

The Interdisciplinary Loop

Lecture 04b (Analysis I)

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Social AI



Engineering and
Physical Sciences
Research Council

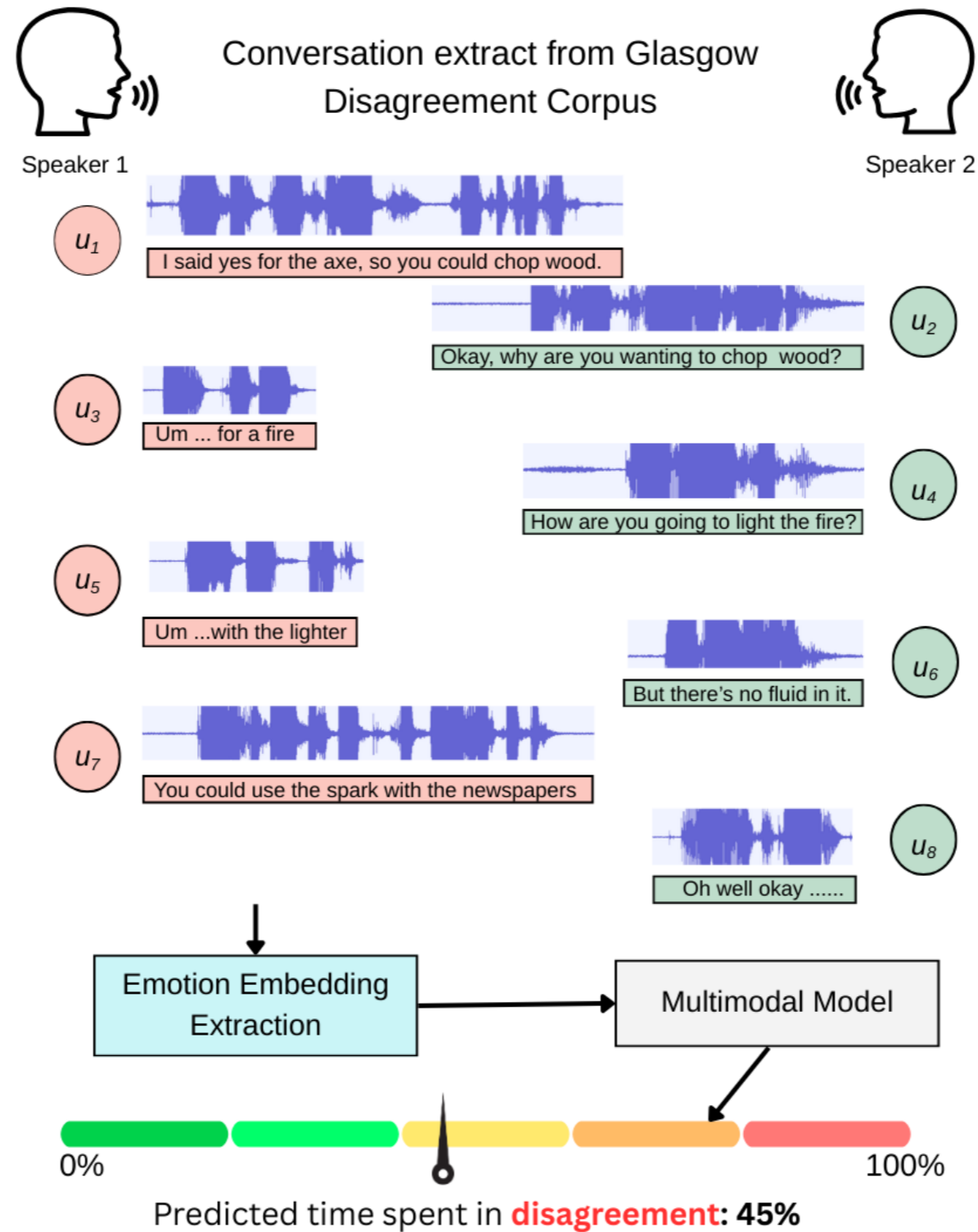
Quick Recap

- The disagreement analysis approach proposed in the previous lecture **processes a conversation recording like any other audio recording**;
- A conversation can be thought of as a sequence of **utterances**, short intervals of continuous speech activity separated by silences;
- In principle, there is a **relationship** between neighbouring utterances;
- An approach based on the considerations above should work better and, in principle, it should provide **information about disagreement dynamics**.

