Escalas diagramáticas

Diseño y validación

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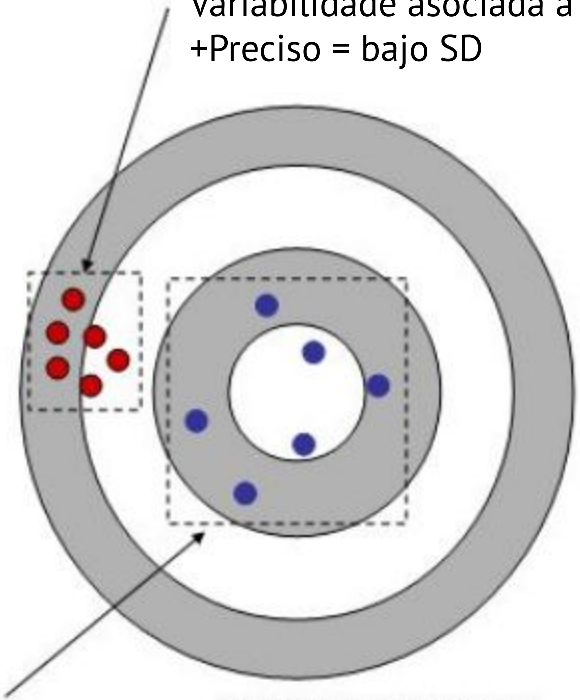
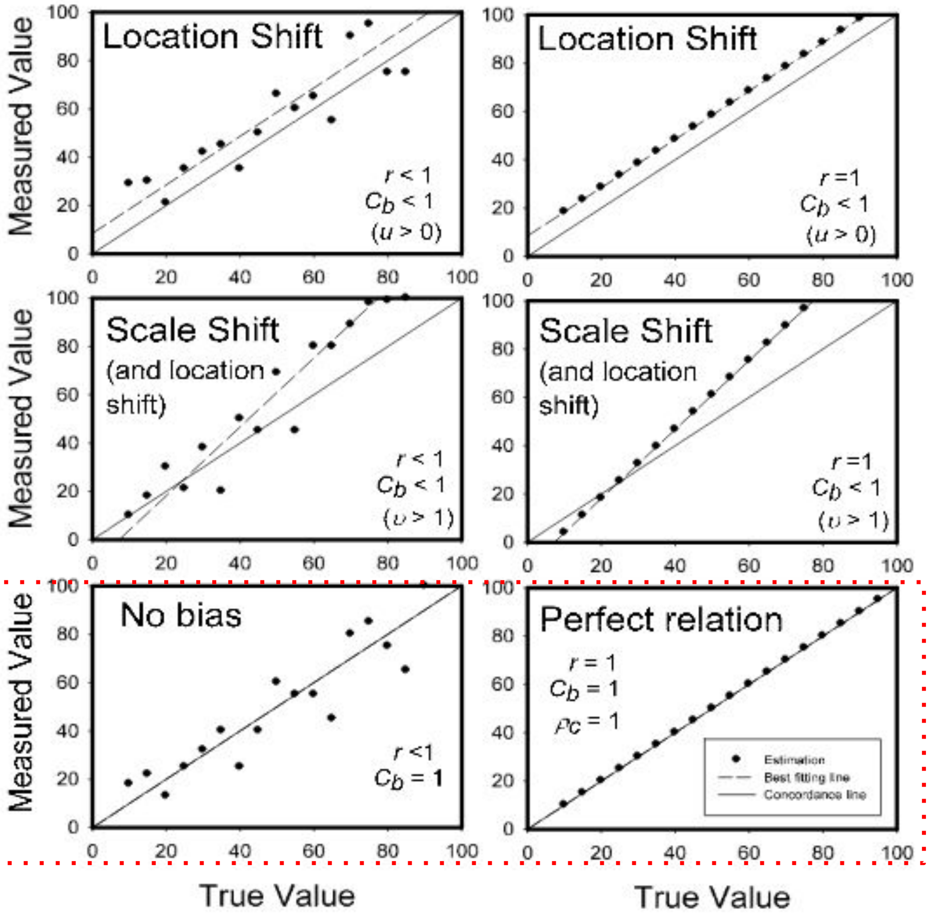
Precisión
Variabilidade asociada a una muestra estimada.
+Preciso = bajo SD



