

From Notes to Conversations: Evaluating Automated Detection of Biased Clinical Communication

Aishwarya Raj, MSL¹, Rohith Palli, MD, PhD¹, Andrea L. Hartzler, PhD¹, Barbara D. Lam MD¹, Patrick Wedgeworth, MISM, MD¹

¹University of Washington, Seattle, WA, USA

Sentiments in Clinical Information

- **Language patterns in clinical documentation can shape and perpetuate healthcare disparities**, as subjective characterizations in provider notes may influence care decisions and reinforce inequitable outcomes over time.
- **Objective:** Compare how NLP captures sentiment in clinical notes versus conversations across sociability, morality, agency, ability, and status (Table 1).

Methods

We applied TRACE², a NLP sentiment-scoring tool, to clinical notes³ (n=2,580) and simulated primary care conversation transcripts (n=108)⁴, comparing sentiment scores in each context.

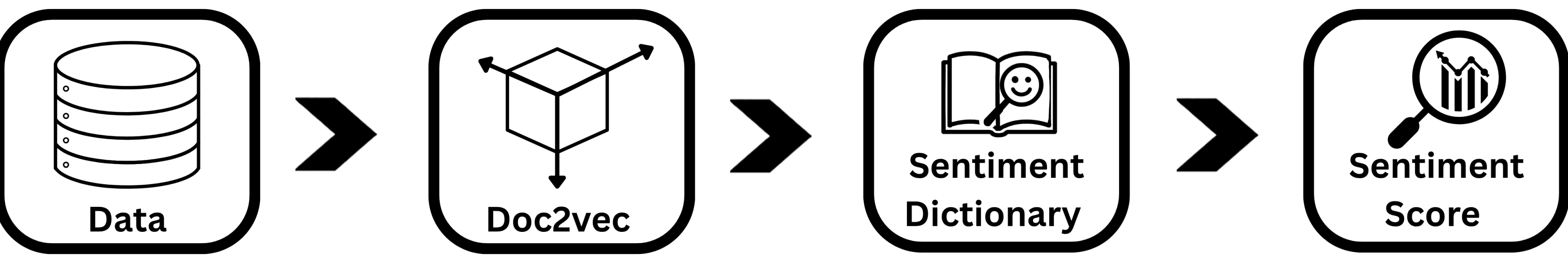


Figure 1. TRACE Sentiment Analysis Workflow Using Clinical Data: This diagram outlines the process of extracting MIMIC-III notes or primary care conversations, and then applying a sentiment lexicon to compute scores.

Table 1. Definitions and Linguistic Examples of Sentiment Dimensions Used in Sentiment Dictionary Construction: derived from the Stereotype Content Model and related frameworks¹.

Sentiment	Attributes	Examples of Positive Language	Examples of Negative Language
Sociability	Captures perceptions of friendliness	Outgoing, Friendly	Frosty, Withdrawn
Morality	Captures perceptions of trust	Sincere, Fair	Abuse, Unkind
Agency	Also termed "Assertive", captures perceptions of competence	Determined, Autonomous	Cautious, Inactive
Ability	Captures perceptions of skill and capability	Educated, Alert	Slow, Clumsy
Status	Captures perceptions of social ranking, power	Privilege, affluent	Hardship, Exclude

References

1. Nicolas G, Bai X, Fiske ST. Comprehensive stereotype content dictionaries using a semi-automated method. Eur J Soc Psychol. 2021;51:178–196. <https://doi.org/10.1002/ejsp.2724>
2. Wedgeworth P, Lui P, Raj A. Using a word embedding approach to detect negative provider sentiment in clinical notes [poster]. 2025 Clinical Informatics Conference; 2025 May 20; Anaheim, CA.
3. Johnson, A., Pollard, T., & Mark, R. (2016). MIMIC-III Clinical Database (version 1.4). PhysioNet. RRID:SCR_007345. <https://doi.org/10.13026/C2XW26>
4. National Library of Medicine. National Institutes of Health. Grant R01LM013301, "Multimodal computational approaches to measure patient-centered communication"; 2020-2025.

Results

Negative Ability and Status Sentiments (Table 1) exhibited higher semantic alignment with both clinical notes and conversations (Table 2).

Table 2. Mean & Standard Deviation of sentiment scores across 10 dimensions for MIMIC-III clinical notes, full primary care transcripts (provider and patient), and provider-only primary care transcripts.

