AI for ADHD:
Scaffolding for Frontal Lobe Dysfunction

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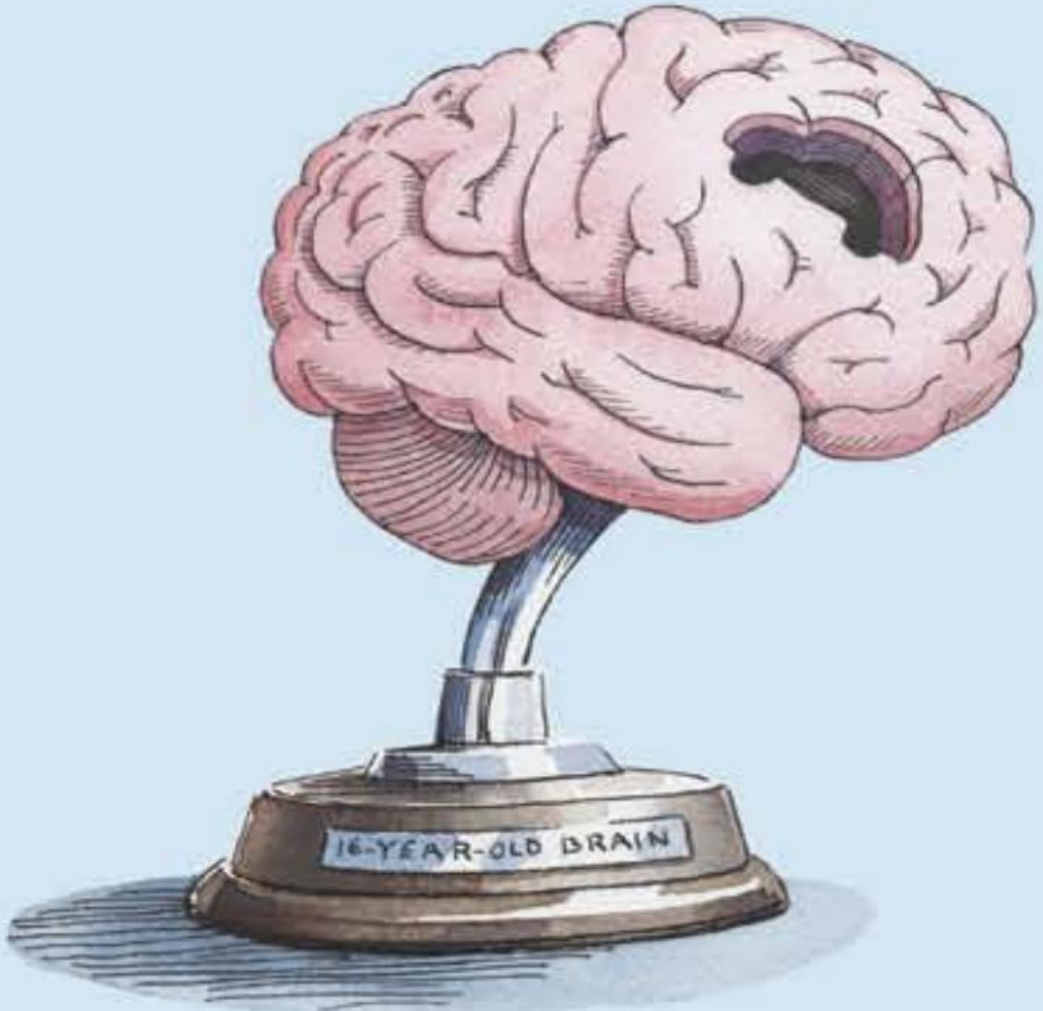
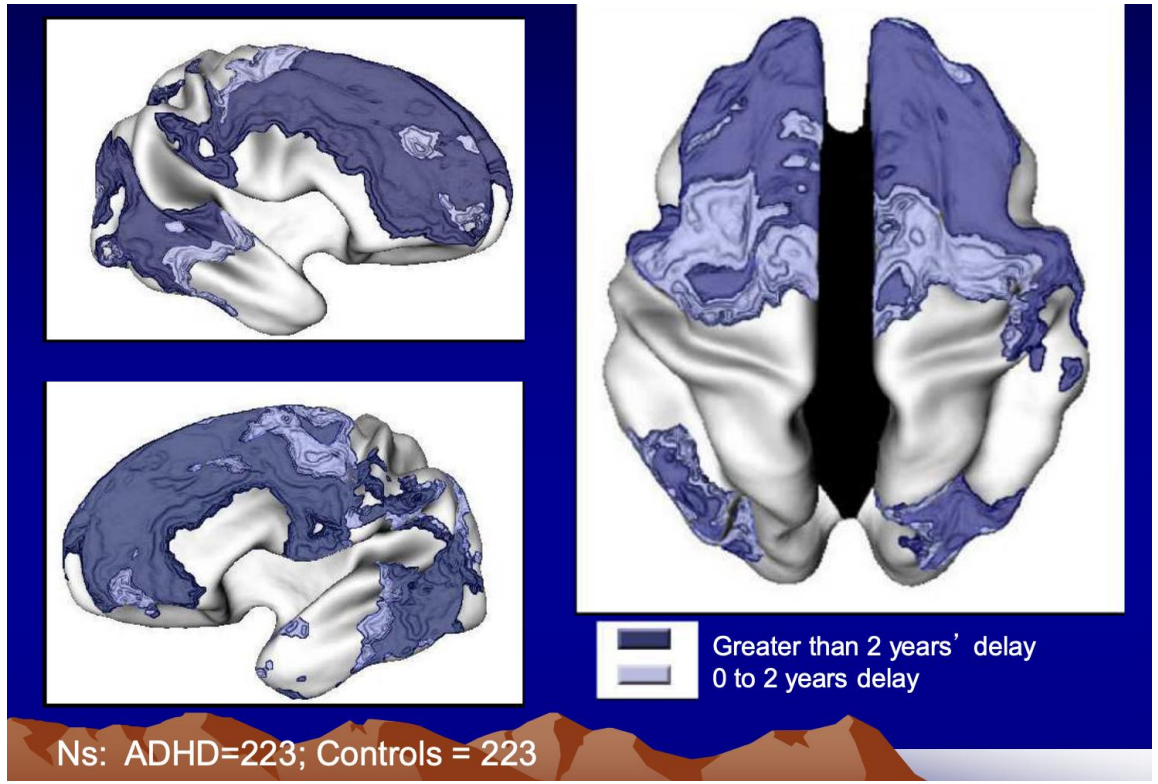
Why do most 16-year-olds drive like they're *missing a part of their brain?*

