

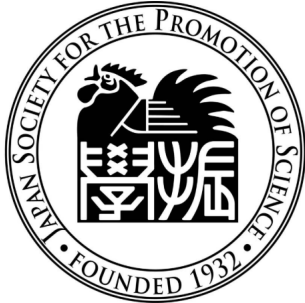
CMCL 2021

**The Workshop on Cognitive Modeling
and Computational Linguistics**

Proceedings of the Workshop

June 10, 2021

Online Event



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Introduction

Welcome to the Workshop on Cognitive Modeling and Computational Linguistics (CMCL)!!

We reached the 11th edition of CMCL, the workshop of reference for the research at the intersection between Computational Linguistics and Cognitive Science. This is the 2nd edition in a row that will be held entirely online because of the COVID-19 pandemic. Although we won't have the possibility of meeting in person in charming Mexico City, the program of CMCL 2021 is one of the richest and most interesting in the recent history of the workshop. We received 26 regular paper submissions and 17 were accepted for publication, for a total acceptance rate of 65.3%. We also received 4 non-archival submissions (extended abstracts or cross-submissions), 2 of which were accepted for presentation.

This year's accepted papers spanned a highly diverse range of questions centering on language, cognition, and computation. Several papers unified computational methods with neurobehavioral data, including EEG, MEG, and fMRI. Many of the papers leveraged state-of-the-art, transformer-based language models to distinguish between two competing theories of sentence processing. Still others probed the differences between language comprehension and language production, and whether it is feasible to treat them similarly for the purposes of explaining language use. Outside of sentence processing, accepted papers also probed the relationship between language and emotion; the graph structure of phonology; and lexical comprehension. Accepted papers spanned several grammatical formalisms, including Combinatory Categorical Grammar, Construction Grammar, and dependency grammars, in addition to statistical approaches. These diverse perspectives on cognition modeling and computational linguistics promote our scientific community's continued growth.

Additionally, as a novelty of this year's edition, we have organized a shared task on eye-tracking data prediction for English, and we accepted 10 system description papers. The ability to accurately model gaze features is vital to advance our understanding of language processing. Therefore, we posed the challenge of predicting token-level eye-tracking metrics recorded during natural reading. The participating teams submitted predictions generated mainly with two approaches: (1) Tree-based boosting algorithms with extensive feature engineering and (2) neural networks trained for regression such as fine-tuning transformer-based language models. The features for training the systems included surface features, lexical and syntactic features, token probability features, and text complexity metrics, as well as representations from state-of-the-art language models, such as BERT, RoBERTa, and XLNet. The winning team presented a linguistic feature-based approach.

Also for this year, the contribution of our PC members in thoroughly reviewing and selecting the best papers has been invaluable. Here we wish to deeply thank all of them for their time and effort.

We also thank Afra Alishahi and Zoya Bylinskii, our keynote speakers, for having accepted our invitation.

Finally, thanks again to our sponsors: the Japanese Society for the Promotion of Sciences and the Laboratoire Parole et Langage. Through their generous support, we have been able to offer fee waivers to PhD students who were first authors of accepted papers, and to offset the participation costs of the invited speakers.

The CMCL 2021 Organizing Committee

Organizing Committee

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Conference Program

June 10, 2021, Mexico City (GMT-5)

9:00–9:15 **Introduction**

9:15–10:15 **Keynote Talk 1**

9:15–10:15 *Grounded Language Learning, from Sounds and Images to Meaning*
Afra Alishahi

10:15–10:30 **Break**

10:30–12:00 **Oral Presentations 1**

Non-Complementarity of Information in Word-Embedding and Brain Representations in Distinguishing between Concrete and Abstract Words
Kalyan Ramakrishnan and Fatma Deniz

Human Sentence Processing: Recurrence or Attention?
Danny Merkx and Stefan L. Frank

Modeling Incremental Language Comprehension in the Brain with Combinatory Categorical Grammar
Miloš Stanojević, Shohini Bhattacharya, Donald Dunagan, Luca Campanelli, Mark Steedman, Jonathan Brennan and John Hale

June 10, 2021, Mexico City (GMT-5) (continued)

12:00–13:00 Lunch break

13:00–14:30 Oral Presentations 2

A Multinomial Processing Tree Model of RC Attachment

Pavel Logacev and Noyan Dokudan

That Looks Hard: Characterizing Linguistic Complexity in Humans and Language Models

Gabriele Sarti, Dominique Brunato and Felice Dell’Orletta

Accounting for Agreement Phenomena in Sentence Comprehension with Transformer Language Models: Effects of Similarity-based Interference on Surprisal and Attention

Soo Hyun Ryu and Richard Lewis

14:30–14:45 Break

14:45–15:00 Shared Task Presentation

CMCL 2021 Shared Task on Eye-Tracking Prediction

Nora Hollenstein, Emmanuele Chersoni, Cassandra L. Jacobs, Yohei Oseki, Laurent Prévot and Enrico Santus

15:00–16:30 Poster Session

LangResearchLab_NC at CMCL2021 Shared Task: Predicting Gaze Behaviour Using Linguistic Features and Tree Regressors

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Graph-theoretic Properties of the Class of Phonological Neighbourhood Networks

Rory Turnbull

Contributions of Propositional Content and Syntactic Category Information in Sentence Processing

Byung-Doh Oh and William Schuler

The Effect of Efficient Messaging and Input Variability on Neural-Agent Iterated Language Learning

Yuchen Lian, Arianna Bisazza and Tessa Verhoef

Capturing Phonotactic Learning Biases with a Simple RNN

Max Nelson, Brandon Prickett and Joe Pater

16:30–17:30 Keynote Talk 2

16:30–17:30 *The Importance of Individualized Text Formats for Readability*

Zoya Bylinskii

June 10, 2021, Mexico City (GMT-5) (continued)

17:30–17:45 Closing Remarks

