PSYC3361—Technical skills & introduction to programming in R

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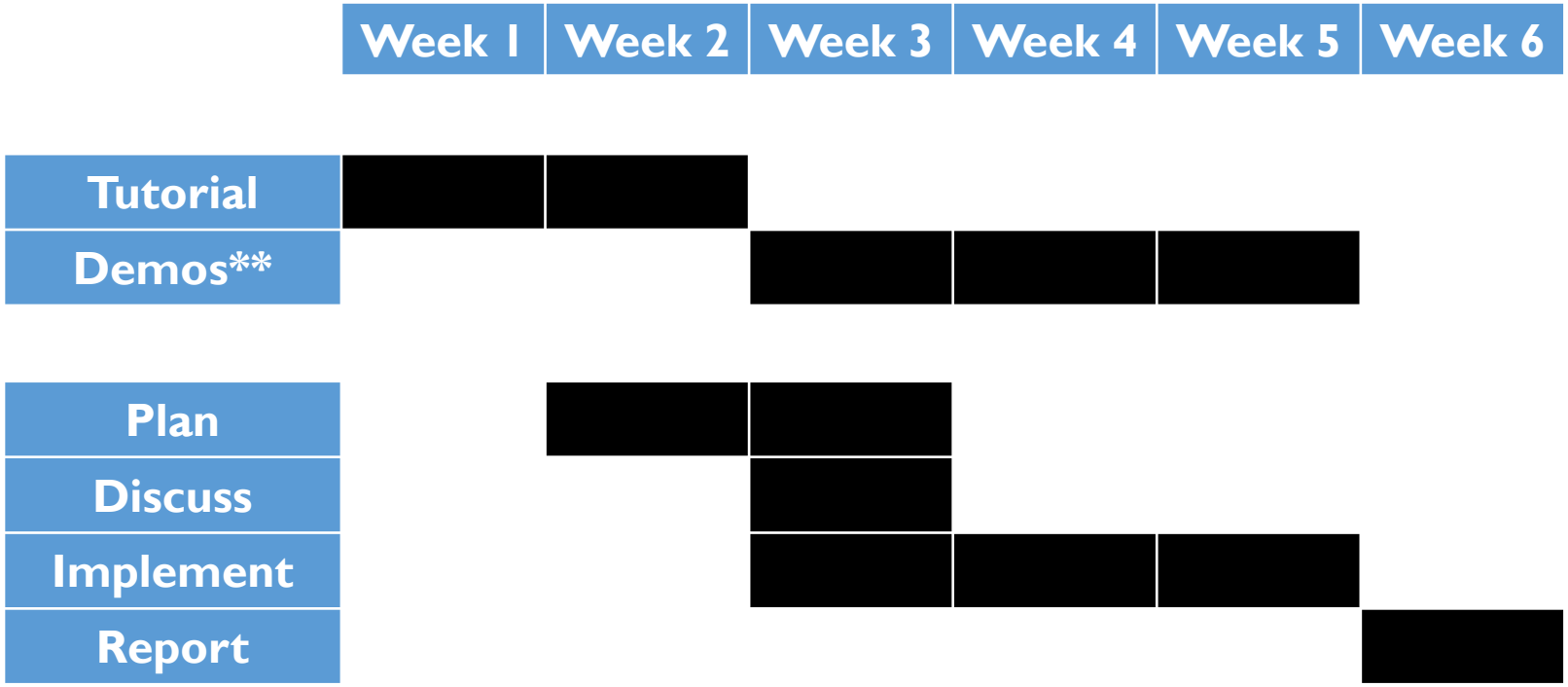
Course objectives

- Be able to read and write basic programs in R
- Be aware of technical options that are available to facilitate research
- Apply technical skills to tasks relevant to research in psychology

