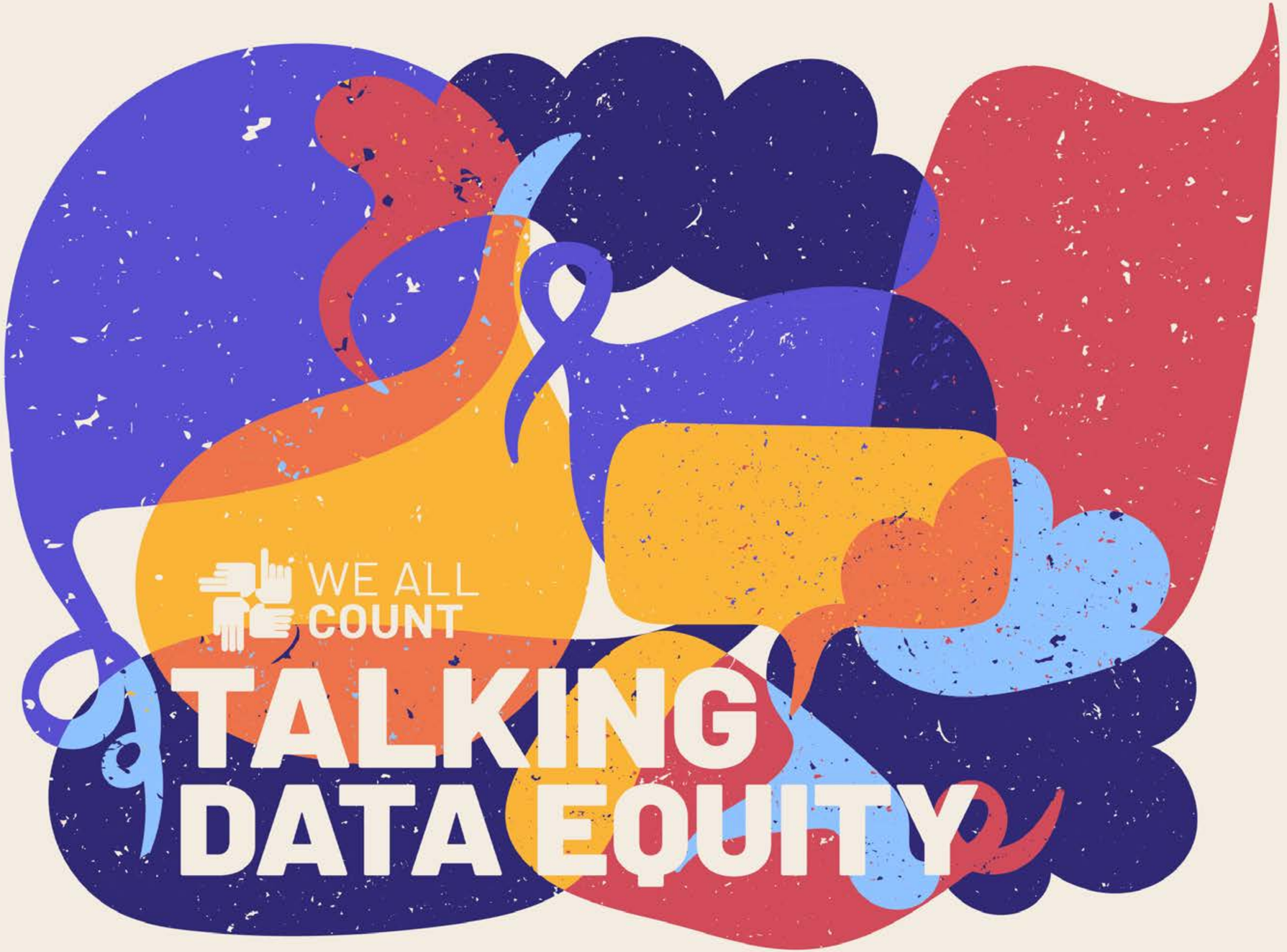
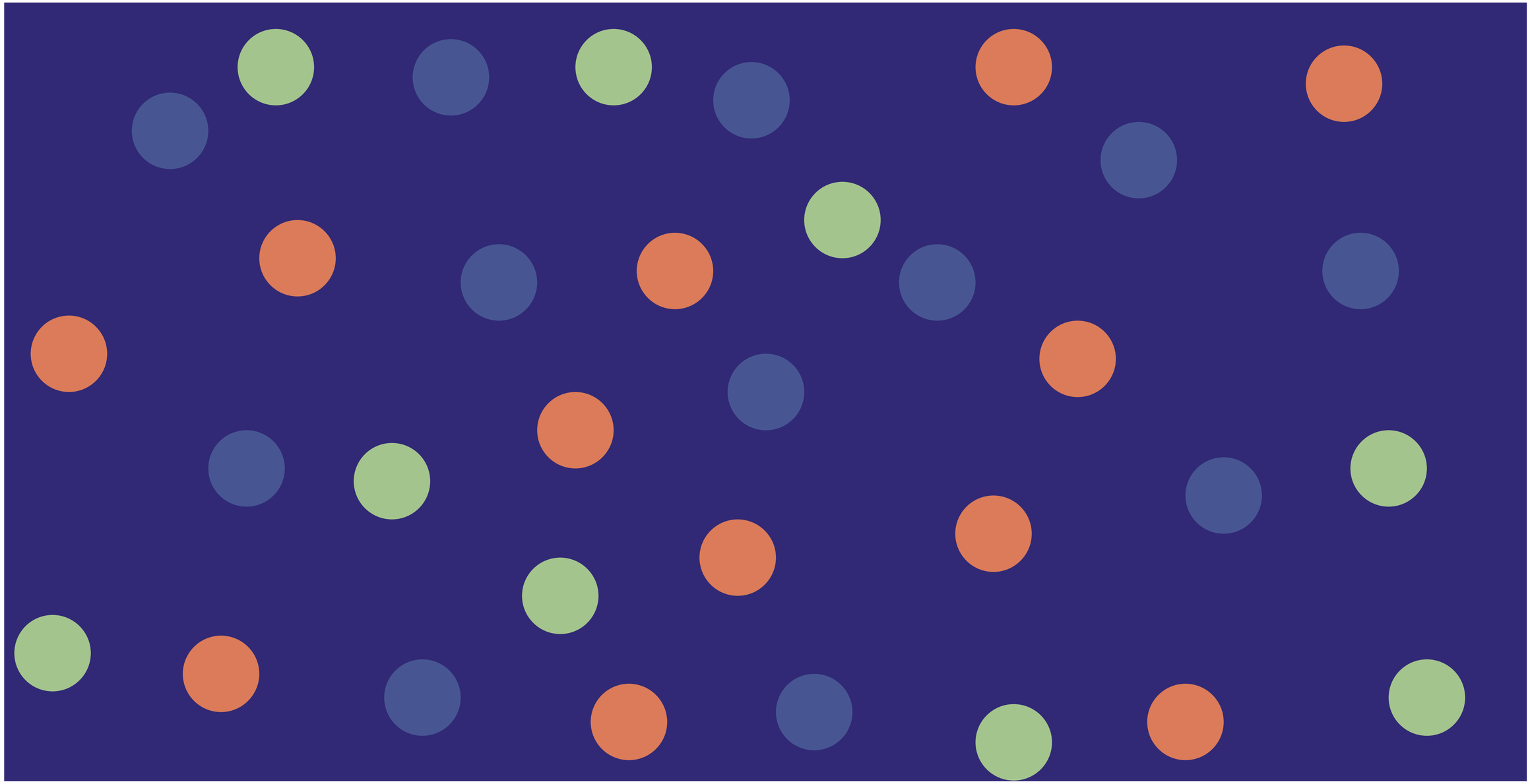

