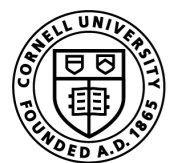


# Analysis of Language Change in Collaborative Instruction Following

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Findings of EMNLP 2021



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# Language Change in Collaborative Interactions

- Previously studied in reference games: as players build common ground, their utterances tend to decrease in complexity
- CerealBar is collaborative language instruction game
- Unlike reference games: speakers can specify multiple goals in an instruction to get more done

How does language change manifest in CerealBar?

# CerealBar

[Suhr et al. 2019]

A situated collaborative game with sequential natural language instruction

Leader



Follower



# CerealBar Community Analysis

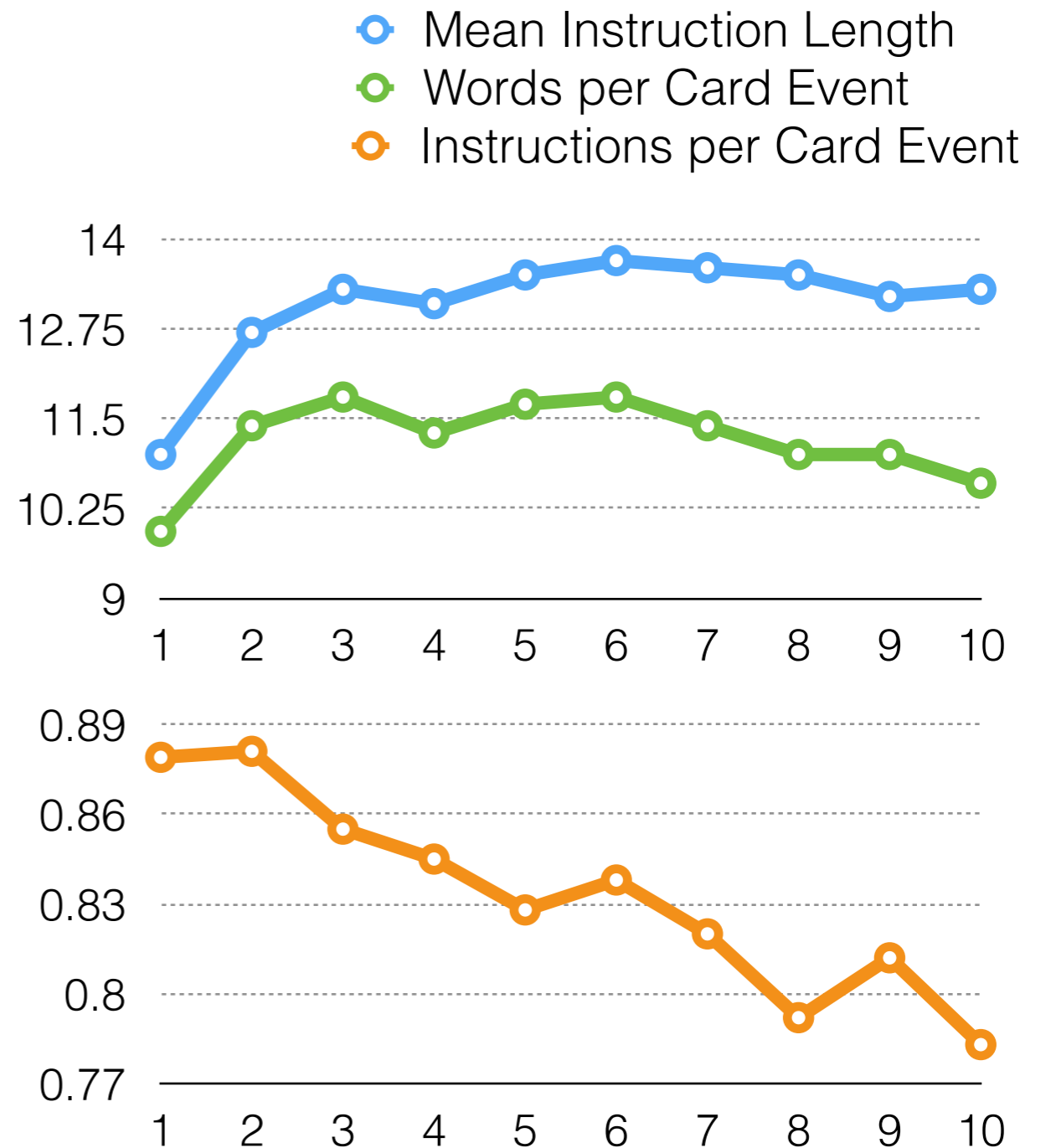
- Data: 1,202 human-human games collected by Suhr et al. 2019
- Games are long: ~19.9 instructions each
- To analyze how language changes over community development, we partition games chronologically into deciles of equal size

# Example Instructions

- **Decile 1:** get the card in front
- **Decile 5:** Collect the green square card in front of you.
- **Decile 10:** turn around on the trail, go straight and get 2 green circles, continue straight on the trail to the right side of the glacier and get 1 black triangle

# Language Change

- Unlike reference games, previously-used metrics indicate no decrease in complexity
- Leaders require fewer words to describe each card event
- Instructions increasingly deliver more information



# Conclusion

- Language and behavior change over time in the community
  - Illustrates the dynamic nature of users and language in interactive systems
  - Language does not simplify over time, in contrast to convention formation results on reference games
- Hypothesis: different incentives in reference games vs. CerealBar
  - Reference games: fixed utility (i.e., tasks) per utterance
  - **CerealBar: flexible utility (i.e., card goals) → speakers leverage increased expertise to specify more tasks using more complex language**