Measurements

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Levels of Measurement

- Nominal and categorical measurement
  - Example: Male versus female
- Ordinal measurement
  - Ordered from the tallest one to the shortest one
- Interval-equidistant points measurement
  - Example: Age in years old
- Ratio-equidistant points with 0 as an option
  - Example: Income in US dollars

Examples: Different Levels of Measurement

- How often do you feel in control of your life?
  1. Never
  2. Seldom
  3. Often
  4. Almost always
- Ethnic Background
  1. Anglo
  2. African-American
  3. Hispanic
  4. Asian-American
  5. Other

Reliability

- How consistently does the measurement technique measure the concept of interest?

- Consistency
- Reproducibility

Types of Reliability

- Test-retest
- Inter-rater reliability
- Intra-rater reliability
- Statistical measures
  - Spearman-Brown split half
  - Guttman
  - Kuder-Richardson-20
  - Cronbach's alpha

Test-Retest Stability

- Measure the same thing over and over to see if it always gives you the same result
- Does not work as well with paper and pencil surveys

Inter- and Intra-Rater Reliability

- Inter- and intra-rater reliability equivalence parallel
  - Inter-rater: Two different raters rate the same thing to see if getting similar results
  - Intra-rater: Give the same survey to the same person a week apart to see if getting the same results

Statistical Measures

- See how much the two measures that you are comparing measure the same thing
  - 1.0 is perfect measure of the same thing
  - .7 is less perfect, but pretty good
  - .3 is not so good

Validity

- The extent to which an instrument reflects the concept being examined

Types of Measurement Validity

- Content (face) validity
- Factor analysis
- Readability

- Others things to be aware of
  - Validity from contrasting groups
  - Validity from examining convergence
  - Validity from examining divergence
  - Validity from discriminant analysis
  - Validity from prediction of future events
  - Validity from predicting concurrent events
  - Successive verification of validity

Content Validity

- Give the instrument to a group of experts and have them tell you whether it has all the elements of what you are trying to measure

Factor Analysis

- Analyze all the items in the scale and see how much they contribute

Readability

- Test the reading level of an instrument
- Should make the instrument to the 8th grade reading level
  - Example: In Detroit, patients thought smoking “cessation” was smoking “sensation”

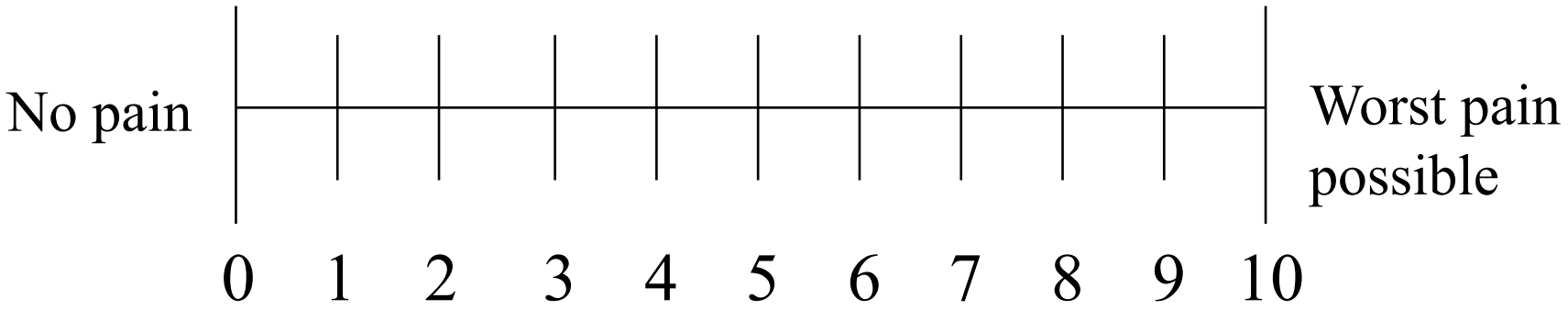
Measurement Strategies

- Qualitative research
  - Observations
  - Interviews
  - Focus Groups
  - Diaries
- Quantitative research
  - Physiologic measures
  - Questionnaires
  - Scales

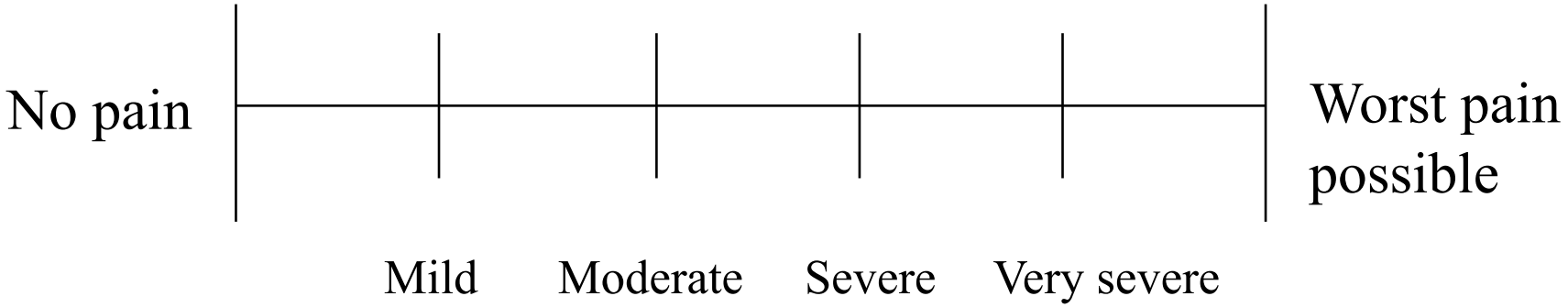
Scales

- Rating scales
- Likert scales
- Visual analog scales

Numeric Rating Scale



Verbal Descriptor Scale



Likert Scale

- 5 or 7 point scale is the best
- Example: How often in the past week have you felt in control of your life?
  - 1 = Never
  - 5 = All the Time

Visual Analog Scale

Worst possible pain

A 10-cm line

No pain

Questionnaire Considerations

- Length
- Pre-testing
  - For length
  - For accuracy
  - For feedback
- Remuneration
- Include a stamped, addressed envelope

Questionnaire Follow-Up

- 1 week later
  - Postcard: A thank you note to those who responded. A reminder to those who have not
- 3 weeks
  - Letter and replacement questionnaire
- 7 weeks
  - Replacement questionnaire by, such as, a certified mail