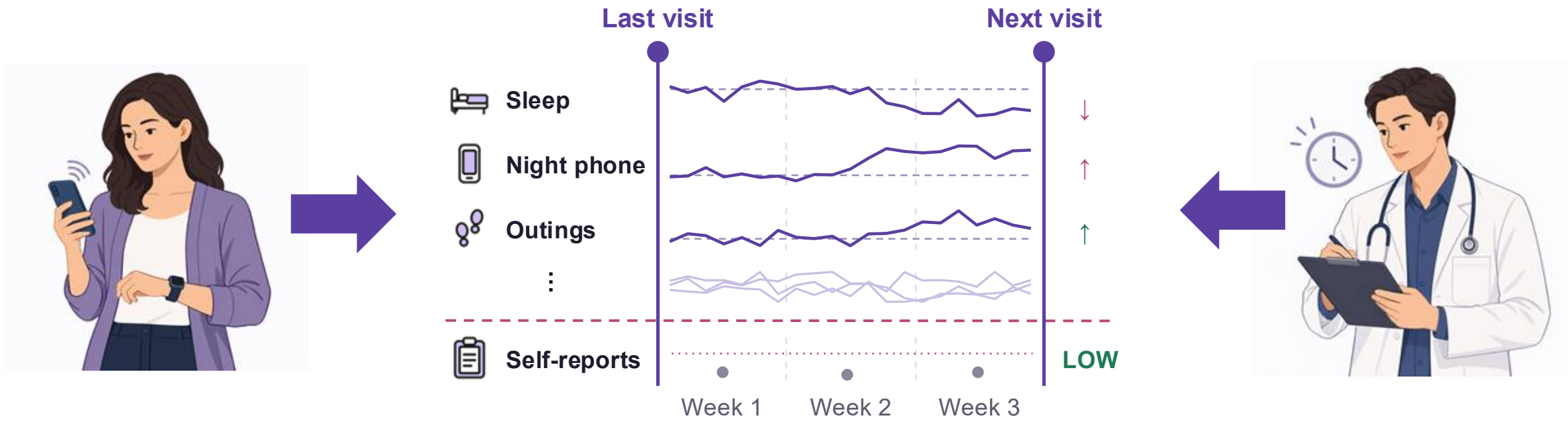
Designing Clinician-Centered Explanations for Sensing-based Longitudinal Mental Health Monitoring

Esther Kang, Youngji Koh, Seungwan Jin, Uichin Lee

KAIST, Daejeon, South Korea

KAIST INTERACTIVE COMPUTING LABORATORY

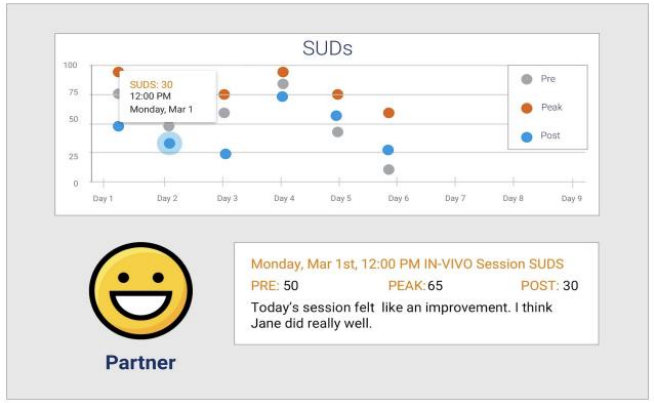
Weeks of patient data, minutes to make sense of it

