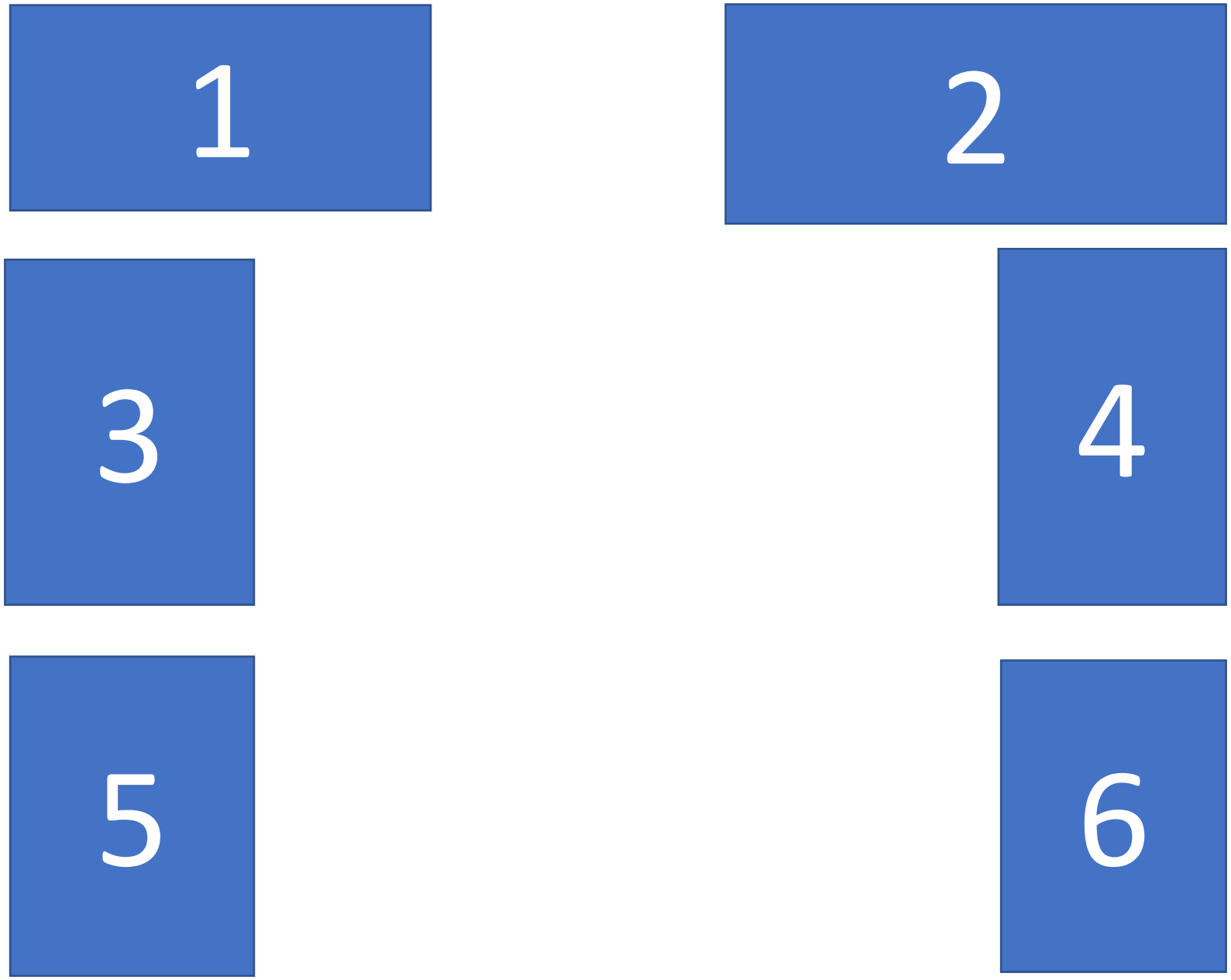
STA130 T0209

Week 5 – Hypothesis Testing

(Materials used in this presentation are provided by the U of T Statistical Sciences Department.

This presentation was prepared by Vivian Ngo.)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Agenda

- Vocabulary
- Presentation Skills
  - Group discussion
- Group presentation

Vocabulary

- Type I error
  - Probability of a false positive (type I error) = alpha.
  - Alpha typically chosen to be 5% (95% Confidence intervals) because we have a low tolerance for this type of error in research!
- Type II error
  - Unfortunately, in practice we don't know if we've committed one of these types of errors.
  - In future statistics courses, you'll learn about ways to control the chance of making of making one of these types of errors.
- Comparing two group means/ proportions

Example: Somebody is convicted of murder

- Null hypothesis?
- Alternative hypothesis?
- How could a type I error occur in this example?
- How could a type II error occur in this example?