Exactitud (accuracy): grado de proximidad de los valores estimados vs reales ("standard gold"). Debe ser evaluada en una muestra (cuanto mayor, mejor)

- Precisión +



Diagonal 1:1
(línea de concordancia)

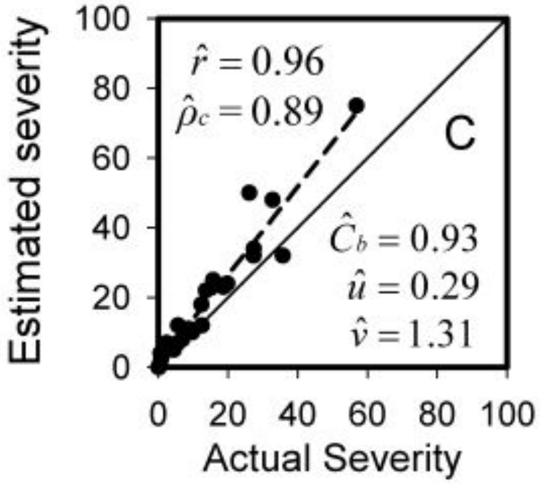
Exacto

Madden, 2007

Coeficiente de correlación de concordancia de Lin (1989, 2000) (Lin's CCC)

Estima la concordancia entre dos variables continuas

Puede variar entre -1 y 1 (concordancia total);
0 es ausencia de concordancia



$$\rho_c = r \cdot C_b$$

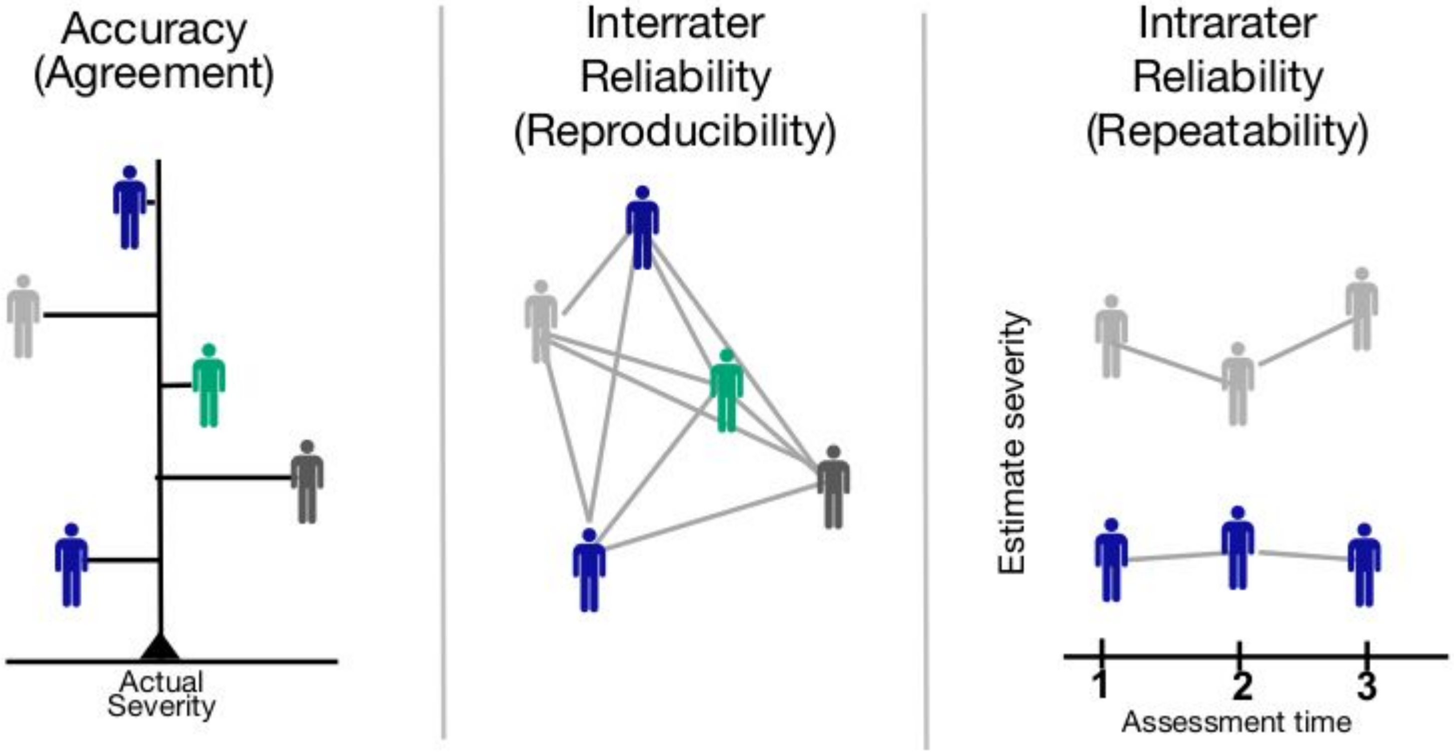
$$C_b = 2/(\upsilon + 1/\upsilon + u^2),$$