WE ALL
COUNT
TALKING
DATA EQUITY

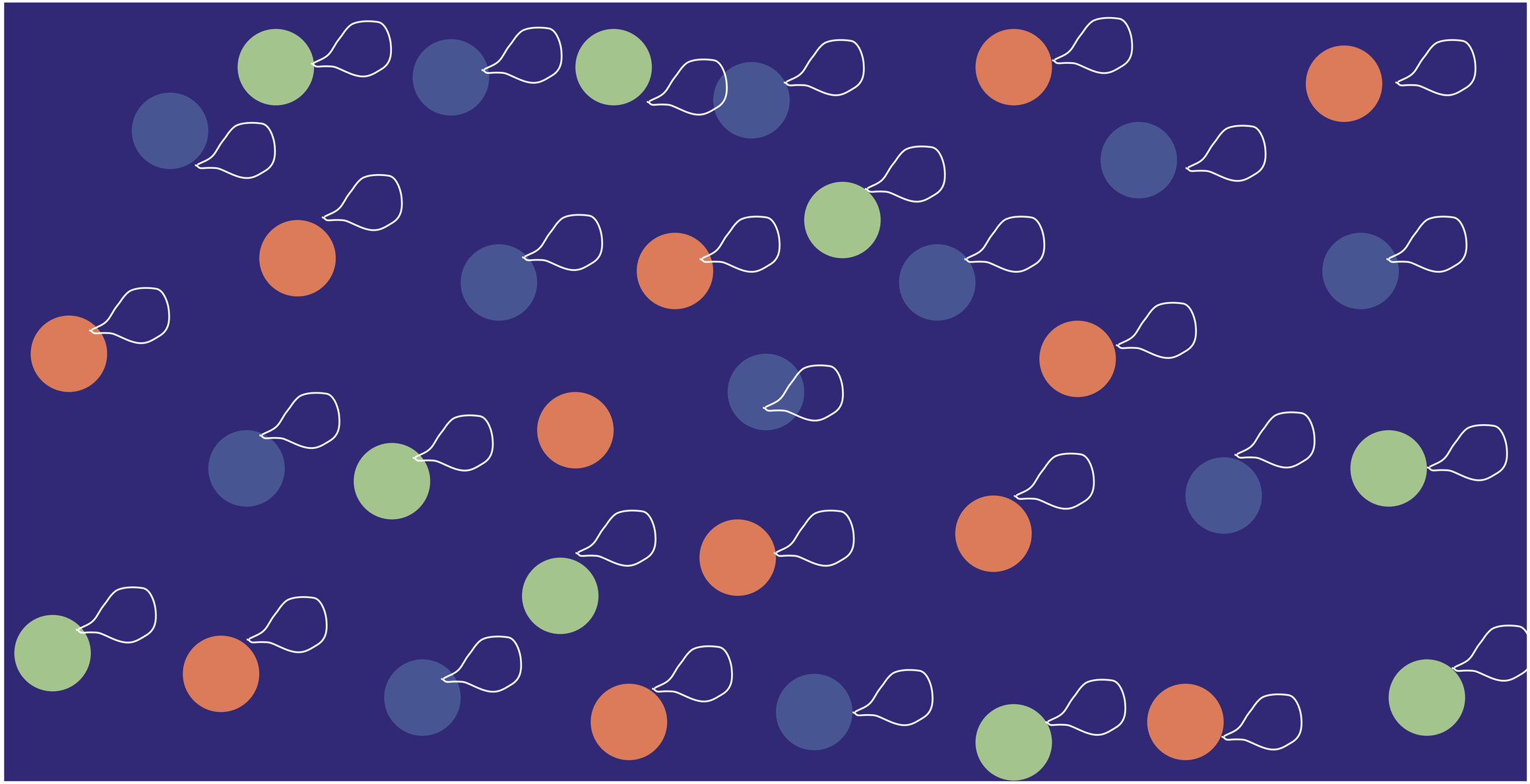
Statistical Weighting and Equity

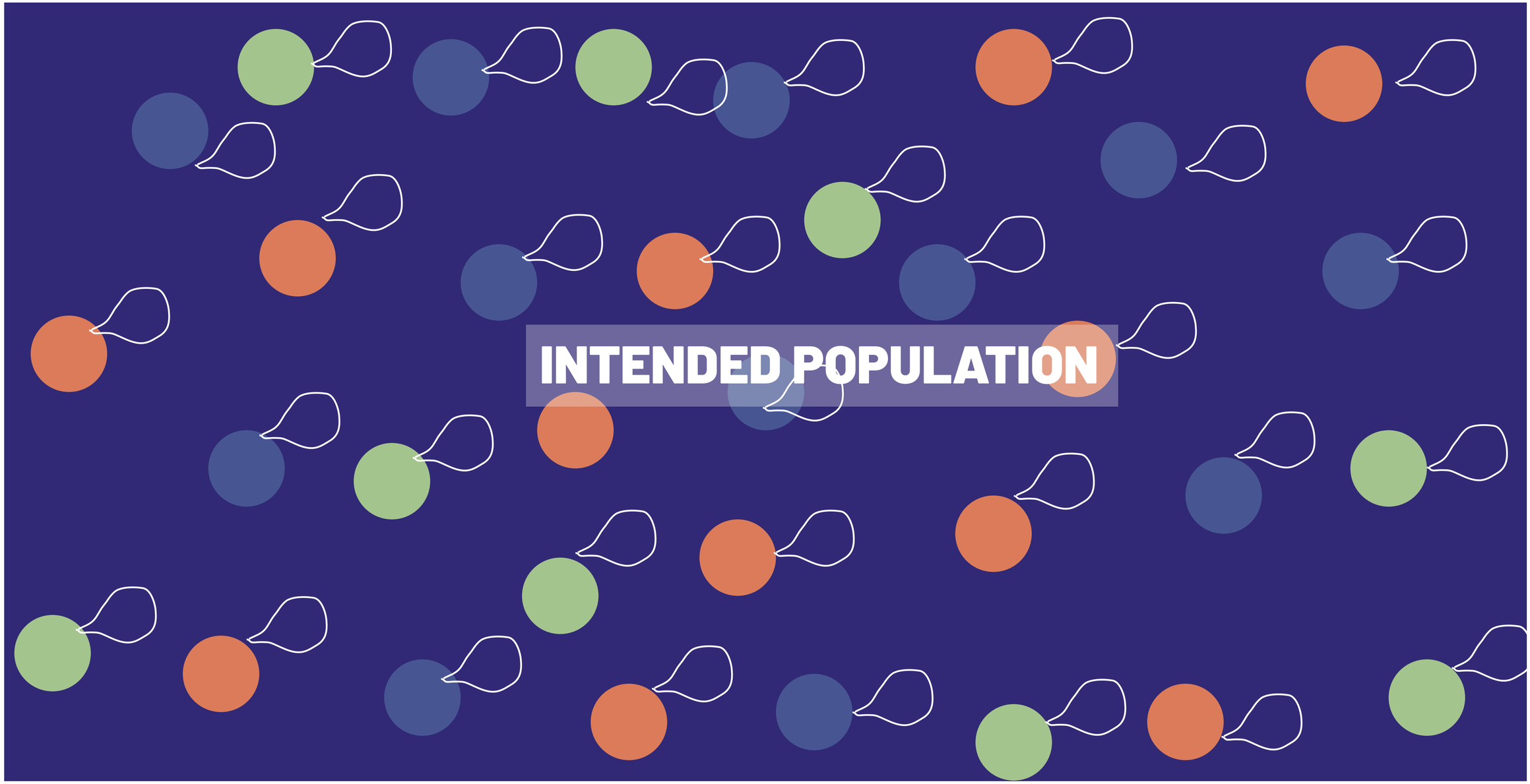
WE ALL COUNT

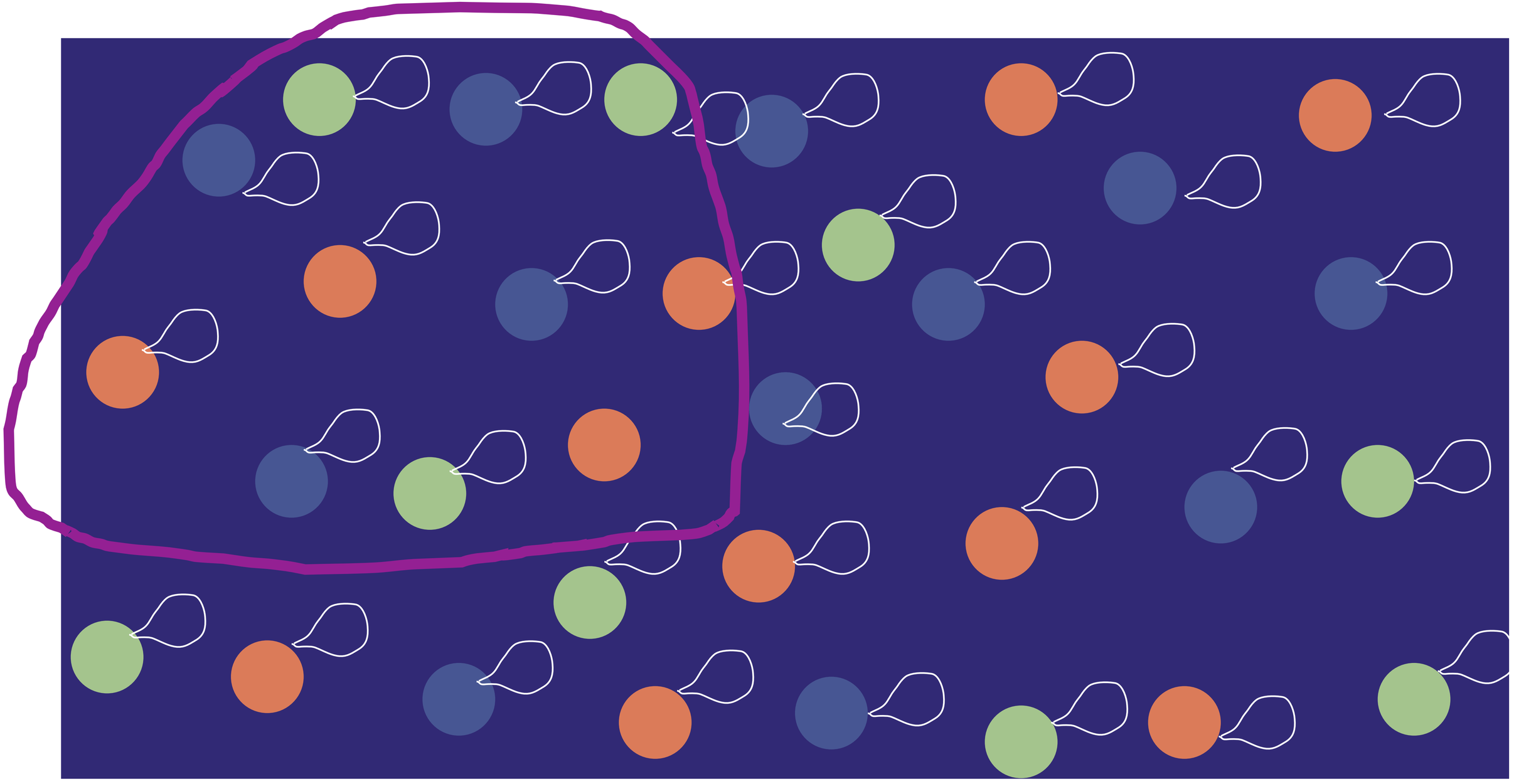
project for equity in data science