Course timeline

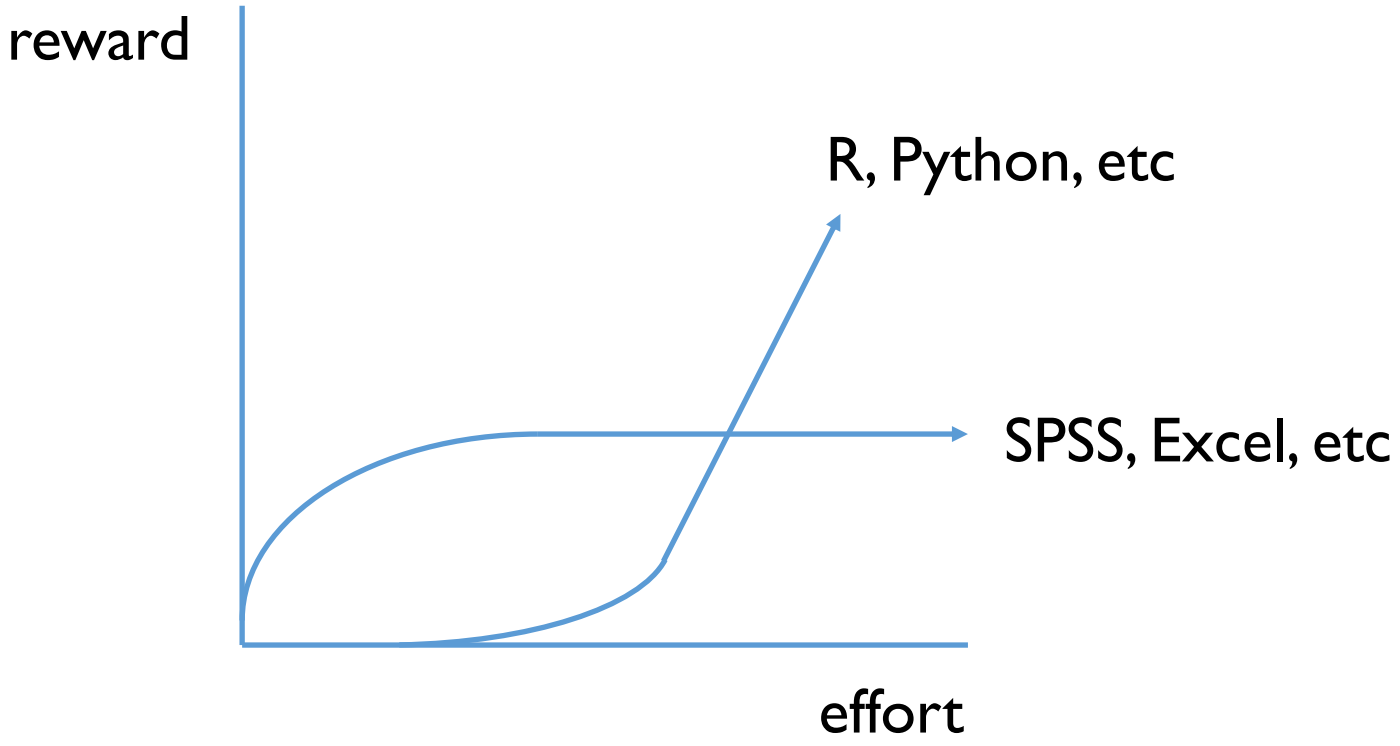


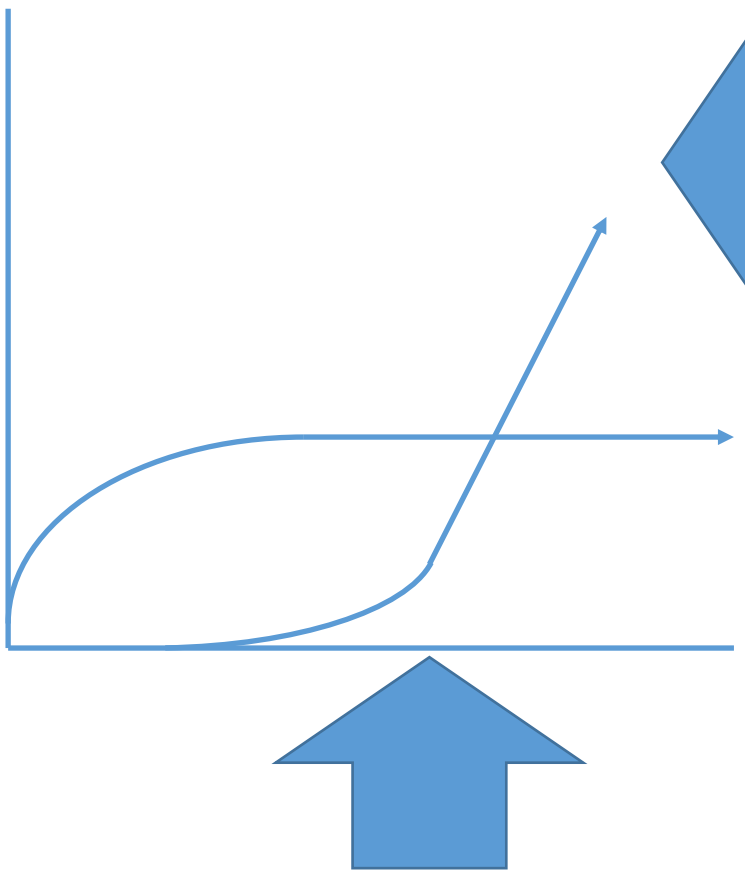
Tutorial and demos

- Tutorial
  - Basics of programming & core concepts
- Other resources
  - Introduction to data analysis with R
  - How to build a shiny app
- Demos??
  - Data visualisation with ggplot?
  - Bayesian data analysis with BayesFactor?
  - Something cool that I haven't thought of yet!

Introductions!

- Your name & general area of your research internship project
- Any previous experience in programming?
- Any programming skills in particular that you would like to achieve or you think might be particularly relevant for your research area?
- Anything you would like to share regarding what you found out about how programming is (or isn't) used in your research area


