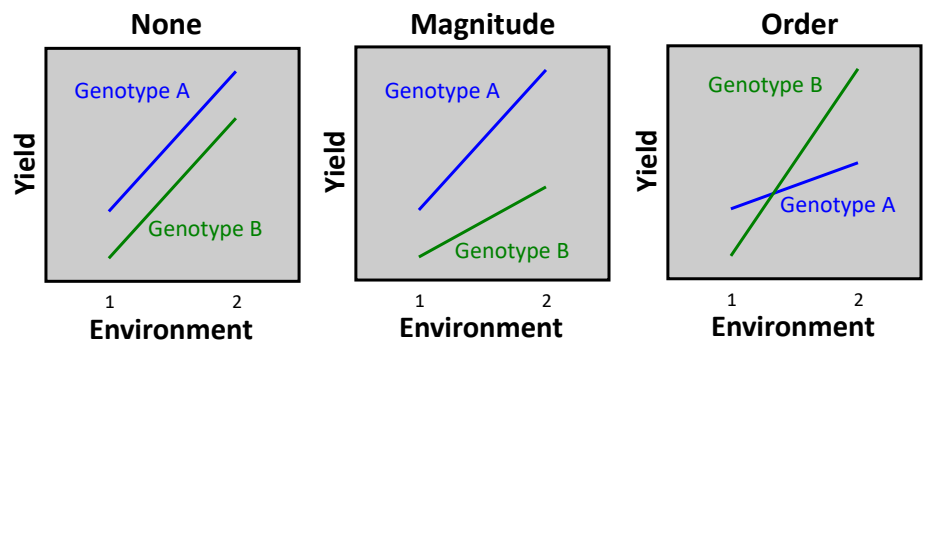


Genotype by Environment Interactions Common Approaches to Stability Analysis

1. Genotype considered stable if its variance over environments is small.
2. Genotype considered stable if its mean response to environments is parallel to the mean of all genotypes.
3. Genotype considered stable if the residual MS from regression on the environmental index is small.

Genotype x Environment Interpretation



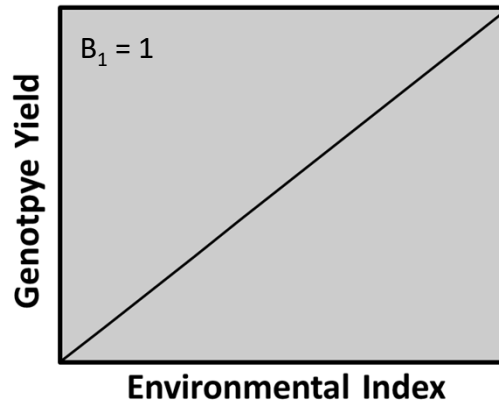
Genotype x Environment Spearman Rank Correlation

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n^3 - n}$$

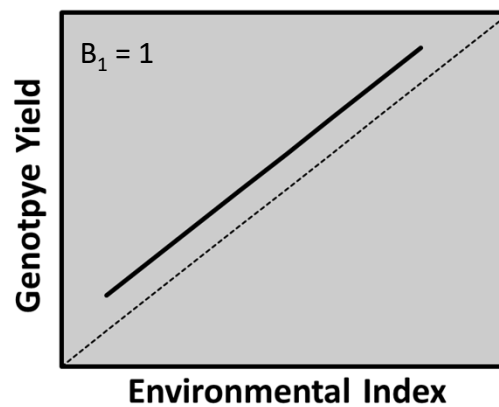
Example - Oat Variety Trial

Spearman Correlation Coefficients, N = 10 Prob > r under H0: Rho=0						
	Env1	Env2	Env3	Env4	Env5	Env6
Ames 1985	1.000	0.609 0.061	0.109 0.763	0.554 0.095	0.468 0.172	0.644 0.044
Kanahwa 1985	0.609 0.061	1.000	0.164 0.650	0.292 0.411	0.449 0.192	0.620 0.055
Washington 1985	0.109 0.763	0.164 0.650	1.000	0.370 0.291	0.660 0.037	0.200 0.579
Ames 1986	0.554 0.095	0.292 0.411	0.370 0.291	1.000	0.492 0.148	0.644 0.044
Kanahwa 1986	0.468 0.172	0.449 0.192	0.660 0.037	0.492 0.148	1.000	0.515 0.127
Washington 1986	0.644 0.044	0.620 0.055	0.200 0.579	0.644 0.044	0.515 0.127	1.000

