Flightspeak Archive Readme

**cleanData.mat & finalAnalysis.m**

*cleanatData.m* is a data file for use in MATLAB, with the raw XPlane data arranged for analysis using the MATLAB script file *finalAnalysis.m*. The script also reads the CSV files *radioCallData.csv* and *callResponseTimes.csv*, and outputs the CSV files in the Saved CSV folder.

**radioCallData.csv & callResponseTimes.csv**

These are data sets based on the radio response task. *radioCallData.csv* lists response accuracy to radio calls, organised by pilot, flight (1 to 4), workload condition (A or B), and call number. Responses to ATC that contained all the information required were given a score of 1, responses that contained some information but were incomplete were given a score of 0.5, and incorrect or non-responses were scored 0. Some calls did not require a response, so these have no responses score.

*callResponseTimes.csv* lists the time in seconds (T=0 being the start of the flight) that ATC calls began and ended, and when the window to respond to these calls began and ended, organised by flight (1-4), condition (A or B), and call number. The expected heading before and after the call are listed, and the ‘change’ column flags those calls where the pilot was instructed to change their heading. Some time values in Flight 4 have times with negative values. These were task-irrelevant radio calls that the pilot was expected to ignore as part of the task.

**Saved CSV**

These data sets are generated by the *finalAnalysis.m* script and follow a similar structure. Each row of the data sets represents data from a single pilot, with their participant number represented in the first column. The second column indicates whether they were a native English speaker or ESL speaker. The remaining columns contain data from one cell in various Within Subjects designs. The number of columns depends on the number of factors and levels being compared. This structure allows for WS ANOVA to be run easily in JASP.

**callResponse3Part.csv, callResponseError.csv & callResponse3Part.jasp**

This is the data set used to calculate mean heading error across the three response windows described in the Safety Science paper and DHSS poster. Each row corresponds to a pilot, with the ‘ESL’ column indicating their ESL status. The remaining columns each represent a cell in a 3x2x3 factorial matrix. There were three factors, Flight (1-3), Condition (A or B), and call status (Call/Response1/Response2). This data was used in the JASP analysis file *callResponse3Part.jasp* to run the analysis reported in the Safety Science paper.

*callResponseError.csv* is similar to *callResponse3Part.csv*, but where the latter separates the response window into Response1 and Response2, the former simply averages heading error over the entire response window.

**meanError.csv**

This data set is the mean heading error by Flight (1-3), where each row represents a pilot and the ‘ESL’ column indicates ESL status. This can be used to conduct a two-way Mixed Factors ANOVA comparing flight performance by Flight and ESL status.

**radioAcc.csv**

This takes the radio call accuracy data from *radioCallData.csv* and presents mean call accuracy per pilot, organised by Flight (1-3) and Condition (A or B). This can be used to conduct a three-way Mixed Factors ANOVA comparing radio call accuracy across ESL status, Flight, and workload condition.

**responseAcc.csv & responseTimes.csv**

These data sets are based on the same trials as *callresponse3Part.csv*, but rather than comparing mean error, they assess how quickly, if at all, the pilot reached the instructed heading within the response window. For example, if a pilot was flying with a heading of 090 and was instructed by ATC to track 180, the trial would be considered “successful” if they reached heading 180 before the next heading instruction from ATC.

In *responseAcc.csv*, each column represents a cell in a 3x2 factorial matrix – Flight (1-3) crossed by Condition (A or B). For each radio call, trials on which the pilot eventually reached the target heading were scored as 1, and trials on which they did not were scored 0. The scores for each cell are the proportion of trials where the pilot was successful.

*responseTimes.csv* has the same structure as *radioAcc.csv*, but it represents the mean time in seconds it took the pilots to reach the target heading on trials when they eventually reached the target heading.