

Threshold-Calibrated Word Sense Disambiguation: Semantic Broadening Without Sense Redistribution in *Schizophrenia*

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Why polysemy makes semantic change hard to interpret

- Lexical Semantic Change Detection (LSCD) studies track shifts in a term's contextual usage over time.
- Rising change scores are hard to interpret for polysemous words.
- Change can reflect (i) shifting sense proportions or (ii) broader use in one sense.
- Interpreting semantic change thus requires a sense-aware approach.
- Recent work frames this as historical word sense disambiguation (WSD).
(Schlechtweg et al., 2025; Goworek et al., 2025; Cassotti & Tahmasebi et al., 2025)

Case study: *schizophrenia*

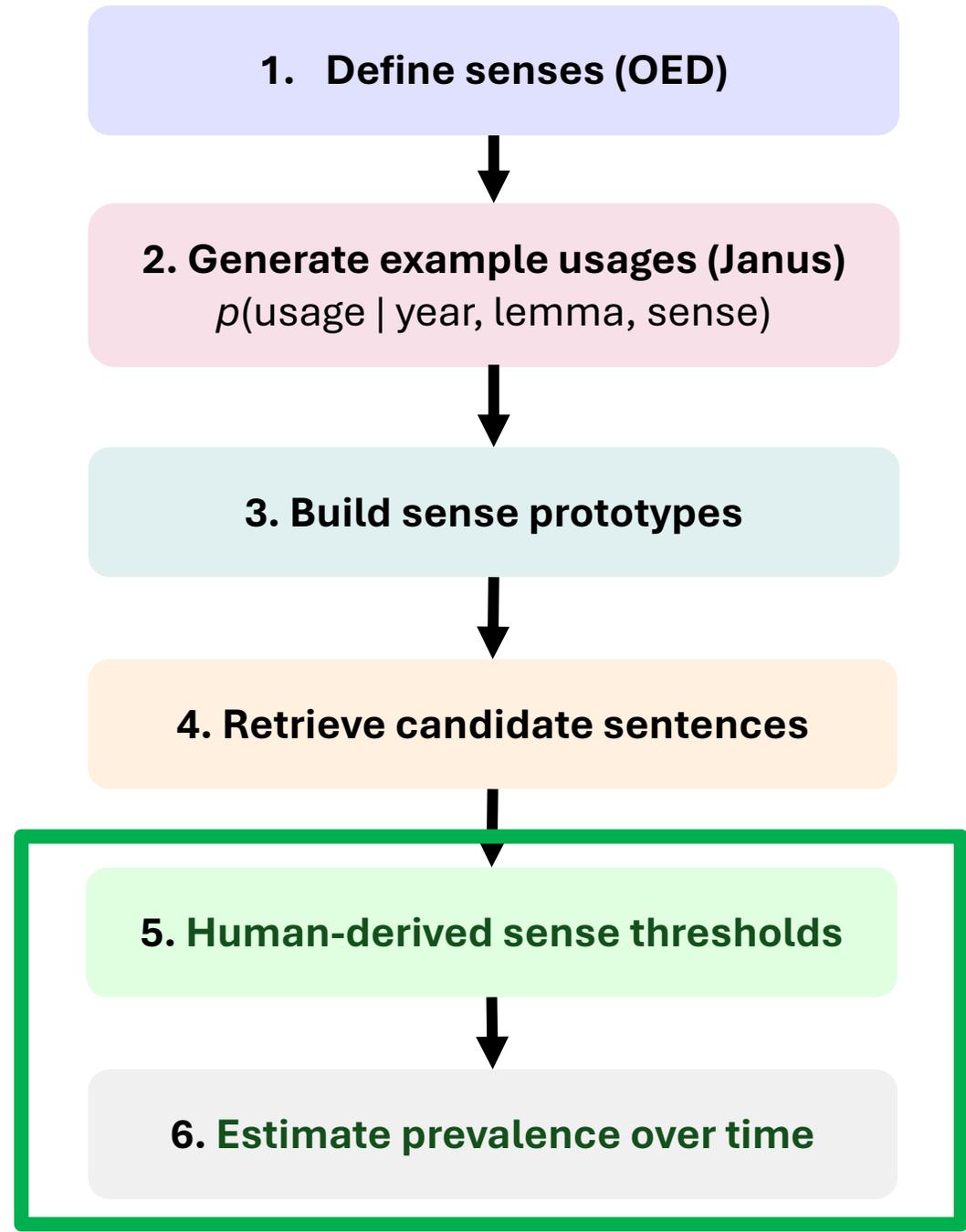
Multiple recurring senses in public discourse.

