

Chapter 2 Investigation Guide

Before you begin the written report,

1. Choose an athlete or team that you are interested in investigating.
2. Choose a *categorical* variable that you will use to measure the athlete or team's *PERFORMANCE* in two different contexts (e.g., home vs. away, day vs. night, etc.).
3. Find the relevant data on the internet or another source. Many of the websites listed below allow you to look at "splits," which break down an athlete or team's *PERFORMANCES* into different contexts. Do not include playoff games, as these are played in different circumstances as regular season games.

To complete the written report,

1. Write an introduction which states the question of interest and briefly describes the context of the athlete or team's *PERFORMANCES*, including noteworthy accomplishments that year and why you chose to use a particular variable to measure the *PERFORMANCES*. Describe how and where you obtained your data *and* include the null and alternative hypotheses.
2. Display the data in a two-way table and make appropriate graphs to compare the athlete or team's *PERFORMANCES* in the two contexts. Compare the graphs, making sure to compare the percentages of success in each context. Give a preliminary answer to the question of interest.
3. Identify and calculate the value of the test statistic you will use to test the hypotheses.
4. Describe how to use note cards to simulate the distribution of the test statistic. Then, by hand or using the applet, conduct at least 50 trials of a simulation to see what values of the test statistic could happen by *RANDOM CHANCE*, assuming that the null hypothesis is true. Include a well-labeled dotplot to display the results of the simulation.
5. Use the results of the simulation to estimate *and* interpret the *p*-value. Then, make an appropriate conclusion about the hypotheses based on the *p*-value.
6. Discuss any limitations or possible errors you may have made in your conclusion. If there is convincing evidence of a difference in *ABILITY*, discuss possible causes.

Web sites with data for multiple sports include:

- www.sports-reference.com
- www.espn.com
- www.usatoday.com/sports
- sports.yahoo.com
- www.si.com

Web site for applet:

- www.whfreeman.com/SRIS

Rubric for Chapter 2 Investigation	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
<p>Introduction and Data Collection</p> <ul style="list-style-type: none"> Describes the context of the research (sport, player, team, year, etc.) and includes reasons for variable choice Has a clearly stated question of interest, including formal hypotheses Specifically describes how the data was collected (including source, if appropriate) Uses appropriate data to answer the question of interest 	<ul style="list-style-type: none"> Displays the data in a two-way table Includes appropriate types of graphs Graphs are clearly labeled and easy to compare Graphs are discussed/compared correctly 	<ul style="list-style-type: none"> Has a specific question of interest and uses appropriate data, but doesn't adequately introduce the context, describe how the data was collected, or state correct hypotheses 	<ul style="list-style-type: none"> Has a question of interest and uses appropriate data, but has several other problems 	<ul style="list-style-type: none"> Has a question of interest
<p>Graphs and Summary Statistics</p>	<ul style="list-style-type: none"> Test statistic is clearly identified and correctly calculated Clearly describes method for performing a simulation and includes an adequate number of trials Displays results of simulation in a clear, well labeled dotplot Estimates p-value correctly 	<ul style="list-style-type: none"> Appropriate graphs and a two-way table are included, but graphs are not well-labeled, not easy to compare, or not compared Conducts a reasonable simulation/calculation to estimate the p-value, but there is a small error, the method is not clearly described, or the test statistic is not clearly identified or calculated 	<ul style="list-style-type: none"> Includes appropriate graphs, but there are several problems (e.g. no two-way table, graphs are incorrect) Attempts a simulation/calculation to estimate p-value 	<ul style="list-style-type: none"> Some graphs are included or a two-way table is included Attempts to analyze the data
<p>Analysis/Simulation</p>	<ul style="list-style-type: none"> Correctly interprets p-value in context Correctly uses the results of the simulation to draw an appropriate conclusion about the question of interest Shows evidence of critical reflection (discusses possible errors, shortcomings, limitations, alternate explanations, etc.) 	<ul style="list-style-type: none"> Makes the correct conclusion based on simulation/p-value Shows some evidence of critical reflection 	<ul style="list-style-type: none"> Makes a partially correct conclusion based on simulation/p-value (e.g. accepts null) Little evidence of critical reflection 	<ul style="list-style-type: none"> Makes a conclusion
<p>Conclusions</p>	<ul style="list-style-type: none"> Clear, holistic picture of the investigation as a two-step process (e.g., includes preliminary and final conclusions) Investigation is well organized, neat and easy to read Ideas are well communicated, including appropriate transitions between sections Clearly contrasts the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> in context 	<ul style="list-style-type: none"> Investigation is organized, easy to read, and has appropriate transitions, but lacks clear communication, a holistic picture of the investigation, or does not clearly contrast the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> 	<ul style="list-style-type: none"> Investigation is somewhat organized, but has several major problems 	<ul style="list-style-type: none"> Communication and organization are poor
<p>Overall Presentation/Communication</p>	<ul style="list-style-type: none"> Clear, holistic picture of the investigation as a two-step process (e.g., includes preliminary and final conclusions) Investigation is well organized, neat and easy to read Ideas are well communicated, including appropriate transitions between sections Clearly contrasts the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> in context 	<ul style="list-style-type: none"> Investigation is organized, easy to read, and has appropriate transitions, but lacks clear communication, a holistic picture of the investigation, or does not clearly contrast the concepts of <i>PERFORMANCE</i> and <i>ABILITY</i> 	<ul style="list-style-type: none"> Investigation is somewhat organized, but has several major problems 	<ul style="list-style-type: none"> Communication and organization are poor