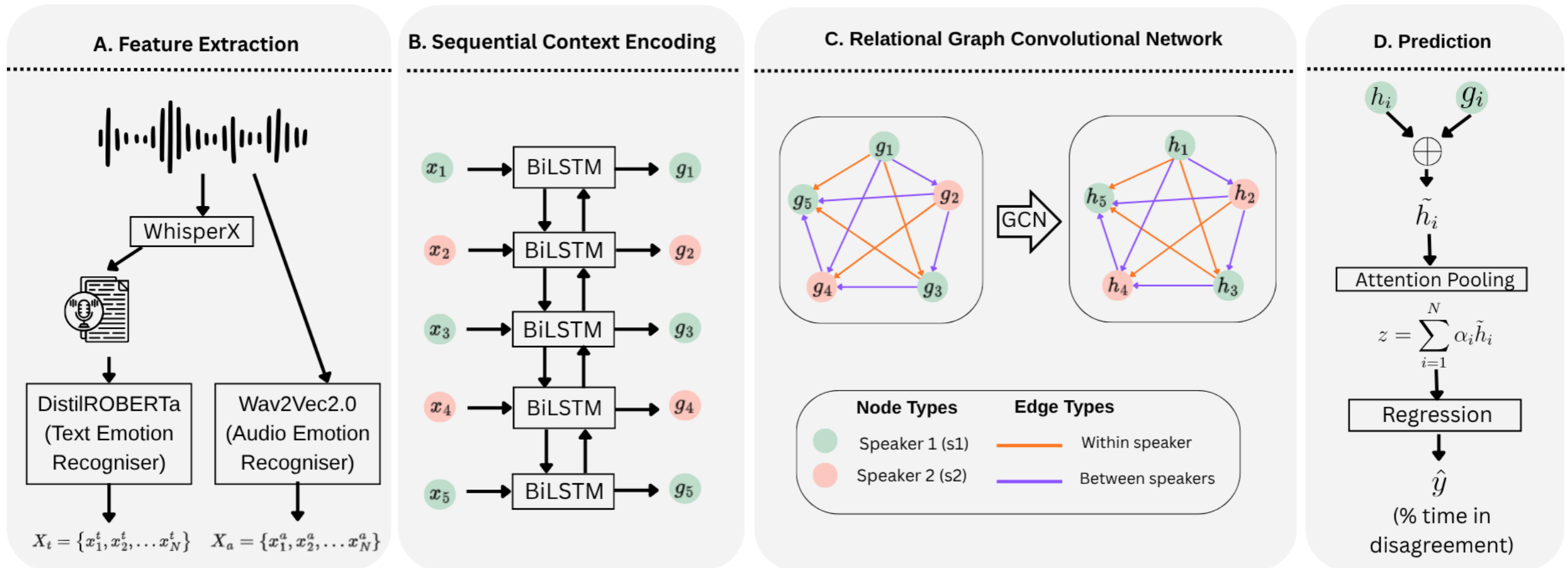
Disagreement

“[...] an **oppositional stance** (verbal or non-verbal) to an antecedent verbal (or non-verbal) **action**.”

