Nottingham Trent University

The value of longitudinal analysis in capturing ongoing motivation

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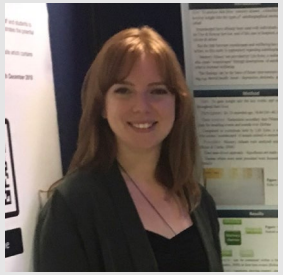

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Department of Psychology

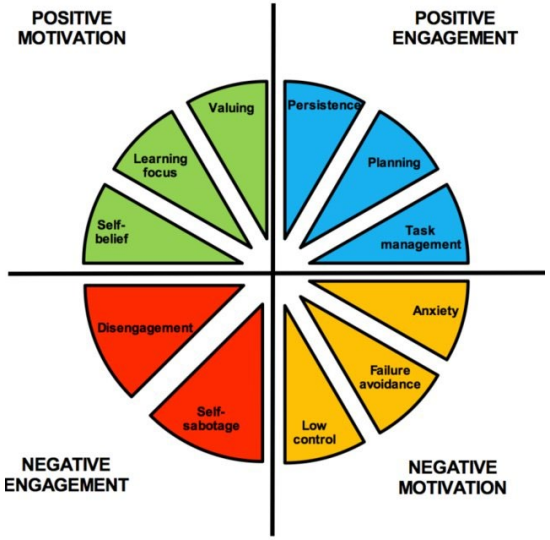
Plan for the talk

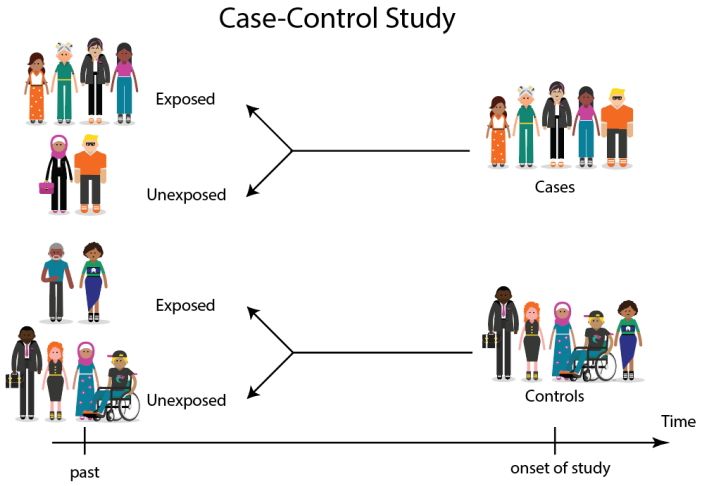
1. A little bit about our TILT group
2. Randomised Control Trials: What do they look like?
3. Examining motivation over time: What does it buy you?
4. The statistics anxiety project
5. Early findings
6. Future talks and plans
7. Your questions and discussion

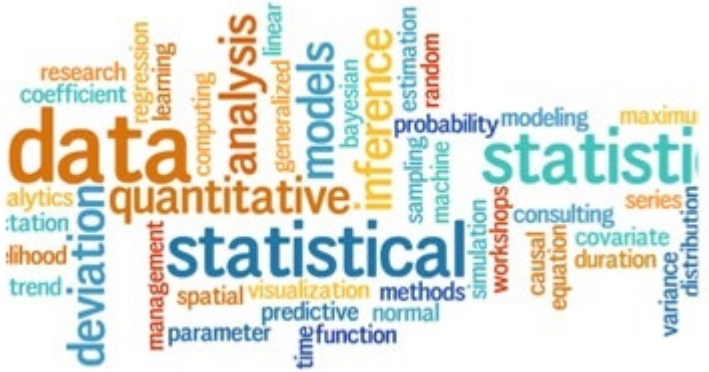
A little bit about our TILT group

Student Motivation and Engagement

TILT Practice and Scholarship Group







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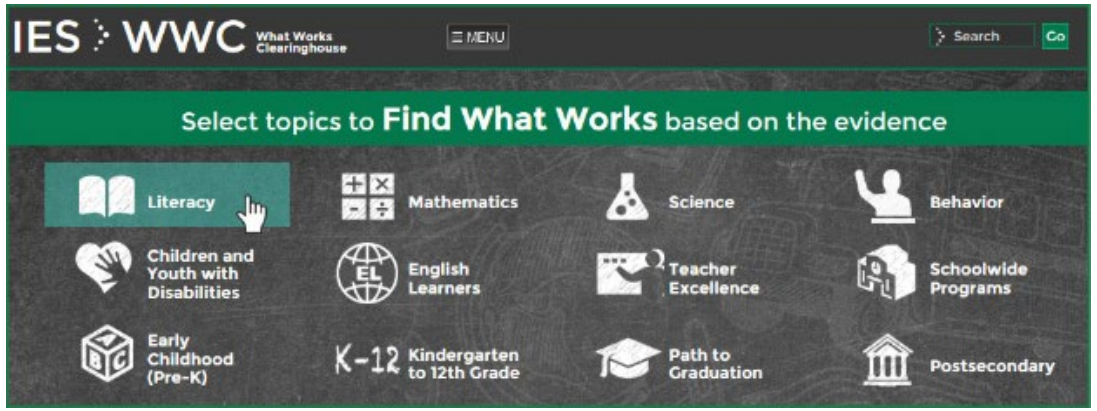
Randomized Control Trials

