



The Potential of Video Games for Learning and Memory

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Theory



Hippocampus

Declarative memory

- Events
- Facts
- Associations
- Experiences

Spatial memory

Dopamine facilitates hippocampal processing

GABA inhibits hippocampal processing





Down Syndrome Hippocampus

GABA is overproduced

Memory is difficult to induce (at neuronal level) in Ts65Dn mice

When GABA is suppressed, memory is facilitated

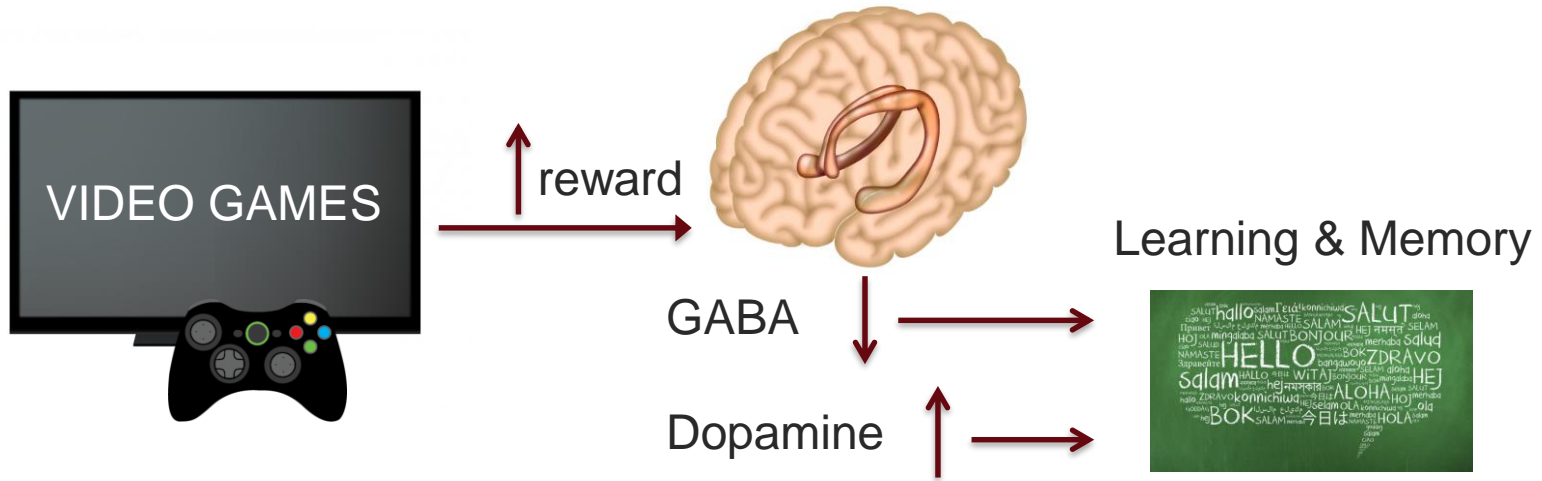


Video Games

- May induce the reward cascade, a mechanism thought to:
 - Dopaminergic influx
 - Suppress GABA
 - **Improve declarative memory**
- Penumbra hypothesis: memory is facilitated until heightened dopamine returns to baseline



