

**t test for r**

Psychology 3000  
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**t-test for testing the significance of r**

So far we've only considered r to be a...

Fourth **t**-test: Test whether an observed value of r is significantly different from 0.

That is, evaluate the PCH of...

**EXAMPLE:**

Suppose a scientist thinks that cigarette smoking is directly related to health problems. The implied "Skeptical Scientific" hypothesis is that cigarette smoking has nothing to do with health problems, that is, there is no relationship between cigarette smoking and health problems.

She obtains a sample of people and gets data on how many cigarettes they smoke per day (from 0 to 40 cigarettes per day) and on how many health problems they have per year (from 0 to 20 health problems per year). His data look like this:

| <u>S#</u> | <u>CIGARETTES</u> | <u>HEALTH PROBS</u> |
|-----------|-------------------|---------------------|
| 1         | 25                | 6                   |
| 2         | 0                 | 3                   |
| 3         | 20                | 10                  |
| .         | .                 | .                   |
| .         | .                 | .                   |
| .         | .                 | .                   |
| 50        | 17                | 7                   |

She runs a correlation between # of cigarettes and # of health problems and finds that  $r = +.766$ . This correlation is based on observations on 50 people.

DATA PATTERN: Does it fit with the scientific hyp?

The Skeptical Scientific hypothesis predicts...

Does the data pattern favor sci hyp or skeptical hyp?

PCH OF CHANCE:

The r calculated from the data differs from 0 only by chance.

Is sci hyp directional or non-directional?

H<sub>0</sub>:

H<sub>1</sub>:

One- or two-tailed?

TEST STATISTIC (Formula)

t =

df = N - 2

CALCULATE value of  $t$ :

$t =$

$$t = 5.307 / .6428 = 8.256$$

FIND Critical value(s) of  $t$ :

alpha = .05, df =

one- or two-tailed?

DELINEATE REGIONS

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0  
Values of  $t$

DECIDE

Do you Reject  $H_0$ ?

What's your decision mean about PCH of Chance?

**Sampling Distribution overview**

[ ]

Sample Statistic:

Now evaluate **Internal validity**:

What if the Scientific Hypothesis were that cigarette smoking causes health problems?

Can he say that cigarette smoking causes health problems for this study alone?