Randomization 2: Designing for common constraints & threats | *Randomisation 2: à traduire*

Alyssa René HEINZE

17-06-2023

Randomization and design: What we've learned, what's next | *à traduire*

Common constraints, more complex designs | *à traduire*

Common threats, anticipatory designs | *a traduire*

Final takeaway: Keep things simple | *a traduire*

Key points for this lecture | *Points clés*

- Randomization and design: What we've learned, what's next
- Common constraints, more complex designs
- Common threats, anticipatory designs
- Final takeaway: Keep things simple

- Vide pour l'instant.
-
-

Randomization and design: What we've learned, what's next | *à traduire*

Randomization and design: What we've learned | *à traduire*

- What we've covered:
  - 4 types of randomization: Simple, complete, block, and cluster
  - And we can combine them: block-cluster, factorial designs
- Most of the time these designs suffice.

Randomization and design: What's next | *à traduire*

- *BUT* we often face:
  - Practical constraints in our context
  - Common threats to inference
- *So* we need to take these into account in the *design* of our experiment.
  - How?
  - Designing to take into account context-specific constraints:
    - Waitlist designs, encouragement designs
  - Designing to anticipate problems:
    - Attrition, spillover

- ▶

Common constraints, more complex designs | *à traduire*

Common constraints | *a traduire*

1. Constrained in how many units can be treated at one time
2. You can't force people to take your treatment

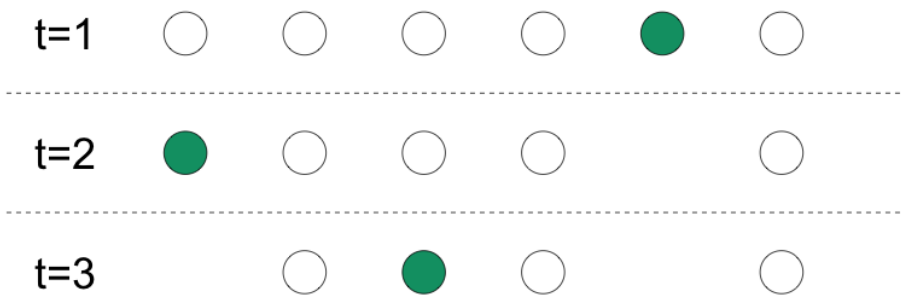
1. a traduire
2. pareil

More complex designs (1): Waitlist design | *a traduire*

- Constraint: Only certain number of units can be treated at a time
- Solution: *Waitlist* design

1. a.t.
    - a.t.

1. Delayed access (Phase-in or wait list) | Accès différé (Accès graduel ou liste d'attente)



- When an intervention can be or must be rolled out in stages, you can randomize the order (*timing*) in which units are treated.
- Your control group are the as-yet untreated units.

- Lorsqu'une intervention peut ou doit être déployée par étapes, vous pouvez randomiser l'ordre (*timing*) de traitement des unités.
- Votre groupe de contrôle sont les unités pas encore traitées.

1. Delayed access (Phase-in or wait list) | Accès différé (Accès graduel ou liste d'attente)

- Be careful: the probability of assignment to treatment will vary over time because units that are assigned to treatment in earlier stages are not eligible to be assigned to treatment in later stages.

- Attention : la probabilité d'assignation au traitement variera dans le temps car les unités assignées au traitement à des stades antérieurs ne sont pas éligibles pour être assignées à un traitement à des stades ultérieurs.

More complex designs (2): Encouragement design | *à traduire.*

- Constraint: You can't force people to take (receive) your treatment
- Solution: **Encouragement** design

- a.t.

2. Encouragement (planning for non-compliance) | *Incitations*

- Randomize **encouragement** to take the treatment, such as a request to drink coffee or offering a subsidy to participate in a program.
- Useful when you cannot force a subject to take the assigned treatment.
- We can learn the average effect of the encouragement to take the treatment.

- Randomisez l'**incitation** à suivre le traitement, en demandant par exmple aux individus de boire du café ou en offrant une subvention pour participer à un programme.
- Utile lorsque vous ne pouvez pas forcer un sujet à participer.
- Nous pouvons connaître l'effet moyen de l'encouragement à suivre le traitement.

2. Encouragement (planning for non-compliance) | *Incitations*

- We can also learn the average effect of the taking the treatment *for those subjects that would take the treatment when assigned to treatment and not take the treatment when assigned to control*.
- But we need an additional assumption (exclusion restriction) and estimation is more complicated (instrumental variables).