“After all these years of living with **schizophrenia**, addiction, and drug-induced Parkinsonism, my mother has also been diagnosed with hoarding disorder.”

“**Schizophrenia** is based on the idea that there are two distinct personalities within one person.”

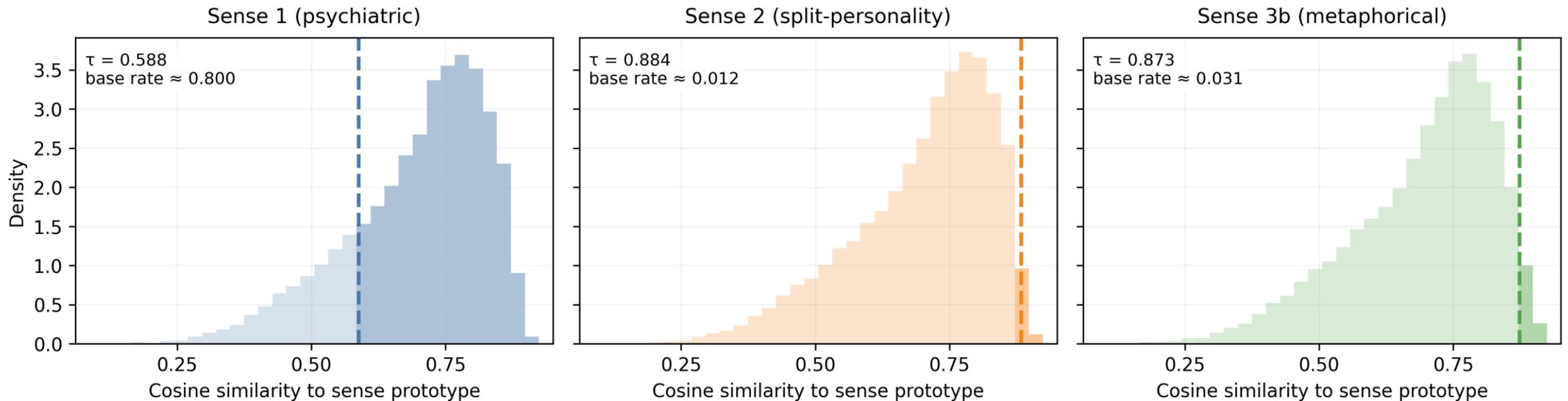
“The **schizophrenia** of the American mind is manifest in its attitude to the United Nations.”

