

LEARNING CHECK

1. What is the difference between the null hypothesis and the research hypothesis?

A: A null hypothesis is what we test with inferential statistics and is a statement of no relationship between variables in the population. The research hypothesis is a statement that there is a relationship between variables in the population. A research hypothesis either states the nature of this relationship (a directional research hypothesis) or only states that a relationship will exist (a nondirectional research hypothesis).

2. Suppose a researcher wants to test the effects of pet therapy on children's anxiety levels about going to the doctor. She expects that children who get to pet a dog in the doctor's waiting room will be less anxious than children who do not get to pet a dog. State the null and research hypotheses, both symbolically and in plain English.

A: $H_0: \mu_{\text{pet therapy}} = \mu_{\text{no pet therapy}}$

$H_r: \mu_{\text{pet therapy}} < \mu_{\text{no pet therapy}}$ (directional research hypothesis)

$\mu_{\text{pet therapy}} \neq \mu_{\text{no pet therapy}}$ (nondirectional research hypothesis)

In plain English, the null hypothesis states that there will be no difference in children's anxiety about going to the doctor based on whether they got to pet a dog in the doctor's waiting room. The research hypothesis (directional) states that children who got to pet a dog in the doctor's waiting room will be less anxious than children who did not get to pet a dog. The research hypothesis (nondirectional) states that children who got to pet a dog and children who did not get to pet a dog in the waiting room will experience different levels of anxiety.

3. Related to the previous question, the researcher clearly has an expectation of what her research will find, and thus, a directional (one-tailed) hypothesis makes sense. Why, however, might it be better for her to use a nondirectional (two-tailed) hypothesis test?

A: A nondirectional (two-tailed) hypothesis test makes it more difficult to reject the null hypothesis. Therefore, with a nondirectional hypothesis test, we would need to have stronger evidence from the sample data to reject the null hypothesis than we would need from a directional hypothesis test.