- Nous pouvons également connaître l'effet moyen de la prise du traitement *pour les sujets qui prendraient le traitement lorsqu'ils sont assignés au traitement et qui ne prendraient pas le traitement lorsqu'ils sont assignés au contrôle (les conformistes)*.
- Mais nous avons besoin d'une hypothèse supplémentaire (restriction d'exclusion) et l'estimation est plus compliquée avec l'assignation comme instrument.

Common threats, anticipatory designs | *a traduire*

Common threats to inference | *a traduire*

1. Attrition: People do not respond to follow up surveys or are hard to find
2. Spillover: The effects of a treatment may spill over from people treated to their neighbors, friends, or family members, making it hard to nail down the effect on any one person

1. a.t
2. a.t

Anticipating threats via design (1): Attrition | *a traduire*

- Challenge: Attrition
- Attention to this *important*
- Solution(s):
  - Pilot your approach to maximize chances of response
  - Plan (budget) to reach all subjects at endline
  - Plan (budget) for double-sampling to follow-up
  - Blind people to treatment status
  - Deliver treatment to control group post-research

- A.t.

1. Attrition: Why it matters | *a traduire*

- Missing outcome data is problematic when:
  - Missingness is systematically associated with certain *types* of outcomes, or with units' treatment assignment status
- The problem is this:
  - Without outcome data, can't analyze impact of treatment on outcomes
  - Can't just ignore the missing data
  - Treatment and control groups are no longer comparable
  - This breaks the "analyze as you randomize" principle

- A.t.

1. Attrition: When it can happen | *a traduire*

- Kids who anticipate failing test miss the test
- Researcher effort: Control units more likely to be missing because researcher engaged less with them
- Data problems: elections results not reported for a certain region, people move away and they're more difficult to track, people change phone numbers
- Responding to surveys is annoying to some people, or they're busy when you approached them

- A.t.

1. Attrition: Anticipating it in design | *a traduire*

1. Pilot your approach: in pilot, figure out what works best to get responses
   - Different types of incentives?
   - Call versus in-person?
   - Best days or timings?
2. Plan to reach all subjects at endline
   - Budget for strong efforts (time, resources) to get responses
3. Plan for double-sampling
   - Budget for *intensive* follow-up with random sample of attriters

- A.t.

1. Attrition: Anticipating it in design | *a traduire*

4. Blind people to their treatment status
   - Idea: people won't avoid follow-up if they know they're in control
5. Promise to deliver treatment to control post-research
   - Idea: people will remain engaged in the study even if in control

- A.t.

1. Attrition: Anticipating it in design | *a traduire*

- NOTE: Keeping good records is crucial!
  - Treatment assignment status
  - Outcome variable as NA if missing
  - (By the way, here we're not talking about covariates)
- A.t.

Anticipating threats via design (2): Spillover | *a traduire*

- Challenge: Spillover
- Attention to this *important*
- Why?
  - Violates core assumption for causal inference
  - A.t.
- Solution:
  - Keep units far apart

2. Spillover: Anticipating it in design | *a traduire*

- *Minimize* spillover by sampling units far enough apart geographically
- Idea: avoid that a treated unit *contaminate* another unit
- NOTE: possible to *study* spillover effects as the focus, but difficult (lots of caveats in order)
  - Often better to try to avoid spillover altogether

- A.t.

Final takeaway: Keep things simple | *a traduire*

Complex $\neq$ better! | *a traduire*

- Complexity is possible, but simplicity is always preferred.
- People mistakenly think
  - Complex = sophisticated $\rightarrow$ better
- In fact, straightforward designs $\rightarrow$ better

- A.t.

Keep things simple | *a traduire*

- You now have more complex designs in your toolkit, but:
  - If you don't need them, don't use them
- Why? With simplicity:
  - Less can go wrong
  - More likely to notice when something does
  - Easier to understand design properties
  - Interpretability and communication of findings

- A.t.

Resources | *Ressources*

- EGAP Methods Guide on Randomization (https://egap.org/resource/10-things-to-know-about-randomization/)
- EGAP Methods Guide on Missing Data (https://egap.org/resource/10-things-to-know-about-missing-data/)
- Guide des méthodes EGAP sur la randomisation (https://egap.org/fr/resource/10-choses-a-savoir-sur-la-randomisation/)
- Guide des méthodes EGAP sur les données manquantes (https://egap.org/resource/10-things-to-know-about-missing-data/)