IMPRS Conference 2020

Interdisciplinary Approaches in the Language Sciences

3-5 June 2020

Welcome!

On behalf of the Max Planck Institute for Psycholinguistics and the entire Organizing Committee, we would like to wholeheartedly welcome you to the 2020 IMPRS conference!

Finance Committee

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Chén Shěn

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Conference website

#IMPRSconf2020

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International Max Planck Research School for language sciences

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Conference schedule

All times are given in Central European Summer Time (CEST, GMT+2). You can always find our current time on the clock on our [homepage](#).

Day 1 - Wednesday June 3rd

9:30 - 9:45 *Zoom access opens: https://zoom.us/j/97562924366*

9:45 - 10:00 Word of welcome by [Caroline Rowland](#)

10:00 - 11:00 Keynote 1: Language Disorders: Developmental with [Ellen Gerrits](#)

11:00 - 11:15 *break*

11:15 - 11:35 Short talk 1: Language Disorders: Developmental with [Babette Diepeveen](#)

11:35 - 11:55 Short talk 2: Language Disorders: Developmental with [Hayo Terband](#)

11:55 - 12:15 Question time short talks 1 and 2

12:15 - 13:15 *lunch break*

13:15 - 14:45 Poster session 1: posters 1-21 ([link](#))

14:45 - 15:00 *break*

15:00 - 17:30 [Workshop session 1*](#)

17:30 - 19:00 *dinner break*

19:00 - 21:00 [Pubquiz](#)

*Attendees for the workshop will have received a confirmation email. Zoom links will be provided in each workshop's designated Slack channel.

Day 2 - Thursday June 4th

9:30 - 10:00 *Zoom access opens: https://zoom.us/j/97562924366*

10:00 - 11:00 Keynote 2: Language disorders: Acquired with Matthew Lambon-Ralph

11:00 - 11:15 *break*

11:15 - 11:35 Short talk 3: Language Disorders: Acquired with Vitória Piai

11:35 - 11:55 Short talk 4: Language Disorders: Acquired with Anja Staiger

11:55 - 12:15 Question time short talks 3 and 4

12:15 - 13:15 *lunch break*

13:15 - 14:15 Discussion session 1: Language Disorders with all speakers, led by Simon Fisher

14:15 - 14:30 *break*

14:30 - 15:30 Keynote 3: Memory & Learning: Neurocognition with Laura Batterink

15:30 - 15:45 *break*

15:45 - 16:05 Short talk 5: Memory & Learning: Neurocognition with James McQueen

16:05 - 16:25 Short talk 6: Memory & Learning: Neurocognition with Lisa Henderson

16:25 - 16:45 Question time short talks 5 and 6

16:45 - 17:00 *break*

17:00 - 18:30 Poster session 2: posters 22-42 (link)

18:30 - 19:00 *break*

19:00 - 20:00 Virtual drinks (link)

Day 3 - Friday June 5th

9:30 - 10:00 *Zoom access opens: https://zoom.us/j/97562924366*

10:00 - 11:00 Keynote 4: Memory & Learning: Animal and Computational Models with Carel ten Cate

11:00 - 11:15 *break*

11:15 - 11:35 Short talk 7: Memory & Learning: Animal and Computational Models with Leonidas Doumas

11:35 - 11:55 Short talk 8: Memory & Learning: Animal and Computational Models with Marieke Woensdregt

11:55 - 12:15 Question time short talks 7 and 8

12:15 - 13:15 *lunch break*

13:15 - 14:15 Discussion session 2: Memory & Learning with all speakers, led by Andrea Martin

14:15 - 14:20 Closing ceremony

14:20 - 14:30 *break*

14:30 - 16:00 Poster session 3: posters 43-64 (link**)**

16:00 - 16:15 *break*

16:15 - 18:00 Workshop session 2*

18:00 onwards End

*Attendees for the workshop will have received a confirmation email. Zoom links will be provided in each workshop's designated Slack channel.

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Virtual format information

Main Sessions (Talks & Discussions)

All talks and discussion sessions will be streamed via Zoom. Please login to our Zoom session with your **Full name, Institute, position** (For example: Max Planck, MPI for Psycholinguistics, phd student). The link to the main zoom session is: https://zoom.us/j/97562924366. The password will be announced via Slack & email (see here how to join our Slack workspace)

While all talks are pre-recorded for technical reasons, they will be followed by live Q&A sessions with the speakers. During the main sessions, you as a conference attendee will be able to submit questions directly via Zoom in the Q&A window. Attendees are encouraged to submit questions <u>during</u> the talk: you do not have to wait for recording of the talk to be finished with the talk. The Q&A window in Zoom has an upvoting system: you can upvote questions of other attendees when you would like to see these questions answered. We will select the most upvoted questions to be answered live during the Q&A.

- If you asked your question without the 'anonymous' option on, we may call your name and ask you to 'raise your hand' with the Zoom option. We will then unmute your microphone so you can ask your question, if time permits.
- If you ask your question with the 'anonymous' option on, we will ask the question on your behalf and ask the precise question you wrote.

More information on how to use the Q&A feature can be found at page 139.

Poster sessions

1. For each poster session, posters will be visible on Owncloud. Passwords to each session will be provided on Slack.
   - Link to Poster session 1: posters 1-21
   - Link to Poster session 2: posters 22-42
   - Link to Poster session 2: posters 43-64

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2. On Owncloud, posters will be numbered. At the end of this booklet, you can see which poster corresponds to which presenter, and accordingly read the abstracts and view the posters.
3. Poster sessions are ideal moments during a conference to meet others and network, make the most of it!
   - We encourage poster presenters to:
     - ➢ Provide their email and twitter handle on their poster
     - ➢ Upload a video recording of their poster presentation on Owncloud
     - ➢ Promote their poster on twitter (with hashtag #IMPRSconf2020) and the #poster_sessions Slack channel
     - ➢ Be available during the poster sessions on Slack and Twitter for direct messages
     - ➢ Set up a live-stream with Zoom, Jitsi, BigBlueButton or Skype during their poster session so that other attendees may virtually join. Share the livestream link on Slack, Twitter and in your Owncloud folder
   - We encourage attendees to contact poster presenters by for example:
     - ➢ Send a direct message on Slack or Twitter to the poster presenter
     - ➢ Email poster presenter
     - ➢ Join the streaming of a poster presenter

Workshops

Separate Zoom links will be available for the workshops. By now, you should have received a confirmation email specifying which workshop you are allocated to. To obtain the link & password to your workshop(s), please join our Slack workspace. You will then be added to the corresponding private slack channel for each workshop. Here, you will receive more information, including how to prepare and the precise format of the workshop. In some of the workshops, participants will be asked to join a breakout room. Information on how to access the breakout rooms and move through them can be found on later in this booklet. If you have any questions, please ask them in the workshop-specific Slack channel.

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Zoom Virtual Drinks

We invite you to virtual Zoom Drinks on Thursday! During this event we will create 50 break-out rooms in a Zoom meeting. You can freely move through the separate rooms to meet new people. Each room will have its own prompt to start a conversation (more info below). The password to this session will be provided through our #general_announcements Slack channel. Information on how to access the breakout rooms and move through them can be found on later in this booklet.

How to use Zoom

1) The link to the Zoom session will guide you to the Zoom website, where you have the option to view the session in your web browser or in the Zoom client. Choose whichever you prefer, it has no effect on the quality of the session. Enter the session's password as provided on Slack when you are prompted to do so. Then enter your name as follows: **Full name, Institute, position** (For example: Max Planck, MPI for Psycholinguistics, phd student). With regard to providing an email address, if you wish to not enter your own, you can enter a fake email without any consequences. We would recommend to use the ConferenceID you received when signing up to the conference and put for example "YOUR_ID@mpi.nl".

2) Once you join the session, your microphone will be muted and you will not be able to start your webcam or unmute yourself.

3) You can leave and join the session at any time. The Zoom session will stay active during the whole conference, so that you can stay connected during the breaks, without having to rejoin after each talk.

How to use Slack

1) Information during the conference will be communicated through our Slack workspace. It is therefore important that you join this Slack workspace. You will receive an invite to join the *IMPRS conference 2020* workspace before the start of the conference. We encourage you to use the web-based version of Slack, since it is more spacious and allows for faster communication than the app.

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2) When you have joined the workspace, please update your profile so that attendees can see who you are. Go to *View profile* and change the following:
   - ➢ **Full name:** position, Full name, Institute
   - ➢ **Display name:** Full name
   - ➢ **What I do:** Attendee
   - ➢ **Profile photo:** if you want, you can upload a photo of yourself here
3) On the Slack workspace we have several channels:
   - #general_announcements: will be used by the conference committee to guide you through the programme by sharing links and passwords to the different sessions
   - #help: is the place where you can ask any organisational, technical or otherwise not content-related questions during the conference. We will always have several members of the committee checking your questions and helping you out
   - #poster_sessions: in this channel you can advertise your poster and maybe share a zoom link and time during which you will be available for questions
   - #random: is a place for all non-work related chat
   - #social_lounge: a place to meet & greet, network with your colleagues. Make sure to introduce yourself here!
   - #theme1-languagedisorders: here you can share your thoughts and ask all clarification and deeply theoretical questions on this theme during the conference
   - #theme2_memorylearning: here you can share your thoughts and ask all clarification and deeply theoretical questions on this theme during the conference
   - #workshop: each of the six workshops will have its own channel, where all information regarding this workshop will be provided. In some cases, communication during the workshop will also take place in this channel. We will add you to the channels of the workshops you were assigned to. If on the first day of the conference you are not added to a workshop channel you should have been admitted, please contact us.
4) On Slack, you can also send direct messages to other members. This may be useful if you want to ask a question to a poster presenter, or would like to discuss questions raised during the talks with particular attendees, or just want to get to know specific fellow attendees.

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Twitter

1. Our conference has a [Twitter account](#) and we will use the hashtag #IMPRSconf2020 to tweet about the conference. We encourage all attendees to use this hashtag to share their thoughts during the conference, for example by live tweeting the talks and discussion sessions (check out [these](#) live tweeting tips and tricks), promoting your or someone else's poster, networking, et cetera!

2. Make sure to use the correct hashtag #IMPRSconf2020. We will regularly check this hashtag and retweet and like your tweets.

3. If you have a question during the conference, please use the #help channel on Slack instead of direct messages on Twitter.

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Speakers

Keynotes Language Disorders

Ellen Gerrits - Wednesday June 3rd 10:00-11:00

Subtheme: Language Disorders: Developmental

Title keynote talk: The efficacy of treatment for children with developmental language disorders

Abstract: My talk will focus on key questions and outcomes in research on efficacy of treatment for speech and language disorders in relation to theories of language acquisition and language processing.

Matthew Lambon-Ralph - Thursday June 4th 10:00-11:00

Subtheme: Language Disorders: Acquired

Title keynote talk: The neural and computational bases of conceptual knowledge and its breakdown in neurological disorders.

Abstract: Conceptual knowledge or semantic memory is central to verbal and nonverbal activities. Utilising a convergent methodological approach across healthy and neurological participants it is possible to begin to understand how concepts are formed and represented in the brain, and how concepts breakdown in different forms of neurological disease.

Keynotes Memory & Learning

Laura Batterink - Thursday June 4th 14:30-15:30

Subtheme: Memory & Learning: Neurocognition

Title keynote talk: Implicit learning, language acquisition, and their meeting point

Abstract: I have argued that implicit learning, which produces knowledge that is inaccessible to awareness, plays an important role in acquiring patterns in language across the lifespan. Drawing upon EEG/ERP evidence, I will demonstrate that linguistic rules or patterns (1) can be processed outside of awareness; (2) can be acquired by adult second language learners unintentionally and implicitly; and (3) can be influenced and enhanced by memory processing during sleep.

Carel ten Cate - Friday June 5th 10:00-11:00

Subtheme: Memory & Learning: Animal and Computational Models

Title keynote talk: The linguistic abilities of birds

Abstract: Songbirds have relatively complex, well structured, learned vocalizations and therefore birdsong is seen as one of the closest animal analogues for language. I am interested in whether this superficial similarity extends to a similarity in cognitive skills of birds, in particular with respect to the processing of phonetic and syntactic features. In my presentation I will present some studies on speech sound perception and 'grammatical' rule learning abilities in birds.

Short Talks

Short talks Language Disorders

Babette Diepeveen: Wednesday June 3rd 11:15-11:35

Subtheme: Language Disorders: Developmental

Title short talk: Early detection of children with developmental language disorders

Abstract: My talk is about the possibilities for identifying children with developmental language disorders at a young age using language milestones and various risk factors. I will discuss how the outcomes of my studies are applicable in the field of public health and well-child healthcare.

Hayo Terband: Wednesday June 3rd 11:35-11:55

Subtheme: Language Disorders: Developmental

Title short talk: Developmental models of childhood speech disorders

Abstract: Speaking is the most complex cognitive-sensorimotor skill humans perform. My focus is on internal representations for speech production and perception and the interplay between different types of representations during development. More specifically, how do phonological and sensorimotor impairments relate to underlying deficits and adaptive strategies, and how do these express themselves in symptomatology?

