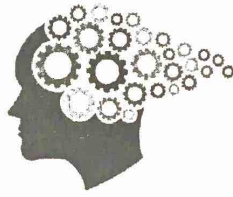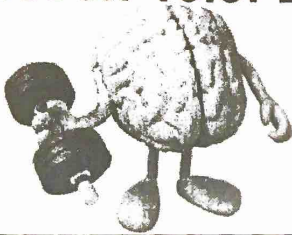Name: _____ Hour: _____ Date: _____

Lesson 10.3: Day 1: Does Memory Training Help?

Don't Forget!!

Does memory training help? You will be given a list of words. You will be given 3 minutes to memorize as many as possible by just rereading the words. You will record as many words as you can remember. You will then be given another list of words to memorize for 3 minutes using a memorization strategy. You will record as many words as you can remember.

1. How many words did you get correct using strategy A (rereading)?

2. How many words did you get correct using the strategy B (quizzing)?

3. Add your data to the table on the board. Copy the data below and calculate the difference in each pair.

A							
B							
Difference							

A							
B							
Difference							

A							
B							
Difference							

4. Go to stapplet.com and enter the DIFFERENCES only in One Quantitative Data. Find each of the following:

No difference

Dotplot: 2nd strategy was better   1st strategy was better
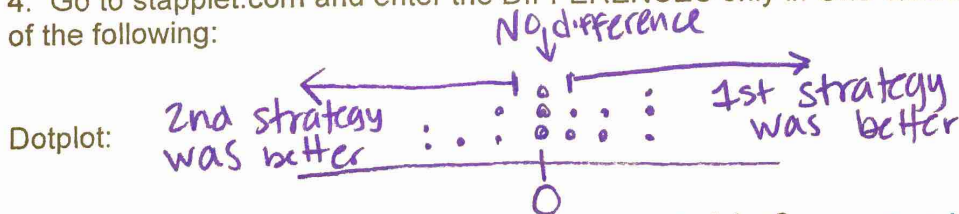
What does the dotplot suggest about the memory training?

Identify where most dots are located, positive or negative, and tell which strategy is better.

Mean: $\bar{x}_{diff}$ = _____   Interpret: On average, people remembered more words with A or B.

Standard Deviation: s_{diff} _____

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Name: _____ Hour: _____ Date: _____

5. Construct a 95% confidence interval for the true mean difference in words remembered by students using rereading and quizzing.

STATE: State the parameter you want to estimate and the confidence level.

Parameter: μ_{diff} → true mean difference in words remembered. Statistic: $\bar{x}_{diff} =$

Confidence level: 95%.

PLAN: Identify the appropriate inference method and check conditions.

Name of procedure: One Sample t interval for μ_{diff}

Check conditions: Random — "Randomly Assigned"

10% - N/A

Normal: ① $n \geq 30$ CLT
or
② No strong skew or outliers

DO: If the conditions are met, perform the calculations.

General Formula: Point Estimate ± margin of error

Specific Formula: $\bar{x}_{diff} \pm t^* \dfrac{s_{diff}}{\sqrt{n}}$

Work:

Answer:

CONCLUDE: Interpret your interval in the context of the problem.

Interpret: We are 95% confident that the interval from __ to __ captures the true mean difference in words remembered using rereading and quizzing.
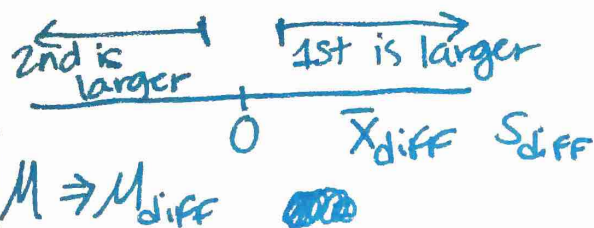
6. Do we have evidence that there is a difference in the average words remembered using rereading and quizzing?

If the interval contains 0, then no. If (+,+) → ① Rereading is better. If (-,-) quizzing is better.

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Lesson 10.3: Day 1: Confidence Interval for Paired Data

Important ideas:

LT#1 Describe Distribution

2nd is larger ← | → 1st is larger

$0 \quad \bar{X}_{diff} \quad S_{diff}$

$\mu \Rightarrow \mu_{diff}$

LT#2

One sample t interval for μ_{diff}

$$\bar{X}_{diff} \pm t^* \frac{S_{diff}}{\sqrt{n}}$$

Check Your Understanding

Researchers designed an experiment to study the effects of caffeine withdrawal. They recruited 11 volunteers who were diagnosed as being caffeine dependent to serve as subjects. Each subject was barred from coffee, colas, and other substances with caffeine for the duration of the experiment. During one 2-day period, subjects took capsules containing their normal caffeine intake. During another 2-day period, they took placebo capsules. The order in which subjects took caffeine and the placebo was randomized. At the end of each 2-day period, a test for depression was given to all 11 subjects. Researchers wanted to know whether being deprived of caffeine would lead to an increase in depression.36 kernels at the α = 0.05 significance level?

The table below contains data on the subjects' scores on the depression test. Higher scores show more symptoms of depression.

Subject	1	2	3	4	5	6	7	8	9	10	11
Depression (caffeine)	5	5	4	3	8	5	0	0	2	11	1
Depression (placebo)	16	23	5	7	14	24	6	3	15	12	0

1. Make a dotplot of the difference in depression test scores (caffeine – placebo) for each subject. What does the graph reveal about the difference in depression test scores?
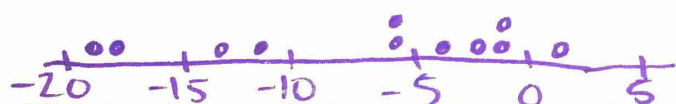
Most dots are negative, meaning the placebo score was higher.

2. Find the mean and standard deviation of the difference (caffeine – placebo) in depression test scores. Interpret the mean difference in context.

$\bar{X}_{diff} = -7.364 \quad S_{diff} = 6.918$

On average, the placebo score was 7.364 higher than caffeine

3. Construct and interpret a 90% confidence interval for the true mean difference in depression test score (caffeine – placebo).

DO: Point Est ± margin of error

$$\bar{X}_{diff} \pm t^* \frac{S_{diff}}{\sqrt{n}}$$

$$-7.364 \pm 1.812 \times \frac{6.918}{\sqrt{11}}$$

$$(-11.144, -3.584)$$

Conclude: We are 90% confident that the interval from -11.144 to -3.584 captures the true average difference in depression scores.

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