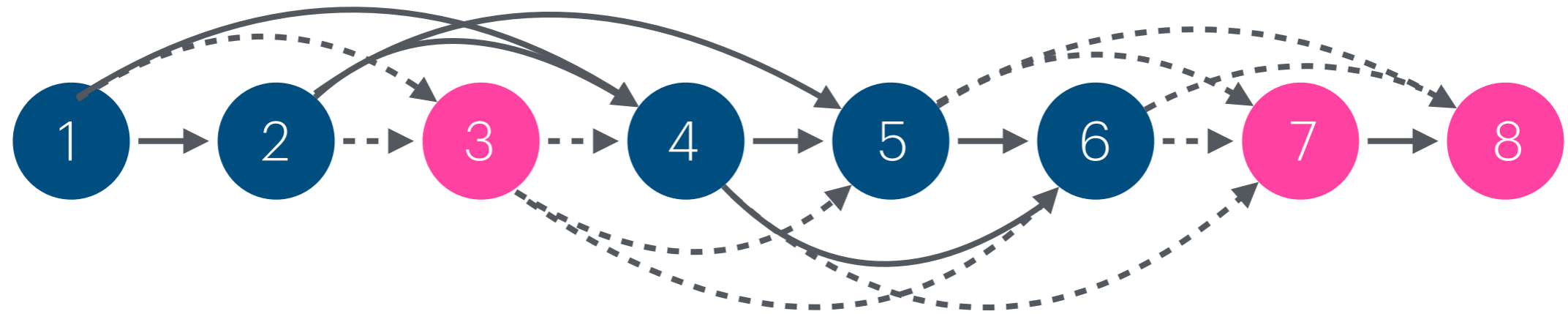
What is a Conversation?



Refining the Approach



Why a Graph?



- The nodes (utterances) are **locally** represented as a weighted sum of the connected nodes (**local weights**);
- The same nodes (utterances) are **globally** represented as a weighted sum of all nodes (**global weights**).