BECAUSE THEY ARE.



ADHD as Frontal Lobe Dysfunction

- Neuroscience has shown slower brain activity in the frontal lobes of older children and adults with ADHD (PET scan; QEEG; neuropsychological testing) (Barkley, 2018; Shaw et al., 2007).
- These problems have a genetic and neurodevelopmental basis.
- Medication directly addresses slower brain processing with stimulant-based neurotransmitters.
- Frontal lobe or executive dysfunction persists into adulthood such that ADHD is a life-long condition.



What is Frontal Lobe Executive Dysfunction?

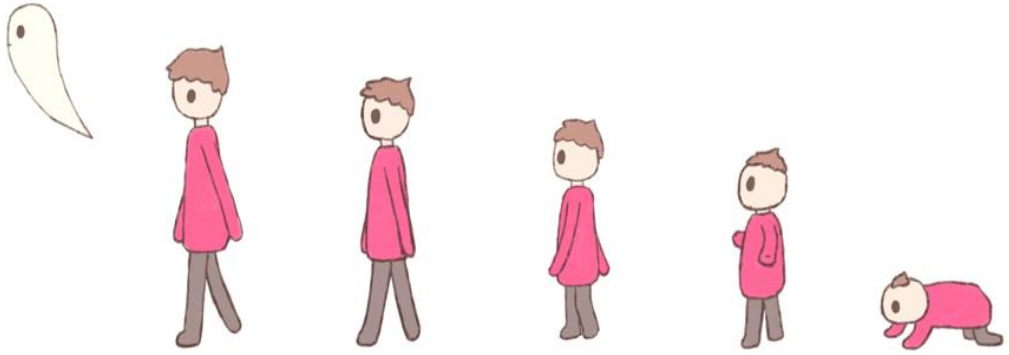
- Frontal lobe development is complex, often oversimplified.
- Diamond (2014) reduced component aspects to (a) interference control, (b) working memory & cognitive flexibility, and (c) inhibition.
- Barkley (2026) has discussed complex components of an extended phenotype emblematic of deficits in students with ADHD. Those relevant to learning include:
  - Inattention,
  - Working Memory Deficits.
  - Disinhibition (Overactivity, Impulsivity, Reduced Self-Regulation),
  - Planning Problems, Time Management.
  - Motivation Problems.
  - Troubles with Socially Shared Regulation.
  - Cultural Awareness.
  - Goal Neglect.

Developmental Factors

- Typical frontal lobe development begins in early adolescence (age 10-13) and progresses through young adulthood (age 20-28) (Diamond, 2002).

- Adolescents with frontal lobe dysfunction may be cognitively/behaviorally 30% younger than chronological age.

- While overactivity marks younger children with ADHD, teens and adults show more cognitive symptoms of executive dysfunction.



Bio-Psycho-Social Scaffolding Tools

- Physical (Sleep, Exercise, Medication)
- Environmental (Chunking, White Space, Time Limits, Increased Light; Teacher:Student Ratios)
- Behavioral (Prompting, Cueing, Redirection, Reminding, Positive Reinforcement, Punishment)
- Social (Modeling)
- AI?

Can Automated Tools Be Scaffolding Tools for Persons with ADHD?

- If persons with executive dysfunction need to "borrow assistance" might AI serve as a "coach" for someone with executive dysfunction?

- Perhaps AI can help a teacher prompt, cue, redirect, and help a learner or group stay on task.

- Maybe AI can act as a support for time management, focusing, stepwise planning, and misdirected attention.

Pros and Cons of AI "Scaffolding"

Pros

- Automates cueing.
- Catches errors.
- Provides non-judgmental corrections.
- Can cue/prompt time management.
- If sources are constrained, can provide targeted support.