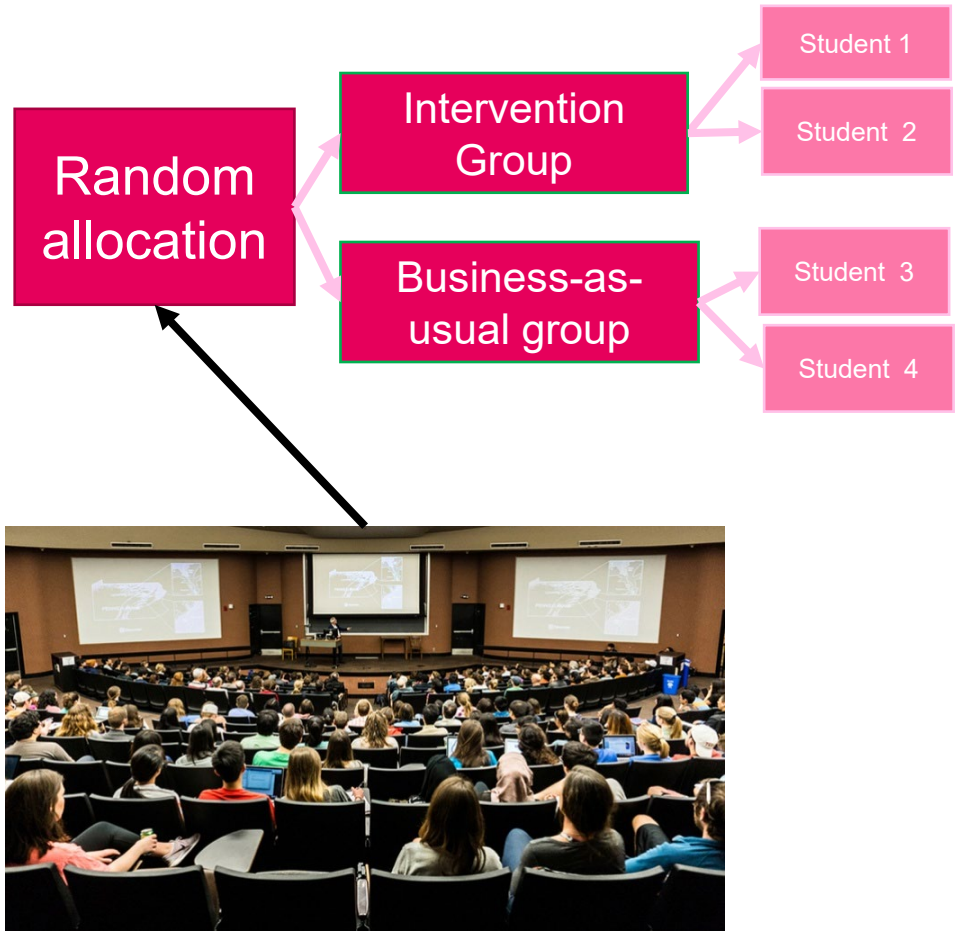
Measuring effectiveness using Randomised Control Trials

