Foundations of Data Equity

WE ALL COUNT

project for equity
in data science

The worst equity problem facing data science is that people are making predjudiced choices but they don't know it.

We want a “silver bullet” against bias, prejudice, human error, and injustice.

What is the average number of students across these three classrooms?

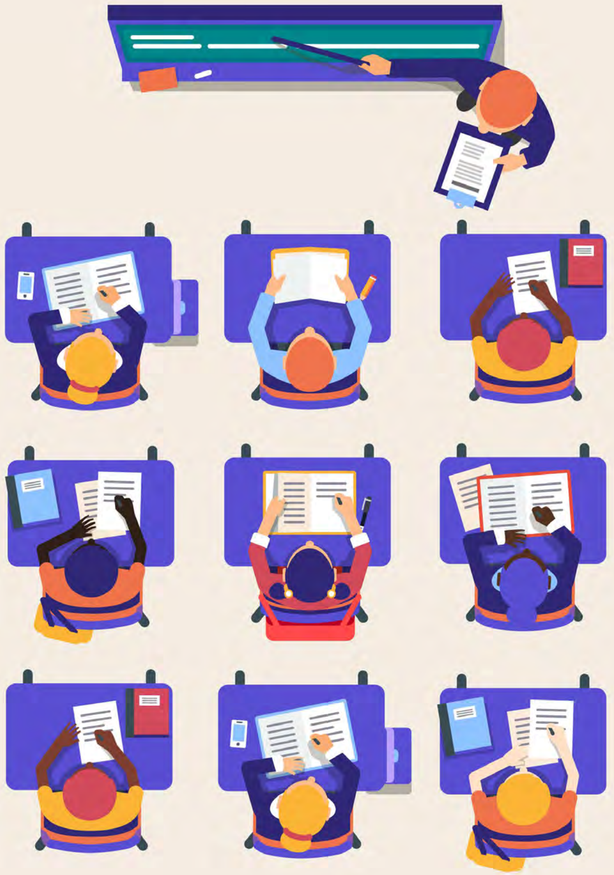
CLASSROOM A

3

CLASSROOM B

6

CLASSROOM C



9

If you got 6, you're right.

If you got 7, you're right.

You just did the same math, but from different perspectives.

From the teachers' perspective:

$$3 + 6 + 9 = 18$$

$$18 \div 3 = 6$$

From the students' perspective:

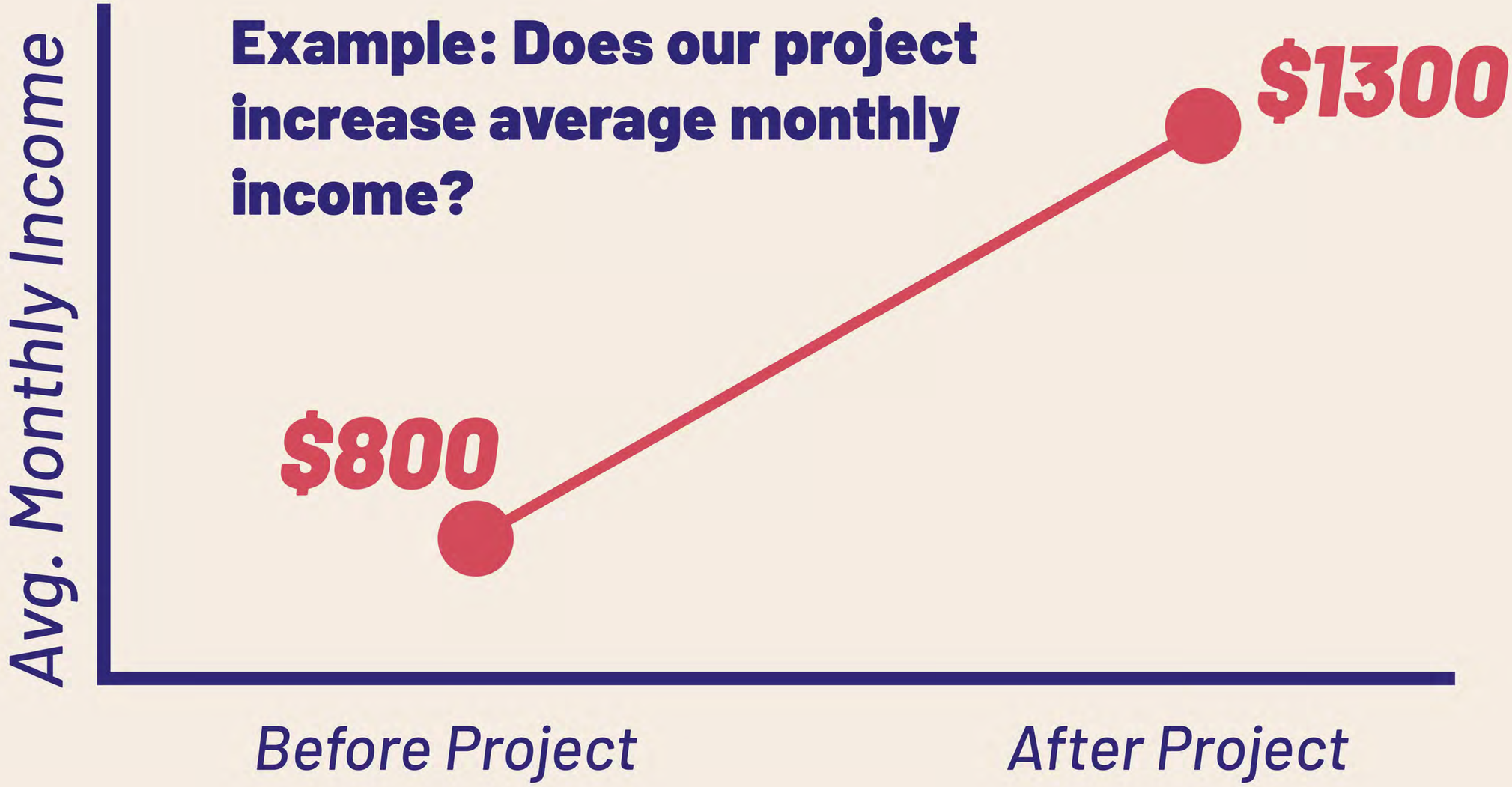
3 + 3 + 3 + 6 + 6 + 6 + 6 + 6 + 6 + 6 + 9 +
9 + 9 + 9 +9 + 9 + 9 + 9 + 9 + 9 = 126

126 ÷ 18 = 7

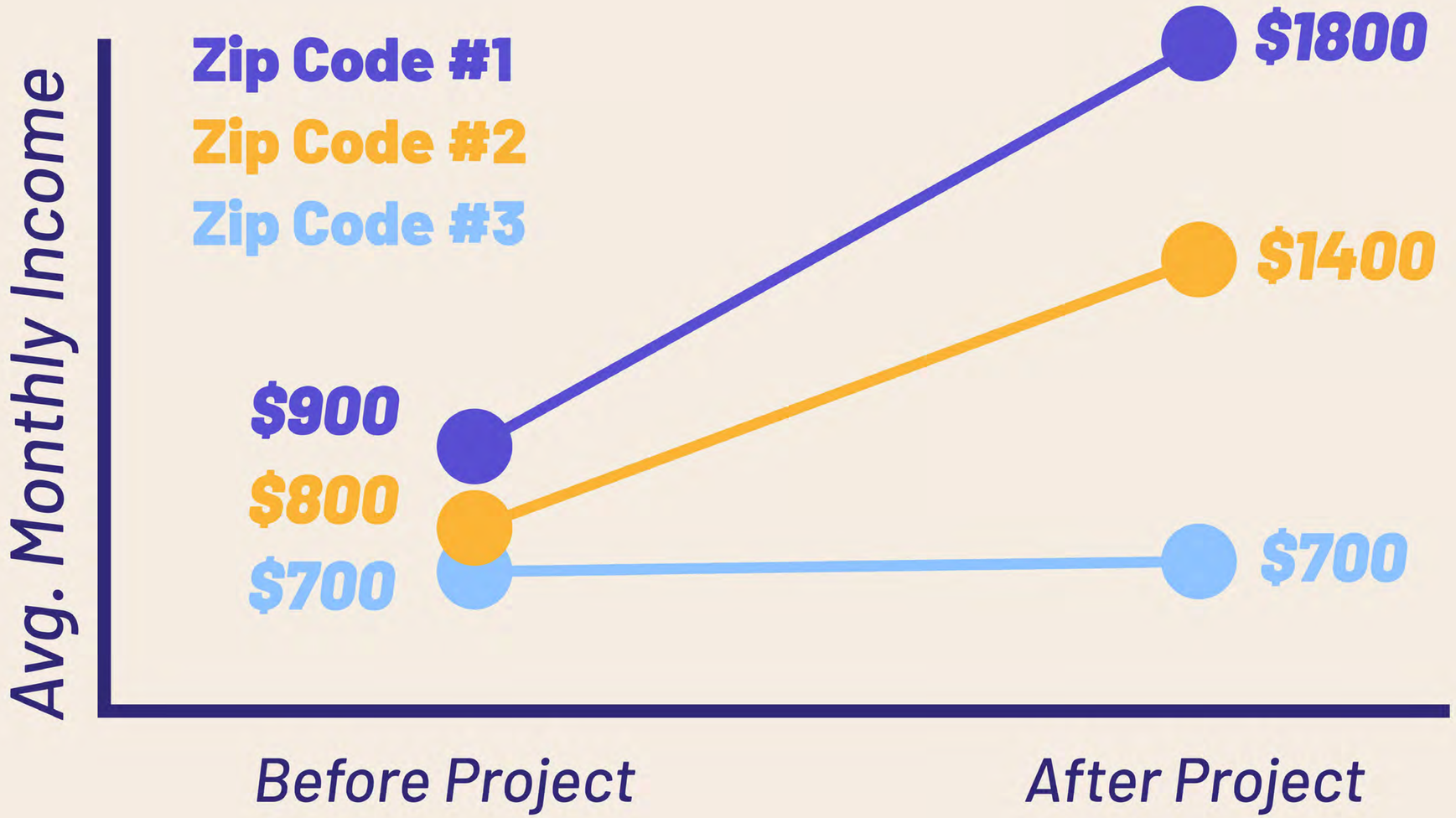

A B A B A B A B
A A
A B A B A B A B
A A
A B A B A B A B
A B A B A B A B

Is our project a success?

