

# EDP308: STATISTICAL LITERACY

The University of Texas at Austin, Fall 2020

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# Overview

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- Samples
  - ▣ The Wisdom of the Crowd
  - ▣ Random Sampling
  - ▣ Non-Random Sampling
- Issues with Sampling
  - ▣ Representativeness
  - ▣ Demographics
- Issues with Social Science Research
  - ▣ Samples vs. Population
  - ▣ UT vs USA

# Samples

# Jelly Beans and Distributions

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## The Code – The Wisdom of the Crowd

With good samples we  
get closer to the truth.

# “How much do you study?”

- I want to know how many hours a week on average students at UT study, so I go to the library and “randomly” ask 100 people, “How many hours a week do you spend studying?”

What are some issues  
with this sampling?

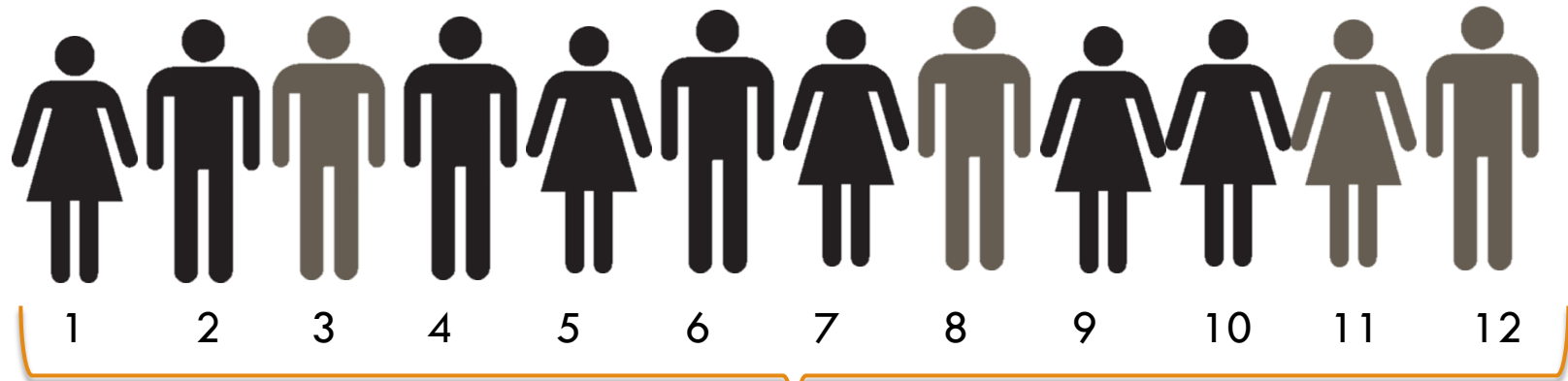
# Let's Sample



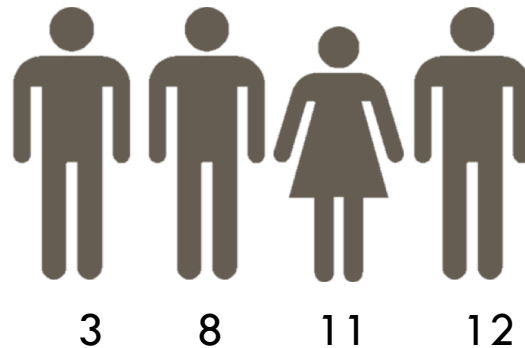
We need to collect a sample of size  $n = 100$

How should we select them?