EPPI CENTRE

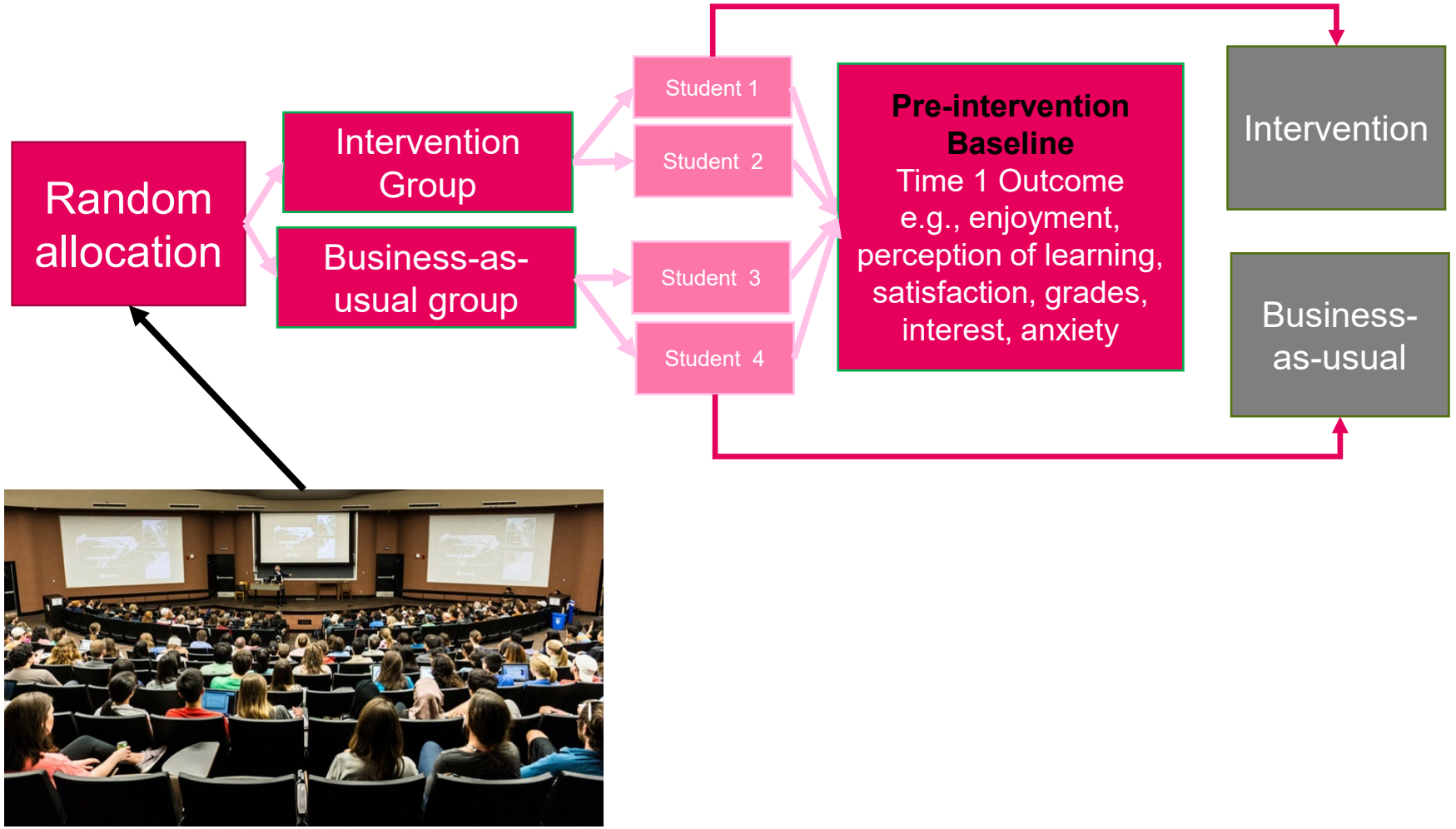


Typical design for a randomised control study

Random allocation, control and comparison groups



Pre-intervention measures



Post-intervention measures

Random allocation

Intervention Group

Business-as-usual group

Student 1

Student 2

Student 3

Student 4

Pre-intervention Baseline
Time 1 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Intervention

Business-as-usual

Student 1

Student 2

Student 3

Student 4

Post-intervention
Time 2 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Pre vs post as the KEY outcome
Where they started and where they got to.