Sense Tracking Pipeline

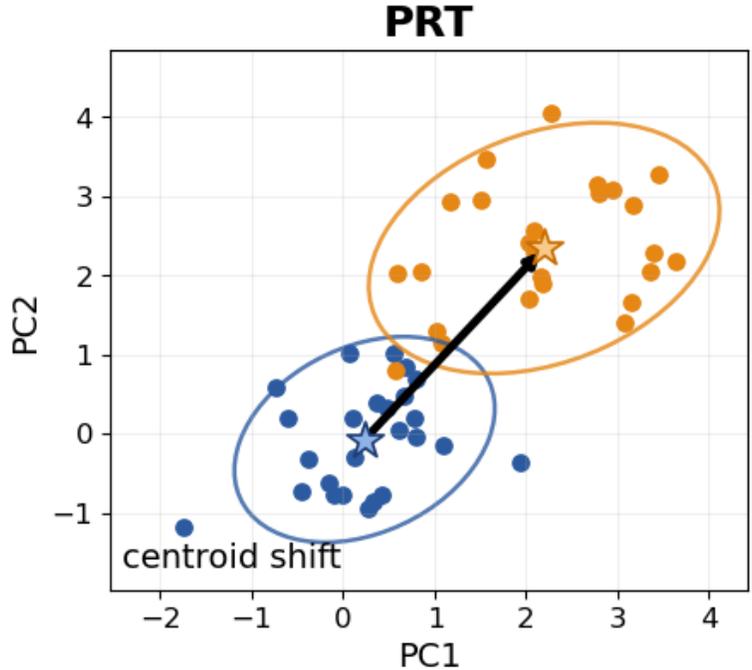
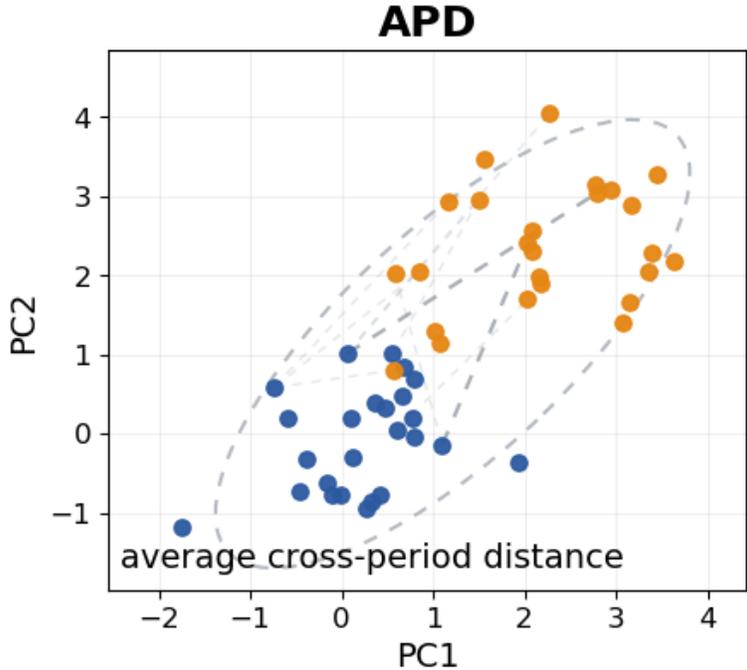
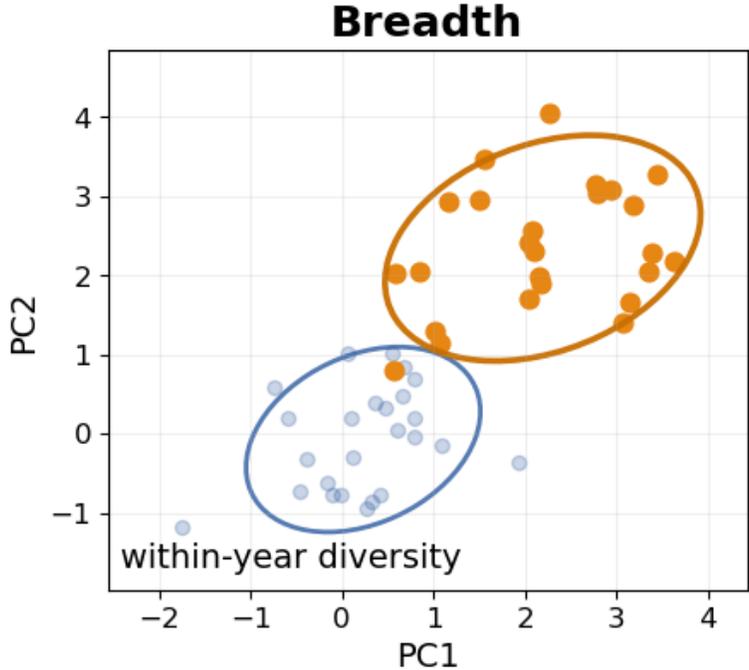


5. Human-derived sense thresholds

- 1) Experts label candidate sentences “yes/no” for each sense
- 2) Rare sense are sampled from the high-similarity tail (Round 1= all deciles; Round 2 = top-decile for rare senses)
- 3) Set one threshold (τ) per sense (using stratified-weighted base rate to estimate how common senses are)
- 4) Sentences below τ remain unassigned



