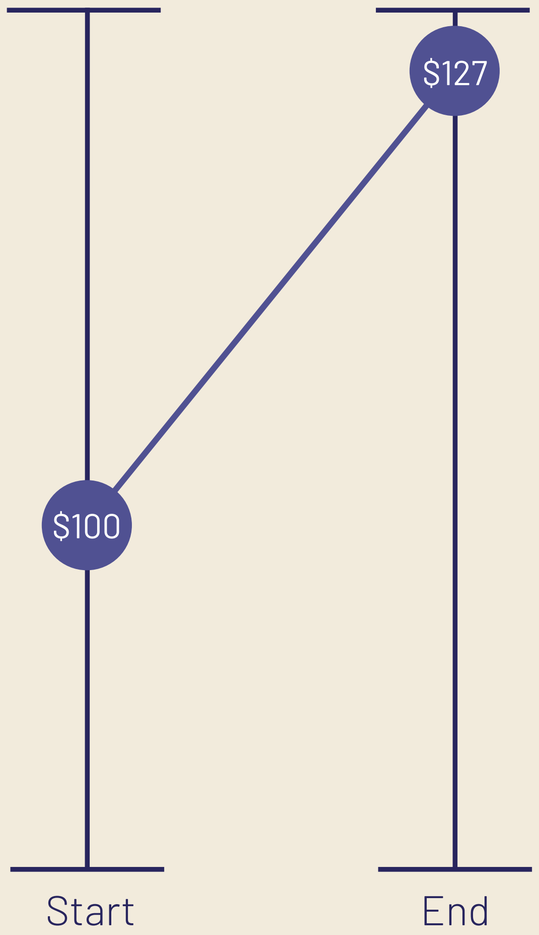
Interpretation

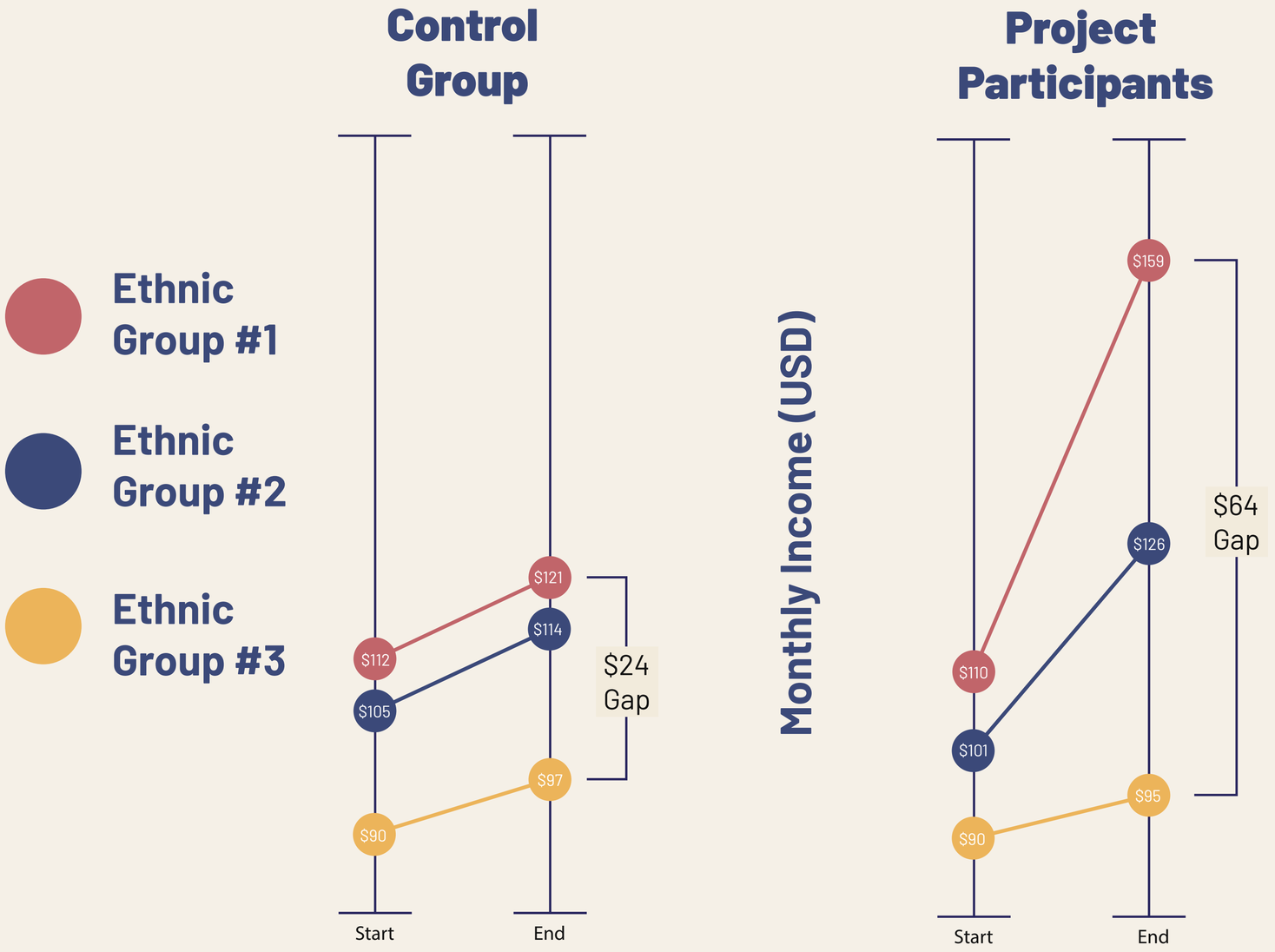
Control Group



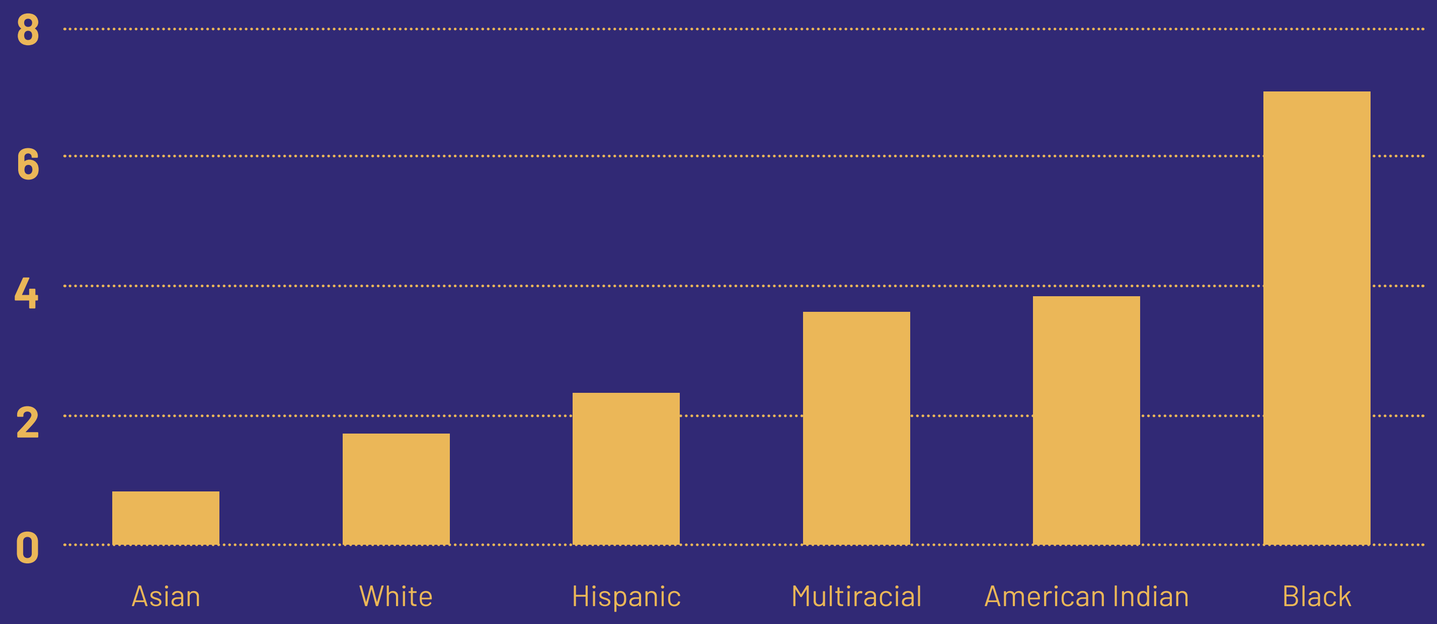
Avg. Monthly Income (USD)

Project Participants