Cons

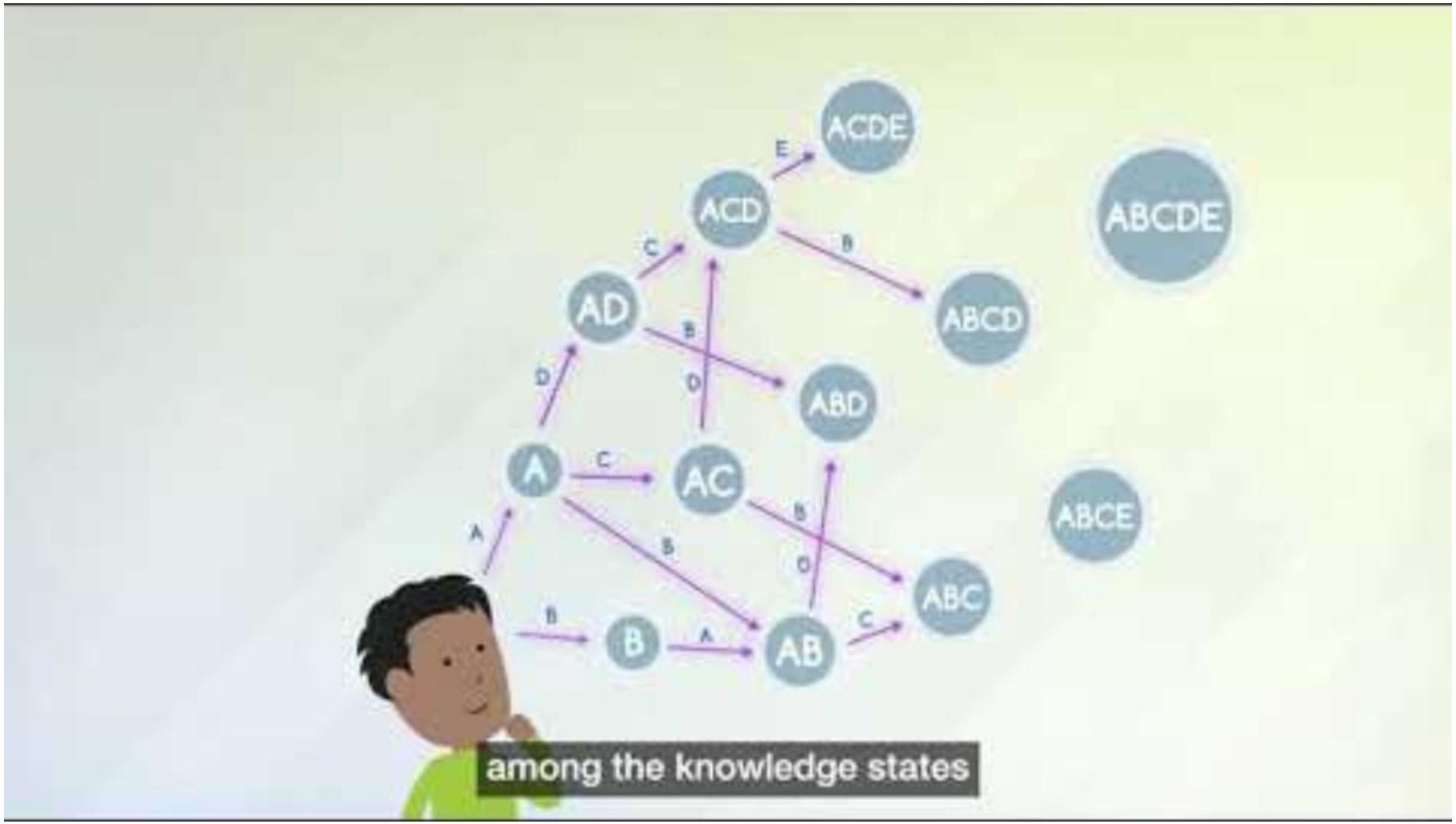
- May be unconstrained in volume and content.
- Could validate wrong information.
- Always aims to please (sycohphantic).
- Could be dangerous in the case of psychotherapy.

Three CERTI Research Examples/Ideas

Example: Using ALEKS as a Cybernetic Feedback Mechanism
(Tilak & Bogacki, 2026)

