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	Indepential Statistics: Making	Bedictions from Dala
	THE GRADUAL STATICTION	
	Indesential Statistics 9-10/100	1.1.10 " (n -1-1-1-1)
	subset od data) to mak	e gereralization about a larger alyzing entire populations -
	population Instead al an	alyzing entire populations -
	coren impractial due to	size of cost
	Papukation us sample	
Torm	Definition	Eva. Na
Population	The complete set of all individuals	All USSR COLOROR
	items of interest	9 voting suspey
sample	A smaller group selected from the	2000 sandanly Clasen U Citroni
	population	Surreyed about voting fairers
Samplia	Occurs when the sample ches	surreying only florida residents
Bay	not accusately represent the	about voting fairess
	population	U

Examples of interential statistics in Adian 11 Class soom Test Scores" Population: All Students in the Class

Sample Io students sitting in the front row Indexence : class performance on the last ted

population

Problem - Front-row students tend to be not engaged and portorin better than the average student, making the cample unrepresentative



bey lakeaways Interential statistics allow as to make generalization about a population of som a sample.

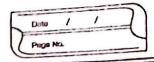
Random sampling is coucial to avoid bias and onsure accuracy. Bias in sample selection can lead to misleading conclusions.

Largex samples typically provide more accusate interpret Simple Random Sampling: Ensuring Jais Selection
What is Simple Random Sampling?
Simple Pandom Sampling (SRS) is a method where:
Every member at the population has an equal chance of being selected being selected.
The selection of one member is indipendent of the selection . The sample is chosen purely by thence ( by training names from a hat, using a random number generator) Example: Twin Study Analysis
Papulation: All twins listed in the Noticeal Twin Registry
Sample: Twins with lost names starting with "Z" and a
subset of those with "B" Issues with sampling: Not Simple Random Sampling

The sample selection was based on last naves, which does not give every train an equal chance of being close.

Con representation of contain ethnic groups (ag

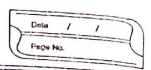
someres starting with 20)



Potential Bias: Ethinic has (some cultures nay have hore surranes starting with 7 ox B).

Behavioral bias (eg prople with last reas starting with 7" nay be not patient) Why sample since Matters in indesential Statistics Random Lamples vs Representative Samples A random sample magny overy member as the population has an equal chance at being relacted. A sapresentative sumple accurately & flects the characteristica of the population small sandom samples may not always be seposentative de to dance ductuations. Example Gerden Imbalance in Small samples -Imagine a population where 50% use male and 50% are dead. If me take a random sample of 20 people, the se's still a 6%. probability (0.06) that 70% or more of the sample could be denale but satter that small samples are never likely to prake ske he d sesults dele to sandom chance How large Samples Rechre Bias larger samples tends to be more depresentative because thay sectura to impact ad sandomus Indiantial statistics adjust dox sample size when making polidian

about the population



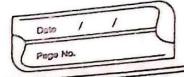
Inall samples -> More Variability -> less reliable conclusions
larger samples -> less variability -> More reliable conclusions More complex sampling nethods in indepential statistics.

In some cases, simple random sumpling isn't paction due to logistical dallonges, such as:

people moving in and out of the population

lack of contact information (eg no phone, not registered). · Constant population charges (ren residents, out of city molters) Mandom Assignment in Inferential Statistics In experimental research, random assignent is the procuss of randomly dividing a sumple into different experimental condition (eg treatment us control) Ensures that pre-existing distrebences between participal across groups - Eliminates selection bias, making results valid Increas the likelihood that differences between graps as chice to the treatment not other factors. Stratidied Sampling in Interestial Statistis

stratistical sampling is a netled wed when a population consists and distinct subgroups (Strata) Instead and randomly sampling the entire population; scalegaters,



(1)	Identidy subgroups (Strata) in the population. Ensure a ach subgroup is propostially specially specially specially specially select individuals from each subgroup.
(2)	Encure and sups (Stogla) in the population and sented in the same.
(4)	By a ach subgroup is propostially of actions
	tandomly select individuals son each sub gard
N 1 12	Example (apital Punishent Views at Usban University
	Population: All students at the University
	Stada 0
	- Daily students (70%) -> Aug age 19
	· Night Androd (30:1) -) And and 39
	Night Audents (30%) -) Aug age 39
	Stratidized sampling approach
	· 10 tal sample size · 700 Floorts
	.: 440 Day sudents (701.)
	60 Night Sudents (301.)
	Why use stratidied sampling.
. 9	Envises Representation: Each subgroup is proportionally inculted Increases Accuracy. Rectros sampling bias compared to simple
	Ingenses Accuracy: Redres sampling bias compared to simple
	random sampling.
	, 0