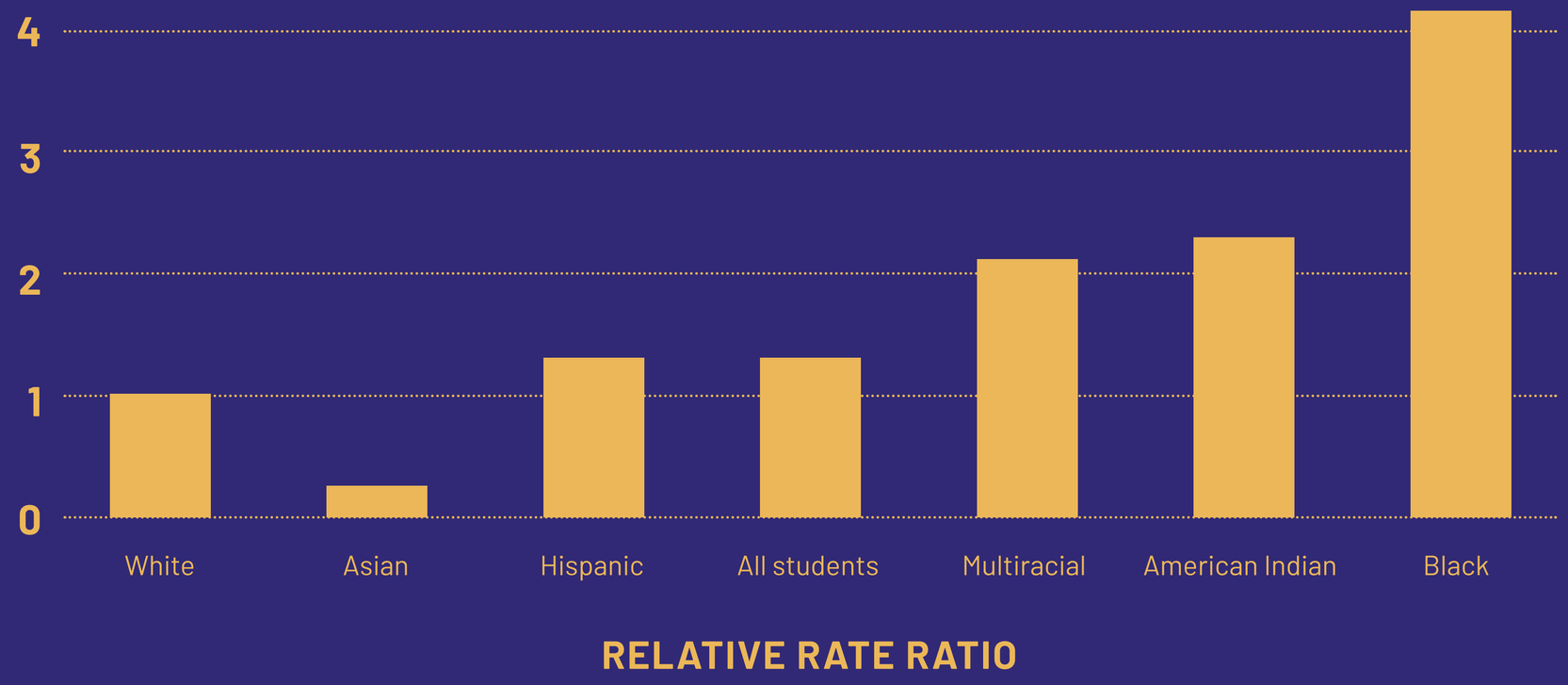

Ethnic Group #1
Ethnic Group #2
Ethnic Group #3
Control Group
Project Participants
Monthly Income (USD)
$121
$114
$112
$105
$97
$90
$24 Gap
$159
$126
$110
$101
$95
$90
$64 Gap
Start
End
Start
End