Oral presentation skills

- Group Discussion: What makes a good oral presentation?

Oral presentation skills

- Video: https://www.youtube.com/watch?v=V8eLdbKXGzk

Oral presentation skills

- **THE 4 C'S:** Calm; Confident; Clear; Concise
- ***Tips for giving a great oral presentation: Content***
  - What is the main message you want to get across?
  - Create an (organized) outline of your presentation
  - Define terms early
  - Make clear transitions between parts of your presentation
  - Make your data/ figures meaningful
  - Summarize
- ***Tips for giving a great oral presentation: Delivery***
  - Be confident, make eye contact and avoid reading
  - Avoid filler words – "ummm", "like", "you know"
  - Speak slowly and it's ok to pause (and breathe!)
  - Remember to enunciate all the parts of each word
  - Practice! Practice! Practice!

Group Presentation

- Prepare a 5-minute presentation summarizing one of the following research findings (next slide)
- Like a written summary, your presentation should include the following components:
- Contextualize the problem
  - Summarize the methods. E.g. State hypotheses; define the test statistic; etc.
  - Summarize their findings
  - Conclusion
  - Limitations (optional, but good practice). E.g. sample size, study design issues, etc.

Research findings

- (a) A health survey asked 200 individuals aged 20-45 living in Toronto to report the number minutes they exercised last week. Researchers were interested in determining whether the average duration of exercise differed between people who consume alcohol and those who do not consume alcohol. Assume the researchers who conducted this study found that people who drank alcohol exercised, on average, 20 minutes per week. In contrast, people who did not drink alcohol exercised 40 minutes per week, on average. The researchers reported a p-value of 0.249.
- (b) A study was conducted to examine whether the sex of a baby is related to whether or not the baby's mother smoked while she was pregnant. The researchers used a birth registry of all children born in Ontario in 2018, which included approximately 130,000 births. The researchers found that 4% of mothers reported smoking during pregnancy and 52% of babies born to mothers who smoked were male. In contrast, 51% of babies born to mothers who did not smoke were male. The researchers reported a p-value of 0.50.

Research findings

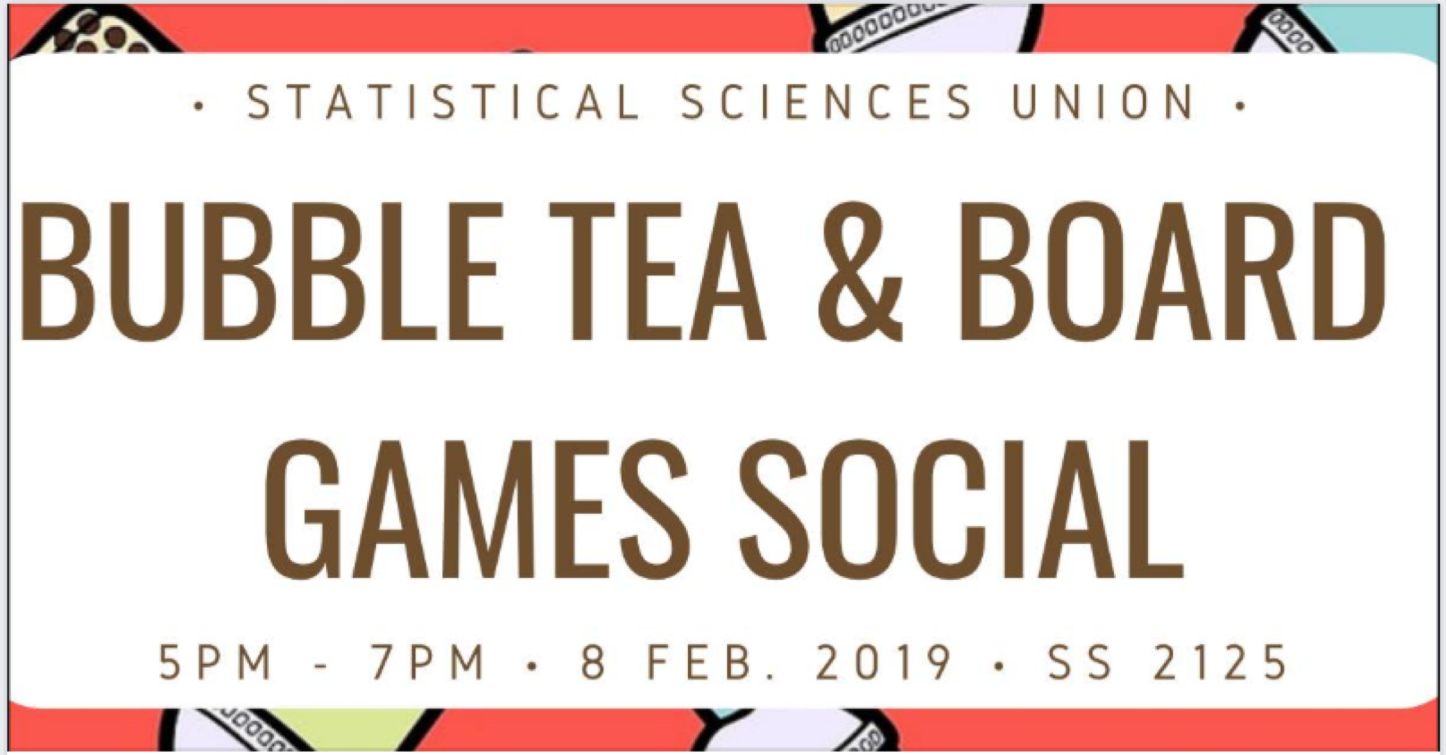
(c) Based on results from a survey of graduates from the University of Toronto, we would like to compare the median salaries of graduates of statistics programs and graduates of computer science programs. 1,000 recent graduates who completed their Bachelor's degree in the last five years were included in the study; 80% of the respondents were female and 20% were male. Among statistics graduates, the median reported income was $76,000. Among computer science graduates, the median reported income was $84,000. The researchers reported a p-value of 0.014.