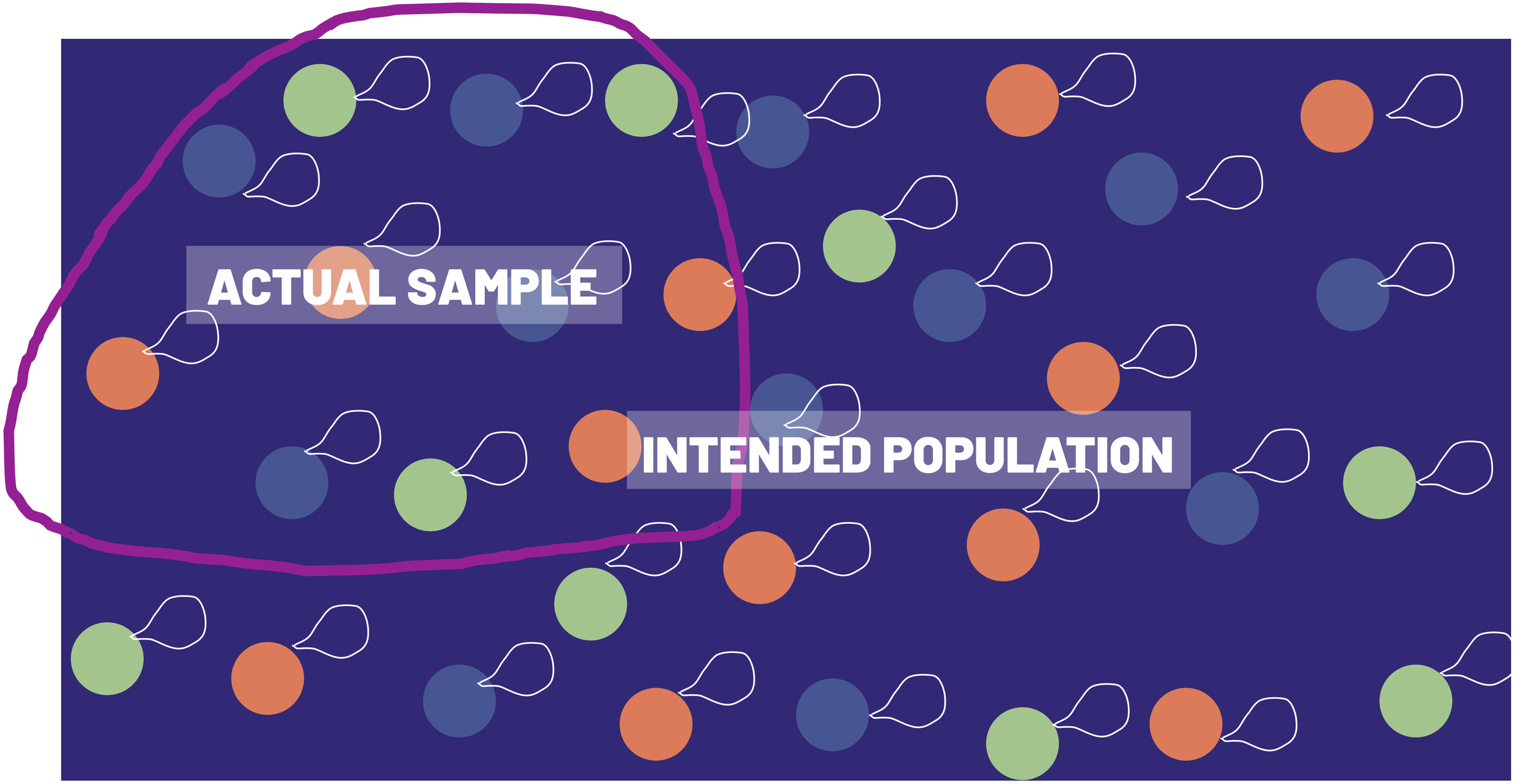
What even IS statistical weighting?
What are the layers of statistical weighting?
What does statistical weighting change?
How is this an equity issue?
Suggestions?

