MVP Model for Data-Driven Insights and Behavior Change Application

1. Objective

To design a unified, multimodal software model that captures, analyzes, and intervenes in real-time to surface and mitigate cognitive and perceptual biases within digital meetings.

2. Data Input & Instrumentation

Data Streams:

- Audio: speaking time, silence gaps, interruption events, vocal tone (pitch, tone, volume, speech rate, jitter), sentiment polarity
- Video: facial action units, gaze direction, head nods/shakes, microexpressions, eye tracking
- Speech Pattern Analysis: Transcript/NLP: hedging language, certainty words, pronoun use, custom bias keywords
- Psychometrics: Big Five (OCEAN) trait calibration (Alternate 1MVP pricing) A better understanding of baseline data, A/B testing groups, and future conative voice analysis features is necessary. Discuss for MVP

3. Preprocessing & Feature Extraction

- Audio: ASR transcription, prosody, tone, pauses, jitter
- Video: face detection & alignment, MediaPipe for AUs, gaze estimation
- Text: keyword extraction, sentiment analysis, transformer embeddings
- Behavior: speaking ratio, interruption count, engagement score

4. Metrics, Baselines & Detection

• Rolling aggregation (e.g., 30-second windows) for real-time cues
• Whole-meeting aggregates for reflection
• Benchmarks: personal/team norms or role-specific standards
• Rule-based thresholds (e.g., >60% airtime) and ML classifiers for nuanced bias detection

5. Intervention Pipeline – Nudges will be both rule-based and ML-generated.

The intervention pipeline progresses through progressively more engaging techniques:

Flag → Nudge → Reframe → Reinforce.

Nudges offer subtle, non-disruptive cues; reframing prompts invite reflection when nudges alone are insufficient.

Flag & Nudge Examples

- High airtime (>60%)
    - A small icon appears next to the speaker's video tile indicating overtalking.
    - An unobtrusive toast message: "Consider pausing to let others speak."
- Repeated interruptions
    - A gentle vibration alert on the user's device reminding "Allow others to finish."
    - A brief tooltip next to the interrupter's name: "Pause and listen."
- Detected frustration in tone
    - A pulsing border around the user's video frame with text: "Take a calming breath."
    - An animated breathing guide overlay for 5 seconds.
- Low participation from quieter members
    - Highlight participant tiles with low speaking time and prompt: "Any thoughts?"
    - Ripple effect on the screen edge near quiet participants inviting input.
- Negative sentiment detected in language
    - A muted color overlay with suggestion: "Frame feedback constructively."
    - A quick sentiment summary pop-up: "Try positive rephrasing."
- High speaking rate anomaly
    - Progress bar displaying speaking pace with note: "Slow down for clarity."
    - Brief on-screen cue: "Pausing improves understanding."

Cognitive Reframing Examples

- Overconfidence in decisions: System asks the user to list one potential downside of their choice, helping them consider alternative outcomes.
- Self-criticism during presentations: Prompt: "Identify one positive impact your contribution offers to the team."
- Groupthink risk in consensus: Suggest writing down dissenting views privately before reopening discussion.
- Avoidance of silence: Offer: "Embrace a 3-second pause to allow others to reflect and respond."
- Escalating tension: Prompt: "Note a moment when tension rose and one way to de-escalate."

Reinforcement & Learning

Following interventions, users receive a summary showing which nudges and reframes were accepted, with measurable shifts in participation or sentiment. Adaptive algorithms refine future prompts based on acceptance rates and outcomes. User behavior metrics be tracked to iteratively improve the system.

6. Additional Psychological Intervention Models - Future

Cognitive Forcing Functions

These prompts interrupt automatic thought patterns by encouraging alternative perspectives. Ideal during high-speed decision moments, they help participants pause and evaluate other options before proceeding.

Premortem Analysis

Participants envision potential failures before decisions are finalized. By identifying possible pitfalls at planning stages, teams can address risks proactively, making this model especially suited for strategic planning and project kickoffs.

Analysis of Competing Hypotheses

A structured approach where all plausible explanations are listed and evaluated. Effective in ambiguous situations with conflicting data, it counteracts confirmation bias through systematic evidence comparison.

Consider the Opposite Prompt

Encourages users to articulate reasons their current assumptions might be wrong. This technique is lightweight and works well when confidence is high and alternative viewpoints are easily overlooked.

Mindfulness-Based Debiasing

Short guided mindfulness exercises help reset cognitive load and reduce stress. Best applied during moments of escalating tension or repeated flags, it fosters calm and clarity.

Bias Habit-Breaking Program

A set of daily micro-exercises delivered outside of meetings, focusing on perspective-taking and bias awareness. Over time, users build lasting mental habits, making it suitable for long-term behavioral change.

Cognitive Forcing Tool for Human-AI Teams

Combines AI-generated counterpoints with user reflection prompts. Particularly useful in collaborative environments where AI insights need to be balanced with human judgment.

Accountability & Justification

Users are asked to document their reasoning for key decisions. This traceable reflection increases ownership and transparency, valuable when decisions carry significant consequences.

7. Governance & Ethics

• Consent & transparency: clear participant notices
• On-device processing & encrypted transport
• Regular bias audits for demographic parity
• Opt-out and data deletion controls

8. Scalability & Adaptation

This modular pipeline can be extended beyond live meetings to include sales calls, one-on-one coaching sessions, and asynchronous video reviews, enabling broad applications for rapid self-awareness and bias mitigation.