Measurement, validity and reliability
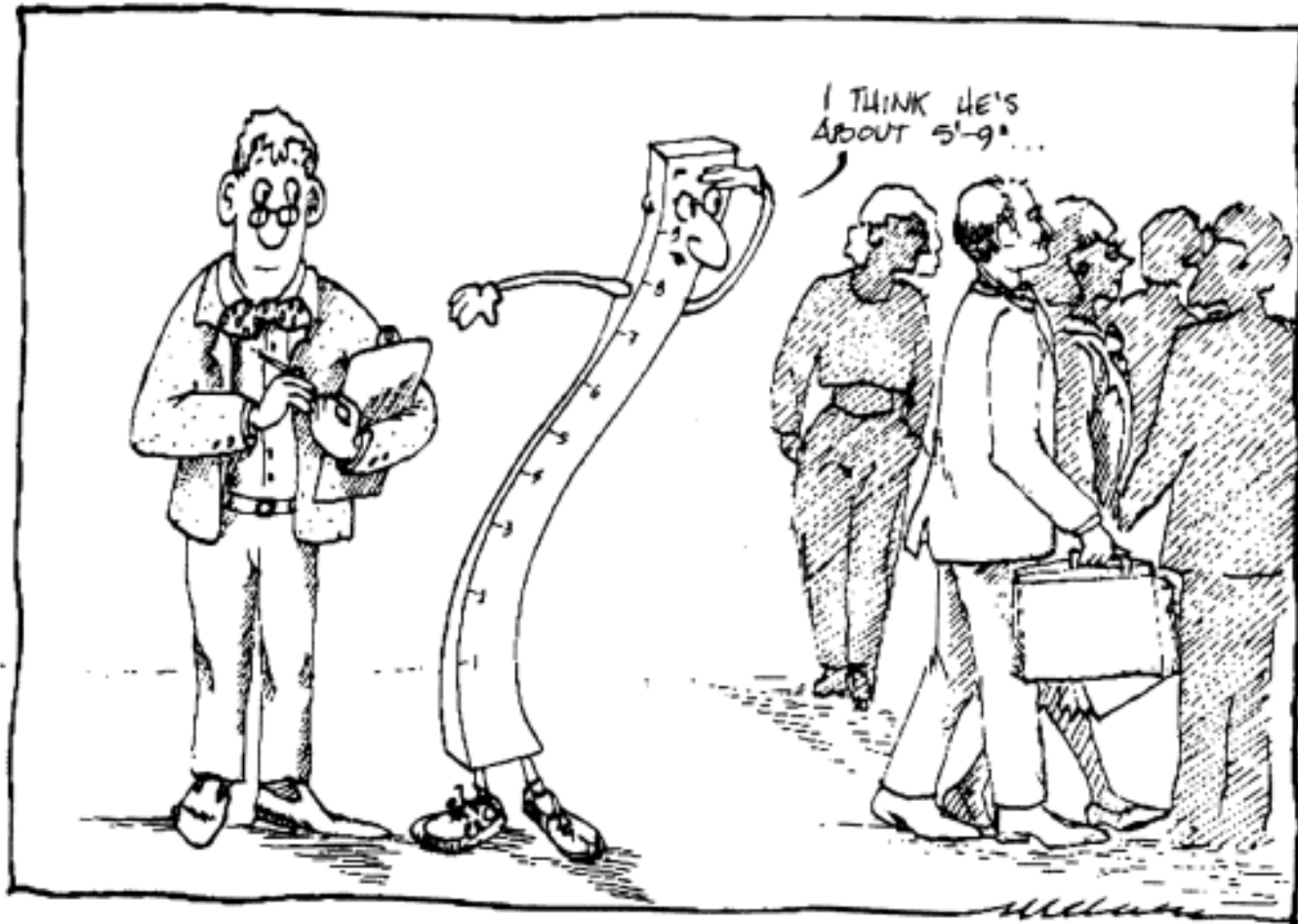
Some thoughts….

'*Concepts without percepts are empty...Percepts without concepts are blind*'.

Immanuel Kant

Aristarchos of Samos evolved around 280-265 BC the heliocentric theory of the universe. The reason that he did not cause a scientific revolution 1700 years before Copernicus is that he could not support his theory with sufficiently precise observations and measurement.

