EPSY 5221 Principles of Educational & Psychological Measurement

*X* = *T* + *E*

*X* is the observed score

*T* is the true score, expected test score (fixed) – not a trait of the person (universe score)

 Mean of an infinite number of replicated tests taken by a person

*E* is the error score, random, unsystematic variation in observed scores

 Standard deviation of the errors is the standard error of measurement

No correlation between *T* and *E* or the errors of two different tests

Consider a single individual who has taken a test many many times: intra-individual variability.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Test Administration | *X* | $\left(X-\overbar{X}\right)$ *=*(*X – T*) *= E* | $\left(X-\overbar{X}\right)^{2}$ *= E*2 |
|  | 1 | 67 | 2 | 4 |
|  | 2 | 67 | 2 | 4 |
|  | 3 | 59 | -6 | 36 |
|  | 4 | 64 | -1 | 1 |
|  | 5 | 64 | -1 | 1 |
|  | 6 | 70 | 5 | 25 |
|  | 7 | 59 | -6 | 36 |
|  | 8 | 69 | 4 | 16 |
|  | 9 | 65 | 0 | 0 |
|  | 10 | 66 | 1 | 1 |
| SUM |  | 650 | 0 | 124 |
| MEAN |  | 65 | 0 | 12.4 |
| VARIANCE |  | 12.4 | 12.4 |  |

 and 

; Since  = 12.4,  = 3.5

, since , then  and 

For an individual, true-score does not vary (assuming no maturation).

Then, observed-score variance is error-score variance.

The ratio of true-score to observed-score variance:

 *rxx* =  or *rxx* = 