An Overview of Hypothesis Testing
testing a Population mean, μ

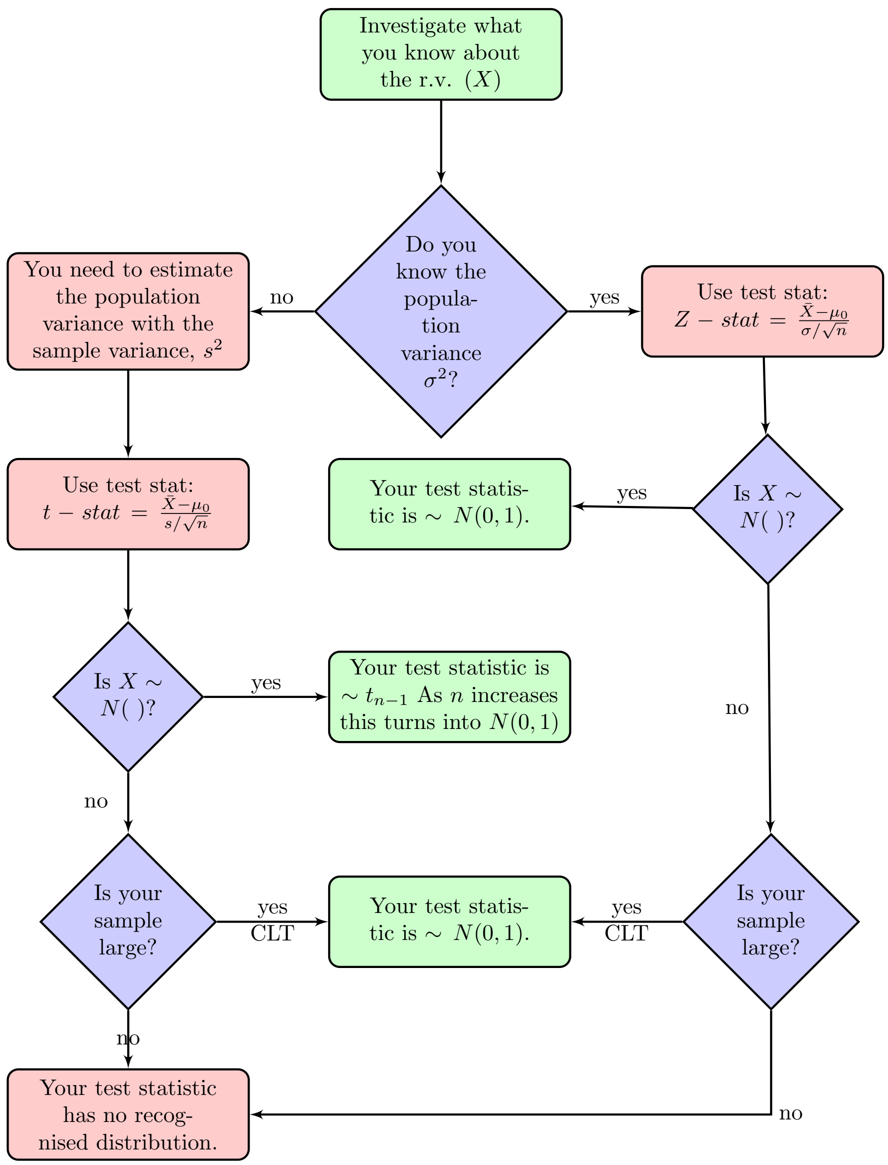
Ralf Becker

The is to guide you through the choice of a test statistic and a distribution when testing a population mean, μ.

Random variable: X

The mean ($E(X) = \mu$) is unknown

$H_0 : \mu = \mu_0$



Ralf Becker. The University of Manchester.

Here is an alternative way to summarise the results for testing a population mean, μ.

Random variable: X

The mean ($E(X) = \mu$) is unknown

$H_0 : \mu = \mu_0$

$X \sim$	$Var(X)$	n	test statistic	test distribution
$N(\ )$	σ^2 known	large	$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}}$	$N(0,1)$
$N(\ )$	σ^2 known	small	$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}}$	$N(0,1)$
not $N(\ )$	σ^2 known	large	$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}}$	$N(0,1)$ CLT
not $N(\ )$	σ^2 known	small	$Z = \frac{\bar{X}-\mu_0}{\sigma/\sqrt{n}}$	?
$N(\ )$	s^2 est.	large	$t = \frac{\bar{X}-\mu_0}{s/\sqrt{n}}$	$t_{n-1} \to N(0,1)$
$N(\ )$	s^2 est.	small	$t = \frac{\bar{X}-\mu_0}{s/\sqrt{n}}$	t_{n-1}
not $N(\ )$	s^2 est.	large	$t = \frac{\bar{X}-\mu_0}{s/\sqrt{n}}$	$N(0,1)$ CLT
not $N(\ )$	s^2 est.	small	$t = \frac{\bar{X}-\mu_0}{s/\sqrt{n}}$	?

Ralf Becker. The University of Manchester.