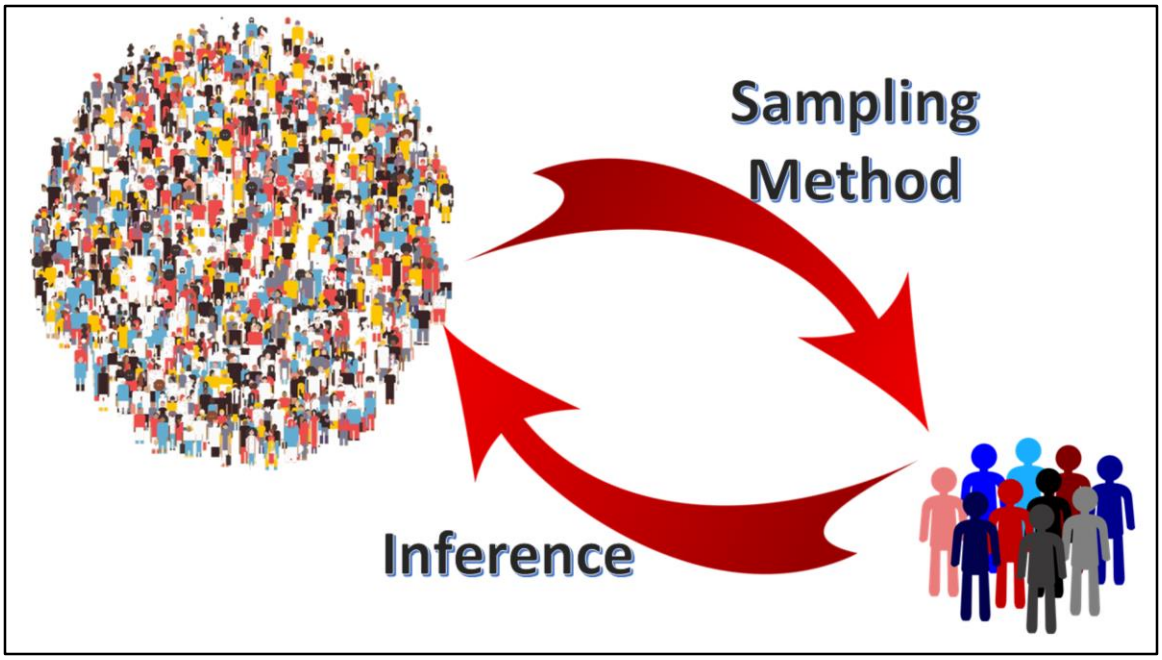
Enriching Sampling Decisions in NCEA Level 2 Assessment

"I used a computer to collect random samples"... Are we really happy with this as an NCEA Level 2 response to gathering data??

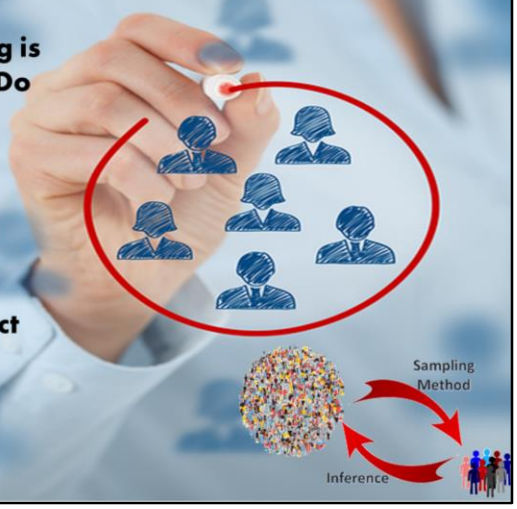
My concern is that students don't really take the time to understand what goes on at the computer stage – it's all a bit of a mystery to them



This is important. We spend a lot of time focussing on the sample to population link – and rightly so. It seems that students and, I suspect many teachers, are losing sight of what matters in making an inference though. It has become too easy to bang out a rule without any underlying understanding. My thinking is that we may be able to improve this situation by spending a bit more time on the population to sample link. What makes a good sample and why? How do we take a good sample?