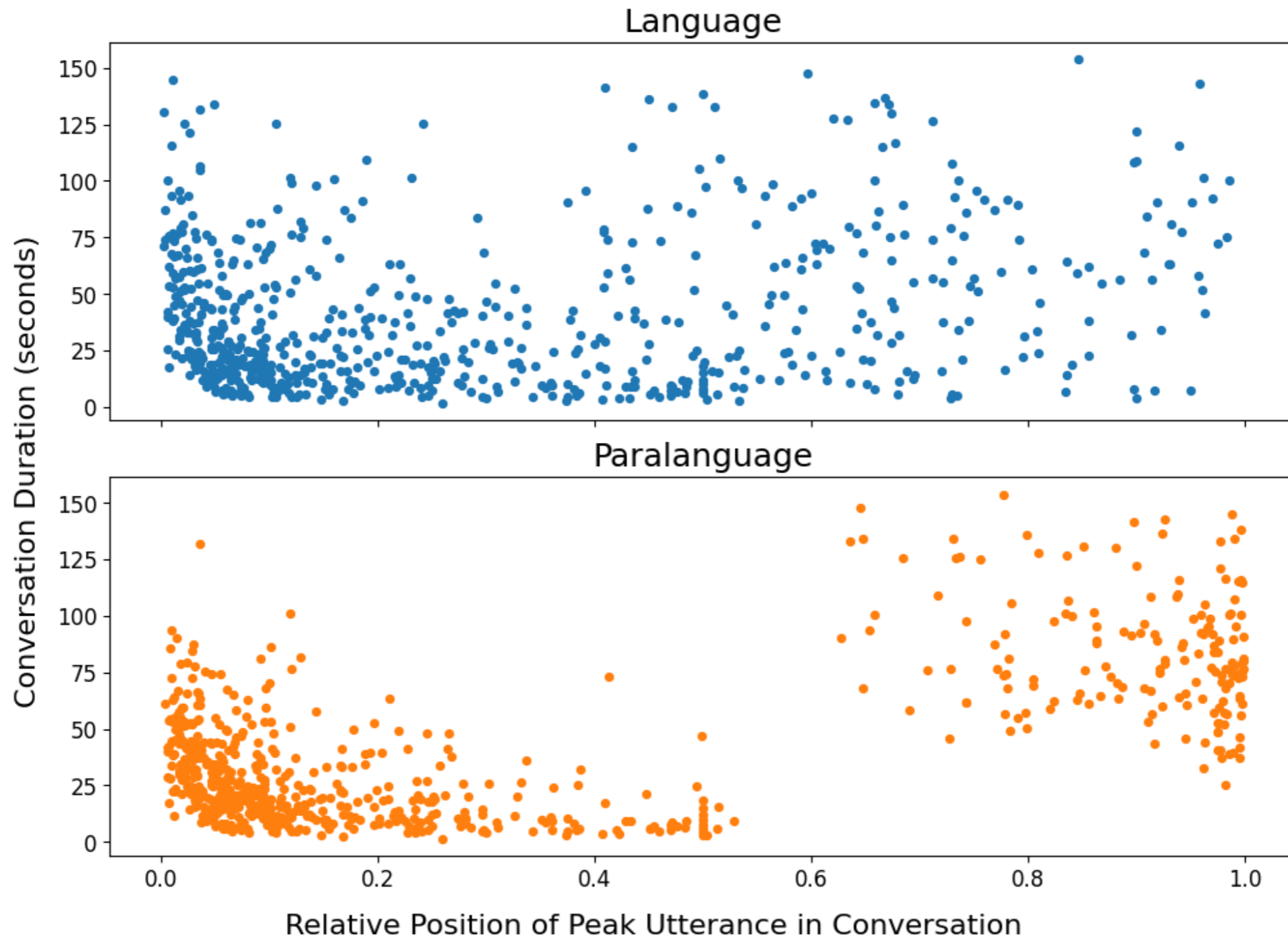
Graph Representation

- The local weights sum to 1 and they allow one to analyse the **interplay between consecutive utterances**;
- The global weights sum to 1 and they allow one to identify the “**peak**” utterances;
- The analysis of the weights provides **insight** about the **dynamics of disagreement**.

Results

Approach	MAE	RMSE	Correlation
Baseline	15.8	20.7	0.0
Previous Approach	9.7±0.1	12.6±0.1	0.52±0.01
Language	85±0.3	11.0±0.1	0.63±0.01
ParaLanguage	8.5±0.3	11.0±0.1	0.63±0.01
Multimodal	8.1±0.3	10.5±0.2	0.67±0.01