Example: Does our project increase average monthly income?



Is our project a success?



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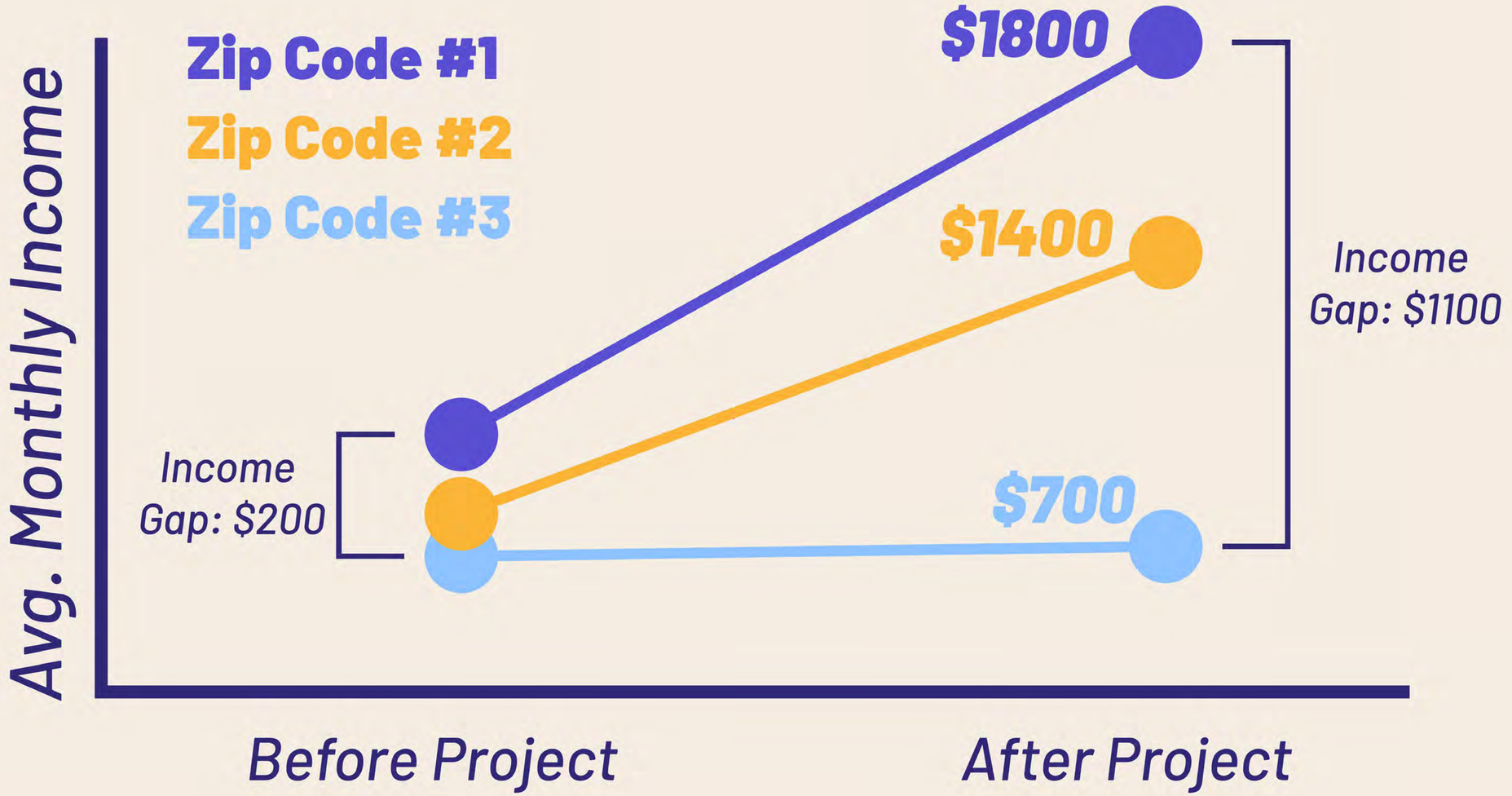
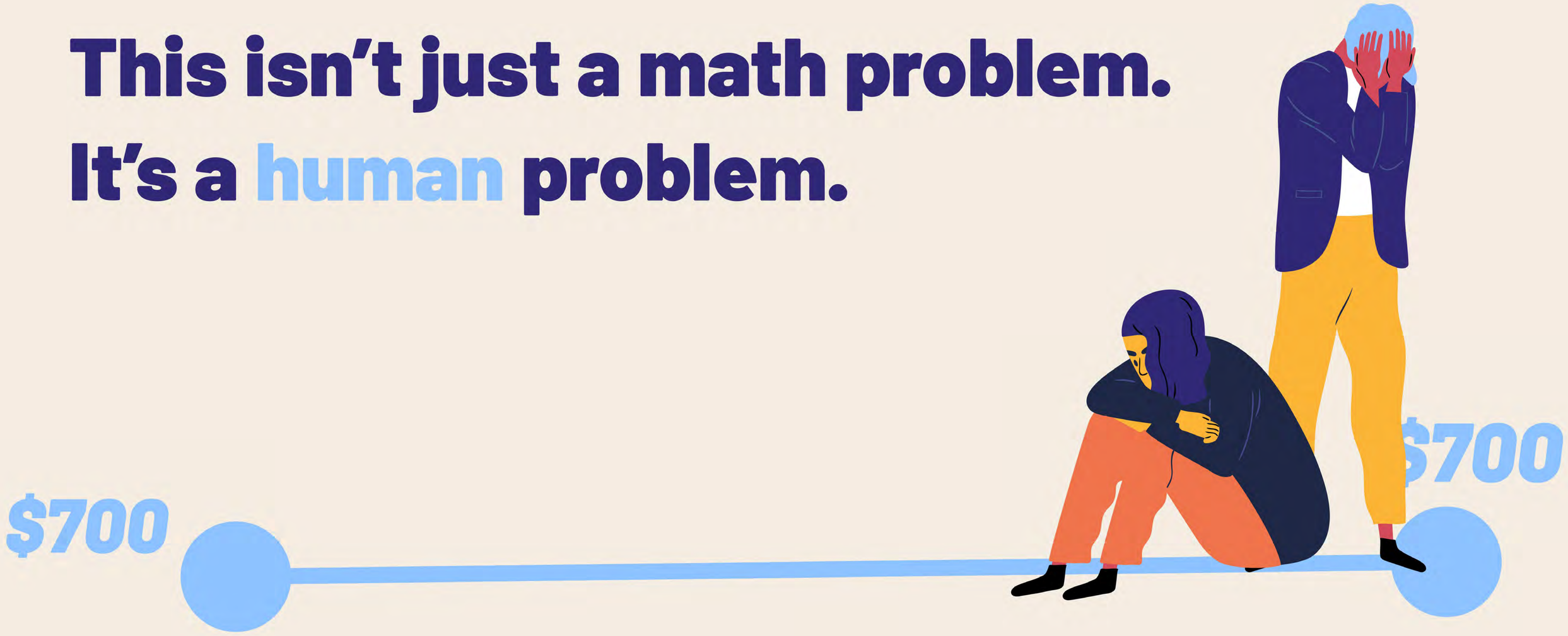


This isn't just a math problem. It's a human problem.



We want to think of data science like this:

CHOOSE: What question should we ask?

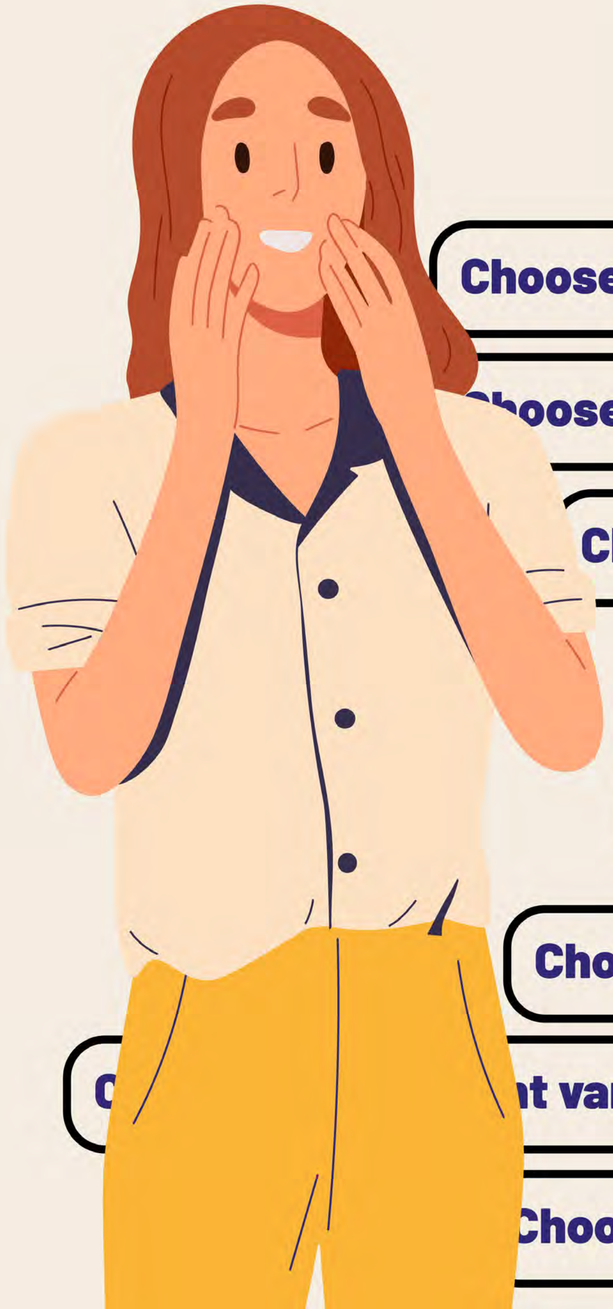
Objective Data

Objective Analysis

Objective Results

Objective Decision

It's a lot more like...



