The following table shows general guidelines for choosing a statistical analysis. We emphasize that these are general guidelines and should not be construed as hard and fast rules. Usually your data could be analyzed in multiple ways, each of which could yield legitimate answers. The table below covers a number of common analyses and helps you choose among them based on the number of dependent variables (sometimes referred to as outcome variables), the nature of your independent variables (sometimes referred to as predictors). You also want to consider the nature of your dependent variable, namely whether it is an interval variable, ordinal or categorical variable, and whether it is normally distributed (see What is the difference between categorical, ordinal and interval variables? (https://stats.idre.ucla.edu/other/mult-pkg/whatstat/what-is-the-difference-between-categorical-ordinal-and-interval-variables/) for more information on this). The table then shows one or more statistical tests commonly used given these types of variables (but not necessarily the only type of test that could be used) and links showing how to do such tests using SAS, Stata and SPSS.

Number of Dependent Variables	Nature of Independent Variables	Nature of Dependent Variable(s)*	Test(s)	How to SAS	How to Stata	How to SPSS	How to R

1	0 IVs (1 population)			SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

interval & normal	one-sample t-test	should-i-usestatistical-analyses-using-sas/#1sampt)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#1sampt)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#1sampt)	should-i-usestatistical-analyses-using-r/#1sampt)
ordinal or interval	one-sample median	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#1sampm)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#1sampm)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#1sampm)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#1sampm)
categorical (2 categories)	binomial test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#bitest)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#bitest)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#bitest)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#bitest)
categorical	Chi-square goodness-of-fit	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#chifit)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#chifit)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#chifit)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#chifit)

1 IV with 2 levels (independent groups)		2	SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

interval & normal	independent sample t-test	should-i-usestatistical-analyses-using-sas/#2ittest)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#2ittest)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#2ittest)	should-i-usestatistical-analyses-using-r/#2ittest)
ordinal or interval	Wilcoxon-Mann Whitney test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#wilc)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#wilc)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#wilc)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#wilc)
categorical	Chi-square test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#chisq)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#chisq)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#chisq)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#chisq)
	Fisher's exact test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#exact)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#exact)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#exact)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#exact)
1 IV with 2 or more levels (independent groups)		SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

	interval & normal	one-way ANOVA	should-i-usestatistical-analyses-using-sas/#1anova)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#1anova)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#1anova)	should-i-usestatistical-analyses-using-r/#1anova)
	ordinal or interval	Kruskal Wallis	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#kw)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#kw)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#kw)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#kw)
	categorical	Chi-square test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#chisq)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#chisq)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#chisq)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#chisq)
1 IV with 2 levels (dependent/matched groups)	interval & normal	paired t-test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#pairt)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#pairt)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#pairt)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#pairt)
	ordinal or interval	Wilcoxon signed ranks test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#wilcsign)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#wilcsign)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#wilcsign)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#wilcsign)
	categorical	McNemar	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#Mcnemar)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#Mcnemar)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#Mcnemar)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#Mcnemar)
1 IV with 2 or more levels (dependent/matched		one-way	SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

groups)	interval & normal	repeated measures ANOVA	should-i-usestatistical-analyses-using-sas/#1repanova)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#1repanova)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#1repanova)	should-i-usestatistical-analyses-using-r/#1repanovA)
	ordinal or interval	Friedman test	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#fried)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#fried)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#fried)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#fried)
	categorical (2 categories)	repeated measures logistic regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#1replog)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#1replog)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#1replog)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#1replog)
2 or more IVs (independent groups)	interval & normal	factorial ANOVA	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#factanov)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#factanov)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#factanov)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#factanov)
	ordinal or interval	ordered logistic regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#orderedlogistic)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#orderedlogistic)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#orderedlogistic)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#orderedlOgistic)
	categorical (2 categories)	factorial logistic regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#faclogistic)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#faclogistic)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#faclogistic)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#faclogisTic)
1 interval IV			SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

interval & normal	correlation	should-i-usestatistical-analyses-using-sas/#corr)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#corr)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#corr)	should-i-usestatistical-analyses-using-r/#corr)
interval & normal	simple linear regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#simpreg)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#simpreg)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#simpreg)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#simpreg)
ordinal or interval	non-parametric correlation	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#nonparr)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#nonparr)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#nonparr)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#nonparr)
categorical	simple logistic regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#simplog)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#simplog)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#simplog)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#simplog)
1 or more interval IVs and/or 1 or more categorical IVs	**interval & normal**		SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

		multiple regression	should-i-usestatistical-analyses-using-sas/#multreg)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#multreg)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#multreg)	should-i-usestatistical-analyses-using-r/#multreg)
		analysis of covariance	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#ancova)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#ancova)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#ancova)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#ancova)
	categorical	multiple logistic regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#logistic)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#logistic)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#logistic)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#logistic)
		discriminant analysis	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#discrim)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#discrim)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#discrim)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#discrim)
2+	**1 IV with 2 or more levels (independent groups)**			SAS (/sas/whatstat/what-statistical-analysis-	Stata (/stata/whatstat/what-	SPSS (/spss/whatstat/what-	R (/r/whatstat/what-statistical-analysis-

		interval & normal	one-way MANOVA	should-i-usestatistical-analyses-using-sas/#manova)	statistical-analysis-should-i-usestatistical-analyses-using-stata/#manova)	statistical-analysis-should-i-usestatistical-analyses-using-spss/#manova)	should-i-usestatistical-analyses-using-r/#manova)
	2+	interval & normal	multivariate multiple linear regression	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#mmreg)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#mmreg)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#mmreg)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#mmreg)
	0	interval & normal	factor analysis	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#factor)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#factor)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#factor)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#factor)
2 sets of 2+	**0**	interval & normal	canonical correlation	SAS (/sas/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-sas/#cancor)	Stata (/stata/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-stata/#cancor)	SPSS (/spss/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-spss/#cancor)	R (/r/whatstat/what-statistical-analysis-should-i-usestatistical-analyses-using-r/#cancor)

*Technically, assumptions of normality concern the errors rather than the dependent variable itself. Statistical errors are the deviations of the observed values of the dependent variable from their true or expected values. These errors are unobservable, since we usually do not know the true values, but we can estimate them with residuals, the deviation of the observed values from the model-predicted values. Additionally, many of these models produce estimates that are robust to violation of the assumption of normality, particularly in large samples.

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