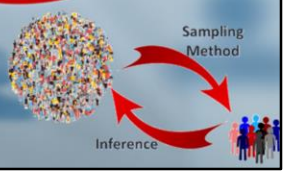
Rationale – actually some questions

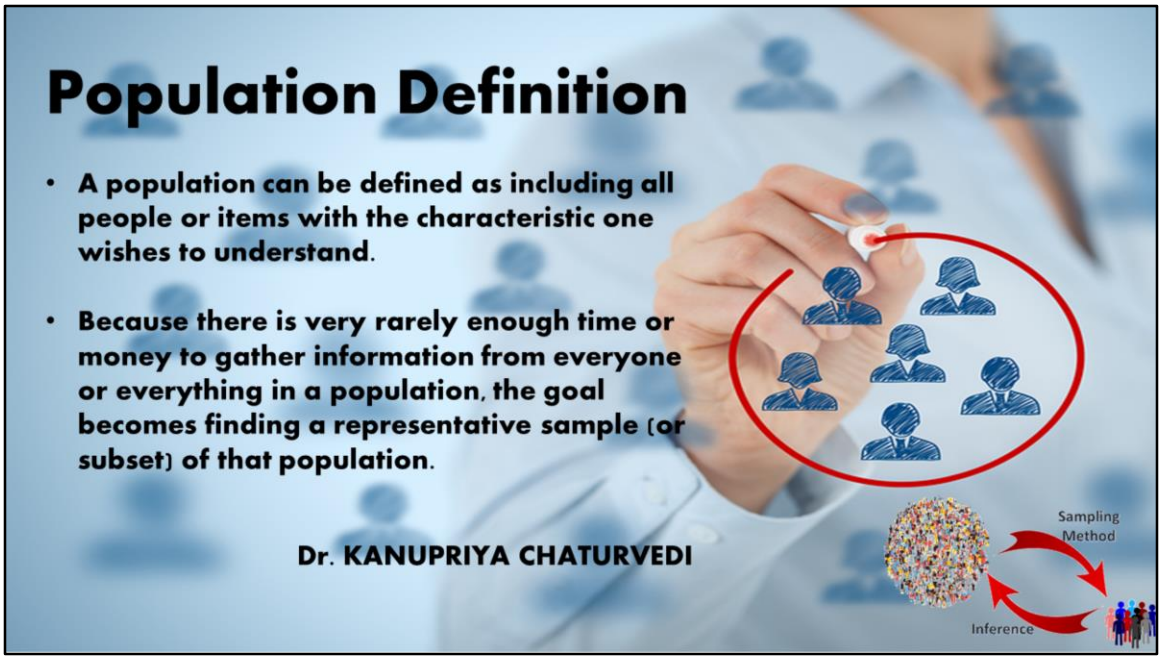
- As per previous slide, inference is the link between sample and population. Sampling is the link between population and sample. Do students need to consider this 'two way street'?
- Students struggle with inferential ideas, especially with the move to confidence intervals. Can better consideration of sampling methods and their potential effect on sampling variation help students to consolidate these ideas?



Rationale – actually some questions

- I know we try to teach this stuff, but we often ignore it come assessment time. The students pick up on this and prioritise accordingly. How can we include sampling method consideration in assessment without taking up insane amounts of time?
- I see this as a nice extension of describing the shape of sample plots… describing how we got the sample in the first place.