Measures: Standard LSCD Metrics



● baseline (t_0) ● year t (annual slice)

How *diverse* are contexts in each year?
(Baes et al., 2024)

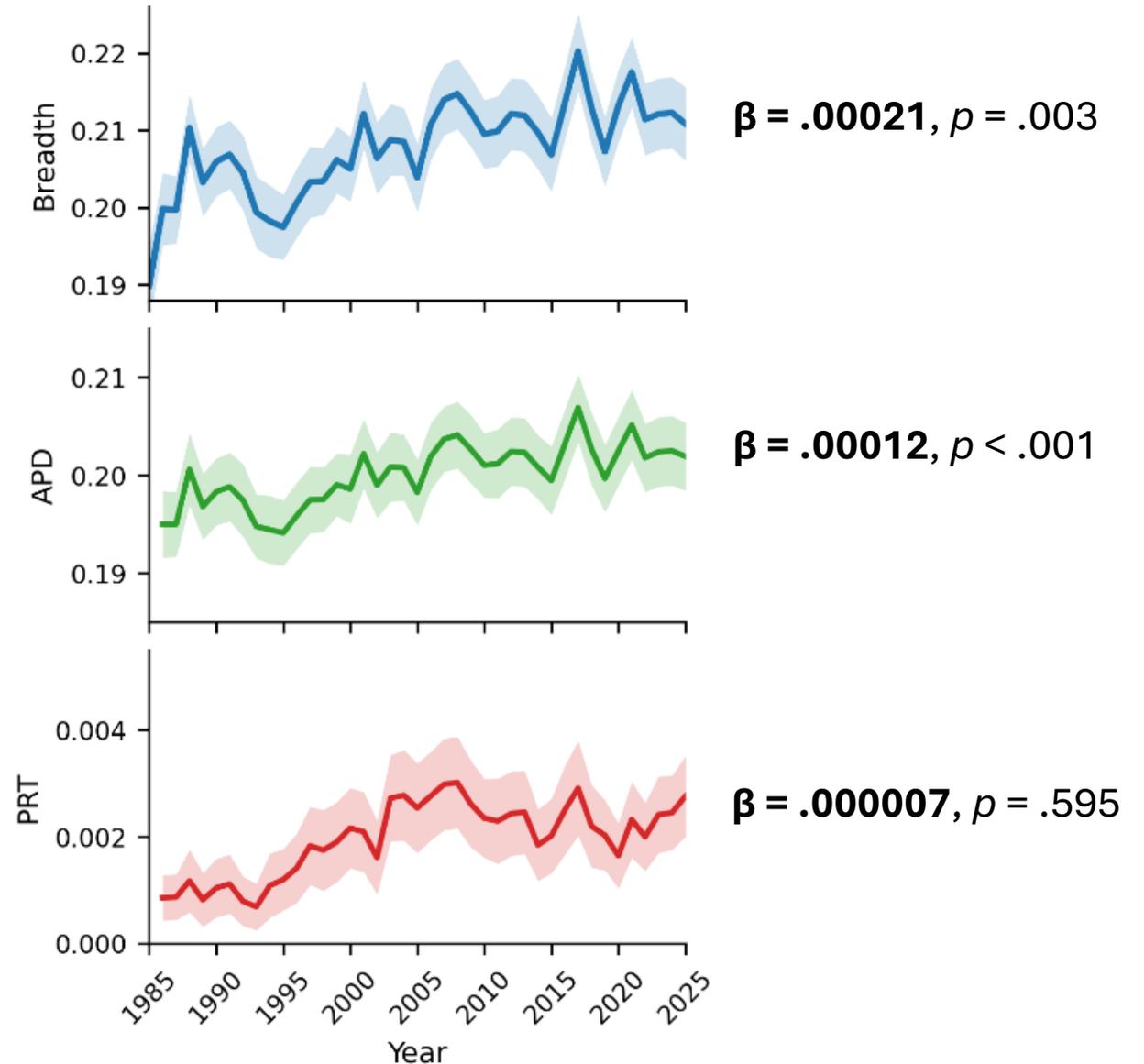
How *different* are later uses from
earlier uses? (Giulianelli et al., 2020)

How much has the *centre* of usage
shifted over time? (Martinc et al., 2020)

Note: All metrics are computed using contextual (XL-LEXEME) embeddings.

