BEHAVIORAL MEASUREMENT IN PRAGMATIC TRIALS

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behavioral basics

- Use validated scales, not necessarily because they're exactly right for you but because they allow for between-study comparisons.

- This is not an argument to exclude non-validated scales that are exactly right for your study. You must study the dynamic you want to study.
- When possible focus on actions, without reference to mental/contextual states.
  - Example: "Were you speeding?"
  - Reframed: "Were you driving over 65mph?"

considerations for pragmatic trials

- Invest time in understanding the data-ecosystem you're operating in.
  - Start with getting a sense of what records are currently collected.
    - Be sure to assess the way the variables are being recorded (e.g., missingness, talk with people about how much they trust the records).
    - Use the conversations to ask practitioners if there are variables that they would really like to collect and use in their normal practice but haven't been doing. Use this as an opportunity to explore adding those variables (e.g., building permanent systems to collect).
  - Can a passively recorded variable approximate what you want?
- Are you measuring the outcomes that *they* are interested in.
  - You're going to be working in *their* space; are the variables you're collecting really reflecting their interests?
  - Another way to say this: are your numbers going to be convincing to these people?
- Are you going to get honest answers?
  - You're embedding in an environment where many participants will continue to be in the setting after the results of the study are published.

BEHAVIORAL MEASURES

statistical trade-offs in a complex environment

the problem with people

- We don’t always tell the truth, especially about sensitive stuff.
- This isn’t just measurement error:

  observed value = true value + error

- People will tend to distort in a consistent way, causing bias in downstream estimates.
- Additionally, some people will refuse to answer questions.
- But we need to know about sensitive stuff: stigmatized medical conditions, drug use, unpopular beliefs, unethical practices, errors in delivery of care…
- This can be particularly a serious issue when you’re getting measurements from people in a setting that they will continue to be in. They have their own reputation, and potentially a group reputation, to consider.

the problem with people

- What can we do about this?
  - Anonymity
  - Use non-judgmental language
  - Ask related questions
  - Give people “outs” (e.g., on a multiple choice give answer which are suggestive of, but not exactly, the stigmatized answer)
  - Surprising idea: tell some of the people what to answer

Blair, G., Imai, K., & Zhou, Y. Y. (2015). **Design and analysis of the randomized response technique**. Journal of the American Statistical Association, 110(511), 1304-1319.

knowing your data

- Often, people don’t answer stigmatizing questions because they’re afraid truthful answers will become known by others. This is true even when anonymity is promised.
- We want to mitigate this pressure to be untruthful, but how?
- Randomized response:
  - Participants in your study are asked a sensitive Yes/No question.
  - People are randomly assigned to either group (a), (b) or (c).
  - If they are (a) then they answer “Yes,” (b) answer “No,” or (c) answer the question truthfully.

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knowing your ~~data~~ humans

- Why does this work?
- Plausible deniability.
- No one knows if the question was answered truthfully or using a randomized-yes/no.

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randomized response

- But doesn't this make things harder?

- Yes:

observed answer = true answer + chance modifier

- No, actually makes it better:

observed answer = true answer + ~~bias~~ + chance modifier

- The key is the researchers control the chance modifier here, so we know exactly how *on average* the randomness impacts the observed answers and can back that out.

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my research: preventing violence

Baiocchi, M., Omondi, B., Langat, N., Boothroyd, D. B., Sinclair, J., Pavia, L., ... & Sarnquist, C. (2017). **A behavior-based intervention that prevents sexual assault: the results of a matched-pairs, cluster-randomized study in Nairobi, Kenya**. Prevention science, 18(7), 818-827.

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randomized response

Example: We're running a version of our violence prevention program at Stanford. Say we recruit 200 students for the program and we'll be asking them sensitive questions.

Study design:

Group 1 – One hundred of the students are randomly selected to complete an anonymous survey. They completed the survey silently while in the presence of the researcher.

Group 2 – The other one hundred students participate in the randomized response version of the survey.

Fidler, D. S., and Kleinknecht, R. E. (1977), **Randomized Response Versus Direct Questioning: Two Data-Collection Methods for Sensitive Information**. Psychological Bulletin, 84, 1045–1049.

randomized response

Group 2 procedure:

- Before answering each question, the student reached into a plastic globe (the kind used to select numbers in bingo games) to pull out a pellet.

