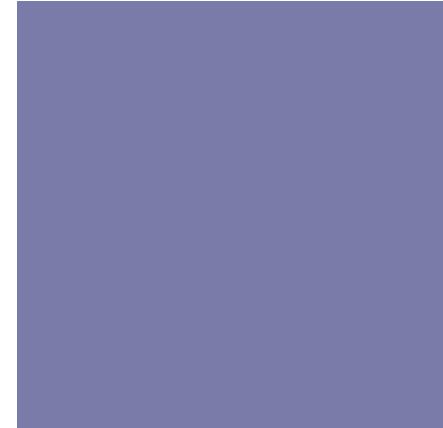
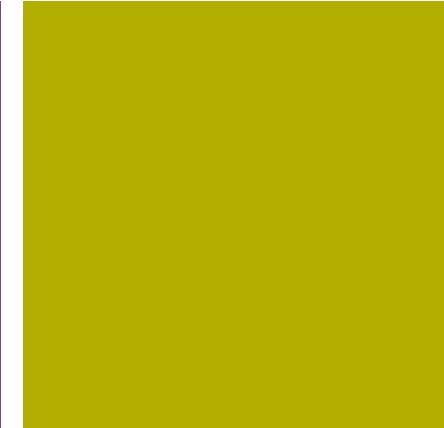




Teaching Presentation

Dawn Liu
10 July 2019



University of Essex

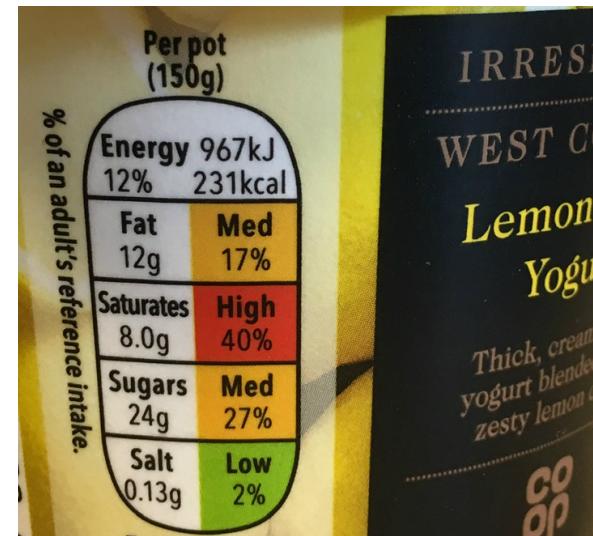


+ Research

- Liu, D., Juanchich, M., Sirota, M., & Orbell, S. (in press). The intuitive use of contextual information in decisions made with verbal and numerical quantities. *Quarterly Journal of Experimental Psychology*.
- Liu, D., & Juanchich, M. (2018). Conceptual understanding and quantity inferences: A new framework for examining consumer understanding of food energy. *Public Health Nutrition*, 21, 3168-3177. doi: 10.1017/S1368980018002021
- Liu, D., Juanchich, M., Foulsham, T., & Sirota, M. (in revision, *Judgment & Decision Making*). Eye-tracking evidence for attention asymmetries in verbal and numerical quantifier processing.
- Liu, D., Juanchich, M., Sirota, M., & Orbell, S. (in revision, *Thinking and Reasoning*). Differences between decisions made using verbal or numerical quantifiers.
- Liu, D., Juanchich, M., Sirota, M., & Orbell, S. (in revision, *Food Quality & Preference*). People overestimate verbal quantities of nutrients on nutrition labels.
- Liu, D., Juanchich, M., & Sirota, M. (in prep). Attribute framing with verbal and numerical quantifiers.
- Liu, D., Juanchich, M., & Sirota, M. (in prep). The directional focus of verbal and numerical quantifiers affects the attribute framing effect.

+ Teaching

- Research Methods in Psychology
- Statistics for Psychologists, 2nd year
- Judgment and Decision Making
- The Science of Uncertainty (Bayesian Modelling in R)
- Introduction to Psychology
- Psychology Research Projects (MSc, BSc)
- Eye-tracking workshop





Research Methods in Psychology

Lecture 2: Samples



University of Essex

Dawn Liu
10 July 2019





Learning points for today



Explain:

- What a sample is
- Why we sample
- How we use samples in psychological research
- Issues with different sampling methods

*Reminder:

Slides are on Moodle: <https://moodle.essex.ac.uk>

Lecture recordings on Listen Again: <https://listenagain.essex.ac.uk>

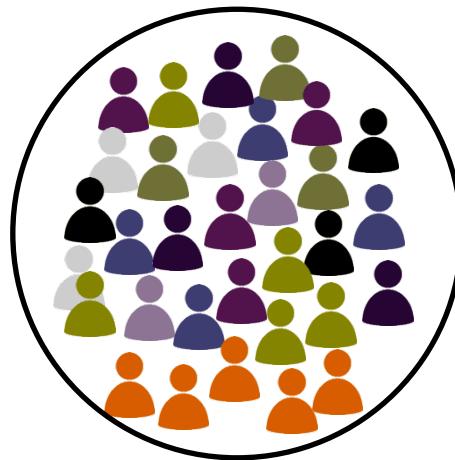




What is a sample?



A smaller collection of the population



that we use to estimate a characteristic of the population.

+

Why sample in psychology?



- Measuring the entire population is impossible



66 million people



327 million people

Conceptual understanding and quantity inferences: a new framework for examining consumer understanding of food energy

Dawn Liu* and Marie Juanchich

Department of Psychology, University of Essex, Wivenhoe Park, Colchester, Essex, CO4 3SQ, UK

Submitted 12 January 2018; Final revision received 8 June 2018; Accepted 13 July 2018

Abstract

Objective: The study examined two components of consumer understanding of food energy information: understanding the concept of energy and its quantity. Using this new framework, we investigated whether activity-equivalent labels facilitated interpretations of food energy compared with calorie labels and whether an image format would strengthen this facilitative effect compared with text.

Design: We assessed the effect of energy representation and format in a 2 (activity *v.* calories) \times 2 (image *v.* text) between-subjects design. Conceptual understanding of energy was measured in terms of level of understanding and personal engagement. Quantitative understanding was measured in terms of participants' estimations of a food's contribution to their recommended daily intake and perceptions of energy values as precise or single-bound interval estimates.

Setting: The experiment was conducted online through Qualtrics.

Subjects: Eight hundred and twelve participants (55% female, age range 18–74 years) were recruited through a national survey panel in the UK.

Results: Participants were twice more likely to have a stronger conceptual understanding of energy and four times more likely to personally engage with activity labels *v.* calorie labels. Participants did not differ across labels in their estimations of energy quantities; however, they inferred quantities to mean exactly

Research sample





Key Concept

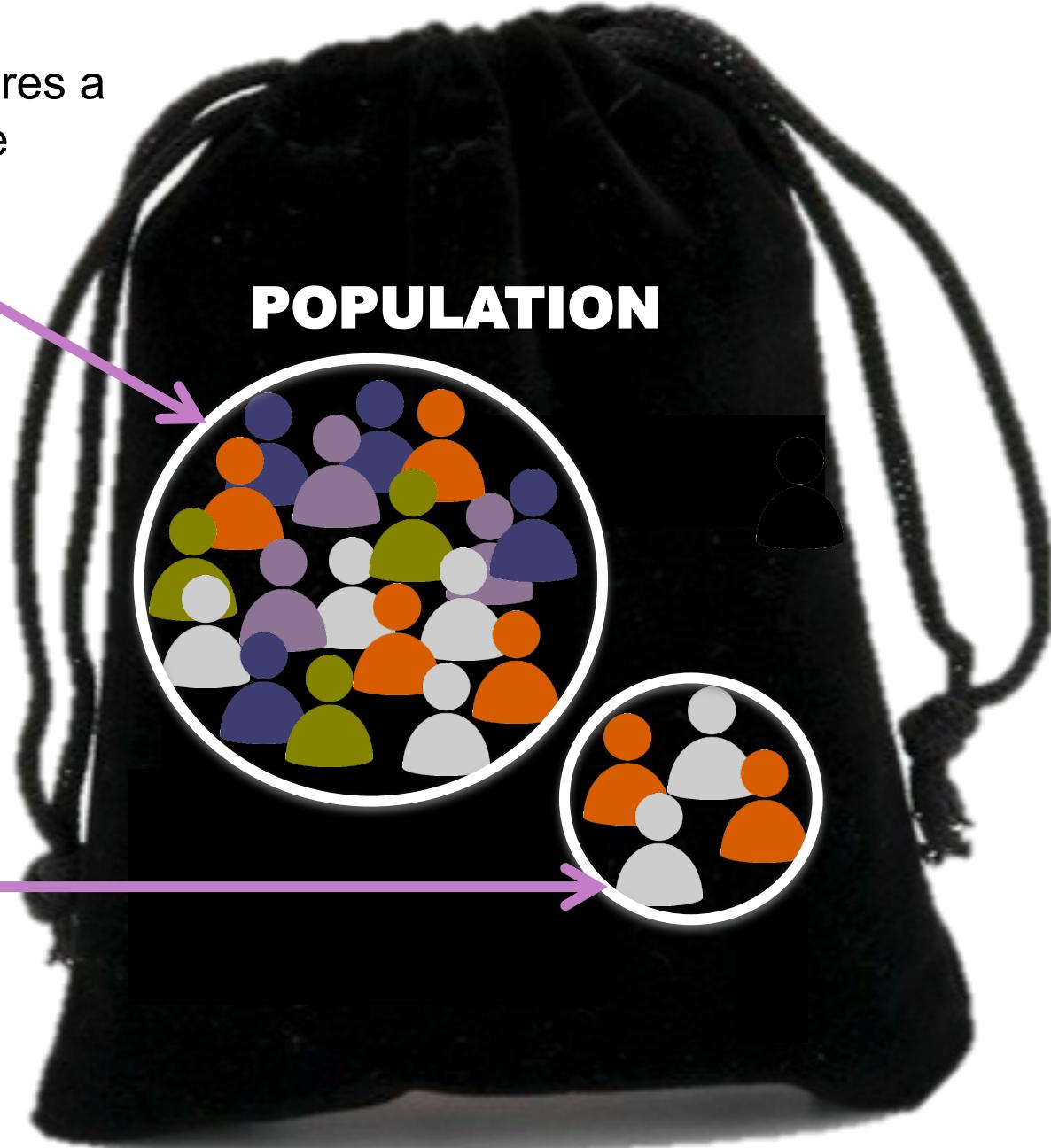
Sample size:

The number of individuals in the sample.

