

89. Right versus left The design of controls and instruments affects how easily people can use them. A student project investigated this effect by asking 25 right-handed students to turn a knob (with their right hands) that moved an indicator. There were two identical instruments, one with a right-hand thread (the knob turns clockwise) and the other with a left-hand thread (the knob must be turned counterclockwise). Each of the 25 students used both instruments in a random order. The following table gives the times in seconds each subject took to move the indicator a fixed distance:³⁰

	s in seconds eac 1 fixed distance: ³		the order in	
Subject	Right thread	La Left thread		
1. 1	113	137	- IT is :	I
2	105 -	105	Assign	
3	130	133	A COURT	
4	101	108	ASSIGN ANY EL ACTIVITY	F
5	138	115	15 C	
6	118	170	Activity	1
7	87	103		
8	116	145	NO MA	Π
9	75	78		
. 10	96	107	USED 5	i
11	122	84		
12	103	148	17	
13	116	147	1	
14	107	87	Colculator Tip	,
15	118	166		
16	103	146	(STAT) (TESTS)	
17	111	123		
18-	-104	135	2! T-Test	
19	111	112		

NOTE: You would get the same Conclusion if you did Right-LEFT. You would just change HA. Holy=0 t= -2.904 HA Ma LO TRY THIS : t=-2.904 P=,0078 STILL REJECT

Subject	Right thread	Left thread	
20	89	93	
21	78	76	
22	100	116	
23	89	78	
24	85	101	
25	88	123	

(a) Explain why it was important to randomly assign the order in which each subject used the two knobs.

(answer here) IT is IM PURTANT TO RANDOMLY ASSIGN SO THAT WE AVERAGE OUT ANY EFFECT DUE TO DOING THE ACTIVITY BETTER THE SECOND TIME NO MATTER WHICH KNOB IS USED SECOND.

(b) The project designers hoped to show that righthanded people find right-hand threads easier to use. Carry out a significance test at the 5% significance level to investigate this claim.

AT TESTS DATA J_{Lo} d!T-Test L_3 Fernio

Complete Test Template

x = 13, 32

n= 25

Sx = 22.936

94. Significance and sample size A study with 5000 subjects reported a result that was statistically significant at the 5% level. Explain why this result might not be particularly large or important.

#'s 94-97 answer here

The study may have rejected Ho, But with such a large sample size, such a rejection might occur even if the actual DiFFERS ONLY SLICHTLY FROM THE HYATHESIZED VALUE. FOR EXAMPLE, THE DIFFERENCE BETWEEN 1=10 AND M=10.5 might have no Practical importance.

WRUNG WITH A CONVENIENCE SAMPLE.

DEPENDING ON THE TIME OF DAY OF

SHOPPERS WOULD

3 REPLICATION

THE DAY OF THE WEE, CERTAIN

60

ANY NUMBER OF THINGS COULD

95. Sampling shoppers A marketing consultant observes 50 consecutive shoppers at a supermarket, recording how much each shopper spends in the store. Explain why it would not be wise to use these data to carry out a significance test about the mean amount spent by all shoppers at this supermarket.

Remember! THE ONLY WAY TO SHOW CAUSE AND EFFECT IS WITH A WELL-DESIGNED, WOULD NOT BE PLESENT. WELL -CONTROLLED EXPERIMENT! 3 COMPONENTS () REAdimization @ CONTRAL

96. Ages of presidents Joe is writing a report on the backgrounds of American presidents. He looks up the ages of all the presidents when they entered office. Because Joe took a statistics course, he uses these numbers to perform a significance test about the mean age of all U.S. presidents. Explain why this makes no sense.

We have in formation c bast the while Population of interest.

TYPES OF

97. Do you have ESP? A researcher looking for 500(.01)=5 evidence of extrasensory perception (ESP) tests 500 subjects. Four of these subjects do significantly better (P < 0.01) than random guessing.

(a) Is it proper to conclude that these four people have ESP? Explain your answer.

(b) What should the researcher now do to test whether any of these four subjects have ESP?

- Way No we'expect **(a)** about 5 of the 500 subjects who don't have ESP to do better then rendomly Guessing just by chince.
- The researcher should repeat the (L) Procedure on these 4 to see if they again per form well

10.38 HW

Test of Significance Template

#8

nterest $\mathcal{M}_{d} = achol mean difference (left-right) in the time it takes to two the knob with left thread and right thread the takes to two the knob with left thread and right thread the even of the knob with left thread and right thread even of the takes to two the knob with left thread and right thread even of the takes to two the knob with left thread and right thread even of the takes to two the knob with left thread and right thread even of the takes to two the knob with left thread and right thread even of the takes to two the knob with left thread and right thread even of the takes to two the takes the take to the takes to the takes to the takes the take to the take takes the take to the takes the take to the take takes the take takes to the take takes the takes the take takes the takes the take takes the takes takes the takes takes the takes the takes takes the takes the takes the takes the takes takes takes the takes take$		
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