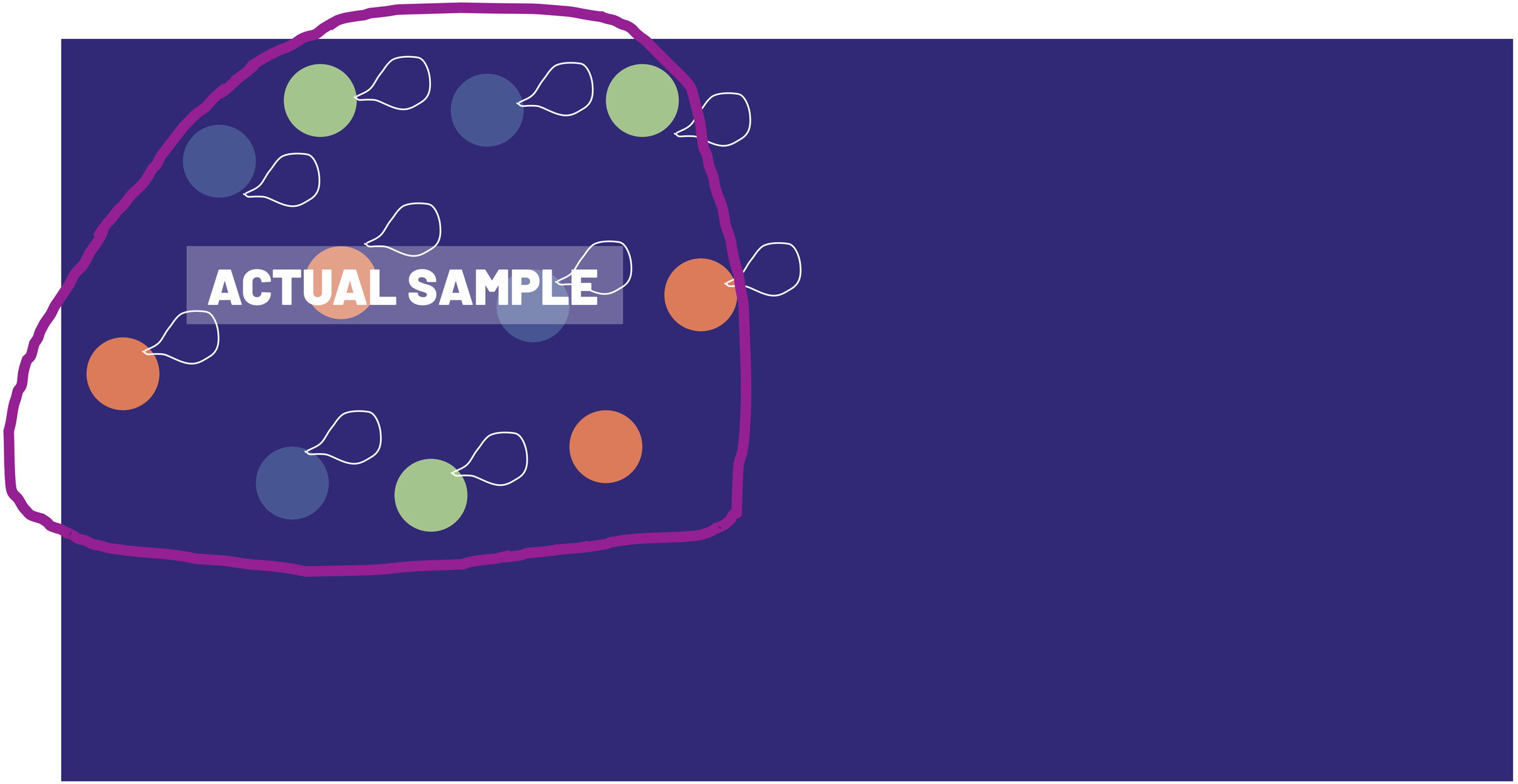





INTENDED POPULATION

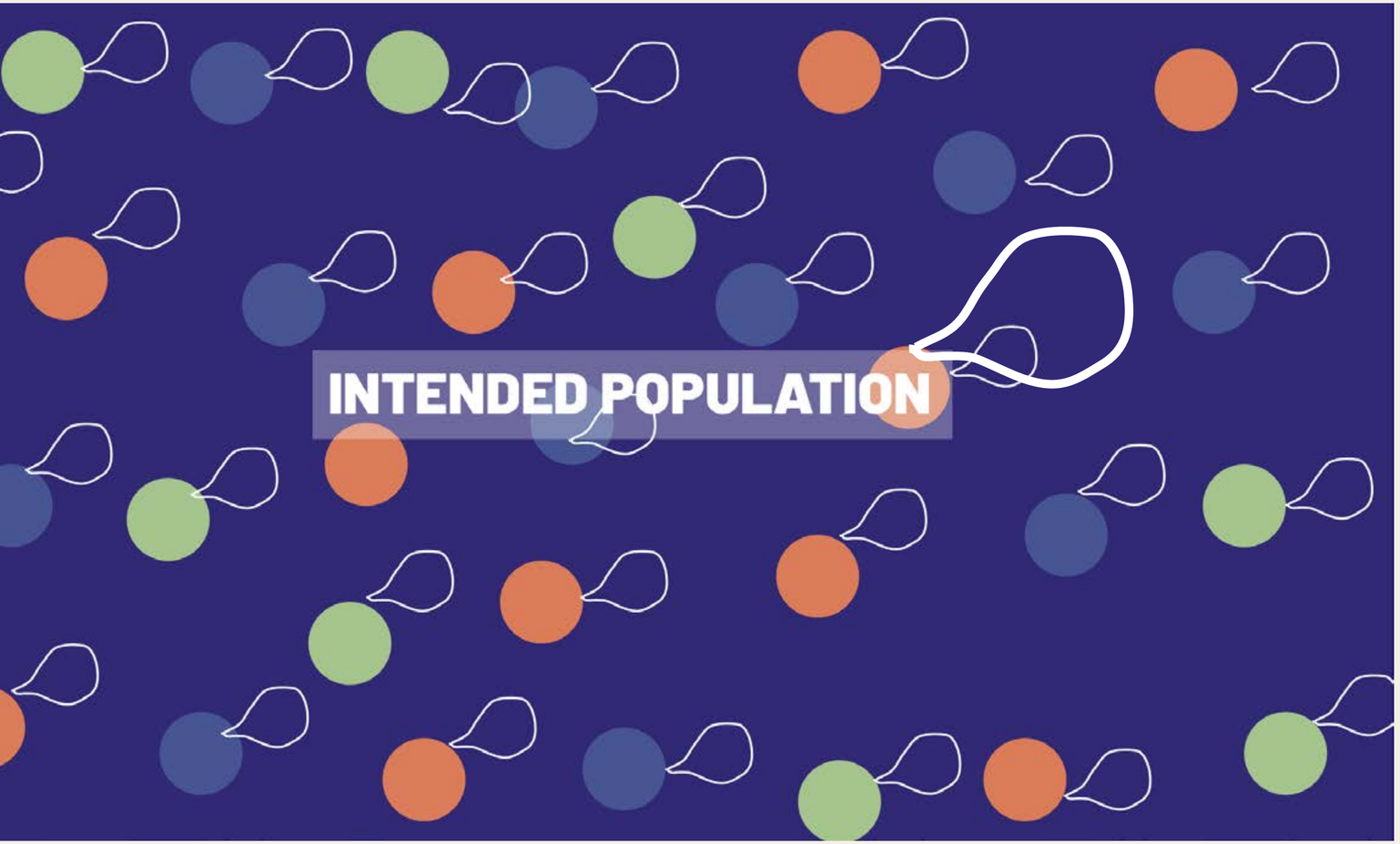



ACTUAL SAMPLE
INTENDED POPULATION


ACTUAL SAMPLE


ACTUAL SAMPLE
INTENDED POPULATION


ACTUAL SAMPLE
INTENDED POPULATION


INTENDED POPULATION

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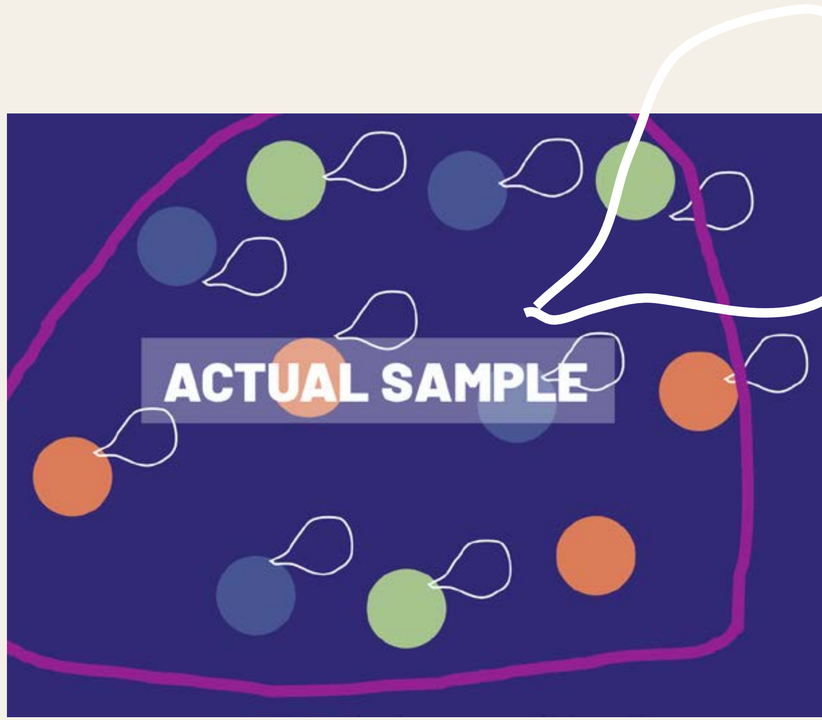
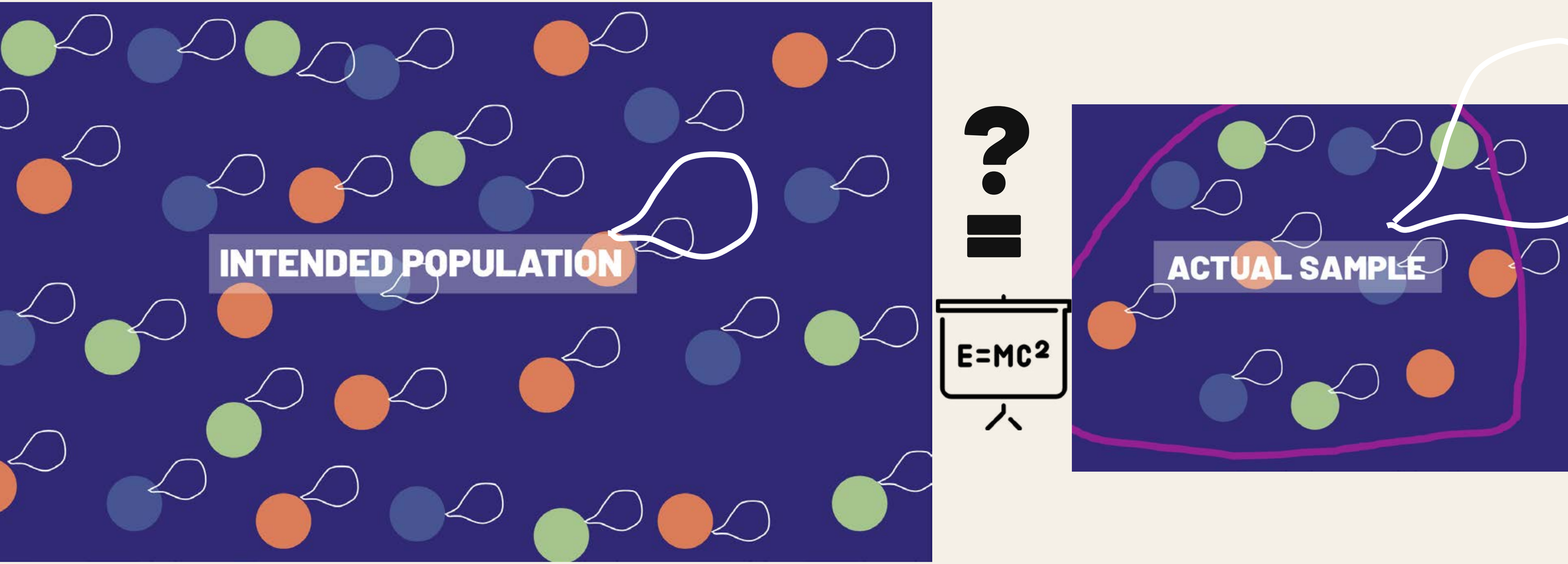

ACTUAL SAMPLE


INTENDED POPULATION
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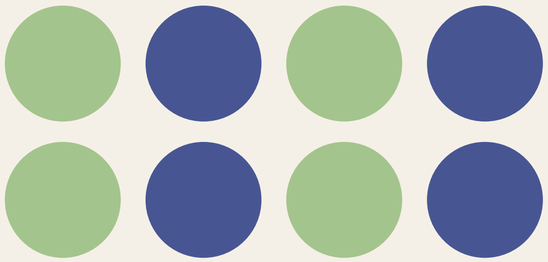
