Scales revisited
or
Scales from a property perspective
David A Gustafson

Monotonicity

- Adding to the entity always causes the measure to change in the same direction
- Ordinal, interval, ratio, absolute

Constant interval

- The interval between values is constant
  - Each similar addition should make the same change
- Interval, ratio, absolute

Averages

- Being able to legitimately take averages of values is characteristic of interval and above scales
- It is not a characteristic of nominal and ordinal scales
- GPA is not legitimate – why?
Stacks of blocks: $n$ vs $n!$

What is average size of stacks?

Well-defined zero

- All measures will have the same zero
- Ratio, absolute

Scale Types

- Which scale type is implied by the transformations, abstraction and mapping?

Scale Types - Ordinal

- Monotonicity
  - $m(T_{op}(d)) \geq m(d) + m(T_{op}(null))$
- Scale is ordinal

Scale Types - Ratio

- Strong Linear Distribution
  - $m(T_{op}(d)) = b(m(d) + m(T_{op}(null)))$ for a constant $b$
  - e.g. let $T_{op}$ be add a loc, $m$ be loc, and $b = 1$
- Scale is ratio
Scale Types - Interval

- Weak Linear Distribution
  - \( m(T_{op}(d)) = b(m(d) + m(T_{op}(null))) + c \) for constants \( b, c \)
  - e.g. let \( T_{op} \) be add a decision, \( m \) be McCabe’s, and \( b = 1, c = -1 \)
- Scale is interval

McCabe’s

- Halstead’s eta

WMC

NOC

CBO
LCOM

Henry-Kafura Info Flow