

ABOUT THE STANDARD

- ◆ Welcome to the standard commonly known “unfamiliar text of statistics”.
- ◆ Yes, a big part of this standard is reading through unfamiliar reports and assessing them, but there is still a bit of theory to learn.
- ◆ Fortunately, the style and types of questions are pretty similar each year and so if you do a lot of exam questions, you can start to pick up the rhythm of the topic and exam paper quite quickly.
- ◆ If you know the concepts inside out – hopefully after watching this video – and do a decent amount of past exams, you should be in a position to do well in this standard.

STRATEGIES FOR SUCCESS

- ◆ The general process of thinking about an unfamiliar statistical report is the following:
- ◆ Firstly, think about the **claim they are trying to make**, and really ensure that you grasp this.
 - ◆ For example, are they claiming that “60% of year 13 students in Wellington like StudyTime” or are they claiming that “60% of year 13 students overall like StudyTime”?
 - ◆ A subtle difference like this actually has big implications.
 - ◆ If they claim that “60% of year 13 students overall like StudyTime” then their data is only from Wellington students, that means that their claim cannot be supported as the sample (Wellington students) is not representative of the population (New Zealand students).
 - ◆ If it’s a study, you should also consider if it’s an observational or experimental study.
 - The observational study, as the participants were not are not forced to receive the treatment created and instead are just watching habits or behaviours that have already happened or are happening e.g. the amount of sleep, as forcing people to only sleep less than a healthy amount would be unethical
 - An experimental study is when the experimenters actively are manipulating the subjects by exposing them to different levels of the explanatory variables. The subjects are also randomly allocated to different groups with different conditions e.g. studying for 10 hours, studying for 5 hours, studying for 3 hours etc.
 - With observational studies, remember you cannot make a causal claim e.g. you cannot claim that an hour less of sleep definitely causes worse writing skills.
- ◆ Secondly, check out the method of the survey or study. Here are some questions you might want to think about:
 - ◆ How did they sample? What are the advantages and disadvantages of the sampling method?
 - For example, a self-selecting sample of NCEA students’ study habits could mean that the sample is biased towards Excellence students over Not Achieved students lmao.
 - Another example is if you survey people via landline only, your sample will be biased towards older people.
 - ◆ How did they actually collect the data? If a survey is involved, how did they phrase their questions? For example, a double-barrelled question is when you ask two questions in one, for example, “Should NCEA

get rid of exams and fund StudyTime to make more memes?”. This is problematic because students may get confused and only answer one part of the question.

- ◆ Another thing you might want to consider is the response rate. A low response rate means that you are unlikely to have a sample that is representative of the whole population as certain groups may not be doing the survey.
- ◆ If it's a study, you should think about the way they collected their measurements.
 - ◆ For example, if they wanted to measure a technique that would help with exam stress, they need students to sit a test before learning the technique and then afterwards, so they can measure a change.
 - ◆ Another example if they are trying to collect data on people's past habits, such as attending class. This is limited as people can easily misremember or underestimate how often they are missing class, particularly if they have to think back to months ago. A better solution would be to give them a log to fill out at the time of missing the class.
- ◆ Thirdly, you want to consider the evidence the report actually presents.
 - ◆ For surveys and polls, you'll be thinking about MoE (Margin of Error) and confidence – make sure you memorise and know how to use the formulas for the rule of thumb, the difference between groups when they are from the same sample, and the difference between groups when they are from independent/different samples.
 - ◆ Remember also that the rule of thumb should only be used between survey results of 30% to 70%. For a bigger or smaller number e.g. a result of 5% in a survey, then the rule of thumb formula no longer holds.
 - ◆ Also remember that when you are calculating the MoE and Confidence Interval between two groups, if the Confidence Interval contains 0% then you can't claim a difference between the two groups, as this means there is a decent chance that the actual difference between the two groups is 0% – making them the same.
 - ◆ For a study, you might be asked to look at the correlation between the explanatory variable and response variable. Remember that the explanatory variable, the factor we thinking might be causing the response variable to change, goes on the x-axis and the response variable is always on the y-axis. Make sure you also run back through r-values and interpreting regression lines, just in case.
- ◆ Fourthly, you want to think about any limitations to the study.
 - ◆ Remember that here you are mainly discussing non-sampling error. To understand what this means, we need to know what sampling error means. Sampling error is the natural error that will always exist because we are only using a sample of the population, rather than the full population. This is measured by the Margin of Error.
 - ◆ Non-sampling error is anything else outside of this, e.g. the method of sampling, how the data was collected, the design of the survey or experiment etc.
 - ◆ There are many things to think about when thinking about the non-sampling error:
 - **Confounding variables:** variables outside of the study that can affect the levels of the explanatory variables and response variables. For example, if you were studying the relationship between the level of social media usage and the amount of sleep, a confounding variable that could affect both our anxiety levels.
 - **Extending the results inappropriately:** Extending the results beyond the scope of the sample is not advised. For example, surveying people in 2008 and then making a claim about people in 2018. Or surveying students at Otago University when making a claim about all university students.
 - There are other key non-sampling errors that we discussed earlier in this video too, such as self-

selecting samples, survey design issues and more. You'll get a good sense of this through going through past papers.

OVERALL

- ◆ We've covered some important strategies and things to remember, but we haven't covered everything.
- ◆ As we said at the start of this video, we really recommend going through the last 3-4 years of exam papers, and also using the StudyTime Walkthrough Guide and Checklist to really check and consolidate your knowledge and feel 100% prepared!