Choose source

Choose effect

Choose research question

Choose scale

oose covariates

Choose definitions

Choose criteria

Choose methodology

Choose scope

Choose moderators

Choose cutoffs

Choose mechanism

Choose enumerators

Choose project design

Choose denominators

Choose timeframes

Choose mediators

Choose resolution

Choose metrics

Choose controls

Choose language

Choose relationships

t variables

Choose data cleaning

Choose collection tool

Choose model

Choose dependent variables

Choose sample

Choose identity categories


THIS TALK
CAN'T BE
UNSEEN...

There is no ‘right’ choice.

Equity is a process not a binary state.

"We were aware that we were asking them to give up some work time to come to the trainings and we didn't want them to be penalized for that, so we controlled for it in the model.

We were patting ourselves on the back for being so equity-minded."

“I can’t wait to get out of this program...”

“You think this was a success?!”

“I’ve barely slept in a month!”

Uh oh...

$$\hat{Y} = b_0 + b_1T_1 + b_2Time_2 + \ldots + b_pX_p$$

(If you do twice as much work, you'll get twice as much product.)

The first model wasn't "wrong".

But the new model was a better choice because it reflected the equity that we wanted it to.

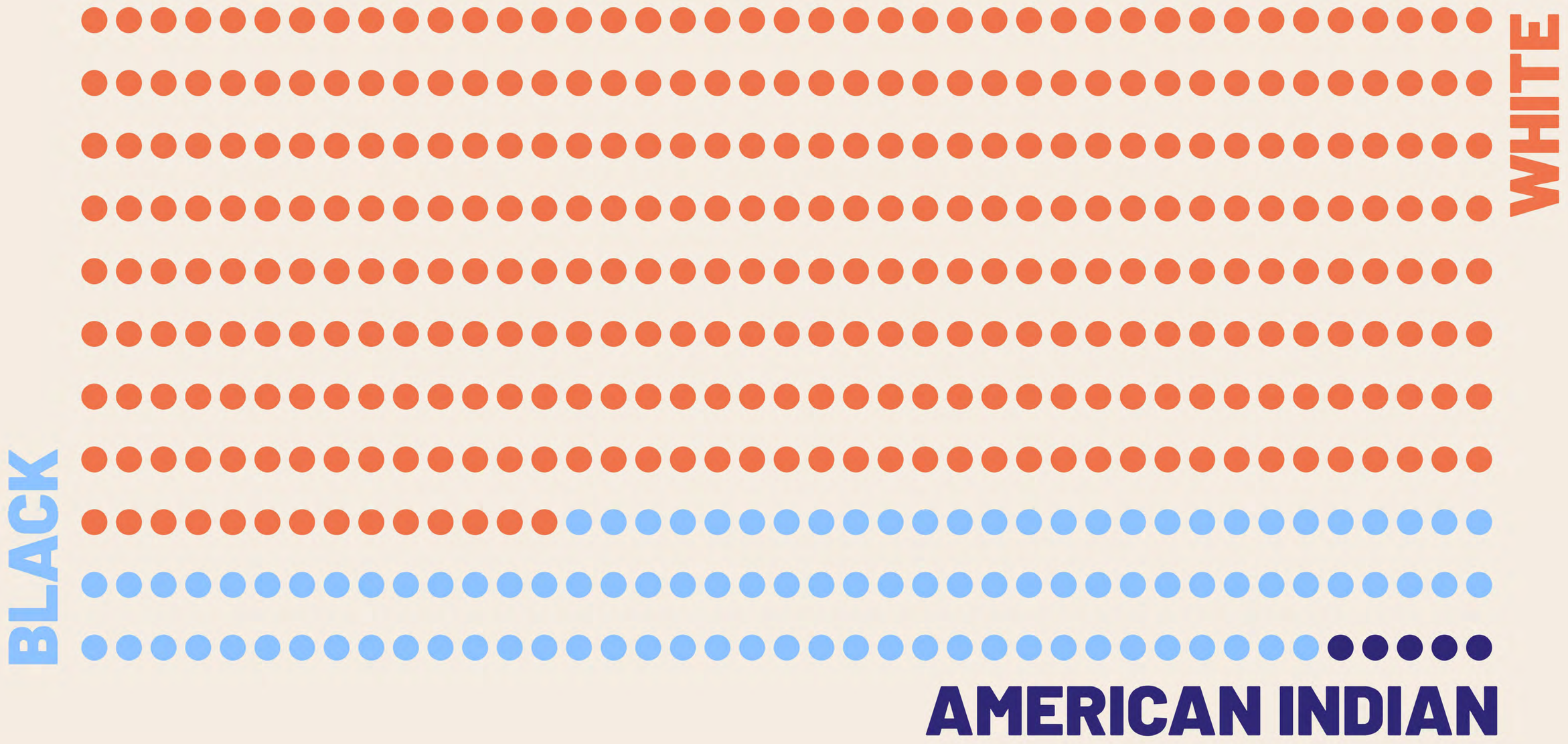
We got two totally different answers even though we were using:

The same data.
The same research question.
The same methodology.
The same analysts.

Even controlling for the same variables.

Every choice reflects a worldview.

Even the smallest choices can have huge impacts.


WHITE
BLACK
AMERICAN INDIAN

~~Their~~ results are not statistically significant.

Our results are ~~not statistically significant~~.

Our results contain uncertainty.

Our results contain uncertainty because...

Choosing Data Equity...

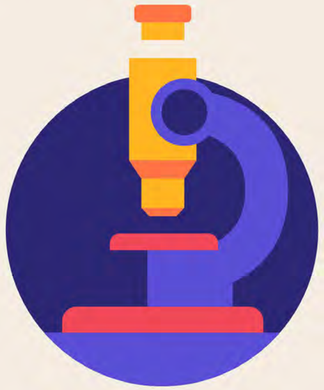
The Data Equity Framework

Funding

Motivation

Project Design

Data Collection



Analysis

Interpretation

Communication

The Data Equity Framework addresses equity issues systematically in each step of a data project. Some form of these steps is universal to all types of data projects.

Funding

Motivation

Project Design

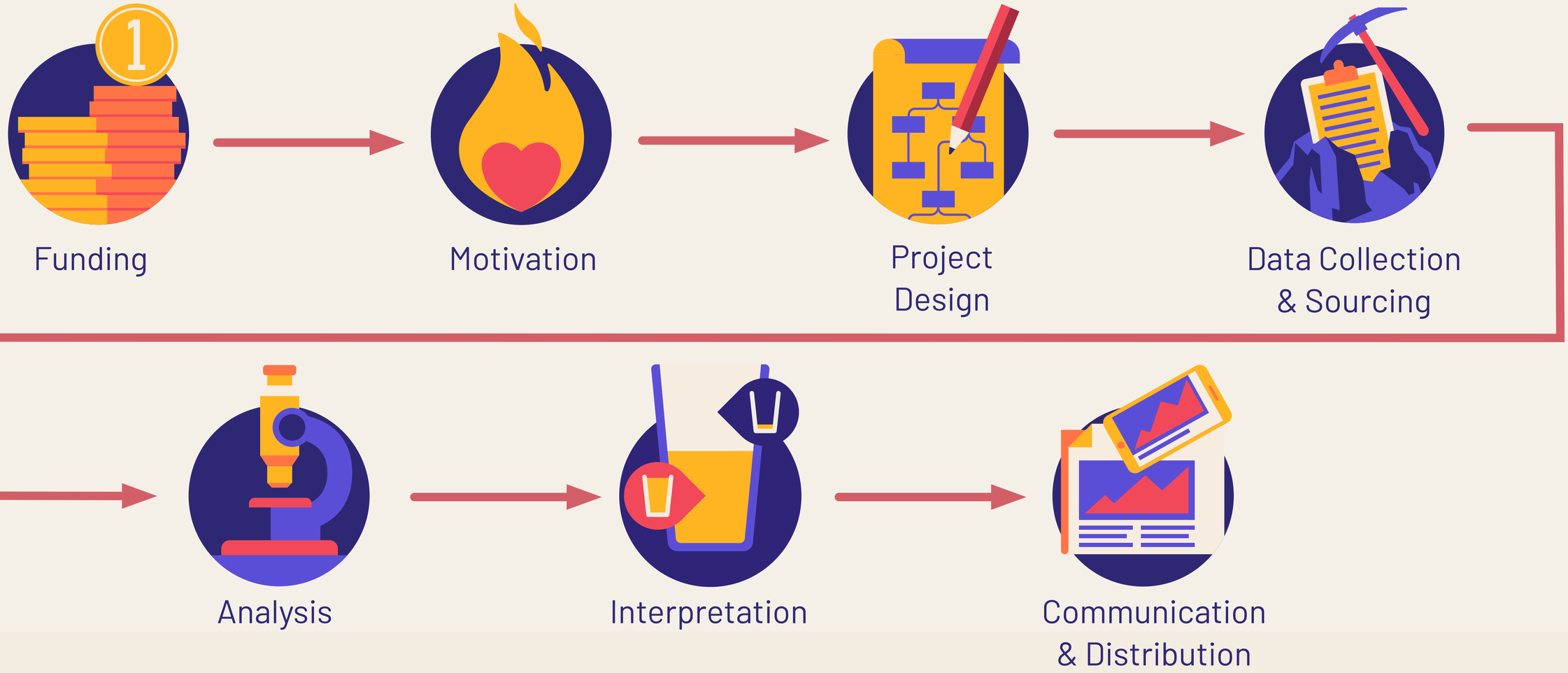
Data Collection & Sourcing

Analysis

Interpretation

Communication & Distribution

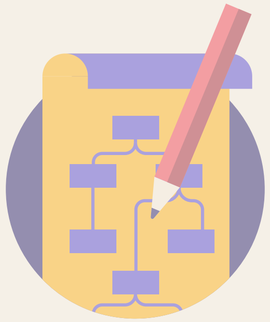
The *order* of steps reflects the typical data project proccess, but you can address them in any order.



