

SERIOUS GAMING TO IMPROVE EXECUTIVE FUNCTION IN ADHD

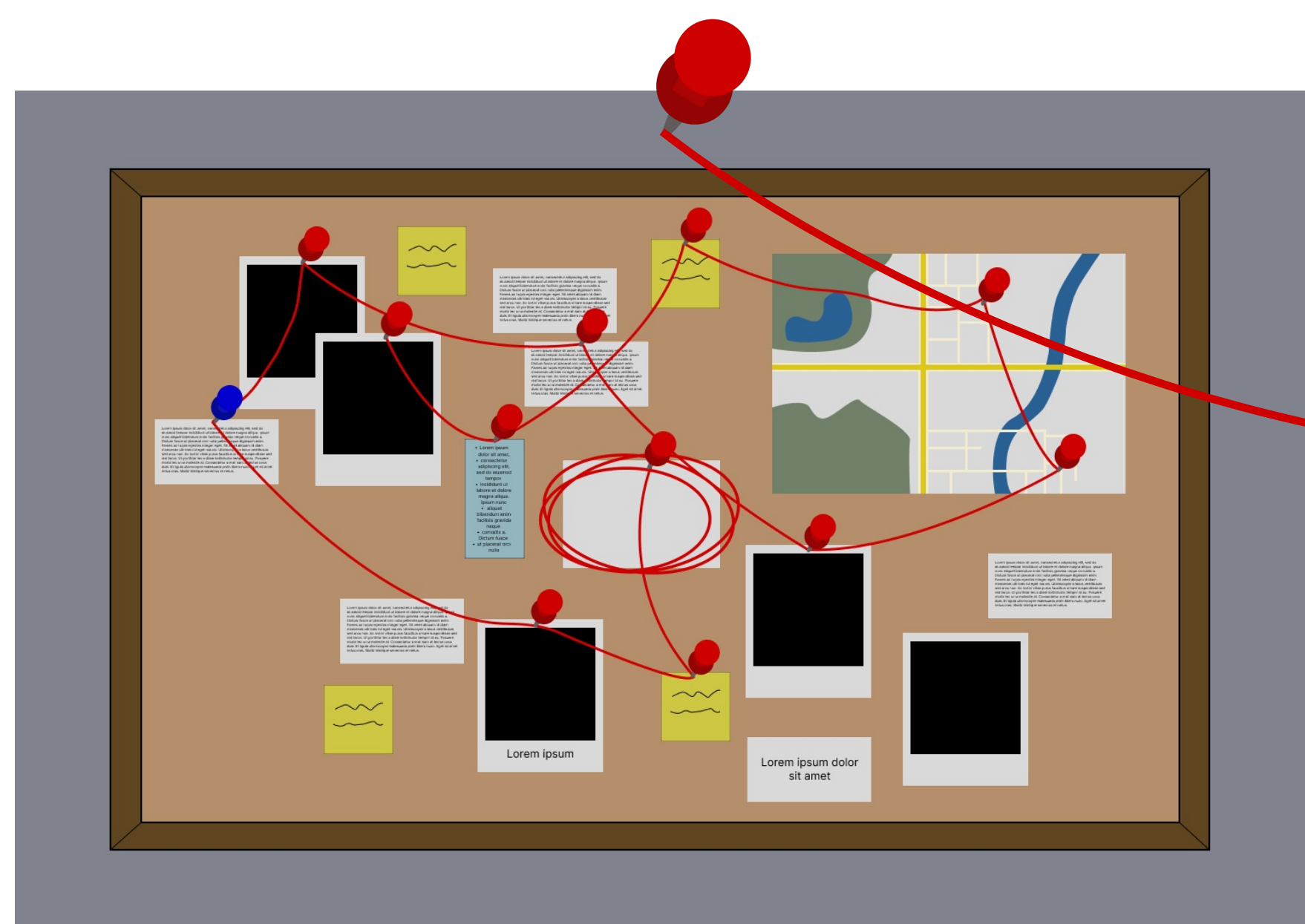
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Executive Functions in ADHD

Those with ADHD often have deficits in their executive functions, which may present themselves as daily struggles:

Cognitive Flexibility	Working Memory	Inhibition
Struggling to switch between tasks	Difficulty organizing thoughts	Lack of impulse control