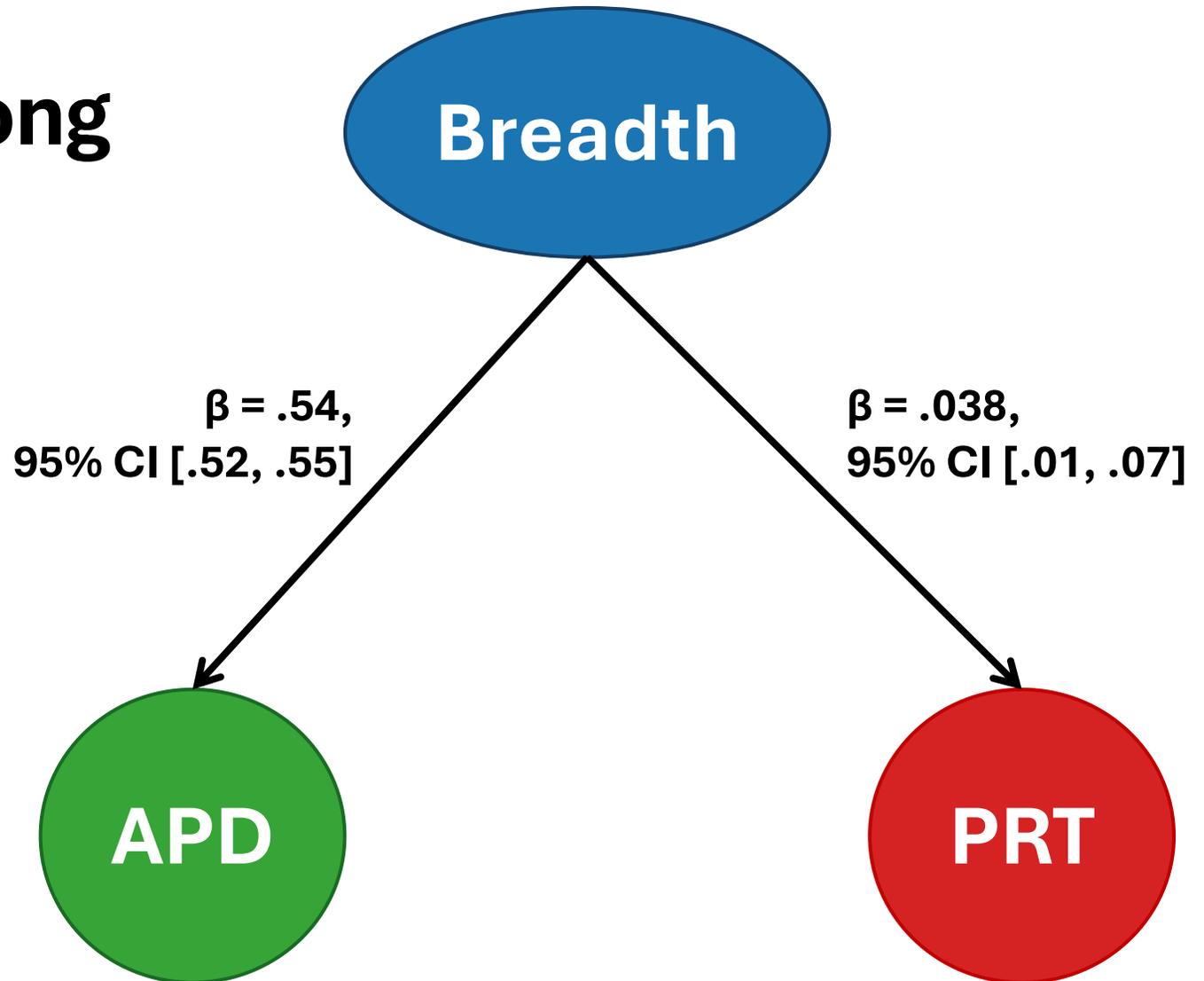
Evidence for semantic change in schizophrenia

- **Breadth** and **APD** increase.
- **PRT** remains **stable**.
- Frequency-controlled effects.