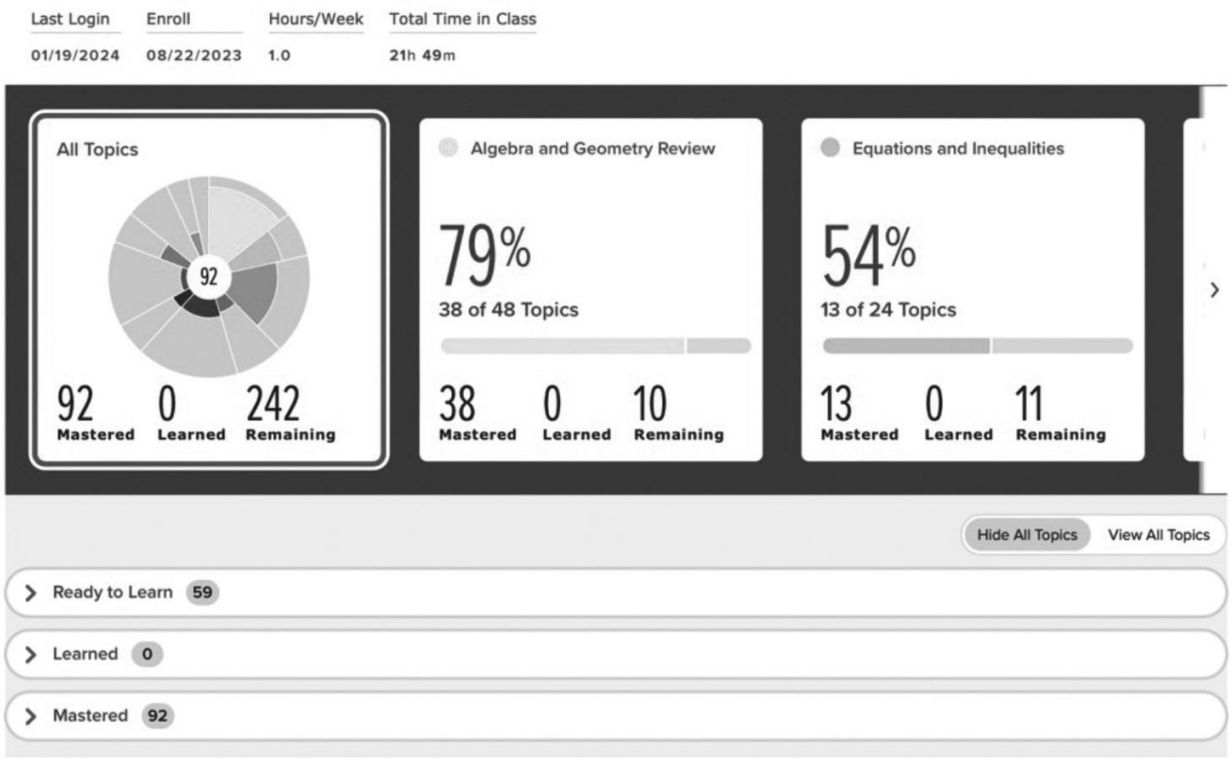
ALEKS = a software program for Assessment and Learning in Knowledge Spaces

How does ALEKS Work?