Rate of students who experienced one suspension or more, by racial/ethnic group

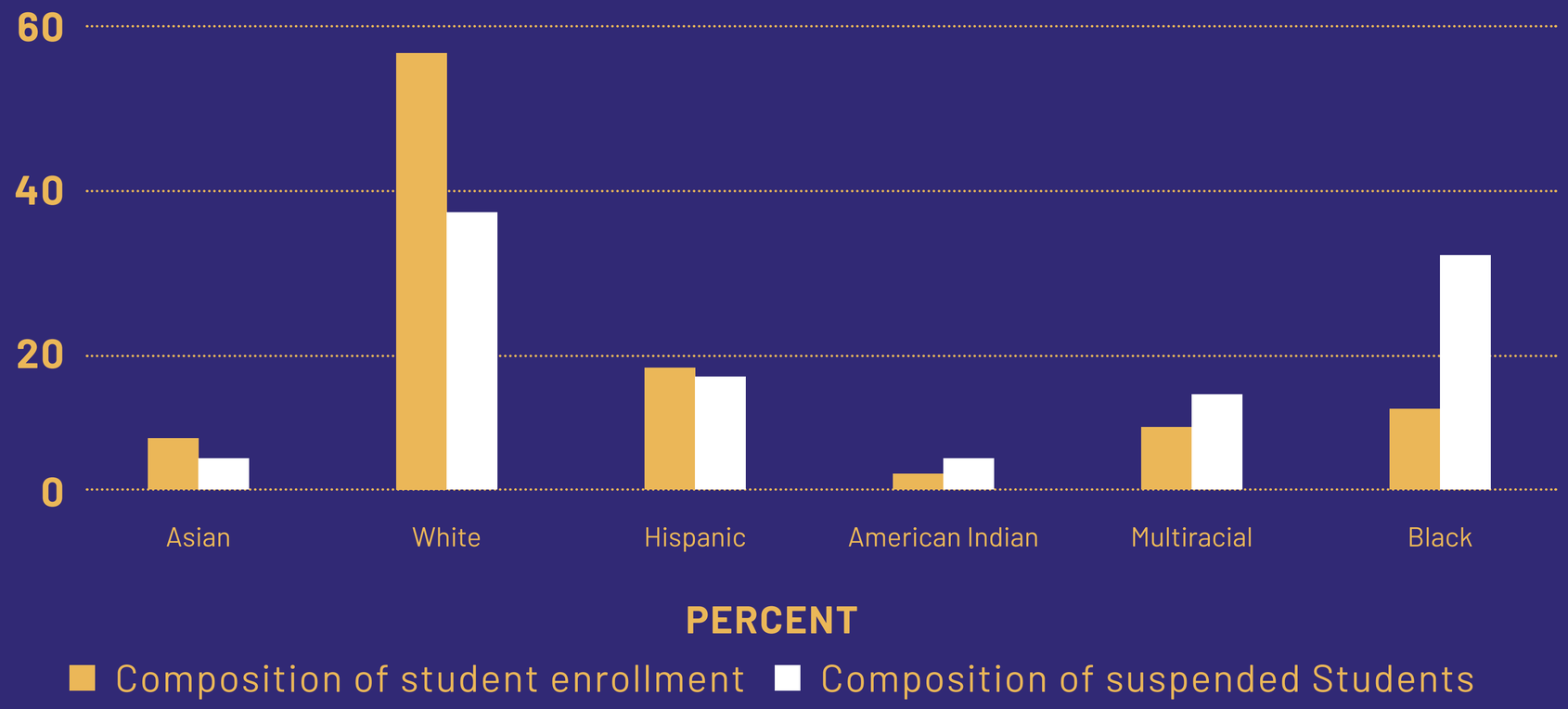


PERCENT OF STUDENTS WHO EXPERIENCED ONE OR MORE SUSPENSIONS

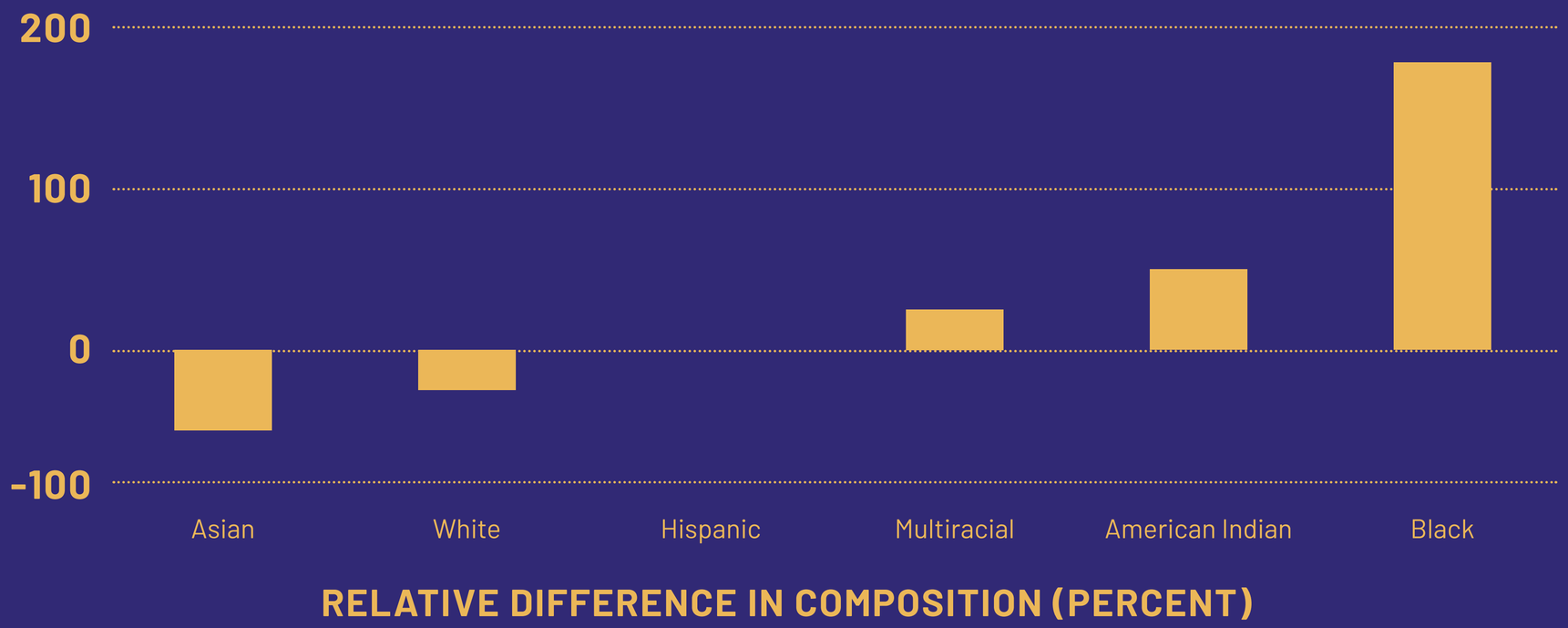
Relative rate ratios comparing the rates of students who experienced one suspension or more in specific racial/ethnic groups with the rate among White students who experienced one suspension or more.