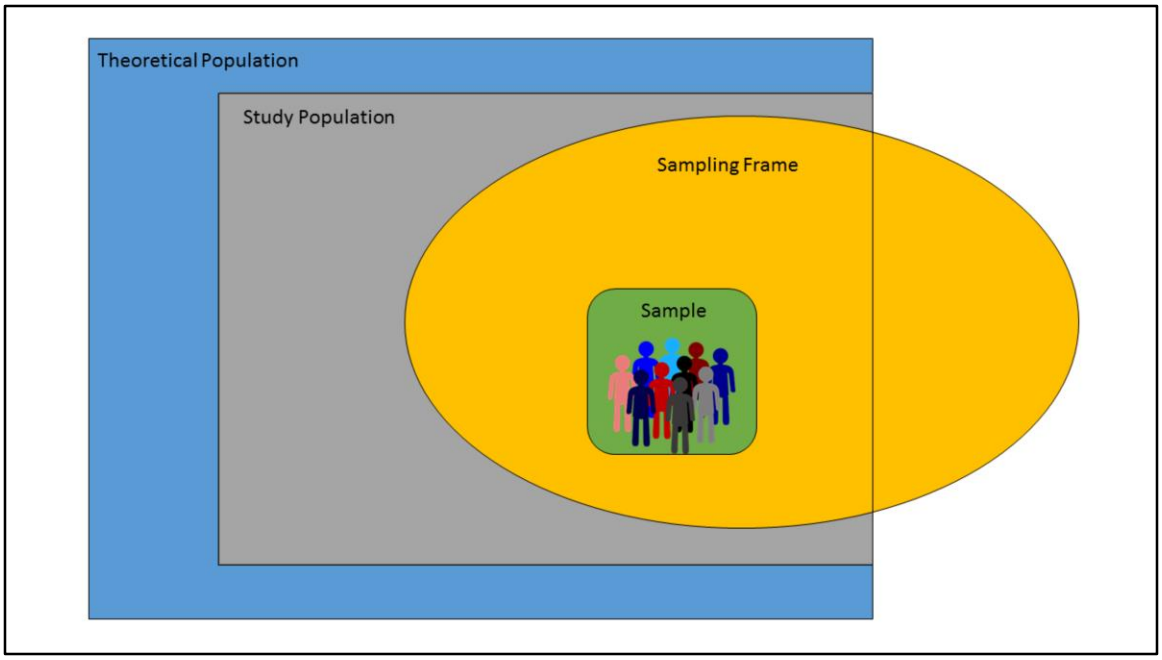




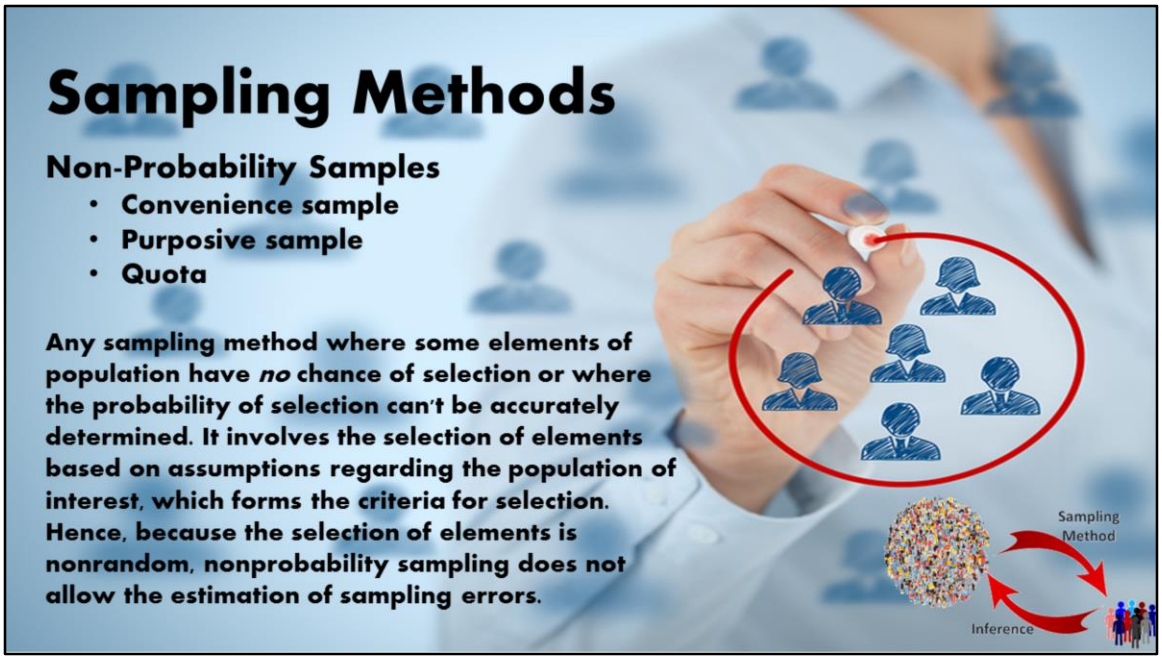
Some of the key teaching points…

Theoretical Population		**Who do you want to generalise to?**
Study Population		**What population can you get access to?**
Sampling Frame		**How can you get access to them?**
Sample		**Who is in your study?**

