Lecture 1:
Chapter 1

C C Moxley

UAB Mathematics

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§1.2 Basic Concepts

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Concept Mastery:

In a survey of 109 randomly selected cell phone users, subjects were asked to tell how mant texts they sent each month and how many they received. What are the potential pitfalls in this survey?

Concept Mastery:

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Is anything wrong with this statement? In the last 50 years, a low crime rate in Hartford, CT, was highly correlated with having a republican mayor in office. Thus, republican mayors are more effective at preventing crime.

Concept Mastery:

Is it possible for a quantity to increase by 200%?

Concept Mastery:

Is it possible for a quantity to increase by 200%? Can a quantity decrease by 200%?

Concept Mastery:

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Is anything wrong with this statement? The number of flu deaths in the US is remarkably high this year: 53,000 people have died this year compared to 45,000 last year.

Concept Mastery

Identify the parameter and the statistic. A survey of 2500 people determined that 40% of the 241,472,385 adults in America are employed in their desired field.

§1.3 Types of Data: Parameter vs. Statistic

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inteval	no natural zero, useful differences	body temperature
ratio	natural zero, useful differences	speed

Concept Mastery

Identify the level of measurement and determine if the calculation is meaningful.

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Is this a statistic or a parameter?

Concept Mastery

Give the level of measurement of the following.

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Concept Mastery

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Concept Mastery

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- The star-rating on Yelp! **Ordinal.**
- Letter grades. **Ordinal.**
- Length of a movie. **Ratio.**
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An **experimental** study is one which seeks to modify its subjects. Often, what is sought is an *understanding of the change* which occurs due to this modification.

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What's the difference between this and a **random sample**?

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Prospective studies involve data collected at a future point in time.

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Also consider randomized experimenting and a randomized block design.

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Sampling errors happen when there is a difference between the measurement in the sample and its corresponding parameter, despite good sampling methods. **Non-sampling errors** occur are the result of human error or poor judgement. **Non-random sampling errors** happen when there is a difference between the measurement in the sample and its corresponding parameter and when the sampling is non-random.

Concept Mastery

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A study want to know if calling at different times of day affects responses. They call at noon and at 6PM and compare the results.
A study wants to know the effect of laughter on respondent's answers. They ask people political questions after they've watched a stand-up comic.

Concept Mastery

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CBS polled neighbors at a house fire to determine the level of concern they had about fires in their home.

Concept Mastery

How might you "control" to see if a subject's sex was a determining factor in the the effectiveness of a drug?