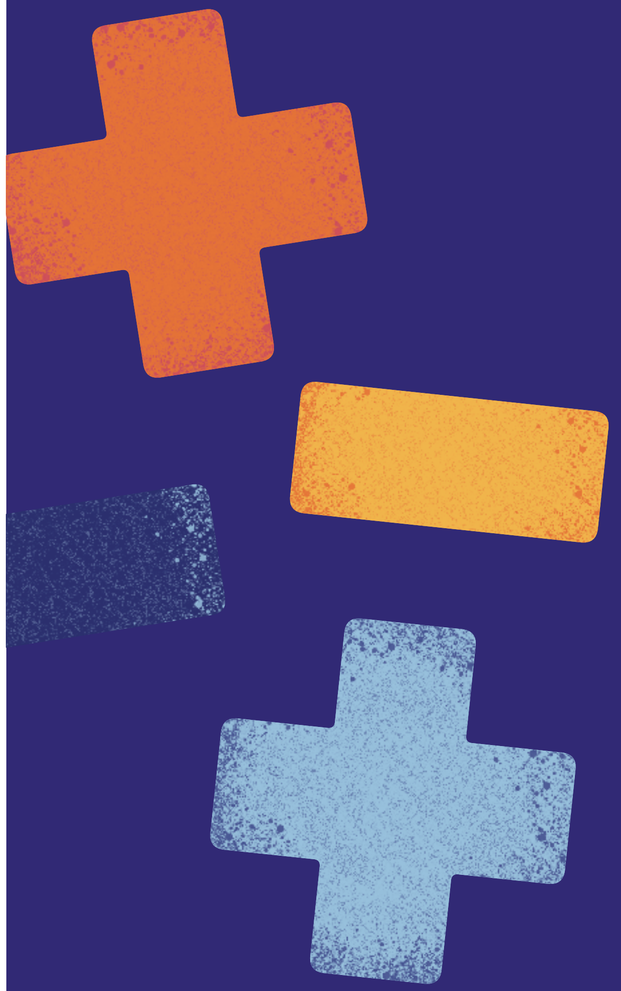


Comparison of two compositions: Proportion of the student group who were suspended and proportion of the group in the student population, by racial/ethnic group.



The relative difference in composition between the proportion of students who experienced suspensions in each racial/ethnic group and proportion of the group in the total student population.





Ways to think about fair

Equal False Negative Rates: the fraction of positives which are marked negative in each group agree.

Equal False Positive Rates: the fraction of negatives which are marked positive in each group agree.

Equal Positive Predictive Values: the fraction of those marked positive which are actually positive in each group agree.

Statistical Parity (equal positive decision rates): the fraction marked positive in each group should agree.

Questions for the Interpretation Step:

What are three alternative explanations for your results?

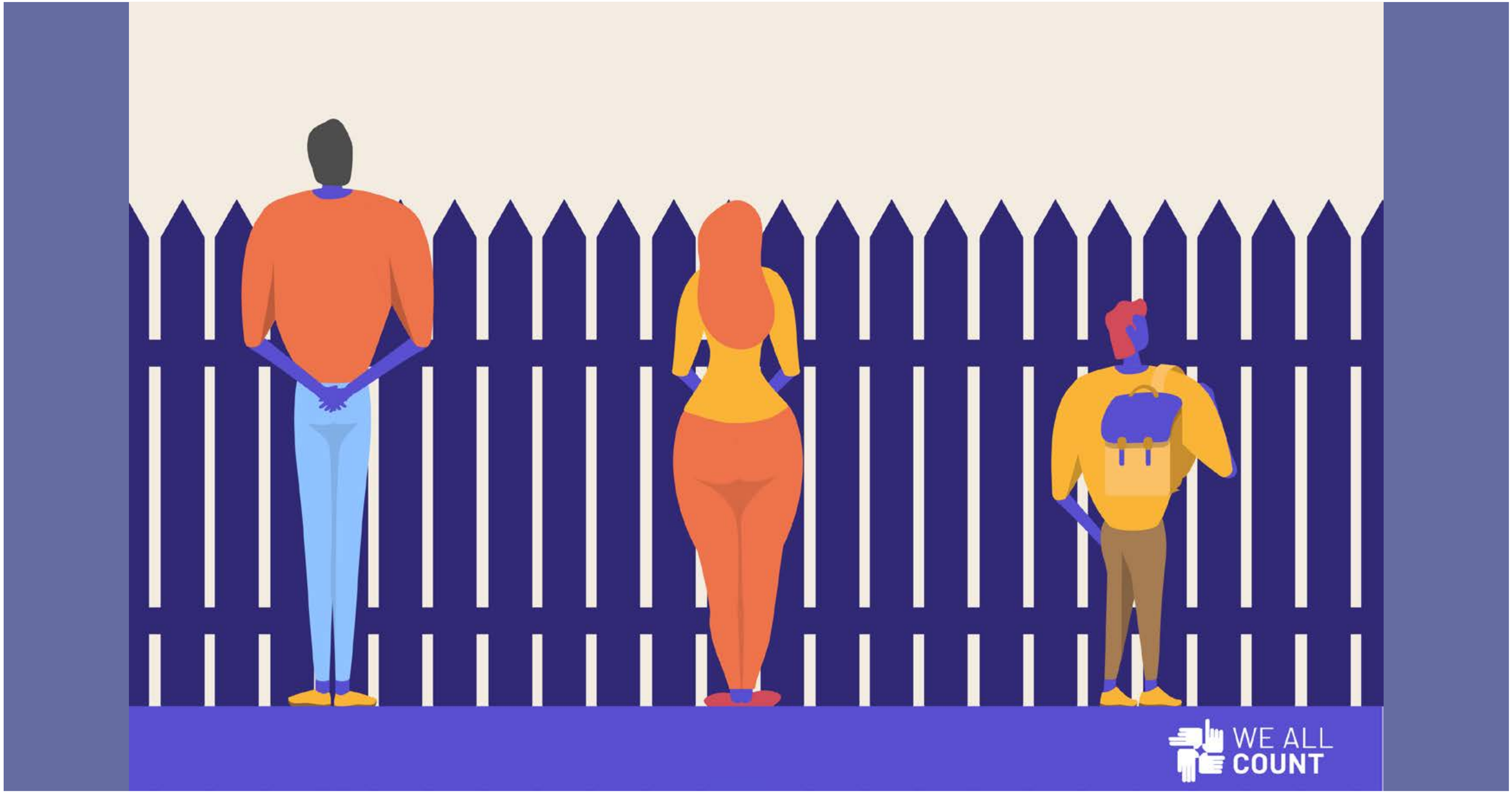
What would your interpretation be if your results were reversed?