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randomized response

Group 2 procedure:

- Before answering each question, the student reaches into a plastic globe (the kind used to select numbers in bingo games) to pull out a pellet.
- To keep the math simple, the globe contains a total of 16 wooden pellets (10 red pellets, 3 non-red pellets imprinted "Yes," and 3 non-red pellets imprinted "No")
- Respondents were trained:

> Before reading the question, turn the globe and draw a pellet. If you draw a red pellet then read the question and answer truthfully. If you draw a "Yes" pellet then do not answer the question; instead, merely circle "Yes" on the survey. Likewise, if you draw a "No" pellet then circle "No" on the survey.

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randomized response

Group 2 procedure:

- They were trained on a few questions, after which the researcher said:

> If I did not see your pellet then I would not know how to interpret your response. You might have drawn a red pellet and answered truthfully, or you might have drawn a non-red pellet and answered according to the pellet. Therefore I will leave the room now. Since I will not see which pellet you draw, your privacy is guaranteed. Do you understand?

Respondents can “blend in” with the crowd.

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randomized response

How do we get the answers out of the Group 2?

$$Estimated\ percent\ yes = \frac{Observed\ percent\ yes - P(told\ to\ say\ \text{Yes})}{P(told\ to\ answer\ truthfully)}$$

Example: Ten pellets say answer truthfully. Three say “Yes.” Three say “No.”

Say we observe 36 “yes” to a particular question in the sample.

$$Estimated\ percent\ yes = \frac{Observed\ percent\ yes - P(told\ to\ say\ \text{Yes})}{P(told\ to\ answer\ truthfully)} = 27.6\%$$

randomized response

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Say we observe 36 "yes" to a particular question in the sample.

$$Estimated\ percent\ yes = \frac{\frac{36}{100} - \frac{3}{16}}{\frac{10}{16}} = 27.6\%$$

randomized response

This is what is happening **on average**:

$$Estimated\ percent\ yes = \frac{\frac{36}{100} - \frac{3}{16}}{\frac{10}{16}} = 27.6\%$$

But we can never know what's going on for **any particular individual**.

Note: this compared to a reported rate of 11% in Group 1.

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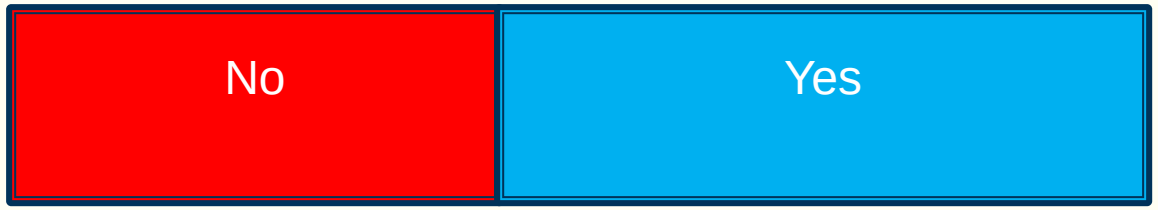
randomized response – in pictures



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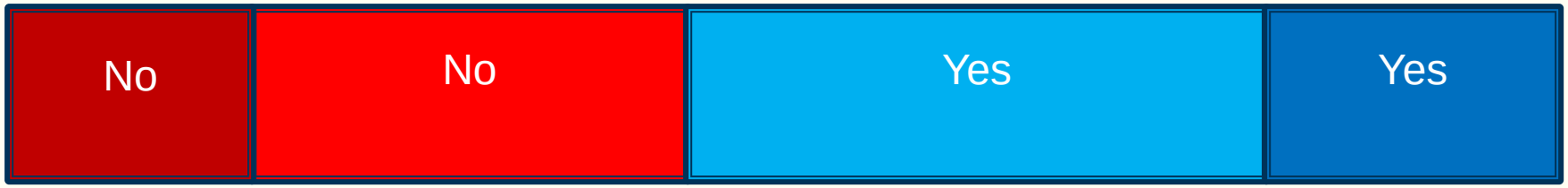

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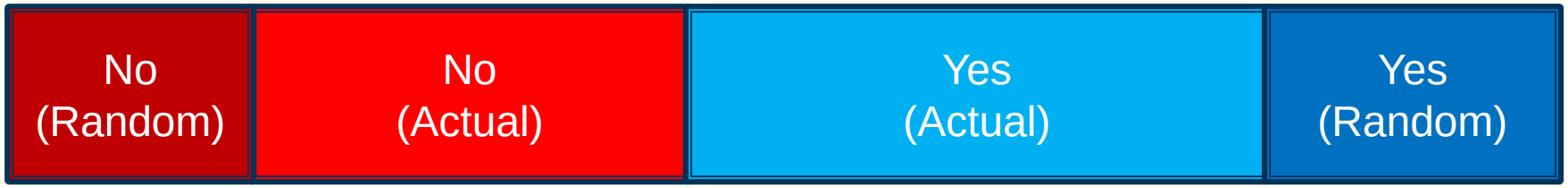