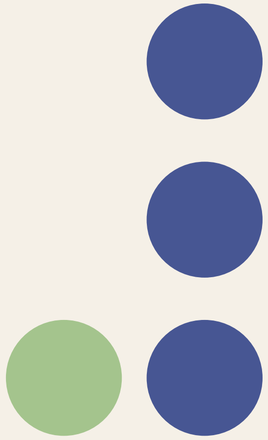
=
E=MC²
ACTUAL SAMPLE

INTENDED POPULATION

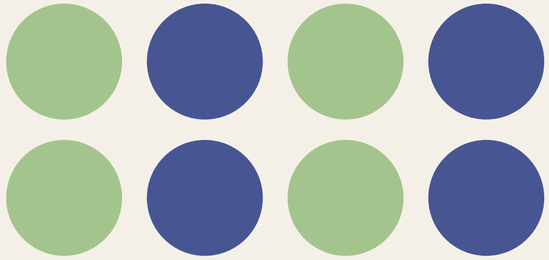
$\stackrel{?}{=}$

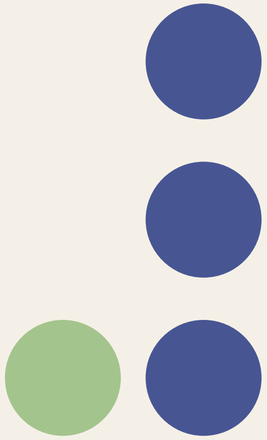
ACTUAL SAMPLE

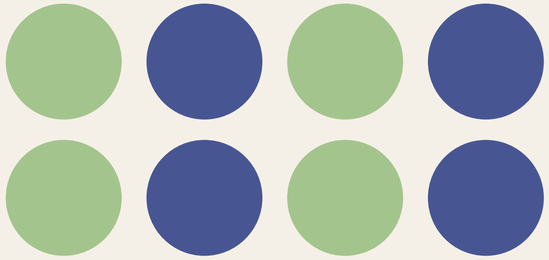




INTENDED POPULATION → ACTUAL SAMPLE → WEIGHTED RESULTS







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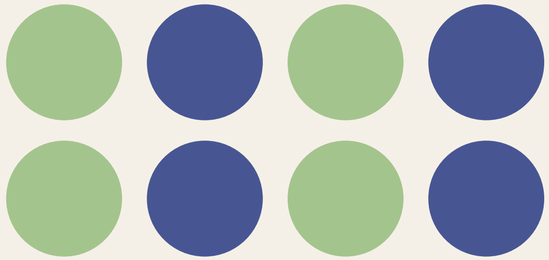
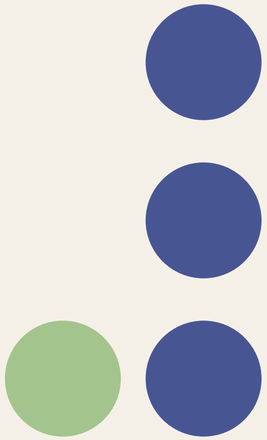
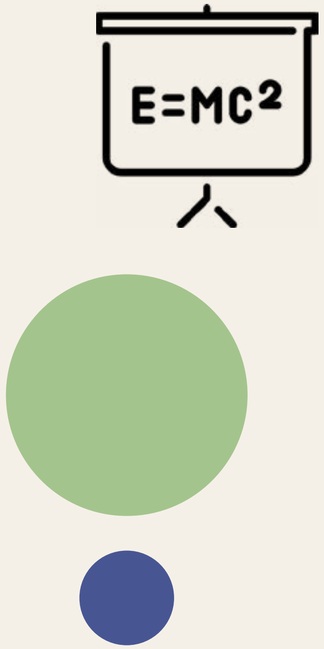
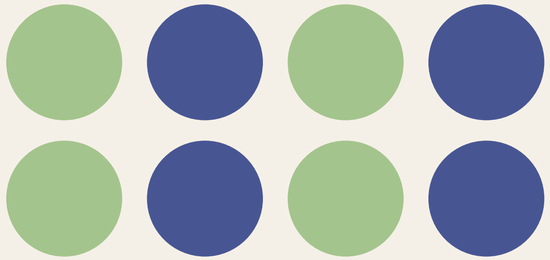