POPULATION



A large sample captures a broader picture of the population.



A small sample may give a more skewed picture.



+ **How should we
pick our sample?**



Ways to sample:



- Random sampling:
 - **Simple random**
 - Stratified random
 - **Cluster**

- Non-random sampling:
 - **Snowball**
 - **Convenience**
 - Quota



How do we sample?



Simple random sample:

Each person in the population has an equal chance of being sampled.



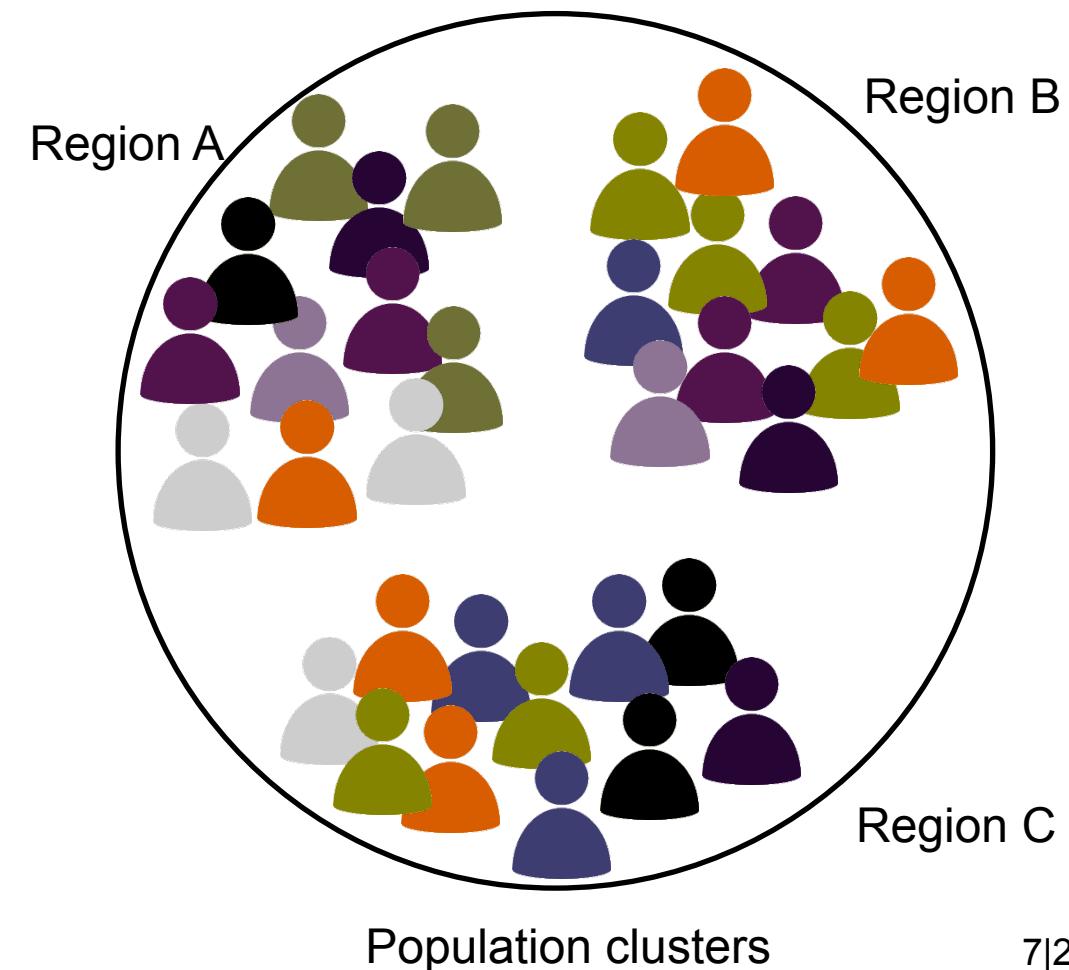
1 in 66 million!!



Key Concept

Cluster sample:

A random sample from within natural groupings ('clusters') in the population.

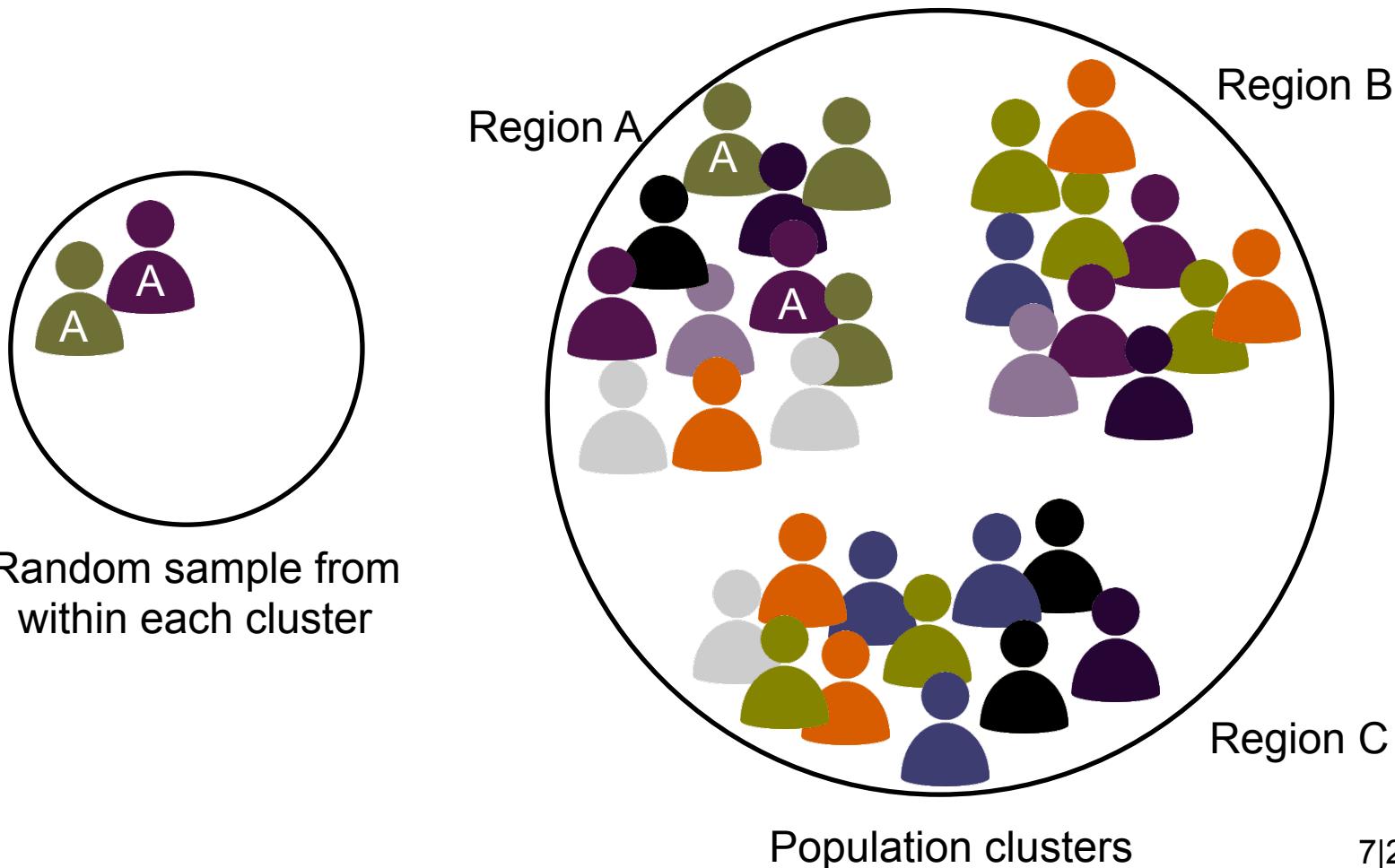




Key Concept

Cluster sample:

A random sample from within natural groupings ('clusters') in the population.