The problem…



Or look at it like this



The basis of the classic "what's wrong with this sample" question

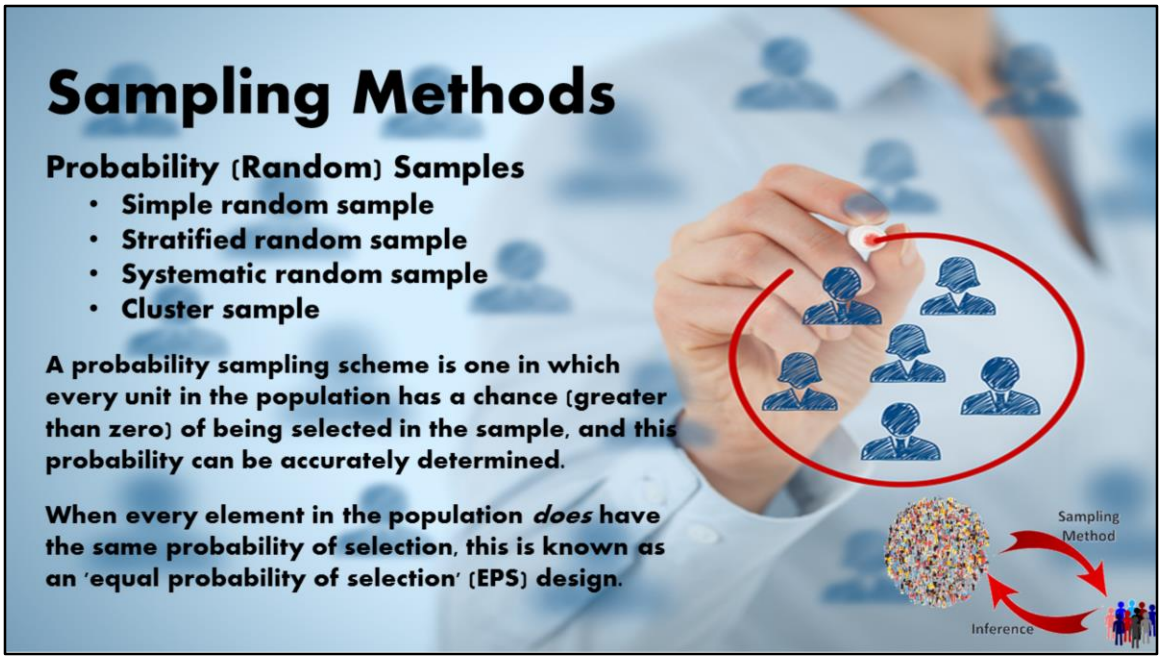
Convenience
Sometimes known as **grab** or **opportunity sampling or accidental or haphazard sampling**.
A type of nonprobability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, readily available and convenient.
The researcher using such a sample cannot scientifically make generalizations about the total population from this sample because it would not be representative enough.
For example, if the interviewer was to conduct a survey at a shopping center early in the morning on a given day, the people that he/she could interview would be limited to those given there at that given time, which would not represent the views of other members of society in such an area, if the survey was to be conducted at different times of day and several times per week.
This type of sampling is most useful for pilot testing.
In social science research, snowball sampling is a similar technique, where existing study subjects are used to recruit more subjects into the sample.

Purposive

The researcher chooses the sample based on who they think would be appropriate for the study. This is used primarily when there is a limited number of people that have expertise in the area being researched