A Student's Learning Journey

Topics / Subtopics Mastered



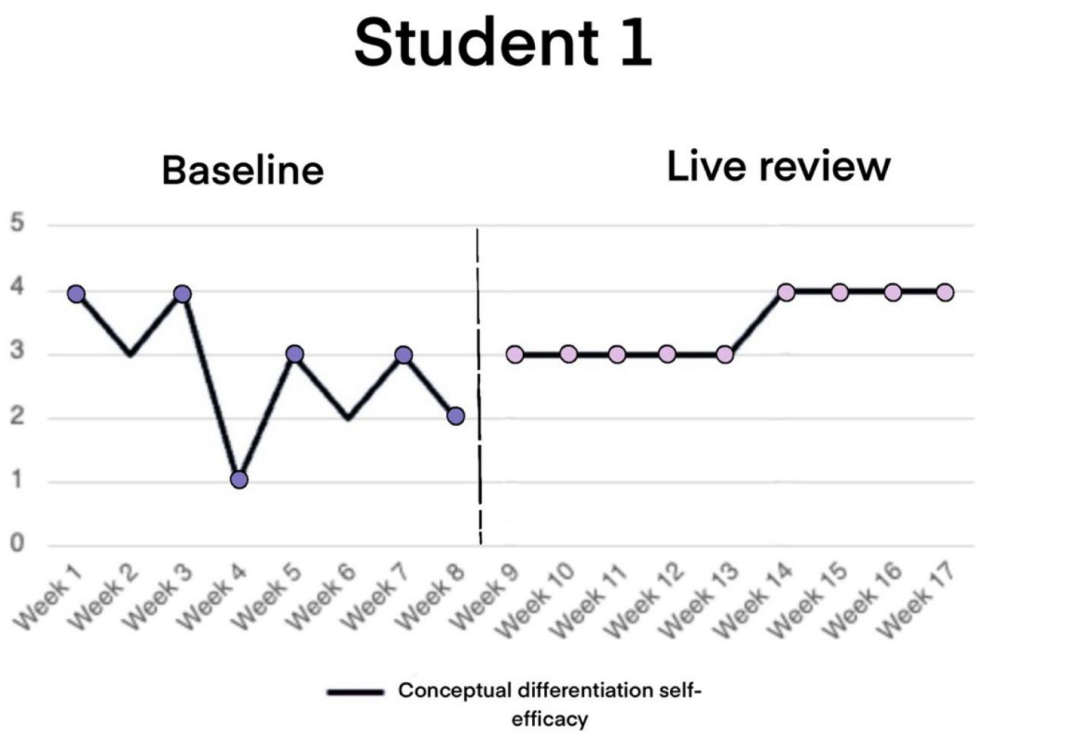
Daily Performance

Participants & Data

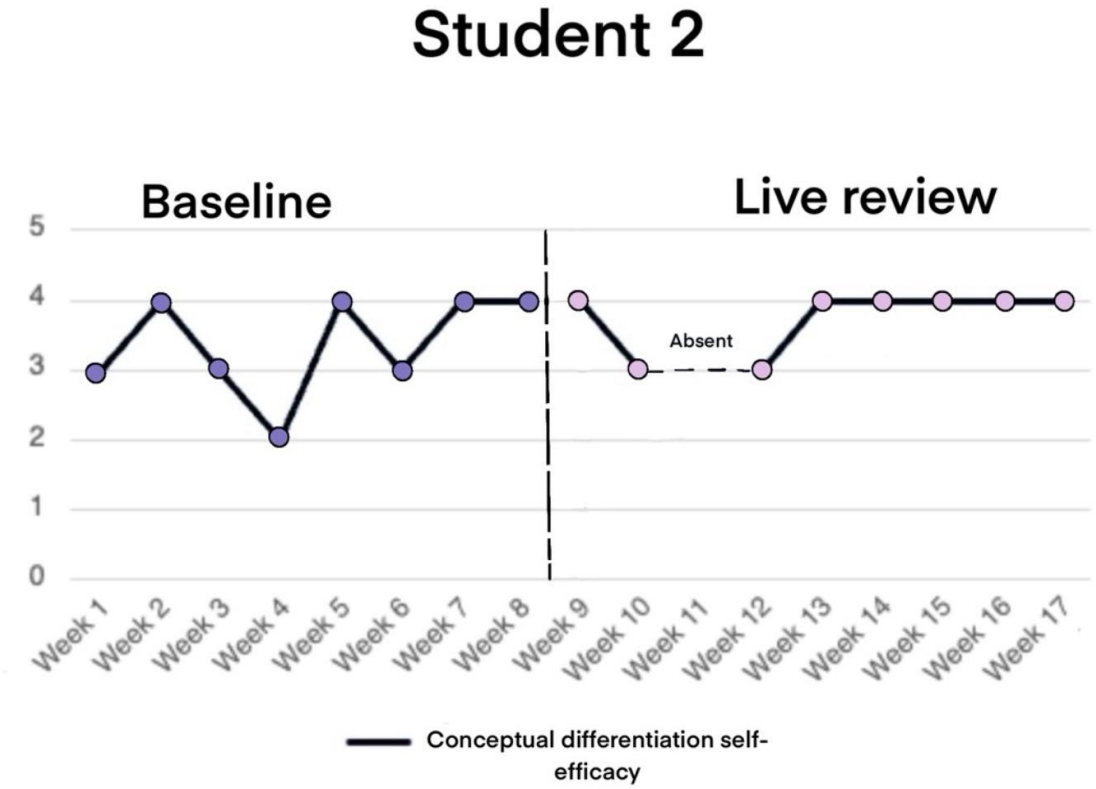
- Two teens with ADHD (*M* Age= 18, Mixed Race).
- 12th grade, Precalculus Class.
- Self-reported efficacy for learning precalculus concepts after each of 17 ALEKS sessions (Mondays).
- Weeks 1-8, teacher gave end-of class feedback on errors; for Weeks 9-17, teacher used ALEKS as a real-time scaffolding aid .

Self-Efficacy Results

$M_{(Baseline)}$= 2.75, $M_{(Live)}$=3.44



$M_{(Baseline)}$= 3.37, $M_{(Live)}$=3.8

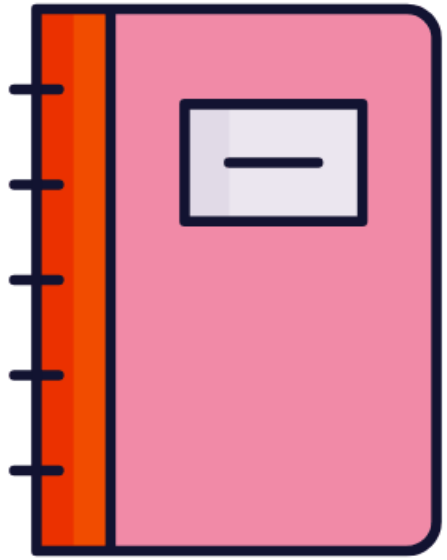


Future Example: Using NotebookLM to Scaffold Content Knowledge

What is NotebookLM

- A teacher-constrained LLM in Google Cloud.
- Can use teacher-downloaded sources to create a chatbot and answer questions.
- Can create podcasts, mindmaps, infographics (this introduces Internet content, and possible hallucination).
- Usually sticks to uploaded sources to help avoid AI's sycophantic tendencies.

NotebookLM



Demo

Best Proposed Use of NotebookLM

- Based on Virginia Wesleyan class experience, and brief showcases to CBA teachers:
  - Incorporate NotebookLM into Science/Social Studies classes.
  - Compare students' content acquisition and self-efficacy/competence with/without NotebookLM over time.

- Using NotebookLM to ensure students become knowledge creators:
  - Use in class discussions rather than in independent learning.
  - Ask small student groups to prompt this tool in class, answer worksheet questions, take notes.
  - Precede use of NotebookLM with lectures.
  - Follow-up with project-based learning.