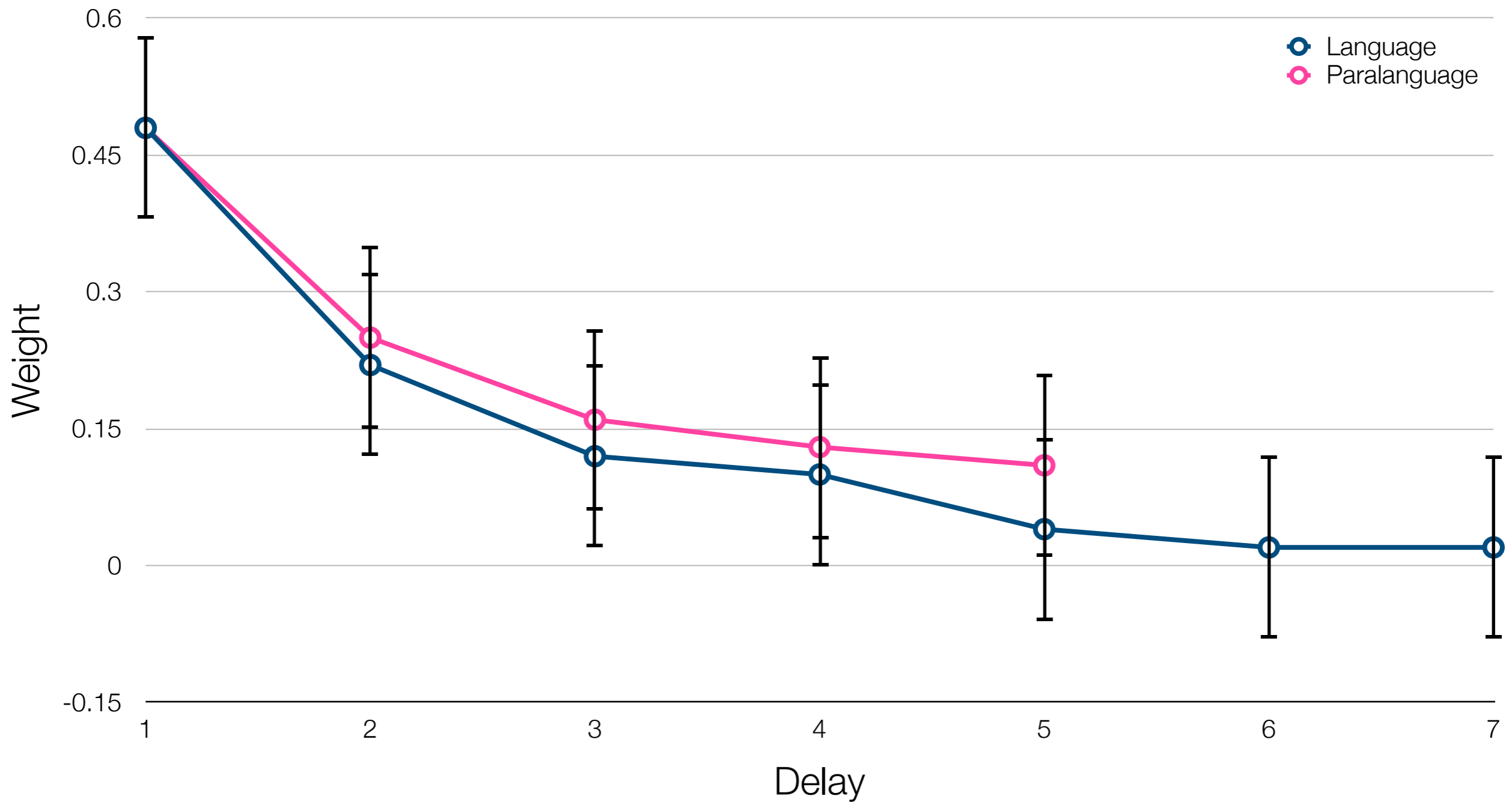
Global Weight Analysis (I)



