

Stats for Beginners: Improving the confidence of incoming psychology undergraduates to tackle research methods.

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What's the problem?

Research methods are an important part of BSc Psychology degrees, but incoming students typically have low prior attainment in math, and struggle to see the value of statistics for their degree (Dempster & McCorry, 2009.)

Both these things are associated with poorer outcomes in first year research methods modules.

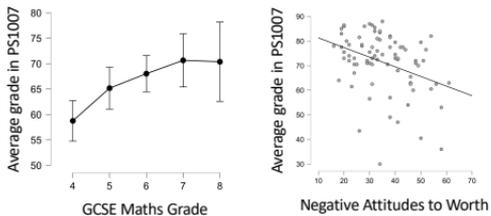


Figure 1: The scale of the problem.

What can we do?

Mini-module to try and prepare students for the content of the research methods modules. Recap some GCSE Math, practice problem solving and mathematical thinking.

Main aim is to build confidence.

Can't be compulsory. Needs to be rapid response. Promotion during welcome week and self-diagnosis via online quiz.

Structure of the program

Combination of asynchronous videos to introduce content, live workshops to apply knowledge and practice problem solving, and worksheets to solidify new skills in student's own time.

Week 1

Sharing experiences and listening to others. Building a shared sense of community.

What about maths/stats makes you anxious?

- "The explaining your answers part of it..."
- "Statistical tests and complex calculations seem difficult"
- "I have no experience with research methods in psychology"
- "I've forgotten things that I learnt in secondary school"
- "When it gets hard and I can't solve it no matter what I do"

Loaded Dice

What do we expect the data to look like?

60 Rolls, hard to tell

600 Rolls, easier to tell

More data means the effect of random fluctuations is smaller, so easier to see the true effect

Week 2

Building intuitions about probability and sampling, in preparation for encountering these ideas in main modules.



Week 2

Data visualizations. Focus on building intuition. Match the graph to the caption exercise, and practice sketching graphs.

Equation 1

$$\frac{1}{N} \sum_{i=1}^N (x_i - y_i)^2$$

Equation 2

$$\frac{1}{s\sqrt{n}} e^{-\left(\frac{x-\mu}{s}\right)^2}$$

Philosophy and approach

Since the key outcome is improved confidence, focus on problem-based and experiential learning (Kolb, 1984). Simple test yourself problems in the asynchronous material, and live sessions always focused around 1-2 group problems

Evaluation and next steps

What was the impact?

You've done a great job James - to make dreaded maths fun!

What did students think?

I really enjoy this session in terms of learning and interaction. And the use of poll everywhere took away the anxiety of participating honestly.

The session was really helpful for me to become comfortable with statistics and made me realise that I don't have to know everything in detail and remember every single thing, but the main thing is understanding.

For the future, a key challenge is to measure how effective the sessions are at improving confidence and performance. Not easy, because we can't do a real 'experiment'. Tracking attitudes over the course of the program might be a good start.

Keen to work with others to think about replicating this approach in other departments. Key message is that this sort of rapid, focused, problem-based approach to building confidence can be implemented easily and is popular with students.

Week 4

Equations as recipes. Gaining confidence with algebra.