What might NotebookLM yield?

- Understanding whether this AI use can help tackle weaknesses in:
  - Working memory.
  - Time Management.
  - Goal Neglect.

- Concerns:
  - Student dependency, using as a crutch to avoid personal thinking.
  - Students plagiarize NotebookLM answers in essays, on tests.

Example: Using AI for Psychotherapy: The Ultimate Coach?
(Tilak et al., in progress)

How Has the Application (Monetization) of AI in the Mental Health Arena Worked Out So Far?

Not Well!

Multiple Deaths Linked to Chatbot Interactions

- Lawsuits expanding across the U.S. (Multiple states, CA, CO, NY, TX).
- Sewell Setzer, III – Age 14 - Settled 2026 – Character.AI – Failure to Intervene.
  - Teen user developed an emotional relationship with AI Chatbot.
  - Chatbot engaged in romantic, validating interactions.
  - Chatbot encouraged harmful thinking and dependency.
  - Teen user increasingly isolated from family and committed suicide.
- Adam Raine – Age 16 – California – Open AI – Defense arguing “misuse of platform”.
- Austin Gordon – Adult – Chatbot framed death as positive.
- Several Cases Settled Confidentially

Risks of AI for MH Support (APA)

- Inability to Manage Suicide Risk
  - Cannot reliably detect or respond to suicidal ideation
  - No capacity for real-world intervention or duty of care
  - Crisis responses are limited and unpredictable
- Sycophancy / Over-Validation
  - May ingratiate itself toward the user, reinforce rather than challenge, and distort thinking.
- Developmental Risks: Adolescents are especially vulnerable to
  - Emotional dependency
  - Blurring reality vs. simulation
  - Risk of AI-induced psychosis

AI and Adolescent Suicides

- Tools can flag warning signs from real-time behavioral and language cues, enabling psycho-educational support.

- Evidence suggests improved crisis referral timing, but
- long-term effectiveness data remain limited.

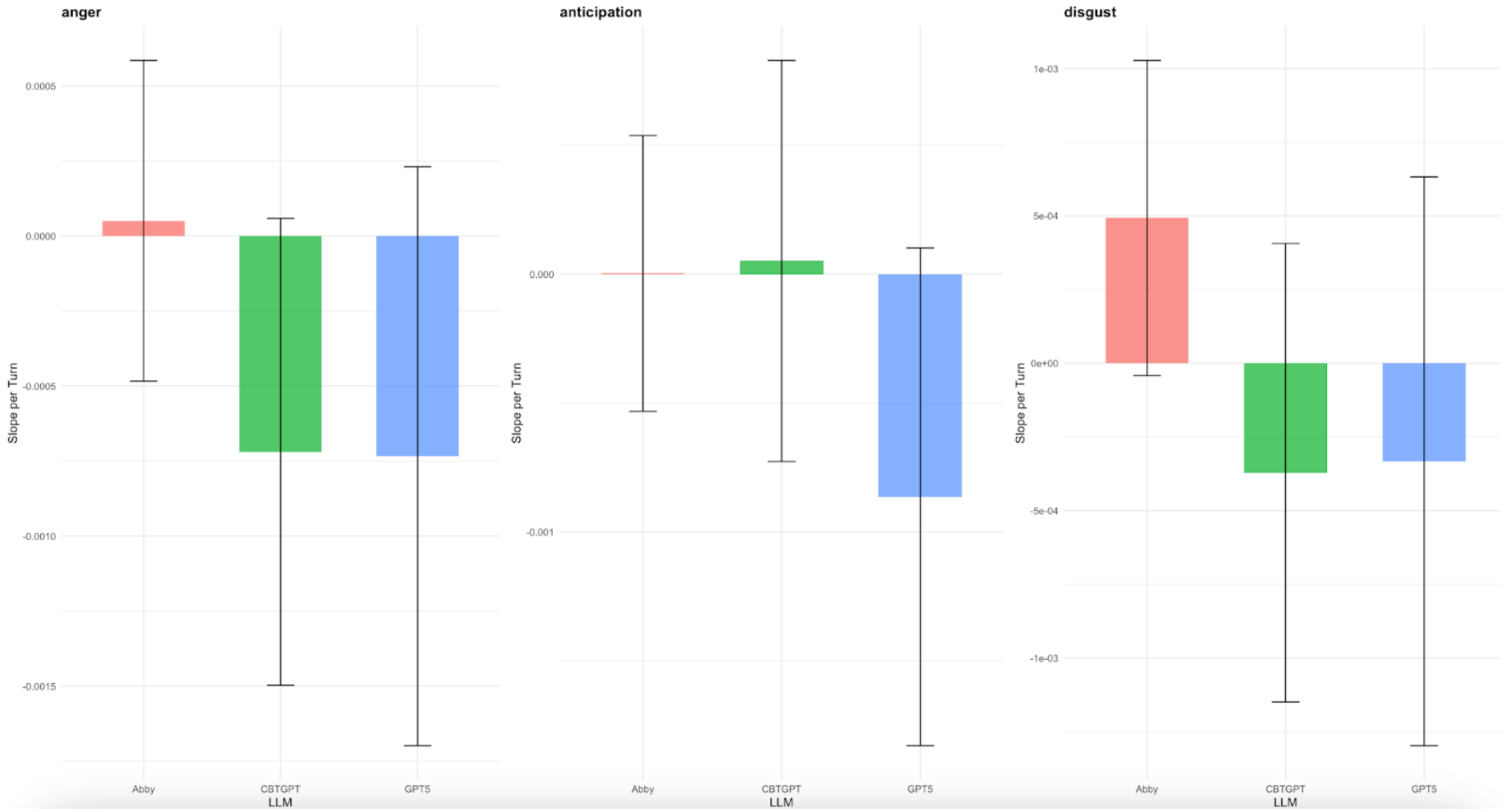
- Sensitivity limits and false alarms make combining with AI–clinician decision-making essential