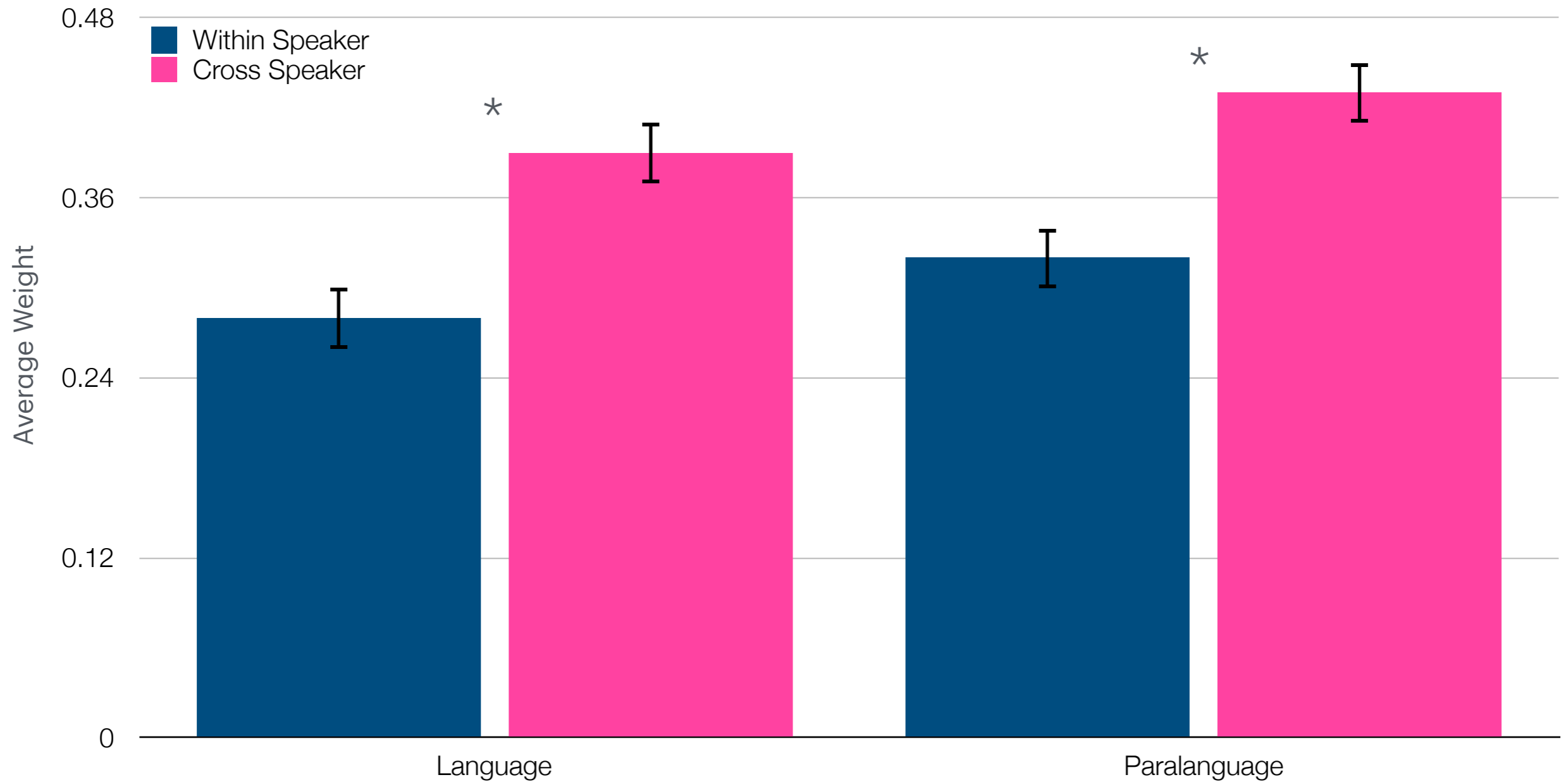
Global Weight Analysis (II)

- The utterances with the highest global weights (“**peak**” utterances) tend to concentrate **early when there is agreement**;
- Vice versa, **peak utterances** tend to concentrate **late** when there is **high disagreement percentage**;
- In the latter case, the model needs to wait the end of the conversation.