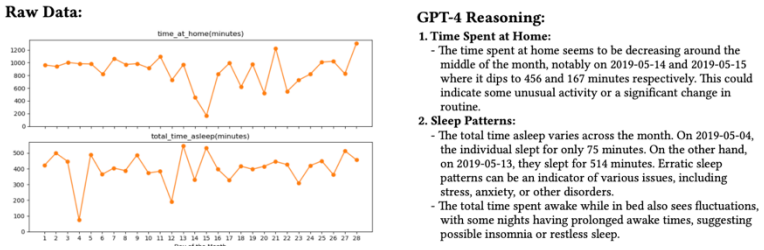


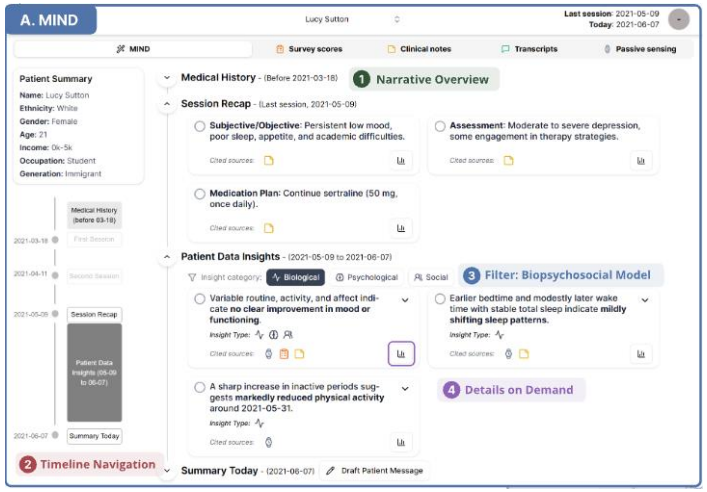
LLMs can interpret these signals, **but clinicians still need to** judge **what** matters, examine the **evidence**, and decide what to explore **next**.

RELATED WORK

How has sensing data been shown to clinicians?







Dashboards of raw trends

Self-reports and sensor signals charted for clinicians to read

(Schertz et al., 2019; Vaidyam et al., 2022)

From trends to interpretations

LLMs write clinical interpretations of the trends

(Englhardt et al., 2024; Evans et al., 2024)

Interpretations with sources

Insights with cited sources, timelines, and details on demand

(Zou et al., 2026; Zhu et al., 2026; Van Dievoort et al., 2026)

RESEARCH QUESTION

How should AI-generated interpretations be explained to support clinical reasoning, not merely justify model outputs?

FORMATIVE STUDY

What clinicians need from explanations

We interviewed **12 psychiatrists** from university hospitals and clinics in South Korea (4 female; mean age 44.5).



DR1 — **Rapid understanding within limited consultation time**
Surface what matters first; keep details one step away

DR2 — **Evidence-grounded clinical interpretation**
Reasoning over accuracy: show the evidence behind each view

DR3 — **Support for clinical inquiry**
Turn remaining uncertainty into questions and interventions

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From longitudinal sensing to clinician-centered explanations

Sensing + EMA

Sleep, activity, phone use, self reports, etc.

Preprocessing

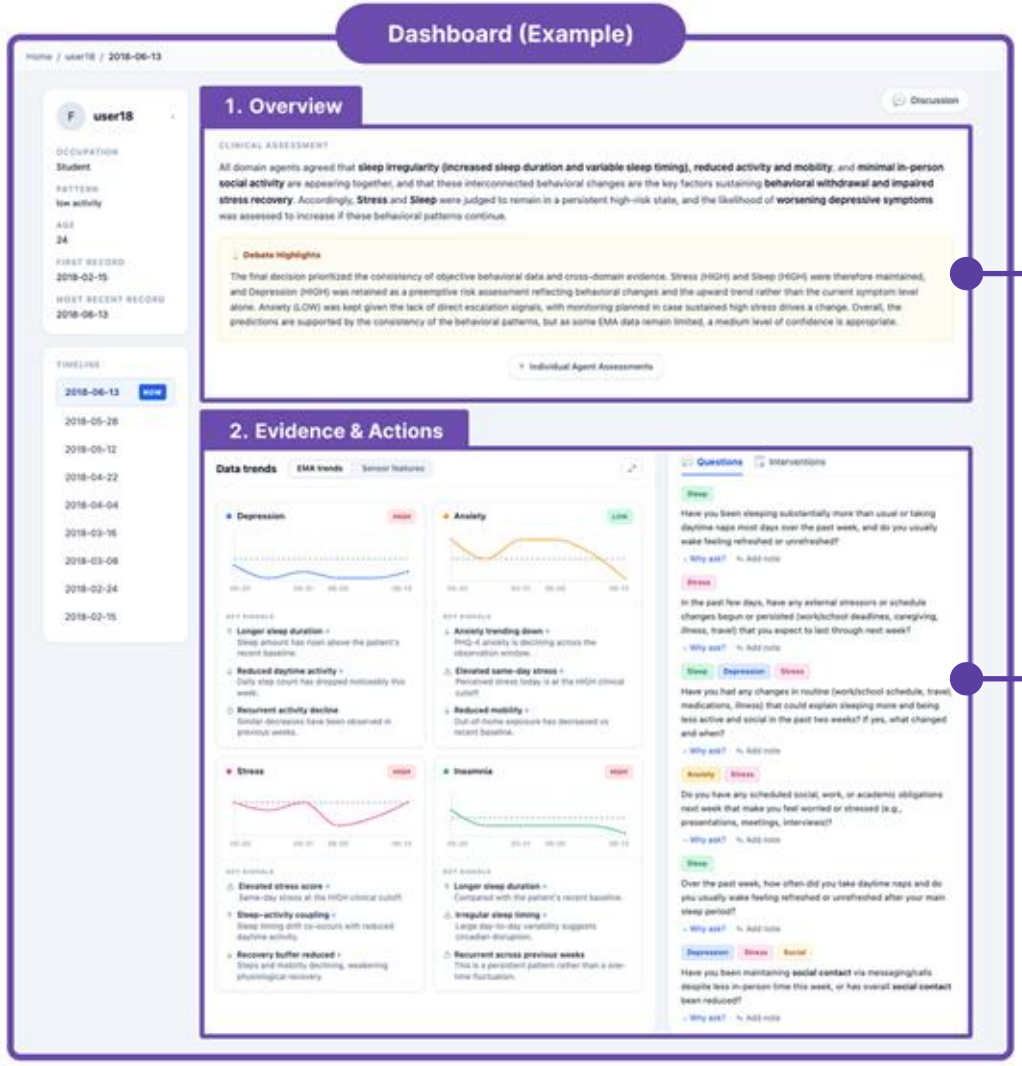
Cleaning, feature extraction, baseline comparison, window-based aggregation