# The Ideal: Simple Random Sampling



Random Number Generator



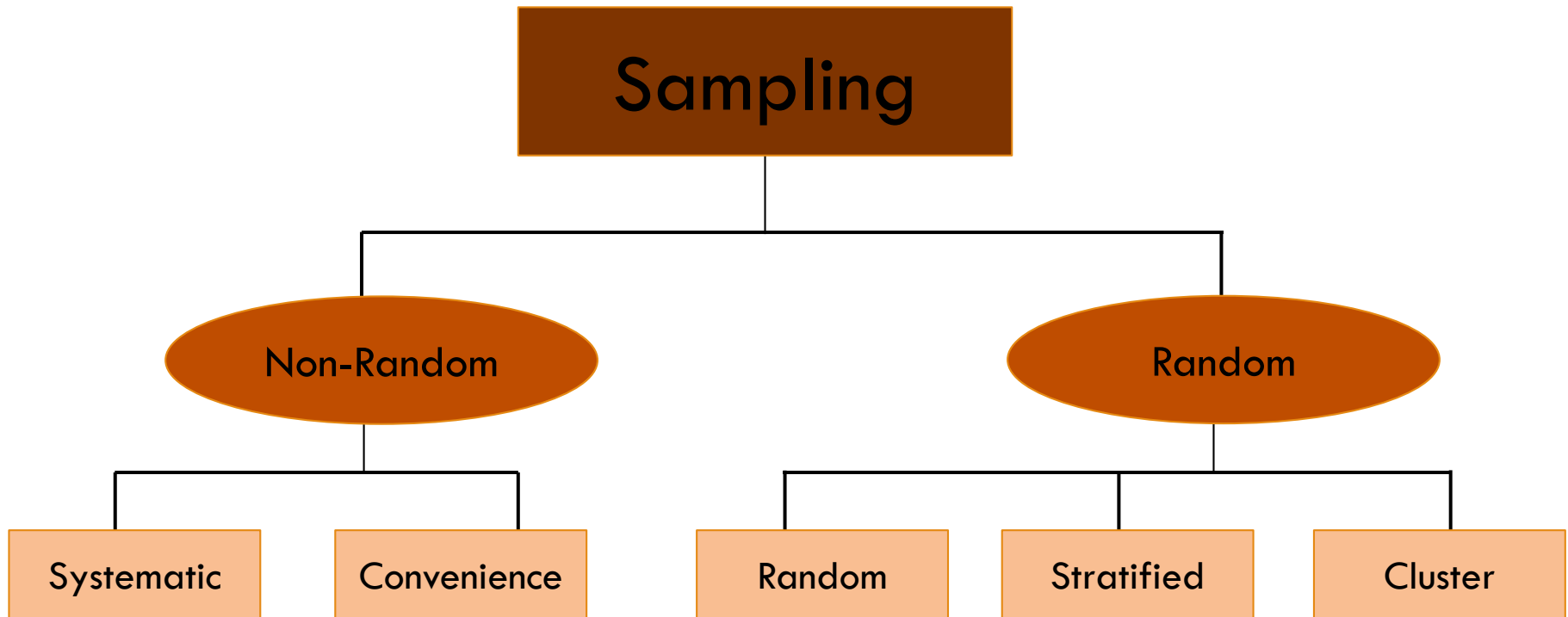
# “Simple” Random Sampling

- Sadly, there is little “simple” about it.
- Something truly randomly sampled:
  - ▣ Defines the population of interest
  - ▣ Every single person in that population is *equally likely* to get randomly chosen
  - ▣ Results in an unbiased estimate

Is this true for our UT sample?



# Other Types of Sampling



There are different sampling methods. It is important to note if a study has conducted a random or non-random sample. Non-random methods typically result in biased samples and thus biased results. Random samples are ideal but harder to achieve in real life. Keep an eye out for whether a sample was collected randomly or non-randomly.

# Issues with Our UT Sample

- I want to know how many hours a week on average students at UT study, so I go to the library and “randomly” ask 100 people, “How many hours a week do you spend studying?”
  - ▣ What about students that study at home or at a café?
  - ▣ What about the time in the semester?
  - ▣ What about different majors?
  - ▣ What about the day I ask?
  - ▣ What about homework? Essays?



# Issues with Our UT Sample

- Now we can see our quick easy question to determine the average number of hours UT students study needs a lot more clarification. (This is part of Conceptualization and Operationalization.)

How would you rephrase this question and define the population?



# Defining the Population and Variable

- These are more specific and do a better job defining the population and the variable of interest?
  - ▣ “What is the average weekly amount of time a Freshman Engineering students at UT enrolled in 15 hours spends on classwork outside of the classroom (ex. homework, studying, building)?”
  - ▣ “What is the average amount of time per week a Senior English students at UT enrolled part-time spend working on classwork outside of the classroom (ex. reading, writing, studying)?”



# Issues in Social Science Research...

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- Where do many (if not most) of the samples for academic research, especially in the social science, come from?
  - ▣ College students...

What are some issues with this?

# Convenience and Guesses

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What are the racial and ethnic demographics of undergraduate UT students (Fall 2019)?

# Convenience and Guesses

What are the racial and ethnic demographics of undergraduate UT students (Fall 2019)?

