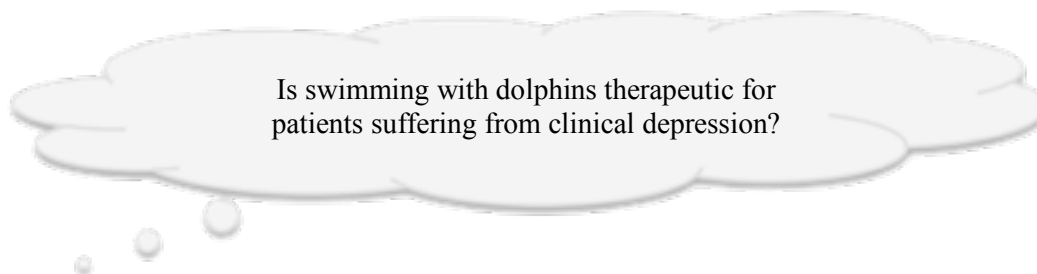


Dolphin Therapy

Swimming with dolphins can certainly be fun, but is it also therapeutic for patients suffering from clinical depression? To investigate this possibility, researchers recruited 30 study participants, aged 18–65, with a clinical diagnosis of mild to moderate depression. Study participants were required to discontinue use of any antidepressant drugs or psychotherapy four weeks prior to the experiment, and throughout the experiment. Prior to the experiment, participants' level of depression was measured and recorded.

These 30 participants went to an island off the coast of Honduras, where they were randomly assigned to one of two treatment groups. Both groups engaged in the same amount of swimming and snorkeling each day, but the treatment group did so in the presence of bottlenose dolphins and the control group did not. At the end of two weeks, participants' level of depression was again measured and compared to the pre-experiment measurement. The primary outcome was whether or not a participant had a reduced level of depression (based on criteria set by the researchers) by the end of the study .



Observed Data: The researchers found that 10 of 15 study participants in the dolphin therapy group showed substantial improvement, compared to three of 15 participants in the control group.

Explore the Observed Data

1. Organize these data/results (i.e., frequencies) into a 2x2 contingency table.
2. Compute: (a) the percentage of participants in the treatment group who had an improved level of depression, (b) the percentage of participants in the control group who had an improved level of depression, and (c) the difference in these two percentages.
3. Do the sample data suggest that there is a positive effect of swimming with dolphins on patients suffering from clinical depression? Explain.



Model the Experimental Variation and Simulate

Set up a TinkerPlots™ sampler to model the experimental variation that would be expected in the difference in percentages if there was no effect of swimming with dolphins. In this model, dummy code the response variable so that 1 = participant improved and 0 = participant did not improve.

4. Copy and paste a picture of your sampler window into your word-processed document.

Simulate

Carry out 500 trials of a randomization test using TinkerPlots™ to investigate whether the observed difference is more than would be expected by chance

Evaluate

5. Use TinkerPlots™ to create a plot of the distribution of simulated differences. Add a **Reference Line** to your plot at the value of the observed difference. Copy and paste this plot into your word-processed document.
6. Compute and report the p -value based on the observed difference. Show your work.
7. Interpret the p -value you computed.

The p -value of ____ is the probability of ...

8. Based on the p -value you computed, how compatible is the observed difference with the results produced by the model specified in the null hypothesis? What does this suggest about the answer to the research question? Explain.