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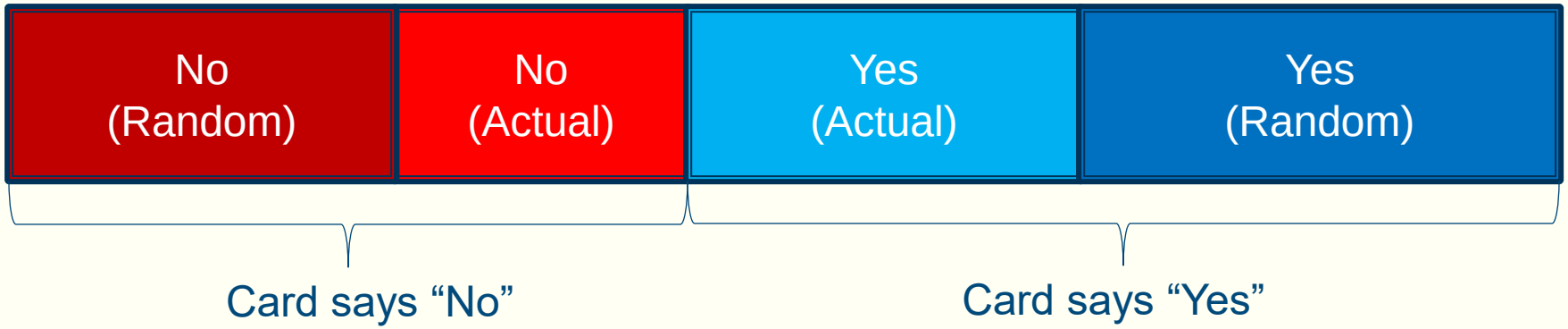

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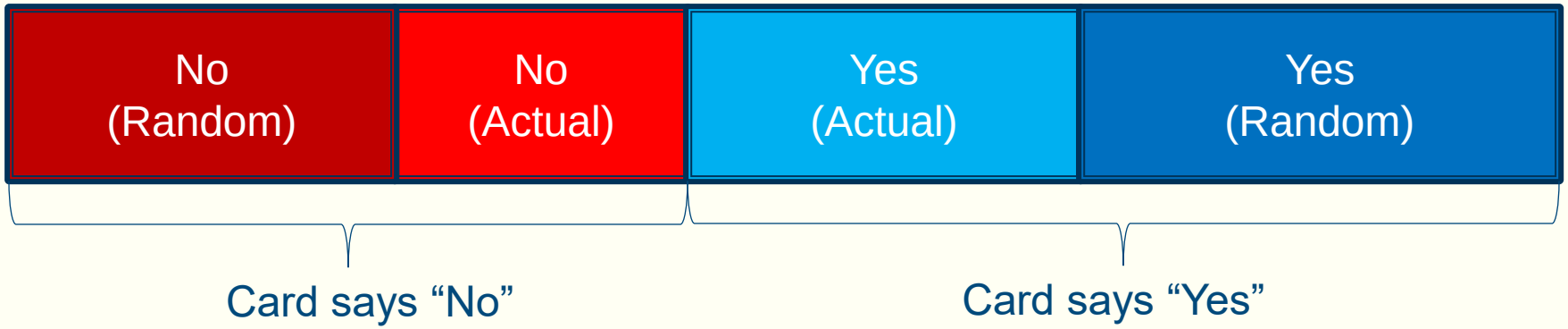
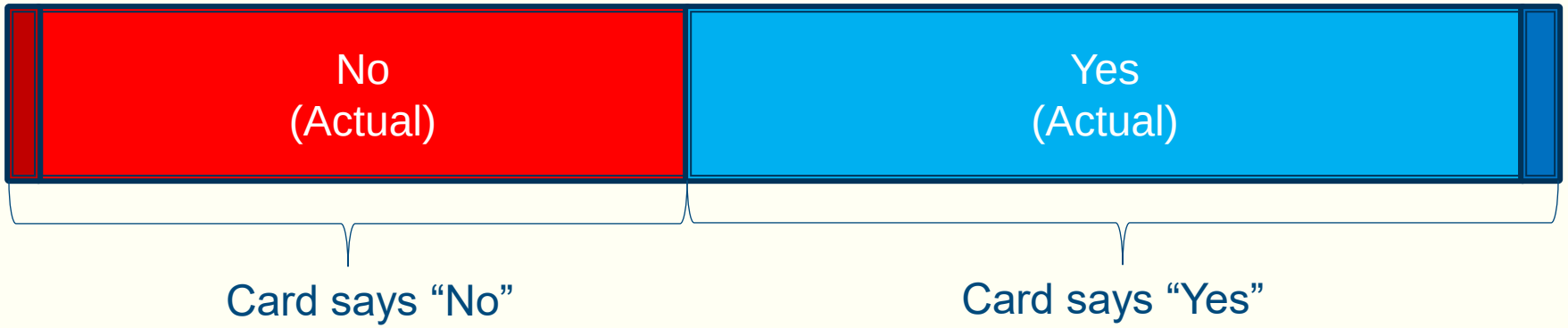


