Researchers set out to investigate the research question: Is swimming with dolphins therapeutic for patients suffering from clinical depression? To study this, researchers recruited 30 subjects aged 18–65 with a clinical diagnosis of mild to moderate depression. Subjects were required to discontinue use of any antidepressant drugs or psychotherapy four weeks prior to the experiment, and throughout the experiment. These 30 subjects went to an island off the coast of Honduras, where they were randomly assigned to one of two treatment groups: a dolphin group and a control group.

Both groups engaged in the same amount of swimming and snorkeling each day, but one group did so in the presence of bottlenose dolphins (dolphin group) and the other group did not (control group). At the end of two weeks, each subjects' level of depression was re-evaluated, as it had been at the beginning of the study, and it was determined whether they showed substantial improvement (reducing their level of depression) by the end of the study.

Hypotheses

1. Write the null and alternative hypothesis.

Observed Data

The researchers found that 10 of 15 subjects in the dolphin therapy group showed substantial improvement, compared to three of 15 subjects in the control group.

2. Organize these data/results (i.e., frequencies) into a 2x2 contingency table.

3. Find the difference between the percentage of subjects assigned to dolphin therapy condition that improved and the percentage of subjects assigned to the control condition that improved.

Model

Set up a TinkerPlots sampler to model the variation due to random assignment by incorporating the fixed responses and conditions of the study.

    4. Sketch the sampler.

Simulate

Run the simulation to carry out a single trial. Plot the results of this trial so that you can collect the mean response of the dolphin therapy group and the control group.

    5. Sketch the plot.

Use the formula editor to compute the difference between the two collected means. Be sure to subtract in the same direction as you did in Question #3.

Run 499 additional trials.

Evaluate

    6. Plot the 500 differences and add a reference line at the observed difference.

    7. Compute and report the *p*-value based on the observed result.

    8. Interpret the *p*-value by completing the sentence: The *p*-value of ____ is the probability of _____.

    9. Use the *p*-value you computed to make a decision about the null hypothesis and provide an answer the research question.

    10. Can we make cause-and-effect claims about swimming with dolphins on the effects on depression from these study results? Explain by referring to the study design and rating the internal validity.