Random allocation

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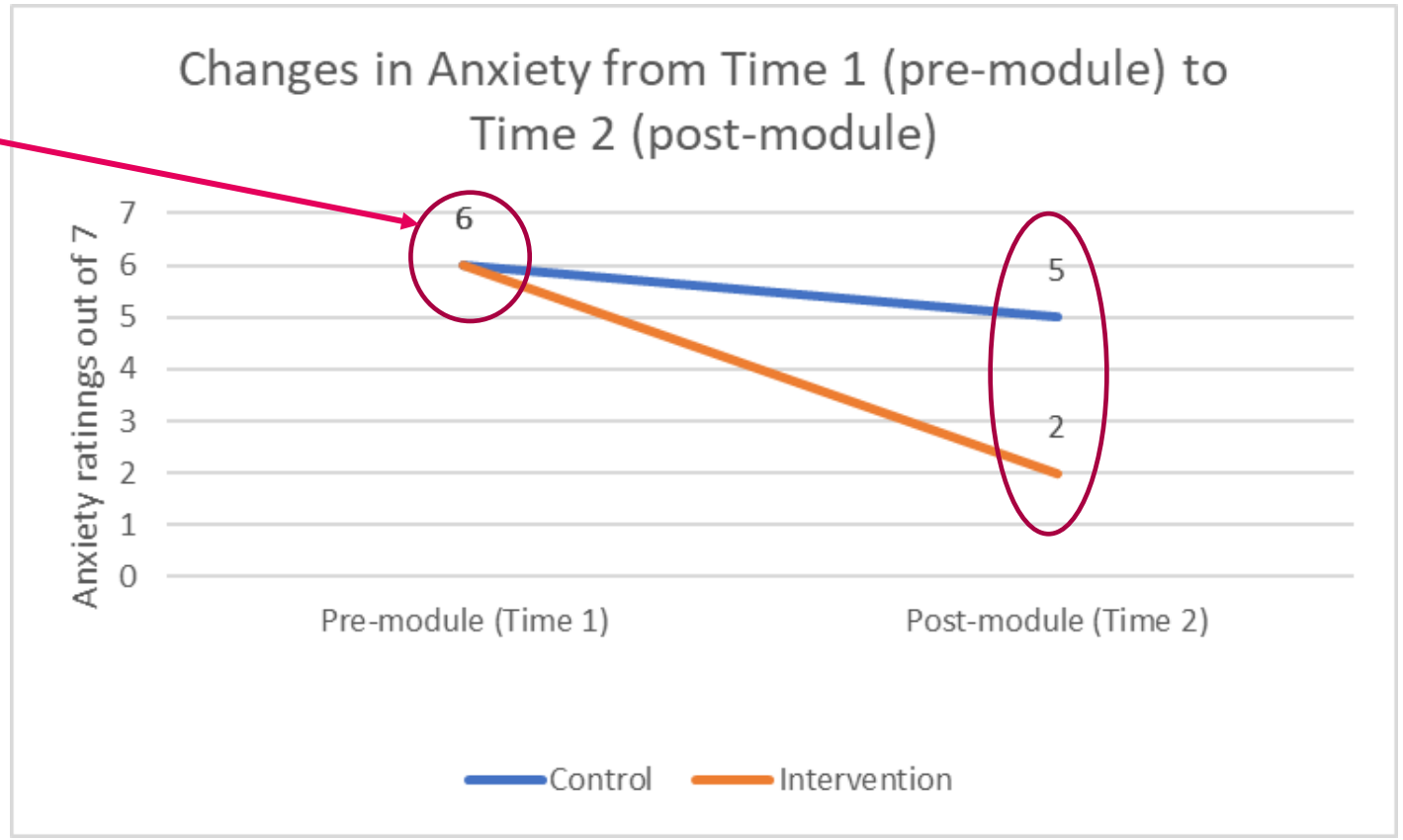
Typical findings

If you have randomised well, both groups should be about the same pre-module



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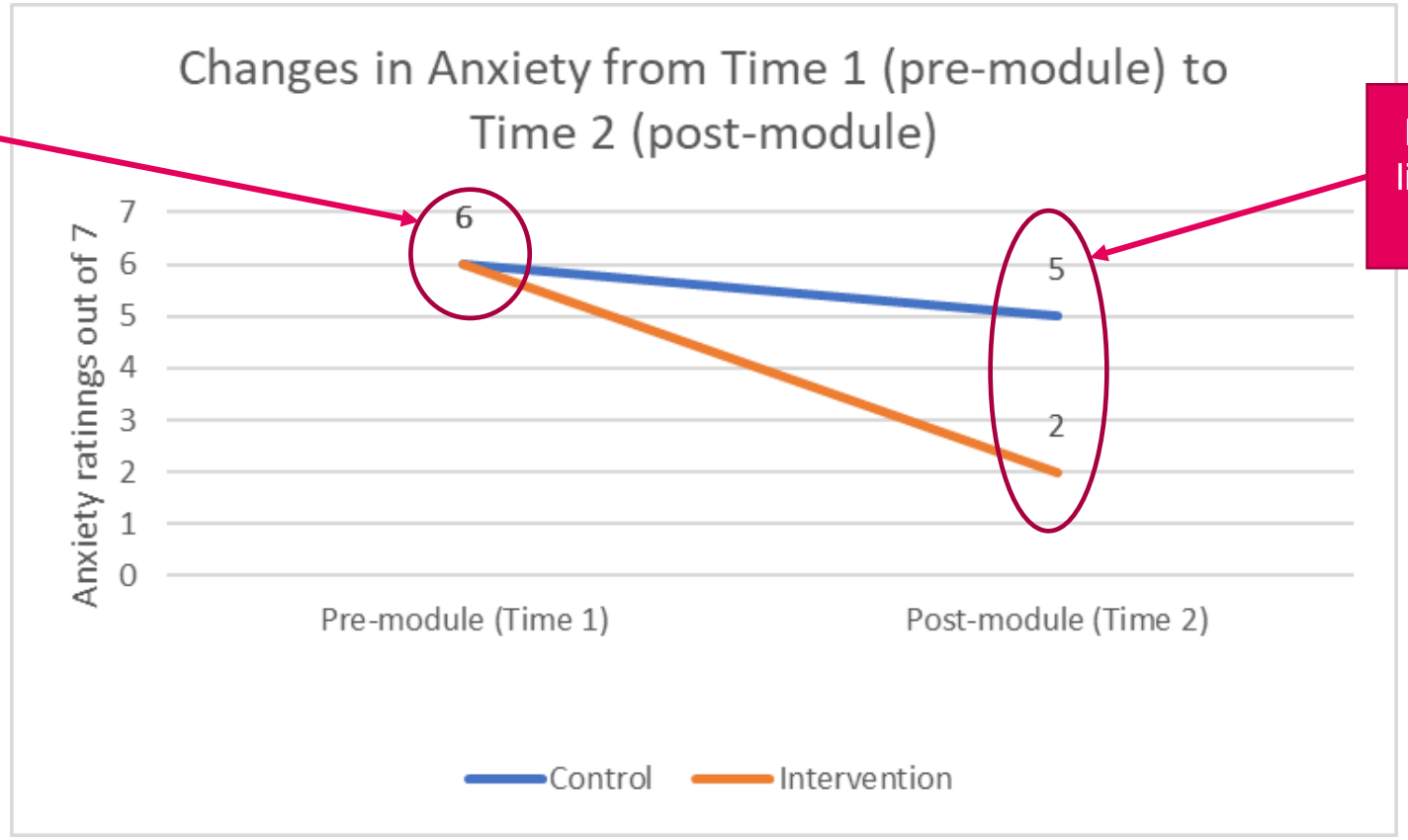

