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An Empathic Machine: How can AI help a human with Empathy?

We know empathy is foundational to the helping professions

> Psychol Addict Behav. 2013 Sep;27(3):878-84. doi: 10.1037/a0030274. Epub 2012 Oct 1.

Is low therapist empathy toxic?

Theresa B Moyers [1], William R Miller

Affiliations + expand

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Abstract

One of the largest determinants of client outcomes is the counselor who provides treatment. Therapists often vary widely in effectiveness, even when delivering standardized manual-guided treatment. In particular, the therapeutic skill of accurate empathy originally described by Carl Rogers has been found to account for a meaningful proportion of variance in therapeutic alliance and in addiction treatment outcomes. High-empathy counselors appear to have higher success rates regardless of theoretical orientation. Low-empathy and confrontational counseling, in contrast, has been associated with higher drop-out and relapse rates, weaker therapeutic alliance, and less client change. The authors propose emphasis on empathic listening skills as an evidence-based practice in the hiring and training of counselors to improve outcomes and prevent harm in addiction treatment.

We know how to measure empathy

Empathy				
Low				High
1	2	3	4	5
Clinician has no apparent interest in client's worldview. Gives little or no attention to the client's perspective.	Clinician makes sporadic efforts to explore the client's perspective. Clinicians' understanding may be inaccurate or may detract from the client's true meaning.	Clinician is actively trying to understand the client's perspective, with modest success.	Clinician shows evidence of accurate understanding of client's worldview. Makes active and repeated efforts to understand client's point of view. Understanding mostly limited to explicit content.	Clinician shows evidence of deep understanding of client's point of view, not just for what has been explicitly stated but what the client means but has not yet said.

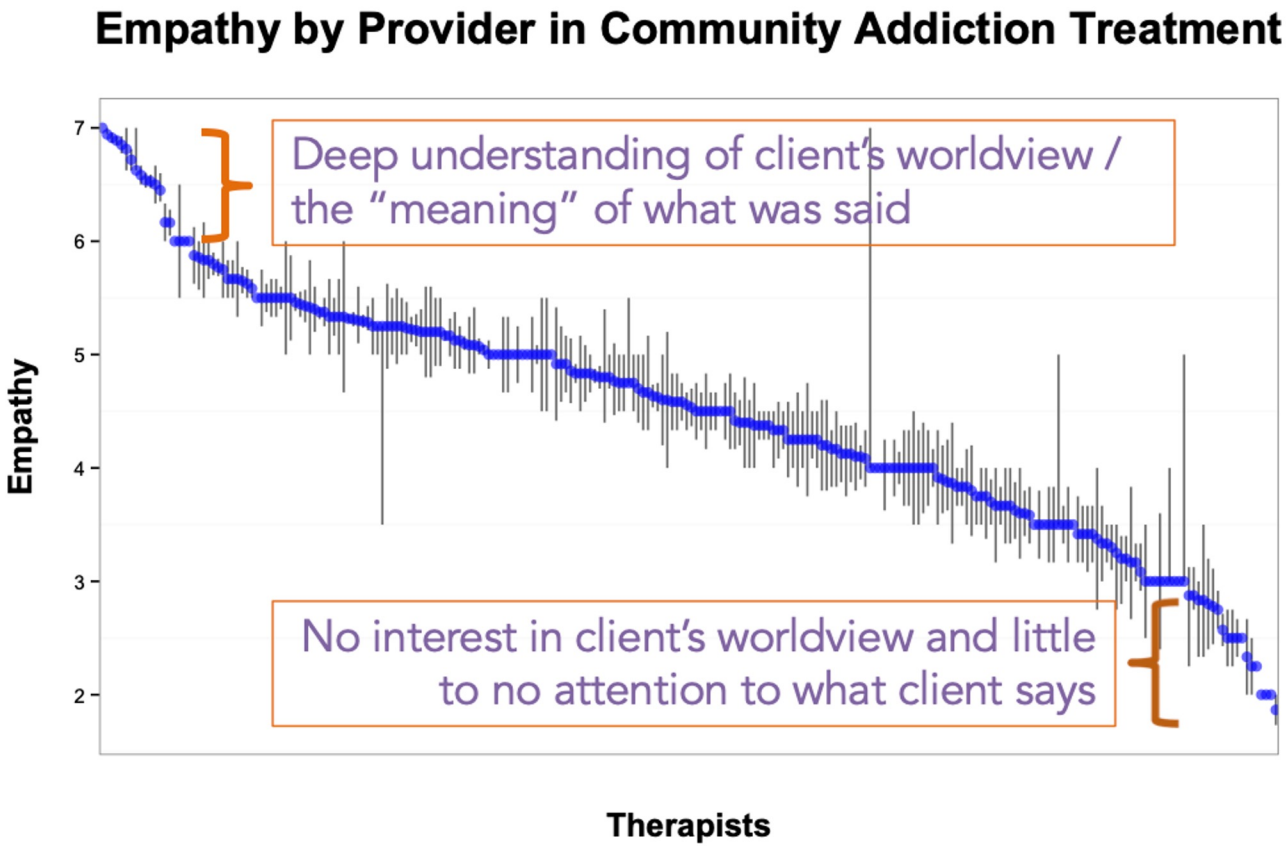
Moyers et al., *Motivational Interviewing Treatment Integrity* system manual, v3.1