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[Vitória Piai](): Thursday June 4th 11:15-11:35

Subtheme: Language Disorders: Acquired

Title short talk: Conceptual and lexical retrieval in spoken word production

Abstract: I will present studies examining conceptual and lexical retrieval in spoken word production in healthy individuals and in individuals with brain lesions, with a particular focus on the roles of the temporal and prefrontal cortex.

[Anja Staiger](): Thursday June 4th 11:35-11:55

Subtheme: Language Disorders: Acquired

Title short talk: The organisation of speech motor control: Insights from motor speech disorders

Abstract: My talk will outline how the motor system involved in speaking can be compromised by brain damage and how motor speech impairments can contribute to the understanding of the neurophysiological mechanisms underlying speech.

Short talks Memory & Learning

James McQueen: Thursday June 4th 15:45-16:05

Subtheme: Memory & Learning: Neurocognition

Title short talk: Memory consolidation in word learning

Abstract: I will present studies using behavioral and neuroscientific techniques which investigated sleep-related memory consolidation in word learning. These studies provide insights into the nature of the lexical representations.

Lisa Henderson: Thursday June 4th 16:05-16:25

Subtheme: Memory & Learning: Neurocognition

Title short talk: Learning and consolidating language: What can we learn from individual differences?

Abstract: A wealth of evidence suggests that sleep plays an important role in supporting the consolidation of new language over the lifespan. Bolstering this idea, this talk will draw on evidence of the impact of sleep on word learning over typical development and also in atypical populations, and consider how we can use this evidence to understand how best to optimise vocabulary growth.

[Leonidas Alex Doumas](#): Friday June 5th 11:15-11:35

Subtheme: Memory & Learning: Animal and Computational Models

Title short talk: Cross-domain generalisation in humans and machines

Abstract: Humans are exceptionally good at generalising across domains. We regularly use information we have learned in one domain (e.g., stacking items on a shelf) to reason about another (e.g., solving puzzles in a video game). By contrast, this kind of generalisation is notoriously difficult for artificial neural networks. We present a neurocomputational model that accomplishes human-level cross-domain generalisation across different tasks.

[Marieke Woensdregt](#): Friday June 5th 11:35-11:55

Subtheme: Memory & Learning: Animal and Computational Models

Title short talk: Using computational modelling to investigate how language adapts to interaction

Abstract: Face-to-face interaction---arguably the primary ecology of language---provides both pressures (such as rapid turn-taking and noise) and affordances (such as interactive repair and other forms of metacommunication) for making conversations run smoothly. I will present computational modelling work that looks into how these different aspects of interaction may influence, through cultural evolution, the shape that language takes.

Workshops

Session 1: Wednesday June 3rd 15:00 - 17:30

Power analyses with Andrew Jessop

Title: Power analyses and simulations in R

Abstract: This workshop will cover how to design and run simulations in R, with a focus on estimating statistical power and sample size requirements for experiments. We will work through examples covering different experimental designs, and attendees will be invited to suggest examples from their own research or bring data to work on during the workshop.

Necessary preparations: None, check the respective Slack channel.

Git version control with Kristijan Armeni & Sophie Arana

Title: Git & Github for collaborative work

Abstract: In this workshop, we will set you up with the minimal basics needed to start using Git and GitHub for version control in your projects. In a hands-on session you will work on issues, pull changes from others to your repo, push your changes to the remote (as a bonus, you'll get tons of new jargon to throw around!).

Necessary preparations: You need Git and a GitHub account. You should be somewhat familiar with the terminal.

Virtual Reality with Eleanor Huizeling & Evelien Heijselaar

Title: Virtual Reality: A multimodal tool for language research

Abstract: This workshop will introduce the benefits and challenges of using VR as a dynamic and multimodal tool to investigate language in naturalistic environments. The session will include a tour of our virtual reality facilities and a discussion on applications of virtual reality in language research.

Necessary preparations: None

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Session 2: Friday June 5th 16:15 - 18:00

Data visualization with [Laurel Brehm](#)

Title: Visualizing data with ggplot

Abstract: A compelling graphic is a hook to get other researchers looking at your paper, poster, or talk! This workshop provides a taxonomy of visualizing data with ggplot, an R package, with a focus on what messages are conveyed with each graphic type and the way to implement them yourself.

Necessary preparations: Have [R](#) and [RStudio](#) installed, if possible: bring your own data

Improving your productivity with [Marisha Manahova](#)

Title: Setting Your Priorities and Improving Your Productivity

Abstract: Do you feel like you have lots to do but not enough time? And even when you're busily trudging along, you still somehow don't get the important things done? In this workshop, we will discuss how to get things done in accordance with what you find important. We will also discuss how to manage your time and your projects, so you can flourish professionally, take care of yourself, and enjoy your life.

Necessary equipment: None

Open Science with Eirini Zormpa

Title: Reproducible analyses in R

Abstract: For science to be verifiable it needs to be, minimally, reproducible; running the same analysis on the same data should give the same results. This may sound easy but it's really not! In this workshop we'll cover why reproducibility is important and how you can make your R code more reproducible.

Necessary preparations: Have R and RStudio installed, preferably have a GitHub account

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Social activities

Pub Quiz: Wednesday June 3rd 19:00 - 21:00

The IMPRS Conference Pubquiz will take place on the evening of the first conference day, 3rd June, 19.00 - 21.00 (CEST), exciting! You can sign up here as an individual or as a team of up to 6 people (note that if you sign up alone we will partner you up with other people who also signed up alone to form a team). To look for team mates, take a look on Slack (in the #social_lounge) or via Twitter to see who else is registered to our conference and ask if they would like to join forces with you in the quiz.

The online pub quiz will be live streamed on Youtube and those who signed up will receive the link on the day of the pubquiz via email. More information on how the questions will be answered will be announced in due time. Before the pub quiz starts, each team should start their own video conference (e.g., on Zoom, Jitsi, BigBlueButton or Skype), and one member per team will be in charge of filling in the answers. More instructions will follow on the livestream from 19:00 onwards. During the quiz, you can communicate with your team via your video conference to decide on the correct answer, and the member in charge of answering will do so for the whole team. Are you ready to compete?

Virtual Drinks: Thursday June 4th 19:00 - 20:00

To join our virtual drinks, follow the link to the Zoom Meeting. The password will be announced on Slack in the #general_announcments channel. We will create 50 breakout rooms between which you will be able to move freely as you wish. This way, you can form smaller or larger groups. In the beginning, you might be assigned to a room at random, but after joining the first room, you will be able to switch freely. Have a look around for people you want to talk to, or listen to some conversations and decide whether you want to stay or move on. Just imagine this to be a bar where people are standing together in different groups, you can grab a drink and wander around. You can first join one and move on to another one later to get to know more fellow attendees. As shown below, each room will have its own conversation prompt to spark some interaction. At the end of the booklet you will find some further explanation on breakout rooms. Enjoy!

Room	Prompt	Room	Prompt
1	What is your favourite pun?	26	What book genre do you like most?
2	What is your favourite word?	27	Do you have pets? (show!)
3	Which strange fears do you have?	28	Who is your 'science hero'?
4	Describe your English accent?	29	Which languages do you speak?
5	Who is your hero?	30	How was the weather today?
6	What is your favourite music genre?	31	Which conference talk did you like most?
7	What do you like to do on the weekend?	32	What is your favourite food?
8	If any animal could be transformed to pet-size, which pet would you want to have?	33	What do you recommend to tourists in your country?
9	What sports do you like to watch?	34	What item do you always take with you?
10	What will you do first when quarantine is lifted?	35	Do you like taking care of plants/ gardening?
11	What is the last book you read?	36	What country would you like to visit?
12	What is your favourite animal?	37	What is the best film you ever saw?
13	What science topic are you working on?	38	Are you a morning- or evening person?
14	What was the last film you saw?	39	How do you normally travel to work?
15	What is your favourite drink?	40	What skill would you like to gain?
16	Which language would you like to learn?	41	What do you do to stay healthy?
17	What is your best recipe?	42	What is your favourite landmark?
18	What hobbies do you have?	43	What superpower would you want?
19	What is the best proverb in your language?	44	What pizza is the best?
20	What field of science interests you do if not the one you're currently working in?	45	Which mythical creature would you like to have as a pet?
21	Which era in history would you want to live in?	46	What is the strangest dream you have had?
22	Where do you live?	47	What is your favourite season?
23	What is your guilty pleasure?	48	Would you go on a world trip alone?
24	What bodily talent do you have (wiggle ear, eyebrow raise, etc.)	49	If you had a box of chocolates, which flavour would you eat first?
25	What is the best book you ever read?	50	What sports do you like to do?

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Problems & troubleshooting

If you have any organisational questions regarding the conference, cannot find Zoom links or passwords, or encounter technical issues, please contact us via our #help channel on Slack. We do check email and Twitter Direct Messages, but we can provide fastest and most efficient support on the #help Slack channel.

If you have any questions regarding any of the workshops, please ask for help on the workshop-specific Slack channel

Privacy

To protect the privacy of all attendees of the conference, we urge you to respect and protect the privacy of all other attendees and only share materials in a responsible, thoughtful manner. It is not allowed to spread any materials or information of another attendee (including all speakers, workshop leaders, poster presenters, or conference committee members) without their written permission. If we receive complaints regarding non permissioned spread of materials and information, we have to exclude you from the conference. Thus, without permission, **do not spread**:

1) PDFs of posters or poster abstracts
2) Recordings of talks, workshops or poster presentations
3) Screenshots of Zoom sessions which includes recognizable faces of other attendees, including speakers, workshop leaders, or poster presenters.
4) Screenshots of presentation slides of talks.
    ➢ If you would like to have the slides of the speakers, you can contact the speaker with your request

Code of conduct

The IMPRS conference committee is dedicated to providing a harassment-free conference experience for everyone. We do not tolerate harassment of conference attendees in any form. This Code of Conduct applies to all of the conference's spaces, including zoom sessions, public channels, private channels and direct messages. Anyone who violates this code of conduct may be sanctioned or expelled from these spaces at the discretion of the conference committee.

General rules

We aim to create a community that welcomes individuals with diverse backgrounds who can interact with each other in a positive environment. We encourage behaviors towards creating such an environment that involves:

- Being a good listener in the discussions
- Being respectful to each other viewpoints
- Always using and encouraging the use of welcoming and inclusive language
- Giving time to others in thinking and completing their viewpoints.
- Aiming for the best of the community regarding benefiting from the discussions.
- Showing support to make everyone feel included and welcomed to the discussions independent from the level of knowledge.

Harassment statement

Our community is not tolerating any type of harassment that might occur online or offline. In particular this includes the following categories:

- Offensive and unwelcome comments that are addressing:
  - Gender
  - Gender identity
  - Sexual orientation
  - Disability
  - Mental illness
  - Neuro(a)typicality
  - Physical appearance
  - Body size
  - Age
  - Race
  - Nationality
  - Immigration status
  - Language
  - Religion
  - Pregnancy/maternal status
  - Marital status
  - Veteran status
  - Anti-Indigenous/Nativeness
  - Anti-Blackness
  - Level of career

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- ○ National origin
- ○ Ethnic origin
- ○ Any lack of/indication of identity maker
- ○ Level of knowledge in the topic
- ○ Political tendance/opinion/affiliation
- ○ Level of the use of the common language (eg.discussions in English)

- Any criticizing or attacking behavior regarding a person's lifestyle preferences and practices regarding any daily activities (eg. eating, health, parenting, use of drugs, employment etc.)
- Any criticizing, attacking behavior or language regarding the career level, the affiliated university and lab, the project group, the project/the research topic they work on or the country, city, they are in.
- Intentionally misgendering, using inappropriate or dead pronouns/names.
- Using/sharing any sexual images, gestures, emojis, jokes, stories, idioms, phrases, wordings, slang language, swearing words, behaviors, voice recordings, videos, links of the web pages throughout the discussions
- Threats of violence
- Any deliberate intimidation, insisting and persisting uncalled behavior
- Stalking, following in both online and offline
- Sharing/sending any offtopic inappropriate harassing photography, recordings
- Sustained and intrusive disruption throughout the discussion.
- Unwelcome sexual attention
- Any inappropriate, insisting social contact (eg. requesting/pursuing any inappropriate intimacy with the others)
- Pursuing one-to-one contact in the case where both sides are not openly willing to/confirming the communication.

Reporting

If you are being harassed, made uncomfortable based on the listed harassment statement section, or if you notice that anyone in the gathering is being harassed, or if you feel any other concerns regarding any disruptive and unacceptable behavior of the others regarding the composure of the discussions please immediately contact the IMPRS conference committee on Slack or write to (Federica.Bartolozzi[at]mpi.nl, Joery.denHoed[at]mpi.nl, Sophie.Arana[at]mpi.nl).

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This statement includes any incident committers, including the people if they are in the organizer team, or a reputable researcher etc. There is no exclusion regarding the personnel who commit the unwanted behavior to be reported. Therefore please do not hesitate to contact the IMPRS conference committee immediately to make your voice heard.

The IMPRS conference committee is responsible to respond to any complaint as promptly as possible they can. If you would get a time lapse between your informing and the response and are still feel uncomfortable with the situation please put your personal safety and well-being first, and consider logging out and be persistent on getting a reply and help from the admin team. Even though you might have taken precautions for yourself, for the safety and health of the community these actions should be stopped immediately.

