

BusML 4202 Midterm 2 tricky concepts reminder

The concepts included in this notes are the ones that I get wrong and they are very tricky!! High chance to be on the exam!!

Attitude and scaling

- understand the difference between Likert scale and graphing continuum.
He doesn't ask much in the sample midterm so I don't think there's a need to worry about it.

Questionnaire design

- Remember the major steps of setting a survey: 1) What should be asked, 2) The layout, 3) and finishing and refining questionnaire

- Understand questionnaire definition and objectives

- Remember a questionnaire should not be a burden to respondents, have to be clear, avoid making assumptions and the solutions to each problem

i) avoid complexity: use complete sentence to ask questions

ii) double- barreled: one question, one item

iii) avoid vague wordings in terms of time (i.e. regularly)

iv) avoid burdensome questions in terms of time frame

v) avoid making assumptions: allow respondents to skip questions

vi) make sure no overlapping in questionnaire options

e.g. Don't say stuff like 1-10, 10-20

vii) *leaded and loaded questions: clue respondents what to answer*

solution: third person technique

purpose of funneling and how that relates to the objective of setting up a questionnaire

Observation research

- In an observation study, you can observe physical behavior and characteristics, but definitely NOT cognitive process (no one can do mind reading!!)

- observational research is less likely to have social desirability bias than survey research (that's why observational research is preferred to questionnaire/survey research!)

Reason: you can have biased wordings in a questionnaire! For observation, you can have greater control (if it is contrived) or even rely on machinery for observation!

- main difference between human vs machine observation

→ human: they *observe*

→ machine: they *record* e.g. physiological observation

- Dimensions of observational research

→ definition of contrived: artificial, physiological measure, control extraneous factors

→ know the definition of direct and indirect observation!!

- Cons of observation research: applicable to real world situation?? (*external validity*)

Experimental research

- The disadvantage of one group pretest-posttest design is extraneous variables are largely uncontrolled (It doesn't even have a control group btw)
- The disadvantage of static group is it has selection bias (lack of randomization)
- Matching (one-to-one match) can be used to replace randomization.
- *Randomization is crucial in posttest-only control group design because it helps guarantee experimental and control group are equal*
- *understand extraneous variables (testing effects, history, maturation, and mortality), especially the difference between maturation and history*
- understand how external and internal validity is related to lab and field experiments.

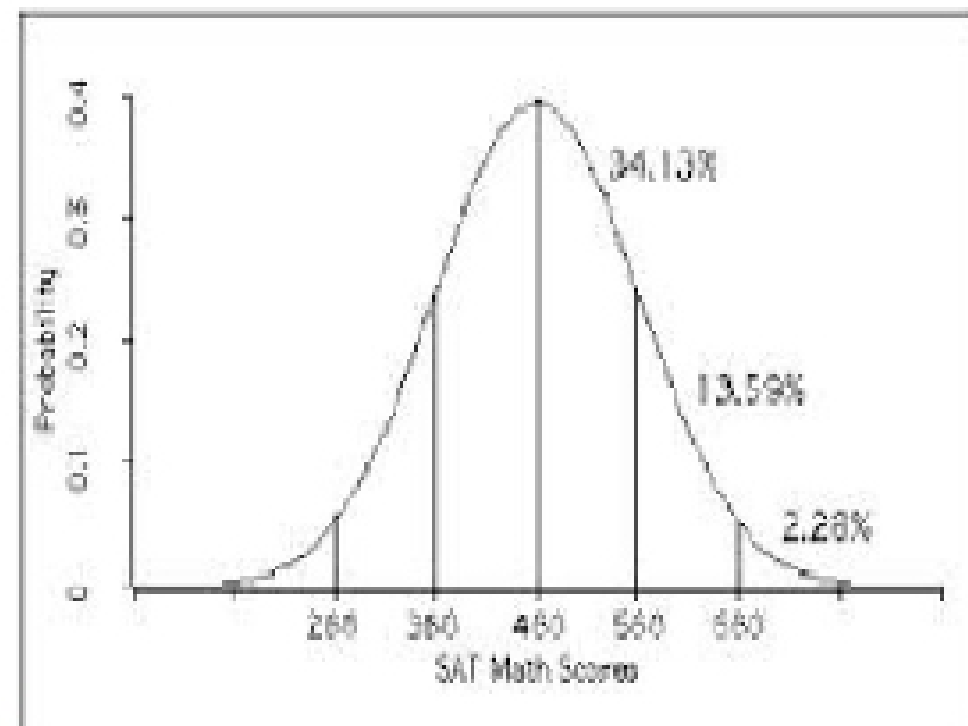
Review of basic statistics Part I and II