We know how to reliably identify empathic communication

CLIENT	Yeah. I think I'm sad that I haven't seen my kids in a couple days. Like I really miss them and I'm pretty pissed that my neighbor like called the cops. I mean I was only gone for 10 minutes. Like I'm not I'm not a bad mom. Like I'm not one of those moms that like leaves her kids at home all day while she goes to work or like. Doesn't. Like I care about my kids a lot and I love them. And I just like I'm not a bad mom.
PROVIDER	Mm hmm (affirmative). Yeah. It sounds like you've got some conflicting emotions going on. EMPATHIC you're sad that they're not around but you're also frustrated that this would even happen in the first place. EMPATHIC

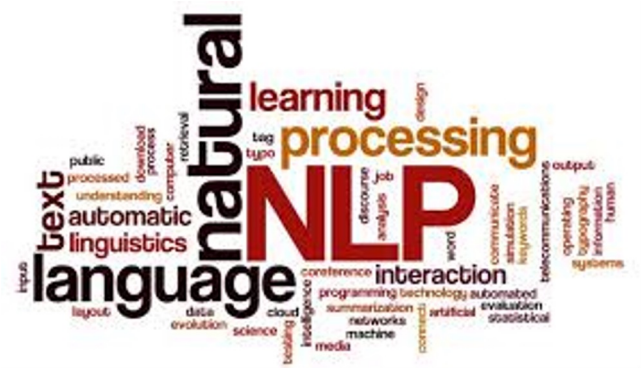
Empathy is highly variable in health communication…

(n=200 providers, ~800 sessions, lots of years of behavioral coding)

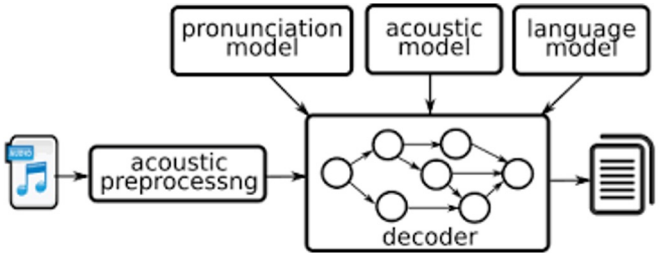


Imel et al. 2013

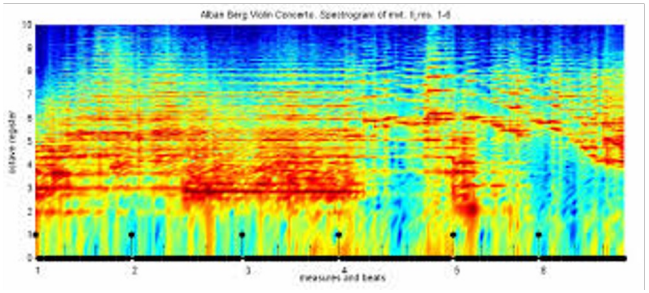
Technological advances now enable automated processing of visits