Multi-agent reasoning

Domain agents reason over different aspects; the Orchestrator synthesizes their assessments.

Explanation interface

Supporting evidence, follow-up questions, and intervention recommendations



1 Overview

Assessment first, agent debate on demand

2 Evidence & Actions

Trends, follow-up questions, interventions

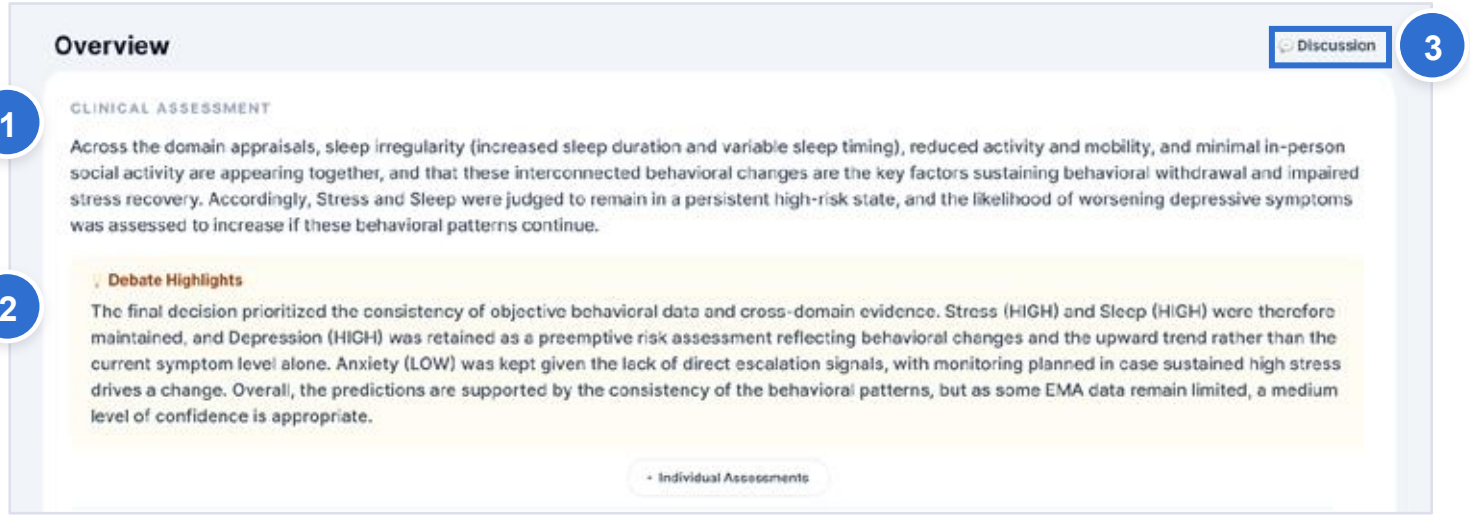
What changed since the last visit?

WHAT CLINICIANS TOLD US

With limited time, clinicians preferred to see the main concerns first and access details when needed.