reward
R, Python, etc
SPSS, Excel, etc
effort

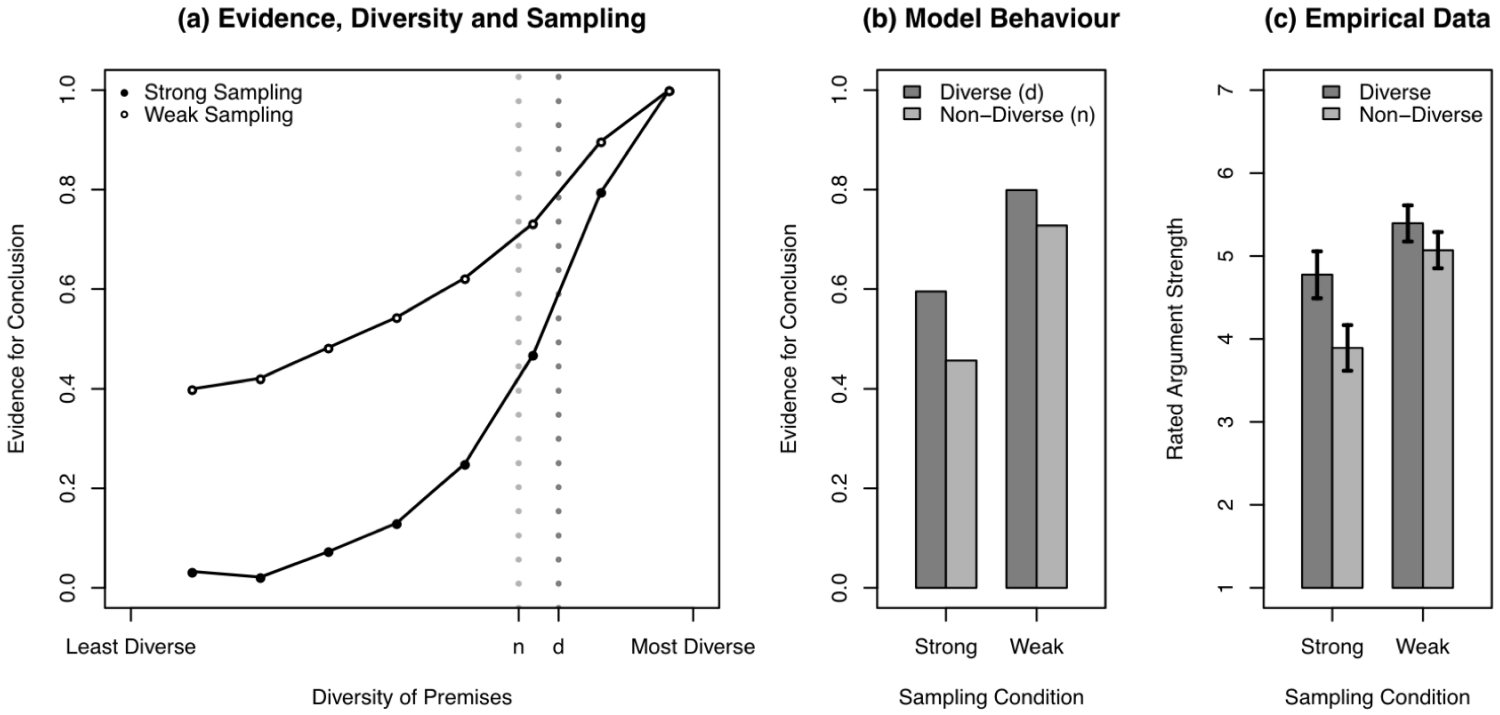


Goal 1: convince you that the payoff is real