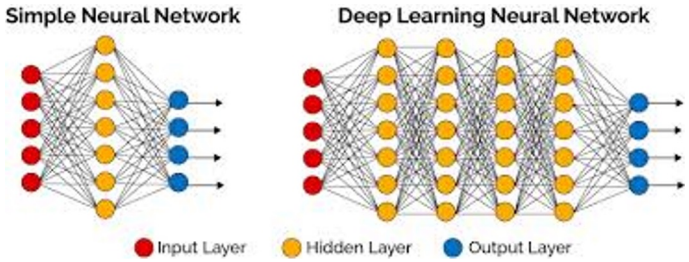
Natural Language Processing



Automatic Speech Recognition



Paralinguistics and vocal acoustics



Machine ('deep') Learning

What is the raw data – the basic building blocks – of psychotherapy?

Words: "Wow, I can not imagine how difficult that must have been to lose your kids."

Tone:
(paralinguistic information)

"***Wow***, I can ***not*** imagine how difficult that must have been to ***lose*** your kids."

Posture
(nonverbal information)

Interaction: How are words, tone, and nonverbal behavior linked and dynamically evolving during the session?

How do we computationally *quantify* the raw data of psychotherapy?

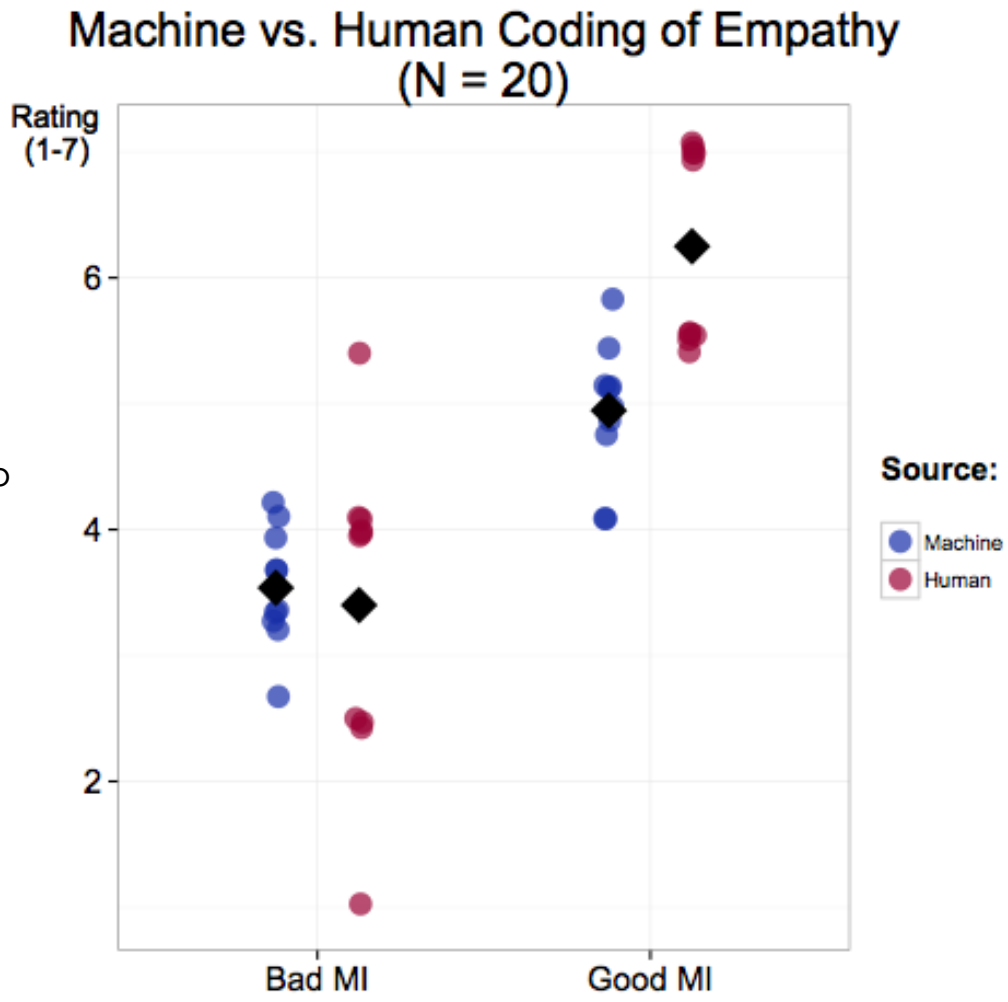
Words:	Individual words and short phrases (n-grams) + text-based machine learning
Tone:	Speech signal processing methods for estimating "acoustic features"
Posture:	Quantify movement and facial emotions from video (not current focus of our work)
Interaction:	Synchrony, entrainment, and dynamic systems models for dyadic linkage and influence