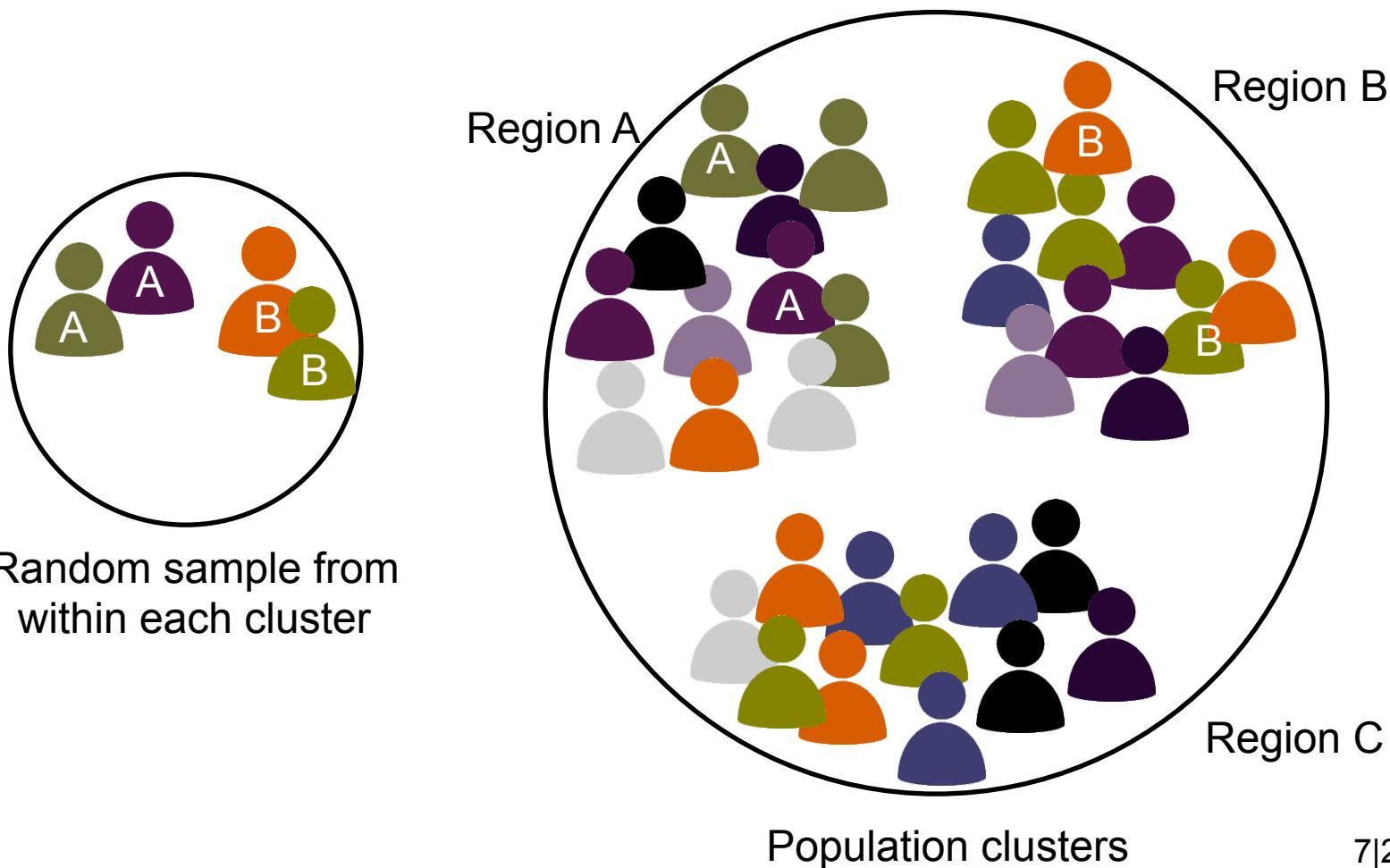




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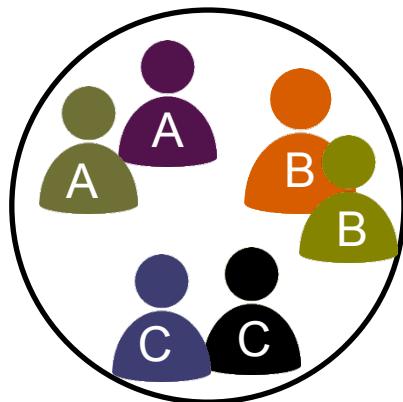




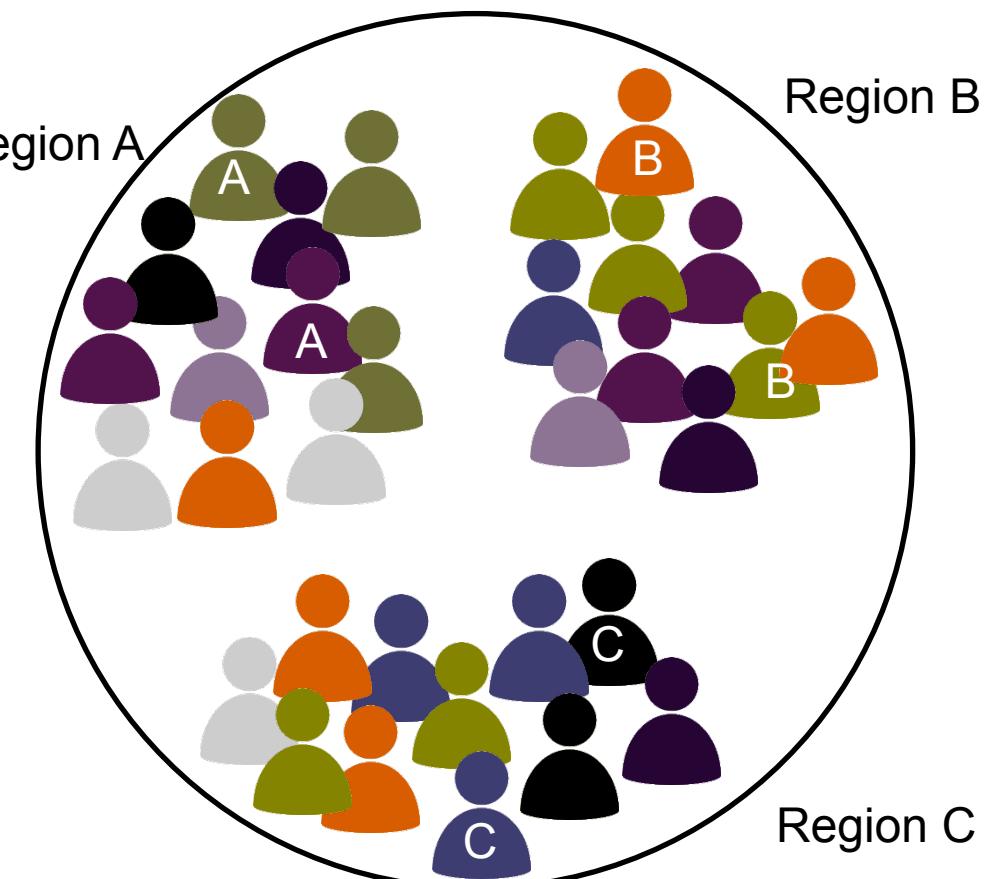
Key Concept

Cluster sample:

A random sample from within natural groupings ('clusters') in the population.



Random sample from
within each cluster



Population clusters

Snowball sample



Snowball sample:



(HOMER SCREAMS)



Key Concept

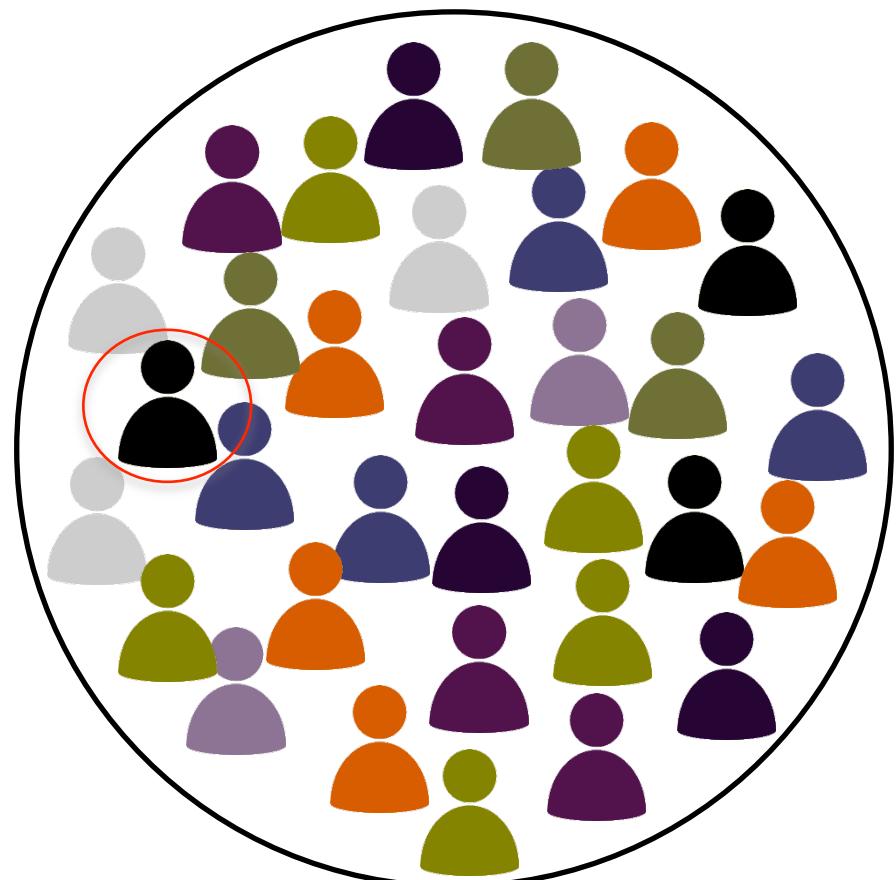
Snowball sample:

Ask people from sample to invite others to participate.



Sampling meme!

First individual asks next individual, who asks next individual, and so on.