Even if you can only address some of the steps in your project, it is still worth doing.

Funding

Motivation



Project Design

Data Collection & Sourcing

Analysis

Interpretation

Communication & Distribution

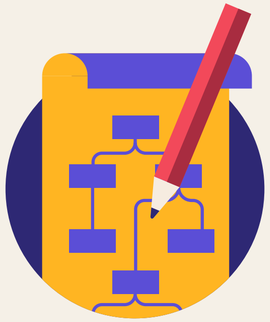
What you do in each step of the Data Equity Framework will have equity *impacts* and *interactions* in other steps and your project as a whole.

The Data Equity Framework works *holistically* and *individually*.

Our plan for this workshop:

Funding

Motivation



Project Design

Data Collection & Sourcing

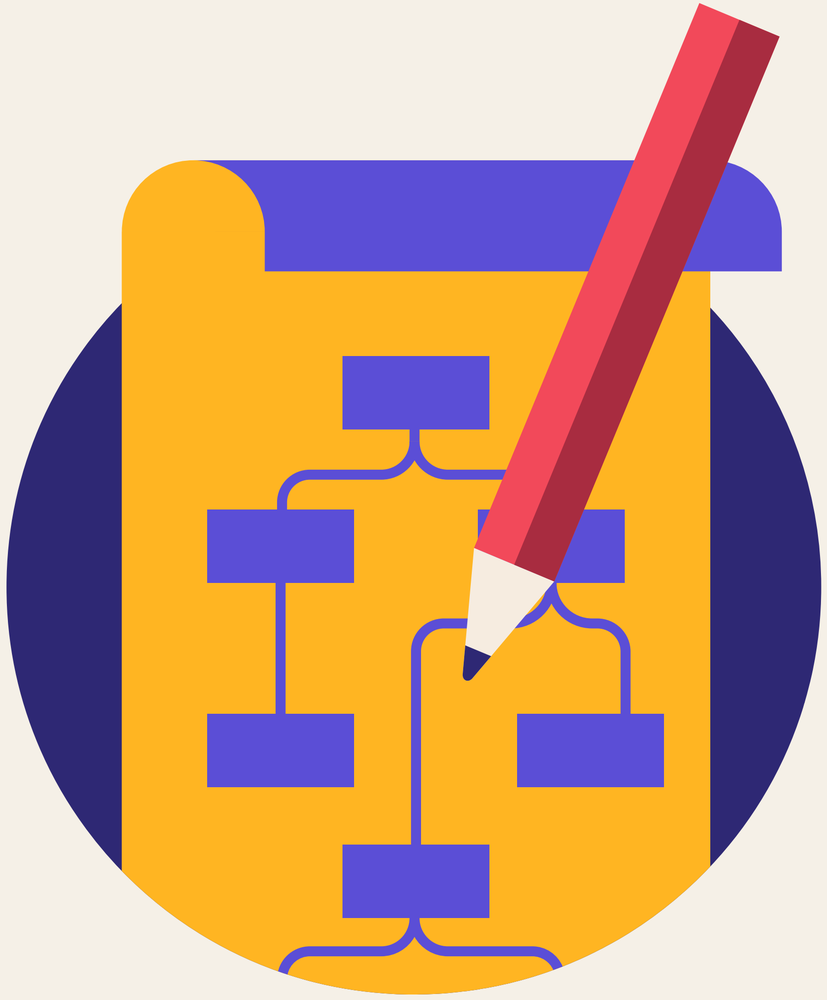
Analysis

Interpretation

Communication & Distribution

Funding

Motivation



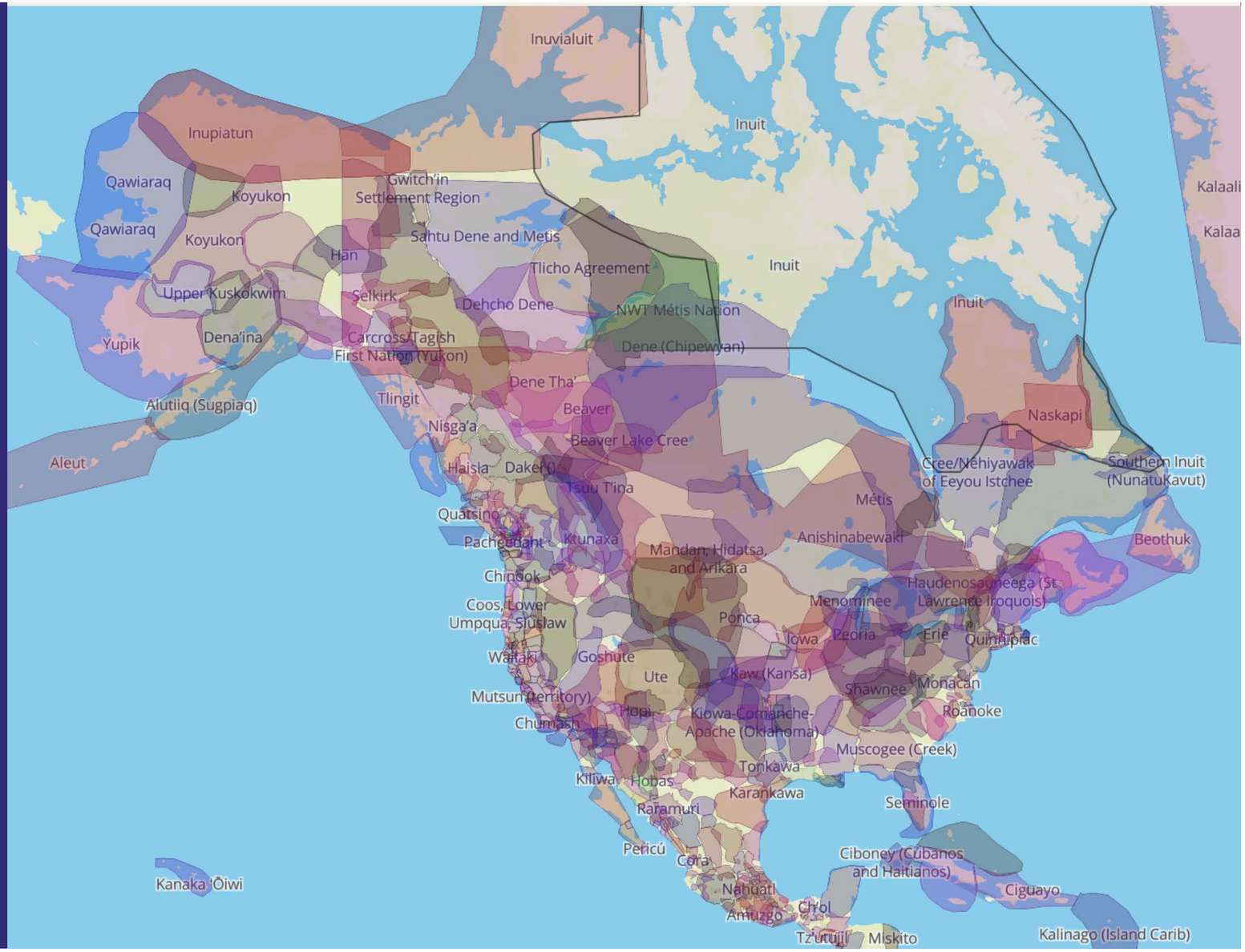
Step 3: Project Design

Project Design is the phase where the WHY becomes the HOW.

Critical step in data equity.

WHY ⋯⋯⋯⋯⋯⋯⋯⋯→ **HOW**

‘Geographical Sample Area’ based on whose geography?



RCTs:
The Gold Standard
… of *What*?

Phase 4: Data Collection & Sourcing

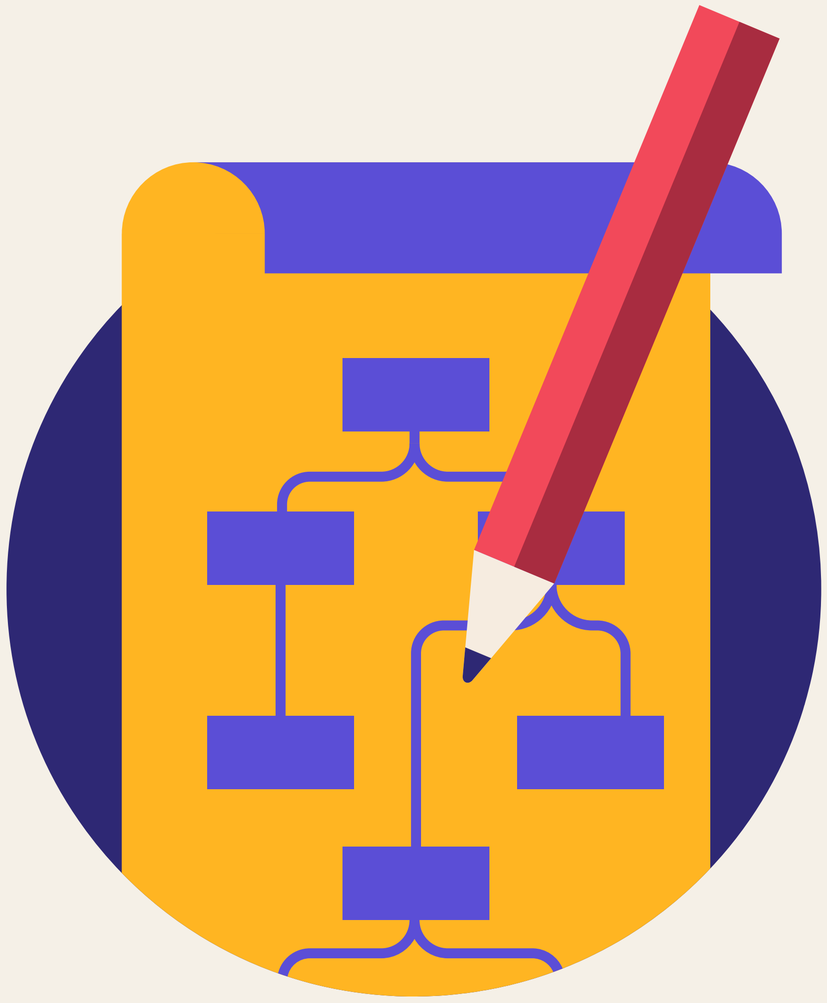
Measuring social constructs (Demographics)

Who is constructing the categories?