50% Green
50% Purple



25% Green
75% Purple





50% Green
50% Purple

AGE GROUP	INTENDED POPULATION		ACTUAL SAMPLE		WEIGHT
18-34	24%	/	28%	=	0.857
35-44	36%	/	38%	=	0.947
45-54	28%	/	25%	=	1.120
55+	12%	/	9%	=	1.333

Person ID	Hispanic	Gender	Age	Pool or Dog Park	Weight
1	Hispanic	F	25	Pool	3
2	Not Hispanic	F	58	Dog Park	0.5
3	Not Hispanic	M	19	Dog Park	4
4	Hispanic	NB	45	Dog Park	1
5	Hispanic	F	51	Pool	0.5

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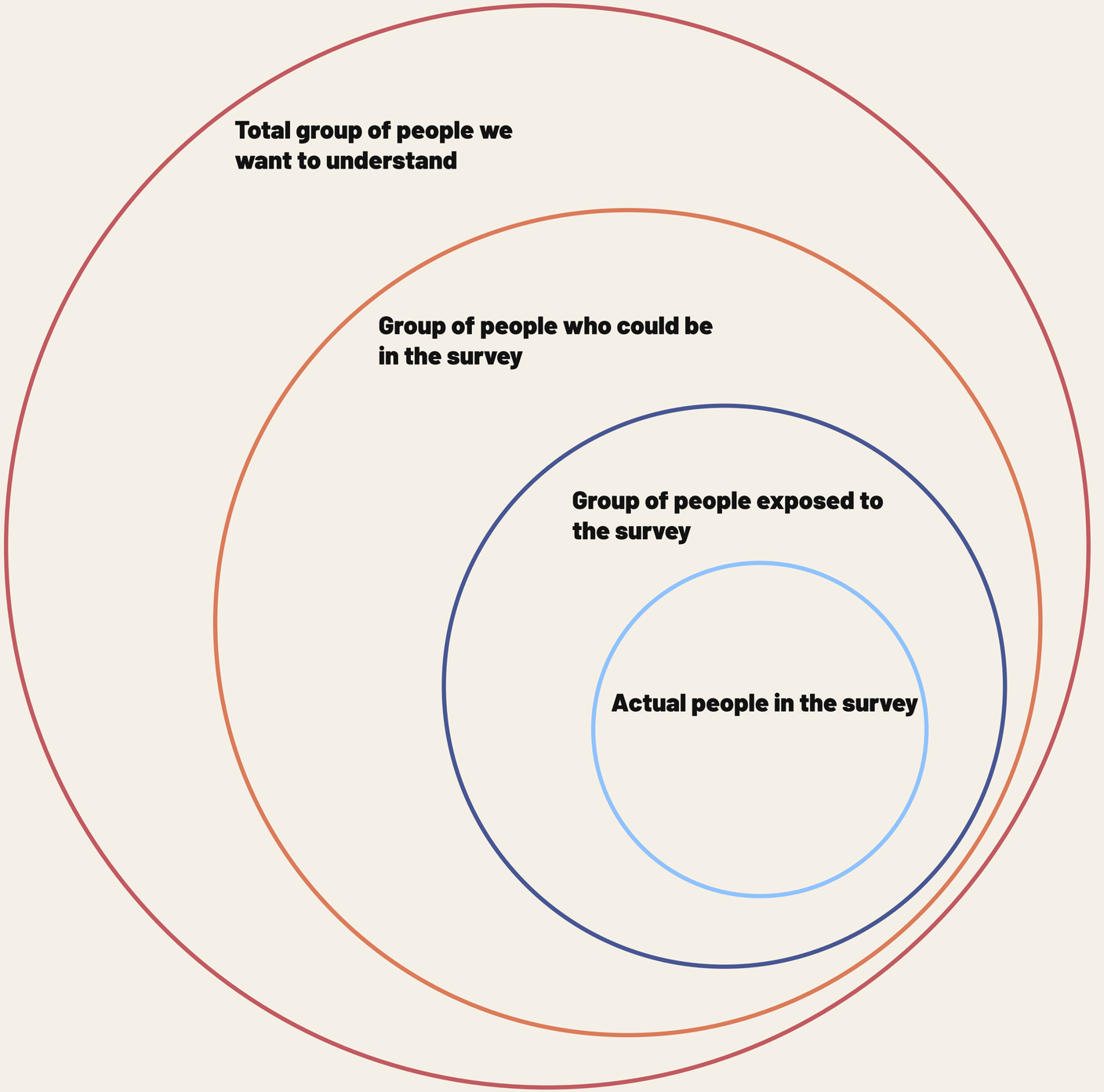
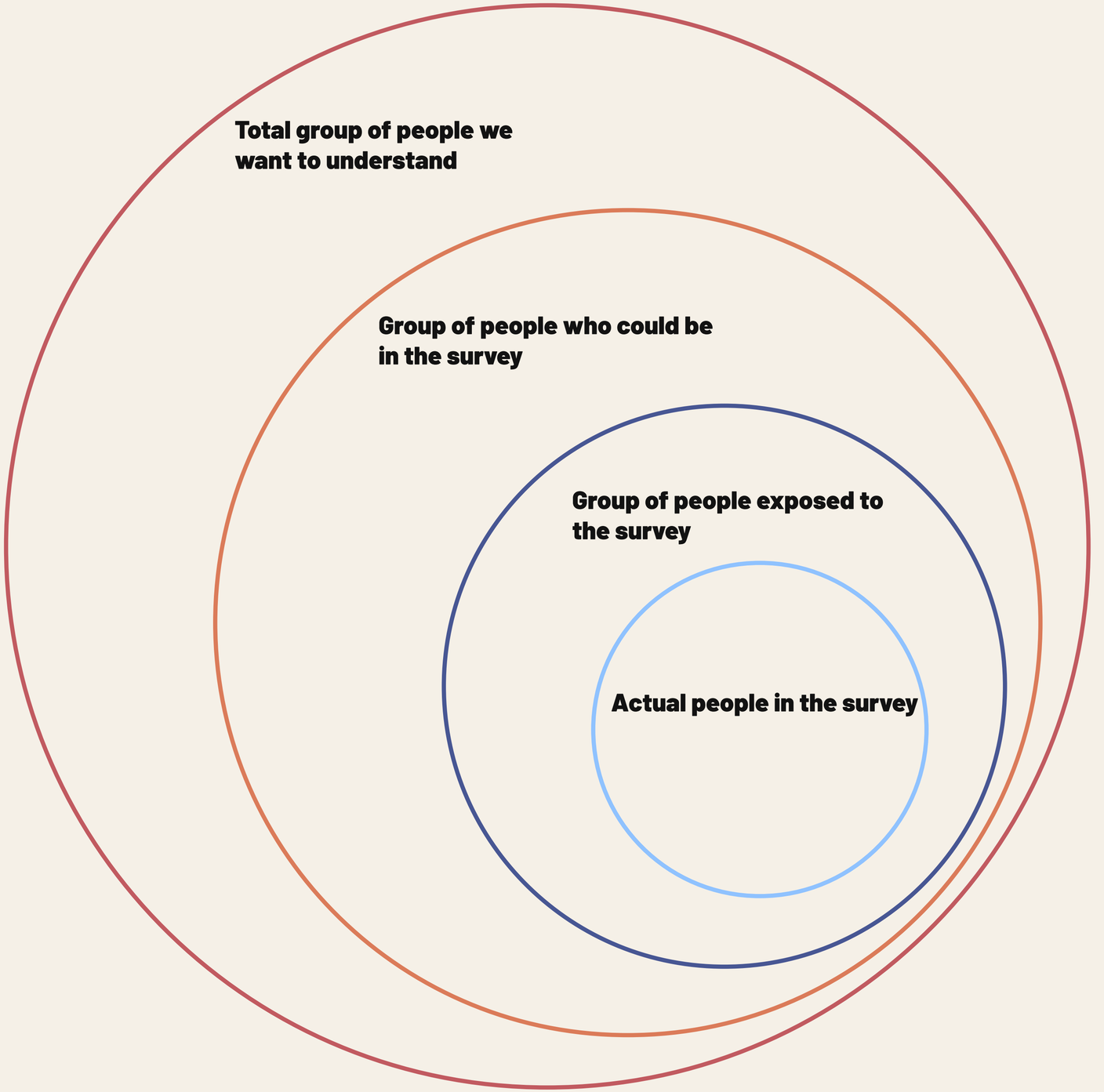