IN THE INTERFACE

1. Synthesized clinical assessment highlights the key changes
2. Debate highlights summarize how the assessment was formed
3. Detailed agent reasoning remains available on demand



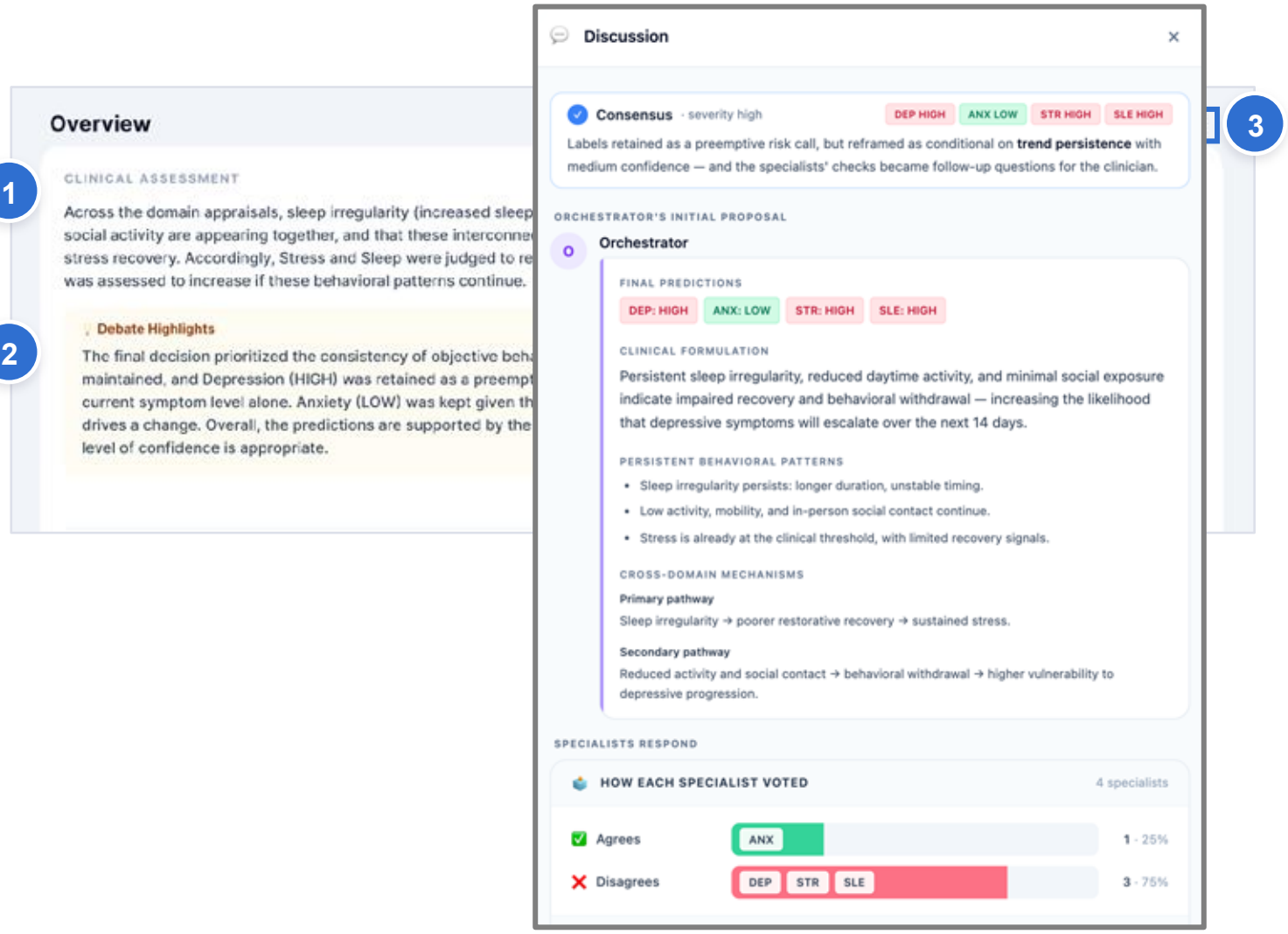
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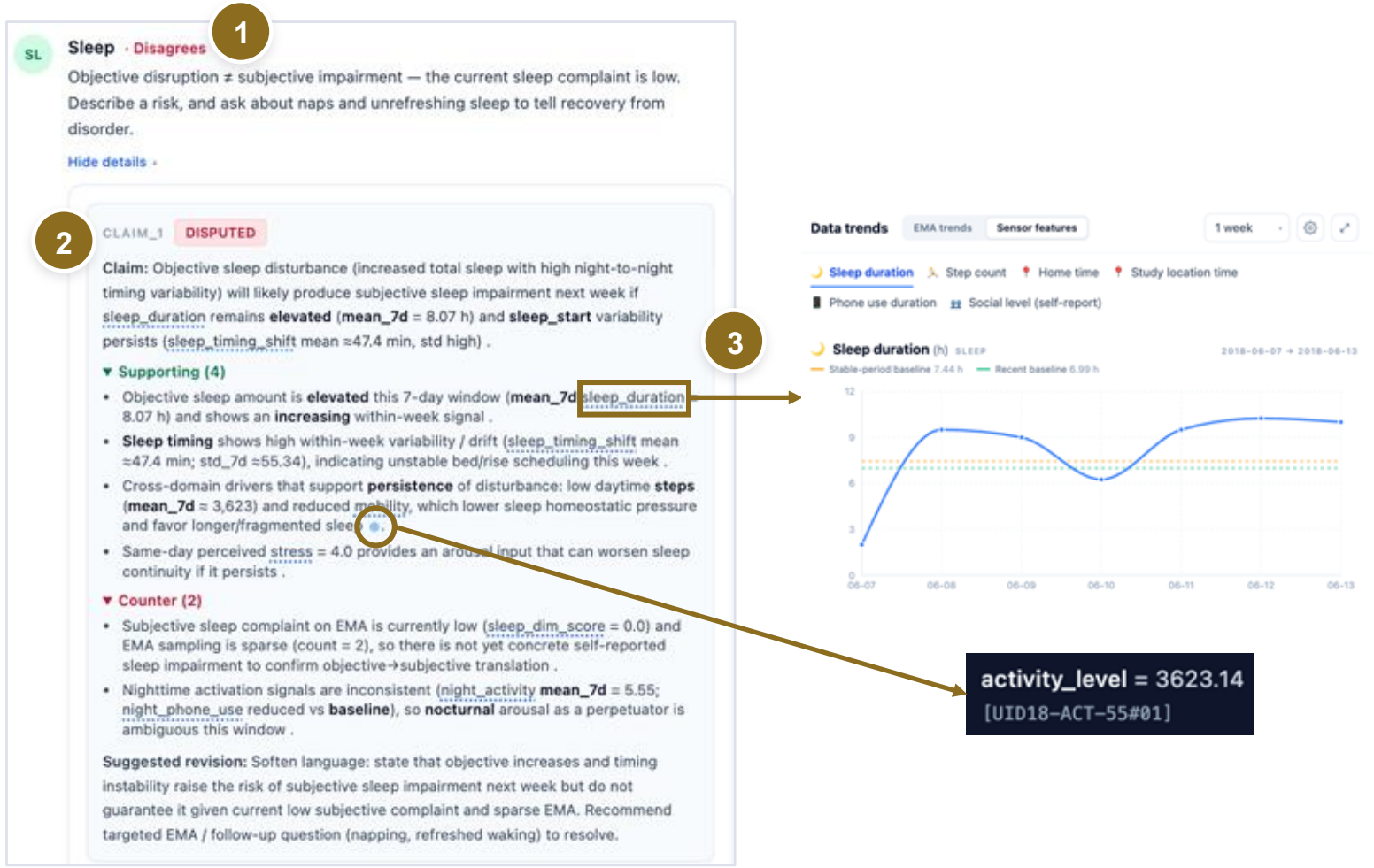
What evidence supports this interpretation?