Whose definitions are we using?

Measuring social constructs (Demographics)

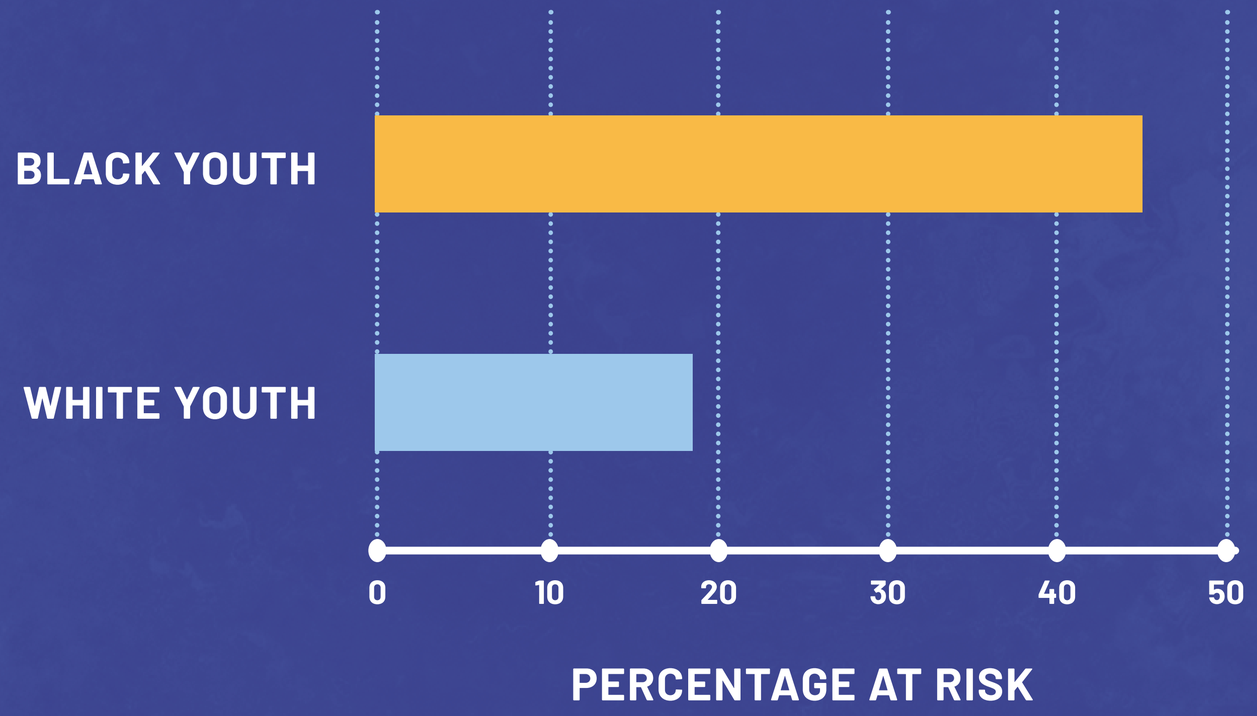
And how are you going to use this?



Step 5: Analysis

Mental Health Risk

In our community, which children are most at risk for mental health issues?



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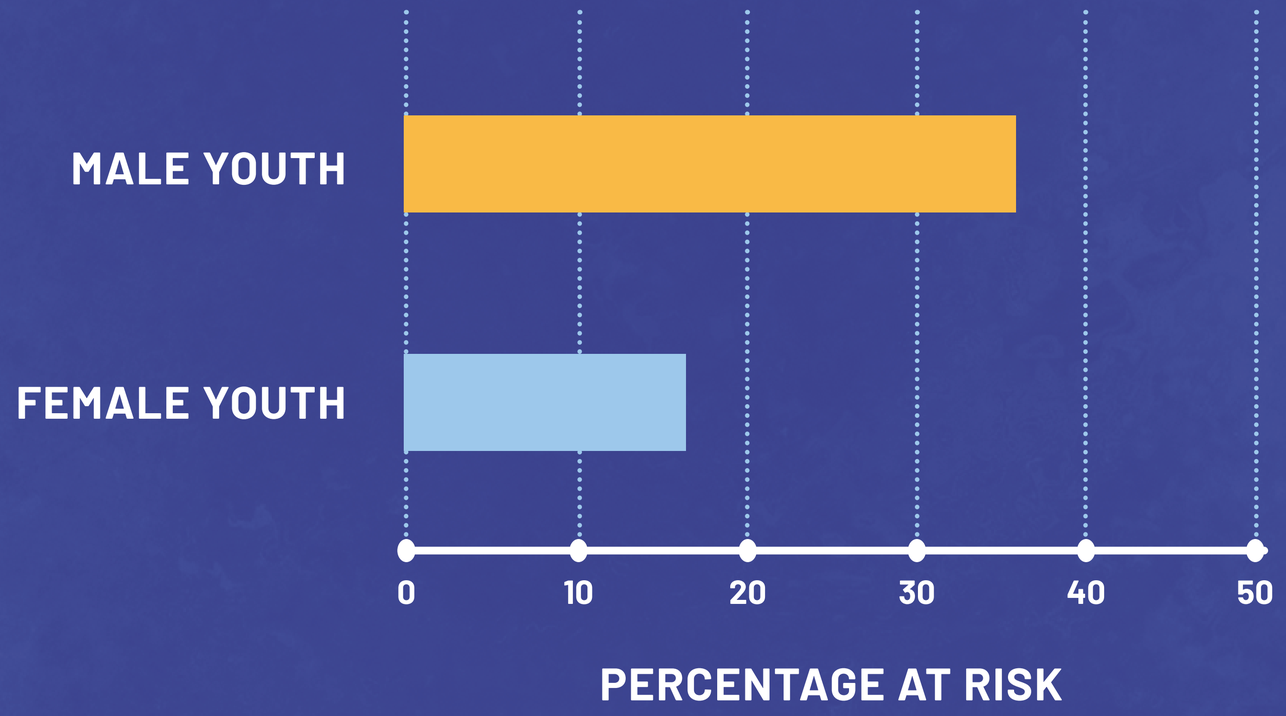

Mental Health Risk

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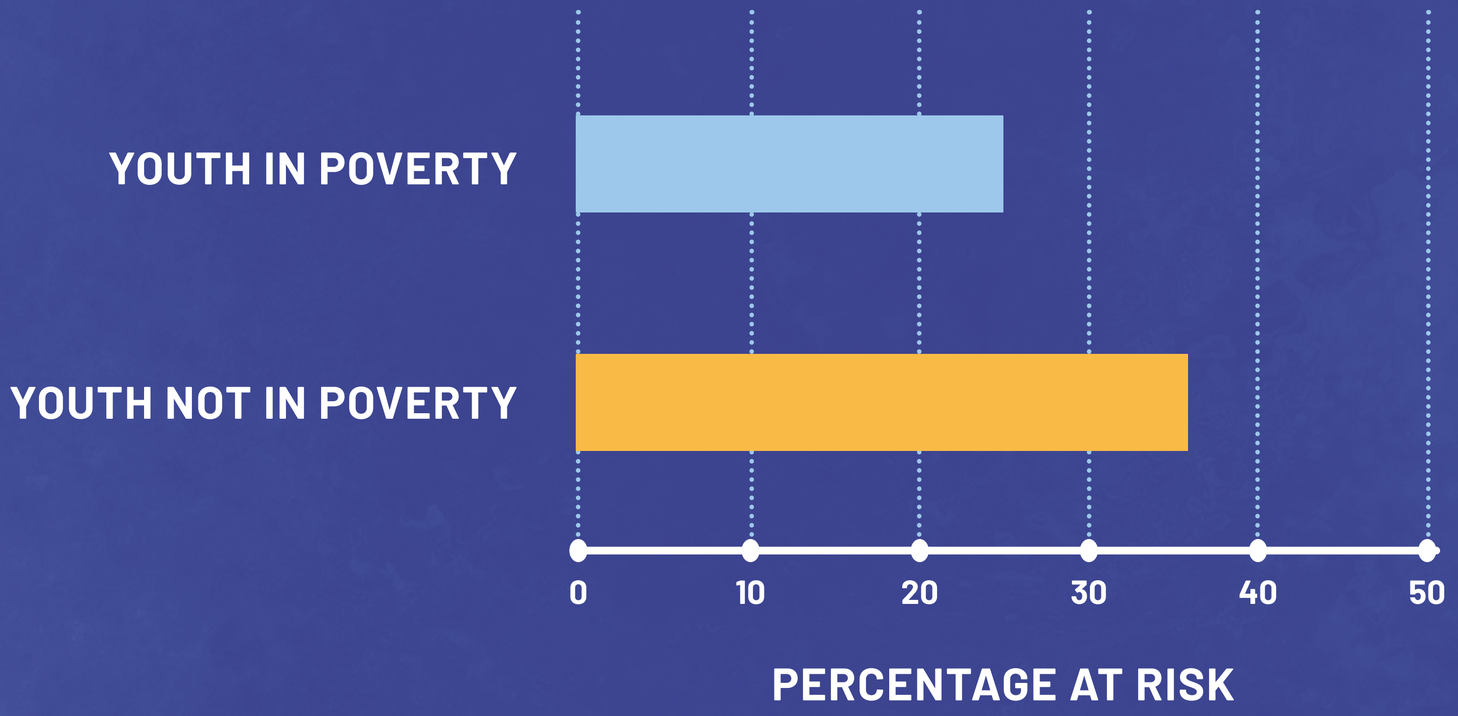
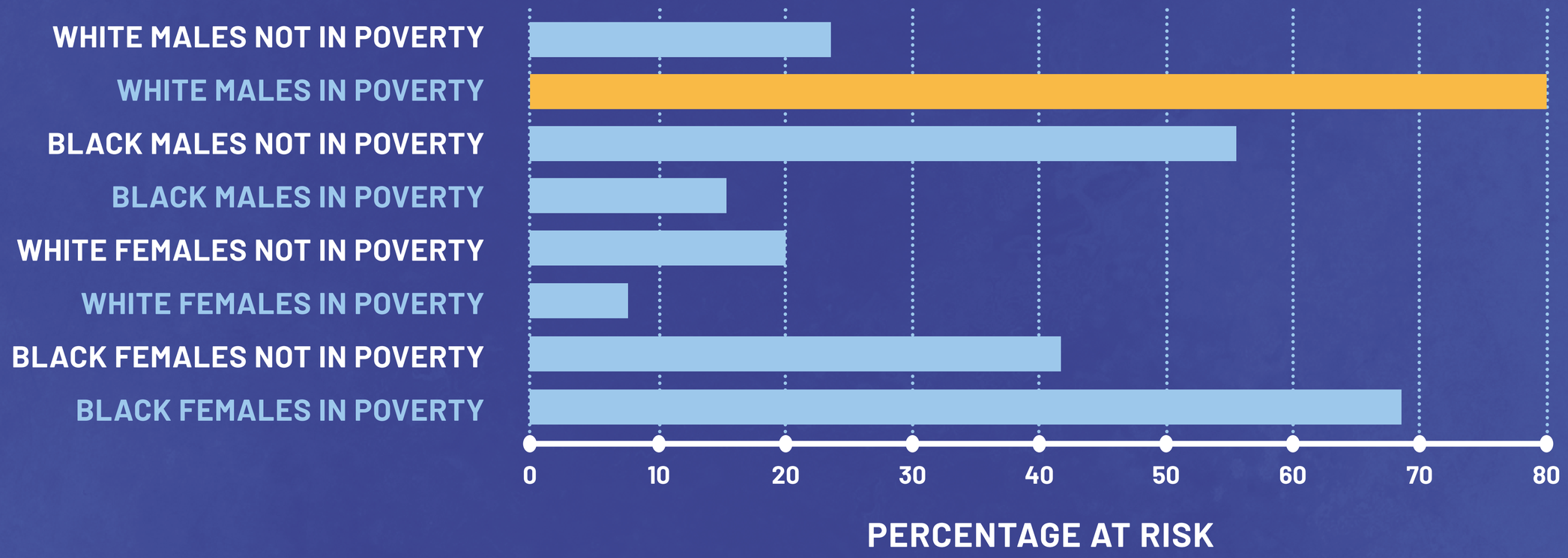