A. R. Burns. *The Penguin History of Greece*

Some more thoughts…

The social scientist finds himself in continuous effort to combine two ideals: vision and precision. Clearly, he needs precise instruments if he wants to develop testable propositions. But the social world is very complex and doesn't provide us with the well delineated objects from which the natural sciences start. Thus, he also needs a great deal of creative imagination - of vision - to decide on the objects about which such propositions should be developed

Paul Lazarsfeld (1965) foreword to *Constructive Typology and Social Theory*

Concepts/constructs

- Concepts are abstractions, they can, though needn't be, expressions of ideas that exist in everyday discourse, where usage may be relatively imprecise

- By their nature concepts are **unobservable**

- They are of use because

  – they help to organise experience
  – they help to communicate it to others
  – they help to explain experience

Examples of concepts

- Bureaucracy
- Organization
- Leadership
- Payment system
- Hierarchy
- Market
- Management

Operationalization

- Conceptualisation

  - process of identifying and clarifying concepts.

- Operationalization

  - specifying observable phenomena (**indicators**) that indicate

    - presence or absence
    - strength or weakness

  - specifying **instruments** to **measure** the indicators

Measurement

'...assignment of numbers to objects or events according to rules'
S. S. Stevens

Domain

Range
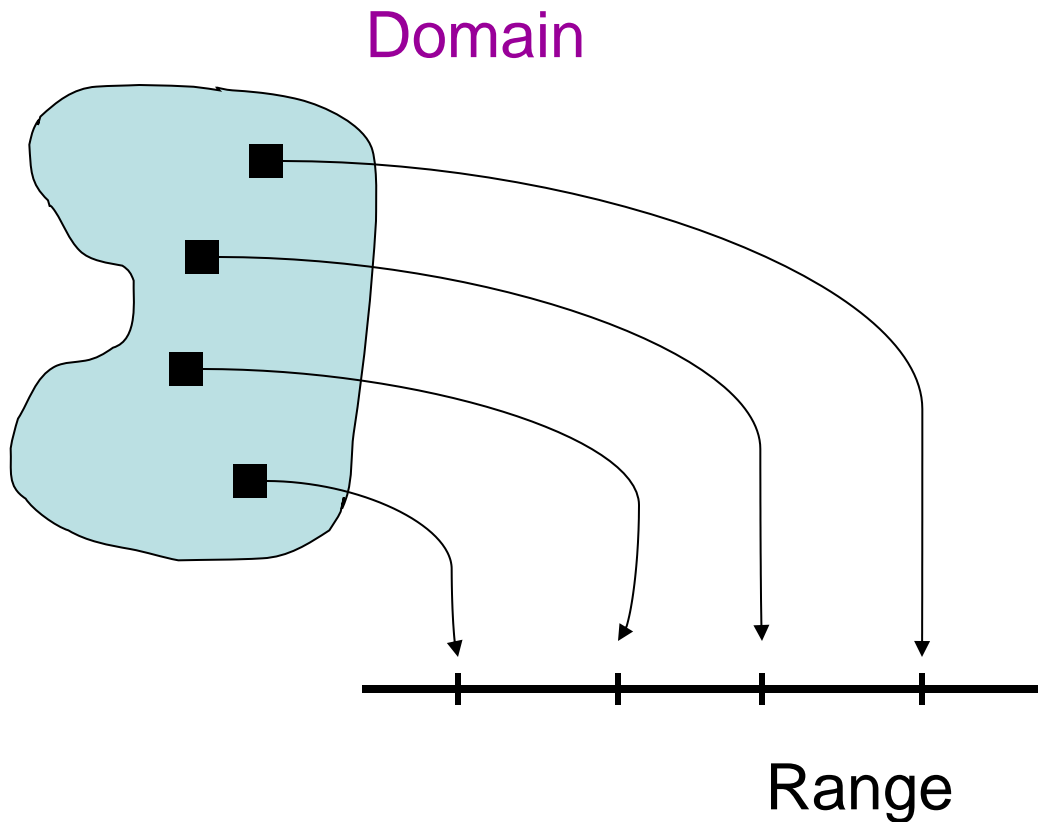
Classification

Concept

Corporate
Communication

Concept

Corporate Communication

Shareholders

Dimensions

Public relations

Employees

Regulators

Customers

Concept

Corporate Communication

Shareholders

Customers

Dimensions

Public relations
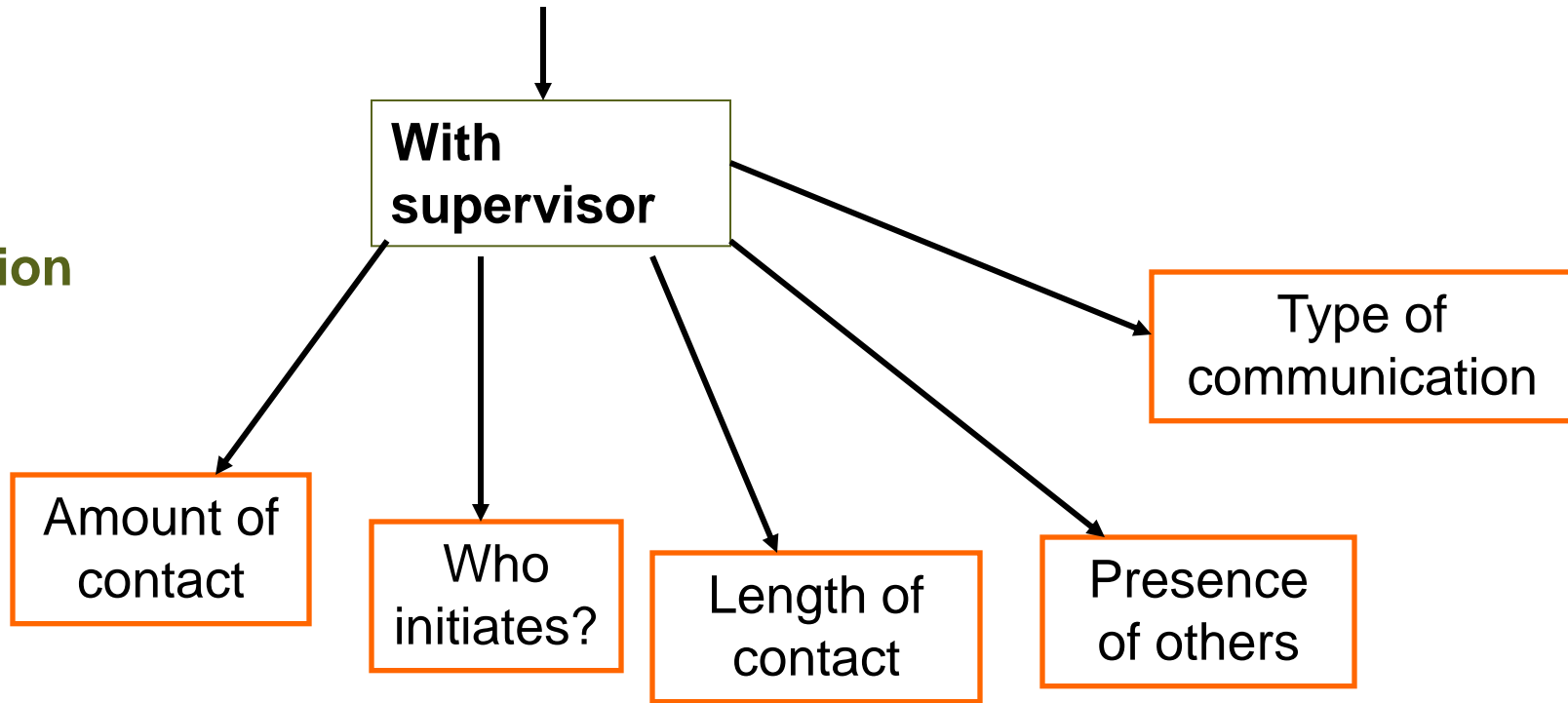
Employees

Regulators

Sub-dimensions

Written