- difference between population parameter and sample statistics
 - Again, is the value of parameter/statistics known or unknown?
 - Again, which one can be depicted by a smooth line? Sample/population?!
 - This is very important. I can't stress enough of it because he already mentions in the review session and the notes. To understand why, just read the section about review of inferential statistics*
 - The area under frequency distribution (histogram) can be viewed as probability
 - It is an estimate of the probability distribution of a continuous variable. The explanation of it can be found in Review of Inferential Statistics section
 - Normal distribution = mean = mode = median (50% above and below the mean)
 - Understand the symmetric rule of normal distribution and understand how to use it in calculations
 - Under Standard Normal Distribution, standard deviation and variance = 1. Recall variance = $(SD)^2$.
 - Does Central Limit Theorem (CLM) apply to any kind of distribution? YES!!
I am not gonna explain what Central Limit Theorem is, since it is taught in Stat1430 and it is in the book.
 - *Use of graphical presentations (MUST be on the test!)*
 - histogram: interval/ratio variables
 - frequency tables, bar charts, pie charts: nominal/ordinal data
 - open-ended questions: word clouds
- In word clouds, if the size of words are larger, it means they are mentioned frequently among respondents.

Review of inferential statistics

- 1) **Properties of sampling distribution vs sample distribution vs population distribution**
Comparison points:
 - **Depicted by smooth line?**

I) Population: Yes!!



e.g.

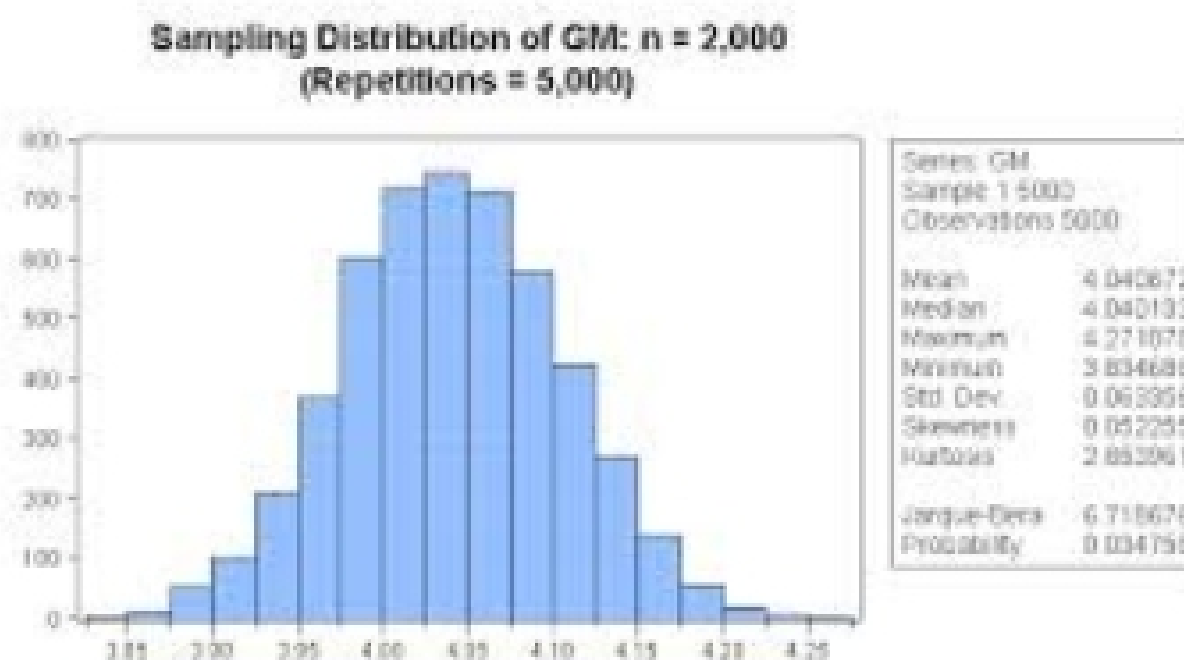
- the lines are like rectangular bars. There are so many rectangular bars in the population distribution which constitutes a smooth line

**** Population distribution does not ALWAYS have normal distribution. If the population distribution is small (i.e. <30), it is possible that it does not have normal distribution.**

II) Sample distribution: No!!

- There is no smooth line, but just rectangular bars!!

E.g.



It is hard to imagine what is the meaning of the number of rectangular bars can make a curve smooth. One way that may help you this to picture the above rectangular bars breaking down into smaller rectangular bars. You may be intuitively understand what is the meaning of this.

III) Sampling distribution: Yes!!

- Note that sampling distribution is NOT sample distribution. Sample distribution