If a participant engages in harassing behavior, the IMPRS conference committee has the responsibility to remind the offender about the MPI's Code of Conduct and warn them that repeated inappropriate, uncivil, threatening, offensive or harmful behavior can lead to a temporary or permanent ban from the conference. Anyone who violates this code of conduct may be sanctioned or expelled from these spaces at the discretion of the administrators.

Enforcement process

We take any type of harassment seriously, we would like to report and take the necessary actions accordingly. Harassment and other code of conduct violations reduce the value of our conference for everyone. We want you to be happy at our conference. People like you make our conference a better place. We expect participants to follow these rules at all conference sessions and conference-related social activities. We think people should follow these rules outside the conference too!

The IMPRS conference committee may take action to redress anything designed to, or with the clear impact of, disrupting the conference or making the environment hostile for any attendee. In the case of a reporting of the violation of the code of conduct, the committee will discuss the actions to be taken immediately. Whatever the resolution that they decide upon, the decision of the admins involved in a violation case will be considered final and which will be shared with the offender privately.

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right to reject any report we believe to have been made in bad faith. Reports intended to silence legitimate criticism may be deleted without response. We will respect confidentiality requests for the purpose of protecting victims of abuse. At our discretion, we may publicly name a person about whom we've received harassment complaints, or privately warn third parties about them, if we believe that doing so will increase the safety of our participants or the general public. We will not name harassment victims without their affirmative consent.

Reference: Community Covenant

Overview poster sessions

Session 1: Wednesday, June 3rd, 13:15 - 14:45. Posters 1-21

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3	Montserrat Comesaña	The representation and processing of synonyms and translations: A masked priming study with European Portuguese-English sequential bilinguals
4	Shanthi Kumarage	A longitudinal investigation of children's early syntactic representations
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14	Cecilia Husta & Christina Papoutsi	Why we speak affects how we speak: Electrophysiological signatures of word planning following verbal versus nonverbal material
15	Natascha Roos	Functional anatomy of context-driven word retrieval: across-session consistency in fMRI
16	Gisela Govaart	The effect of speaker variability on phoneme processing: A crowd-science experiment
17	Yang Cao	Do alpha and beta oscillations dissociate in context-driven spoken-word production?
18	Simone Gastaldon	Speech–brain entrainment in adults who stutter is reduced when listening for speaking
19	Diana Krasovskaya	Seeing is hearing: Can visual rhythms replace acoustic envelope information in speech perception?
20	Lena Henke	Cycling up the garden path: Oscillatory phase predicts downstream P600
21	Imke Wets	Semi-spontaneous language production in Dutch speaking people with primary progressive aphasia

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International Max Planck Research School for language sciences

Session 2: Thursday June 4th 17:00-18:30. Posters 22-42

Poster	Presenter	Title
22	Joanna Sierpowska	Lexical selection in word production and the white-matter system of the (pre)supplementary motor area
23	Chloè Metz	On recalling and learning new phonological forms: the effect of new semantic representations
24	Ashley Blake	Cognitive predictors of individual differences in children's language acquisition
25	Guiseppe Di Dona	Familiar voices and phonemes are retrieved by means of different processes: A MMN study
26	Yevheniy Skyra	Hebbian learning of language structure in adults: Evidence from a speech production task
27	Danny Merkx	Human sentence processing: recurrence or attention?
28	Isabelle O'Halloran	Implicit and explicit processes in statistical learning and consolidation of grammatical regularities
29	Zsofia Stefan	Planning to be concise: An eye-tracking study of the production of referential expressions in native (L1) and non-native (L2) speakers
30	Jinbiao Yang	Build a lexicon from zero: A cognitive-inspired unsupervised model for detecting sub-word, word, and supra-word units
31	Friederike Schütte	Verbal short-term memory without language processing? The role of syntax and morpho-syntax
34	Jieying He	Interference Between Concurrent Language Production and Comprehension: Representational Similarity or Capacity Limitation?
33	Arushi Garg	Investigating the lemma using fMRI – Linking production and comprehension
34	Lynn Eekhof	Unraveling the social cognitive potential of narratives using eye tracking: the case of viewpoint markers
35	Mariella Paul	Gradual change of non-adjacent dependency learning during early childhood
36	Iva Saban	Stroop effect and bilingualism: Separating its components in weak and recently-trained bilinguals
37	Abigail Cosgrove	Do our storytelling abilities change as we age? Exploring the underlying semantic mechanisms related to discourse production.
38	Ileana Camerino	White-matter microstructural integrity in small vessel disease with category fluency impairment
39	Natasha Vernooij	Grey manchas: Codeswitching when grammars do not align
40	Laura Giglio	A production-comprehension asymmetry in the engagement of the language network for constituent structure building
41	João Ferreira	The role of the basal ganglia in inflectional encoding: An fMRI study of producing the past tense
42	Iris Broedelet	Distributional learning of visual object categories

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International Max Planck Research School for language sciences

Session 3: Friday June 5th 14:30-16:00. Posters 43-64

Poster	Presenter	Title
43	Ana Rita Sá-Leite	An ERP study on the gender congruency effect with European Portuguese speakers: Is transparency modulating gender processing?
44	Natalia Rivera-Vera	The effect of speakers' reliability in adult second language cross-situational word learning (CSWL)
45	Sofia Fregni	An exploratory fMRI study on metonymy and metaphor processing
46	Amanda Hickey	Grammar generalisation and statistical learning in adults and children: The role of word learning and explicit awareness
47	Daisy Lei	The role of images in the learning and consolidation of novel words: An ERP study
48	Rosa Padt	Consolidation of newly learned words in the L2
49	Astrid Graessner	Fronto-temporal contributions to basic semantic composition: Evidence from lesion behavior mapping
50	Svetlana Postarnak	Shared neural resources during the discrimination of speech and music timbre information: An electrophysiological study
51	Lena Ackermann	The effect of category interest on novel-word retention in toddlers
52	Alessio Quaresima	The Tripod model: A minimal reduction of the dendritic tree and its functional relevance for neural processing
53	Amanda Olsson	Feedback in spaced or massed retrieval practice affects word learning in adults
54	Laura Diprossimo	Top-down or bottom-up? Investigating the benefit of perceptual anchoring in early language acquisition with fNIRS
55	Maria Alice Baraldi	Pragmatic abilities in early Parkinson's disease
56	Anastasia Kromina	Eye-movement comparison in reading in deaf and hearing Russian sign language speakers
57	Eleonora Marocchini	Indirect requests comprehension in High-Functioning Autism and typical development
58	Anastasiia Kaprielova	Eye-movements during reading in children with hearing loss
59	María Eugenia Arthuis Blanco	Early neuronal traces of lexical memory during language development
60	Fenja Schlag	Variation in the association between polygenic risk for psychiatric disorder and social skill sets in the general population reveals disorder specific profiles
61	Stan van der Burght	Dissociating intonation-driven syntactic and semantic processing in the left inferior frontal gyrus using rTMS
62	Yanmei Li	Investigating the role of content support in L2 writing: Focus on writing performance and L2 learners' engagement
63	Margit Scheibel	Early semantic facilitation in blocked cyclic naming is due to facilitatory top-down effects on object recognition
64	Gianna Urbanczik & Anna Rosenkranz	The influence of grammatical categories on verbal fluency performance in people with aphasia

Poster abstracts

Session 1: Wednesday June 3rd 13:15-14:45. Posters 1-21

Poster 1: Effects of number congruency on Mandarin speakers' referential behaviour

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People use a more explicit referential expression (e.g., a repeated NP) when the antecedent has a semantically similar competitor compared to when it has a semantically dissimilar competitor (Fukumura, van Gompel, Harley, & Pickering, 2011). Many studies argue that such semantic similarity effects are entirely due to the semantic competition between two semantically similar entities (Arnold & Griffin, 2007). However, other factors might be relevant. We report three experiments that used another dimension of semantic similarity, number congruency, to investigate whether lexical or structural factors play any role in semantic similarity effects in spoken Mandarin.

In Exp1 (*n* = 36), we manipulated number congruency between the target referent (**farmer**) and the competitor (*shepherd*): number-congruent condition (**one farmer**-*one shepherd*; **four farmers**-*four shepherds*) vs number-incongruent condition (**one farmer**-*four shepherds*; **four farmers**-*one shepherd*). We expressed the singularity/plurality of the entities using a numeral and classifier that preceded the noun (e.g., yi/si-WEI farmer 'one/four farmer'). Participants saw introductory pictures and preambles mentioning both entities, and then described actions involving only the target referent(s). Exp2 (*n* = 36) used the same design when plurality was expressed via a morpheme -men attached to a singular noun (e.g., farmer-men 'farmer-plural'). We measured the use of omissions/null subjects, pronouns and repeated NPs. Exp1 and Exp2 consistently found that participants produced fewer omissions (*p* < .001) and more repeated NPs (*p* < .001) in the number-congruent than in the number-incongruent condition.

Exp3 (*n* = 36) investigated whether lexical or structural factors might contribute to the effects of number congruency. We expressed all singular/plural entities using bare nouns without

a numeral or morpheme -men. Participants again produced fewer omissions ($p < .001$) and more repeated NPs ($p <.001$) in the number-congruent than in the number-incongruent condition. This indicates that the effects of number congruency result entirely from semantic competition and cannot be modulated by other factors such as lexical/syntactic representations of the entities.

Arnold, J. E., & Griffin, Z. M. (2007). The effect of additional characters on choice of referring expression: Everyone counts. *Journal of Memory and Language*, *56*(4), 521–536. https://doi.org/10.1016/j.jml.2006.09.007

Fukumura, K., van Gompel, R. P. G., Harley, T., & Pickering, M. J. (2011). How does similarity-based interference affect the choice of referring expression? *Journal of Memory and Language*, *65*(3), 331–344. https://doi.org/10.1016/j.jml.2011.06.001

Poster 2: CLIL does not mean bilingualism: A MEG study based on picture-naming regime

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The aim of the study is to gain insight into the dynamics of word production in picture naming tasks in three groups of monolingual, semi-bilingual and bilingual learners. An important source of information on the time course of cognitive processes comes from EEG or MEG studies. We applied picture naming task under MEG to provide more insights into the language production processes and to to track temporal information with a precision at the millisecond range, allowing investigation of the temporal flow and scalp distributions of well-established behavioral effects. Our CLIL participants' mental word processing found to be significantly different from their proficient counterparts in different stages of picture naming. Our observations call into mind that CLIL students failed to be as natural and are resorting to a completely different brain mechanism to cope with their lack of proficiency than their bilingual peers and this difference was totally evident in different stages of word retrieval and word processing.

Poster 3: The representation and processing of synonyms and translations: A masked priming study with European Portuguese-English sequential bilinguals

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According to the Multilink model (Dijkstra et al., 2019), words from the first (L1) and (L2) second languages share a common store and their access is non-selective. Thus, the presentation of a target-word activates in parallel lexical candidates from both languages that share with it form and semantic overlap. The degree of words' activation not only depends on their overlap but also on their resting level of activation (i.e., words that are more used, usually L1 words, have a higher resting level of activation). Since translations and synonyms share meaning, they are seen as qualitatively similar lexical representations and so may be subject to a similar processing if their frequency levels are matched. To the best of our knowledge, only one recently published study has examined the processing of synonyms by using a masked priming lexical decision (LD) task in an attempt to understand whether the tenets of Multilink are right (Witzel, 2019). The author failed to find reliable masked priming effects for low-frequency synonyms preceded by high-frequency synonyms. As there is a vast amount of studies showing facilitative effects for translations in an L1-L2 direction, the author concludes that synonyms and translations are not equally processed. Although interesting, the author neither compared directly the processing of synonyms and translations nor evaluated a homogenous sample of participants in what regards language proficiency. The aim of the present masked priming LD study was to overcome these gaps through the analysis of the processing of synonyms and translations in European Portuguese-English sequential bilinguals. Thus, target words could be preceded either by synonyms in the same language and their corresponding unrelated control prime words or by

non-cognate translation equivalents and their corresponding unrelated control prime words. The results are discussed in the light of the Multilink model.

Dijkstra, T., Wahl, A., Buytenhuijs, F., van Halem, N., Al-jibouri, Z., de Korte, M., & Rekké, S. (2019). Multilink: a computational model for bilingual word recognition and word translation. *Bilingualism: Language and Cognition, 22*(4), 657-679.

Witzel, N. (2019). Can masked synonym priming replicate masked translation priming? *Quarterly Journal of Experimental Psychology, 72*, 2554–2562.

Poster 4: A longitudinal investigation of children's early syntactic representations

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A core question in language development research concerns the degree to which early syntactic representations are abstract or lexicalised. Syntactic priming is a method widely used to test the nature of underlying syntactic representations. Lexicalist theories of grammar (e.g., Tomasello, 2000) predict an early emerging lexical boost effect that emerges before abstract priming. In contrast, one prominent computational model of priming that acquires syntactic representations via error-based learning (Chang, Dell, & Bock, 2006), predicts the opposite pattern, since the lexical boost is argued to reflect memory processes peripheral to language. The model also predicts higher abstract priming at earlier time points.