For your control group, it is likely anxiety will have gone down a little anyway

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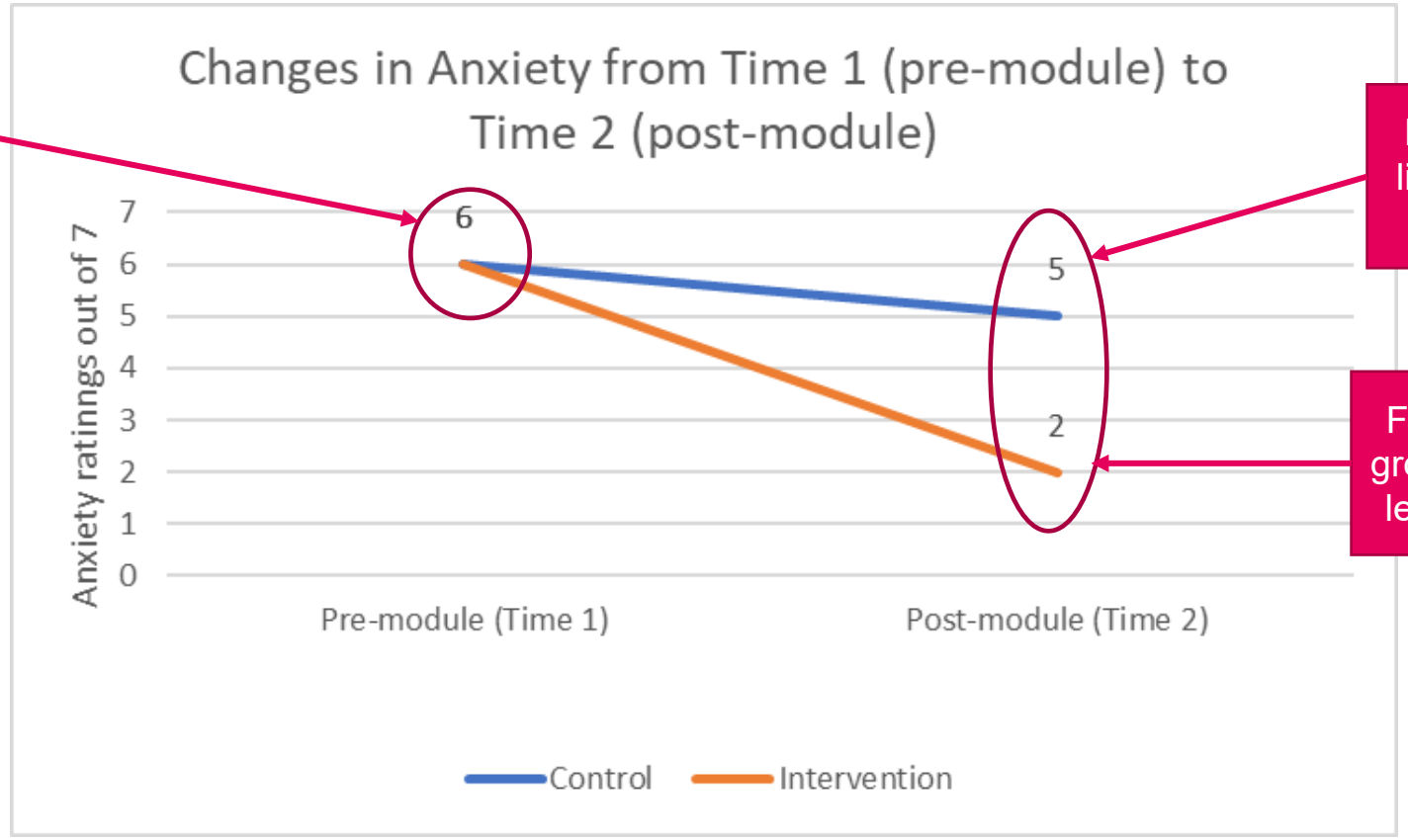
Typical findings

If you have randomised well, both groups should be about the same pre-module



For your control group, it is likely anxiety will have gone down a little anyway

For your intervention group group, (significantly) different level of reduction in anxiety

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What elements of the RCT can we practically deliver?