WHAT CLINICIANS TOLD US

Clinicians wanted AI interpretations to remain traceable to the evidence behind them, including conflicting evidence.

IN THE INTERFACE

1. Competing interpretations and agent disagreement remain visible
2. Each claim exposes both supporting and counter evidence
3. Evidence links back to the longitudinal data



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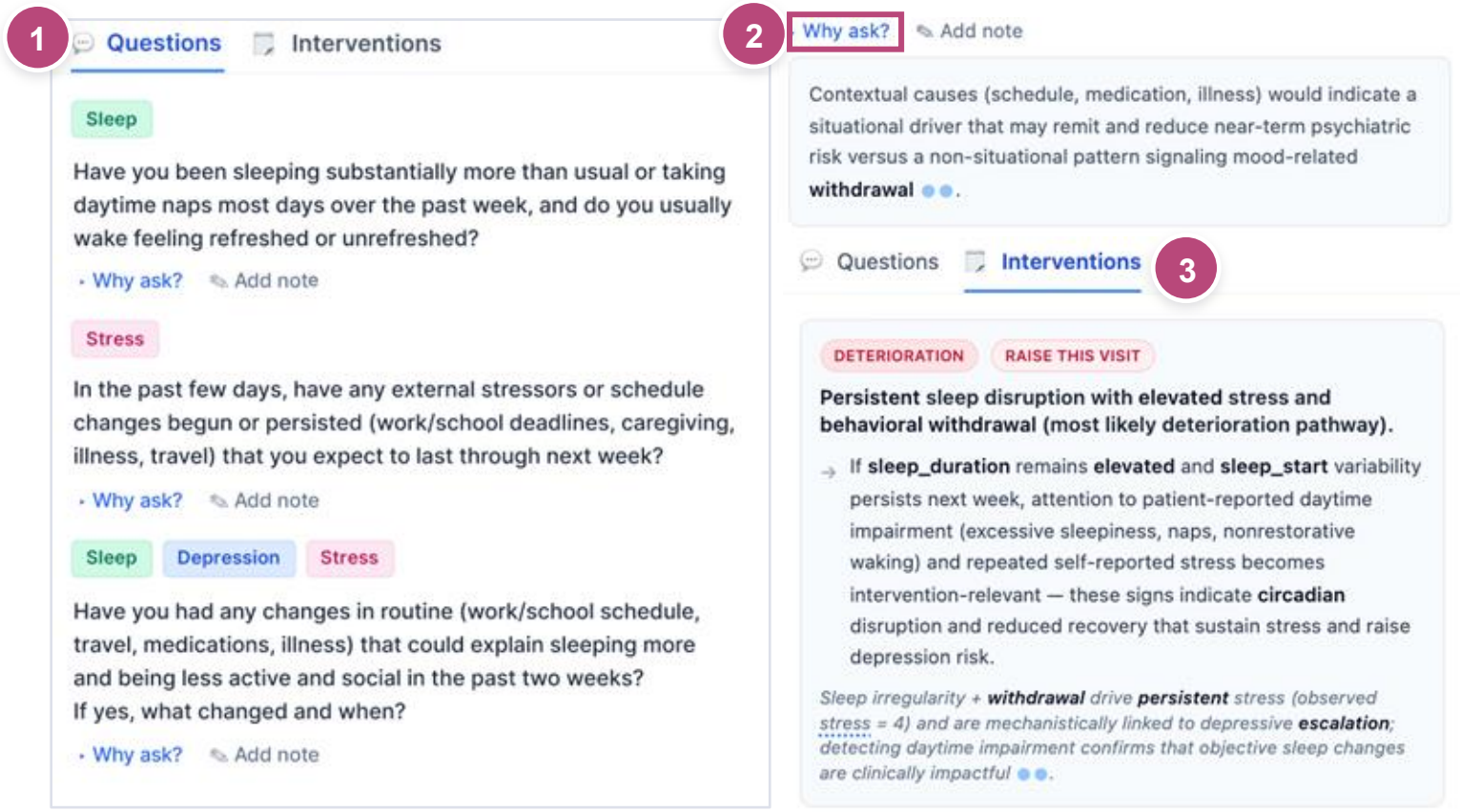
What should I ask the patient next?

WHAT CLINICIANS TOLD US

Clinicians valued follow-up questions that helped clarify what remained uncertain before making a judgment.

IN THE INTERFACE

1. Follow-up questions are generated from unresolved findings
2. “Why ask?” shows the uncertainty each question is meant to resolve
3. Intervention suggestions connect findings to possible next steps



DISCUSSION

From AI explanation to clinical sensemaking

AI explanation
insights from rich longitudinal data

→

Identify
Bring the most relevant changes into focus

Evaluate
Keep interpretations traceable to the evidence

Act
Bring remaining uncertainty into the conversation

→

Clinical sensemaking
under time constraints

Limitations & Future Work

Represent sensing uncertainty
e.g., data quality, missingness, and sparse self-reports

Evaluate in clinical settings
with practicing psychiatrists and patients beyond students

Make explanation interactive
clinicians correct it and the system learns from it

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Summary

- **12 psychiatrists, three requirements**
  : rapid understanding, evidence-grounded interpretation, clinical inquiry
- **Beyond presenting insights, supporting clinical reasoning**
  : assessment first, competing evidence kept visible, uncertainty turned into questions

Thank you! **esther.kang@kaist.ac.kr**

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