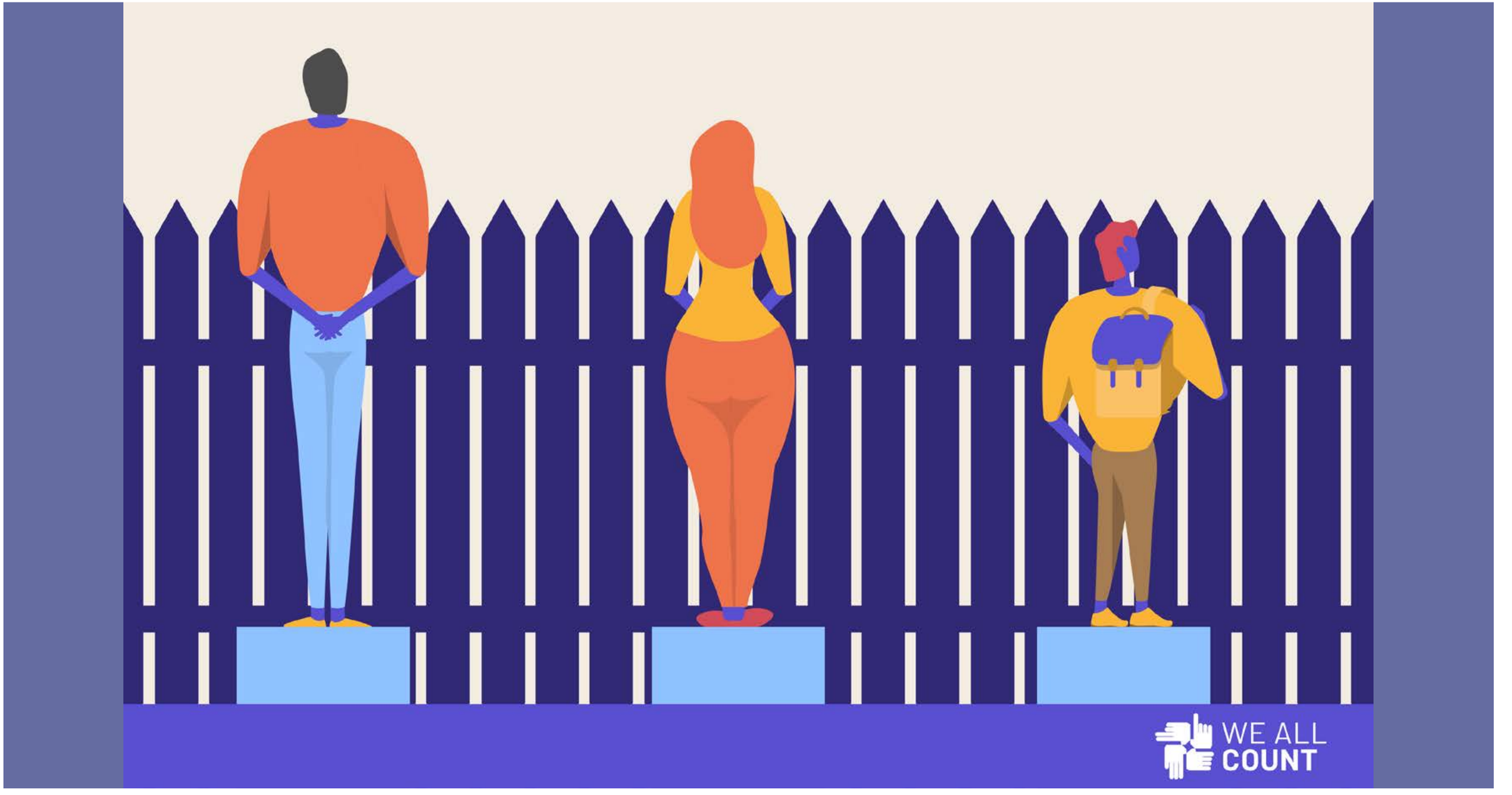
How would you describe these results to a five year old? What would their questions be?