Random allocation

Intervention Group

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Pre-intervention Baseline
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e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

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What elements of the RCT can we practically deliver?

Intervention

Business-as-usual

Student 1

Student 2

Student 4

Pre-intervention Baseline
Time 1 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Post-intervention
Time 2 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

What elements of the RCT can we practically deliver?

Random allocation

Intervention group

Business-as-usual group

Student

Student

Student

Student

Pre-intervention Baseline
Time 1 Outcome
e.g. enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Intervention

Business-as-usual

Student 1

Student 2

Student

Student 4

Post-intervention
Time 2 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Attribute gains to the intervention

What elements of the RCT can we practically deliver?

Intervention Group

Business-as-usual Group

Student 1

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Pre-intervention Baseline
Time 1 Outcome
e.g. enjoyment, perception of learning, satisfaction, grades, interest, anxiety

Intervention

Business-as-usual

Student 1

Student 2

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Post-intervention
Time 2 Outcome
e.g., enjoyment, perception of learning, satisfaction, grades, interest, anxiety

- No comparison with business-as-usual
- No pre-post comparison

Attribute gains to the intervention

Examining motivation over time: Is this a good idea?

Problems with RCTs

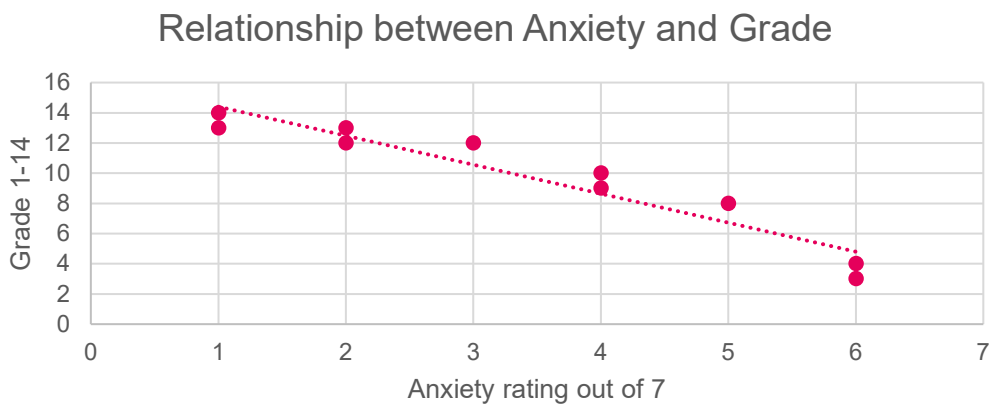
- Randomisation difficult e.g., how can half your students get an intervention and the other half not?
- Finding an appropriate control group is REALLY difficult.
- Potentially costly
- Can we find a way to assess student experiences in a way that isn't quite RCT but gives us some of the benefits of the RCT logic?

The benefits of pre-post designs

- Students can be their own controls, that is, we can assess what they are like at Time 1 and see how THEY change over time.
- This is better than just looking at them at one time point.
- Here is the logic.

Student	Anxiety rating taken later in module	Grade
1	5	8
2	4	9
3	3	12
4	2	13
5	1	13
6	6	4
7	6	3
8	1	14
9	2	12
10	4	10

Correlation -0.94



Conclusion

The higher your level of anxiety, the lower your final grade.

Student	Anxiety rating taken later in module	Grade
1	5	8
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7	6	3
8	1	14
9	2	12
10	4	10

Anxiety Time1	Anxiety Time 2	Change in anxiety	Grade
3	5	-2	8
3	4	-1	9
3	3	0	12
3	2	1	13
3	1	2	13
3	6	-3	4
3	6	-3	3
3	1	2	14
3	2	1	12
3	4	-1	10

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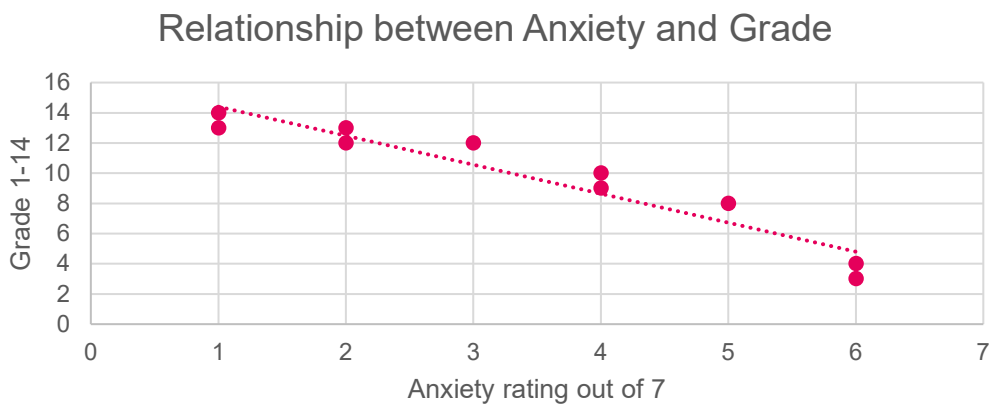