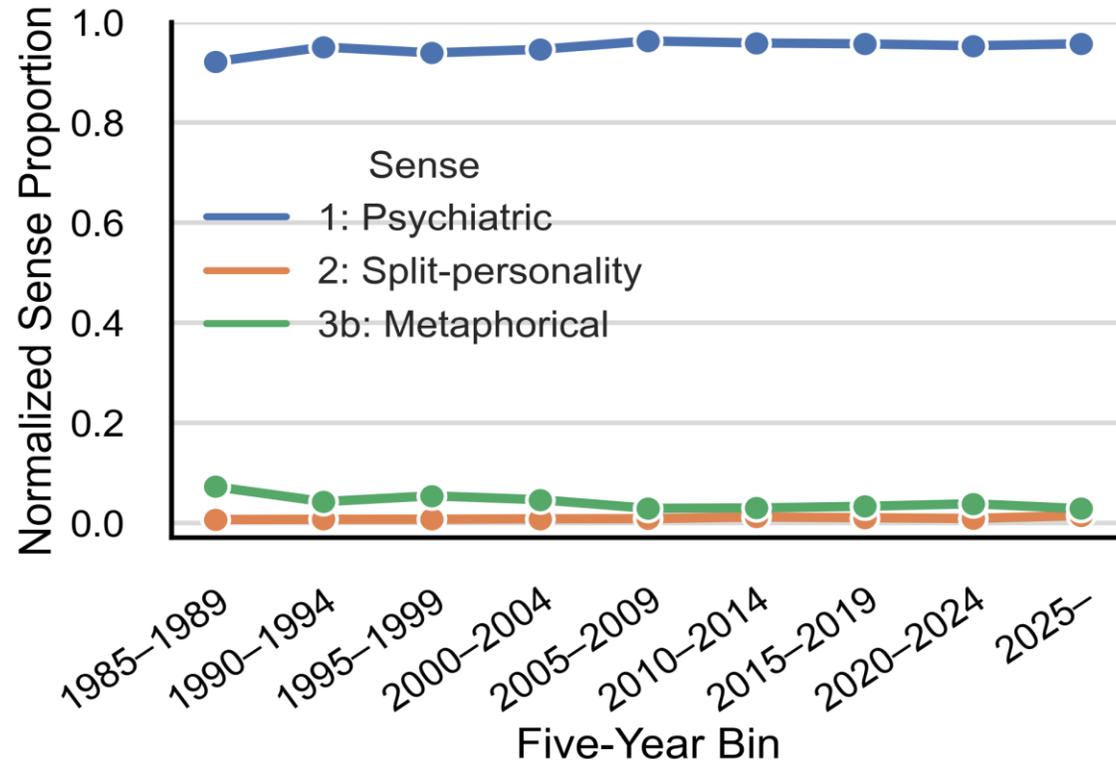


Relationships among LSCD measures

- **Breadth** strongly predicts **APD**, but more weakly predicts **PRT** after frequency control.



Sense prevalence stays stable (1985-2025)



- The **psychiatric** sense dominates (~95%).
- Increases in **Breadth** and **APD** reflect **contextual diversification** within the **dominant sense**, rather than **sense redistribution**.

In sum...

- Standard LSCD measures suggest that *schizophrenia* changes over time.
- Our novel sense tracking pipeline shows that sense prevalence remains stable.
- The change mainly reflects broader contextual use within the dominant psychiatric sense.

Our Contribution

- Rising LSCD scores do not necessarily mean **sense replacement**.
- Our **threshold-calibrated, sense-aware pipeline** helps distinguish contextual broadening from sense redistribution, improving the interpretability of semantic change measures.

Thank you.

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Get in touch!

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