

## Chapter 3 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 if the athlete or team was streaky (had the hot hand).
- 3.) Find the relevant data on the Internet or another source. Websites such as [www.espn.com](http://www.espn.com) allow you to look at play-by-play data for individual games to see the outcome of each attempt in the order they occurred (to find play-by-play data, click on a game in the schedule and then choose the play-by-play tab). If you are investigating a team, look at their schedule and results to see the outcomes of their games in order.

To complete the written report:

- 1.) Write an introduction which states the question of interest and briefly describe 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. Also, describe how and where you obtained your data and include the null and alternative hypotheses.
- 2.) Display the outcomes for the athlete or team in the order they occurred and state the overall number of success and failures.
- 3.) Calculate two different test statistics that you could use to test your hypotheses. (e.g. longest streak, number of streaks, or difference in proportion of success after a success and after a failure). If you are using the longest streak or number of streaks, make sure to underline the streaks when displaying the outcomes. If you are using the difference in proportions, make sure to include a two-way table displaying the outcomes of each pair. Briefly discuss how the values of these tests statistics provide evidence that the athlete or team was streaky.
- 4.) For the first test statistic, conduct 100 trials of a simulation to see what values of the test statistic could happen by random chance, assuming that the athlete or team's outcomes are independent. Include a well-labeled dotplot to display the results of the simulation. You can use the applet to conduct the simulations, but you must include a description of how you would do the simulations by hand. Then, estimate the p-value and make an appropriate conclusion.
- 5.) Repeat step 4.) for the second test statistic.
- 6.) Write a conclusion that discusses the results of both tests. Were the conclusions the same? If not, why do you think the conclusions were different? Also, discuss any limitations or possible errors you may have made (e.g. type 1 or type 2).

## Chapter 3 Investigation Guide: Checklist

- **Title Page**
  - **Class Name**
  - **Your Name**
  - **Period**
- **Table of Contents**
  - **Contents of Each Page**
  - **Page Numbers**
- **Introduction**
  - **Introduce the athlete/team (include any accomplishments)**
  - **What is the question of interest and why did you select this topic**
  - **Describe how and where you obtained your data**
  - **Describe the null and alternative hypotheses**
  - **Give a preliminary answer to the question of interest**
- **Graphs**
  - **Two-way table**
  - **Bar Chart**
  - **Segmented Bar Chart**
  - **Brief Explanation for EACH graph-what is each graph and table is displaying.**
- **Simulation (2 total)**
  - **Conduct the applet simulations ONLY**
  - **Explain the procedure and data necessary to conduct the applet simulation**
  - **Describe how to conduct the simulation using note cards. (Do not do this simulation)**
  - **Perform 100 trials of the applet simulations.**
- **Dotplots**
  - **Create a dotplot for each of the applet simulation**
  - **Explain the results of the dotplot (3-5 sentences)**
  - **Estimate and interpret your p-values**
- **Conclusion**
  - **Give a conclusion based on your results and simulations (explaining the p-value and what it allows you to conclude. (1 page minimum))**
- **Errors/Causes**
  - **Discuss the possible errors and causes**
  - **1 page (minimum)**
- **References**
  - **Using appropriate citing rules and techniques, cite all the references used for the investigation**