Key Concept

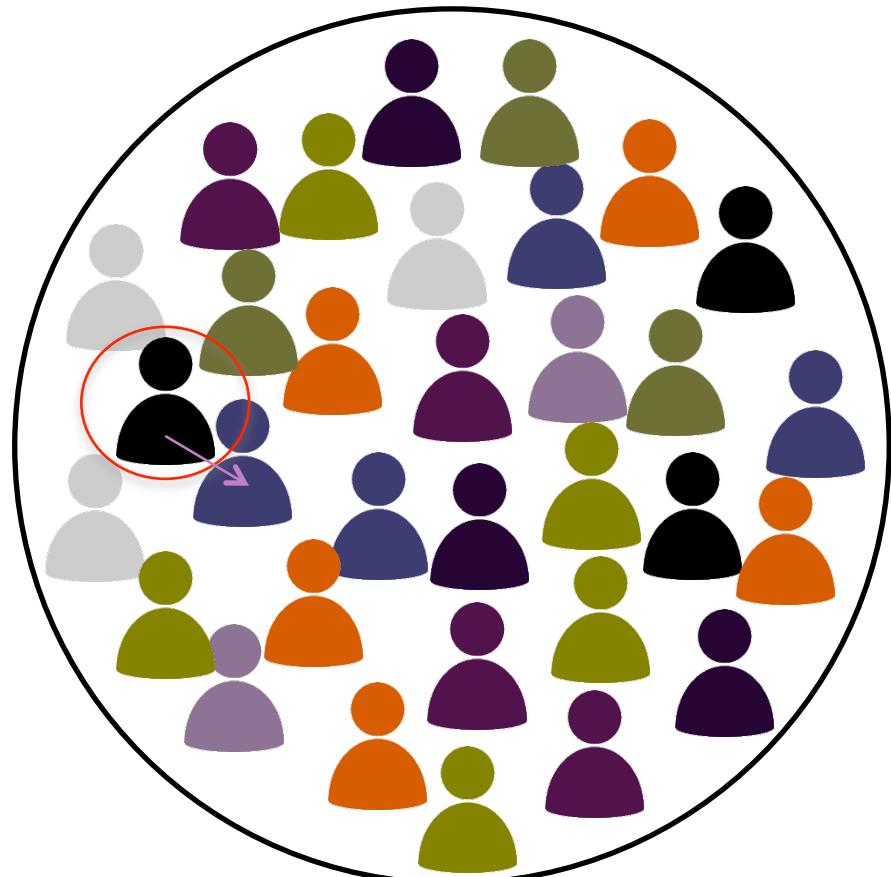
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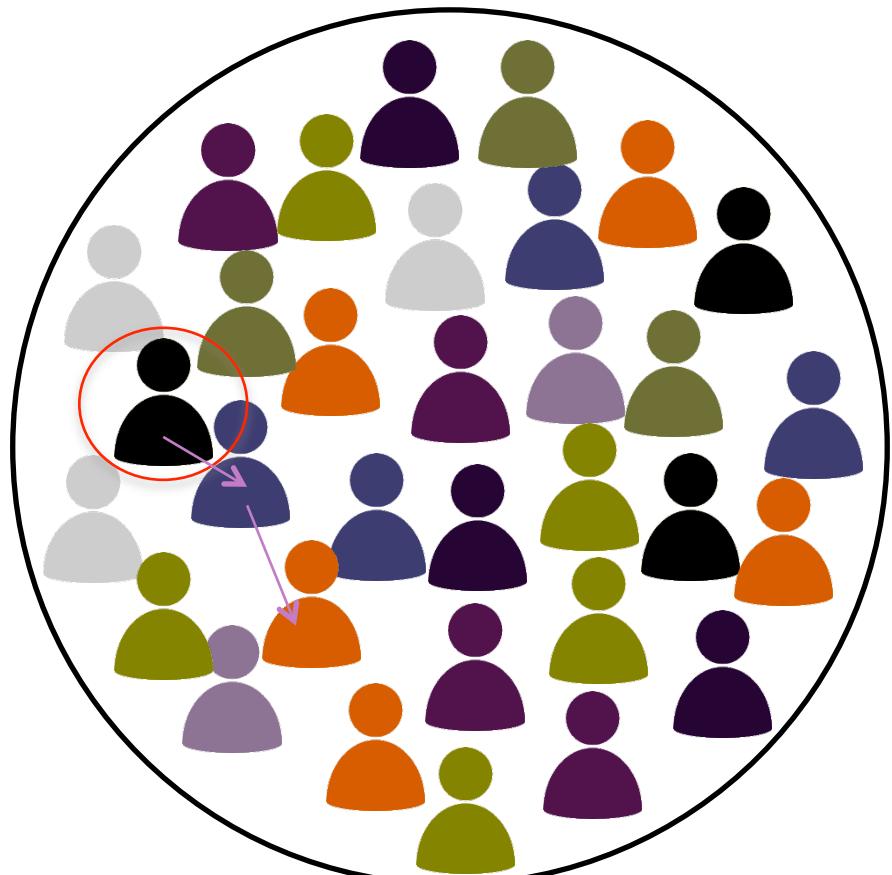
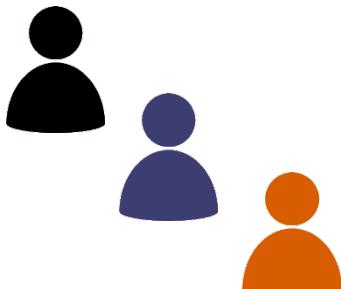
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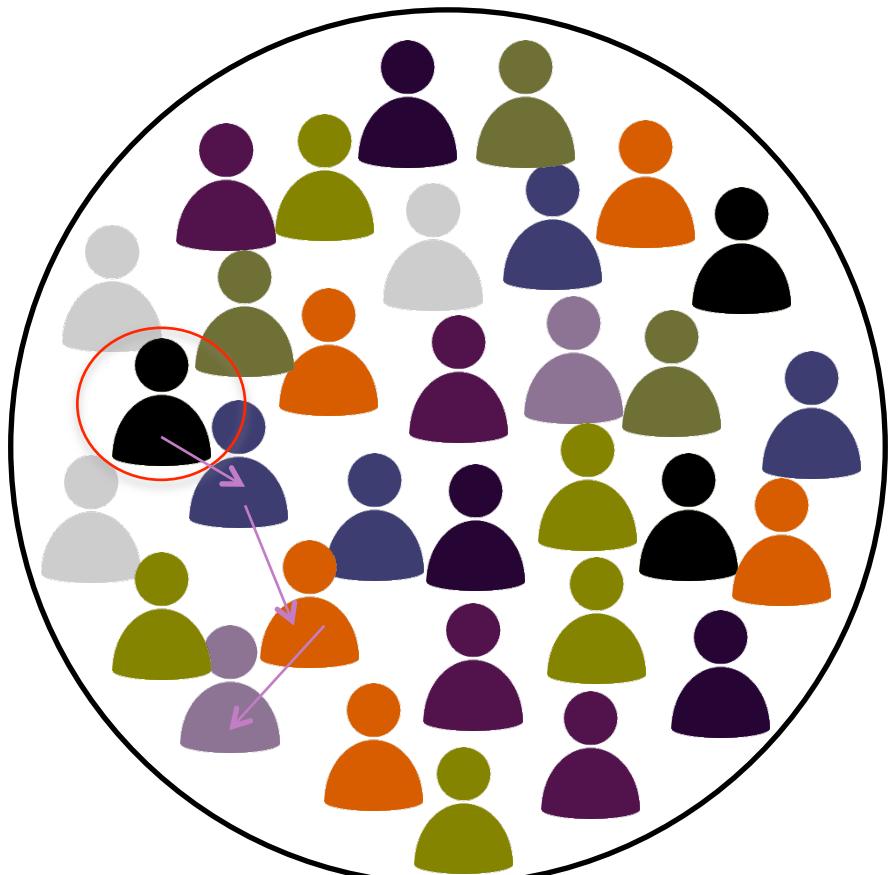
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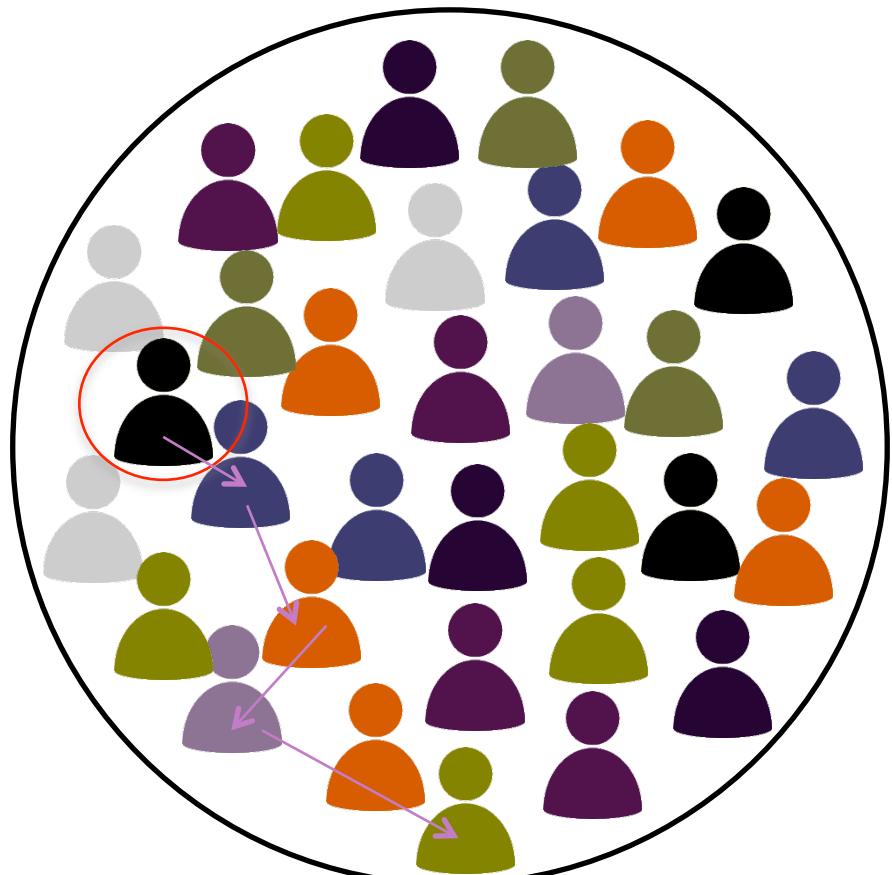
Snowball sample:

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Sampling meme!

