Vocabulary

Term	Definition
Alpha level	The threshold P-value that determines when we reject a null hypothesis. If we observe a statistic whose P-value based on the null hypothesis is less than α, we reject that null hypothesis.
Alternative hypothesis	The alternative hypothesis proposes what we should conclude if we find the mull hypothesis to be unlikely.
Assumptions	Every model depends on assumptions. Although we may be able to think about whether an assumption is plausible, it remains something that we *assume* and cannot *verify*.
Conditions	Although we cannot verify assumptions, often there are conditions about the data that we can check to see whether an assumption is at least reasonable.
Confidence interval	A level C confidence interval for a model parameter is an interval of values usually of the form *estimate* $\pm$ *margin of error* found from data in such a way that C% of all random samples will yield intervals that capture the true parameter value.
Critical value	The number of standard errors to move away from the mean of the sampling distribution to correspond to the specified level of confidence. The critical value, denoted z^*, is usually found from a table or with technology.
Critical value	The value in the sampling distribution model of the statistic whose P-value is equal to the alpha level. Any statistic value farther from the null hypothesis value than the critical value will have a smaller P-value than α and will lead to rejecting the null hypothesis. The critical value is often denoted with an asterisk, as z^*, for example.
Effect size	The difference between the null hypothesis value and true value of a model parameter is called the effect size.
Margin of error	In a confidence interval, the extent of the interval on either side of the observed statistic value is called the margin of error. A margin of error is typically the product of a critical value from the sampling distribution and a standard error from the data. A small margin of error corresponds to a confidence interval that pins down the parameter precisely. A large margin of error corresponds to a confidence interval that gives relatively little information about the estimated parameter.
Null hypothesis	The claim being assessed in a hypothesis test is called the null hypothesis. Usually, the null hypothesis is a statement of "no change from the traditional value," "no effect," "no difference," or "no relationship." For a claim to be a testable hull hypothesis, it must specify a value for some population parameter that can form the basis for assuming a sampling distribution for a test statistic.
One-proportion *z*-test	A test of the null hypothesis that the proportion of a single sample equals a specified value (H_0: $p = p_0$) by referring the statistic z = (*p hat* - p_0) divided by *SD*(*p hat*) to a Standard Normal model.

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One-proportion *z*-interval	A confidence interval for the true value of a proportion. The confidence interval is *p hat* $\pm$ *z*SE*(*p hat*) where *z** is the critical value from the Standard Normal model corresponding to the specified confidence level.
One-sided alternative	An alternative hypothesis is one-sided (e.g., H_A: $p > p_0$ or H_A: $p < p_0$) when we are interested in deviations in *only one* direction away from the hypothesized parameter value.
Pooling	When we have data from different sources that we believe are homogeneous, we can get a better estimate of the common proportion and its standard deviation. We can combine, or pool, the data into a single group for the purpose of estimating the common proportion. The resulting pooled standard error is based on more data and is thus more reliable (if the null hypothesis is true and the groups are truly homogeneous).
Power	The probability that a hypothesis test will correctly reject a false null hypothesis is the power of the test. To find power, we must specify a particular alternative parameter value as the "true" value. For any specific value in the alternative, the power is 1 - β.
P-value	The probability of observing a value for a test statistic is at least as far from the hypothesized value as the statistic value actually observed if the null hypothesis is true. A small *P*-value indicates either that the observation is improbable of that the probability calculation was based on incorrect assumptions. The assumed truth of the null hypothesis is the assumption under suspicion.
Sampling distribution of the difference between two proportions	The sampling distribution of $p\ hat_1 - p\ hat_2$ is, under appropriate assumptions, modeled by a Normal model with mean $\mu = p\ hat_1 - p\ hat_2$ and standard deviation $SD(p\ hat_1 - p\ hat_2)$ = the square root of $(p_1q_1/n_1 + p_2q_2/n_2)$
Significance level	The alpha level is also called the significance level, most often in a phrase such as a conclusion that a particular test is "significant at the 5% significance level."
Statistically significant	When the P-value falls below the alpha-level, we say that the test is "statistically significant" at that alpha level.
Two-proportion *z*-interval	A two-proportion *z*-interval gives a confidence interval for the true difference in proportions, $p_1 - p_2$, in two independent groups. The confidence interval is $(p\ hat_1 - p\ hat_2) \pm z^* \times SE(p\ hat_1 - p\ hat_2)$, where *z** is the critical value from the standard Normal model corresponding to the specified confidence level.
Two-proportion *z*-test	Test the mull hypothesis H_0: $p_1 - p_2 = 0$ by referring the statistic $z = (p\ hat_1 - p\ hat_2)/SE$ of the pooled data $(p\ hat_1 - p\ hat_2)$ to a standard Normal model.
Two-sided alternative	An alternative hypothesis is two-sided (H_A: $p \neq p_0$) when we are interested in deviations in *either* direction away from the hypothesized parameter value.

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Type I error	The error of rejecting a null hypothesis when in fact it is true (also called a "false positive"). The probability of a Type I error is α.
Type II error	The error of failing to reject a null hypothesis when in fact it is false (also called a "false negative"). The probability of a Type II error is commonly denoted β and depends on the effect size.
Variances of independent random variables add	The variance of a sum or difference of independent random variables is the sum of the variances of those variables.