6/03/20

Agenda for Math 5710 ♫ Meeting #9   ☻☺ 7/02/20 (8:00 a.m. – 9:10 a.m.)

1.   Hello:

Brigham City: Adam Blakeslee   Ryan Johnson   Tyson Mortensen

Logan: David Allen   Natalie Anderson   Kameron Baird   Stephen Brezinski
                Zachary Ellis   Adam Flanders   Brock Francom   Xiang Gao
                Ryan Goodman   Janette Goodridge   Hadley Hamar   Phillip Leifer
                Brittney Miller   Jonathan Mousley   Erika Mueller   Shelby Simpson
                Steven Summers   Matthew White   Zhang Xiaomeng

2.   Note the syllabus' activity list for today:

09:
H/7/02
	1. Construct the following concepts, comprehend associated communication structures, and discover interrelations among them:
	        evaluations or judgments, measurements, measurement results or data, and
	         measurement scales
	2. Take advantage of Quiz 09.

3.   Briefly, raise and address issues and questions stimulated by the following homework
      assignment:

   A.   Study our notes from Meeting #8 ; comprehend Jim's sample responses to the Quiz #9
         prompts that are posted on *Canvas*.

   B*.   Staggerlee wants to conduct a coin-flipping experiment for the purpose of determining
         the probabilities of randomly obtaining various events when a fair coin is flipped
         exactly three times in succession. He plans to use the resulting probability distributions
         to hedge his bets in a variety of games of chance. Please design the experiment for him
         so that it yields probability values for the each of the following events: X_j is the event in
         which exactly j tails turn up for $j \in \{ 0, 1, 2, 3 \}$. Describe the experiment – identifying
         the sample space and discrete probability distribution.

   C.   Compare your responses to the homework prompts to those Jim posted in *Canvas* on
         the usual page.

4. Compare the following three probability-related experiments w/r the concern for the validity of the process by which data were collected:

A. Staggerlee wants to conduct a coin-flipping experiment for the purpose of determining the probabilities of randomly obtaining various events when a fair coin is flipped exactly three times in succession. He plans to use the resulting probability distributions to hedge his bets in a variety of games of chance. Please design the experiment for him so that it yields probability values for the each of the following events: X_j is the event in which exactly j tails turn up for $j \in \{ 0, 1, 2, 3 \}$. Describe the experiment – identifying the sample space and discrete probability distribution.

Sample description:

Let $\Omega = \{$ TTT, TTH, THT, HTT, HHH, HHT, HTH, THH $\}$

Let X_j = the event that there exactly j tails. Thus,
$$| X_0 | = |\{ \text{HHH} \}| = 1$$
$$| X_1 | = |\{ \text{HHT, HTH, THH} \}| = 3$$
$$| X_2 | = |\{ \text{TTH, THT, HTT} \}| = 3$$
$$| X_3 | = |\{ \text{TTT} \}| = 1$$

Let p be our random probability function. Since $|\Omega| = 8$, we have the following probability values:

$$p(X_0) = \frac{1}{8} \wedge p(X_1) = \frac{3}{8} \wedge p(X_2) = \frac{3}{8} \wedge p(X_3) = \frac{1}{8}$$

B. ABSTRACT

Hiu Man Christine Chiu
How Delayed Responses in Text Messages Affect Relationships

Previous research contradicts whether text messaging promotes or hinders social relationships. The current study examined how delayed responses in text messaging affect people's relationships. A total of 239 undergraduate students (162 females and 77 males) read three series of text messages presented as occurring between the participants themselves and three target respondents (an imaginary same gender friend, romantic partner, and opposite gender friend) and rated their relationship satisfaction. Participants were randomly assigned to a delayed or immediate condition. The only difference between the two conditions was the response time from the target respondents. Overall, participants rated higher relationship satisfaction when target respondent was a romantic partner. Female participants, as expected, reported higher relationship satisfaction in the immediate condition across all three relationship types. Male participants, in contrast, expressed a reversed pattern when communicating with a romantic partner and an opposite gender friend.

C.

ABSTRACT

Teaching Students to Communicate with the Precise Language of Mathematics: A Focus on the Concept of Function in Calculus Courses

Derrick S. Harkness

The use of precise language is one of the determining characteristics of mathematics that is often missing in mathematics classrooms. This lack of precision results in poorly constructed concepts that limit comprehension of essential mathematical definitions and notation. One important concept that frequently lacks the precision required by mathematics is the concept of function. Functions are foundational in the study of undergraduate mathematics and are essential to other areas of modern mathematics. Because of its pivotal role, the concept of function is given particular attention in the three articles that comprise this study.

A unit on functions that focuses on using precise language was developed and presented to a class of 50 first-semester calculus students during the first two weeks of the semester. This unit includes a learning goal, a set of specific objectives, a collection of learning activities, and an end-of-unit assessment. The results of the implementation of this unit and the administration of the assessment indicated that when students were able to construct the concept of function themselves and formulate a formal definition, they had a deeper and more meaningful understanding of the concept.

In order to demonstrate its validity, the assessment was analyzed as to its relevance, reliability, and its test items' effectiveness in discriminating between different levels of achievement. The results of this analysis indicated that the assessment was relevant to both the mathematical content and learning levels indicated by the unit's objectives and had a high level of reliability. Additionally, the test items contained in the assessment had a reasonable level of effectiveness in discriminating between different levels of student achievement.