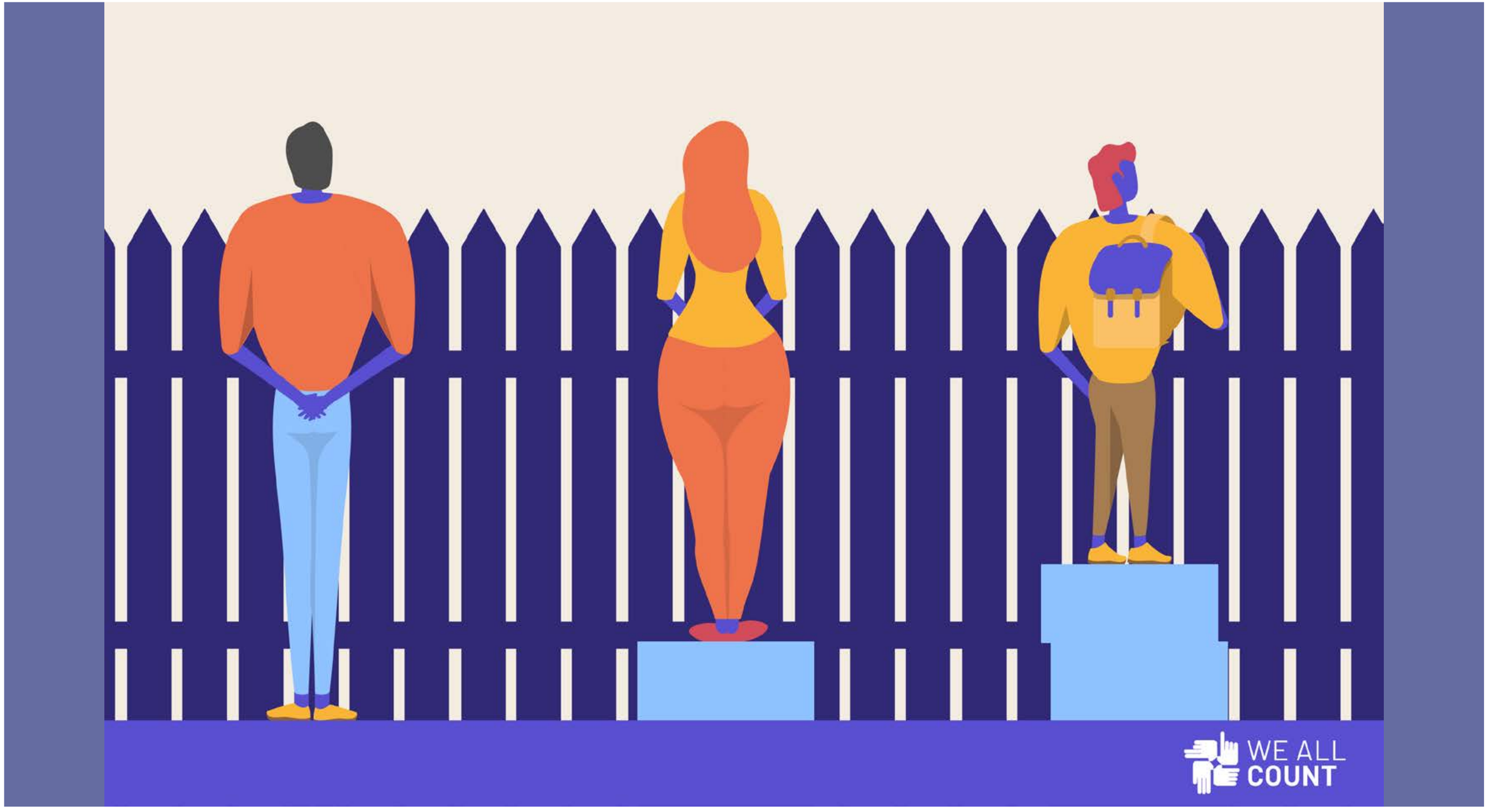
How can you break out your interpretation in an intersectional way?

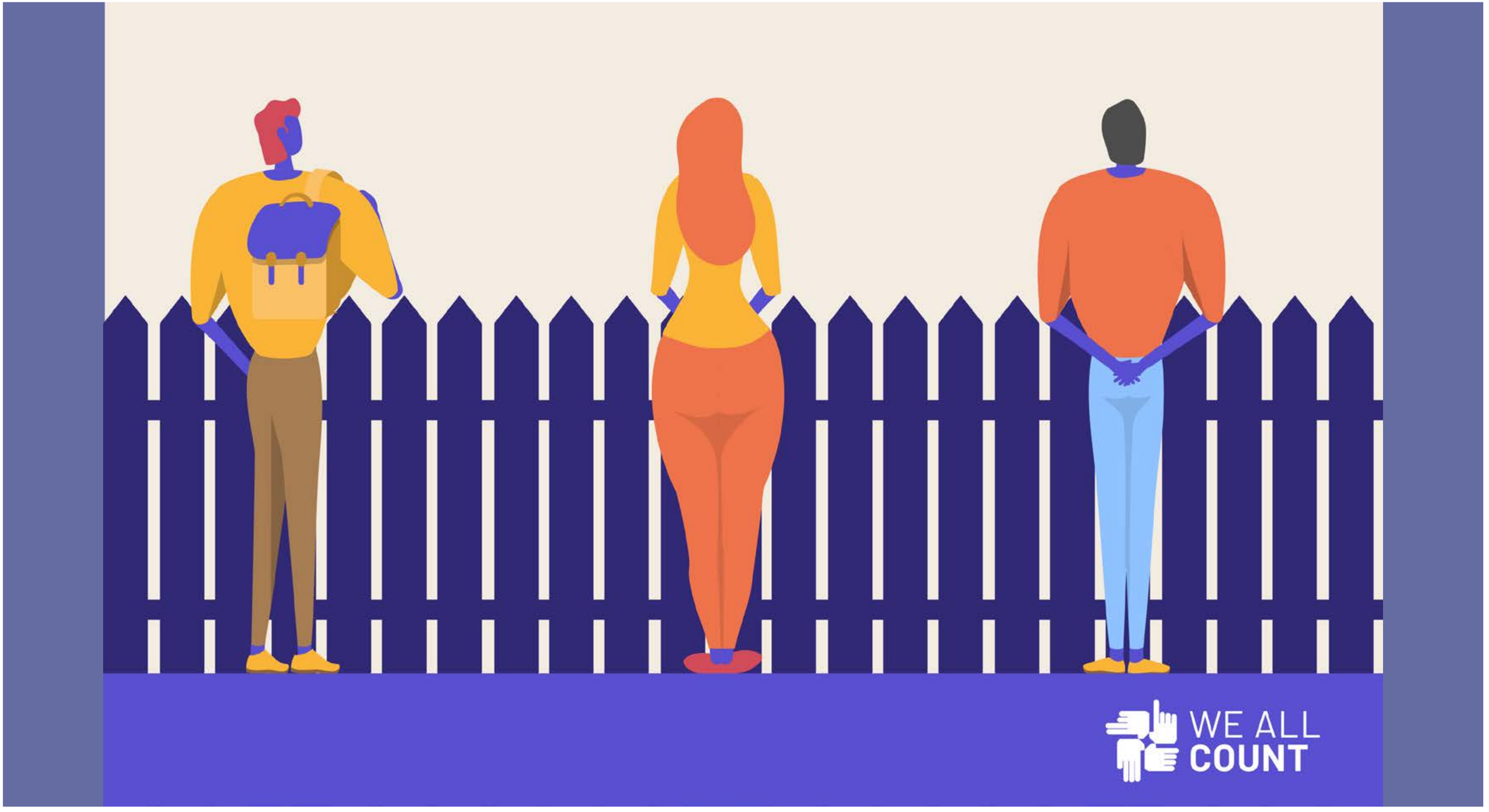
How does uncertainty and probability affect these results