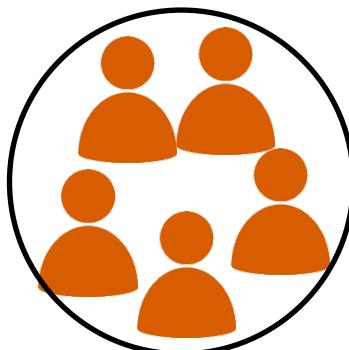
First individual asks next individual, who asks next individual, and so on.





Key Concept

Convenience sample:
A sample that is available.



Population



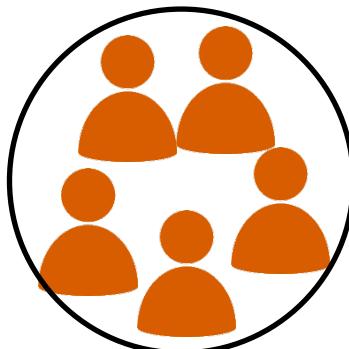
Key Concept

Convenience sample:

A sample that is available.



These individuals have no chance of being sampled.



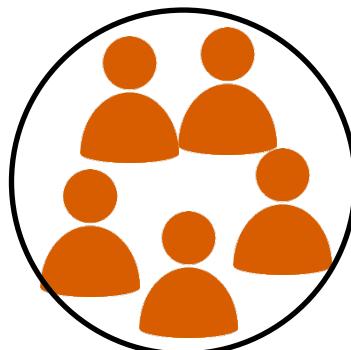
Population



Key Concept

Convenience sample:

A sample that is available.



Sample of students
from psychology



Population



Sampling methods in practice



Epstein et al., 1996: Intuitive vs. analytical thinking styles

Method

Sample and Procedure

One hundred eighty-four participants (55 men and 129 women), enrolled in undergraduate psychology classes at a large state university, volunteered for the study in exchange for experimental credit. They

McKenzie & Nelson, 2003: Framing events

Method

The participants were 192 University of California, San Diego (UCSD) students, who received partial course credit. There were 32 participants in each of six conditions. In one condition, the parti-

Methods

Participants

We recruited 60 undergraduate students with Android phones, who participated in exchange for class credit or \$30. One student was removed from the study due to non-compliance and 4

Sandstrom et al., 2016: Social interactions.

Method

Participants. Thirty-one participants ($M_{age} = 22.50$, $SD = 2.78$) were recruited through the department subject pool and

Loaiza & Halse, 2018: Working & long-term memory.

+ Is there something we have in common?



Sampling methods in practice



Western
Educated
Industrialised
Rich
Democratic

- 96% of research published in top psychology journals have WEIRD samples

+ What can we say about the population from our sample?

+ What can we say about the population from our sample?

Depends on who is our population ...

Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account of Decision Making, Self-Regulation, and Active Initiative

Kathleen D. Vohs
University of Minnesota

Brandon J. Schmeichel
Texas A&M University

Noelle M. Nelson
University of Minnesota

Roy F. Baumeister
Florida State University

Jean M. Twenge
San Diego State University

Dianne M. Tice
Florida State University



Sample of students

Method

Participants. Thirty undergraduate students (20 women) participated in Experiment 1A and 30 undergraduate students (18 women) participated in Experiment 1B in exchange for partial course credit.

Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account of Decision Making, Self-Regulation, and Active Initiative

Kathleen D. Vohs

rudimentary selfhood of other animals. Self-control and decision making are central, vital skills for functioning in human culture. Our findings suggest that the formation of the human self has involved finding a way to create an energy resource that can be used to control action in these advanced and expensive ways.

The current research tested the hypothesis that making many choices impairs subsequent self-control. Drawing from a limited-resource model of self-regulation and executive function, the authors hypothesized that decision making depletes the same resource used for self-control, leading to reduced self-control.



Sample of students



Population

Consequences of Erudite Vernacular Utilized Irrespective of Necessity: Problems with Using Long Words Needlessly

DANIEL M. OPPENHEIMER*

Princeton University, USA



Participants and procedure

Seventy-one Stanford University undergraduates participated to fulfil part of a course requirement. The survey was included in a packet of unrelated one-page questionnaires. Packets were distributed in class, and participants were given a week to complete the entire packet.

Sample of students

Consequences of Erudite Vernacular Utilized Irrespective of Necessity: Problems with Using Long Words Needlessly

DANIEL M. OPPENHEIMER*

straightforward of these is that authors should avoid needless complexity. As reported in the introduction of this paper, a vast majority of Stanford students use a strategy of complexity when writing papers and this is undoubtedly true at campuses and businesses across the country. However, this research shows that such strategies tend to backfire. This



Sample of students

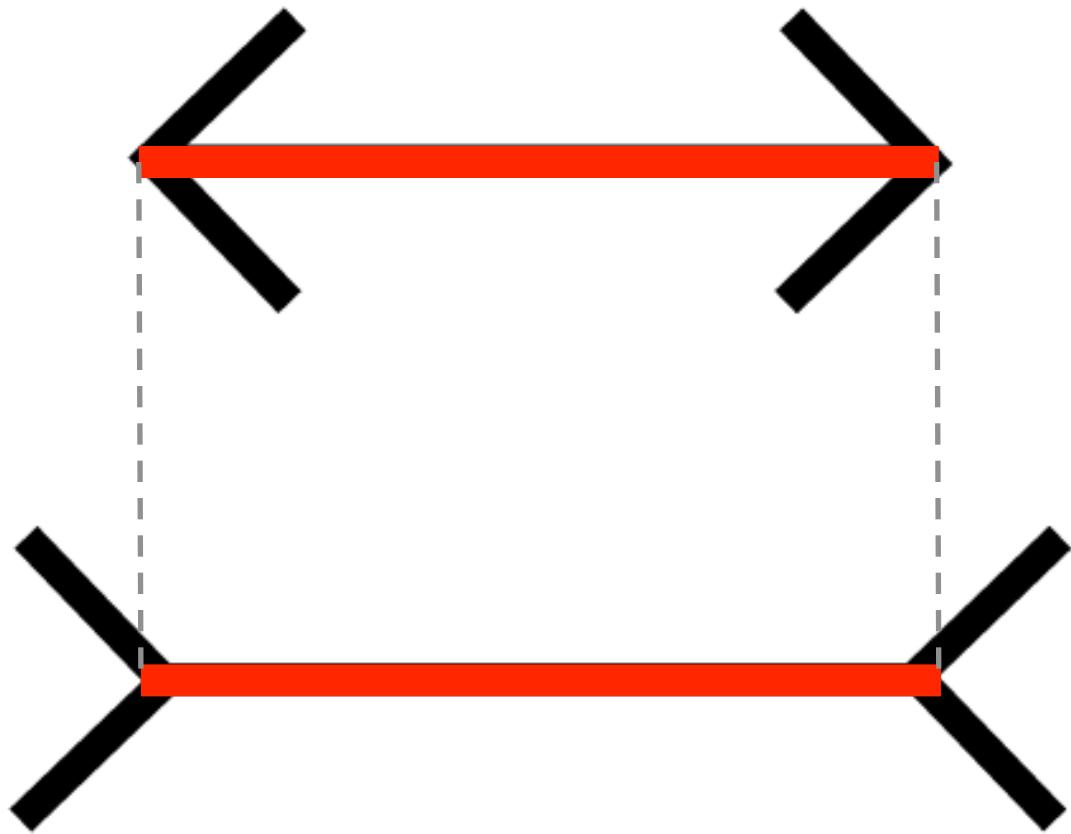


Population

+ What about brains?









Sampling methods in practice



Western
Educated
Industrialised
Rich
Democratic

- This basic illusion does not generalise to non-WEIRD samples





+ Evaluating a study: Your ‘toolbox’





+ Evaluating a study: Your ‘toolbox’

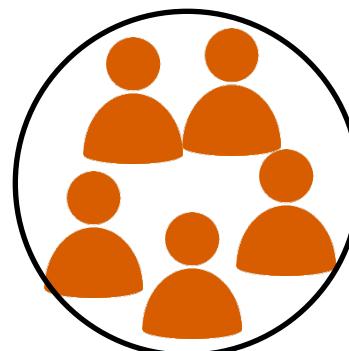
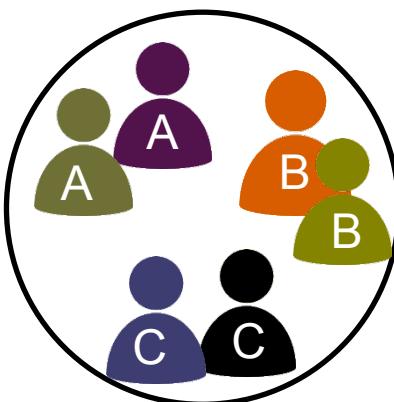
- What was the sample size?





+ Evaluating a study: Your ‘toolbox’

- What was the sample size?
- How was the sample obtained?





Evaluating a study: Your ‘toolbox’



- What was the sample size?
- How was the sample obtained?
- Do these limit our ability to generalise?
- **WHY?**



Learning points for today



- What is a sample?
 - A smaller collection of the population

- Why do we sample?
 - Samples help us estimate characteristics of a population that we are interested in



Learning points for today



- How do we sample?
- Methodological considerations:
 - Sample size
 - Sampling methods
 - Random: simple, cluster
 - Non-random: snowball, convenience
 - (Others as well!)



Learning points for today



- How do we sample?
- We want samples that estimate the population better:
 - Big samples
 - Representative samples





Learning points for today



- How do we sample?
- Convenience samples are most common in psychology
 - Evaluate if they will generalise:
 - How representative?
 - To which populations?
 - Why?