where $\upsilon = \sigma_U/\sigma_W$, and $u = (\mu_U - \mu_W)/\sqrt{\sigma_U \cdot \sigma_W}$

Grado de concordancia	Valor del coeficiente de Lin
Casi perfecta	> 0.99
Sustancial	0.95 – 0.99
Moderada	0.90 – 0.90
Pobre	< 0.90

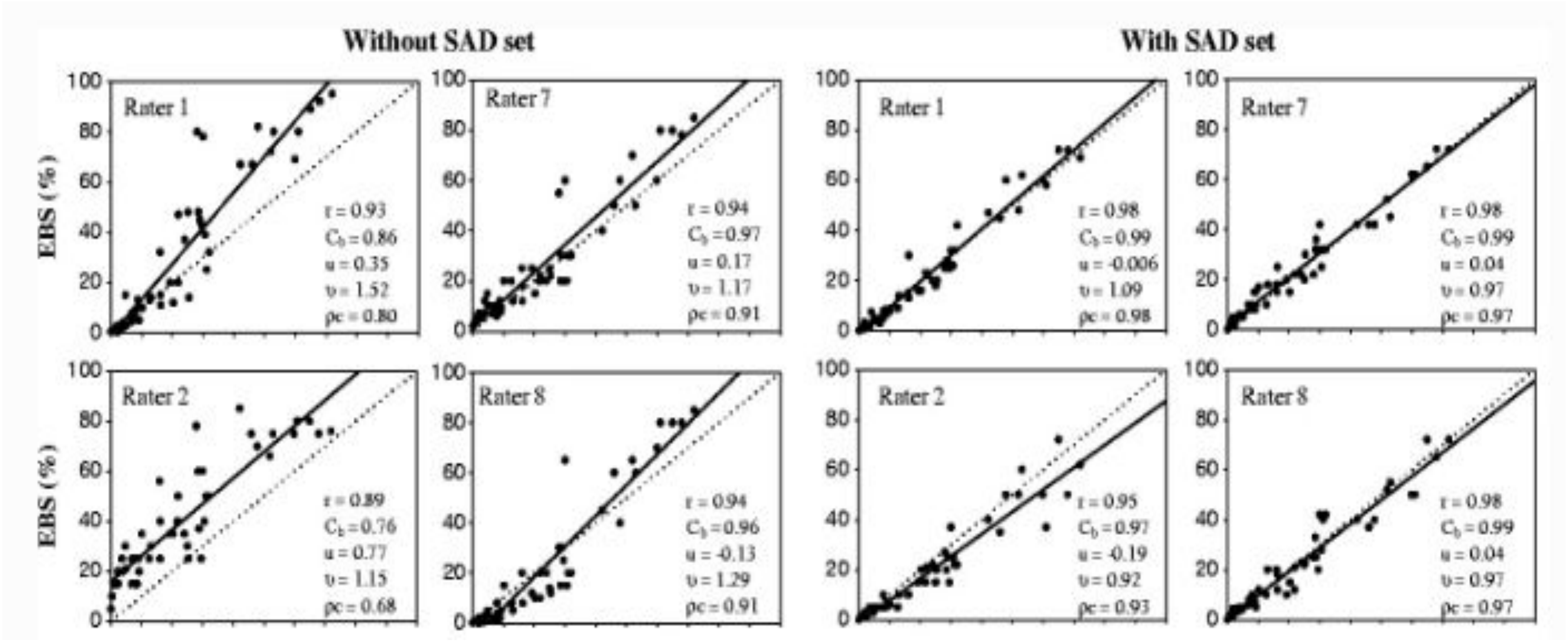
Coeficiente de concordancia para variables continuas