Genotype x Environment Stability Analysis

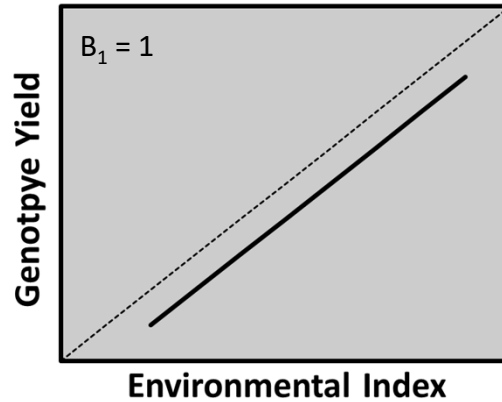


Genotype x Environment Stability Analysis



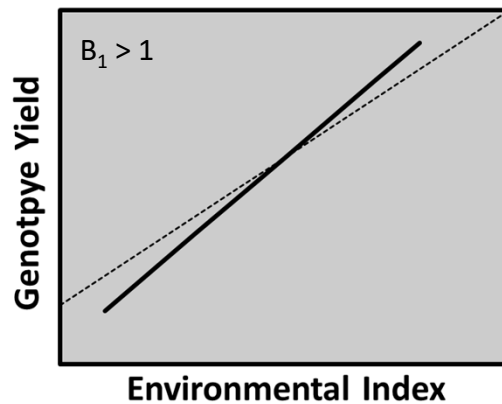
Stable with greater than average yield.

Genotype x Environment Stability Analysis



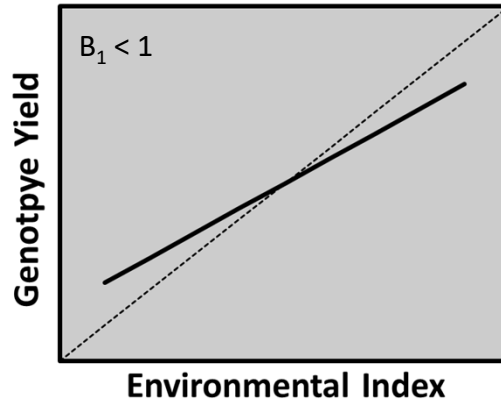
Stable with less than average yield.

Genotype x Environment Stability Analysis



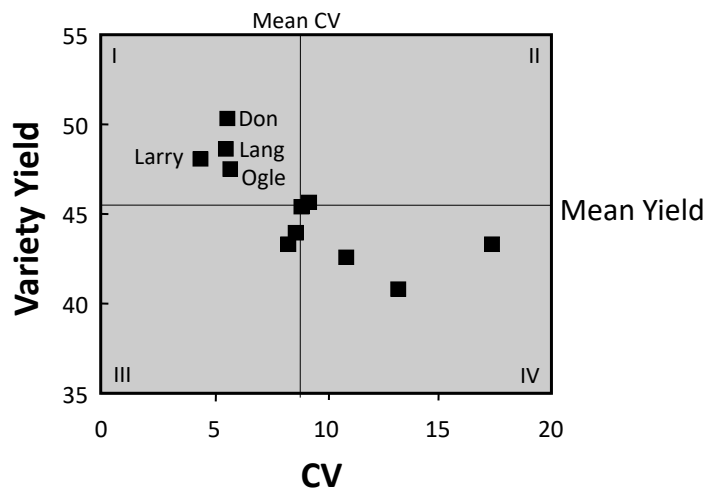
Specifically adapted to good environments.

Genotype x Environment Stability Analysis



Specifically adapted to poor environments.

Genotype x Environment Oat Variety Trial - Stability Analysis



Combined Experiments Meta Analysis

Model:

$$Y_{ij} = B_0 + B_1X_{ij} + s_i + b_iX_{ij} + e_{ij}$$

Where:

Y_{ij} = predicted value for j^{th} level of X in study i

B_0 = intercept for all studies

B_1 = overall slope for Y regressed on X

X_{ij} = j^{th} level of X in study i

s_i = random effect of study i

b_i = random effect of study i on the regression of Y on X in study i

e_{ij} = residual error

Combined Experiments Meta Analysis

Proc Mixed Code:

```
PROC MIXED;  
CLASS Study;  
MODEL Y = X / SOLUTION;  
RANDOM intercept X / TYPE=UN  
SUBJECT=Study SOLUTION;  
RUN;
```

St-Pierre, 2001.