Mental Health Risk

We saw that the Black children were at risk, that male children were at risk, and children not living in poverty were at risk.



About Distribution of Key **Predictor Variables**

BLACK **WHITE**

MALE **FEMALE**

NOT POOR **POOR**

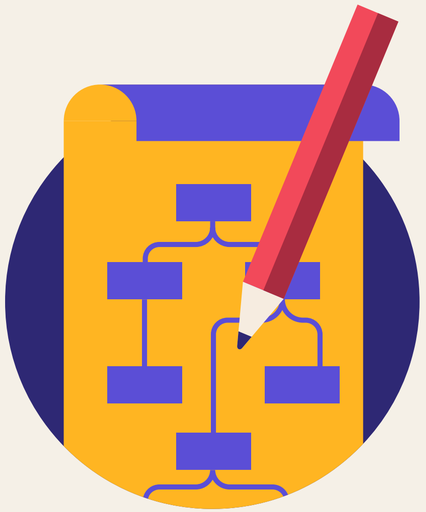
It seems like you're letting the data talk. **But really you're telling the data what to say.**

Example:

Project for a school district in Texas.

Research question: “What are the trends in Black, Indigenous and Hispanic male dropout rates compared to White male students?

Which of our two interventions are working best?”



Example:

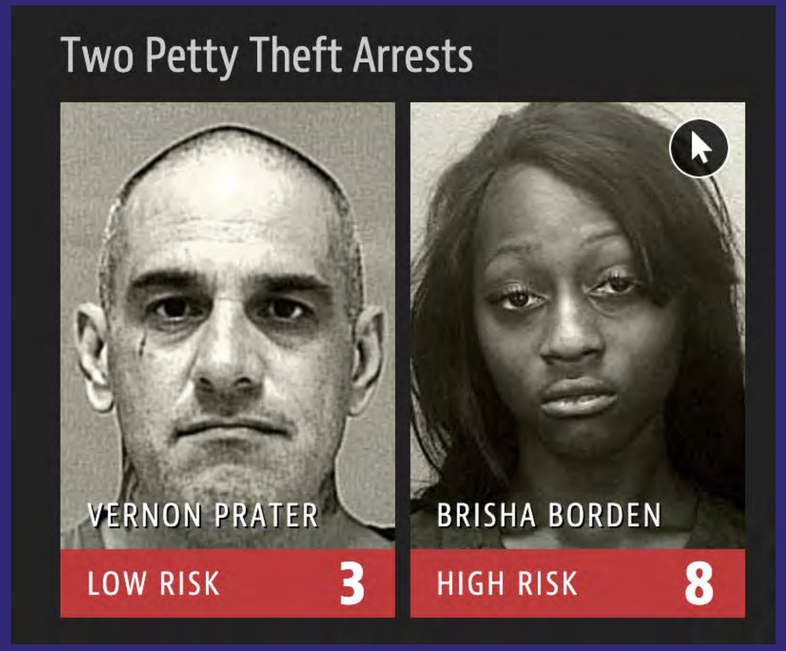
Project for a school district in Texas.

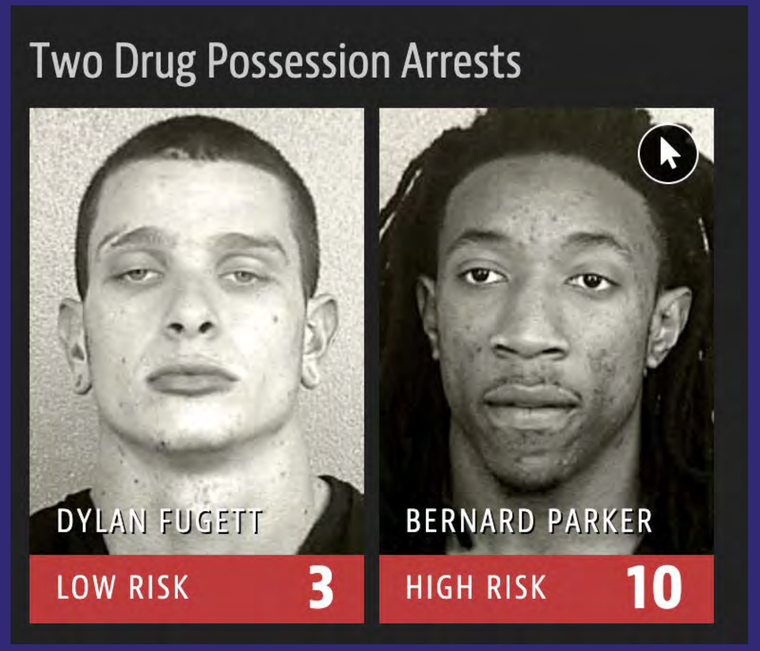
Changed to:

“How much are our interventions effective in removing the barriers we put up to Black, Indigenous and Hispanic boys remaining in school in our district?“

Interpretation

COMPAS gives a score that predicts how likely it is that this person will reoffend.





~~COMPAS gives a score that predicts how likely it is that this person will reoffend.~~

COMPAS gives a score that predicts how likely it is that this person might be in contact with the police again, be arrested by those police and not have the money for immediate bail release.

Results Stage

This is the end of the Analysis Step (5).

Results are represented as numbers.

This is where we apply meaning by seeing what our methodology can tell us and how we can interpret the analysis based on our perspective.

Interpretation Stage

This is the end of the Interpretation Step (6).

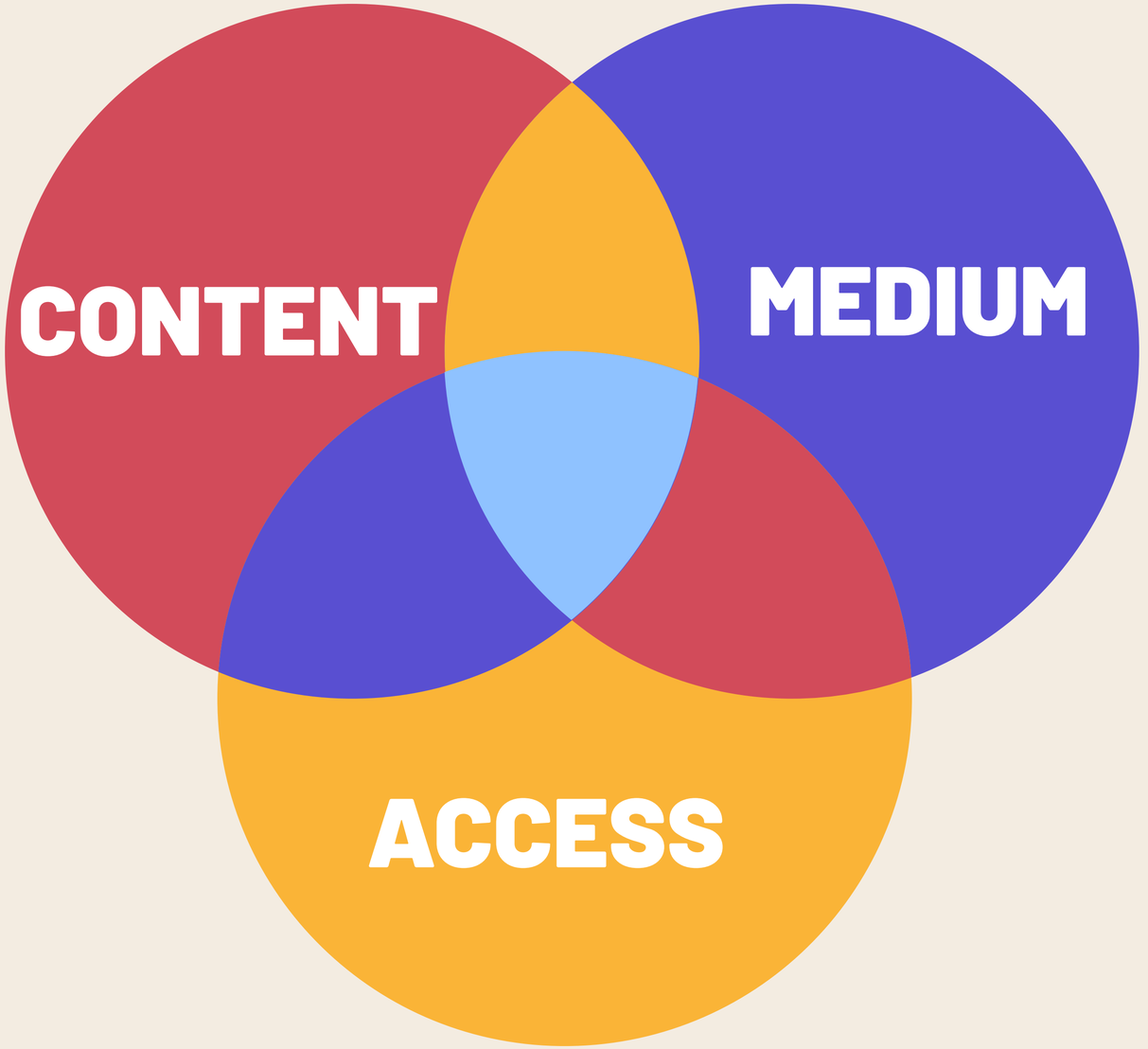
The numbers have meaning and a narrative to explain them.