Here we present the first longitudinal study of syntactic priming across development. We tested a cohort of approximately 100 children between 36 and 54 months on the active/passive alternation. Beginning at 36 months, the children played the 'snap' card game with an experimenter every 6 months, resulting in 4 time points. Both the structure of the prime sentence, and verb overlap between prime and target sentence were manipulated. Therefore, we tested the development of both the abstract priming and lexical boost effects.

The pattern of results is most consistent with Chang et al. (2006): the abstract priming effect was significant at all time points, with the effect appearing larger at earlier than later time points. While there was a lexical boost effect, its presence was initially solely dependent on one verb (push); when that verb was excluded from analyses the effect was no longer present at 36 and 42 months, suggesting it is idiosyncratic in young children. Overall, the results provide support for Chang et al.'s (2006) model of syntactic development.

Chang, F., Dell, G. S., & Bock, K. (2006). *Becoming syntactic, 113*(2), 234-272.
http://dx.doi.org/10.1037/0033-295X.113.2.234

Tomasello, M. (2000). Do young children have adult syntactic competence?. *Cognition, 74*(3), 209-253.

Poster 5: Multi-scalar reorganization of white matter in the human temporal lobe

Guilherme Blazquez Freches

The primate temporal cortex is thought to be a unique primate specialization and different to the lateral expansions seen in other mammalian orders. Even within the primate order, the temporal lobe is thought to have undergone significant expansion and reorganization, particularly in the great ape and human lineages. However, exactly how its principles of white matter organization have changed throughout evolution remains elusive. Recently, a framework for cross-species comparison was proposed that places species with homologous white matter tracts into a common space – connectivity blueprints. Here, we extended that framework with the use of Laplacian Eigenmaps and unveiled conserved and divergent principles of organization across human, chimpanzee, and macaque temporal association cortices. Our cross-species embedding revealed a shared common connectivity gradient ranging from the inferior to superior temporal gyri, suggesting a common architecture for the temporal lobe white matter across these three species, consistent with the role of longitudinal tracts in this brain region. Other gradients separated human-specific aspects of connectivity from non-human specific ones. To assess the statistical reliability of these findings, the gradient profile of every analyzed vertex of the cortical surface was used to compute a distribution of similarities between human and non-human vertices. This distribution was modeled as a mixture of three components and yielded strong evidence for conservation in the superior temporal gyrus, temporal pole and fusiform gyrus, moderate human reorganizations in the inferior temporal gyrus and right posterior medium temporal gyrus, and massive reorganization of the left posterior medium temporal gyrus. This work paves the way for establishing trajectories of white matter reorganization across evolution and their functional consequence, particularly in the light of the human-unique cognitive skill for language.

Poster 6: The predictive potential of hand gestures during conversation: An investigation of the timing of gestures in relation to speech

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Face-to-face conversation involves rapid turn-taking. One possible explanation for why interlocutors can respond so quickly is that they predict the content (and end) of the unfolding turn, such that they can begin to plan their responding turn as soon as possible (e.g. Levinson & Torreira, 2015). It has been proposed that, in face-to-face conversation, listeners may not only be able to use speech but also the visible bodily movements of the speaker to facilitate predictive language processing (Holler & Levinson, 2019). However, for the listeners to use the speaker's gestures to predict upcoming turn content, gestures should precede speech, and previous quantitative research investigating gesture-speech timing during natural conversation have shown mixed results regarding whether this is the case (Chui, 2005; Ferré, 2010). Therefore, in this study we test whether hand gestures that represent semantic information (e.g. actions or objects) temporally precede corresponding information in speech, such that they could potentially be used to predict speech. In a Dutch corpus of unscripted dyadic conversations, we annotated representational hand gestures that occurred during question-response sequences. For each gesture, we coded which word(s) in the speech corresponded most closely to the meaning depicted by the gesture. We found that gestures preceded the corresponding information in the speech stream, with gestures (as a whole) starting on average 672 milliseconds earlier, and gesture strokes (i.e. the most meaningful part) starting on average 215 milliseconds earlier. These results suggest that representational hand gestures may indeed have the potential to facilitate predictive language processing. Further analyses on the data are currently being carried out to test this possibility. Together, the results will increase our understanding of the possible mechanisms involved in language processing in social interaction.

Chui, K. (2005). Temporal patterning of speech and iconic gestures in conversational discourse. *Journal of Pragmatics*, *37*(6), 871–887. https://doi.org/10.1016/j.pragma.2004.10.016

Ferré, G. (2010). Timing relationships between speech and co-verbal gestures in spontaneous French. In M. Kipp, J.-C. Martin, P. Paggio, & D. Heylen (Eds.), *Proceedings of the 7th International Conference on Language Resources and Evaluation* (pp. 86–91). https://hal.archives-ouvertes.fr/hal-00485797/document

Holler, J., & Levinson, S. C. (2019). Multimodal language processing in human communication. *Trends in Cognitive Sciences*, *23*(8), 639–652. https://doi.org/10.1016/j.tics.2019.05.006

Levinson, S. C., & Torreira, F. (2015). Timing in turn-taking and its implications for processing models of language. *Frontiers in Psychology*, *6*, 731. https://doi.org/10.3389/fpsyg.2015.00731

Poster 7: Reliability of the SRT task: if at first you don't succeed, try try try again

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Marianna E. Hayiou-Thomas

Lisa Henderson

A dominant causal theory of developmental language disorder and dyslexia proposes an impairment in the procedural memory system (Ullman & Pierpoint, 2005). A large body of research over the last decade has used the Serial Reaction Time task (SRTT) to test this "procedural deficit hypothesis"; however, findings have been inconsistent, and the reliability of this task has been questioned. Here, we present two studies that examine the reliability of a probabilistic SRTT in adults. Study 1 (n = 103) investigated whether the similarity between sequences used during Session 1 and Session 2 would influence the amount and/or stability of procedural learning. In study 1, there was clear evidence of procedural learning effects in both sessions, as well as a positive relationship with similarity: more similar sequences in Session 2 showed larger learning effects than less similar sequences. In terms of reliability, although split-half reliability was acceptable (SRT1: r = .72; SRT2: r = .68), test-retest reliability was poor, regardless of similarity (r < .25). Study 2 (n = 47) went on to test whether the stability of the SRTT would increase over multiple sessions, and whether the task would be sensitive to individual differences in language, literacy, and sustained attention. As before, split-half reliability was higher than test-retest reliability; stability improved between sessions 2 and 3 than between sessions 1 and 2 (test-retest r = .60 and r = .43, respectively). Finally, there was a positive and significant relationship between procedural learning and spelling, vocabulary and attention. Together, these findings point to methodological recommendations that lead to greater stability of the SRTT. It also suggests that spurious results regarding individual differences may emerge when using unreliable tasks. Future studies will aim to explore the use of these methodological changes for testing group differences in the context of dyslexia.

Ullman, M. T., & Pierpont, E. I. (2005). Specific language impairment is not specific to language: The procedural deficit hypothesis. *Cortex 41*(3), 399-433. https://doi.org/10.1016/S0010-9452(08)70276-4

Poster 8: Parafoveal processing in mildly aphasic readers

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Previous studies of silent reading in aphasia have shown that aphasic readers benefit from top-down facilitation during word and sentence reading. These eye-tracking experiments showed that during foveal processing the effect of contextual predictability, where the predictable words are processed faster, was greater for aphasic readers than for neurologically healthy readers at some measures. The present study targets parafoveal processing in mild aphasia. The invisible boundary paradigm (Rayner, 1975) was utilized with two types of parafoveal previews: identical and unrelated to the target. Eight aphasic and twelve non-brain-damaged readers participated in the eye-tracking experiment. The results showed that people with mild reading impairments make use of information in the parafovea and exhibit significant parafoveal preview benefits. Furthermore, mildly aphasic readers do not receive additional facilitation from sentence context compared to healthy readers, probably because they use a parafoveal processing strategy that is not very different from healthy readers. Possible explanations for the absence of top-down facilitation and implications for future research are discussed.

Rayner, K. (1975). Parafoveal identification during a fixation in reading. *Acta Psychologica, 39*, 271–282.

Poster 9: The boundary between presuppositions and implicatures

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The boundary between presuppositions and implicatures is not plainly defined. Lombardi Vallauri (2016a; 2016b; 2019) proposed that implicits can be divided into implicits of content (such as implicatures) and implicits of responsibility (such as presuppositions). Implicits of content conceal certain notional content, while implicits of responsibility conceal the assumption of responsibility for certain content on the part of the source of the message. Thus, if a message contains an implicit of responsibility, it explicitly encodes its notional content. Starting from a study by Drai and de Saussure (2016), this experiment attempted to investigate whether Lombardi Vallauri's distinction is supported by behavioral data (Giunta, under review). A population of students (n = 82) was asked to indicate if certain sentences were/were not in a short text they read. The sentences were of four kinds: assertions which were present in the texts, sentences which explicitly encoded contents conveyed in the texts through presuppositions, sentences which explicitly encoded contents conveyed in the texts through implicatures, sentences which were plausible but totally absent. Statistical analysis showed that the four kinds of sentences received different "judgments of presence", which means that students evaluated the four kinds of sentences as "differently present" in the text they read. Moreover, the average of the judgements of presence given to the sentences that explicitly encoded contents conveyed in the texts through presuppositions was higher than the average of the judgements of presence given to the sentences that explicitly encoded contents conveyed in the texts through implicatures. In other words, students judged the sentences which expressed contents conveyed through presuppositions "more present" than the ones which expressed contents conveyed through implicatures, corroborating Lombardi Vallauri's proposal.

Drai, N. & de Saussure, L. (2016). Quand l'implicite devient explicite: d'un accident expérimental à une étude pilote. *Syntaxe & Sémantique*, 17, 115-133.

Giunta, G. (under review). *Presupposition as implicitness of responsibility and implicature as implicitness of content. An experimental study*.

Lombardi Vallauri, E. (2016a). *Implicits as Evolved Persuaders*. In K. Allan, A. Capone and I. Kecskes (eds.). Pragmemes and Theories. Cham, Springer, 725-748.

Lombardi Vallauri, E. (2016b). The "exaptation" of linguistic implicit strategies. *SpringerPlus*, 5(1), 1106.

Lombardi Vallauri, E. (2019). *La lingua disonesta*. Roma, Carocci.

Poster 10: Bayesian modelling of clause-level constructional knowledge for Korean-speaking preschool children

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Usage-based constructionist approaches concern how to appropriately represent developmental trajectories involving clusters of form-function pairings (*constructions*) based on exposure, together with cognitive-psychological factors. We explore how Korean-speaking preschool children develop clause-level constructional knowledge about a transitive event (active transitives; suffixal passives) through Bayesian simulations.

A canonical active transitive (1a) occurs with a nominative-marked actor, followed by an accusative-marked undergoer, with no active verbal morphology. A canonical suffixal passive (2a) occurs with a nominative-marked undergoer, followed by a dative-marked actor, with passive morphology attached to a verb. These patterns can be scrambled (1b; 2b). Oftentimes, omission applies to a marker or an argument and a marker altogether.

(1a)	actor-nominative	undergoer-accusative	V
(1b)	undergoer-accusative	actor-nominative	V
(2a)	undergoer-nominative	actor-dative	V-passive
(2b)	actor-dative	undergoer-nominativ	V-passive

For model training, we created schematised input_pairings of morpho-syntactic and semantic-functional properties involving these construction types (with varying degrees of omission of sentential components) _based on characteristics of the CHILDES database. The actual frequency information about the constructional patterns in the corpus data served as initial priors for learning. Our model, adapting the Alishahi and Stevenson's (2008) learning algorithm, learnt (1) probabilities of individual patterns and (2) conditional probabilities of constructional components within each pattern. We measured posterior probabilities of these patterns per learning (1 to 30) to estimate the degree of clustering for these constructions.

Overall, we found dominance of several patterns (e.g., canonical active transitive with no omission) and their inhibitory effects on the growth of the related patterns (e.g., scrambled active transitive; suffixal passives). This largely mirrored distributional nature of child production found in the same corpus data. Our learning model successfully demonstrated the ability to develop clause-level constructional knowledge as a function of input characteristics and statistical learning, which adds to the cross-linguistic evidence for the effectiveness of Bayesian inference on modelling human learning.

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Poster 11: Context window and polysemy interpretation: A case of Korean adverbial postposition *−(u)lo*

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Construal of a polysemous word occurs in conjunction with a series of words, delivering various frame-semantic meanings (Goldberg,2006) and yet purporting similar interpretations (Harris,1954). In this regard, context window_a range of words surrounding a target word, affecting the determination of its characteristics_is drawing attention to the computational understanding of combinatorial properties of words.

We ask how context window addresses polysemy interpretation in Korean, a language typologically different from the major Indo-European languages investigated for this task. We report computational simulations regarding how various context window sizes address polysemy of *-(u)lo*, which manifests polysemy due to its multiple functions mapped onto one form. We used the Sejong corpus, with semantic annotations of this postposition cross-verified by three native speakers of Korean (κ =0.95). Employing a distributional semantic model (Harris,1954), we devised an unsupervised learning algorithm by combining Singular Value Decomposition with Positive Pointwise Mutual Information. We measured model performance through accuracy rates that the model classified test sentences by the functions of *-(u)lo*, with manipulation of context window from one to ten. For this purpose, we used the similarity-based estimate (Dagan.et.al.,1993) by calculating cosine similarity scores between *-(u)lo* and its co-occurring content words.

