

Computational Behavioral Analysis of Child-Psychologist Interactions

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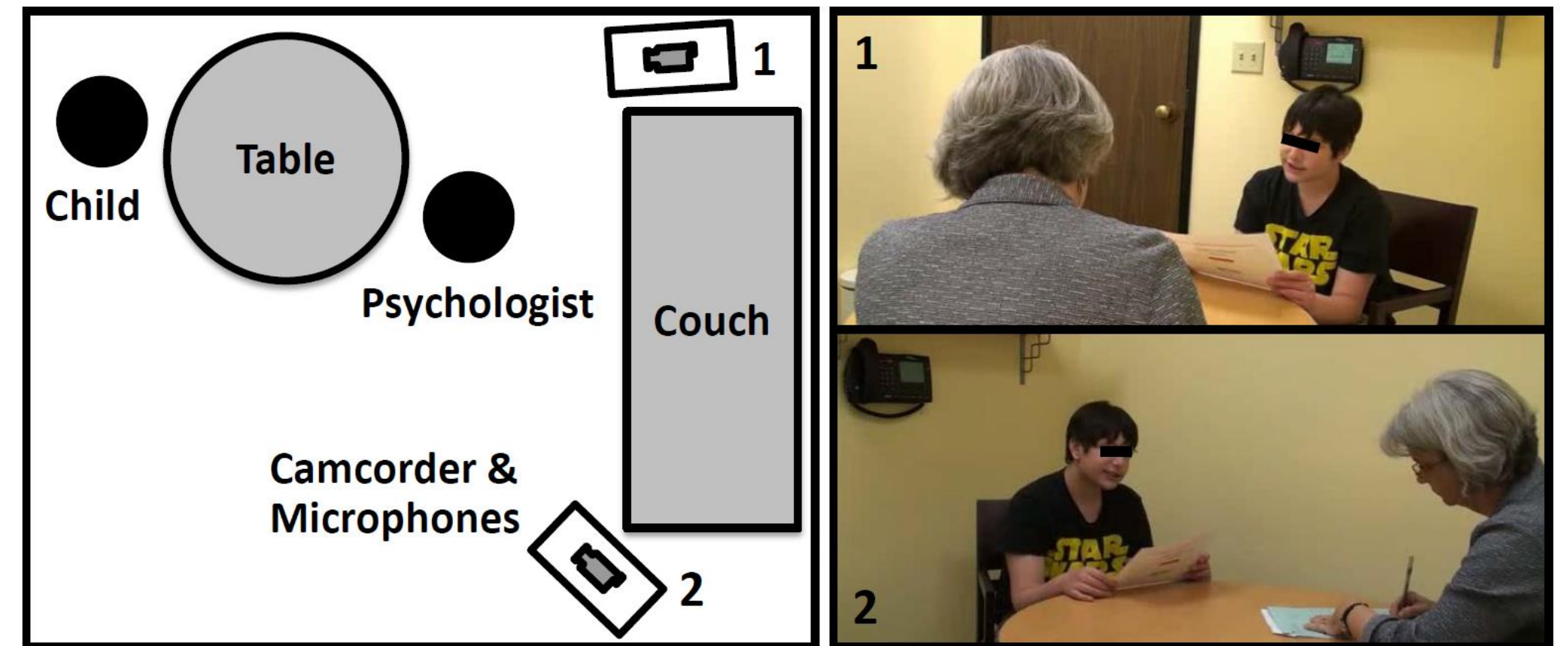
Motivation & Introduction

Interactions with individuals with autism: **generally lower social rapport**
What led to perceptions? Can we **objectively measure** this phenomena?