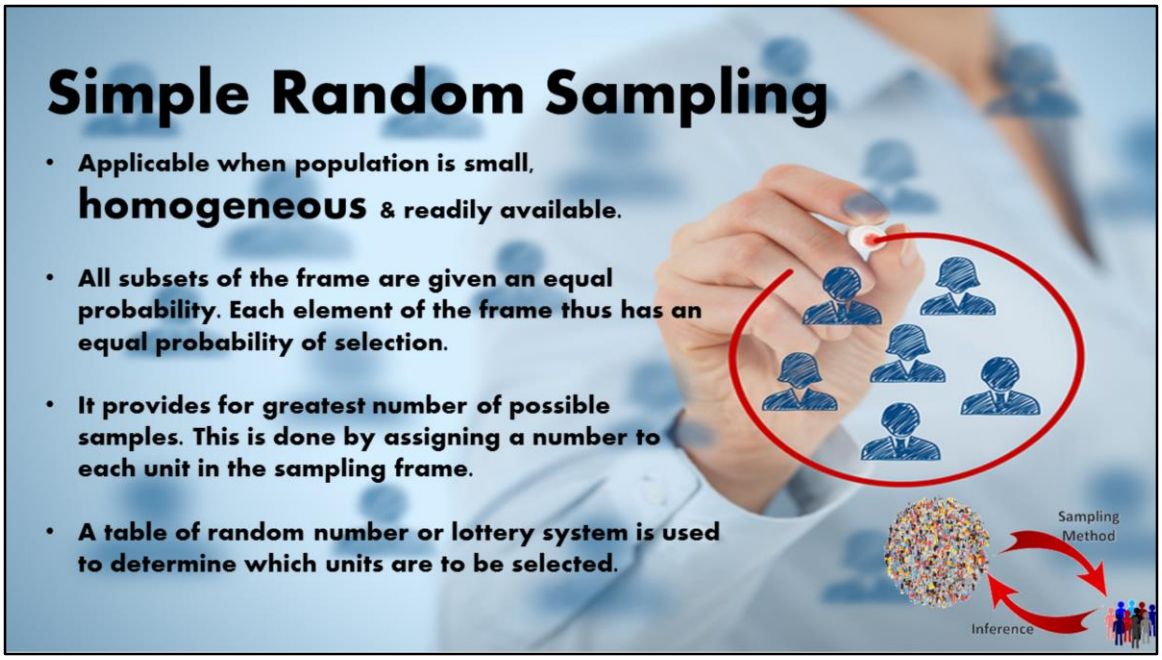
Quota

The population is first segmented into mutually exclusive sub-groups, just as in stratified sampling.
Then judgment used to select subjects or units from each segment based on a specified proportion.
For example, an interviewer may be told to sample 200 females and 300 males between the age of 45 and 60.
It is this second step which makes the technique one of non-probability sampling.
In quota sampling the selection of the sample is non-random.
For example interviewers might be tempted to interview those who look most helpful. The problem is that these samples may be biased because not everyone gets a chance of selection. This random element is its greatest weakness and quota versus probability has been a matter of controversy for many years



We normally focus on the first two, mention the third, and usually treat cluster sampling as a non-probability scheme

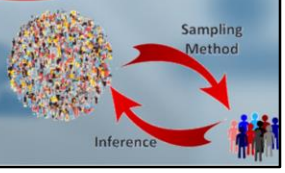
Cluster sampling is an example of 'two-stage sampling' .
First stage a sample of areas is chosen;
Second stage a sample of respondents *within* those areas is selected.
Population divided into clusters of homogeneous units, usually based on geographical contiguity.
Sampling units are groups rather than individuals.
A sample of such clusters is then selected.
All units from the selected clusters are studied.



We often forget the homogenous bit…

Stratified Systematic Random Sampling

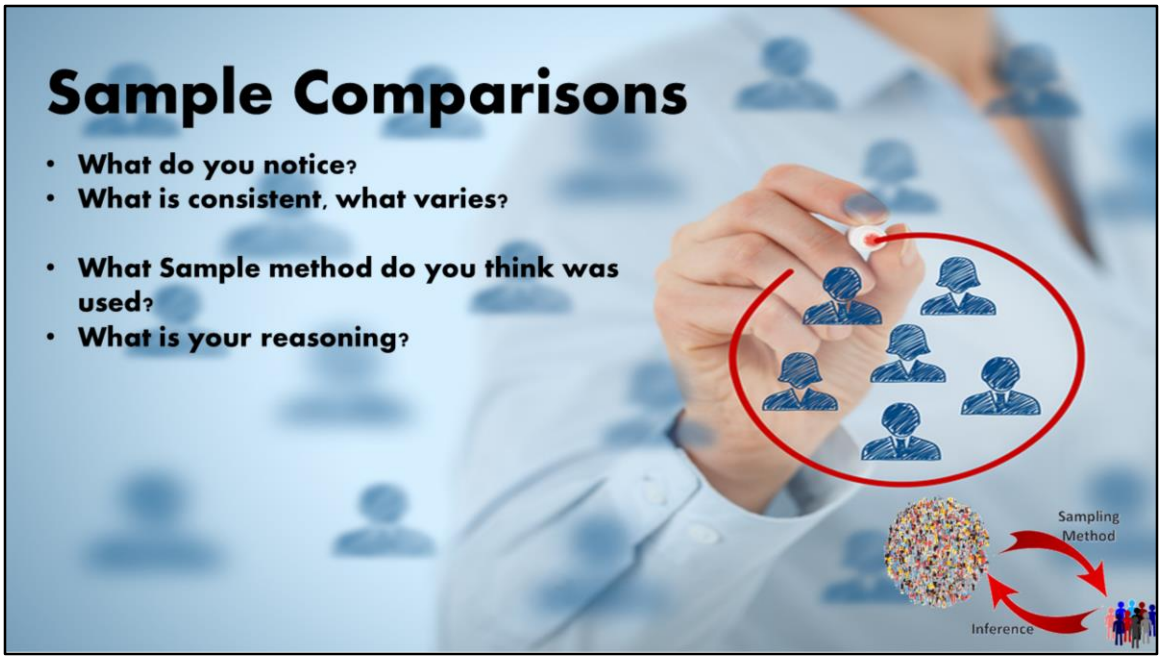
- Sort the study population by identified strata variables, then by the grouping variable.
- Conduct a systematic random sample on the sorted list.
- This sample will be made up of items from the strata in roughly the same proportion as they are found in the population.