Our model achieved the highest classification accuracy rate in the window size of one, and the accuracy rates decreased as the window size increased. This trend aligns with advantages of small window sizes (Bullinaria & Levy, 2007). Considering that a narrower range of context window relates more to syntactic than to sematic information (Patel.et.al.,1997), our model may have employed structural, more than semantic, characteristics of tri-grams (word-target-word) for the best classification performance. Given the networks of interlinked clusters of words and symbolic units in human cognition (*construct-i-con*; Goldberg,2006), our findings shed light on relations between a polysemous word and an abstract schema including the word, represented as context window, in addressing word-level polysemy.

Bullinaria, John A & Levy, Joseph P. 2007. Extracting semantic representations from word co-occurrence statistics: A computational study. *Behavior Research Methods*, 39(3), 510–526.

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Poster 12: List with and without syntax: Neural correlates of syntactic structure

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A fundamental challenge for the neurobiology of syntax is de-confounding syntax from semantics. Recent magnetoencephalographic (MEG) findings implicate the left posterior temporal lobe (PTL) for syntactic composition, evidenced by cases in which two words semantically combine in two conditions but syntactically combine only in one (Flick & Pylkkänen, 2020). Here we used lists as both test and control conditions as a novel approach to controlling semantics to examine neural effects of syntactic structure. Three-noun lists (*pianos, violins, guitars*) were embedded in sentences (*The music store sells pianos, violins, guitars*…) and in longer lists (*theater, graves, drums, mulch, pianos, violins, guitars*…). These list items were matched in both their lexical characteristics and local combinatorics across conditions: in neither case do these words semantically nor syntactically compose with one another (e.g. '*pianos violins*' does not form a phrase). We also varied the semantic association levels of the list items to contrast syntax with associative semantics. In a memory-probe task, the presence of structure resulted in increased source-localized MEG activity for lists-inside-sentences over lists-inside-lists in left inferior frontal cortex (236-273ms post-stimulus-onset), left anterior temporal lobe (0-50 and 310-359ms), and left PTL (332-389). Marginal association effects were observed in the left temporo-parietal cortex, with higher activity elicited by high than low associative words (373-415ms). While explanations in terms of the global semantics of the sentences cannot yet be ruled out, our approach in using lists as a test case allows us to rule out explanations in terms of lexical semantics and local semantic composition.

Flick, G., & Pylkkänen, L. (2020). Isolating syntax in natural language: MEG evidence for an early contribution of left posterior temporal cortex. *Cortex*, *127*, 42–57. https://doi.org/10.1016/j.cortex.2020.01.025

Poster 13: Quantifying interpreting types: Implications for cognitive demands and processing mechanisms

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Interpreting is a highly demanding language processing and intense bilingual experience. Most interpreting theories claim that different interpreting types, mainly simultaneous interpreting (SI) and consecutive interpreting (CI), should involve varied cognitive demands and processing mechanisms. Relying on a dependency-based syntactically annotated corpus, the present study draws on dependency distance and dependency direction to investigate the differences between different interpreting types. Dependency distance, the linear distance between two syntactically related words in a sentence, is an index of sentence complexity and can mirror the cognitive constraints in various tasks. Dependency direction is a reliable metric reflecting the word-order structural features of languages, which has been used for both inter- and intra-language classification. It was found that: 1) CI yields smaller dependency distances than SI, suggesting that consecutive interpreting bears heavier cognitive demands than simultaneous interpreting; 2) CI and SI output texts differ in the proportion of head-initial dependency relations, with SI (versus CI) rendering outputs more similar with target language in word order. Taken together, the findings indicate that consecutive interpreting is more cognitively demanding than simultaneous interpreting, which is contrary to our intuition but provides implications for the processing mechanisms underlying different interpreting types. The current study suggests a possible *cognitive load relief process* in SI and a *cognitive load accumulation process* in CI.

Poster 14: Why we speak affects how we speak: Electrophysiological signatures of word planning following verbal versus nonverbal material

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It is unclear whether there are differences in the neural mechanisms of word planning when it arises after processing of verbal versus nonverbal material. Twenty participants took part in an EEG experiment where they completed verbal- and nonverbal-context picture-naming tasks. The goal in both tasks was to name a target picture that was presented after constraining and nonconstraining contexts. In the verbal settings, the contexts were provided as sentences (e.g. constraining: "The farmer milked a..."; nonconstraining: "The child drew a..."; target picture: COW), while in the nonverbal settings, the contexts were provided as two priming pictures (e.g. constraining: nest, feather; nonconstraining: cradle, television; target picture: BIRD). The target pictures were named faster following constraining contexts in both tasks. This indicates that word planning starts before the target picture onset in the constraining condition. In the verbal-context task, we replicated alpha-beta desynchronization in the constraining relative to the nonconstraining condition before the target picture onset. In the nonverbal-context task, we did not find any alpha-beta desynchronization. Interestingly, we found three ERP components that showed significant differences between the conditions. Even though this suggests that word planning occurs in a different manner before the target picture onset following nonverbal constraining contexts, participants do engage in conceptual preparation, which speeds up word planning. These results were mirrored when we computed correlations with naming times in the pre-picture interval. In the verbal settings, we only found significant correlations between naming times and the desynchronization in the alpha- and beta-bands. In the nonverbal settings, we only found significant correlations between naming times and the ERP waveform. In conclusion, we show that the alpha-beta desynchronization is associated with the word planning process, but conceptual preparation alone is not enough to elicit it.

Poster 15: Functional anatomy of context-driven word retrieval: across-session consistency in fMRI

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Functional magnetic resonance imaging (fMRI) is suitable for mapping the functional anatomy of cognitive processes. However, mapping brain areas for specific tasks with fMRI does not necessarily guarantee validity. One difficulty is to capture time-dynamic modulations of brain activity with fMRI, which could make the mapping unreliable. The present study tested the suitability of fMRI for language mapping using a dynamic language paradigm, and its consistency across sessions. Fifteen healthy speakers performed a context-driven picture-naming task, reading a sentence (word-by-word) and naming the last word, which was presented as a picture. Sentences appeared in a constrained and unconstrained condition. Thus, participants could either already retrieve the final word through sentence context (constrained sentences), or could only say the word after the picture appeared (unconstrained sentences). This procedure was repeated in an equivalent second session, approximately three weeks later. Picture naming times showed a strong context effect, confirming that a constrained sentence context primes the final word. Trying to tap into the process of word retrieval per condition, the fMRI analysis focused on BOLD contrasts at sentence beginning, pre-picture interval, and picture appearance. This revealed BOLD increases before picture appearance for constrained over unconstrained sentences in left-hemisphere language as well as bilateral areas. Further, similar BOLD increases were observed after picture appearance for unconstrained over constrained sentences. These constitute the condition-specific time points when the final word is known and could be retrieved. In terms of across-session consistency, the different contrasts yielded very similar results. However, the session-specific BOLD contrasts per time point as well as condition-specific at sentence beginning do not completely converge. This indicates that standard BOLD analyses do not appropriately incorporate time dynamic modulations of the signal, constituting a limitation of language mapping with fMRI, which is especially relevant for clinical purposes.

Poster 16: The effect of speaker variability on phoneme processing: A crowd-science experiment

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Listeners can effortlessly understand speech from any speaker, which is remarkable given the enormous acoustic variability and lack of invariant features corresponding to phonemes across speakers. Recently, it has been proposed that listeners use voice information to adapt to speakers (Kleinschmidt & Jaeger, 2015), which would reduce acoustic variability and explain why listeners can understand speech robustly from different speakers.

In the current study, we investigate whether adult listeners rely on voice information to adapt to speakers by testing the effect of speaker variability on phoneme processing. Specifically, we will examine whether there is a processing cost for listening to multiple speakers as compared to a single speaker. Given that listeners effortlessly understand different speakers, we will use a crowd-science approach to increase our sample-size to capture potentially subtle effects of speaker variability on phoneme processing.

To test phoneme discrimination, we will select two phoneme contrasts that are equally far separated in acoustic space *within* speakers, but unequally far separated *across* speakers, by capitalizing on an analysis that quantifies how much influence speaker variability has on acoustic distance between phoneme contrasts in English (Bergmann et al., 2016). We will test the discrimination of these two phoneme contrasts in a single-speaker and a multiple speaker condition, in a web-based XAB discrimination experiment, which we will gamify in order to keep

participants' attention. We will present the experimental design, along with the conceptualization of the game.

If listeners adapt to speakers based on voice information, there should be higher processing costs in the multiple-speaker condition, and this processing cost should be highest for the phoneme contrast that is furthest separated in acoustic space across speakers.

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Kleinschmidt, D. F., & Jaeger, T. F. (2015). Robust speech perception: Recognize the familiar, generalize to the similar, and adapt to the novel. *Psychological Review*, *122*(2), 148–203.

Poster 17: Do alpha and beta oscillations dissociate in context-driven spoken-word production?

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Alpha- and beta-band oscillatory power decreases have been consistently found in spoken-word production, and localized to left lateral-temporal and lateral-frontal lobes (Piai et al., 2014; Roos & Piai, 2020). The oscillations were linked to both motor preparation and word-retrieval processes (Piai et al., 2015). However, the observed power decreases have a broad frequency range comprising two "classic" bands, alpha and beta. It remains unclear whether alpha- and beta-band power decreases support a single operation or contribute independently when a spoken word is planned. Using magnetoencephalography, we probed whether the alpha and beta bands are distinct from an anatomical perspective. Participants named or judged pictures after reading a sentence that was either constraining or nonconstraining towards the final word, presented as a picture. To better isolate the alpha and beta bands for each individual, alpha and beta spectral distributions on the sensors were defined using an irregular-resampling auto-spectral analysis (IRASA, Wen & Liu, 2015). IRASA allows distinguishing rhythmic activity from the concurrent power-spectral $1/f$ modulation, which creates spurious correlations across frequency bins. The peaks of alpha and beta were defined on a participant basis using the $1/f$ modulation-free power spectrum averaged over sensors that yielded large context effects on the group level. Then, we used beamforming to localize the alpha- and beta-band oscillations respectively in the pre-picture interval with individual's peaks as the center frequencies for which the power estimations were calculated. The sensor-level cross-spectral density matrix was computed based on the individualized peaks of alpha and beta on a participant-by-participant basis instead of using canonical frequency bands. For both the naming and judgment tasks, the alpha and beta power decreases overlapped in the left posterior temporal lobe extending into the left inferior parietal cortex, associated with conceptual processing. For the naming task, the beta band involved more right hemisphere than alpha. These results suggest that for conceptual processing, alpha and beta oscillations do not dissociate.

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Piai, V., Roelofs, A., Rommers, J., & Maris, E. (2015). Beta oscillations reflect memory and motor aspects of spoken word production. *Human Brain Mapping, 36*(7), 2767-2780.

Piai, V., Roelofs, A., & Maris, E. (2014). Oscillatory brain responses in spoken word production reflect lexical frequency and sentential constraint. *Neuropsychologia 53,* 146-156.

Roos, N., & Piai, V. (2020). Across-session consistency of context driven language processing: a magnetoencephalography study. *European Journal of Neuroscience.* Accepted Author Manuscript. https://doi.org/10.1111/ejn.14785

Wen, H., Liu, Z. (2015). Separating fractal and oscillatory components in the power spectrum of neurophysiological signal. *Brain Topography*, *29*(1), 13-26.

Poster 18: Speech–brain entrainment in adults who stutter is reduced when listening for speaking

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Stuttering is a fluency disorder that may result from dysfunctional internal sensorimotor coordination. Interestingly, when people who stutter (PWS) are encouraged to follow an external rhythm (e.g. chorus reading, singing, using a metronome), their performance temporarily improves (Max et al., 2004). Neural entrainment to speech rhythmic information at the prosodic and syllabic scale in delta (< 3 Hz) and theta (4-7 Hz) frequency bands, respectively, has been proposed as a fundamental mechanism for speech perception (Obleser & Kayser, 2019). Crucially, auditory and motor regions seem to be intrinsically synchronized in a restricted range within these frequency bands while listening to speech (Assaneo & Poeppel, 2018). In this study we investigated whether PWS show altered entrainment to speech in conditions that differentially recruit the speech-motor system.

EEG was recorded from 13 adult male PWS and 13 fluent controls while listening to unfinished sentences. As sentence completion, participants either heard a word (comprehension task) or had to produce it by naming a picture (production task), in two distinct blocks. Sentences could either make the target predictable (semantically constraining condition) or not (neutral condition). The constraining condition in the production task, therefore, allows accumulating information for anticipating word planning and the engagement of the speech-motor network. We used coherence to measure brain entrainment to unfinished sentences. No differences between conditions emerged within each group, in either task. Group differences emerged in the production task only, whereby PWS show lower coherence for the constrained condition in theta band (4Hz) in bilateral temporal brain regions.

Our results suggest that anticipating the recruitment of the speech-motor network thanks to predictable contexts may interfere with tracking rhythmic information at the syllabic scale in

PWS, possibly because of the additional resources required for engaging it. This supports the contribution of the speech-motor network in tracking syllabic temporal information in the speech stream.

