

Table 8-3 Wording of the Final Conclusion

| Condition | Conclusion |
|--|---|
| Original claim does not include equality, and you reject H_0 . | "There is sufficient evidence to support the claim that . . . (original claim)." |
| Original claim does not include equality, and you fail to reject H_0 . | "There is not sufficient evidence to support the claim that . . . (original claim)." |
| Original claim includes equality, and you reject H_0 . | "There is sufficient evidence to warrant rejection of the claim that . . . (original claim)." |
| Original claim includes equality, and you fail to reject H_0 . | "There is not sufficient evidence to warrant rejection of the claim that . . . (original claim)." |

Accept/Fail to Reject A few textbooks continue to say “accept the null hypothesis” instead of “fail to reject the null hypothesis.” The term *accept* is misleading, because it implies incorrectly that the null hypothesis has been proved, but we can never prove a null hypothesis. The phrase *fail to reject* says more correctly that the available evidence isn’t strong enough to warrant rejection of the null hypothesis. In this text we use the terminology *fail to reject the null hypothesis*, instead of *accept the null hypothesis*.

Multiple Negatives When stating the final conclusion in nontechnical terms, it is possible to get correct statements with up to three negative terms. (Example: “There is *not* sufficient evidence to warrant *rejection* of the claim of *no* difference between 0.5 and the population proportion.”) Such conclusions are confusing, so it is good to restate them in a way that makes them understandable, but be careful to not change the meaning. For example, instead of saying that “there is not sufficient evidence to warrant rejection of the claim of no difference between 0.5 and the population proportion,” better statements would be these:

- Fail to reject the claim that the population proportion is equal to 0.5.
- Unless stronger evidence is obtained, continue to assume that the population proportion is equal to 0.5.

CAUTION Never conclude a hypothesis test with a statement of “reject the null hypothesis” or “fail to reject the null hypothesis.” Always make sense of the conclusion with a statement that uses simple nontechnical wording that addresses the original claim.

The Big Picture Revisited Example 1 describes a clinical trial that resulted in 58 girls in 100 births. Try to follow this line of reasoning:

- If we assume that $p = 0.5$ (as in the null hypothesis), the probability of getting 58 or more girls is 0.0548.
- Because the probability of 0.0548 is not small (such as 0.05 or less), we see that random chance is a reasonable explanation for getting 58 (or more) girls in 100 births.
- Because 58 girls in 100 births can easily occur by chance, we don’t have sufficient evidence to conclude that the XSORT method is effective.

The hypothesis test procedure basically formalizes the reasoning process above, and it provides a common structure and terminology recognizable by professionals in a wide variety of disciplines, not just statistics.