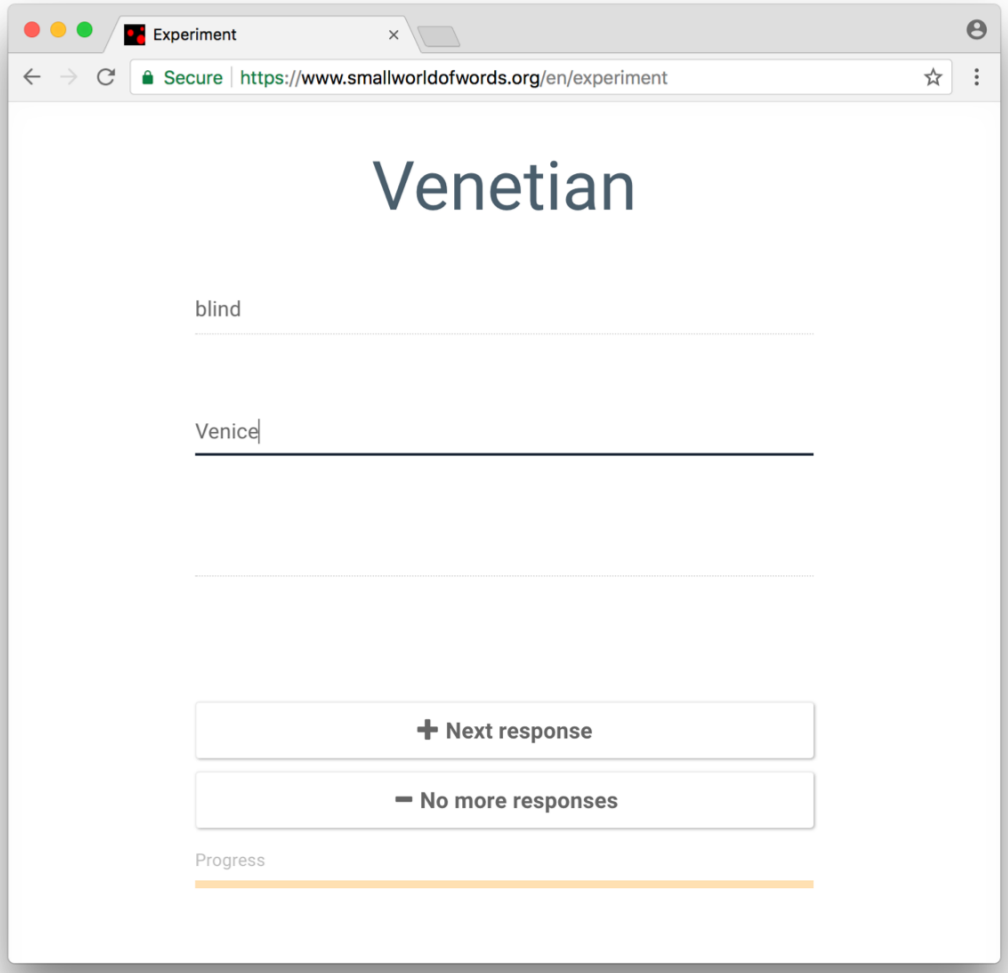
Goal 2: help you get closer to the point where it becomes rewarding

