

Final Technical Report

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1.3 Data and Methods

To determine if a player's ping pong shot accuracy is affected when dipping the ball in water before their shot into a cup, I will complete trials that simulate a game of Cup Pong, with either a completely dry ball or a method of dunking the ball and shaking excess water off before each shot a participant takes. This experiment will investigate if the shot accuracy when using a ball that has been dunked in water differs from the shot accuracy when using a dry ball in Cup Pong.

I carried out the experiment indoors, such as traditional Cup Pong. The experiment used a table with dimensions 96" L x 30" W x 29" H, eleven disposable 18-ounce Chinet brand red plastic cups, water, a microfiber towel, and 2 Franklin brand 40mm standard ping pong balls. The set up of the table and cups is as depicted in Diagram 1. The ten cups in the formation have an integer label from 1 to 10. All sampled attempts were from behind the singular cup at one end of the table, facing the triangle cup.

Each trial is a single attempt to make the ping pong ball into the cup. Two trials were performed consecutively, similar to traditional Cup Pong. After each set of two trials, the balls were removed, then dried off with a towel. The data was recorded on which shots were made, and if so, the number of the cup that the ball landed into was recorded. When balls were removed from the cups' insides, I left the formation undisturbed. Each shot attempt was made with an overhead toss and no bounce onto the table—a bounce-shot. Trials where the ball was made into a cup not using a bounce-shot was counted as successful. For the wet method, the ball was fully submerged in water and shaken lightly five times to remove excess water, which is similar to the standard technique for the “dunking method” in Cup Pong.

The total sample size of this experiment is the researcher's 100 attempts to make it into the cup. I am the researcher, Hannah Pawig, a sophomore Statistics Undergraduate student at the California Polytechnic State University in San Luis Obispo, CA. No other abilities or certifications were needed to carry out the trials, besides my own ability to participate in the activity without needing any accommodations or aid. I have some experience with Cup Pong, but do not consider myself a proficient player of the game. We must note that conclusions

from this study may not be generalized to a larger population of college students, because the researcher was the only recruited member of the study.

I used Microsoft Excel to record data in between each 2 trials (Excel Version 16.71). Prior to carrying out the experiment and collecting data, the order of playing method to be used for each trial was randomized in the Excel sheet that is detailed in the corresponding document within the “scripts” folder. This means that the method variable was randomized first, a variable that contains information specifying what playing style (“wet” or “dry”) was used for the trial. As trials were being carried out, the researcher recorded the data for the following variables: *success* and *which_cup*. The *success* variable was input as a binary variable: 1 was input for successful attempts and 0 for unsuccessful attempts. The *which_cup* variable was coded numerically from integers 0 to 10, each integer greater than 0 corresponding to a cup in the triangle formation. The integer 0 was recorded for *which_cup* when the shot was unsuccessful.

The analysis was carried out in statistical software R, using a two-sided 2 proportion z-test (R version 4.3.0). I created a *trials* variable into the analysis data set as an identifier for each trial, which gave each observation the corresponding trial number based on occurrence during the experiment. I also converted the *which_cup* and *method* variables from numeric to factor variables. I did this in order to relabel the “0” cup level in *which_cup* into a level named “None” and to use *method* as a grouping variable.

Diagram 1 — Cup Formation

Diagram will appear here.