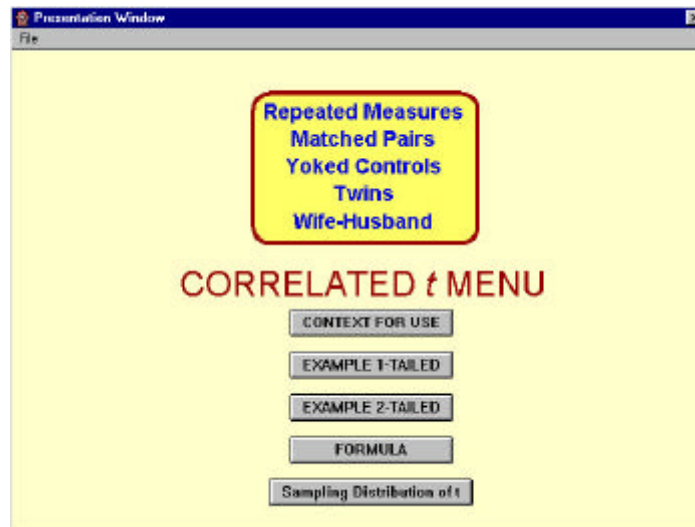


t test for Correlated Means

Psychology 3000

Tom Malloy



Context for use

Definition of context

There is a clear connection between...

Common experimental situations in which this arises

Case 1. Repeated measures

e.g., Evaluate a Diet

pre-test vs. post-test

Other cases

Relationships

Yoked controls

EXAMPLE (One-tailed test):

Consolidated Markets Corporation is considering buying New Ergonomic Keyboards for their computers from Jazzy Ergonomic Keyboards (Jer-key). The Jer-key salesperson claims that the new keyboards (designed to take advantage of the latest in ergonomic theory) will increase typing speed.

What is the **IV**?

What is the **DV**?

The accountant for Consolidated (who doesn't like to spend money) thinks changing the keyboard will affect typing speed but isn't sure if it will be for the better or the worse.

Scientific Hypotheses

What scientific hypothesis might you expect from the Jer-key **salesperson**?

Is it directional or non-directional?

What scientific hypothesis might you expect from the **accountant** for Consolidated Markets?

Is it directional or non-directional?

What might be the hypothesis of a **skeptic**?

PCH of Chance:

Statistical Hypotheses

Skeptic: PCH of Chance

H_0 :

Salesperson: (We will choose this one for this example)

H_1 :

One- or two-tailed?

Accountant:

H_1 :

One- or two-tailed?

Research Design

To see if the New Keyboard increases typing speed, the company has 10 typists type for 12 minutes on both their Old Keyboards as well as on the New Keyboards. Which keyboard a given typist types on first is randomly determined. Each typist is carefully measured for the number of words per minute typed (DV) on each keyboard.

TYPING SPEED			difference	
SUBJECT #	OLD	NEW	<i>d</i>	<i>d</i> ²
1	55	61	-6	36
2	54	60	-6	36
3	47	56	-9	81
4	59	63	-4	16
5	51	56	-5	25
6	61	63	-2	
7	57	59	-2	
8	54	56		
9	63	62		
10	58	61		
SUM			-38	216

$$\sum d = -38 \quad \sum d^2 = ?$$

Mean difference score = $M_d =$

S = Standard Deviation of Differences scores = $S_d =$

TEST STATISTIC to decide between statistical hypotheses

$t =$

$n =$

$M_d =$

$E(M_d) =$

$S_d =$

$df =$

CALCULATE t

FIND Critical value of t

alpha =

df =

one- or two-tailed?

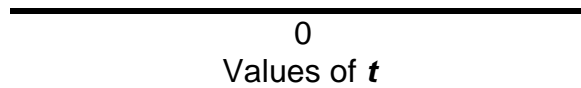
Value found in table =

Should this be plus or minus?

Why?

Statistical Conclusion

DELINEATE REGIONS



In which region is calculated t ?

Do you Rej H_0 ?

What's your decision mean about PCH of Chance?

Sampling Distribution overview



[]

Sample Statistic

EXAMPLE: (Two-tailed case)

Use same example

The results are the same

Calculated $t =$

Scientific Hypotheses

Same as above

Statistical Hypotheses

Same as above

Accountant: Let's choose the H_1 based on the accountant's hypothesis

$H_1:$

One- or two-tailed?

FIND Critical value of t

alpha =

df =

one- or two-tailed?

Critical value of $t =$

Should this be plus or minus?

Why?

DELINEATE REGIONS

—————
0
Values of t

DECIDE

In which region is calculated t ?

Do you Rej H_0 ?

What's your decision mean about PCH of Chance?

Sampling Distribution overview



[]

Sample Statistic