Useful for <u>designing studies</u>

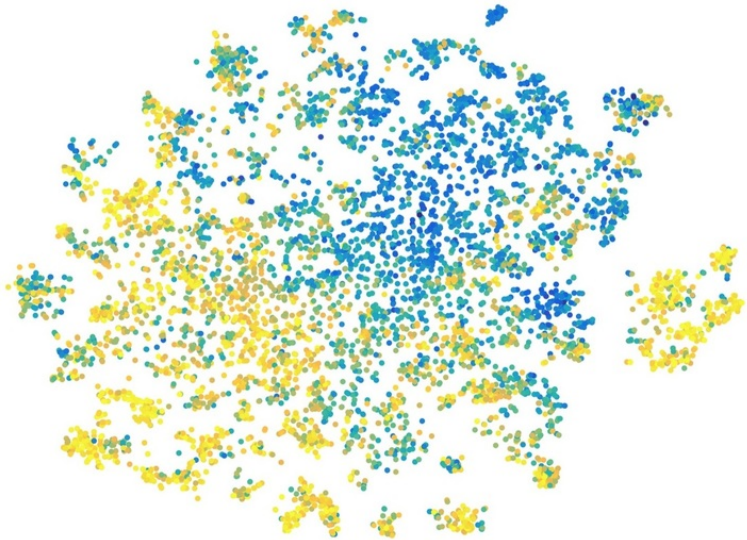
- I knew what the theory was, I knew what I wanted to manipulate…
- But until I ran the simulations, I didn't know whether to expect this to be a diagnostic experiment!