Total group of people we want to understand
Group of people who could be in the survey
Group of people exposed to the survey
Actual people in the survey



Non-coverage error

Sampling error
Hard to reach pops

Unit non-response

Item non-response
Under-reporting
Top-coding

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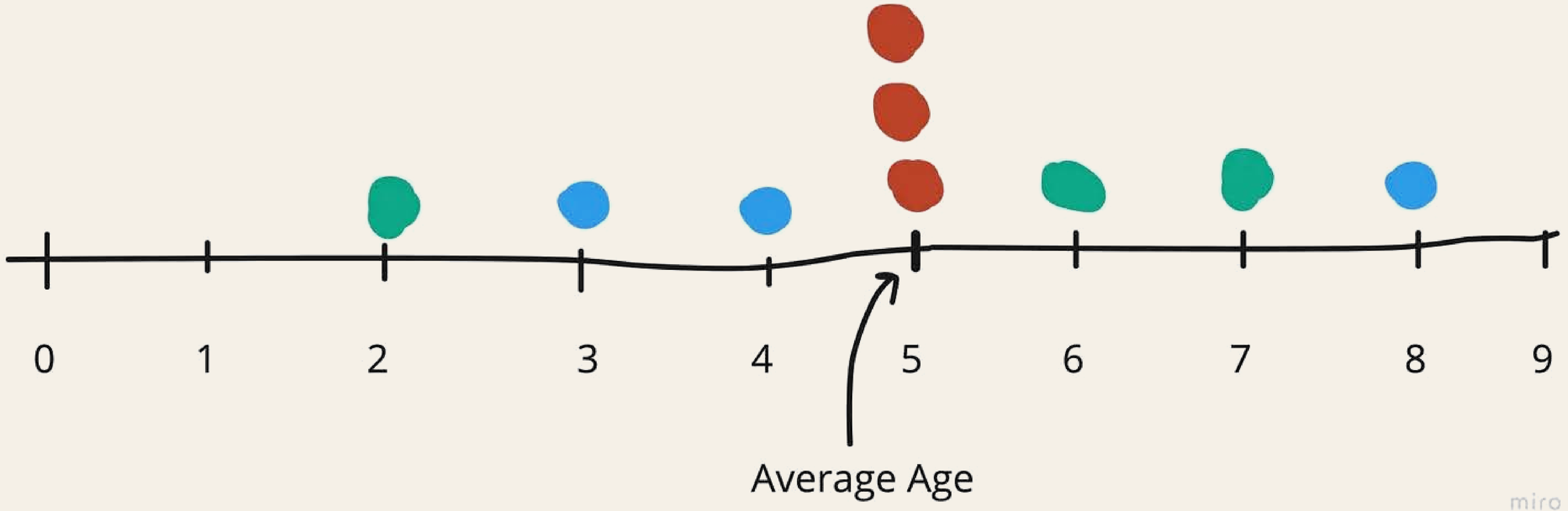
0
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Average Age
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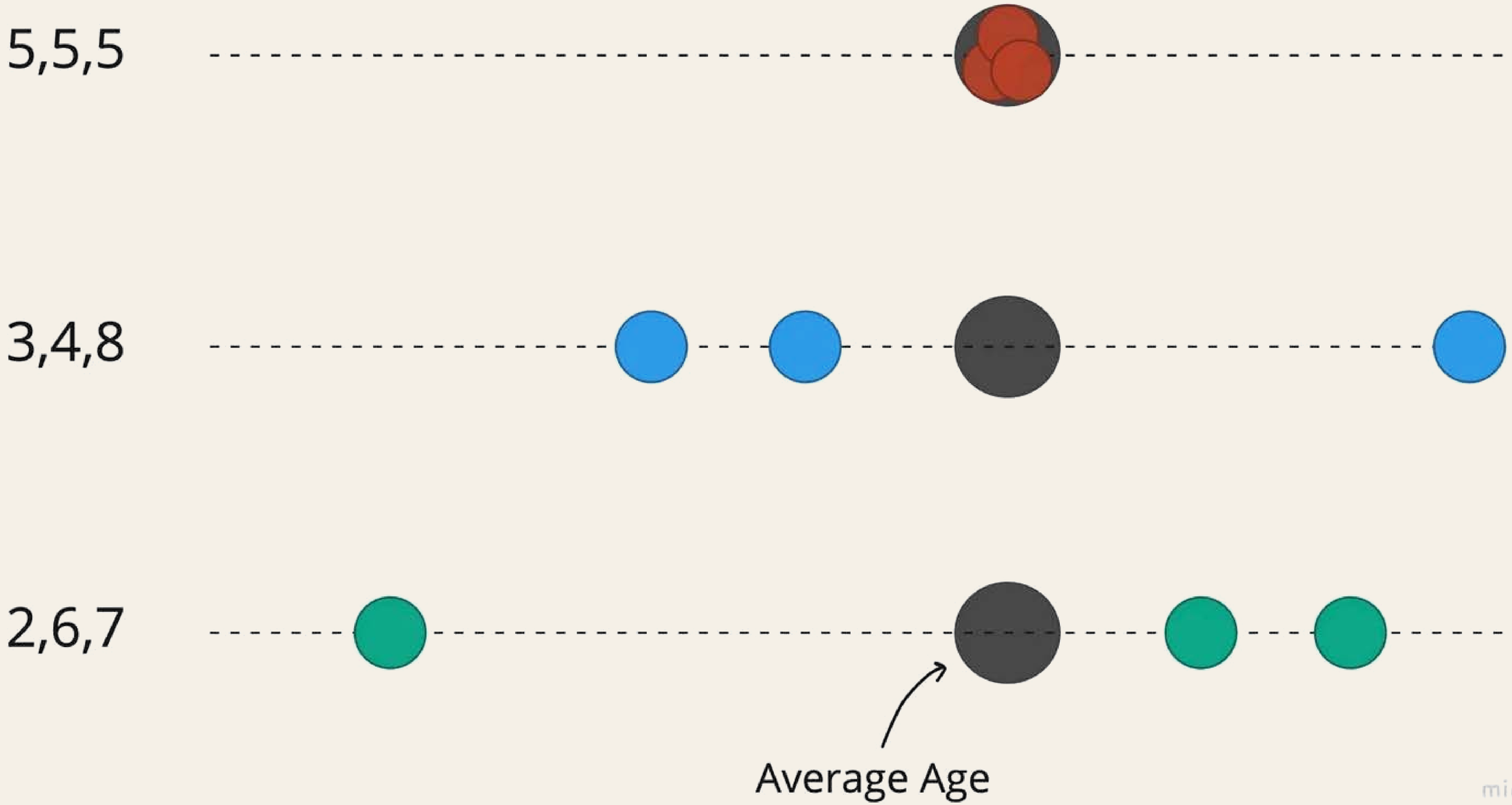

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Comparative Study > Am Indian Alsk Native Ment Health Res. 2009;16(3):1-15.
doi: 10.5820/aian.1603.2009.1.