More randomized responses → higher amount of anonymity

randomized response – in pictures



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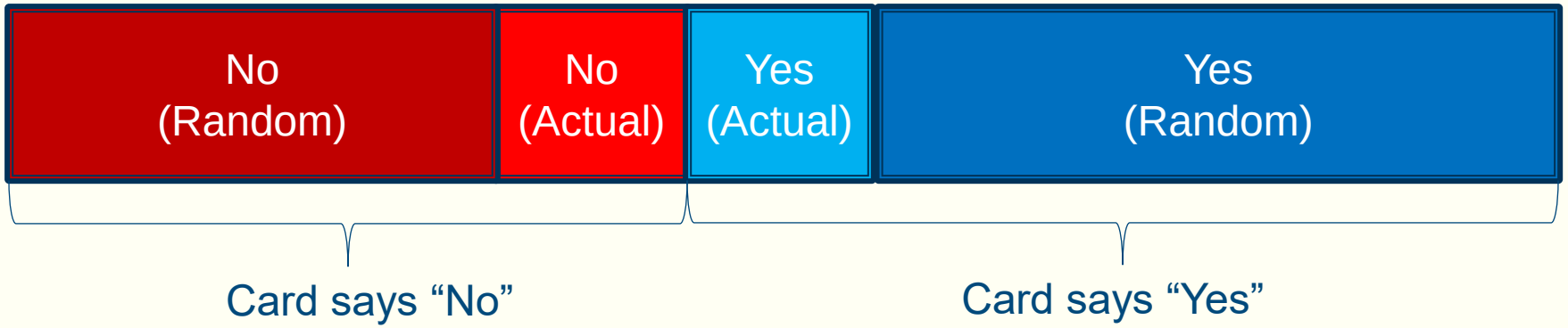

More randomized responses → higher amount of anonymity

More randomized responses → more variability in estimate

This is a bias-variance trade-off.

randomized response

- Another benefit:

  Only 7 refusals in Group 2, whereas 15 people refused in Group 1.

  Providing protection – by carefully crafting both your questions and the way you ask questions – can lead to much better data.

comparative lists

- Two lists, one has the stigmatized behavior of interest, the other list doesn't.
- Ask for the number of experiences on the list.

IN THE PRIOR 12 MONTHS I…
Made a new friend.
Picked up a new hobby.
Yelled at a friend.
Yelled at a family member.
Was punched.

IN THE PRIOR 12 MONTHS I…
Made a new friend.
Picked up a new hobby.
Yelled at a friend.
Yelled at a family member.
Was punched.
Punched another person.

- Need some question to be "safe" but also a couple need to be similarly sensitive.

Ahart, A. M., & Sackett, P. R. (2004). **A new method of examining relationships between individual difference measures and sensitive behavior criteria: Evaluating the unmatched count technique**. Organizational Research Methods, 7(1), 101-114.

TAKEAWAYS

takeaways

- Because your study is pragmatic, you will likely be embedded in a setting that already exists and will continue to exist after you do your study.
- Leverage, and if possible improve upon, existing data systems.
- Behavioral questions can provoke people into responding untruthfully. This is particularly challenging because people will tend to do this in systematic ways (not just randomly) which will lead to bias in your estimates.
- By thinking carefully about how you ask questions – both in the wording, but also in the delivery – you can head off problems.
- Care about the people you're studying.

FIN.

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