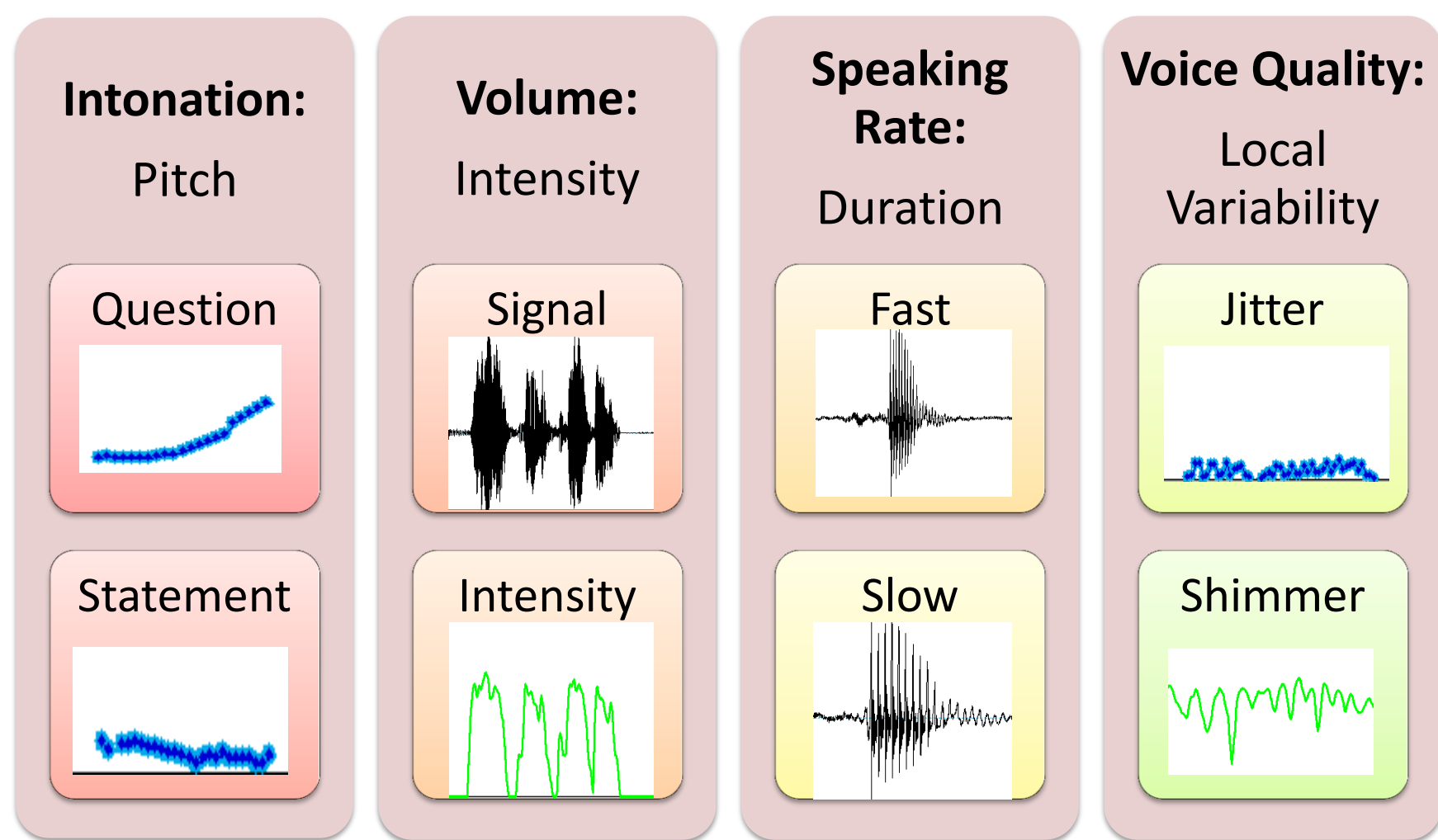
- Goal:** Create quantitative descriptors of interaction.
 - Purpose:** Understand the underlying structure of interaction
For example, timing, phasing of salient events.
 - Application:** Scale-up behavioral research, stratify spectrum, inform personalized intervention, long-term monitoring
- We model the psychologist's behavior (an interlocutor) too!**

Prosody is the way in which something is said (intonation, volume, rate)
Prosody indicates: syntax, semantics, pragmatics, and paralinguistics
Turn-taking and **language** cues can capture the *conversational style*.