Effect of race and ethnicity classification on survey estimates: Anomaly of the weighted totals of American Indians and Alaska Natives

Sunghee Lee [1], Delight E Satter, Ninez A Ponce

CHIS 2001 Estimates of Health-Related Variables for the AI/AN Population Using Different Weights

	Original Weight			Revised Weight			Proposed Weight		
	Weighted Total	(%)	SE (%)	Weighted Total	(%)	SE (%)	Weighted Total	(%)	SE (%)
General health: Fair, Poor									
AM AI/AN	89,569	21.4	1.1	187,395	22.9	1.4	88,428	22.8	1.5
NL AI/AN	8,952	24.5	2.6	37,918	24.9	2.9	23,402	24.3	2.9
Arthritis									
AM AI/AN	112,468	26.9	1.1	198,327	24.2	1.3	106,974	27.6	1.6
NL AI/AN	10,982	30.1	2.7	46,862	30.7	3.1	28,873	30.0	3.1
Asthma									
AM AI/AN	81,522	19.5	1.2	124,393	15.2	1.0	69,153	17.8	1.4
NL AI/AN	7,708	21.2	2.6	34,728	22.8	3.0	21,243	22.1	3.0

Journal of Experimental Political Science

Article contents

Developing Standards for Post-Hoc Weighting in Population-Based Survey Experiments

Published online by Cambridge University Press: **12 October 2017**

Annie Franco, Neil Malhotra, Gabor Simonovits and L. J. Zigerell

Show author details

Abstract

Weighting techniques are employed to generalize results from survey experiments to populations of theoretical and substantive interest. Although weighting is often viewed as a second-order methodological issue, these adjustment methods invoke untestable assumptions about the nature of sample selection and potential heterogeneity in the treatment effect. Therefore, although weighting is a useful technique in estimating population quantities, it can introduce bias and also be used as a researcher degree of freedom. We review survey experiments published in three major journals from 2000–2015 and find that there are no standard operating procedures for weighting survey experiments. We argue that all survey experiments should report the sample average treatment effect (SATE). Researchers seeking to generalize to a broader population can weight to estimate the population average treatment effect (PATE), but should discuss the construction and application of weights in a detailed and transparent manner given the possibility that weighting can introduce bias.

July 28, 2020

Comparison of Weighted and Unweighted Population Data to Assess Inequities in Coronavirus Disease 2019 Deaths by Race/Ethnicity Reported by the US Centers for Disease Control and Prevention

Tori L. Cowger, MPH[1,2,3]; Brigette A. Davis, MPH[1,3,4]; Onisha S. Etkins, MS[1,3,4]; et al

» Author Affiliations | Article Information

JAMA Netw Open. 2020;3(7):e2016933. doi:10.1001/jamanetworkopen.2020.16933

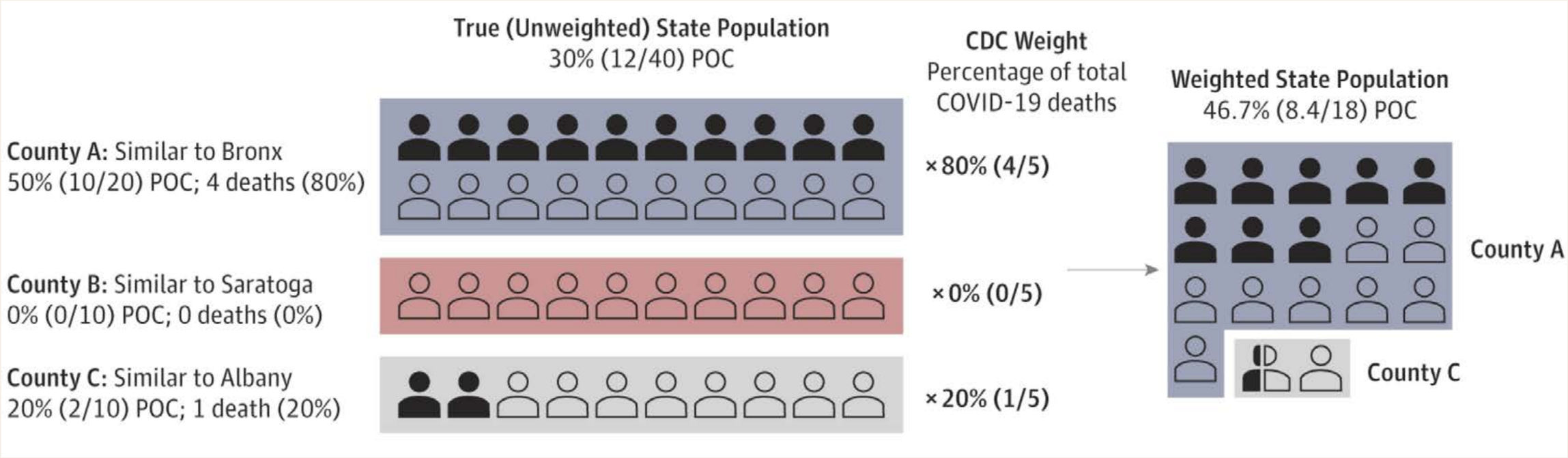
“By adjusting for the geographical distribution of racial groups, the CDC effectively compares inequities that would remain had all racial and ethnic groups lived in the same geographical areas. Controlling for this major pathway understates COVID-19 mortality among Black, Latinx, and Asian individuals and overstates the burden among White individuals.” Cowger, et al.

Table. Percentage Distribution by Race/Ethnicity for COVID-19 Deaths, CDC-NCHS-Weighted Population, and US Census Population and Absolute and Relative Differences Using Data as of May 13, 2020

	Distribution, %			Comparison with CDC-NCHS-weighted population		Comparison with US Census population (unweighted)	
Race/ethnicity[a]	COVID-19 deaths[b]	CDC-NCHS-weighted population	US Census population	Difference, %[c]	Ratio[d]	Difference, %[e]	Ratio[f]
American Indian and Alaska Native[g]	0.4	0.2	0.7	0.2[h]	2.00[h]	−0.3	0.57
Asian American	5.8	11.5	5.7	−5.7	0.50	0.1[h]	1.02[h]
Black	22.4	18.2	12.5	4.2[h]	1.23[h]	9.9[h]	1.79[h]
Latinx	16.6	26.8	18.3	−10.2	0.62	−1.7	0.91
Other race[i]	2.5	1.9	2.4	0.6[h]	1.32[h]	0.1[h]	1.04[h]
White	52.3	41.4	60.4	10.9[h]	1.26[h]	−8.1	0.87

“The indirect standardization procedure implemented by the CDC is misleading and obviates a key mechanism by which structural racism operates to produce health inequities: social segregation. The CDC approach heavily weights large, urban counties because of their high proportion of COVID-19 deaths (eg, New York City) and excludes counties without any COVID-19 deaths.

In effect, the CDC treats the geographical clustering of COVID-19 deaths as a nuisance parameter that must be controlled for to accurately compare the distribution of deaths across racial groups in the same geographical areas. However, the same mechanisms that pattern the geographical distribution of COVID-19 mortality also operate to produce racial/ethnic inequities in mortality.” Cowger, et al.



What even is statistical weighting?
What are the layers of statistical weighting?
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How is this an equity issue?
Suggestions?

1. Researchers should explicitly state why they are using weights.

2. Researchrs should explicitly state what weighting variables were used, why, and who made the choice.

3. When reporting weighted results, unweighted results should be easily accessible as well.

4. In some situations weighting plans should be documented in advance of data collection and analysis.