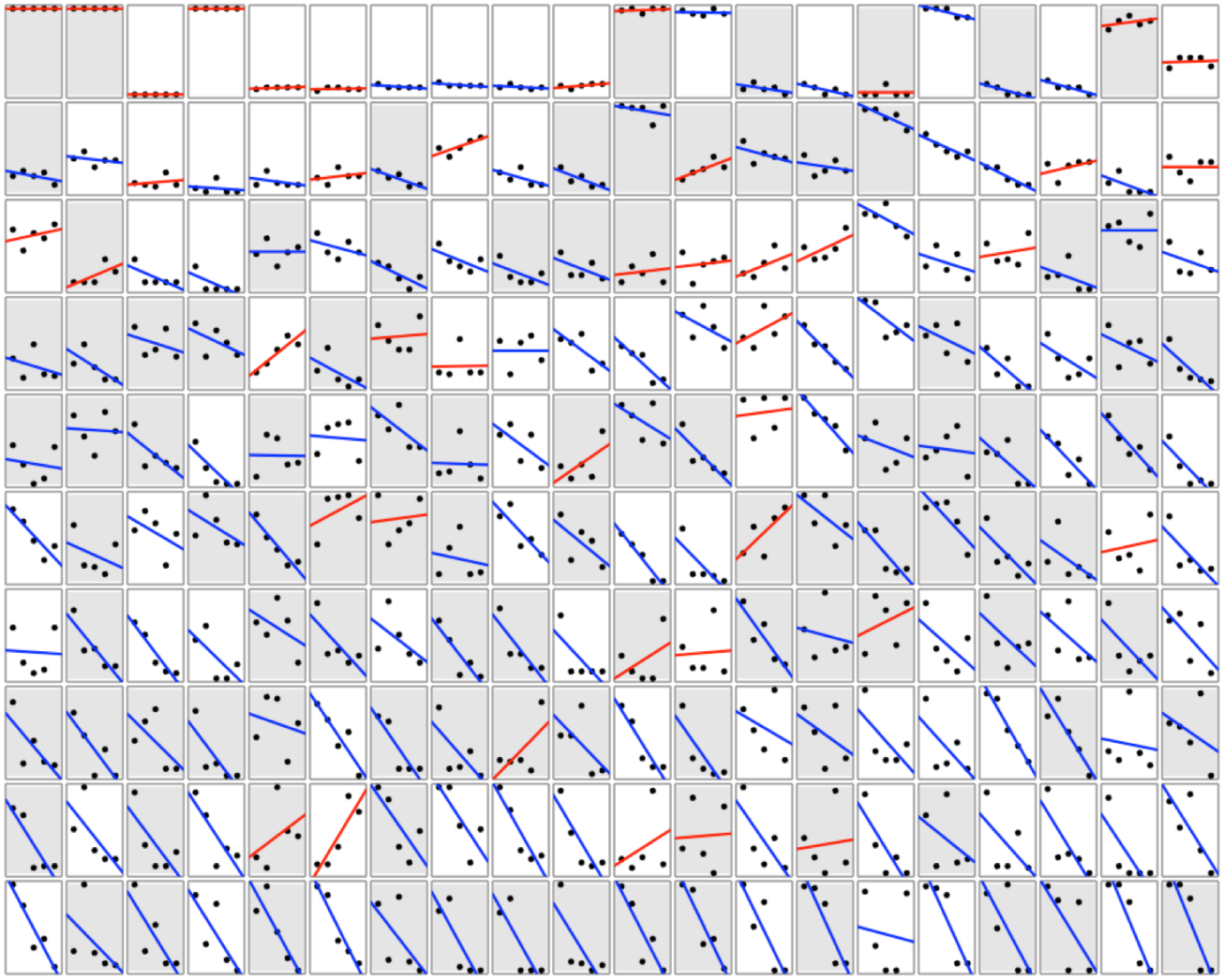
Useful for data collection



- 90,701 participants
- 12,292 distinct cues
- 3,686,400 responses

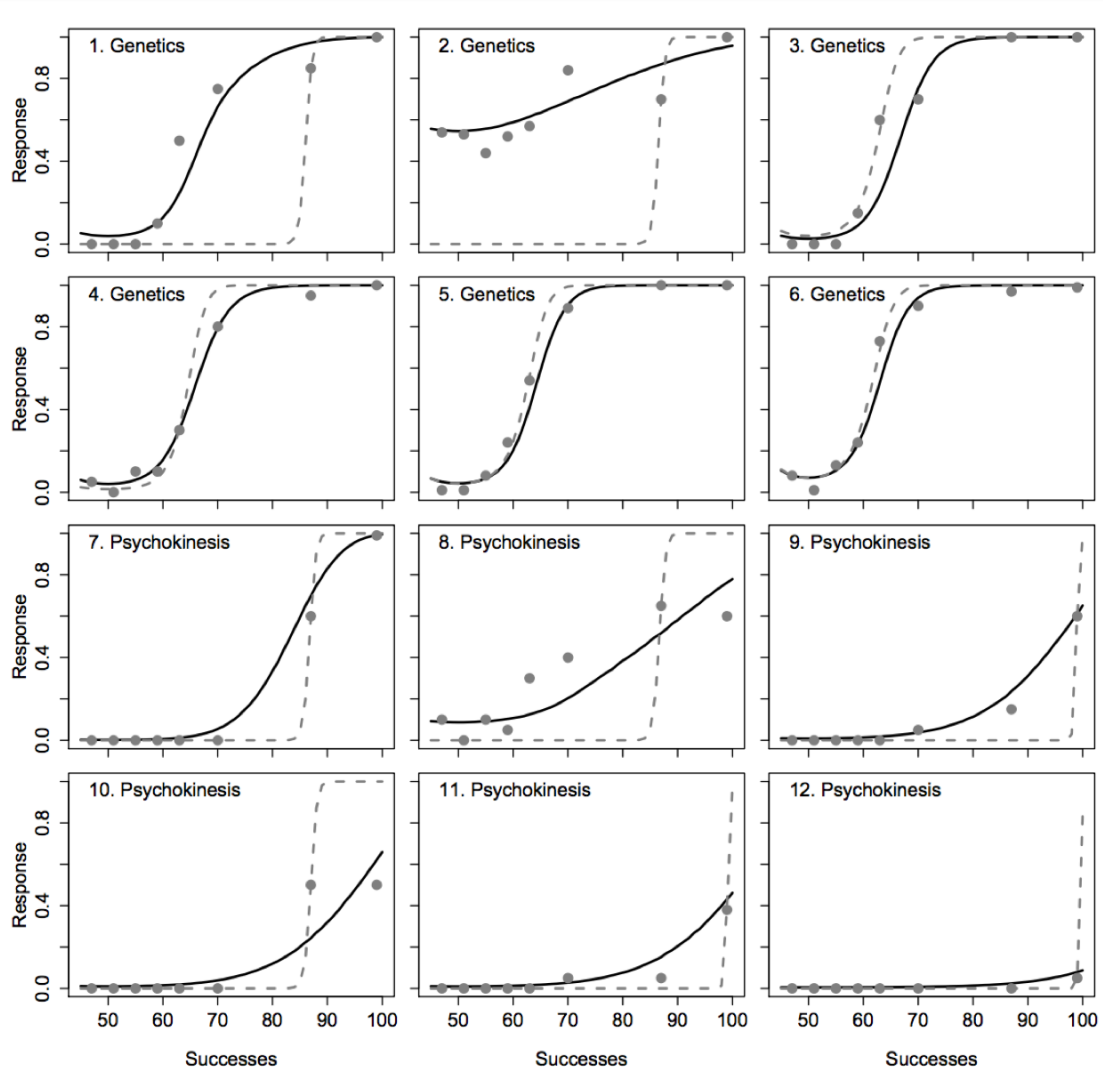


Useful for data visualisation



visual representation of 200 regression analyses

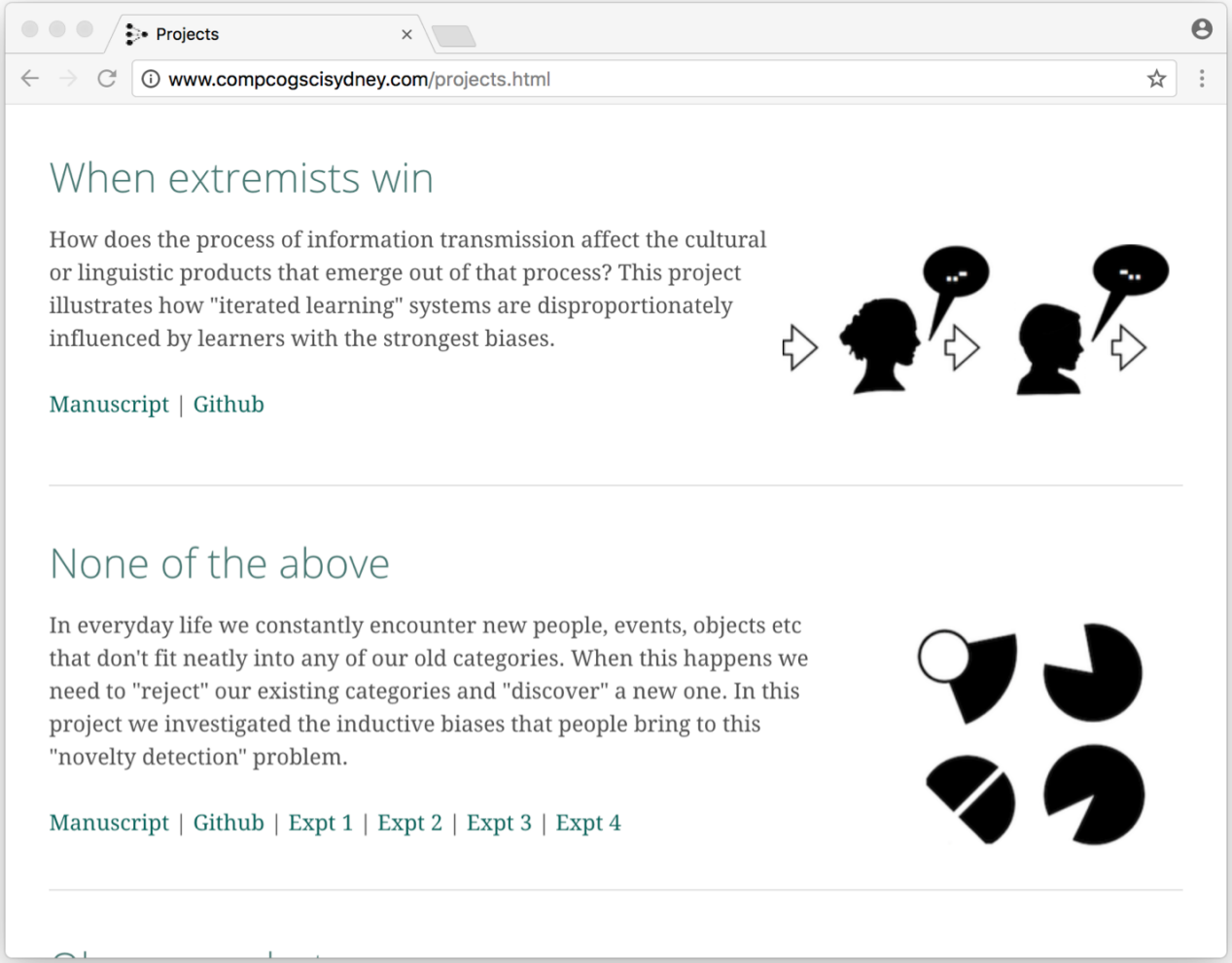
Useful for statistical analysis



hierarchical
Bayesian models
with blah blah blah

Useful for reproducible methods

links to working versions of the experiment code, and live demos of the experiment itself



Why program?

- From the blog post:
  - Develop problem-solving and algorithmic thinking
  - Automate repetitive tasks
  - Run experiments
  - Analyse data
  - Facilitate sound, reproducible, shareable research practices
- What are some others?

Why program?

- Flexibility & novelty?
  - Research often involves doing something that has never been done before.
  - You will have to invent the tool!
  - These technical skills give you the power to use your computer in ways that go far beyond what can be offered by any general or specialist application