Electronic

Face to face

Concept

Corporate Communication

Shareholders

Dimensions

Public relations

Employees

Regulators

Customers

Sub-dimensions

Written

Electronic

Face to face

Further sub-dimensions

With colleagues

With senior management

With supervisor

With line management
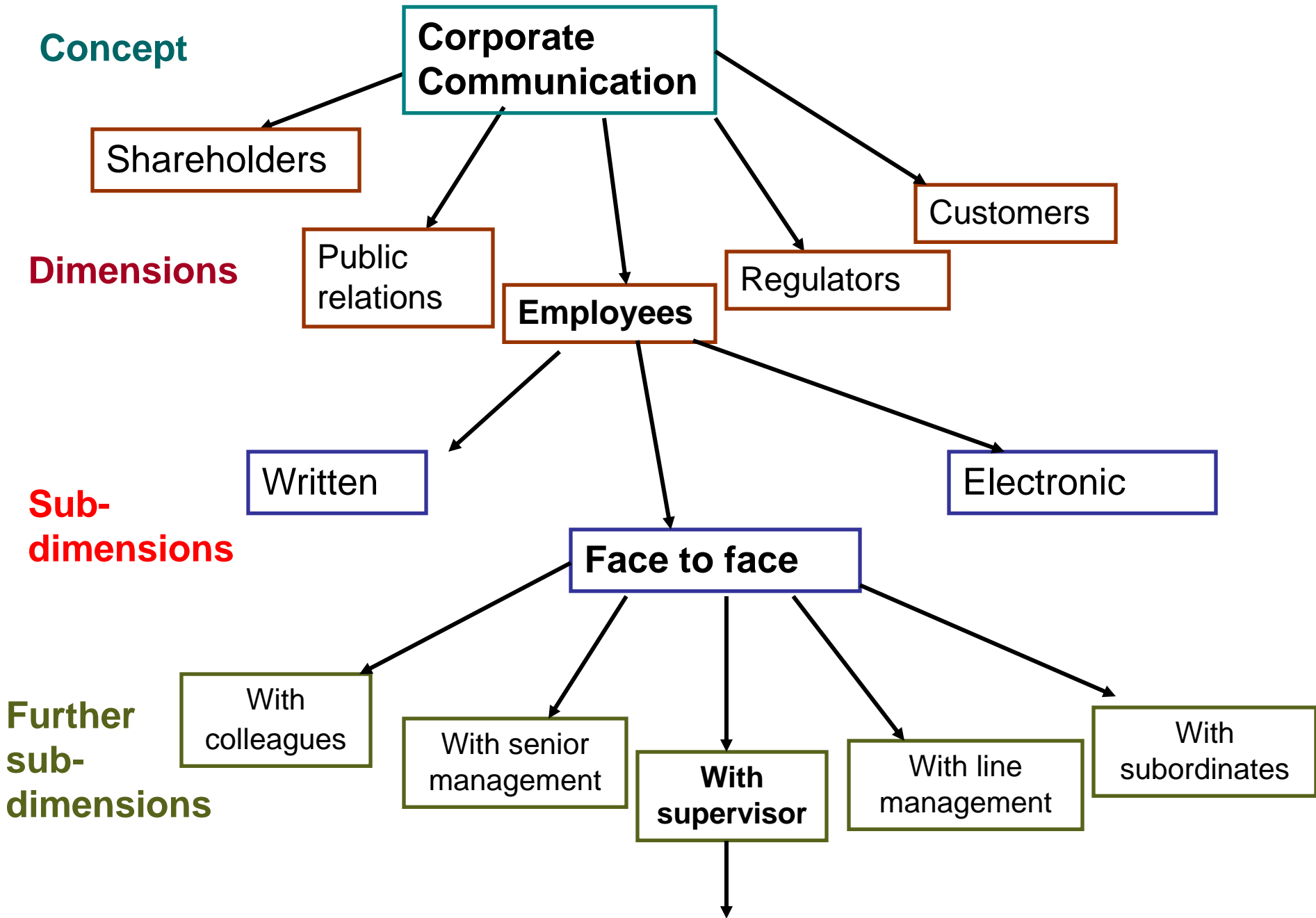
With subordinates

Further sub-dimension

With supervisor

Type of communication

Indicators

Amount of contact

Who initiates?

Length of contact

Presence of others

Survey questions

In the past 7 days how many times have you had a face-to face conversation with your supervisor?

❑ Never

❑ A few times a week

❑ About once a day

❑ Several times a day

❑ Don't have a supervisor

Validity and reliability

- Validity
  - Does the measure accurately reflect the concept it is meant to measure?

- Reliability
  - Does a particular measure, applied to the same object, yield the same result each time?

