

## Chapter 6: Norm-Referenced Measurement

### Topics for Discussion

- Reliability
  - Consistency
  - Repeatability
- Validity
  - Truthfulness
- Objectivity
  - Interrater reliability

### Observed, Error, and True Scores

### Reliability

- Interclass Reliability
- Pearson product moment
- Test–retest
- Equivalence
  - Split halves

### Spearman–Brown Prophecy Formula

### Effect of a Constant Change in Measures

### Intraclass Reliability ANOVA Model

### Cronbach's Alpha Coefficient

### Intraclass (ANOVA) Reliabilities

Common terms you will encounter

- Alpha reliability
- Kuder Richardson formula 20 ( $KR_{20}$ )
- Kuder-Richardson formula 21 ( $KR_{21}$ )
- ANOVA reliabilities

### Calculating the Alpha Coefficient

## Index of Reliability

## Standard Error of Measurement

## Factors Affecting Test Reliability

- ❑ Fatigue
- ❑ Practice
- ❑ Subject variability
- ❑ Time between testing
- ❑ Circumstances surrounding the testing periods
- ❑ Appropriate difficulty for testing subjects
- ❑ Precision of measurement
- ❑ Environmental conditions

## Validity Types

- ❑ Content-related validity
- ❑ Criterion-related validity
  - Statistical or correlational
    - Concurrent
    - Predictive
- ❑ Construct-related validity

## Standard Error of Estimate

## Standard Errors

## Methods of Obtaining a Criterion Measure

- ❑ Actual participation
  - Examples are golf and archery
- ❑ Perform the criterion
  - Known valid criterion (e.g., treadmill performance)
- ❑ Expert judges
  - Panel judges
- ❑ Tournament participation
  - Round robin
- ❑ Known valid test

## Concurrent Validity Coefficients for Golf Test

### Correlations Between IQs of Related or Unrelated Children as a Function of Genetic Similarity and Similarity of Environment

- ❑ Identical twins reared together .88
- ❑ Identical twins reared apart .75
- ❑ Fraternal twins same sex .53
- ❑ Fraternal twins opposite sex .53
- ❑ Siblings reared together .49
- ❑ Siblings reared apart .46
- ❑ Parent with child .52
- ❑ Foster parent with child .19
- ❑ Unrelated reared together .16

## Interpreting the $r$ You Obtain

### Validity and Reliability

### Concurrent Validity Examples

Interpret these correlations

	Actual golf score	Putting trial 1	Putting trial 2	Driving trial 1	Driving trial 2	Observer1	Observer 2
Actual golf score	1.00						
Putting T1	.78	1.00					
Putting T2	.74	.83	1.00				
Driving T1	.58	.21	.25	1.00			
Driving T2	.68	.25	.30	.70	1.00		
Observer 1	.48	.34	.40	.43	.38	1.00	
Observer 2	.39	.30	.41	.47	.35	.50	1.00

## SPSS Examples