Dimension	MIMIC Mean & SD	Full Transcript Mean & SD	Provider Only Transcript Mean & SD
Positive Sociability	0.12 ± 0.10	0.04 ± 0.09	0.06 ± 0.11
Negative Sociability	0.15 ± 0.11	0.02 ± 0.10	0.12 ± 0.10
Positive Morality	0.13 ± 0.10	0.02 ± 0.09	0.07 ± 0.08
Negative Morality	0.10 ± 0.11	0.00 ± 0.10	0.03 ± 0.10
Positive Agency	0.12 ± 0.10	0.02 ± 0.08	0.05 ± 0.09
Negative Agency	0.18 ± 0.10	0.04 ± 0.08	0.10 ± 0.12
Positive Ability	0.12 ± 0.10	0.01 ± 0.08	0.05 ± 0.10
Negative Ability	0.30 ± 0.11	0.11 ± 0.10	0.20 ± 0.10
Positive Status	0.15 ± 0.10	0.01 ± 0.09	0.04 ± 0.10
Negative Status	0.21 ± 0.10	0.03 ± 0.11	0.10 ± 0.12

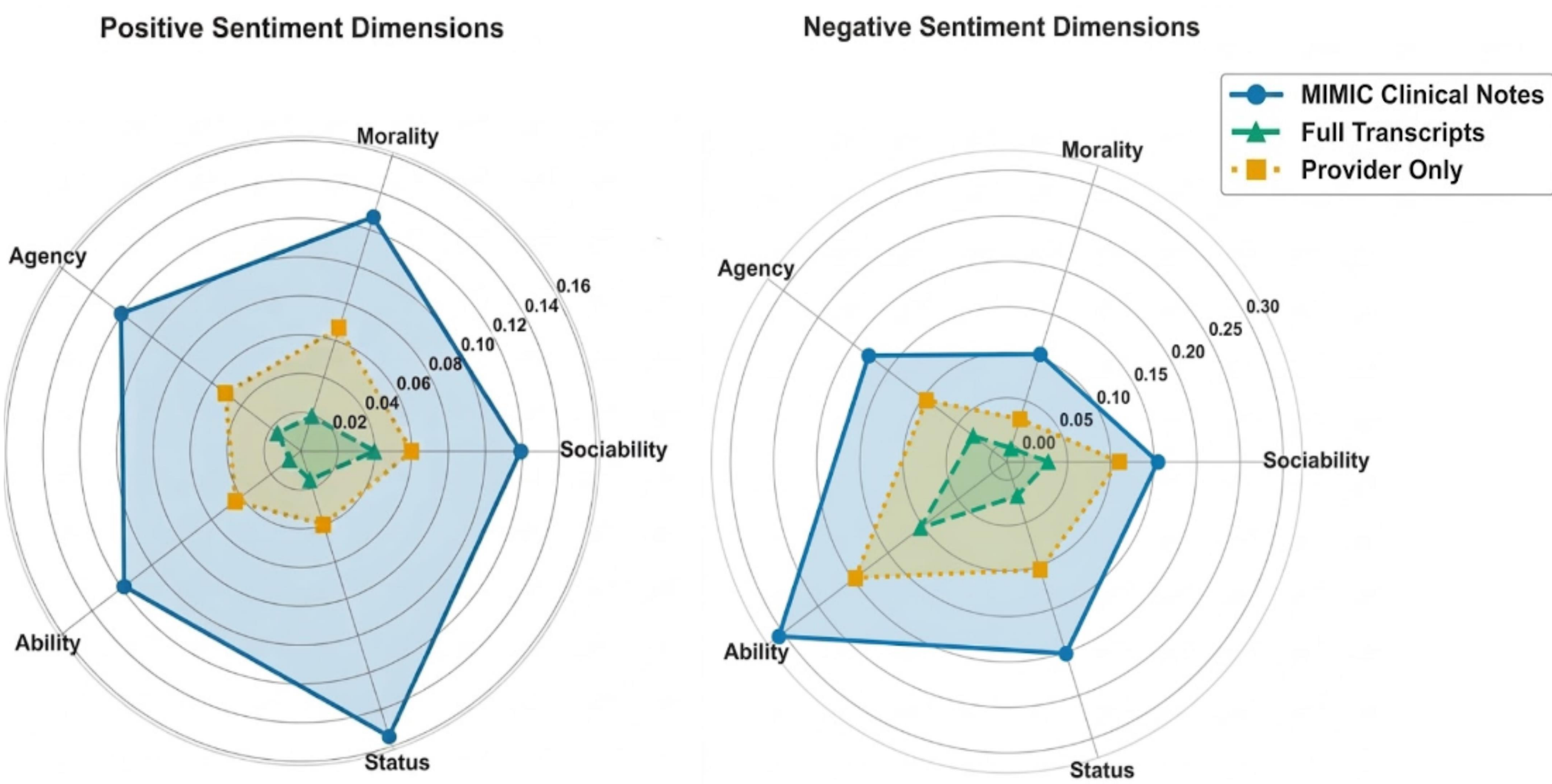


Figure 2. Mean positive and negative sentiment scores for MIMIC-III clinical notes, full primary-care transcripts, and provider-only primary-care transcripts

Conclusions

We will next investigate **what is lost in translation**, how sentiment specific phrases manifest as bias and how documentation modifies role-specific conversational signals that shape care.

Acknowledgements

Special thanks to Catherine Chia, Marvin Tran, Kenny Yi, Janice Sabin PhD, Trevor A. Cohen PhD, Wanda Pratt PhD, Brian Wood MD, and the University of Washington Institute for Medical Data Science Pilot Award.