- Validity presumes reliability

How to evaluate reliability I

- Test-retest method
  - consistency of repeated measurements on same subjects (possibly by different observers)
  - problems
    - reality may change
    - subjects react to the testing process
    - memory

How to evaluate reliability II

- Inter-item reliability
  - Use in parallel more than one indicator of the same construct (Union Militancy)
    - I am opposed to strike action under any circumstances.
    - I could not vote for strike action regardless of the facts and circumstances of the case.
  - If certain assumptions are met…
    - reliability can be measured as the correlation between the responses to two items
    - if there are more items as a function of the average inter-item correlation

Threats to measurement validity

- Measure covers
  - only part of the concept,
  - more than the concept,
- Interviewees
  - misunderstand questions,
  - systematically exaggerate or understate,
  - selectively refuse to answer,
  - systematically make mistakes when answering questions,
  - want to finish interview and systematically agree

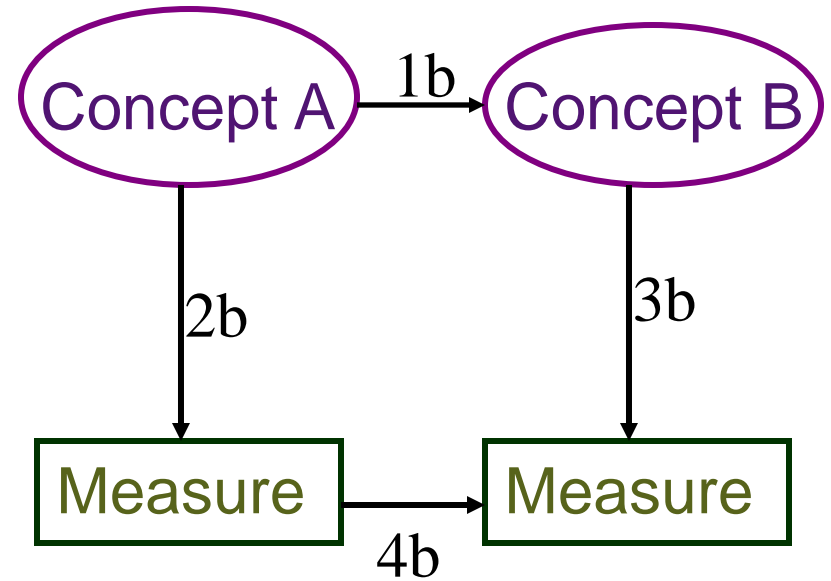# Types/tests of validity I

- **Subjective Validation**

  – Face validity, Content validity.

- **Criterion-related Validation**

  – The higher the correlation the more valid is the measure.