Assaneo, M. F., & Poeppel, D. (2018). The coupling between auditory and motor cortices is rate-restricted: Evidence for an intrinsic speech-motor rhythm. *Science Advances*, 4(2), eaao3842. https://doi.org/10.1126/sciadv.aao3842

Max, L., Guenther, F. H., Gracco, V. L., Ghosh, S. S., & Wallace, M. E. (2004). Unstable or Insufficiently Activated Internal Models and Feedback-Biased Motor Control as Sources of Dysfluency: A Theoretical Model of Stuttering. *Contemporary Issues in Communication Science and Disorders*, 31(Spring), 105–122. https://doi.org/10.1044/cicsd_31_s_105

Obleser, J., & Kayser, C. (2019). Neural Entrainment and Attentional Selection in the Listening Brain. *Trends in Cognitive Sciences*, 23(11), 913–926. https://doi.org/10.1016/j.tics.2019.08.004

Poster 19: Seeing is hearing: Can visual rhythms replace acoustic envelope information in speech perception?

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Linguistic units, such as words, syllables, and phonemes, are reflected in the temporal structure of speech. Amplitude fluctuations of an acoustic signal can be indirectly mapped onto linguistic events unfolding within distinct temporal windows. There is a correspondence between the amplitude modulations of the speech signal and cortical oscillations. Syllabic segmentation in particular is associated with cortical oscillations in the theta-band frequency range of (4 − 8 Hz), which correlates with mean syllable rate. Intelligibility of speech decreases when theta-band amplitude modulations are removed from the acoustic signal. Findings by Ghitza (2012) show that intelligibility of degraded speech is partly restored when theta-band oscillations are introduced in form of noise bursts crudely marking the syllabic rhythm.

This research replicates the experiment by Ghitza (2012) with a larger number of participants and different speech stimuli to examine the effect of enhancing degraded speech intelligibility. Furthermore, I introduced audio-visual conditions to test the hypothesis that the temporal cues conveyed via visual sensory modality can also enhance intelligibility.

The obtained results do not reproduce Ghitza's findings on increased intelligibility. To the contrary, I illustrate that intelligibility under the condition of restored theta-range modulations is significantly lower than with theta-range oscillations removed. There was no effect of visual cueing found. This suggests that restoring temporal information of the acoustic envelope by introducing sound bursts or visual pulses synchronized to the mid-vowel points of syllables does not increase intelligibility of degraded speech. The impact of theta-range oscillations on speech intelligibility requires further investigation in future research.

Ghitza, O. (2012). On the role of theta-driven syllabic parsing in decoding speech: intelligibility of speech with a manipulated modulation spectrum. *Frontiers in Psychology, 3*, 238.

Poster 20: Cycling up the garden path: Oscillatory phase predicts downstream P600

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Long sequences of words overload working memory. While chunking of words into larger units can mitigate memory limitations, chunks are still constrained in length. Electroencephalography (EEG) studies on sentence comprehension have shown that multi-word chunks are terminated after a time period of approximately 2.7 seconds. Here, we hypothesized that this periodicity reflects internally constrained electrophysiological processing cycles within the delta frequency band (< 4 Hz). We recorded participants' EEG while they listened to temporarily ambiguous sentences, such as *The conductor interrupted the flutist and the drummer delighted the listener*. When combining *the drummer* with *the flutist* to form a complex noun phrase, the following verb elicits a garden path. Alternatively, *the drummer* could be interpreted as subject of a new clause, resulting in the correct interpretation. We aimed to dissociate the two interpretations via manipulating speech rate. In the FAST condition, the sentence including both *the flutist* and *the drummer* fell into a single time window of 2.7 seconds, which should elicit a garden path. In the SLOW condition, 2.7 seconds ended after *the flutist*, aiming at the correct interpretation. In line with our predictions, event-related brain potentials at the disambiguating verb showed a P600 component in the FAST condition, indicating the encounter of a garden path. Critically, single-trial P600 amplitudes across conditions were predicted by the phase of the delta-band oscillation towards the end of *the flutist* (i.e., when a chunk is either continued or terminated). This means that a multi-word chunk was terminated when the underlying neural oscillator had reached a specific phase of its cycle, eliciting a garden path later in the sentence. We thus suggest that cycles of delta-band oscillations are an internal electrophysiological time constraint on chunking, possibly underlying the previously described 2.7-seconds-period of chunk termination.

Poster 21: Semi-spontaneous language production in Dutch speaking people with primary progressive aphasia

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Primary progressive aphasia (PPA) is a neurodegenerative language disorder. Despite recent research, this disorder is less studied than vascular aphasia. There are three main accepted variants: nonfluent/agrammatic PPA (nfv-PPA), semantic PPA (sv-PPA) and logopenic PPA (lv-PPA). Research that looks into the spontaneous language production of each of these variants stems (almost) exclusively from English speaking patients. However, English has relatively simple morphosyntax. Therefore, research that examines grammatical and lexical characteristics of patients with PPA with another native language may offer better insights into the language production of PPA. In the present study, fifteen Dutch speaking people with PPA provided an oral description of a situational drawing (Visch-Brink, Vandenborre, De Smet, & Mariën, 2014). Lexical and grammatical features were evaluated and contrasted for the three variants. Furthermore, our study also examined the relationship between the semi-spontaneous language production of PPA individuals and their performance on standardized confrontation naming and working-memory tests. The relationship in the literature is unclear, despite the fact that confrontation naming and other neuropsychological tests are commonly used in the diagnostic process of the disease. In the present study, individuals with sv-PPA produced a reduced number of nouns and adjectives relative to the other variants. They also used higher frequency nouns. Individuals with lv-PPA produced less copular verbs and those with nfv-PPA produced more incorrect finite verbs. The number of dependent clauses was reduced in both lv-PPA and nfv-PPA relative to sv-PPA. However, due to the small sample, these measures were not statistically significantly different across variants. Regression analyses relating lexical variables to confrontation naming scores failed to provide evidence for confrontation naming score as a predictor for semi-spontaneous language performance. Furthermore, digit-span failed to serve as a predictor for grammatical complexity in semi-spontaneous language of PPA. The present results provide a starting point for hypotheses for further research.

Session 2: Thursday June 4th 17:00-18:30. Posters 22-42

Poster 22: Lexical selection in word production and the white-matter system of the (pre)supplementary motor area

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The supplementary and pre-supplementary motor areas (SMA and pre-SMA) have been suggested to be involved in language since the early days of electrical stimulation mapping. However, they received less attention than the classic perisylvian areas. Recent updates in neuroanatomy allowed to revisit the (pre)SMA, showing its white matter connections towards inferior and middle frontal gyri (IFG, MFG) and caudate nuclei. Additionally, observations in people with brain lesions have suggested a role for these connections in language (e.g., speech motor control or lexical selection; see Dick et al., 2019; Kinoshita et al., 2015; Sierpowska et al., 2015). However, reports up to now lack the anatomical precision for linking language production to specific projections.

To fill this gap, we will compare the microstructural properties of the three projections stemming from the (pre)SMA hub (IFG, MFG, and caudate; left and right) with individual verb generation performance. We will analyze a dataset of diffusion-weighted images (DWI) of 50 healthy participants and their scores in verb generation (Janssen et al., submitted). The task consisted of 100 high-frequency concrete Dutch nouns, in response to which appropriate verbs should be produced (e.g., *apple - eat*). The possible noun-to-verb pairs did not share a morphological stem and the items differed in selection difficulty (expressed by the number of possible response options; Thompson-Schill et al., 1998).

We expect that the microstructural properties of the connections towards IFG will explain the variability in verb-generation performance (more robust for the verbs of high selection) and that these effects will be left-lateralized. With respect to the connections towards caudate and MFG, we expect a similar effect with regard to the selection difficulty, but we do not assume that these effects will be left-lateralized. These results will be the first to relate verb generation with (pre)SMA white matter system in a healthy population.

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Janssen, N., Kessels, R.P.C, Mars, R.B., Llera, A., Beckmann, C.F., & Roelofs., A.. Dissociating the functional roles of arcuate fasciculus subtracts in speech production *(submitted)*.

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Poster 23: On recalling and learning new phonological forms: the effect of new semantic representations

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According to the semantic binding hypothesis, long-term stored semantic information helps to stabilise lexical-phonological forms in verbal short-term memory (vSTM). Since learning new phonological forms draws upon vSTM and the quality of underlying phonological representations, we used behavioural and electrophysiological methods to examine whether providing new semantic information supports the acquisition and maintenance of novel phonological forms in vSTM. Healthy adults and dyslexic participants were exposed to new spoken nonwords with or without novel semantic information, before completing tasks assessing immediate serial recall (ISR) and word learning of these items, including a measure of passive auditory discrimination of a pair of trained nonwords (indexed by electrophysiological mismatch negativity responses; N100). It was predicted that learning measures would demonstrate a relative benefit for semantically-associated forms (more word-like responses) and that such a semantic benefit may be amplified for participants with weaker phonological capacities (i.e., dyslexic participants). Explicit and some implicit measures of learning showed a benefit for trained items but the emergence of this benefit of semantically-trained compared to phonologically-familiar items varied between groups. Healthy adults were more likely to show a beneficial effect of semantic information in learning, in line with previous studies. However, predicted semantic enhancement of phoneme-level stability of word forms tested in the ISR task was not found in each group of participants. Early electrophysiological differentiation between the pair of semantically trained and familiarised-only forms was only observed within the healthy non-dyslexic adults. We suggest that the additional demands of acquiring novel semantic information may not benefit acquisition of new phonological forms in dyslexic individuals. More work is needed to examine use of established long-term knowledge in novel word learning and short-term memory in dyslexia.

Poster 24: Cognitive predictors of individual differences in children's language acquisition

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Language acquisition is supported by two learning and memory systems, declarative and procedural memory; with previous research proposing that grammar learning is implicit and supported by procedural learning. Grammatical deficits, as evidenced in children with developmental language disorder (DLD), are attributed to impairment to neural regions underlying procedural memory (see Ullman & Pierpont, 2005; Ullman, Earle, Walenski & Janacsek, 2020). Whilst this theory is not disputed, it is suggested that explicit processes are also involved, in different stages and in differing degrees (Dąbrowska, 2010).

We propose that children's language acquisition can be understood by combining insights from the usage-based model of language and skill acquisition theory. According to usage-based theories, grammatical development involves extracting constructional schemas from previously encountered utterances (Tomasello, 2003). These schemas are then entrenched and routinized through repeated practice (Dąbrowska, 2010). We understand this through previous literature regarding skill acquisition theory; language learning is a complex, cognitive skill involving distinct processes which correspond to generalisation and routinization.

Therefore, this research investigates children's language acquisition as the product of cognitive skill learning. The multiple-trial Tower of Hanoi (MToH) puzzle will be used to explore individual differences in the speed of automatization, as a predictor of linguistic attainment. Research methodology comprises an individual differences group design with children aged 7-9 years. Participants will complete a battery of attainment measures, comprising of language and cognitive assessments. Thereafter they will complete the MToH task 25 times, the last 5 attempts while performing a secondary task. The more strongly the procedure for solving the puzzle is automatized during learning, the less performance will be affected when participants' attention is divided between solving the puzzle and the secondary task. It is hypothesised that the speed of automatization will differ between typically developing children and children with DLD.

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Poster 25: Familiar voices and phonemes are retrieved by means of different processes: A MMN study

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When familiar voices and native phonemes are retrieved from memory, they elicit comparable electrophysiological patterns (Beauchemin et al., 2006; Dehaene-Lambertz, 1997). However, familiar voices usually convey native speech, thus the presence of linguistic information in the signal may mask any possible non-linguistic voice-specific processing. Therefore, it is crucial to separately address linguistic and vocal information in order to understand whether they are learned and retrieved via shared neurocognitive processes. To this aim, we ran a longitudinal ERP study to evaluate the effects of learning a new voice vs. a new phoneme on the Mismatch Negativity (MMN) response. Two groups of fifteen Italian native speakers with no prior knowledge of German were involved in an MMN experiment that was repeated before and after different training procedures. In the MMN experiment, responses to an unfamiliar German-speaking voice and to a German phoneme were tested. After the first EEG recording, one group of participants was involved in a speaker identification training and acquired familiarity with the previously unfamiliar voice. The other group was enrolled in a syllable identification training and acquired familiarity with the new phoneme. At the end of the training procedure, the EEG experiment was repeated and MMN responses of pre-training and post-training recordings were compared. Results showed that the acquisition of familiarity with a voice reduced the MMN response in the group enrolled in the speaker identification training. This suggests that a form of long-term adaptation to the acoustic information of the learned voice occurred. Acquiring a new phoneme instead seems to take place both via passive listening and active training, as both groups showed a small enhancement of the MMN responses to the critical phoneme. Considering these differentiated electrophysiological patterns, learning and retrieving a new voice or a new phoneme seem to be dependent on partially different mechanisms.