Additional resources



- Textbook chapters:
 - Howitt, D., & Cramer, D. (2016). *Introduction to Research Methods in Psychology* (5th ed). Harlow, Essex: Pearson Education Limited.
 - Chapter 4: Sample sizes
 - Chapter 13: Sampling methods
- Psychological publications on sampling issues:
 - Hanel, P.H.P., & Vione, K.C. (2016). Do student samples provide an accurate estimate of the general public? *PLoS ONE*, 11, e0168354. doi:[10.1371/journal.pone.0168354](https://doi.org/10.1371/journal.pone.0168354)
 - Henrich, J., Heine, S., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences*, 33, 61-135. doi:[10.1017/S0140525X0999152X](https://doi.org/10.1017/S0140525X0999152X)
 - Marszalek, J.M., Barber, C., & Kohlhart, J. (2011). Sample size in psychological research over the past 30 years. *Perceptual and Motor Skills*, 112, 331-348. doi: [10.2466/03.11.PMS.112.2.331-384](https://doi.org/10.2466/03.11.PMS.112.2.331-384)
- Web resources:
 - http://psychology.udavis.edu/rainbow/html/fact_sample.html
 - https://www.learner.org/courses/learningmath/data/session1/part_d/random.html*

*Interactive website: try out sampling for yourself!



Upcoming lectures



Today: Samples Overview

- Upcoming:
 - (A) Psychological Research Methods:
 - Research designs (quantitative and qualitative)
 - Reporting research
 - (B) Interpreting and inferring from sample data:
 - Descriptive statistics (i.e., describing data)
 - Hypothesis testing (i.e., testing our predictions)
 - Inferential statistics (i.e., what are the odds)

+ Thank you!

Dawn Liu
10 July 2019
dliuxi@essex.ac.uk



Small samples can still be useful



- Offer basic understanding of behavioural effects
- Starting point to understand human mind
- Issue is with conclusions, not the research itself





Sampling Error



- We can observe characteristics in our sample
- But our sample will not be exactly the same as the population



Sampling Error:
Difference between sample and population



Sample colour range: 5



Population colour range: 9



Key Concept

Stratified random sample:

Random sample selected from each population subdivision



Random sample from within each population group:



1. Proportionate stratified:
In same proportion as population



2. Disproportionate stratified:
Representative sample within group



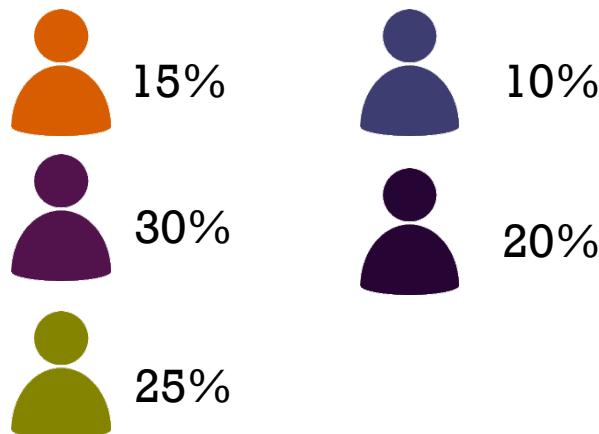
Population subdivisions



Quota sample:

Sample within each group until you have proportionate numbers to the population.

Sample until you have the right proportion:



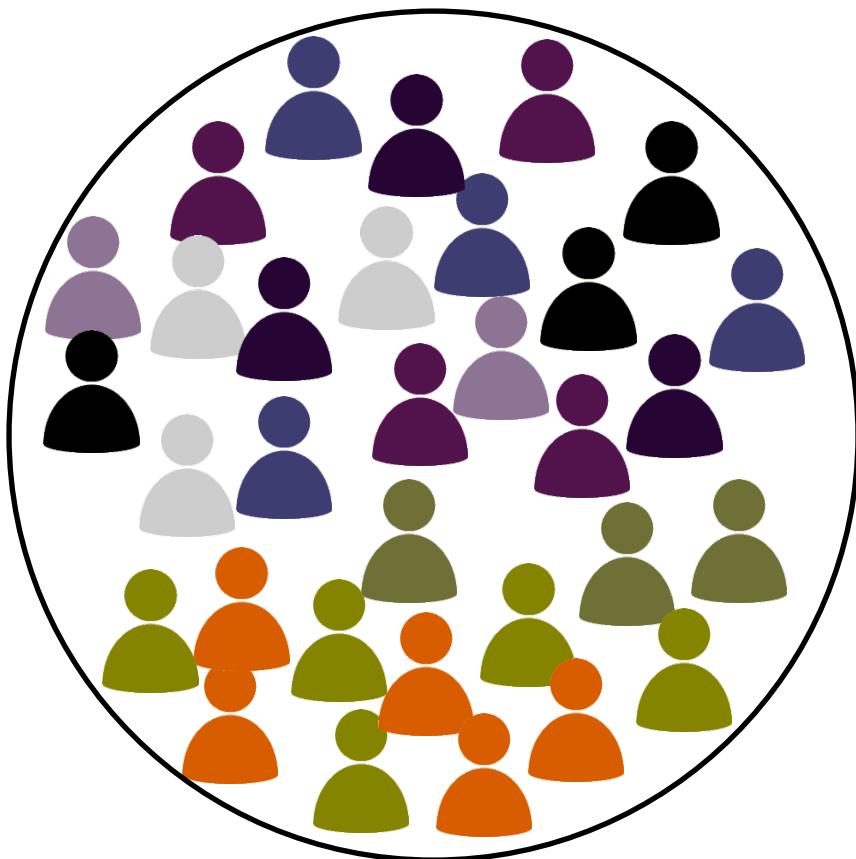
Population clusters

+

What is our population?

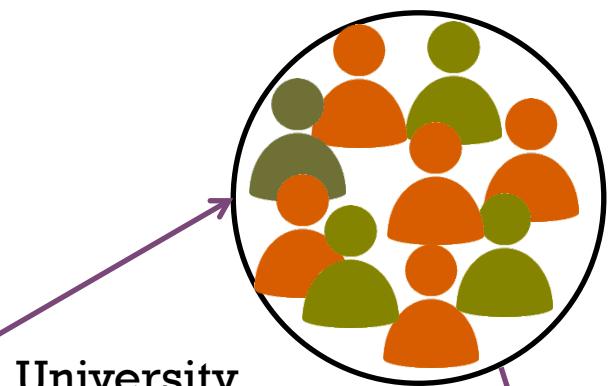
How do people in the UK read food labels?

UK population

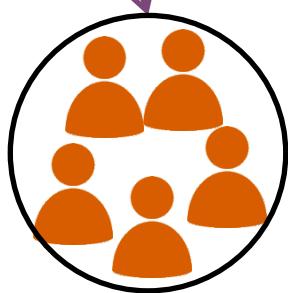


How do university students in the UK read food labels?

University population



University sample



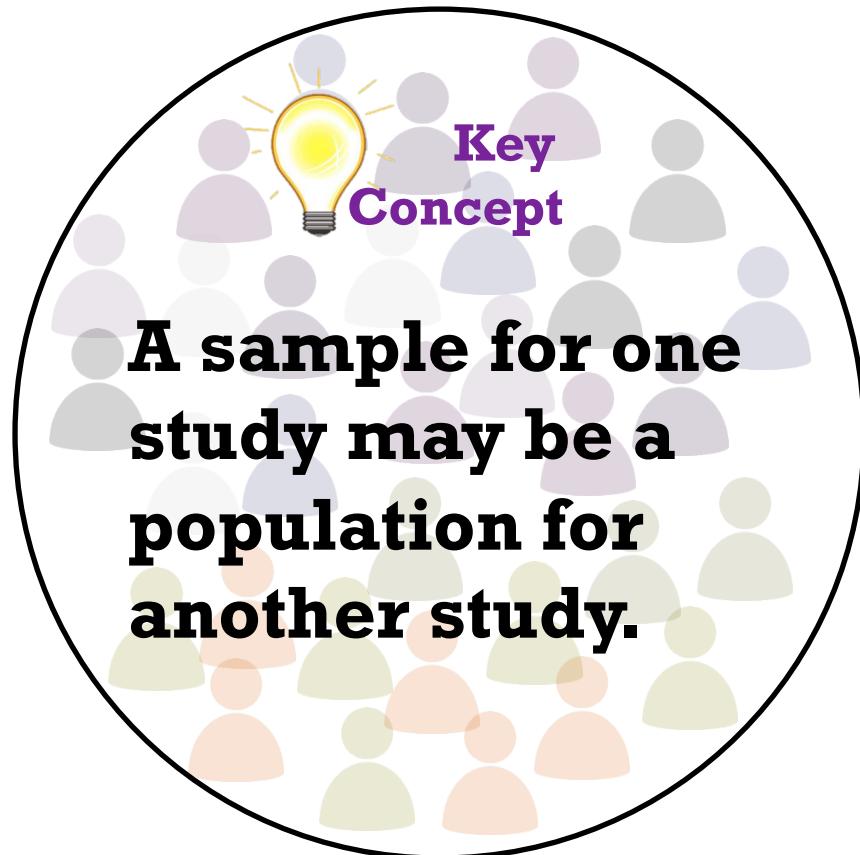
Psychology sample

+

What is our population?