- **Construct validity**

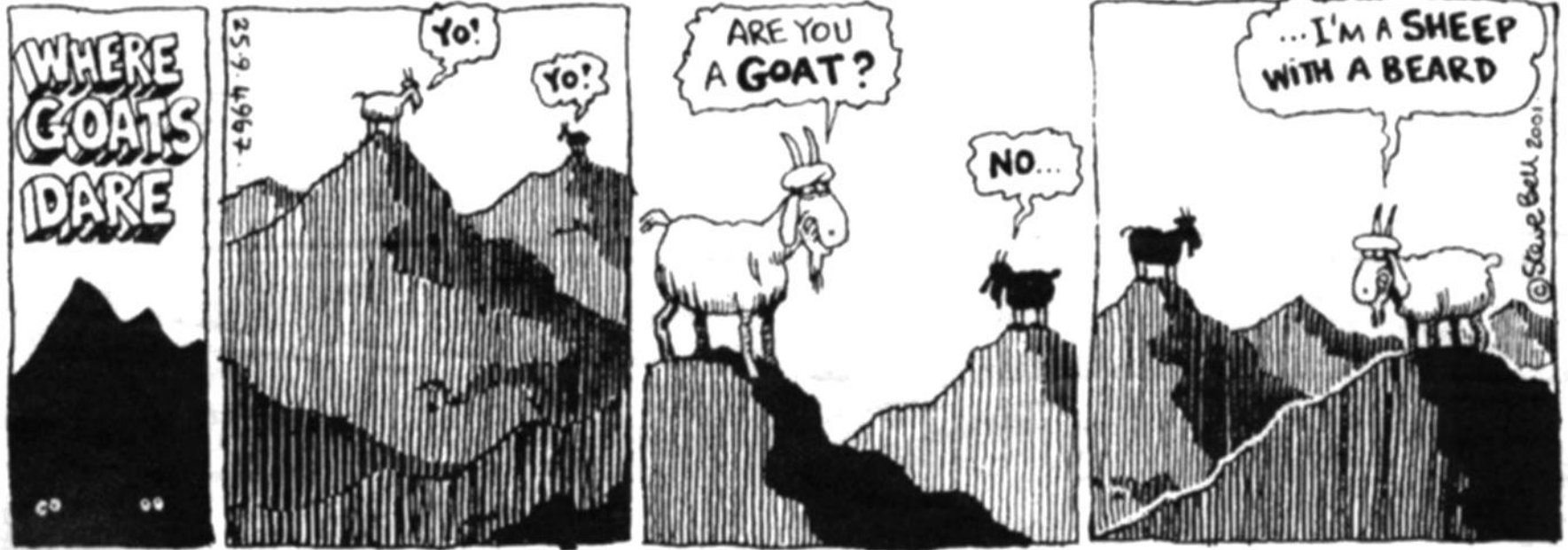# Types/Tests of Validity II
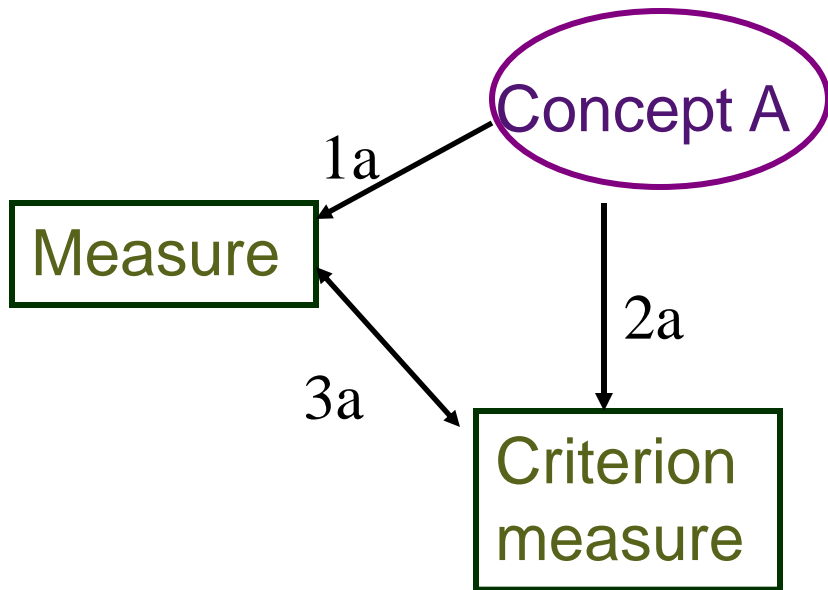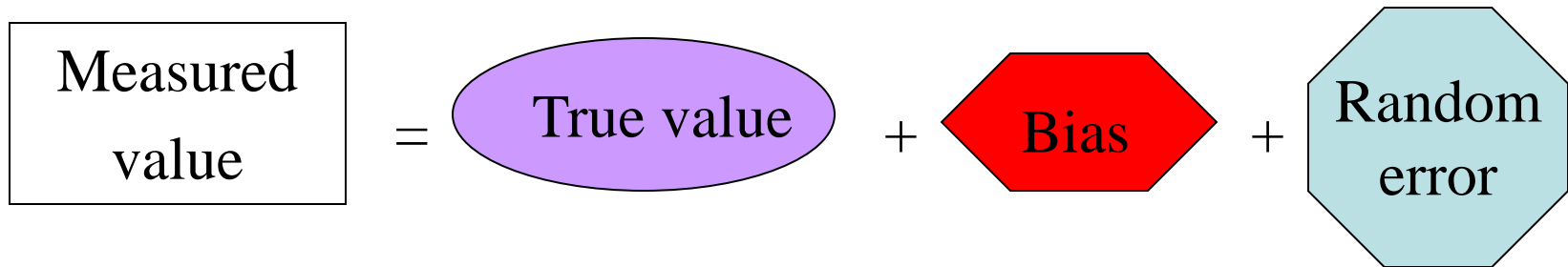
Criterion-related V.   Construct V.

Measurement error

Measurement error continued

Measured value	=	True value	+	Bias	+	Random error

Measured value   what you see or record

True value   true underlying state of affairs

Bias   things measured unintentionally
- response sets
- yea saying
- memory

Random error   response errors that are as likely to be big/small + as big/small -

To be continued…