(d) A team of researchers were interested in understanding millennial's views regarding housing affordability in Toronto. The team interviewed 850 millennials currently living in Toronto. 84% reported that they felt housing prices were unaffordable in the city. Suppose the researchers were interested in testing whether this proportion was different from a study published last year, which found that 92% of millennials reported that housing costs were unaffordable. The researchers reported a p-value of 0.023.

Research findings

(e) Suppose a drug company was interested in testing a new weight-loss drug. They enrolled 20,000 participants and assigned 10,000 to take their new drug, SlimX, and 10,000 to take a placebo. The researchers found that over 2 months, participants who took SlimX lost, on average, 5 lbs. In comparison, the control group lost 4.5 lbs during the same time. The researchers reported a p-value of <0.0001

	4 (Excellent)	3 (Good)	2 (Adequate)	1 (Poor)
Context	The context and connection to the problem are clear.	Some context was provided and all variables/concepts were mentioned. Some aspects were not clear.	Very little context was provided and only some variables/ concepts were mentioned.	No context and mentioning of any variables/ concepts covering in this week's materials.
Structure	Well organized, follows a logical structure.	The organization follows some logical structure.	Some structure but difficult to follow.	There is no structure, very difficult to follow.
Conclusion	There is a clear central idea and the conclusion is correct.	A central idea or conclusion is present. The conclusion might be incorrect.	The central idea or conclusion is weak and not supported.	The central idea or conclusion is missing. Incorrect conclusion.
Transitions	The progression is logical. Effective use of transitions.	The progression is controlled. The use of transitions is mostly meaningful.	Minor disruptions in flow and weak transitions.	Weak progression and lack of transitions.
Vocabulary	Good use of statistical terms and appropriate choice of words.	Use of statistical terms and phrases mostly correct, demonstrates understanding of concepts.	Some use of statistical terms/ phrases and some understanding of concepts demonstrated.	Inaccurate or incorrect use of statistical terms or phrases and a lack of understanding statistical concepts.
Presentation Skills	Regular eye contact with all parts of the audience. The audience was engaged. The presenter held the audience's attention. Appropriate speaking volume & body language. Good pace.	Somewhat regular eye contact or eye contact with some of the audience The audience was mostly engaged. The presenter mostly spoke at a suitable volume. Spoke too quietly at times. Some fidgeting. Going too fast/slow.	Focused on only one or two members of the audience. Sporadic eye contact. The audience was not engaged. Speaker could be heard by only some of the audience. Body language was distracting.	Minimal (or no) eye contact. The audience was never engaged. The presenter did not speak clearly. Presenter was very difficult to hear.
Preparedness/ Participation	Extremely prepared and rehearsed. The presenter was confident.	Mostly prepared but some dependence on or reading off of notes. The presenter seemed fairly confident.	The presenter was not well prepared. The presenter did not seem confident.	Evident lack of preparation/rehearsal. Complete dependence on notes.



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SSU: Bubble Tea & Board Game Social

Public · Hosted by Kyle Tran and Sydney Ro

✓ Interested ▾ | Share ▾ | •••

Today at 5 PM – 7 PM
Starts in about 7 hours

SS2125