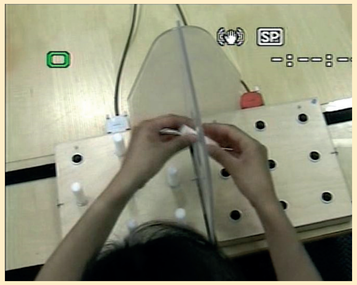
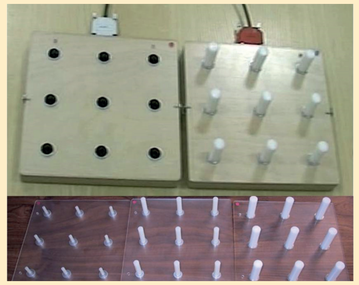
Analysis tool for detecting strategic thinking in recovering stroke victims

The game



Bimanual task

Patients are given a pegboard game to complete by moving 9 pegs from one board to the other. There are two types of tasks players are advised to do: unimanual (no obstacle between the boards) and bimanual (pegs are required to pass through a hole). The board records the sequence of moves that players make as coordinates (x and y ranging from 1-3).



Unimanual task

The data analysis tool

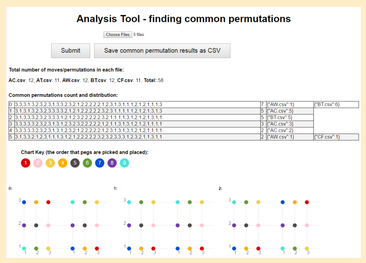
Large	R > L	Left			
3	1	0	3	1	1.542
3	2	2.393	3	2	3.485
3	3	4.286	3	3	5.217
2	1	5.948	2	1	7.13
2	2	7.951	2	2	9.053
2	3	9.924	2	3	11.136
1	1	11.857	1	1	12.928
1	2	13.68	1	2	14.901
1	3	15.702	1	3	17.355

Segement of data needed to be analysed.

Depending on the order and pattern players use with each move set, we can see if there are strategies/ permutations that are commonly used. My job was to write an analysis tool that would find the most common permutations of move sequences. As well as their distribution within the data files (how many times did each player use each move sequence) and record their total counts.

The analysis tool interface

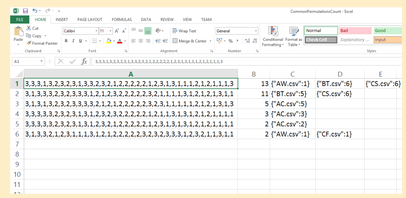
Results



Example screenshot of results displayed.

The results that are output by the analysis tool include:

- Common permutations and their count, listed in descending order.
- The distribution of permutations (how many times they occur in each player file).
- The total number of valid permutations in each file and the sum of all permutations found in the files selected.
- A chart representation of the permutations/moves.



Results can be saved as a CSV file, openable in Excel.

How to interpret the charts

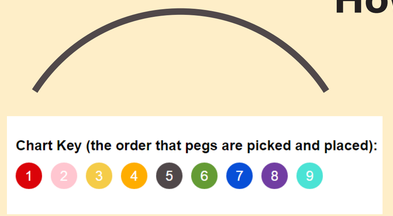


Chart Key

The dots on the left represent the pegs being picked up from the left most board. The dots on the right represent where they are placed. Each peg is a different colour representing the order each one is picked up and placed (see left for key).

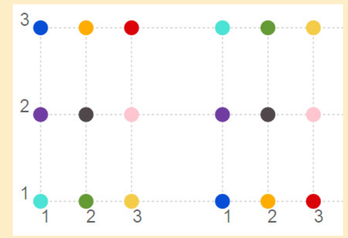
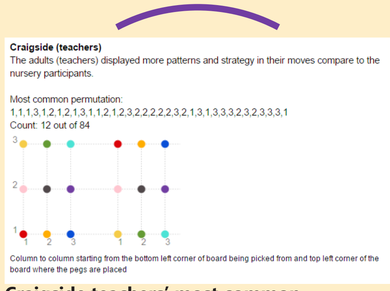


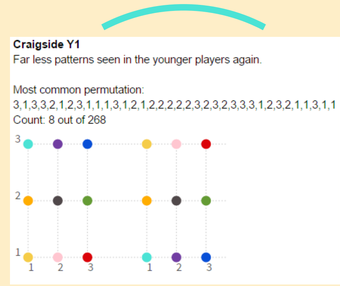
Chart example of a column to column strategy

Results analysis



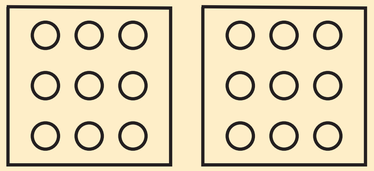
Craigside teachers' most common permutation is more than 14% of all teachers' results.

A common trend was that older players seemed to use common strategies to move the pegs. Thus there were, on average more common permutations of moves found in players as the age increased.
This is most apparent in the data collected at Craigside school. It is clear that maturer players are able to find strategies and utilise them more.



Craigside year 1 students' most common permutation is only just under 3% of all year 1 results.

Looking into the future



Currently there is no substantial research into stroke victim's recovery in strategic thinking. We hope to use the analysis tool to find common patterns and permutations carried out by patients throughout their recovery. This data would then help us see if we can develop games in the future to help aid recovery or research further into how strategic thinking correlates with general cognitive recovery of patients.

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