Calidad de las estimativas

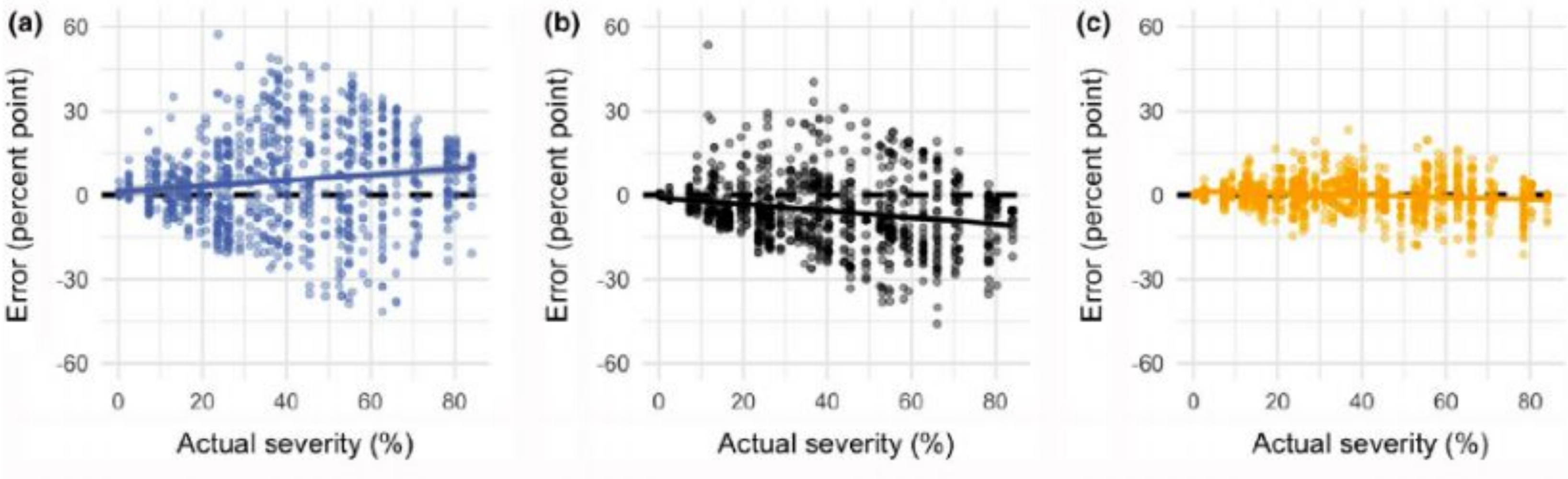


Presentación gráfica de resultados

[Ríos, 2013]