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Poster 26: Hebbian learning of language structure in adults: Evidence from a speech production task

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There is growing support for the notion that a Hebb-style learning mechanism (wherein representations for sequences are strengthened through repetition) may contribute to vocabulary learning. Hebb repetition effects (Hebb, 1961) have been well documented for serially-ordered sequences of syllables – both for whole sequences, and for smaller chunks contained within them. Yet, relatively little is known about humans' capacity for Hebbian learning of sequences containing structure. We test this here, examining Hebb-style learning of sequences containing non-adjacent dependencies.

Forty-eight native Dutch-speaking adults completed a speech repetition task modelled on studies of Hebbian Learning (e.g., Szmalec, Page, & Duyck, 2012). Participants were presented with 9-syllable sequences, which they repeated aloud. There were two types of sequence; targets, which contained three tri-syllable chunks, with each chunk containing a distinct nonadjacent dependency (e.g., *belapogimitudiwuko*), or scrambled foils (e.g., *bekotupolagidiwumi*). These were interleaved, with a structured sequence occurring on every third trial, and repeating 12 times over the course of the study. To disentangle learning of dependencies from learning of tri-syllable chunks, participants were subsequently presented with generalization sequences (targets and foils), where generalization targets contained trained dependencies with new medial syllables. Participants' repetitions were transcribed and scored for accuracy, and recall of target and foil sequences was compared using Linear Mixed-Effects analysis.

Participants demonstrated learning over the course of the task, with higher repetition accuracy for targets than for foils. Recall was significantly greater for pairs of syllables in rule-carrying positions (i.e., syllables 1&3, 4&6, and 7&9) for target sequences than for foils – indicating non-adjacent dependency learning. These effects were replicated in the generalization task. The data provide further evidence that adults can acquire phonological word forms through

Hebbian learning, and extend this to learning of within-word structure – indicating humans' capacity for Hebbian learning may be more powerful than prior research would predict.

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Poster 27: Human sentence processing: recurrence or attention?

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Recurrent neural networks have long been an architecture of interest for computational models of human sentence processing. The more recently introduced Transformer architecture has been shown to outperform recurrent neural networks on many natural language processing tasks but little is known about their ability to model human language processing. It has long been thought that human sentence reading involves something akin to recurrence and so recurrent neural networks may still have an advantage over the Transformer as a cognitive model. In this study we train both Transformer and recurrent network based language models and compare their performance as a model of human sentence processing. We use the trained language models to compute surprisal values for the stimuli used in several reading experiments and use mixed linear modelling to measure how well the surprisal explains measures of human reading effort. Our analysis shows that the Transformers outperform the RNNs as cognitive models in explaining self-paced reading times and N400 strength but not gaze durations from an eye-tracking experiment. This could potentially be explained by the word-by-word presentation in the self paced reading and N400 experiments placing higher demand on the readers' working memory, playing to the advantage of the Transformer's attention based architecture.

Poster 28: Implicit and explicit processes in statistical learning and consolidation of grammatical regularities

Isabelle O'Halloran

Statistical learning is a key cognitive mechanism underpinning our ability to learn and use grammar. In the context of language acquisition, statistical learning enables us to track co-occurrences between properties of objects in the environment and components of words. Until recently, the extraction of regularities in the linguistic input was thought to be governed by implicit learning processes, however, emerging evidence suggests that explicit awareness may also contribute (e.g., Batterink et al. 2015; 2019). In the present study, we examined the contribution of both implicit and explicit processes to the statistical learning of grammatical regularities, and we specifically examined how their contribution may evolve over off-line consolidation periods. Thirty-eight adult participants were trained on a novel language with an artificial grammatical gender system over four consecutive days. In an attempt to mimic the systematicity of regularities found in natural languages, items in the novel language contained different levels of complexity in the mapping between phonological and semantic features. Participants were trained on a simple word learning task in an eye-tracking paradigm, in which anticipatory eye-movements provided a measure of implicit learning. Explicit awareness of the regularities was assessed continuously across the four sessions through a training task that required participants to provide confidence ratings about the picture-word pairs being learned. At the end of training, participants' abilities to generalize the trained grammatical regularities was also assessed. Data analysis is ongoing. Using a combination of implicit and explicit tasks over a protracted training and consolidation period, this study aimed to explore the contribution of both explicit and implicit mechanisms to grammar learning.

Poster 29: Planning to be concise: An eye-tracking study of the production of referential expressions in native (L1) and non-native (L2) speakers

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Despite Gricean norms of communication, speakers often include redundant modifiers in referential expressions. This effect might reflect reliance on a heuristic-like over-modification strategy that aims to avoid the high cognitive costs of evaluating the disambiguating value (informativity) of each information unit while maintaining fluency and meeting addressee needs. To test this explanation, eye-tracked native (L1) and non-native (L2) English speakers saw displays with eight shapes organised into four pairs and were asked to describe two target shapes. We manipulated the size of the target and non-target shapes in a 2 (Modifier informativity) x 2 (Modifier position) design. The target could be uniquely identified with the use of one *necessary* size modifier (*big heart above diamond*; *heart above big diamond*), and we measured how often speakers produced redundant modifiers (*[big] heart* where all non-target hearts were big) and contrastive optional modifiers (e.g., *[big] heart* where some non-target hearts were small) early and late in the utterance (*[big] heart above big diamond* vs. *big heart above [big] diamond*).

Speakers produced more optional modifiers when these modifiers were contrastive than redundant, and more modifiers in early than late utterance positions, suggesting sensitivity to modifier informativity and to the time pressures of production (omitting early optional modifiers requires that speakers recognise their redundancy early in the planning process). Longer visual inspection of non-target shapes (i.e., longer assessment of the informativity of potential modifiers) predicted production of concise rather than over-modified expressions. Importantly, L1 and L2 participants produced similar rates and patterns of over-modification, but time-course analyses revealed that L2 speakers inspected non-target shapes sooner and longer overall than L1 speakers, and particularly when producing concise expressions, suggesting a strategy to prioritise earlier assessment of modifier informativity. Thus, the temporal dynamics of planning may vary across speakers with different proficiency levels.

Poster 30: Build a lexicon from zero: A cognitive-inspired unsupervised model for detecting sub-word, word, and supra-word units

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Knowing process units is the precondition of language processing. Tradition psycholinguistic and NLP studies often use words as the units, but recent psycholinguistic studies showed other text chunks, such as morphemes, phrases, or even idioms, can also be the units. A recent cognitive neuroscience study suggested that in a text hierarchy, the larger chunks are processed prior to the smallers (Yang, et al., 2020). Inspired by the larger-priority phenomenon and some other cognitive evidence, we designed Less-is-Better (LiB) model to extract the processing units out from any corpus without prior knowledge. LiB learns a lexicon of chunks from the corpus, and optimizes the lexicon to use least chunks to reconstruct the corpus. As the result, LiB can detect the common chunks (e.g., "go", "ing", "going", and "isgoingto") and put them to the head of lexicon, but without tracking their frequencies. Since there is no golden standard for the processing units, we converted the learned chunks to words and evaluated LiB by word segmentation task. On CHILDES corpus, LiB got 87%'s F1 score, which was same as the state-of-the-art Bayesian model (Johnson & Goldwater, 2009). The training time is 25.4 s on a laptop and the memory increment was less than 2 MB. We have successfully applied the model on Chinese text, English text, and scripted English speech. In summary, our cognitive-inspired computational model applies to psycholinguistic task (language processing unit detection) and NLP task (word segmentation), and it is much more efficient than other sophisticated models. It also suggests that we could improve other NLP models by cognitive phenomena to go against the trend of expensive computation resources.

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Johnson, M., & Goldwater, S. (2009, June). Improving nonparameteric Bayesian inference: experiments on unsupervised word segmentation with adaptor grammars. In *Proceedings*

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Poster 31: Verbal short-term memory without language processing? The role of syntax and morpho-syntax

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In the classic view of verbal short-term memory, immediate recall of verbal sequences is achieved through maintaining phonological representations via articulatory rehearsal, while the influence of other linguistic information is negligible (Baddeley, 2000). According to language-based accounts, however, short-term retention of verbal material is inherently bound to language production and comprehension, thus also influenced by semantic or syntactic factors (e.g., MacDonald, 2016). In line with this, serial recall of word lists is better when lists are presented in a canonical word order for English rather than in a non-canonical order, e.g., when adjectives precede nouns rather than vice versa, even when they are semantically unrelated (Perham, Marsh, & Jones, 2009). However, in many languages, grammaticality is not exclusively determined by word order. In German, for instance, an adjective-noun sequence is grammatically correct only if the adjective is inflected in congruence with the noun's person, number, and grammatical gender. Therefore, we investigated whether similar effects of syntactic word order occur in immediate serial recall of lists in German. In a modified replication of Perham et al.'s study, we presented lists of 6 items each including semantically implausible combinations of adjectives and nouns. We manipulated ordering (adjective-noun vs noun-adjective) and morpho-syntactic congruence between nouns and adjectives within pairs (inflected vs uninflected adjectives). Serial recall performance benefitted from an adjective-noun order only when adjectives were inflected. However, recall for the lists with uninflected adjectives was as good as in the most grammatical condition. This may be due to a confound with word length, an assumption we are currently testing in a follow-up experiment. Nonetheless, the current findings are in line with language-based models and indicate that, in a language that determines grammaticality in an interplay of syntactic and morphosyntactic factors, word order alone is not sufficient to improve verbal short-term memory.

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Poster 32: Interference Between Concurrent Language Production and Comprehension: Representational Similarity or Capacity Limitation?

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A characteristic of natural conversation is turn-taking, with interlocutors alternating roles of listening and speaking. Evidence suggests that it takes approximately 600 msec to go from conceptual activation to word articulation (Indefrey & Levelt, 2004), but the timing between turns in naturalistic conversation is around 200 msec (Stivers et al., 2009), which suggests that speech planning must overlap with comprehension (Levinson, 2016). Performing concurrent planning and listening can degrade performance for either domain-specific (representational similarity) or domain-general (capacity limitation) reasons (Meyer & Kieras, 1997; Pashler, 1994). This study was to explore how representational similarity and attention demand influence speech planning while simultaneously listening. Experiment 1 manipulated the difficulty of lexical selection by varying name agreement of to-be-named pictures (high, low), and the representational similarity by varying auditory information (Dutch speech, Chinese speech, eight-talker babble). We found that name agreement and representational similarity both influenced planning, with limited interaction between them, suggesting that representational similarity modulates the advanced planning span of lexical selection. Experiment 2 manipulated attention demands of listening by asking participants to name six pictures in Dutch while ignoring or listening to Dutch speech (focused-attention, divided-attention). The name agreement effect replicated Experiment 1, and while naming performance was worse in the divided-attention condition than in the focused-attention condition, there was limited evidence for the interaction between them. The results suggest that attention demand of listening influence many aspects of continuous speech, and modulate the planning scope of lexical selection in continuous speech planning. While speakers draw upon both domain-specific (representational similarity) and domain-general (capacity limitation) mechanisms to navigate speaking and listening in conversation, these studies combined suggest that the two mechanisms do not modulate the temporal aspects, but modulate the planning scope of continuous planning with different selection demand during concurrent comprehension.

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Levinson, S. C. (2016). Turn-taking in human communication–origins and implications for language processing. *Trends in Cognitive Sciences, 20*(1), 6–14.

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Poster 33: Investigating the lemma using fMRI – Linking production and comprehension

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Lemma representations help speakers map the meaning of words to their sounds and listeners map the sounds to their meanings. There is evidence from a variety of studies using different methodologies that suggests that lemmas are likely localised in the middle portion of the left middle temporal gyrus (left mMTG) (Dronkers et al., 2004; Indefrey & Levelt, 2004; Piai et al., 2014; Roelofs, 2014), but there are also competing views (Hickok & Poeppel, 2007). Claims regarding the shared nature of lemmas between production and comprehension and their localisation in the brain have not been empirically established due to the challenge presented by the abstract nature of lemma representations. The sole purpose of a lemma is to link various types of representations associated with a word (conceptual, syntactic and phonological representations). Thus, any single task on word recognition or production would always involve one or more of these other representations, making it hard to attribute observed effects specifically to lemmas. To work around this problem, we conducted an fMRI study with four tasks that comprised two modalities (speech production and comprehension) and that targeted different levels of representation (conceptual or syntactic) to which the lemma connects. We analysed activity common to all four tasks to find out whether there is a brain region activated in all tasks, regardless of the modality and targeted level of representation, and whether such activation can be localised to the left mMTG. In line with our predictions, we found activation in the left mMTG in both speaking and listening tasks that require access to conceptual and syntactic representations. This evidence supports theories that claim lemma representations are located in the left mMTG, and that they underlie both production and comprehension.

Dronkers, N. F., Wilkins, D. P., Van Valin, R. D., Redfern, B. B., & Jaeger, J. J. (2004). Lesion analysis of the brain areas involved in language comprehension. *Cognition, 92*(1–2), 145–177. https://doi.org/10.1016/j.cognition.2003.11.002

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Indefrey, P., & Levelt, W. J. M. (2004). The spatial and temporal signatures of word production components. *Cognition, 92*(1–2), 101–144. https://doi.org/10.1016/j.cognition.2002.06.001

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Poster 34: Unraveling the social cognitive potential of narratives using eye tracking: the case of viewpoint markers

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Following reflections on the value of narratives, recent years have seen a rise in empirical studies investigating the effect of exposure to narratives on social cognitive abilities such as empathy and mindreading. Although correlational studies show a promising, positive relationship between exposure to fiction and social cognitive performance (e.g., Mumper & Gerrig, 2017), results from studies investigating the causal, short-term impact of exposure to narratives are much harder to interpret (see Dodell-Feder & Tamir, 2018). Part of the explanation for these mixed findings might lie in the fact that previous studies have often focused on the broad concepts of literariness and fictionality as the driving factors behind the positive impact of narratives, rather than focusing on specific textual characteristics. Moreover, individual differences between readers have thus far largely been ignored.