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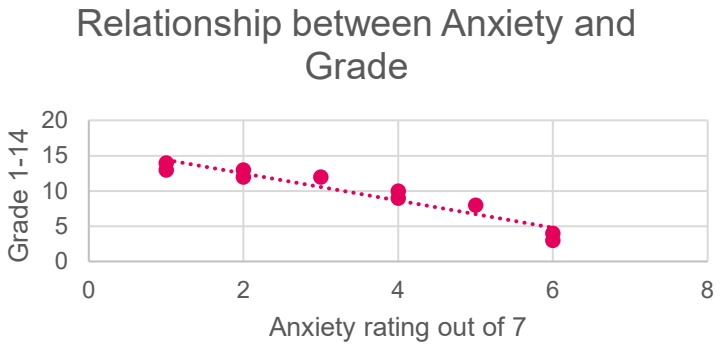

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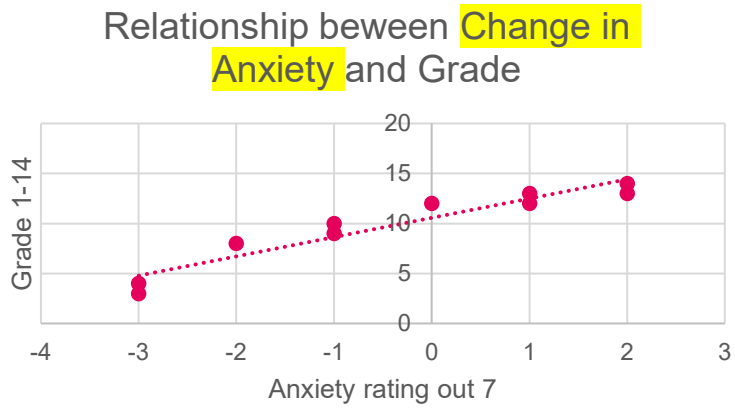

- The conclusion is now about IMPROVEMENT in *changes in experience*
- It doesn't matter where you end up, it matters where you STARTED.
- If you just take end of module measures, you miss the crux of the developmental journey.

It is important to assess where students started from

- We think the real benefit of longitudinal designs is that we can start telling an NTU story about how we move students from one state to another.
- “Our teaching results in better motivated students”
- “Our teaching results in lower student anxiety”
- Our teaching results in more engaged students”
- Better, Lower, More than what?
- Ans: Relative to when they started (module, course).
- **NTU Students leave in a psychologically better place than when they started**

What can a longitudinal approach add to the design model i.e., how many crosses can we get rid of?

Student 1

Student 2

Pre-intervention Baseline
Time 1 Outcome
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Intervention

Student 1

Student 2

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Post-intervention
Time 2 Outcome
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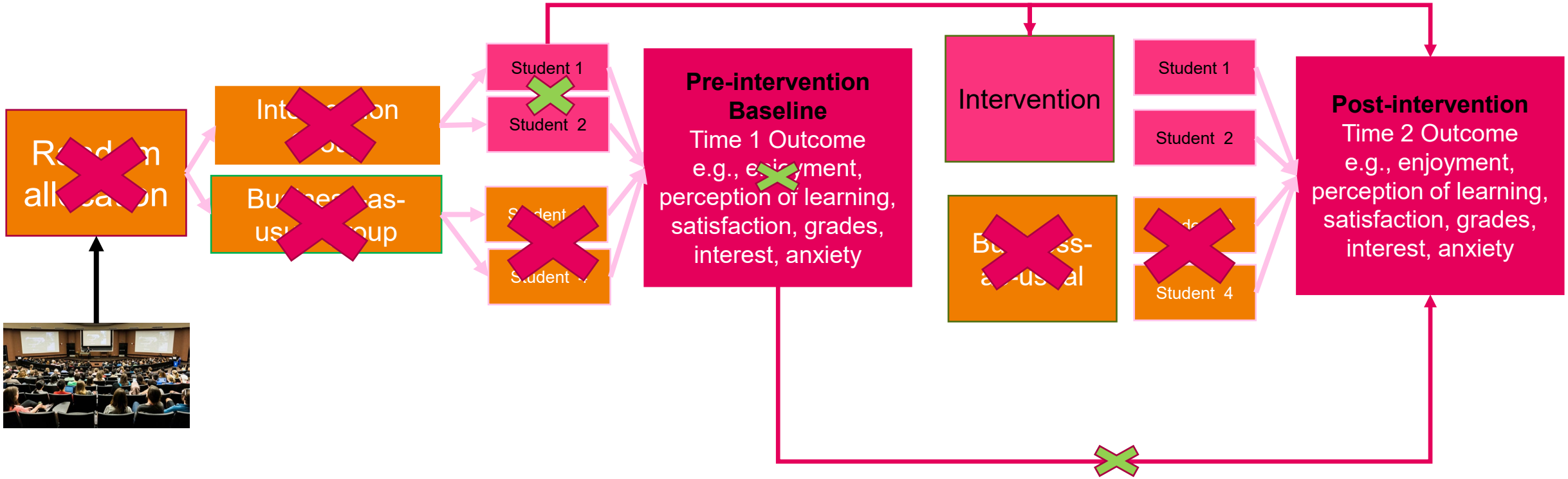
A longitudinal approach cannot resolve the problem of control groups, but it does give us change over time.