Presentación gráfica de resultados (cont.) [Franceschi, 2020]



Presentación tabular de resultados

Franceschi, 2020

Method	N	u^a	υ^b	$C_b{}^c$	r^d	$\rho_c{}^e$
New SAD	18	0.01 a	0.99 a	0.99 a	0.96 a	0.96 a
Old SAD	19	−0.26 b	0.98 a	0.92 b	0.77 b	0.83 b
Unaided New	18	0.19 c	1.23 b	0.92 b	0.77 b	0.82 b
Unaided Old	19	0.21 c	1.23 b	0.90 b	0.72 b	0.80 b

Note: Means followed by the same letter in the column are not significantly different (Tukey's HSD, 5% level).

[a]Location shift (u, 0 = no bias relative to the concordance line).

[b]Scale shift (υ, 1 = no bias relative to the concordance line).

[c]Bias correction factor (C_b) measures how far the best fitted line deviates from 45° and is a measure of accuracy.

[d]Correlation coefficient as a measure of precision (r).

[e]Lin's concordance correlation coefficient (LCC), that combines both measures of precision (r) and accuracy (C_b) to measure overall accuracy (agreement) with the true value.

Presentación tabular de resultados (cont.)

TABLE 3 Measures of inter-rater reliability of severity estimates by 37 inexperienced raters during two assessments unaided, or with the use of a new standard area diagram set (New SAD) or an Old SAD (Godoy *et al*., 2006) as an aid to assessment of disease severity

Method	Intra-class correlation coefficient (ICC) ρ [95% CI][a]	Overall concordance correlation (OCC)[b]
New SAD	0.94 [0.92–0.96]	0.940
Unaided New	0.83 [0.77–0.88]	0.759
Old SAD	0.81 [0.74–0.87]	0.736
Unaided Old	0.83 [0.77–0.89]	0.746

[a]Calculated with decisions of ICC model described elsewhere (Schwanck and Del Ponte, 2014).

[b]Overall agreement statistics based on Lin (1989) and Barnhart *et al.* (2002) to evaluate agreement among multiple observers.

Franceschi, 2020

Por que não usar a regressão?

The disadvantage of using regression analysis in some situations to quantify accuracy or agreement was previously addressed (Lin, 1989; Madden *et al.*, 2007). The claim was that regression analysis did not detect departure from intercept 0 and slope 1 if data are very scattered (the less precise the data, the less likely the hypothesis will be rejected), and conversely a highly reproducible system could be rejected due to very small error. This observation prompted Lin (1989) to develop a new concordance correlation coefficient. The coefficient has been

Bock et al. (2010)

The concordance coefficient of correlation has not yet been used much in plant pathology. It is much more common to use regression analysis of U on W (see Chapter 3). In particular, one could write:

$$U = \beta_0 + \beta_1 W$$

where β_1 is the slope and β_0 is the intercept (value of U when $W = 0$). As mentioned above, a perfect agreement is represented by a best fitting line with slope of 1 and an intercept of 0. Regression analysis is a very useful method to describe and characterize relationships, and we use variations of regression methods throughout the book. However, regression analysis is *not* a good approach for testing for agreement (Lin, 1989; Shoukri and Pause, 1999). In particular, testing for the equivalence of the slope and intercepts to certain constants can lead to misleading results in agreement studies. When there is high variability (low precision), one can too easily accept that the slope and intercept are equal to the hypothetical values, leading to the false impression of agreement. Conversely, with very low variability (high precision), it is too easy to conclude that the slope and intercept are not equal to the hypothetical values, even when the best fitting line is very close to the concordance line. This would lead to the false impression of poor agreement. Thus, it is much better to use the concordance correlation coefficient [or MSD or related statistic (Lin et al., 2002)], and not regression analysis, to test for agreement.

Madden et al. (2007)