

The Mathematical Symbols used in Statistics

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[updated: Saturday, April 19, 2008]

“All wisdom is rooted in learning to call things by the right name.”

---Confucious (c. 500 B.C.)

Purpose:

The purpose of this document is clearly identify the many mathematical symbols used in typical statistics problems. Mathematics is the language of science. Statistics is the language of research. Students need to master these symbols because these symbols are the standard nomenclature in statistical reasoning.

In general, Greek letters are used for measures of the population (called “parameters”) and Latin letters are used for measures of one or more samples (called “statistics”). The pronunciation and vernacular for each symbol is included as well.

Concept	Symbol	
	Population	Sample
Number of Observations (size)	N (big “en”)	n (little “en”)
Mean	μ (“mu”)	\bar{x} (“x-bar”)
Variance	σ^2 (lower case “sigma” squared)	s^2 (“ess-squared”)
Standard Deviation	σ (lower case “sigma”)	s (“ess”)
Proportion	π (lower case “pi”)	p (little “pea”)
Correlation Coefficient	ρ (lower case “rho”)	r (little “are”)

Other Greek and Latin letters are used to symbolize various numerical quantities and mathematical transformations.

Concept	Symbol
Summation	Σ (upper case “sigma”)
Sum Product	Π (upper case “pi”)
Type I Error	α (lower case “alpha”)
Type II Error	β (lower case “beta”)
Regression – y-intercept (constant)	b_0
Regression – slope	b_1
Regression – actual y value	y (“why”)
Regression – predicated y value	\hat{y} (“why hat”)
Square of the correlation	r^2 (little “are squared”)
(multiple) Coefficient of Determination	R^2 (big “are squared”)