“Our study shows that being black puts you at the highest risk for adult illiteracy.”

Communication & Distribution

EQUITABLE DISTRIBUTION

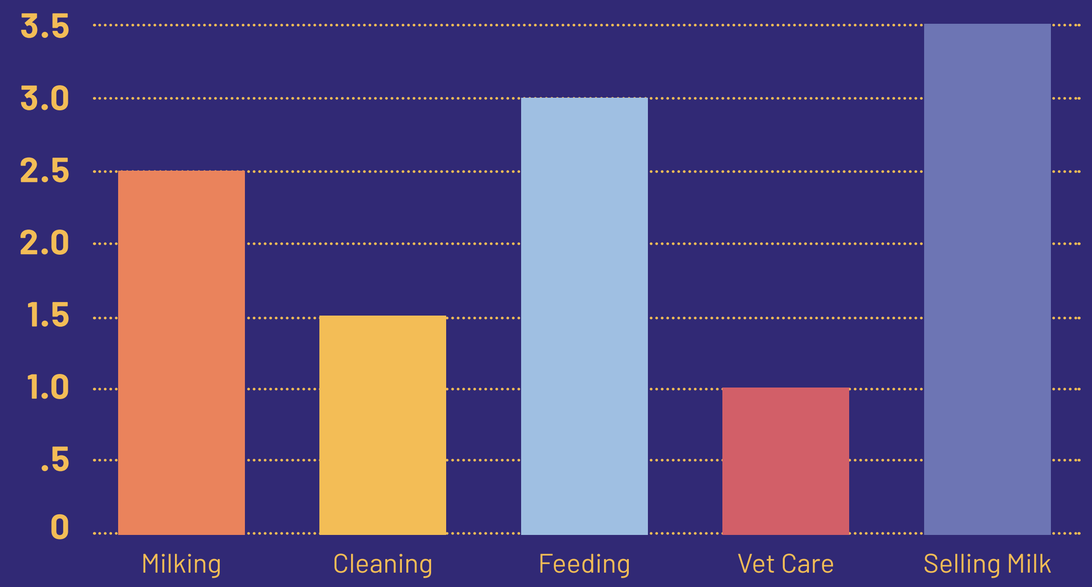
Each audience will have a ‘sweet spot’ for how to best distribute your information.



Data Visualization

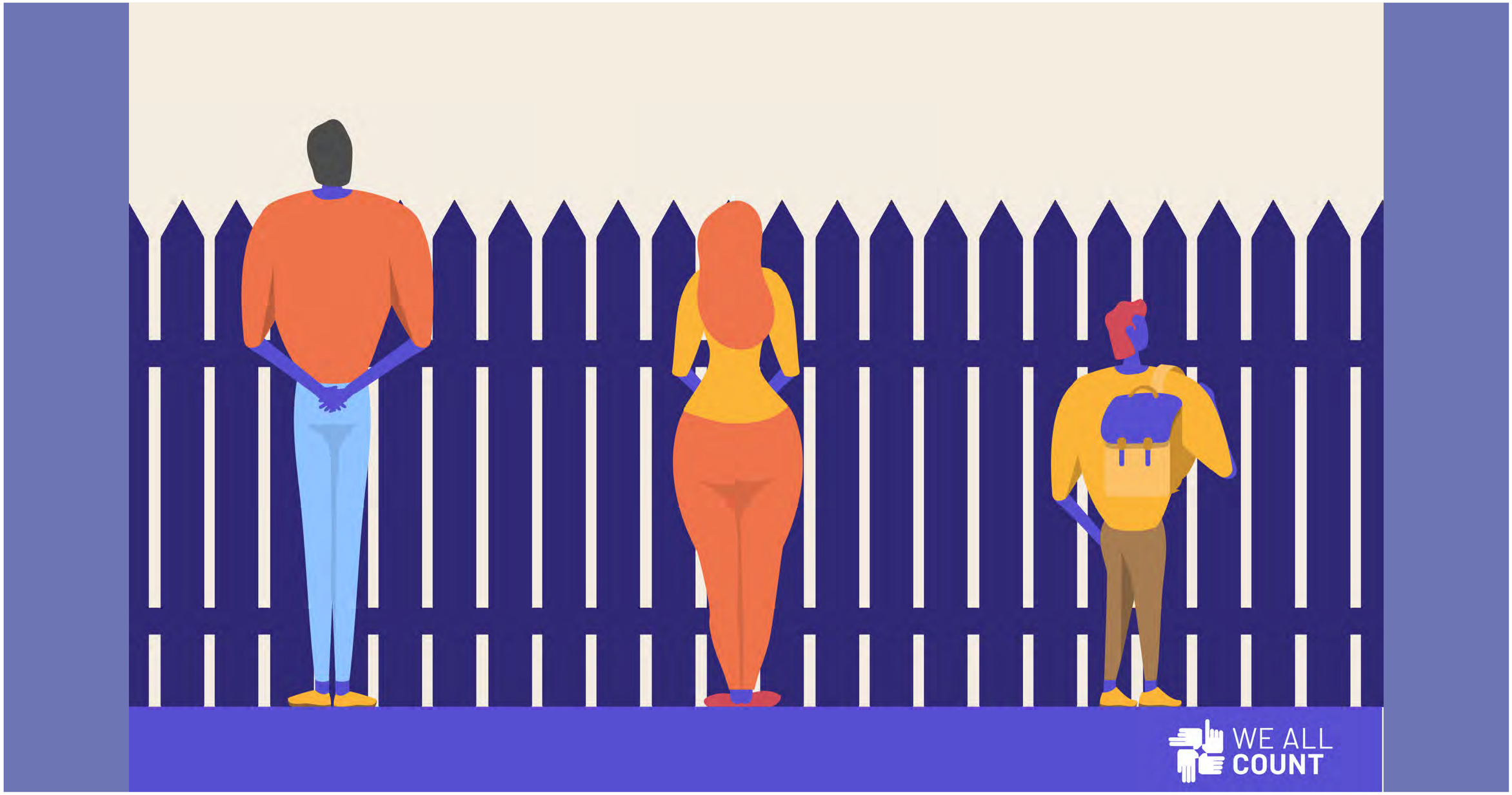
Ditch your ‘best’ practices for an adaptive, user-oriented system.

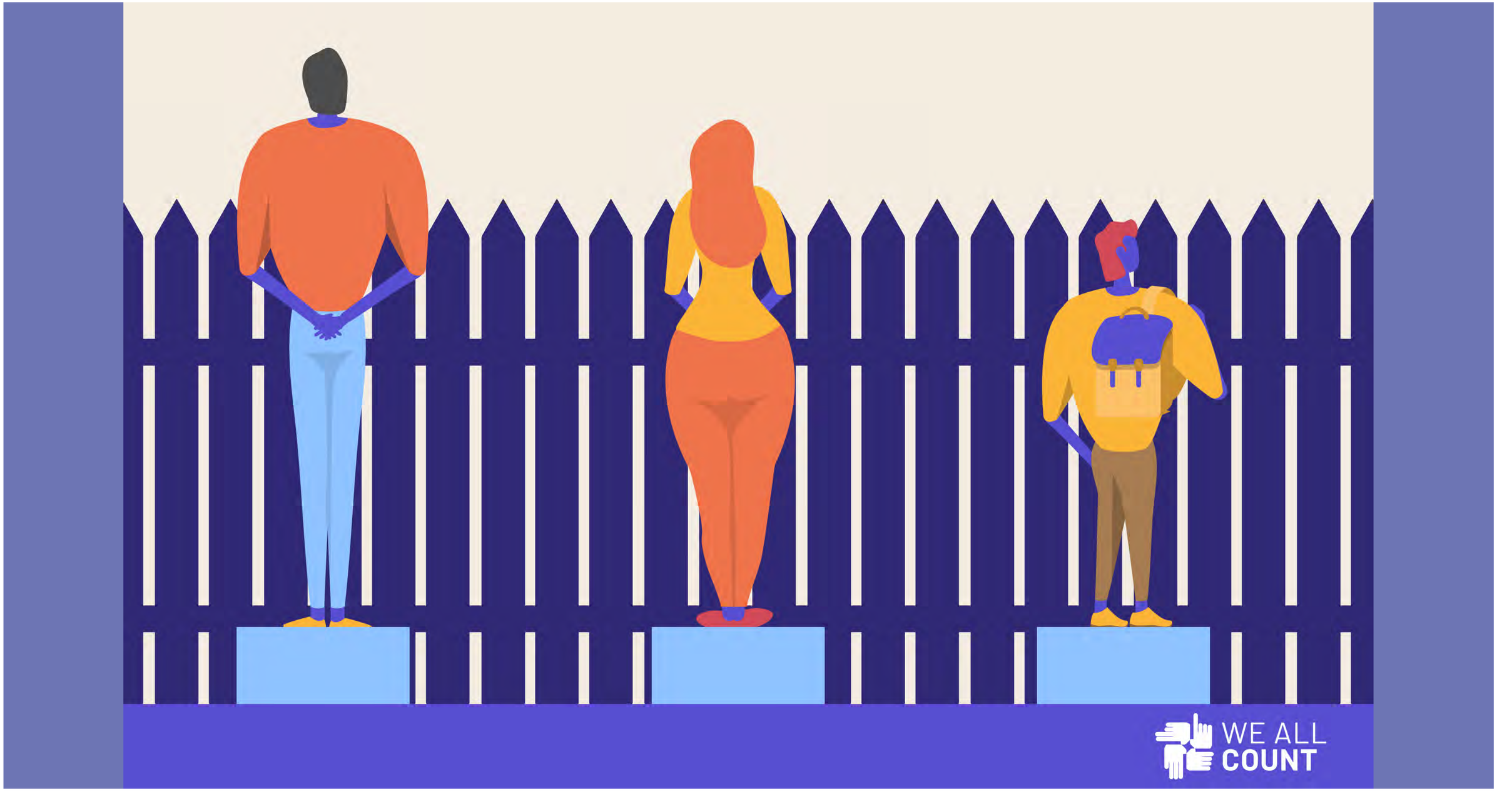
Data Viz “best practices” are not culturally universal.