Data



Acoustic-Prosody



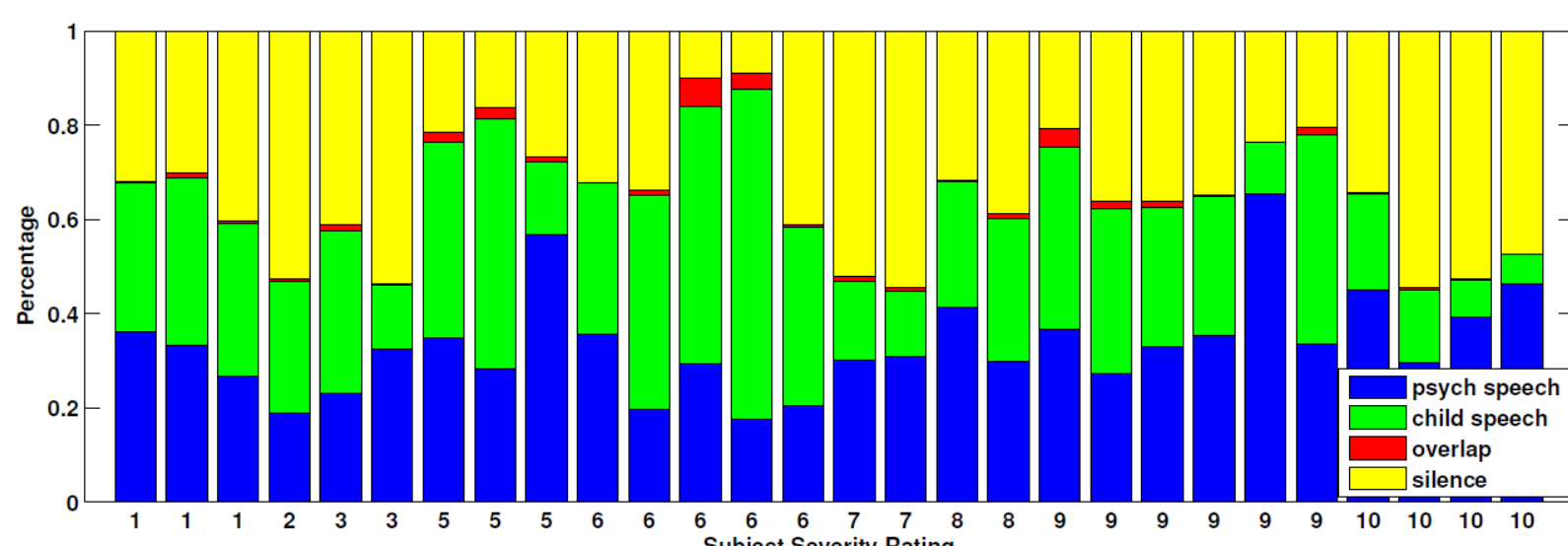
Turn-taking and Language

- Turn-taking:**
- Speaking or silent?
 - Interrupting?
 - Latency?
- Language:**
- WPS (words per sentence) – similar to MLU
 - First-person, singular pronouns
 - Positive emotion, negative emotion, affect (+/-)
 - Assents (okay)
 - Non-fluencies (hmm, um)
 - Fillers (I mean, you know)