Race/Ethnicity	% at UT
White (Non-Latinx)	
Black	
Latinx	
Asian	
Foreign	
Other	

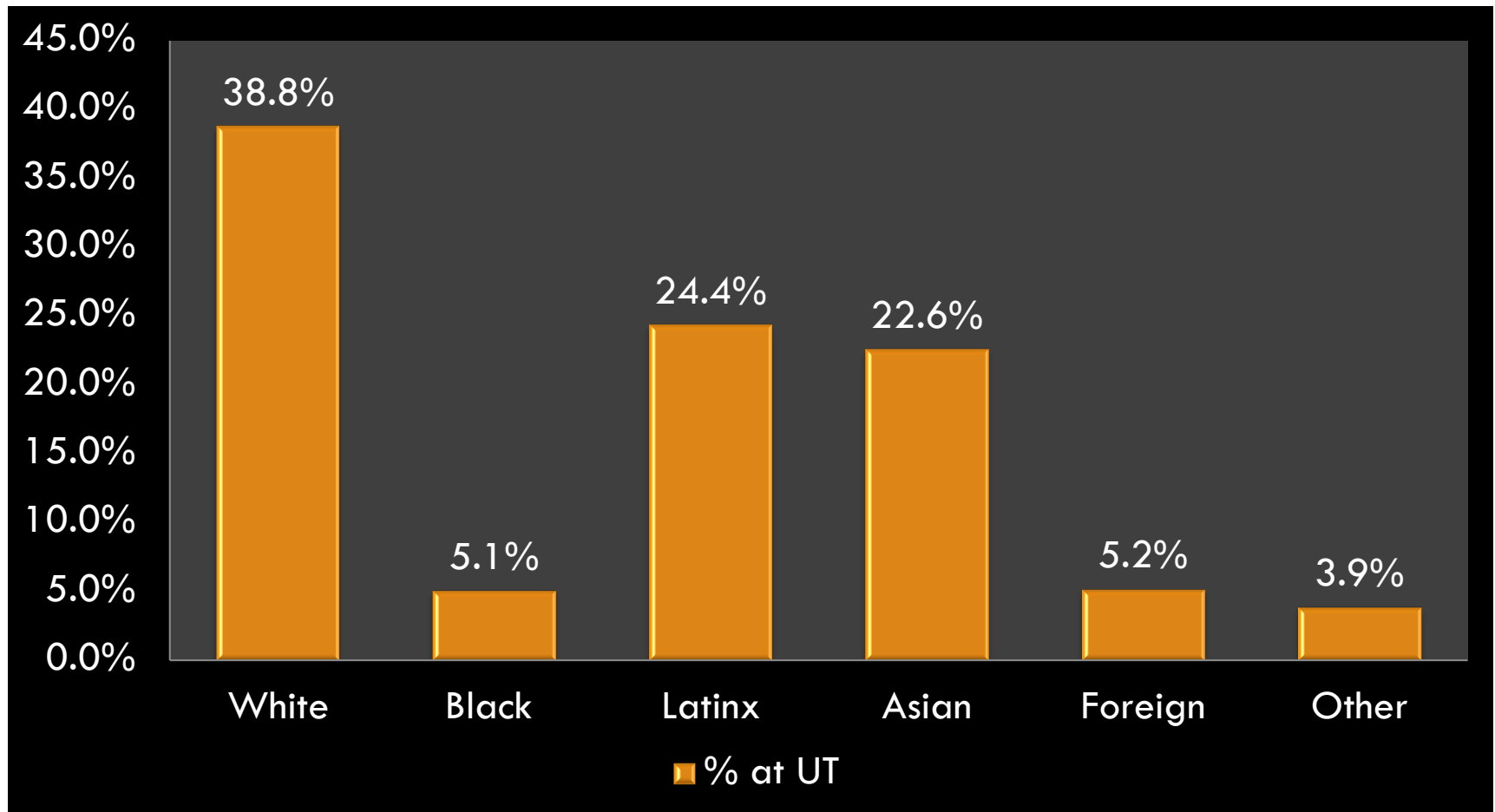
# Convenience and Guesses

What are the racial and ethnic demographics of undergraduate UT students (Fall 2019)?