TIME SPENT ON DAIRY ACTIVITIES PER DAY

Why does this matter for equity?


WE ALL
COUNT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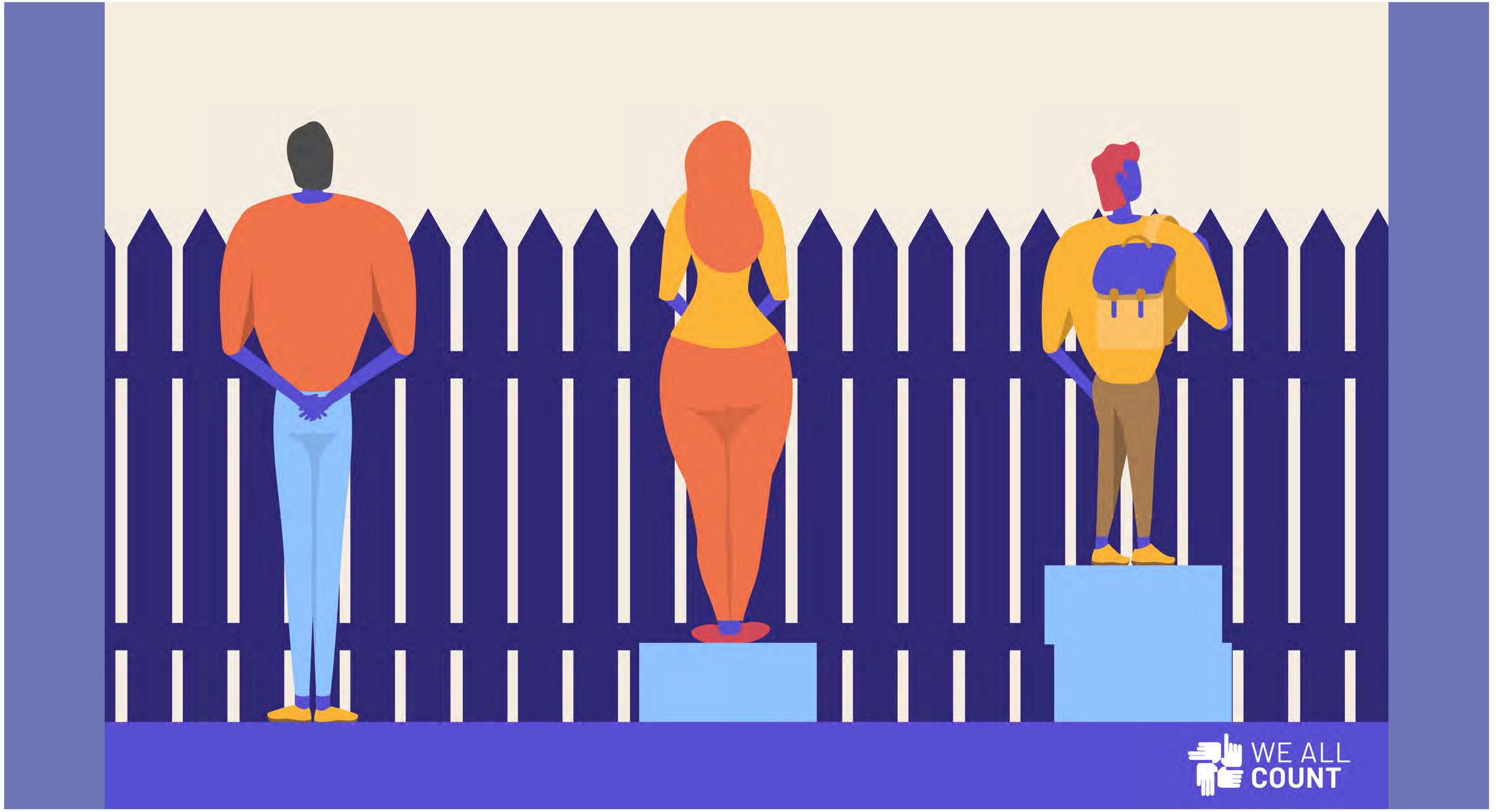
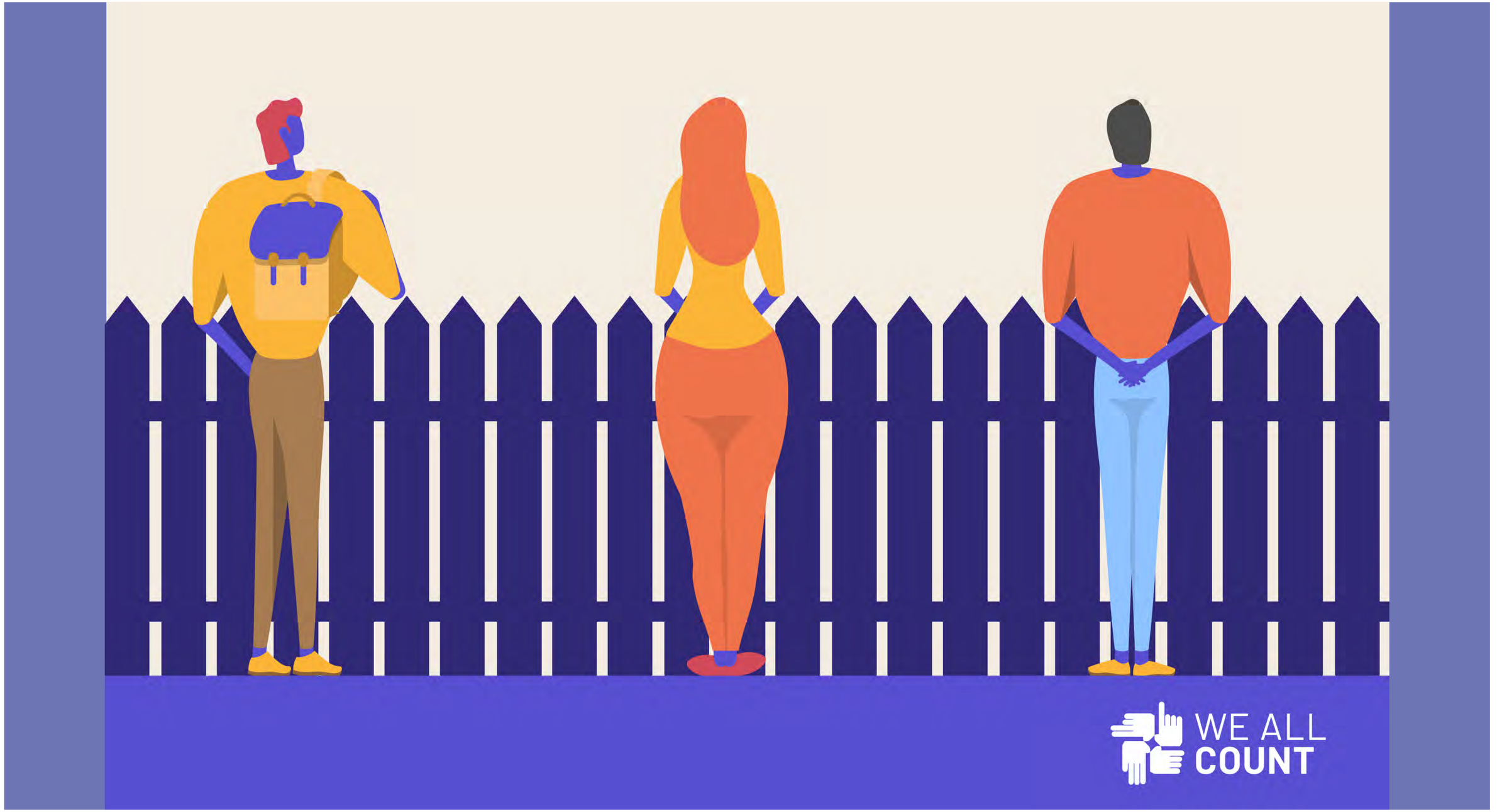
COUNT


WE ALL
COUNT


WE ALL
COUNT


WE ALL
COUNT


WE ALL
COUNT

Our data reflects how we see the world, but that's a good thing.

It means we can choose equity.

WE ALL COUNT

project for equity
in data science

Thank you!

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Thank you.

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