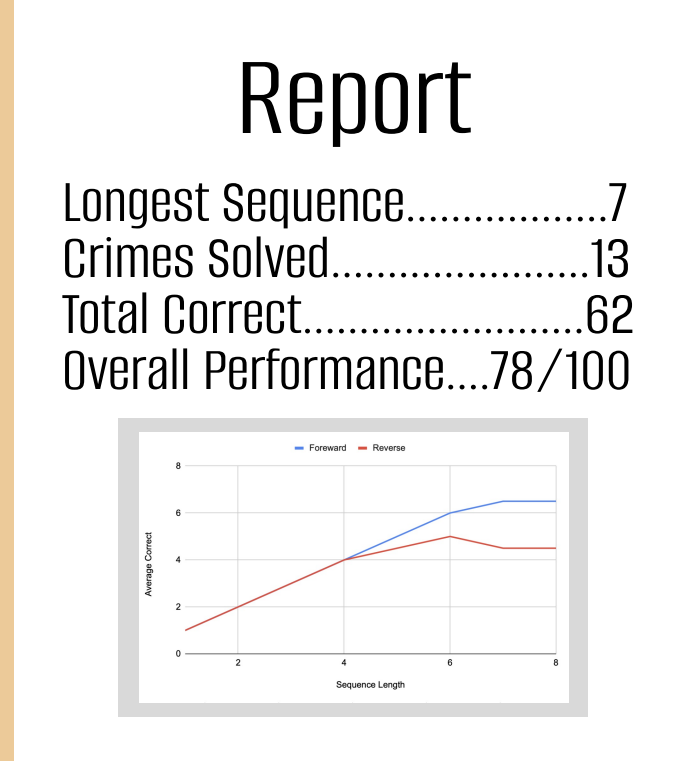
The interest in serious video games has increased in the treatment of ADHD alongside current treatments for a greater benefit.



Corsi Block Tapping Task - Push pins become blue one at a time to form a sequence. Player is to remember the sequence and reproduce it when all push pins return to red.

In-Game Progress Reports

- After each game task, feedback is given in the form of a progress report
- Focus on both in-game performance and the trained executive function
- Automated system monitors player's performance and adjusts as necessary
- Automated results allow for instant feedback



Corsi Block Tapping Task progress report shown at completion of the task

Method

Reason

Gamifying ADHD treatment	<ul style="list-style-type: none">• Increased motivation to continue treatment• High levels of immediate reinforcement
Training individual executive functions through 'mini-games'	<ul style="list-style-type: none">• Isolated, proven cognitive tasks for each executive function• Allows for identification of 'struggle' areas
Target age 18-22	<ul style="list-style-type: none">• Existing serious games focus mostly on children• ADHD doesn't stop at adulthood, treatment still needed

The Game

Training executive functions through a serious video game makes treatment more fun and engaging. This game utilizes the theme of crime investigation training to integrate cognitive tasks that target the most common executive functions deficits associated with ADHD. Each cognitive task is incorporated within a crime investigation training scenario, aligning with the core principles of the task.

Cognitive Tasks as In-Game Tasks

Corsi Block Tapping Task

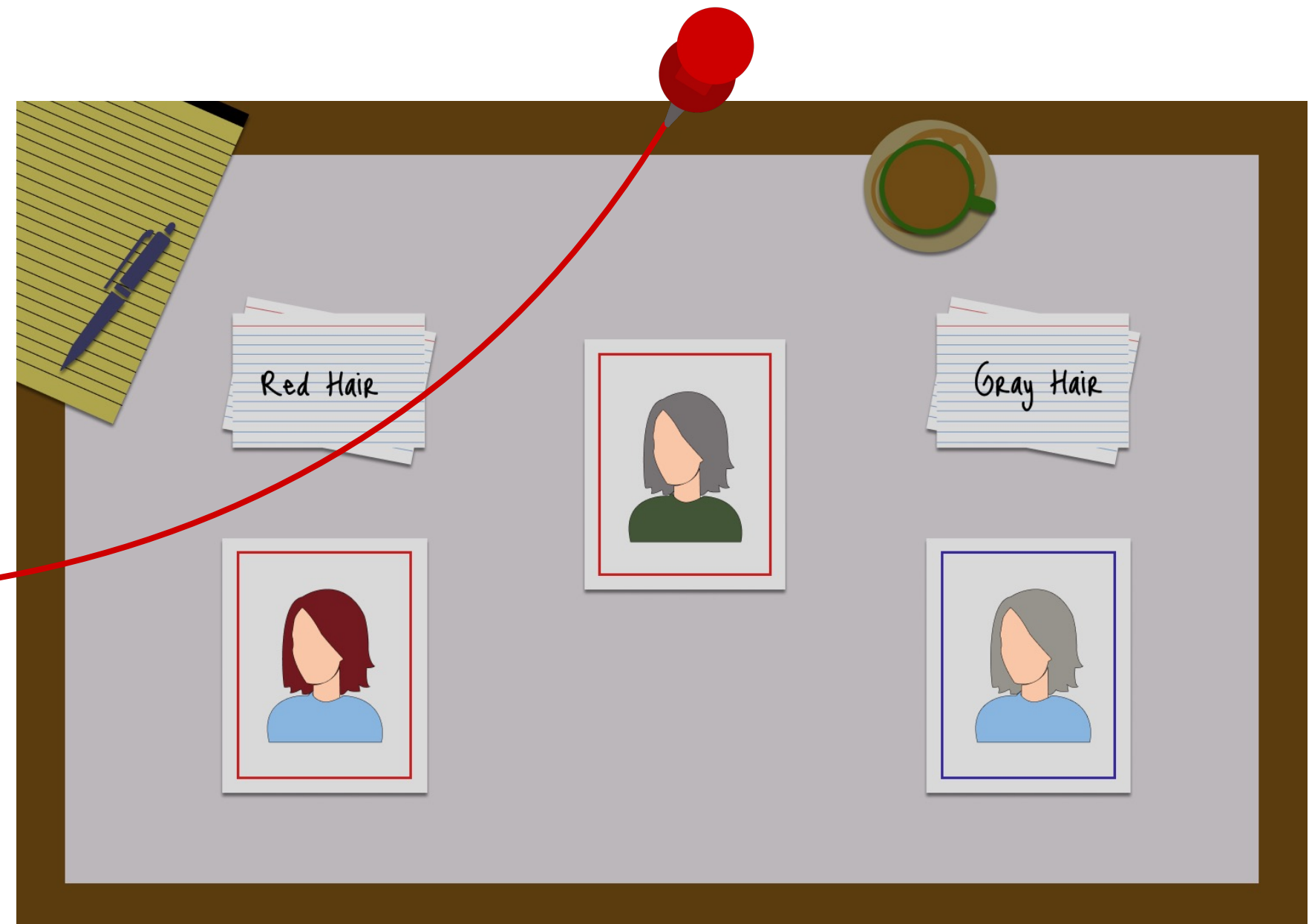
- Focus on training working memory
- Managing a sequence of events via crime investigation board