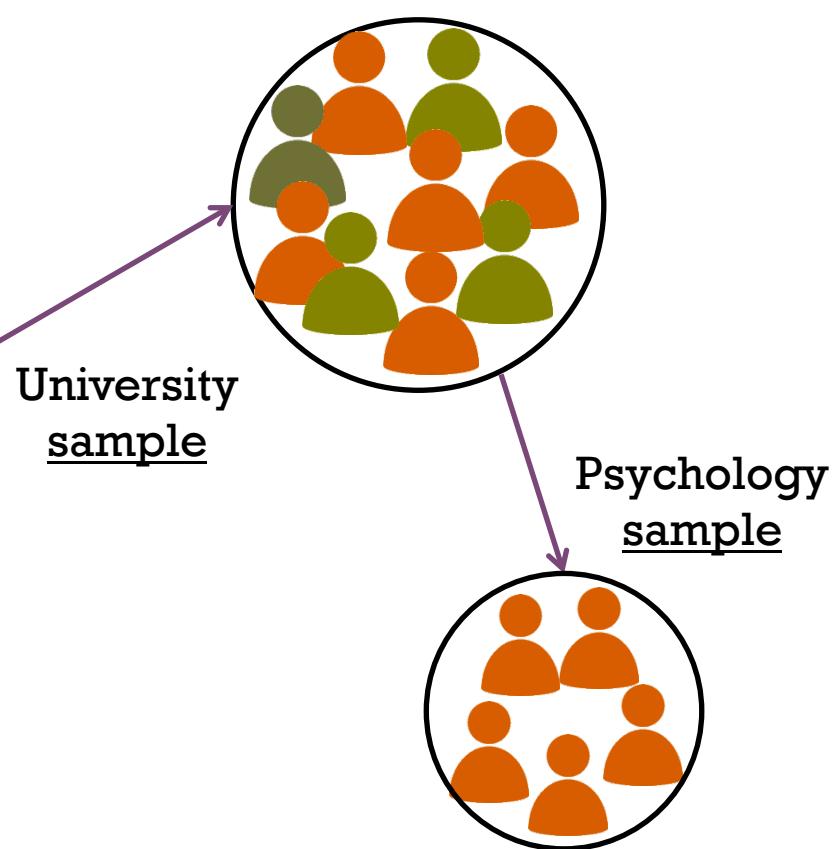
How do people in the UK read food labels?

UK population



How do university students in the UK read food labels?

University population





Sample sizes in practice

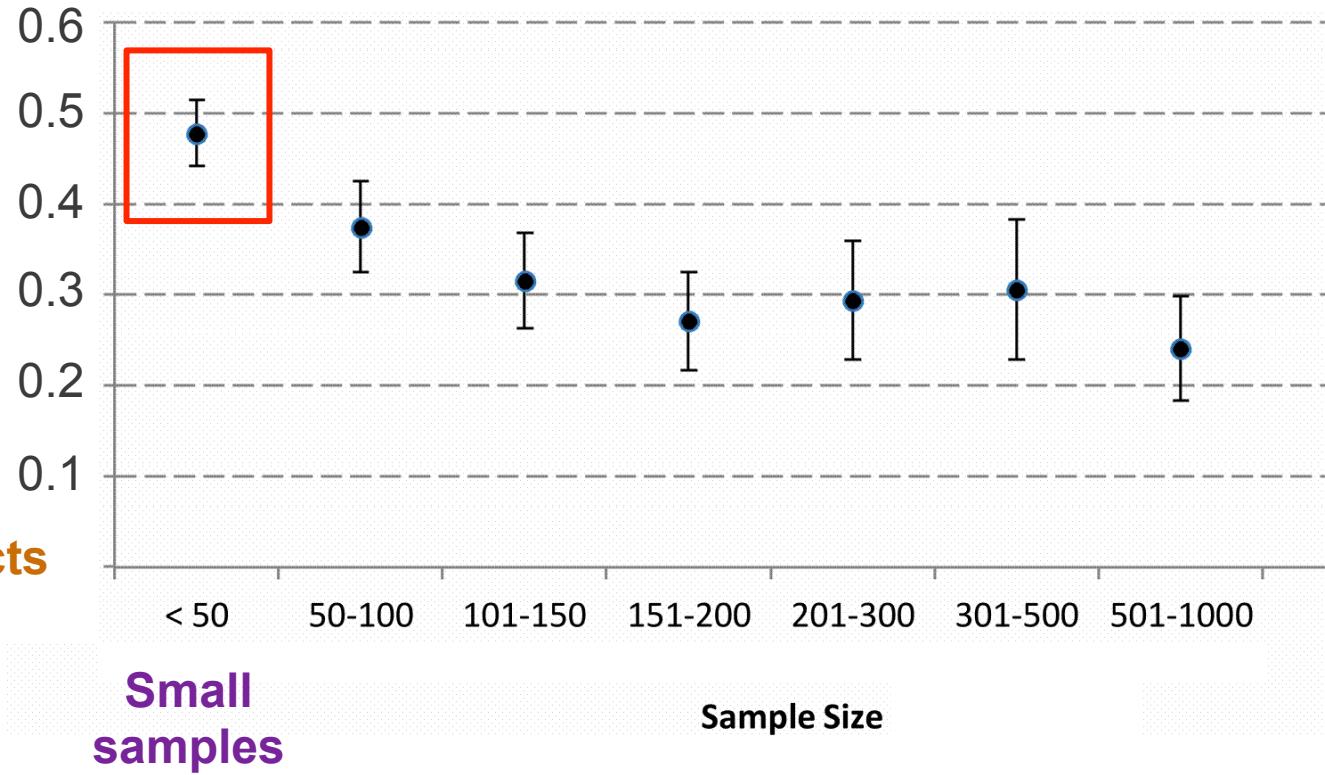


- Small(er) samples give more extreme results:

Big effects



Small effects





Sample sizes in practice

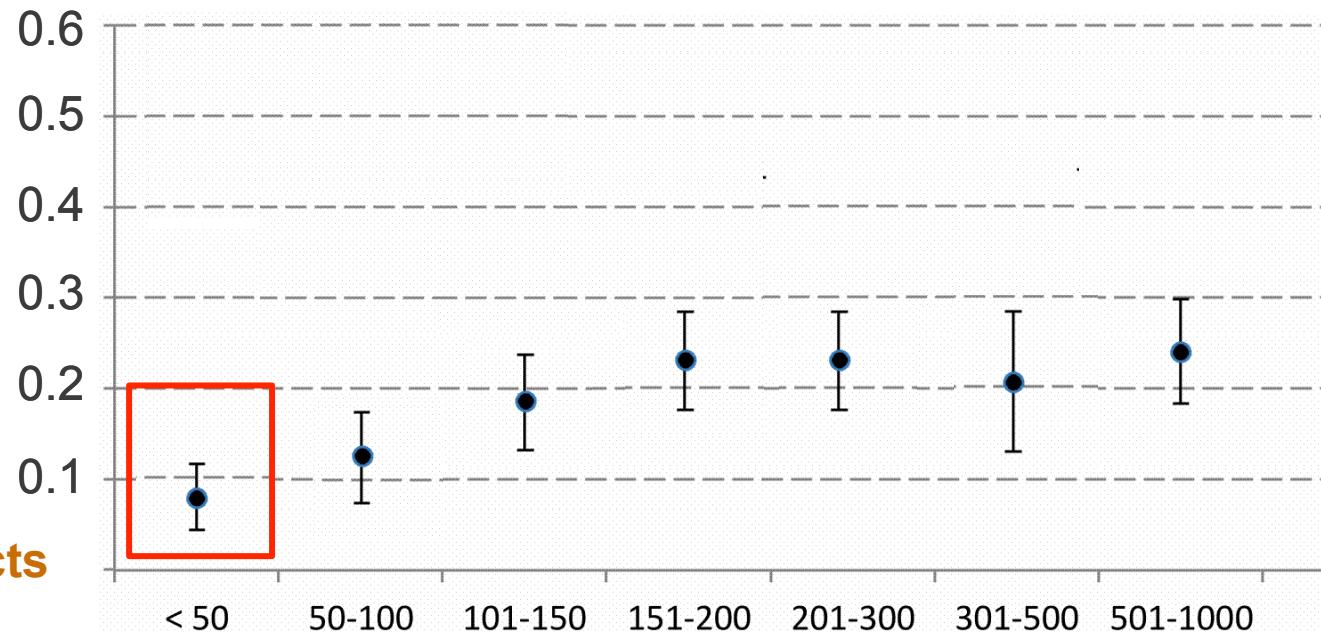


- Small(er) samples give more extreme results:

Big effects



Small effects



**Small
samples**

Sample Size



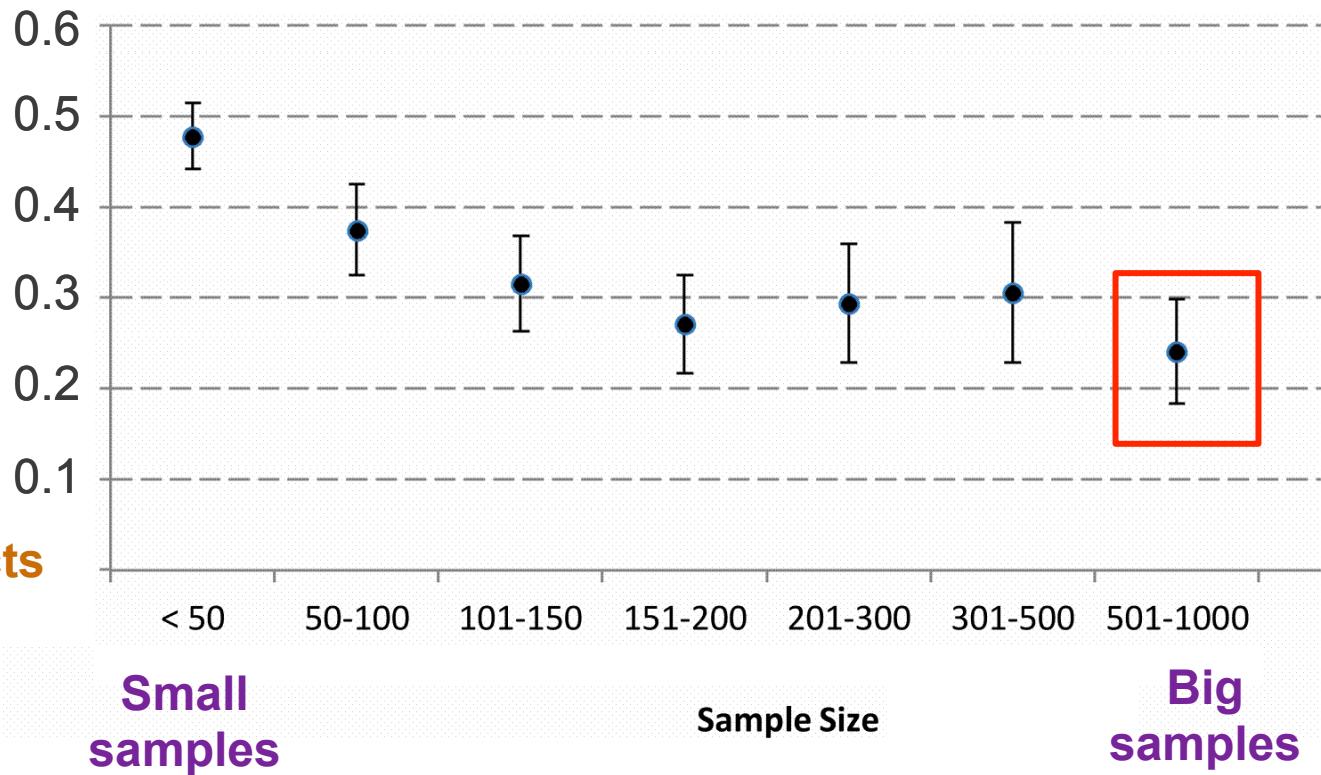
Sample sizes in practice

- Bigger samples are closer to real population effects:

Big effects



Small effects





Sampling methods in practice

- 96% of research published in top psychology journals have WEIRD samples

Middle East	East Asia	South Asia	Southeast Asia	Sub-Saharan Africa
Depressed mood Social isolation/ loneliness	Fatigue Worthlessness/guilt	Sleep Fatigue	Issues with heart**/ Depressed mood	Depressed mood Sleep
Fatigue Irritability	Sleep Loss of interest	Depressed mood/sadness Weight/Appetite	Sleep Social isolation/ loneliness	Weight/appetite Fatigue
Sleep/General pain	Weight/Appetite & suicide	Issues with heart**/ Headaches**	Thinking too much**	Social isolation/ loneliness

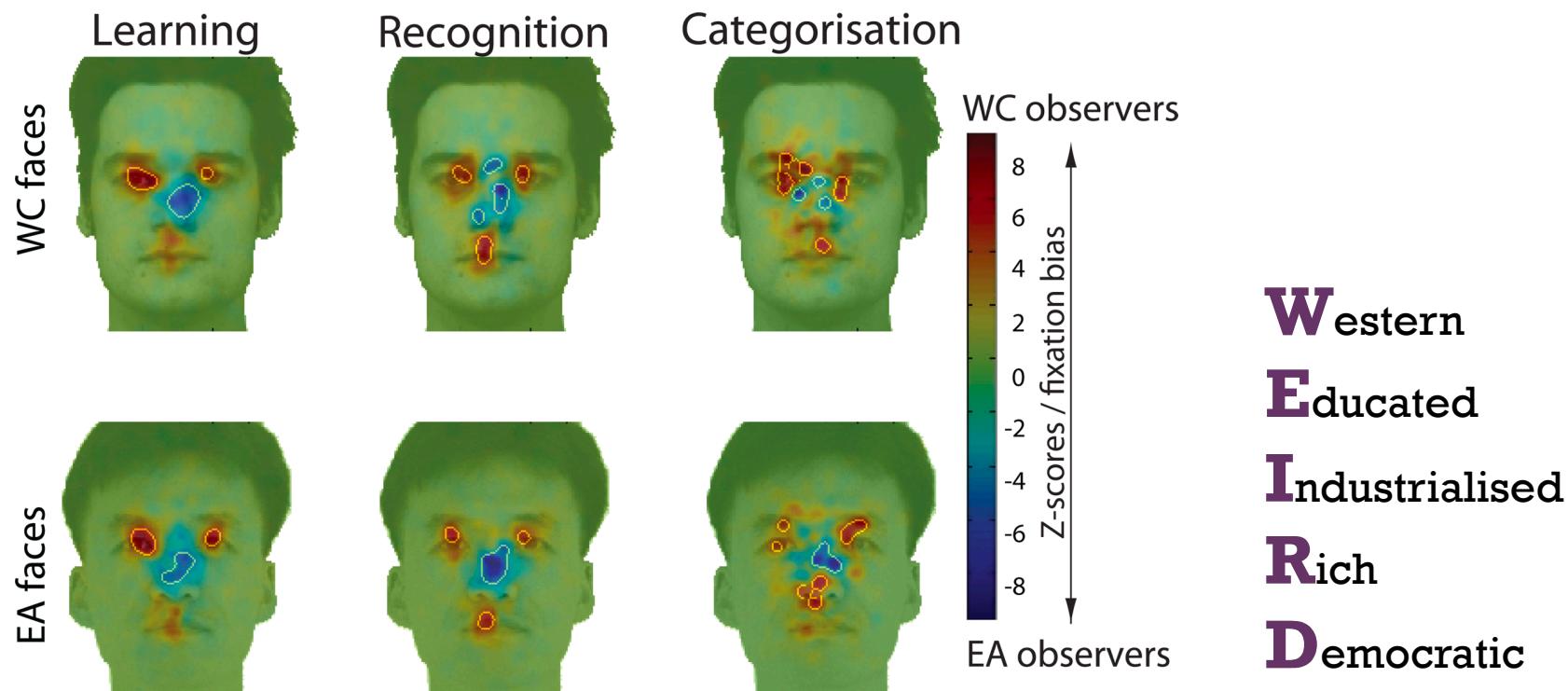
Presenting symptoms in depressive diagnoses (bolded symptoms are present in WEIRD-based diagnostic manual.)

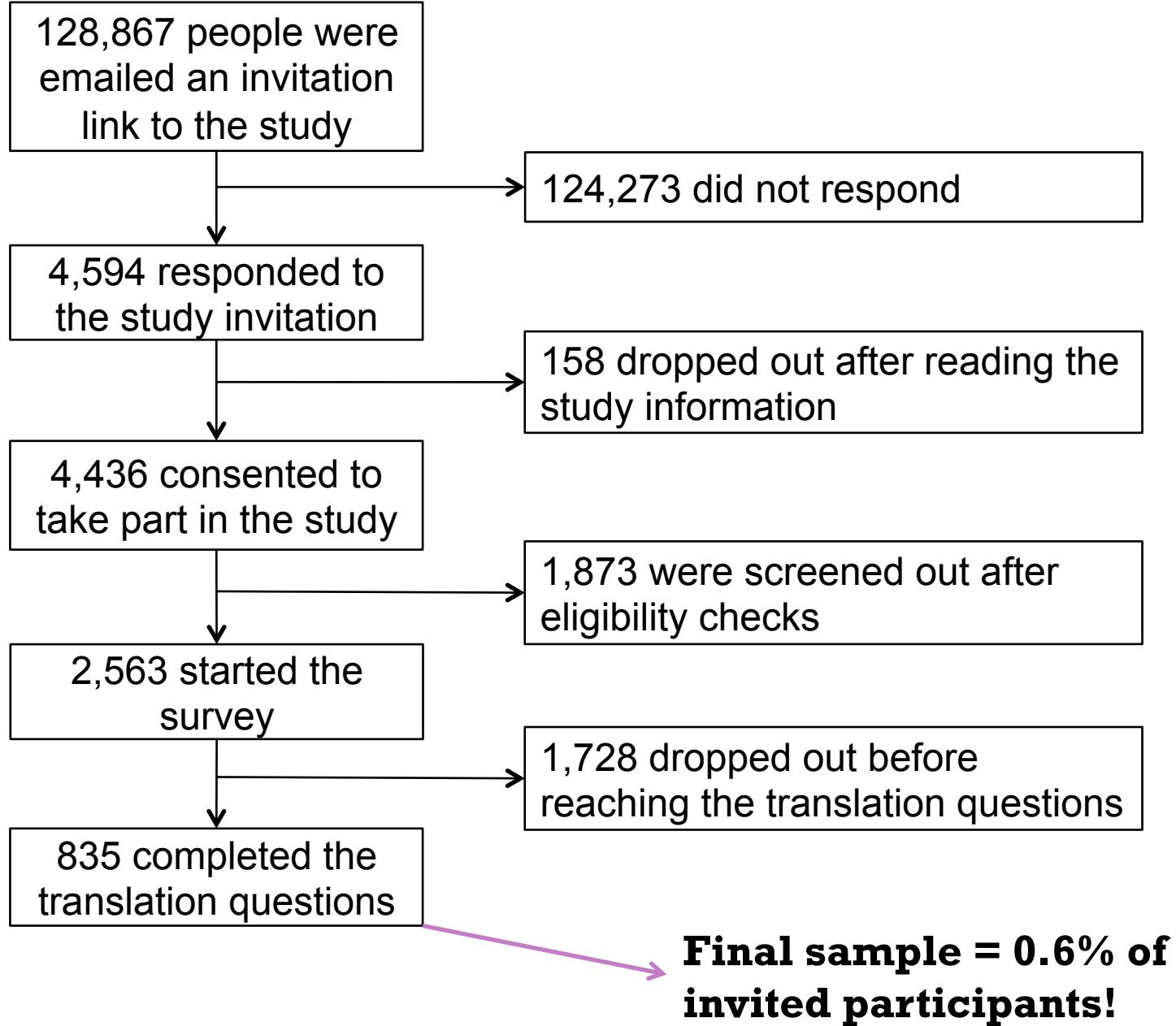
W
E
I
R
D



Sampling methods in practice

- 96% of research published in top psychology journals have WEIRD samples







Homework for the tutorial

- Identify a situation around you where you could get a sample of data
 - How many minutes are buses late?
 - Your monthly electricity bills?
 - Your children's amount of screen time?
- Answer the following:
 - What would be the population (and why)?
 - What sort of sample do you have? (Convenience, quota, random?)
 - How representative is your sample? Why (or why not)?