Empathy: ML based Feedback (Sound to codes)

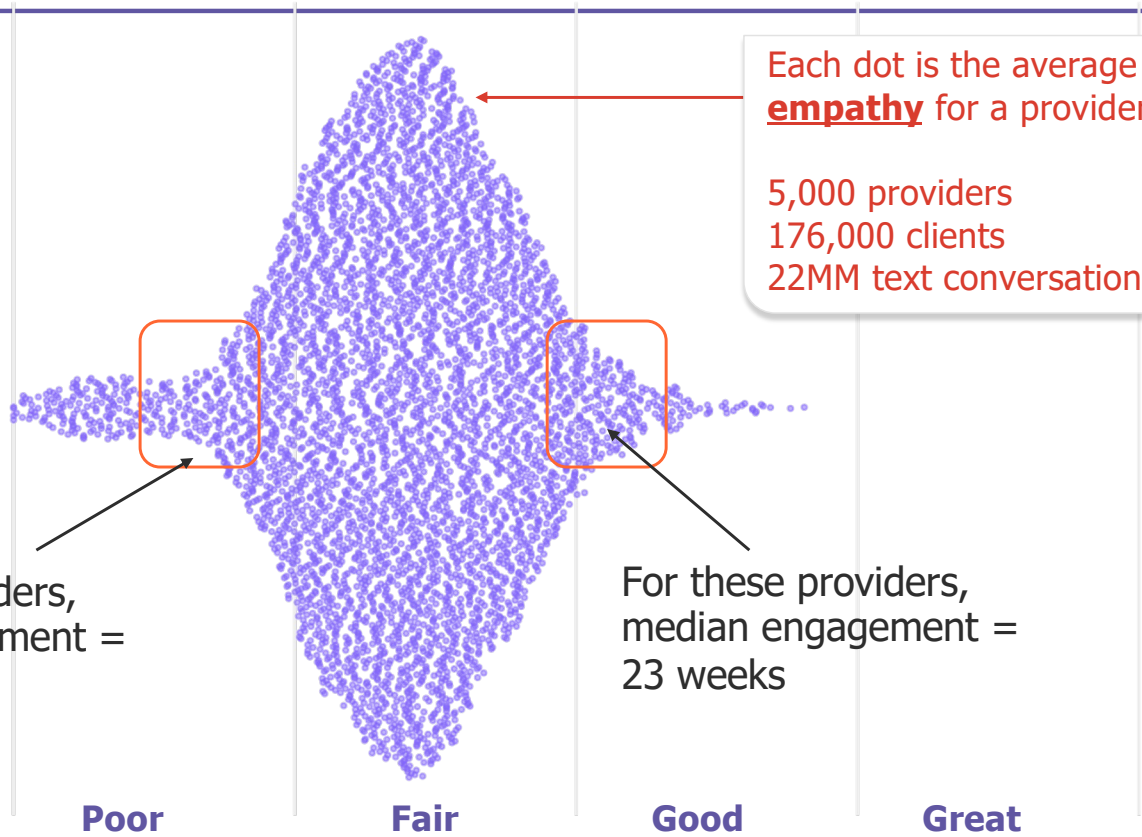
200 sessions from MI training study:
r = 0.65; Xiao et al., 2015, *PLOS ONE*

20 new, role-played sessions, with no models fit to sessions: *r* = 0.61 (Pace et al. 2017)

1,384 sessions from 6 MI RCT or training studies: *r* = 0.59



Workforce challenges: The problem we live with but never see



Each dot is the average **empathy** for a provider across all clients

5,000 providers
176,000 clients
22MM text conversations

For these providers, median engagement = 6 weeks

For these providers, median engagement = 23 weeks

Imel et al. (2024). Outcomes in mental health counseling from conversational content with transformer based machine learning. *JAMA OPEN*