- Reproduceability?
  - Facilitates the creation of an accurate and comprehensive record of precisely what was involved in your research

Why program?

- Algorithmic thinking
  - Successful application of technical skills requires an algorithmic approach and a problem-solving mindset. Programming, in particular, is very unforgiving of mistakes or imprecision—hunting down the cause of coding errors ('bugs') is in itself an excellent way of honing problem-solving skills and strategies

Disadvantages?

- Time better spent on other things?
  - Programming can facilitate the learning of other things—statistics and experiments become easier.
- Not relevant for my particular area?
  - Every area could benefit in some way, even if just for data management and analysis
- I can just hire someone to do it for me?
  - Very difficult to communicate requirements if don't have programming understanding—plus, how would you know if it is done correctly?
  - Oh, and programmers are *expensive*!

Not a computer person?

- Well maybe.
- But for a lot people it's just that they haven't really had a chance to learn the skill. It's just a trick.
- Technical skills we will cover are uncorrelated with everyday notion of 'computing'.
- No need to learn complicated interfaces or abstract 'clicking sequences'
- More like knitting than computer games

Overall approach

- Assessment based on engagement ('learning logs'); intrinsic motivation
- Atmosphere that is informal, relaxed, and collaborative
- We will help you achieve as much on this topic as you desire

Learning logs

- After each class, create a post on Moodle:
  - My goal for today's session was . . .
  - I spent the session . . .
  - The things that went well were . . .
  - The things that were challenging were . . .
  - Next time I want to ...
- I will read and comment on them.
- Classmates can also read and comment

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