Communication & Distribution


WE ALL
COUNT


WE ALL
COUNT

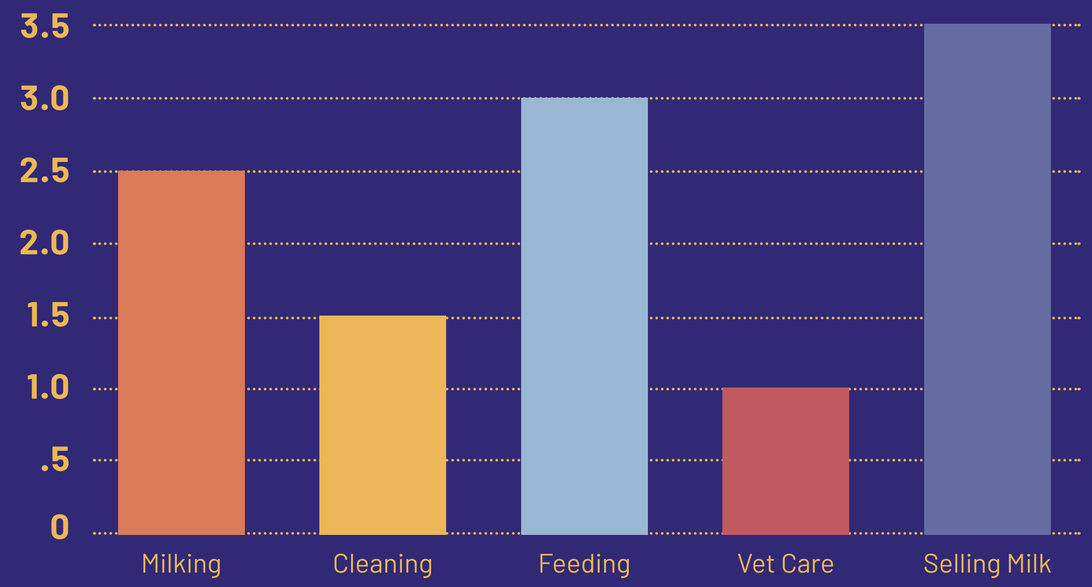

WE ALL
COUNT


WE ALL
COUNT

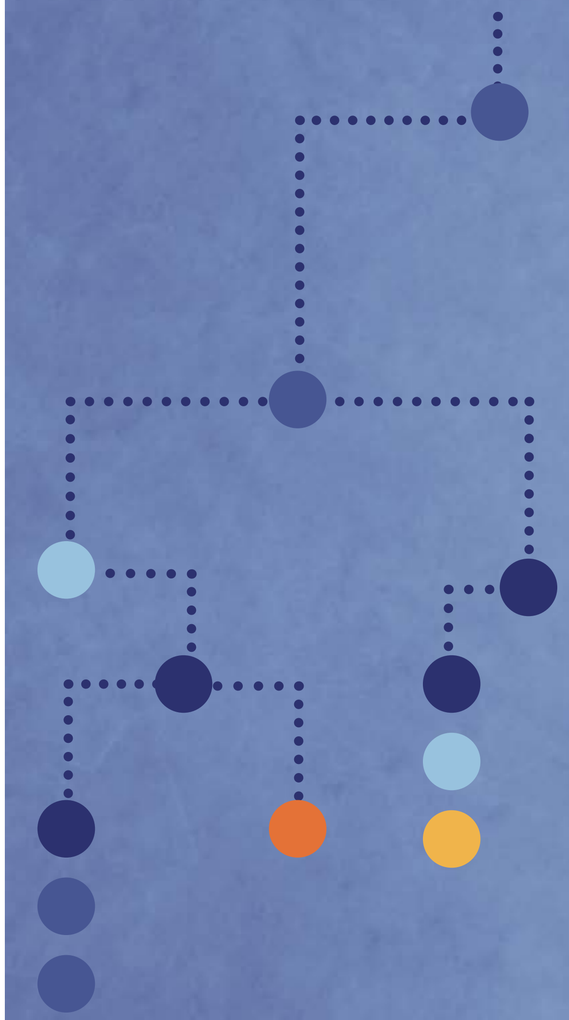

WE ALL
COUNT


WE ALL
COUNT

Data Viz “best practices” are not culturally universaly.



TIME SPENT ON DAIRY ACTIVITIES PER DAY



Lastly, consider the mediums used to distribute information.

All distribution systems come with compromises.

Questions for the Communication Step:

Who gets to see the findings? Really?

Are they in English only?

Is the graphic design reflect the cultural and cognitive preferences of which power group?

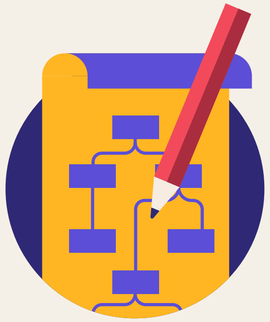
Where is the locus of power in the visual and written communication?

Does the result and communication require internet access?

Sources of bias can be identified in each step of the data life cycle.