Stop-Go Task

- Focus on training inhibition
- Player responds to stimuli in simulated investigation

Wisconsin Card Sorting Task

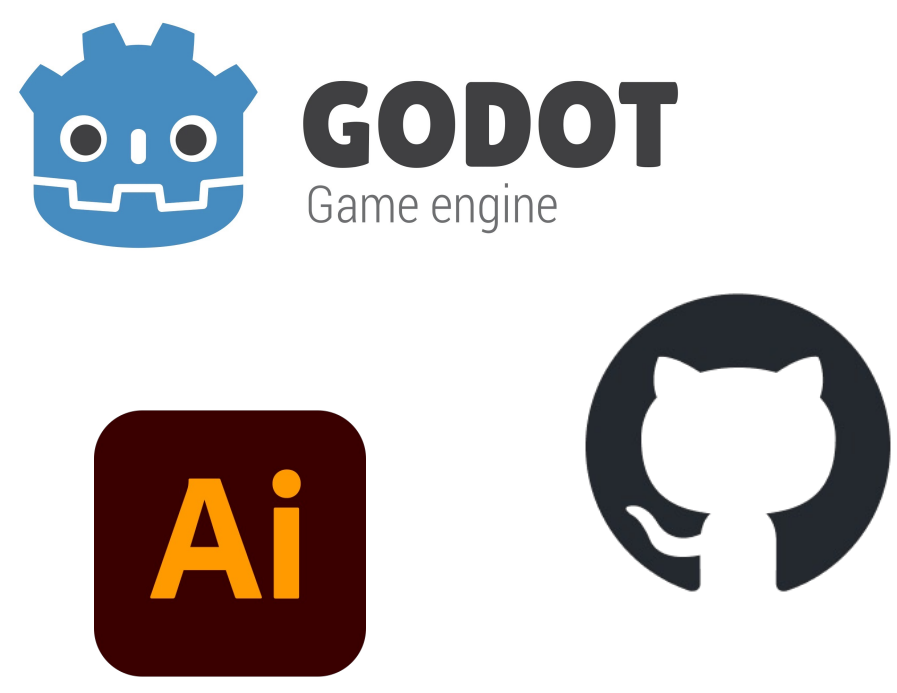
- Focus on training cognitive flexibility
- Player sorts through suspects and evidence based on specific criteria



Wisconsin Card Sorting Task - Player is tasked with sorting the center card, a suspect, to its correct group even if it feels counter-intuitive.

Next Steps - Building the Game

- Game Development
 - Godot - GDScript
 - Git - GitHub
 - Creating engaging game loops
 - Object Oriented Programming
 - Agile/Scrum
 - UML Diagrams
- Directing and interacting with artists
 - Adobe Illustrator



Future Work

- Experimentation with ADHD diagnosed young adults
 - Does this game improve executive functions? How significantly?
 - Self reflection vs in-game assessment vs traditional assessment
- Automated results combined with AI to cater cognitive tasks to the individual