

INSTRUCTIONS ON HOW TO USE THE R SCRIPTS PROVIDED.

The scripts provided show how we analyzed the outputs of the model to write our paper published in the Journal of Archaeological Science. They can be used as inspiration to analyze one's own outputs, if needed.

A few things to note:

- The code, while commented extensively, is repetitive and will need to be simplified in the future through the use of more functions.
- We have removed any link to files located on our computer. Therefore, to run these, you will have to update the paths to the files where indicated by the following text: [write path to file here]
- To run these scripts, you will need to run BehaviorSpace on the model using different settings to produce csv outputs and BehaviorSpace outputs to analyse. The single file provided in the "results" folder is not sufficient.
- These scripts were written using R and RStudio. If you have RStudio, you can simply open these files, update the important paths, select the whole code and run it.
 - o However, keep in mind that the LCP_ASCII_Analysis and the LCP Jackknife use the output of the LCP_Parse_outputs script. Therefore, you cannot run the former without running the latter first.

Summary of what each script does and requires:

Parse_LCP_outputs.R:

- This script uses the BehaviorSpace master output (which records a few variables for each run) to parse and collate the individual runs' outputs.
- Run the model using BehaviorSpace.
- Make sure that all the packages listed at the top of the script are installed.
- At the beginning of the script, the code cleans out the names and format of some BehaviorSpace output columns. Make sure that you reported those values, that the column names are the same as in the script and change the refining you want (e.g.: do you want lower min slopes?). Comment out anything that does not fit with what you produced.
- Update the missing paths (lines 58, 183, 215, 243, 321)
- Select all and press Run.
- This will produce an ASCII raster file of the collated routes for each optimization chosen. The raster cells will have a popularity value (how many of the paths walked on that cell) between 0-1.
- It also produces individual CSV files for each combination of sites that collate the number of times each cell is walked on between the two. These CSV files can be read by other scripts to run faster.

Parse_LCP_FETE_outputs.R:

- This script uses the BehaviorSpace master output (which records a few variables for each run) to parse and collate the individual runs' outputs.
- Run the model using BehaviorSpace with the mode set to "grid" and iterating through each possible start and end points.
- Make sure that all the packages listed at the top of the script are installed.
- Update the missing paths (lines 42, 161)
- Select all and press Run.
- This will produce an ASCII raster file of the collated routes for each optimization chosen. The raster cells will have a popularity value (how many of the paths walked on that cell) between 0 and 1.

LCP_BehaviorSpace_Sensitivity.R:

- This script uses the BehaviorSpace master output (which records a few variables for each run) to parse and collate the individual runs' outputs.
 - o It focuses on runs between two sites separated by the mountains and runs between two sites on the coast to show how variables can affect different scenarios.
- Run the model using BehaviorSpace (already provided mountain and plain experiments).
- Make sure that all the packages listed at the top of the script are installed.
- Updates the missing paths (lines 306, 410, 490, 631, 668)
- Select parts you want to run and press Run.
 - o Big sections are separated by #####. They can be run individually one after another to make sure that you see all the individual results (plots and CSV files).

LCP_Jackknife.R:

- This script uses the BehaviorSpace master output (which records a few variables for each run) to run over different variations of the ITERATED routes' CSV files (created by the Parse_LCP_outputs script).
- Make sure that all the packages listed at the top of the script are installed.
- Updates the missing paths (lines 66, 376, and 378)
- Select everything and press run. This will prompt a file finder to browse to the DEM used in the simulation, as well as the BehaviorSpace master output.
- It produces a CSV file that records the popularity of the cell under each site when considering paths from different sites' combinations.
- This script would have to be modified extensively to fit other people' research and is provided as an example of how we calculated those values for our own.

LCP_ASCII_Analysis.R:

- This script uses the produced ASCII files of path popularity and the shapefile location of sites to calculate if each site's location falls on a cell that is significantly more popular than other cells.
 - o Therefore, it needs to be run after running the Parse_LCP_outputs script.
- This script is the only one that was significantly cleaned up.
- If you run this script with your own analysis, you may want to update the name of the shapefile column holding site names (line 74)
- You can simply select everything, and press run. It will prompt file finder to get the following four files:

- DEM
 - Shapefile of the sites' locations
 - Raster of paths from which to get the popularity (produced for each optimization setting by the Parse_LCP_outputs script)
 - A raster used as buffer used to constrict the possible paths. Should be the raster of Exploration paths if available, or the DEM to compare the sites' popularity with all cells.
- This script runs a T-test between the popularity of the cell underneath each site and the popularity of all cells within the buffer and determines if the former is significantly higher than the latter. It prints the results in the Console.