The statistics anxiety project

The Problem and research questions

- About 1000 students study year one statistics in Psychology
- We know they worry about statistics, a lot.
- But how does the experience of studying statistics at NTU Psychology change through a year-long module?
- Do students reduce or increase their anxiety?
- Are there differences in types of students in terms of their changes in anxiety?
- Are the changes in anxiety related to module grades?

The statistics anxiety project: Design

Time 1 Questionnaire (October, 2021) → Time 2 Questionnaire (December, 2021) → Time 3 Questionnaire May, 2022)

Time 1 variables - Demographics

- Gender
- Age
- Ethnicity
- Postcode - Please write down the postcode of your address away from university i.e., your home address. If you are in any way worried this postcode will identify you specifically, please note that a typical 7-digit postcode e.g., MK13 0LA covers about 100 households or about 300-400 people. If you are uncomfortable giving your 6 or 7 digit postcode, we can work with just the first part of your postcode e.g., MK13.

Time 1 and 2 variables - Motivational

- Self-Efficacy (3 items) - *e.g., Compared with other students in this class I expect to do well.* 1= not at all true for me to 7=very true of me
- Class Anxiety (7 items) – *e.g., Doing the coursework for a statistics course* 1 = No anxiety and 5=strong anxiety
- Fear of asking for help (4 items) – On a scale of 1 to 5 where 1 = No anxiety and 5=strong anxiety, rate your level of anxiety in the following situations: *e.g., Going to ask my statistics teacher for individual help with material I am having difficulty understanding*
- Statistics worthiness for study (16 items) – *e.g., I lived this long without knowing statistics, why should I learn it now?* 1 = Strongly Disagree and 5=Strongly Agree.
- Maths Self-concept (7 items) - *e.g., I have not done maths for a long time. I know I will have problems getting through statistics* 1 = Strongly Disagree and 5=Strongly Agree.

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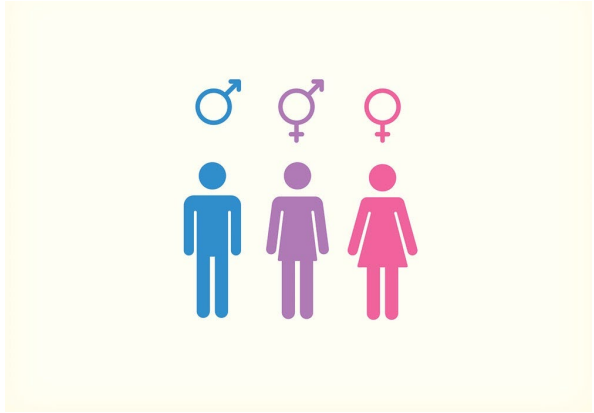
Early findings

Summary of Results – The sample

- N=170 completed phase I (> 20% response rate)
- M=22 F=143, Non-binary=3
- Mean age=19.2 (s.d.=3.2)
- Ethnicity=112 white, non-white=58.

Student confidence

Negative relationship between all variables and self-efficacy, such that students who have higher self-efficacy have lower class anxiety, lower fear to ask for help, see statistics as more worthwhile and have better stats self-concept.



Gender: Females had higher class anxiety, higher fear asking support, lower attitude towards worth of stats, lower perception of ability to calculate and understand stats.

Ethnicity: White students had lower stats self-efficacy (i.e., confidence) than non-white students.

Social class: No differences for all the many ways we assessed social class e.g., deprivation indices, social class categories AB, C1, C2, D1.

Future talks and plans

What we have planned

- Talk in January 2022 to present findings in detail from phase I
- Talk in March 2022 to present findings in detail from phase II – First chance to look at changes in motivational measures
- Talk in September to present findings in detail from phase III – How did all these changes relate to final course grades?
- NTU funded studentship https://www.ntu.ac.uk/research/find-a-phd-opportunity/studentship-projects/next-slide-please-motivating-our-next-generation-of-data-analysts - Anyone you know who may be interested?

Any questions?