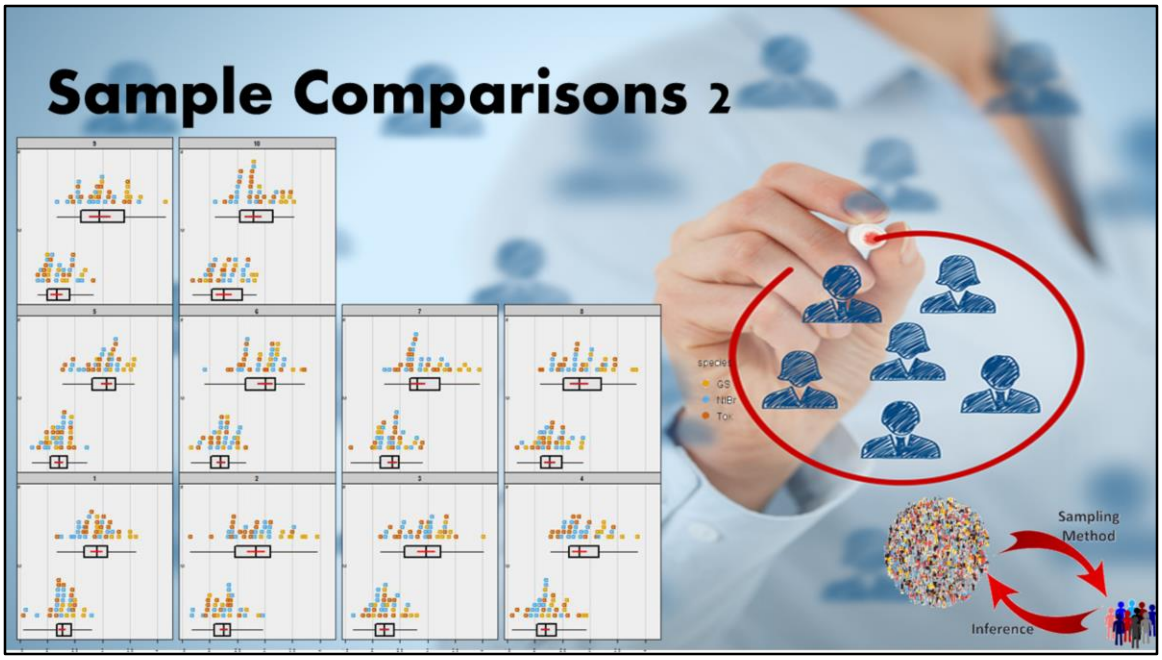
Sample Comparisons

- What do you notice?
- What is consistent, what varies?

- What Sample method do you think was used?
- What is your reasoning?



SRS
What do you notice? What is consistent, what varies?
What Sample method do you think was used? Why?