Race/Ethnicity	% at UT
White (Non-Latinx)	38.8%
Black	5.1%
Latinx	24.4%
Asian	22.6%
Foreign	5.2%
Other	3.9%



# Frequency Distribution of UT-Students 2019



# Convenience and Guesses

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What are the racial and ethnic demographics of the US population (2019)?

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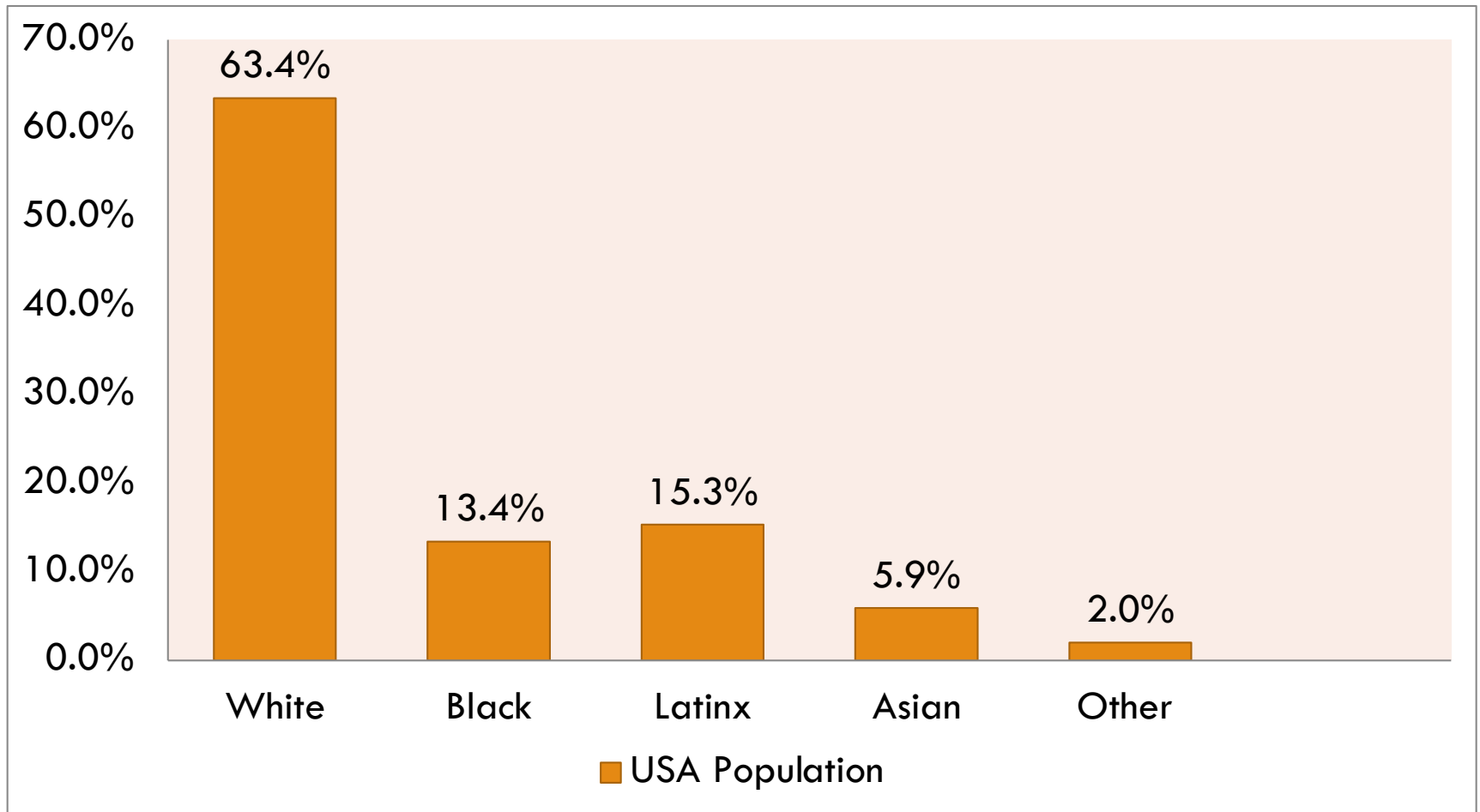
Race/Ethnicity	% of USA
White (Non-Latinx)	
Black	
Latinx	
Asian	
Foreign	
Other	

# Convenience and Guesses

What are the racial and ethnic demographics of the US population (2019)?