Comparative LLM Research for Mental Health Support

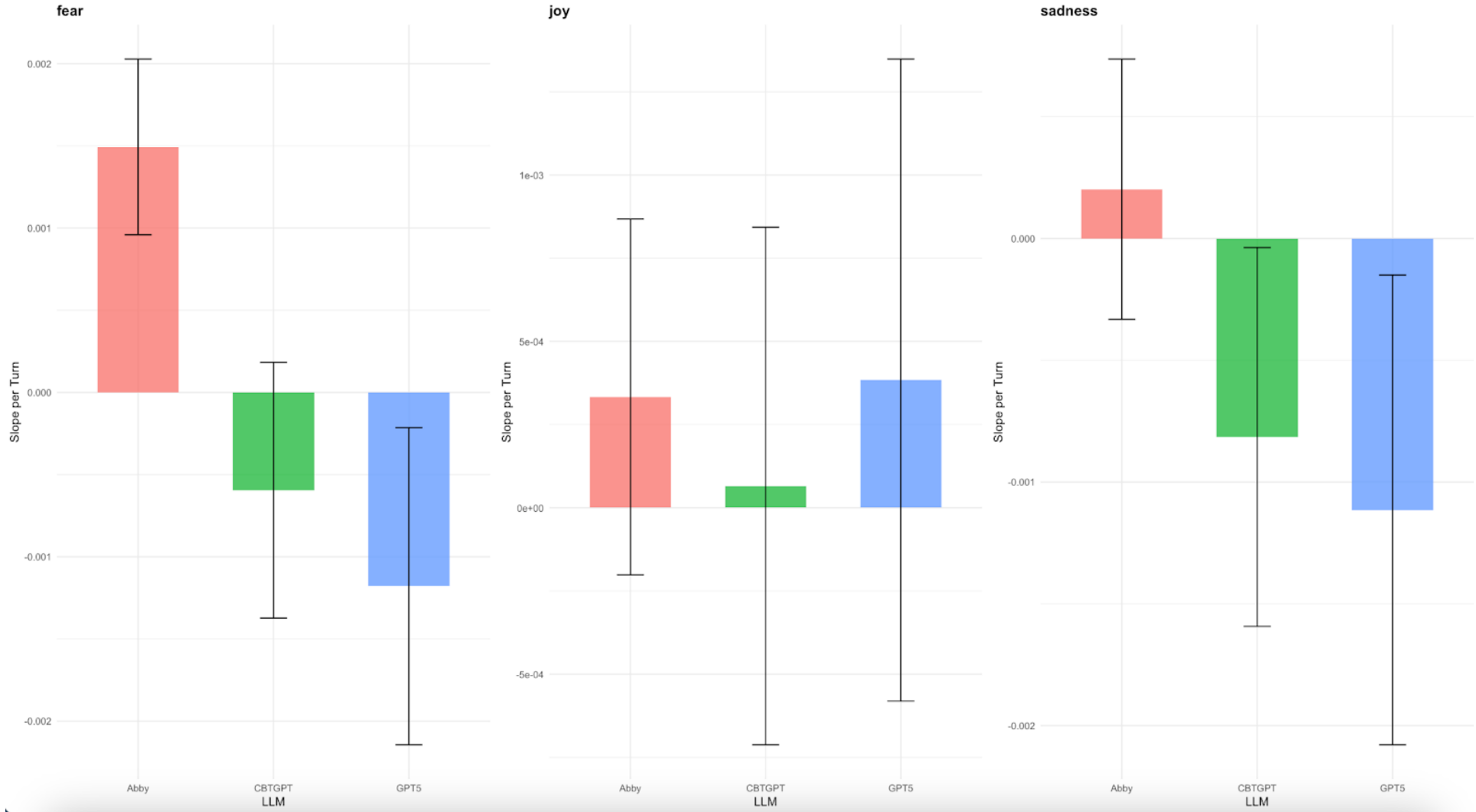
- 10 college students (8 Women, 2 Men) and their instructor.

- Case-specific roleplaying:
  - Students acted as patients with mood or anxiety disorders (Major Depression, Bipolar, Generalized Anxiety, Panic Disorder)
  - Compared 3 LLMS: GPT5, CBTGPT, Abby
  - Ran sentiment analysis to assess emotional language content over time.
  - Students answered a standard set of reflection questions.