Funding

Motivation



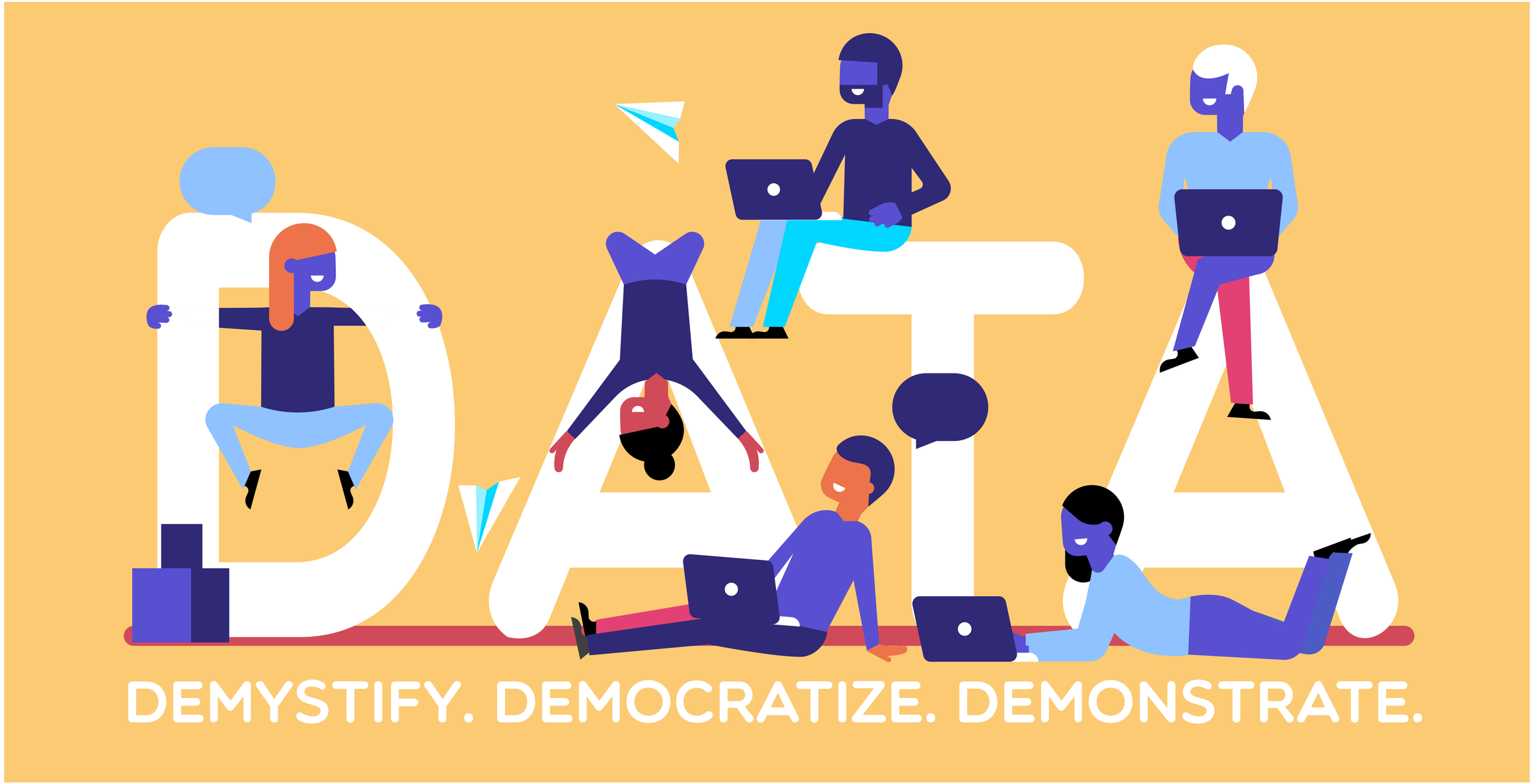
Project Design

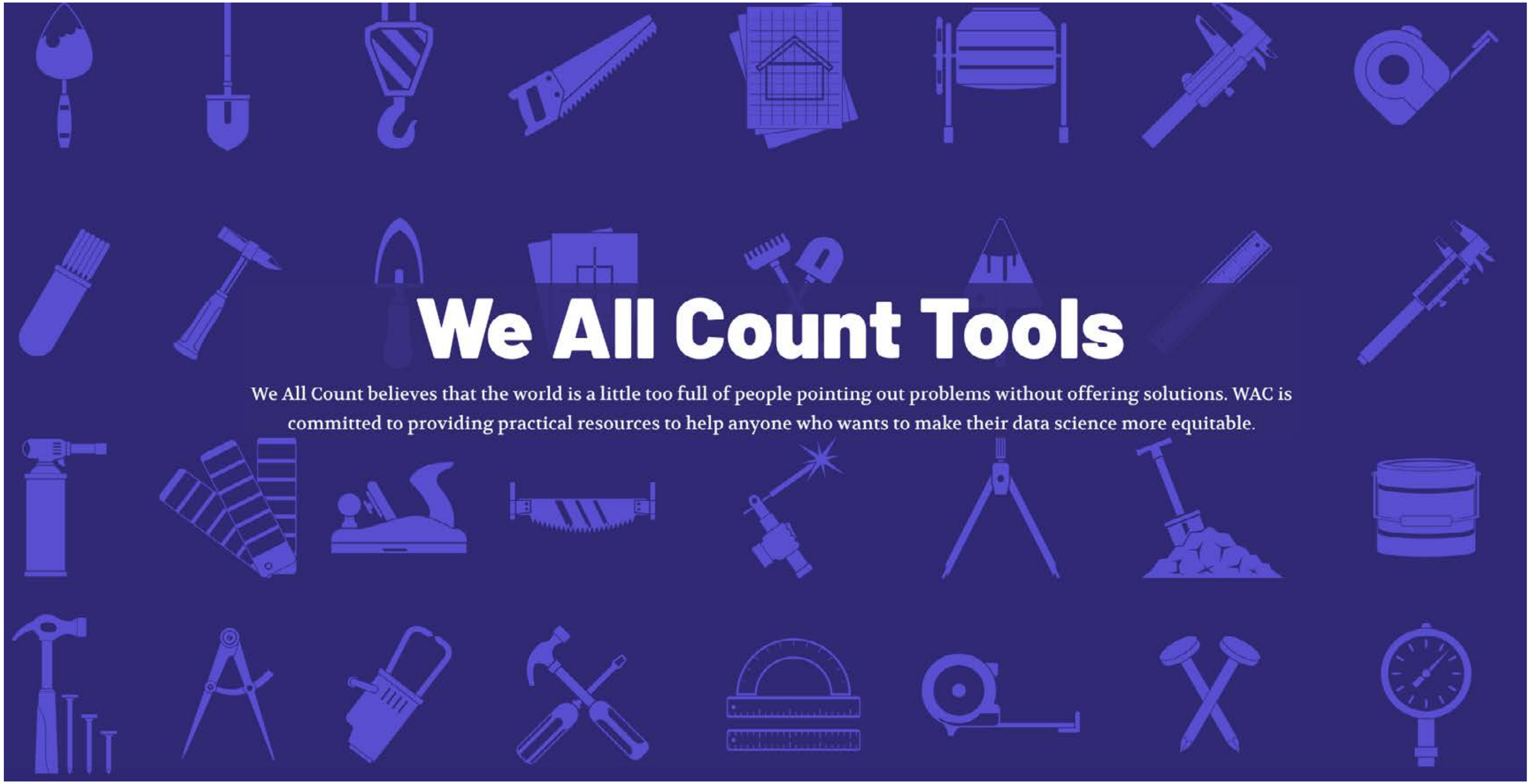
Data Collection & Sourcing

Analysis

Interpretation

Comunication & Distribution


DEMYSTIFY. DEMOCRATIZE. DEMONSTRATE.



We All Count Tools

We All Count believes that the world is a little too full of people pointing out problems without offering solutions. WAC is committed to providing practical resources to help anyone who wants to make their data science more equitable.

Thank you.

WeAllCount.com

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