Race/Ethnicity	% of USA
White (Non-Latinx)	63.4 %
Black	13.4 %
Latinx	15.3 %
Asian	5.9 %
Foreign	NA
Other	2 %

# Frequency Distribution of USA 2019

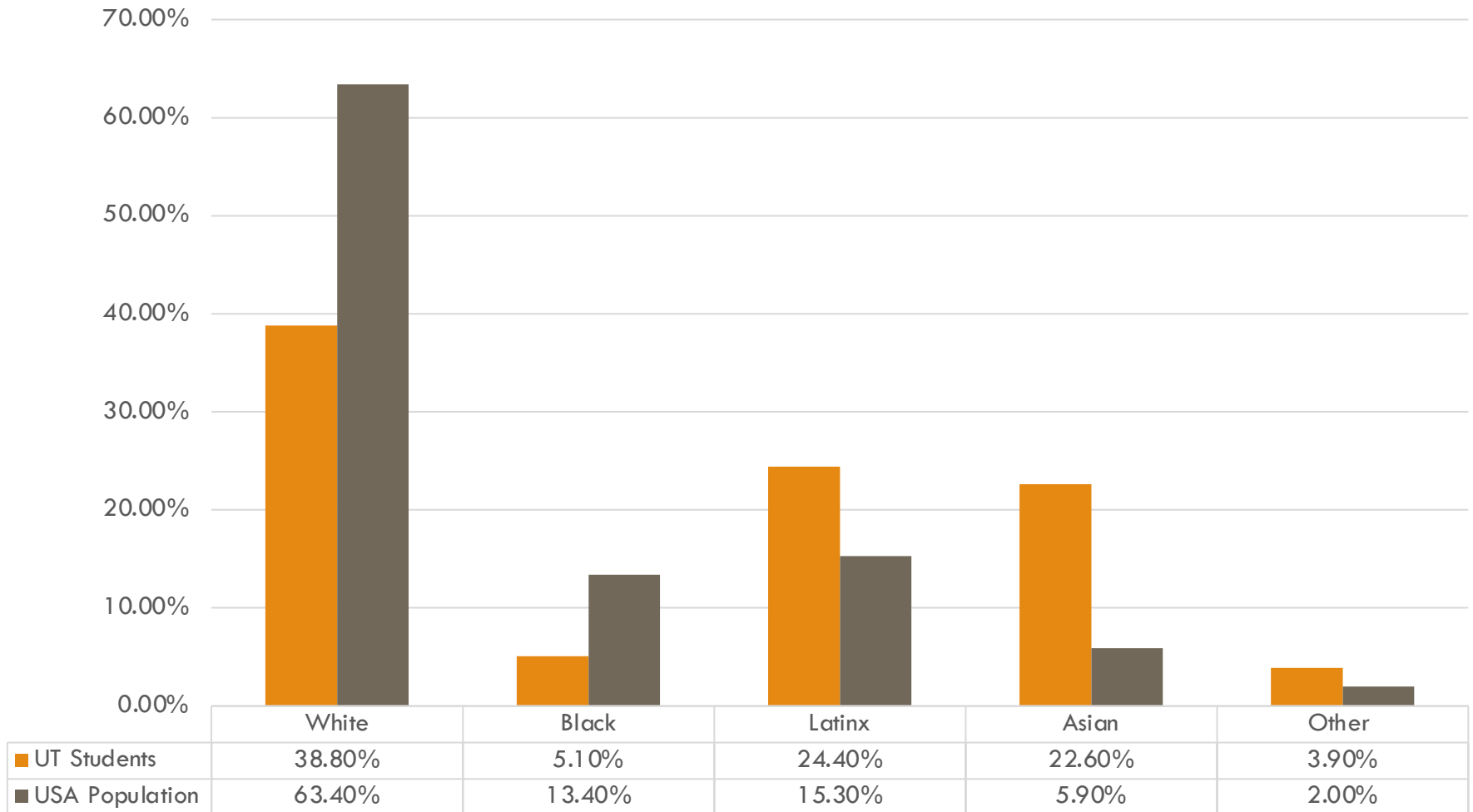


# Convenience and Accuracy

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How representative would our  
UT-Austin sample be of the  
US population?

# UT Student vs US Population



# Next Up...

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- Now that we have an idea on how to take a sample, let's see what we can learn from our samples and a new distribution called...

## The Sampling Distribution...