A researcher examines student satisfaction (1 to 5 scale with higher numbers being more satisfied) with the previous recreational facilities and the new facilities with a fancy pool. Here are their responses (below). Are students **more satisfied** with the new facilities using the p**<.01 significance level**? List the 6 hypothesis testing steps.

|  |  |
| --- | --- |
| Old Recreational Facilities | New Recreational Facilities |
| 2 | 4 |
| 1 | 2 |
| 5 | 5 |
| 3 | 5 |
| 3 | 4 |
| 2 | 3 |
| 5 | 4 |

|  |
| --- |
| Assumptions:  DV is scale – interval, so yes  Random selection – could randomly email, random assign which questions went first  Normal – not sure because N < 30 |
| Step 2:  R: difference new – old > no difference um = 0  N: difference new – old <= no difference um = 0 |
| Step 3:  M difference score = .86 um = 0  S difference score = 1.07  Sm difference score = 0.40  N = 7 |
| Step 4:  P < .01  One tailed  Greater than test  Df = N – 1, 7 – 1 = 6  qt(.01/1, 6, lower.tail = F)  **3.14** |
| Step 5:  Paired t-test  data: Chapter10\_data$new and Chapter10\_data$old  **t = 2.1213**, df = 6, p-value = 0.03907  alternative hypothesis: true difference in means is greater than 0  99 percent confidence interval:  -0.4126869 Inf  sample estimates:  mean of the differences  0.8571429 |
| Step 6:  Fail to reject |
| Confidence Interval:  M = 0.86, SD = 1.07, SE = 0.40, **99%CI[-0.64 - 2.36]**  t(6) = 2.12, p = 0.08, d = 0.80, 99%CI[-0.35 - 1.92] |
| Effect size:  d = 0.80, 99%CI[-0.35 - 1.92]  (large effect) |

The city council is trying to determine if they should change disposal fees for waste services. They are comparing the number of trash bags before and after the last change to see if people **reduced waste**. A significant reduction in waste would relieve their trash truck drivers and save money. Should they increase the fee at the **p<.05 level**?

Before After

|  |  |
| --- | --- |
| 5 | 8 |
| 6 | 4 |
| 3 | 1 |
| 4 | 1 |
| 7 | 5 |
| 4 | 5 |
| 5 | 4 |
| 7 | 3 |

|  |
| --- |
| Assumptions:  DV is scale? Yes, ratio.  Randomly select: yes! (random assign? No)  Normal? N < 30, so don’t know. |
| Step 1/2:  R: difference after – before < no change no difference um = 0  N: difference after – before > = no change no difference um = 0 |
| Step 3:  M difference score = - 1.25 um = 0  S difference score = 2.25  Sm difference score = .80  N = 8 |
| Step 4:  P < .05  Less than one tailed test  Df = 8 – 1 = 7  qt(.05/1, 7, lower.tail = T)  **-1.89** |
| Step 5:  Paired t-test  data: Chapter10\_data\_2$after and Chapter10\_data\_2$before  **t = -1.57**, df = 7, p-value = 0.08021  alternative hypothesis: true difference in means is less than 0  95 percent confidence interval:  -Inf 0.2584565  sample estimates:  mean of the differences  -1.25 |
| Step 6:  Fail to reject |
| Confidence Interval:  M = -1.25, SD = 2.25, SE = 0.80, **95%CI[-3.13 - 0.63]**  t(7) = -1.57, p = 0.16, d = -0.56, 95%CI[-1.29 - 0.21] |
| Effect size:  d = -0.56, 95%CI[-1.29 - 0.21] (medium effect) |