Note: Feature extraction requires forced-alignment of speech to text

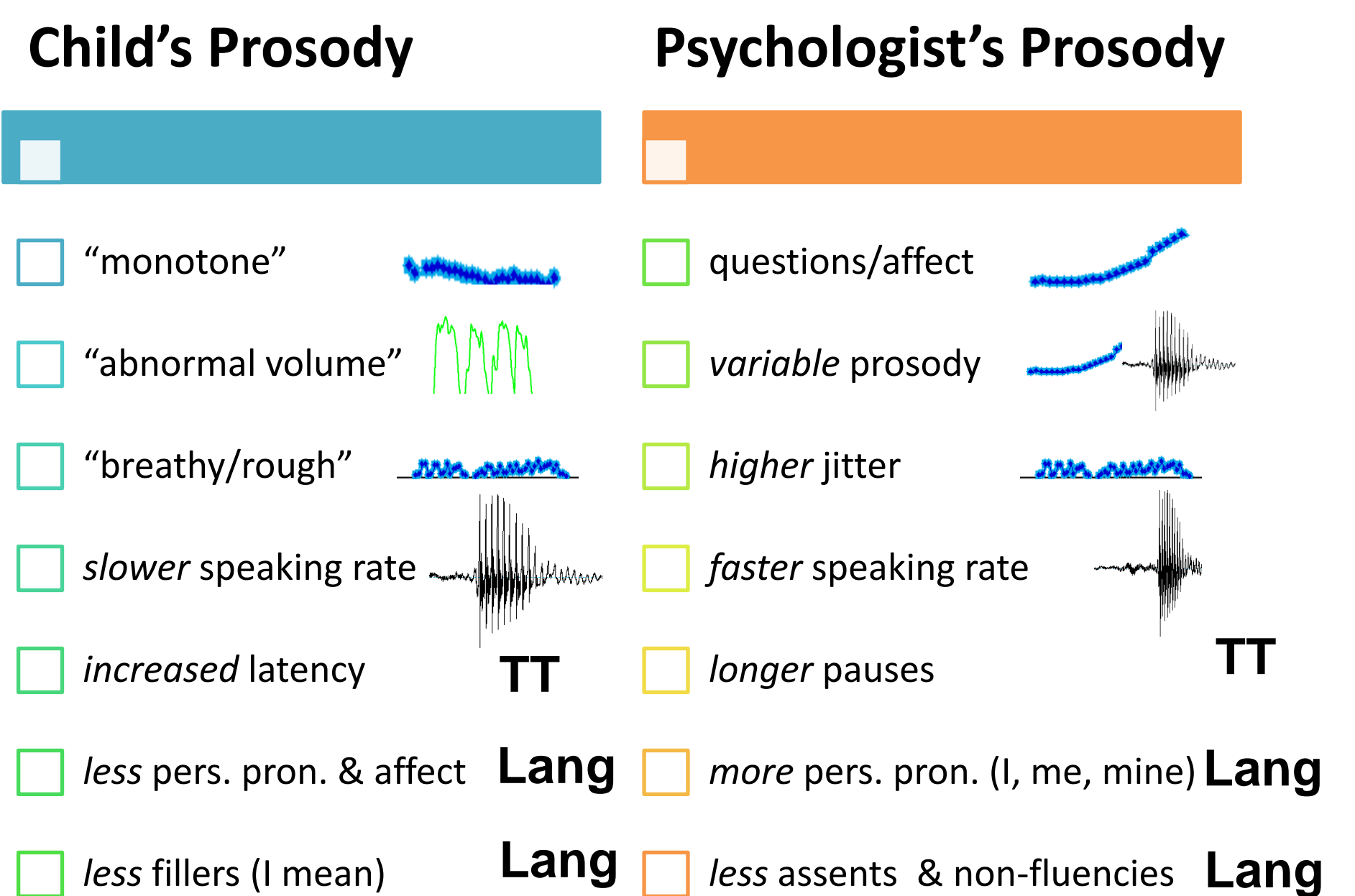
Simple Vocal Analysis

For interactions with children with more severe autistic symptoms
The *child* speaks less, while the *psychologist* speaks more.



Conversational Analysis

For interactions with children with more severe autistic symptoms



Predictive Task

Acoustics&TT are most predictive in high Social Demand activities.
Psychologist's language is predictive even in low Social Demand.

	Psych Ac.	Child Ac.	P&C Ac.	Psych Lg.	Child Lg.	P&C Lg.
High SD	+0.43	+0.76	+0.50	+0.49	-0.01	+0.27
Med. SD	+0.46	+0.17	+0.29	0.10	+0.35	+0.46
Low SD	+0.20	+0.02	-0.11	+0.39	-0.97	+0.27

Discussion

Future Work

- The conversational quality degrades for children with higher ASD severity.
- Children exhibit difficulties conversing, while the psychologist varies her speech and language strategies to engage the child.
- Model temporal patterning of interaction (e.g., vocal arousal)
- Model strategies of the psychologist