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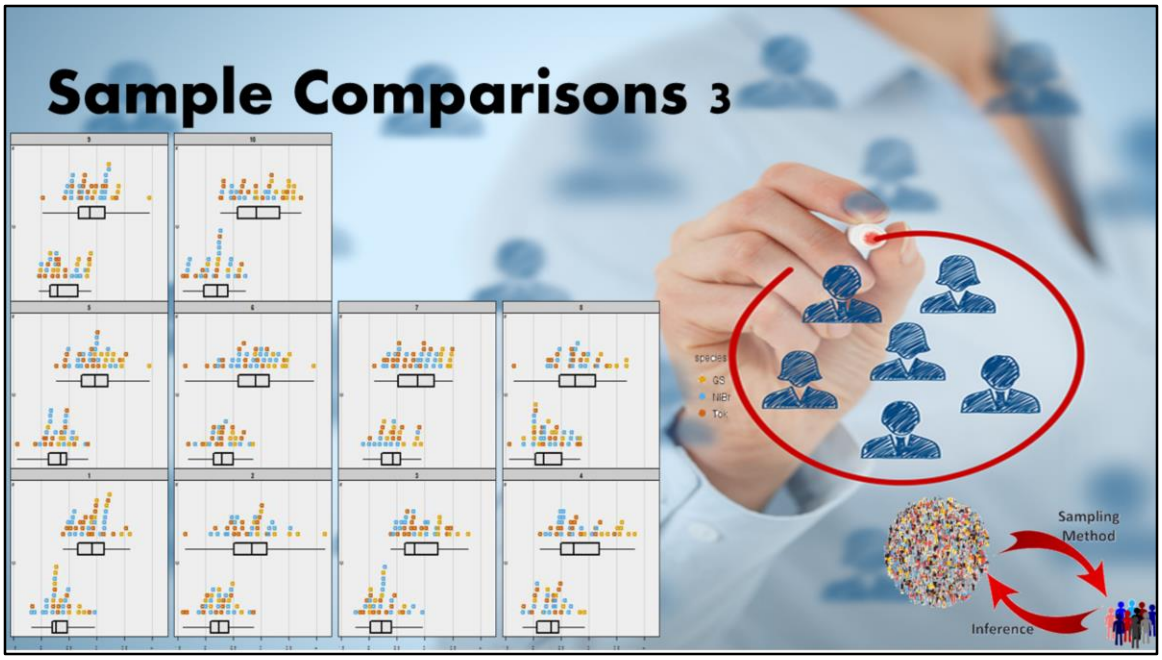
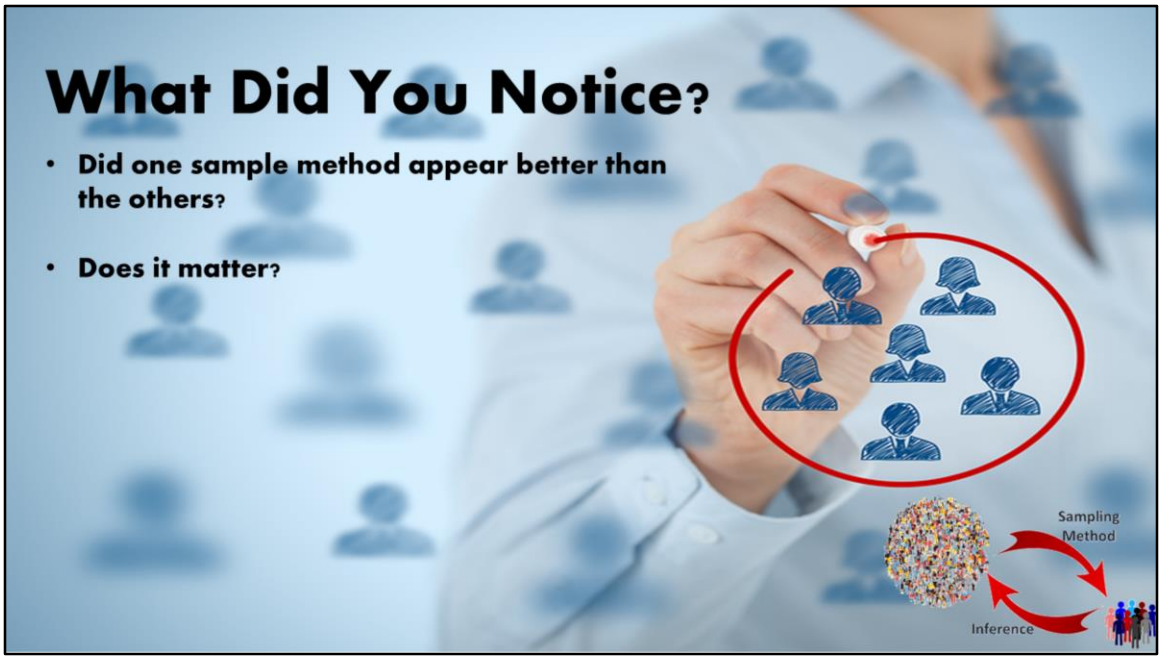


StratRS
What do you notice? What is consistent, what varies?
What Sample method do you think was used? Why?



Probably not!
In this case, taking a SRS would have worked perfectly well
From the point of view of the sample it doesn't matter at all. It's the underlying thinking that matters – linking the sample to population characteristics.

The Process

- Consider the variables in the data set. Which ones might impact on the variable of interest?
- Follow the handout instructions.

Have a Go!!!