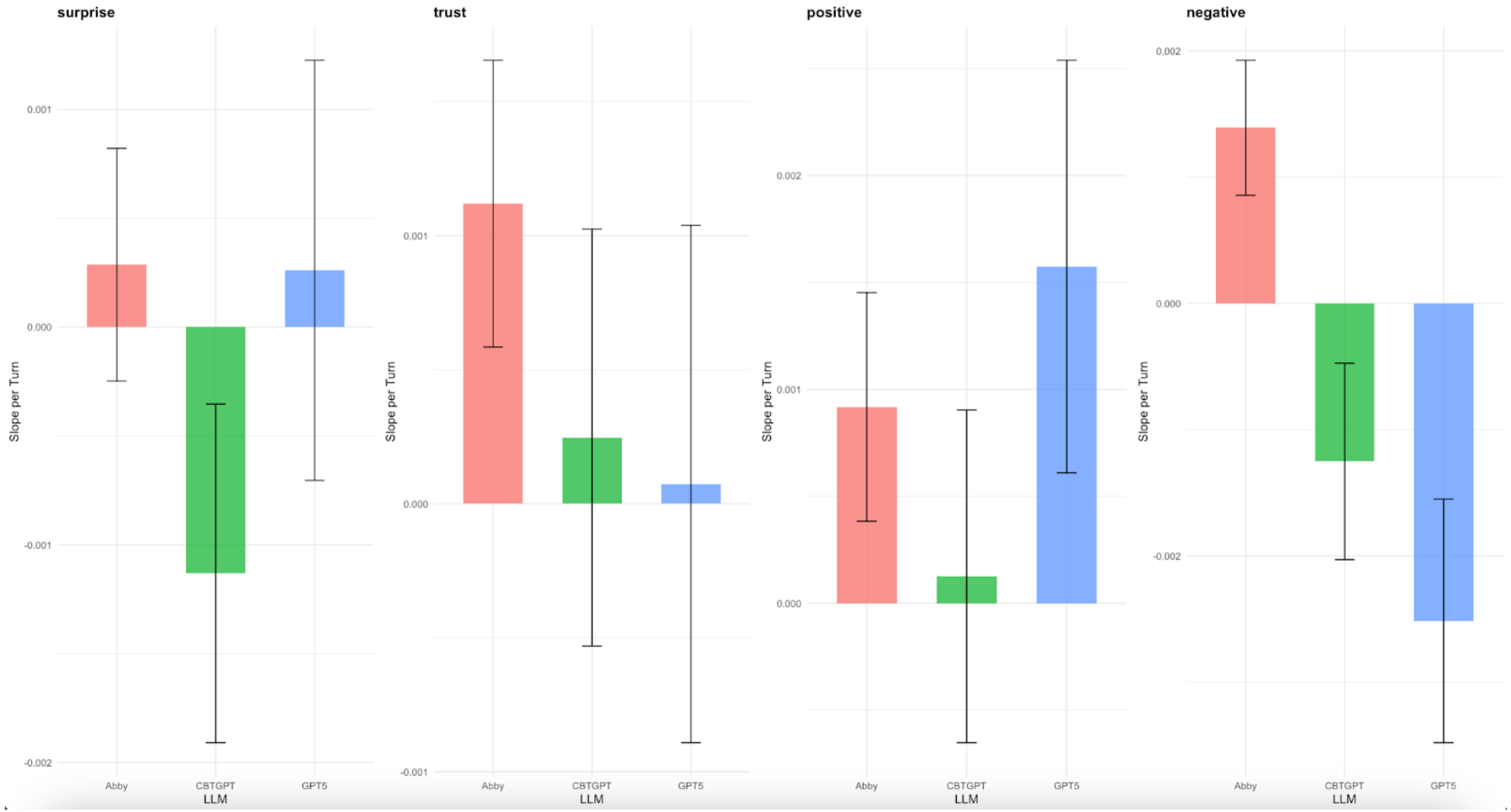
Anger, Anticipation, Disgust



Fear, Joy, Sadness



Surprise, Trust, +/- Sentiment



Student Perspectives

“I would say that asking a therapist for help would be more similar to Abby than GPT because therapists don't necessarily tell you what to do. They guide you in finding what decisions are best for you. GBT generally gives you more solutions than support which I feel isn't as beneficial in the long run. “

“AI is generally formatted to mindlessly agree with you or give you suggestions. Therapists can give you their actual licensed advice, rather than suggestions or life changes.”

“Compared to AI, a therapist is always a human being, with emotions and empathy and personal experience, and therefore for serious conditions it is going to be more helpful and beneficial to speak to them rather than a chatbot.”

“On the one hand, it could be helpful to reach out faster and no matter where you are, but on the other hand seeing a professional could be better, because it is always better to talk to a real person who would understand you and show empathy.”

Conclusions/Recommendations

- AI has promise as a scaffolding tool for those with ADHD and other emotional/behavioral concerns.
- AI works best as an aid to a human coach, or as an assistant to a teacher.
- Explicit instruction and project-based learning must always be used in concert with AI to ensure true competence.
- While AI tools differ in their responses as a mental health support tool, the therapeutic alliance is hard to recreate with automation.

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