5.   Take a brief and shallow swim in the waters of psychometrics:

   A.   Acquaint ourselves with foci of the discipline of psychometrics.

      i. Design measurements (i.e., data gather processes that are both valid and usable)

      ii. Conduct studies for the purpose of assessing the validity of measurements

B.   Begin to construct and interrelate the following concepts as we examine and note examples from the following entries in our Glossary:

033.   A taste of psychometrics:

A. Measurements

Definition for *measurement*: A measurement is a process by which data or information are collected via empirical observations.
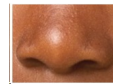
Note: A measurement is an objective process focusing on a quantitative variable.

B. Assessments

Definition for *assessment*: An assessment is a judgment or evaluation drawn from inferences that extend beyond what has been empirically observed.

Note: An assessment is a subjective process focusing on a qualitative variable.

C. The relations between a measurement and an assessment:

Note: Assessments are influenced by data (i.e., measurement results) but accurate assessments also depend on the sagaciousness and ethics of the people who conduct the assessments.
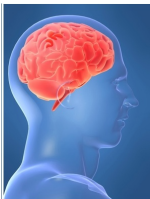
D. Discrete data strings and data sequences:

Definition for *discrete data*:

$m \in \{$ discrete data $\} \Leftrightarrow ((m \in \{$ strings $\} \veebar m \in \{$ sequences $\}) \wedge$ the codomain of m is a subset of $\mathbb{R}$).
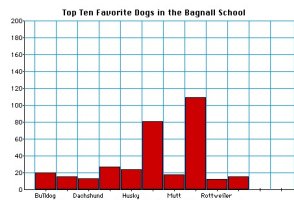
6. Further interrelate topics from Glossary entries 033A–D employing the language of the following psychometric model:

$$D_0 = D_t + D_E$$

7. Briefly allude to four types of scales of measurement results (i.e., data) that have implications for choices of statistical models used to analyze those data:
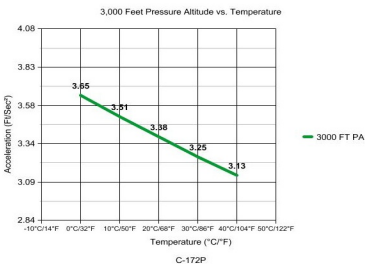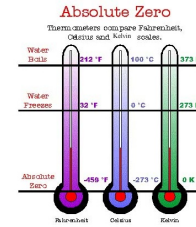
A. Nominal

B. Ordinal

C. Interval

D.   Ratio

8.   Take advantage of Quiz 09.

9.   Complete the following homework assignment prior to Meeting #10:

A.   Study our notes from Meeting #9 ; comprehend Jim's sample responses to the Quiz #9 prompts that are posted on *Canvas*.
                L
B.   Comprehend the entry from Line #033A–D & 33E-i from our *Glossary* document.

C*.   In light of the following goal statement for a proposed study, write a paragraph explaining whether or not there should be measurement validity concerns with either data relevant to the dependent variable (salaries of the study subjects) or the dependent variable (subjects' scores on the *Stanford-Binet Intelligence Test*. (Please post the resulting PDF using the appropriate Canvas Assignment link.):

> The proposed study examines the correlation between the salaries of professional economists working for corporations in the in California and their scores on the *Stanford-Binet Intelligence Test*.

D*.   Examine each of the following multiple choice prompts; for each circle the lower-case letter in front of the one correct choice:

i.   Which one of the following is a sufficient condition for an accurate assessment:
   a)   Wise value judgments based on valid measurement results.
   b)   Objective data from valid measurements.
   c)   Non-subjective judgments.

ii.   Which one of the following is NOT a measurement?
   a)   Hearing a person answer a question.
   b)   Recognizing that a person does not know the answer to a question.
   c)   Noting that a person hesitates before answering a question.

iii. Gloria scored 80 and Robert scored 20 on a test designed to be relevant to students' achievement of the goal of unit on systems of linear equations. Their teacher should NOT conclude from these results that Gloria achieved the goal four times better than Robert because of which one of the following reasons?
   a)   A difference of 60 is not great enough to warrant such a conclusion.
   b)   Such unit tests do not generate scores from interval scales.
   c)   Such unit tests do not generate scores from ordinal scales.
   d)   Such unit tests do not generate scores from ratio scales.
   e)   The D_o generated by such unit tests rarely approach the targeted D_t.

iv. Which one of the following statements is true?
   a) Results from an interval measurement can tenably be interpreted as if they were nominal.
   b) Results from an ordinal measurement can tenably be interpreted as if they were interval.
   c) Results from a nominal measurement can tenably be interpreted as if they were ratio.
   d) Results from an interval measurement can tenably interpreted as if they were ratio.

E. Comprehend Jim's sample responses to Prompts #8-C&D that are posted on *Canvas*.

10. And from Yogi Berra:

"Little League baseball is a very good thing because it keeps the parents off the streets."

"When you come to a fork in the road, take it."

"Half the lies they tell about me aren't true."

"I wish I had an answer to that because I'm tired of answering that question."

"If you ask me anything I don't know, I'm not going to answer."

"The future ain't what it used to be."

"It's tough to make predictions, especially about the future."

"A nickel ain't worth a dime anymore."

"I never said most of the things I said."

"We made too many wrong mistakes."