My Concept Map



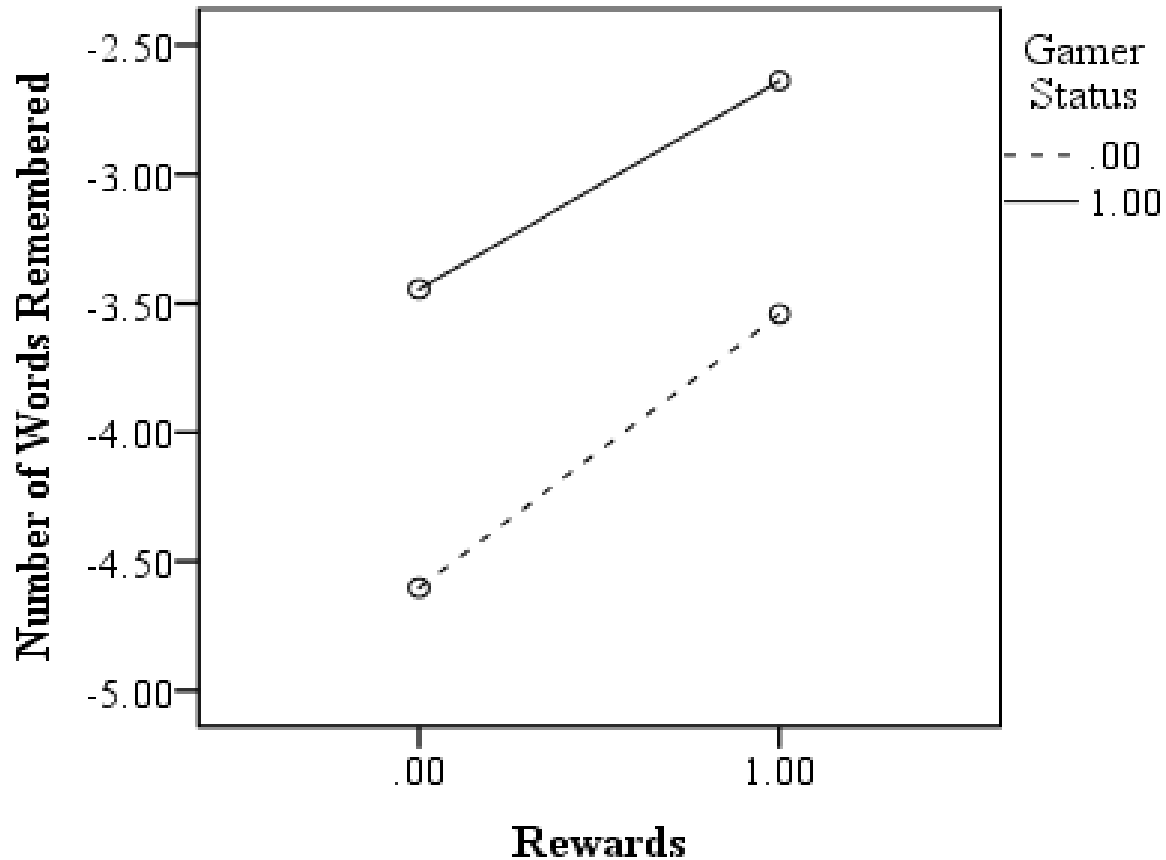


Current Research

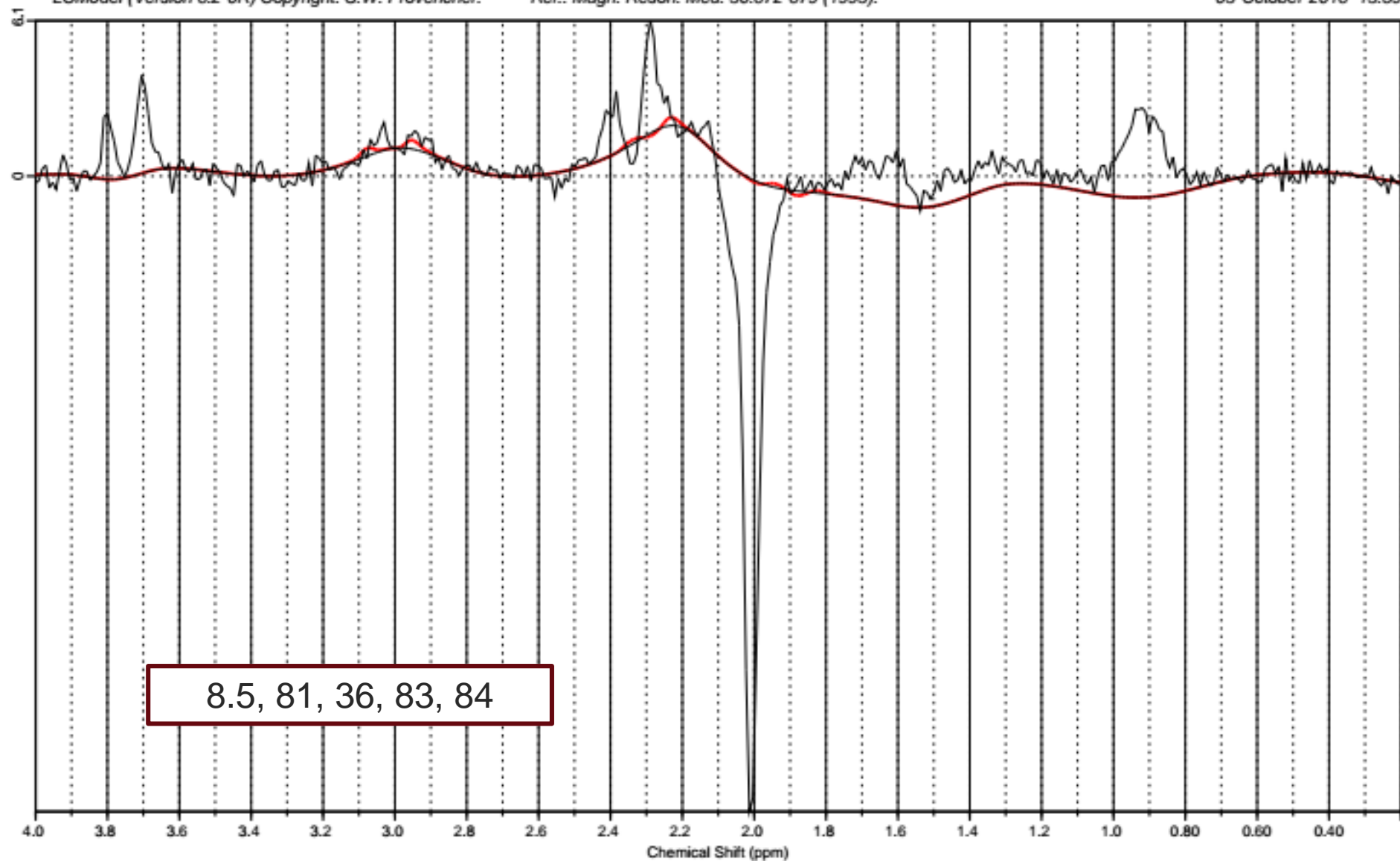


Games and Memory

Figure 1. Main Effects of Rewards and Gamer Status on Words Remembered



Can pla
influe
• 40
• Pla
rev
To sup
rewards
words
rewards





Hopes for Future Research

How do different video game mechanics including reward and spatial navigation influence hippocampal activation? GABA concentrations?

Do different activation patterns influence short-term declarative and associative memory as well as long-term memory consolidation?

How is this mechanism preserved and how does it differ in those with Down syndrome?

What kinds of video game design decisions facilitate gameplay in those with Down syndrome? Do these influence the effects of games on memory?