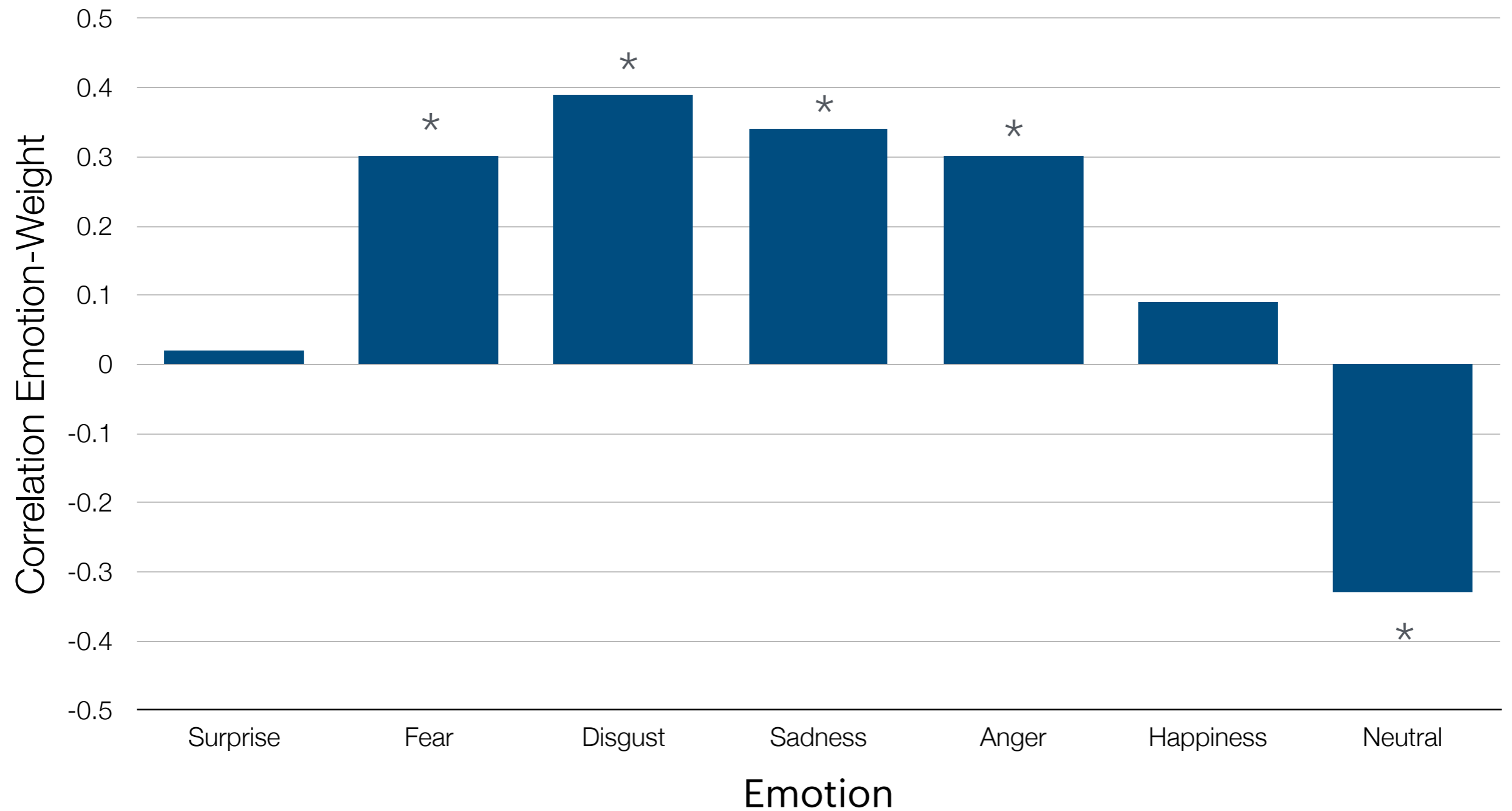
Local Weight Analysis (I)



Local Weight Analysis (II)



Local Weight Analysis (III)



Local Weight Analysis (IV)

- The **closest previous utterance weights**, on average, **half of the total** in the local representations;
- On average, **Cross Speaker weights are greater**, to a statistically significant extent, **than Within Speaker ones**;
- What a speaker says (and how s/he says it) **depends on what the other** says (and on how s/he says it);
- Local weights **correlate significantly with the emotional content** (especially negative) of the utterances.

Disagreement

“[...] an **oppositional stance** (verbal or non-verbal) to an antecedent verbal (or non-verbal) **action**.”

Outline

- Why Conversations
- Example: Disagreement Analysis
- Conclusions

Conclusions

- Developing **insight** about the social or psychological phenomenon under investigation is **as important as achieving a good performance**;
- In principle, it is a **good insight** that leads to a **good performance**;
- Insight is not always possible, but whenever it is possible, it is highly desirable;
- It is a loop because the definition of disagreement “designs” the approach and, in turns, it is the final outcome.

Thank You!