This project exploits the potential of eye tracking to study the impact of specific textual characteristics that are naturally present in narratives in an ecologically valid way, i.e., without the need to use text manipulations. In addition, eye tracking can be used to study the role of individual differences between readers (e.g., Mak & Willems, 2018; Van den Hoven et al., 2016). Having collected eye tracking data from 114 participants who read a 5000-word literary, non-fictional narrative, we aim to investigate whether differences in the degree to which readers' reading behavior was affected by lexical markers of perceptual, cognitive and affective viewpoint can predict subsequent performance on behavioral measures of social cognition (while controlling for stable trait differences). We expect that readers who were more affected by these viewpoint markers, as signaled by slower reading, will display superior social cognitive performance. Using a psycholinguistic approach, this study contributes to a more fine-grained understanding of the relationship between narratives and social cognition.

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Poster 35: Gradual change of non-adjacent dependency learning during early childhood

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Grammatical dependencies between non-neighboring elements are important building blocks of language. For example, the sentence "The sister is singing" requires the listener to track grammatical relations between "is" and "-ing", which are separated by one element ("sing"). Event-related potential (ERP) studies revealed that 4-month-old infants learn these non-adjacent dependencies (NADs) under passive listening conditions (Friederici et al., 2011), while adults struggle to do so and instead require an active task (Friederici et al., 2013; Mueller et al., 2012). Thus, infancy and adulthood seem to be reflected by different stages of NAD learning. Here, we aimed to investigate whether the according developmental changes take place in a gradual or *all-or-nothing* manner.

We exposed German learning children between 1 and 3 years of age to a miniature version of Italian comprised of sentences containing NADs between an auxiliary and a verb suffix, for example, "La sorella <u>sta</u> cant<u>ando</u>" (The sister <u>is</u> sing<u>ing</u>). Children were first familiarized with correct examples and then tested with correct and incorrect examples. Incorrect examples contained an NAD violation, for example, "*La sorella <u>sta</u> cant<u>are</u>" (*The sister <u>is</u> sing). The rationale of our paradigm implies that the discrimination of grammatically correct and incorrect test items (i.e. NAD violations), as measured by ERPs, indicates whether infants have learned the underlying dependency.

Children across the tested age range learned the NADs, as demonstrated by a significant difference between ERPs in response to correct and incorrect sentences. However, we observed a linear decrease in the amplitude of the ERP effect (incorrect - correct sentences) between 1 and 3 years of age. This decrease seems to take place gradually across age, suggestive of a sensitive, rather than a critical period, of NAD learning. This may indicate that the transition between the developmental stages of NAD learning occurs in a gradual manner.

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Poster 36: Stroop effect and bilingualism: Separating its components in weak and recently-trained bilinguals

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The Stroop task is a tool used to test the automaticity of reading and the interference this provokes. In the typical procedure, subjects are asked to respond to the color of a printed color word while ignoring its meaning. Participants are slower and less accurate to respond when the meaning of the word and the color are incongruent (e.g. "red" printed in blue) relative to congruent (e.g. "red" printed in red) (Stroop, 1935). This Stroop effect has two sources: conflict in meaning between the word and color (i.e., stimulus conflict) and conflict between the responses suggested by the word and color (i.e., response conflict). The Stroop effect has also been used to investigate interference between two languages in bilinguals. The present series of studies investigates source of the conflict in bilinguals. Participants performed a bilingual version of the Stroop task, with first language (French) and second language (English, Croatian) distracter color-words. As expected, native language words produce both stimulus and response conflict. The key question was whether the second-language words affect cognitive processing in a similar way (Schmidt, Hartsuiker & De Houwer, 2018). According the Revised Hierarchical Model (Kroll & Stewart, 1994), second language words have access to semantic representations only if the language proficiency is sufficiently high. Our results showed that even a weakly spoken language (English) is able to produce both types of conflict. In additional studies, participants were briefly introduced a novel set of unfamiliar color-words (Croatian). After the training phase, participants again performed the bilingual Stroop task in order to investigate whether newly acquired words from an unfamiliar language evoke stimulus conflict, response conflict, or both. Implications for models of early language learning will be discussed.

Kroll, J. F., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. *Journal of Memory and Language, 33*, 149-174.

Schmidt, J. R., Hartsuiker, R. J., De Houwer, J. (2018). Interference in Dutch-French bilinguals: Stimulus and response conflict in intra- and interlingual Stroop. *Experimental Psychology, 65,* 13–22.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*, 643-662.

Poster 37: Do our storytelling abilities change as we age? Exploring the underlying semantic mechanisms related to discourse production.

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Storytelling is a vital aspect of language processing that requires successful integration of characters, events, and actions. Coherent stories include the necessary information to effectively transition between utterances and convey the overall gist. Since older adults produce more off-topic speech, it remains unclear whether the quality of a narrative will sustain age related production declines. Moreover, how does semantic network organization affect their storytelling coherence? We hypothesized that individuals with high storytelling ability will have a more interconnected semantic network, as assessed by the following graph theory measures: clustering coefficient, modularity and shortest average path length. Results indicate that the semantic network structures of younger and older adults are significantly different, networks of younger adults exhibit higher levels of efficiency, greater interconnectedness and more robustness when compared to older adults. More specifically, younger adults have lower average shortest path lengths (YAs: 2.7 OAs: 2.72 p <.001), and higher modularity compared to older adults (YAs: 0.58 OAs: 0.55 p <.001). There were no group level differences for clustering coefficient (YAs: 0.74 OAs: 0.73 p = .30). We also examined the coherence of story elicitations from the same participant group. Comparisons between the two age groups indicated that both global coherence ratings (p = .07) and local coherence ratings (p = .13) show stability with increasing age. These results conclude that even though there is change at the structural network level, this does not reflect performance on semantic verbal fluency task or the story coherence production of the two age groups.

Poster 38: White-matter microstructural integrity in small vessel disease with category fluency impairment

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White-matter (WM) hyperintensities in anterior thalamic radiations (ATR) and forceps minor (FM) are associated with lower performance on category fluency in patients with small vessel disease (SVD). However, it is unclear whether the microstructural integrity in these tracts is compromised in patients with impaired category fluency. Our aim was to compare the microstructural integrity in ATR and FM between SVD patients who declined in category fluency performance over time (SVD-IP) and SVD patients with stable performance (SVD-NP). 22 SVD-IP patients were identified who declined in category fluency in the course of nine years. Their microstructural integrity of ATR and FM was compared to that of 26 SVD-NP patients, matched on age, sex and education, who remained stable over that period. Microstructural integrity was obtained by quantifying fractional anisotropy (FA) and mean diffusivity (MD) in two ways: using TRActs Constrained by UnderLying Anatomy[1] yielding total mean FA and MD, and using Tract-Based Spatial Statistics[2] yielding voxel-wise FA and MD. Mean MD of all tracts was higher and mean FA was lower in SVD-IP than SVD-NP. Only the difference in mean MD of FM was statistically significant between SVD-IP and SVD-NP (p = .025). These results are consistent with the voxel-wise analysis, where only the MD of FM showed statistically significant voxels at different points in the tract. However, five SVD-IP and two SVD-NP patients developed dementia in the nine-year period. Excluding those patients from the analyses resulted in non-significant results (all p-values > .05). Microstructural integrity of FM potentially differs between SVD-IP and SVD-NP. General lack of difference in integrity between the groups may be due to insufficient

power. Our findings provide a starting point for future investigations on the role of WM integrity as a possible biomarker of fluency decline in SVD.

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Yendiki, A., Panneck, P., Srinivasan, P., Stevens, A., Zöllei, L., Augustinack, J., ... & Jbabdi, S. (2011). Automated probabilistic reconstruction of white-matter pathways in health and disease using an atlas of the underlying anatomy. *Frontiers in neuroinformatics*, *5*, 23.

Poster 39: Grey manchas: Codeswitching when grammars do not align

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Can bilinguals code switch when their grammars do not align? English follows adjective+noun word order while Spanish predominately follows noun+adjective word order. Given these opposing orders, is the phrase "*I'm gonna have grey manchas [stains] all over...*" an acceptable code switch? We investigated these questions in a bilingual Spanish-English corpus (Bangor-Miami) and by collecting acceptability rankings. Poplack (1980) made the claim that bilingual code switches only occur when the syntaxes of the two languages are aligned, ruling out "grey manchas." Other models maintain that Adj/Noun code switches only occur if they follow the word order of the adjective language (Cantone & MacSwan, 2009), the language of first word, or the matrix language (Myers-Scotton, 2002). Corpus Analysis: In the Bangor-Miami corpus, a codeswitch has a probability of .058 (Fricke & Kootstra, 2016). Adjective-noun switches have a probability of .015, making them 4 times less likely than the average code switch. None of the models explained all of the code switches. Sixteen of the 29 code switches followed the word order of the adjective language and 16 followed the order of the first word's language, with some overlap between the subsets. Of the 24 code switches where the matrix language could be determined, 15 code switches followed the matrix language word order. Acceptability Rankings: In a pilot study, grammatical non-codeswitched items (*big box*, *caja grande*) were most consistently ranked the best of four options, consistent with Poplack's model. There was less consistency among the ungrammatical non-codeswitched items (*box big*, *grande caja*). Differences among the codeswitched conditions were observed, but did not lend strong support to any theory. Thus, the acceptability rankings also suggest that there may be various constraints at work. Both the corpus data and the preliminary ranking data point to the need for a more complex model of codeswitching.

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Fricke, M., & Kootstra, G.J. (2016). Primed codeswitching in spontaneous bilingual dialogue. *Journal of Memory and Language, 91*, 181-201.

Myers-Scotton, C. (2002). *Contact linguistics: Bilingual encounters and grammatical outcomes.* Oxford University Press.

Poplack, S. (1980). Sometimes I'll start a sentence in Spanish y termino en español: Toward a typology of code switching. *Linguistics, 18*, 581-618.

Poster 40: A production-comprehension asymmetry in the engagement of the language network for constituent structure building

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The neurobiology of sentence production has been largely understudied compared to the neurobiology of sentence comprehension, due to difficulties with experimental control and motion-related artifacts in neuroimaging. A recent meta-analysis of syntactic processes in production and comprehension found that only the left inferior frontal gyrus (LIFG) was reliably active in production studies, but a larger network including the left temporal lobe was engaged in comprehension (Indefrey, 2018). To add to the current understanding of the brain organization of language production, we conceptually replicated an early PET study of sentence production (Indefrey et al., 2001), at the same time focusing on constituent structure building, which in comprehension engages LIFG and temporo-parietal areas (Pallier et al., 2011).

Participants had to produce sentences in a gradient of constituent structures based on a visual prompt. The production outputs (in Dutch) could be: noun phrase list ("to think", "to jump", "the boy", "the girl"), coordinated sentences ("the boy jumps", "the girl runs"), or embedded sentences ("the boy thinks that the girl jumps"). Therefore, the conditions had very similar numbers of words but involved constituents of increasing size. We collected fMRI data from 40 participants performing production and comprehension of these stimuli. We found that increasingly larger constituent sizes engage the LIFG and left middle temporal gyrus (LMTG) extending to inferior parietal areas in both production and comprehension, confirming that syntactic processes in production are not limited to LIFG but overlap largely with comprehension. We also ran an ROI analysis in predefined regions (LIFG and LMTG), which showed that the LMTG was overall more engaged in comprehension than production, while the LIFG was more sensitive to constituent structure in production than in comprehension. These results suggest that syntactic encoding and parsing differentially engage largely overlapping areas.

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Indefrey, P., Brown, C. M., Hellwig, F., Amunts, K., Herzog, H., Seitz, R. J., & Hagoort, P. (2001). A neural correlate of syntactic encoding during speech production. In *Proceedings of the National Academy of Sciences*, *98*(10), 5933–5936. https://doi.org/10.1073/pnas.101118098

Pallier, C., Devauchelle, A.-D., & Dehaene, S. (2011). Cortical representation of the constituent structure of sentences. In *Proceedings of the National Academy of Sciences*, 201018711. https://doi.org/10.1073/pnas.1018711108

Poster 41: The role of the basal ganglia in inflectional encoding: An fMRI study of producing the past tense

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According to a prominent account of inflectional encoding (Pinker & Ullman, 2002), regular forms are encoded by a rule-governed combination of stems and affixes, whereas irregular forms are retrieved from memory while inhibiting rule application. In a previous series of behavioral experiments, we tested whether a domain-general type of inhibition, involved in task and language switching, is also involved in irregular production. Participants alternated between inflecting a regular and an irregular verb, or between reading and inflecting a verb of the same regularity. Inflecting a verb requires inhibition of reading, which should delay reading after inflecting. If the same type of domain-general inhibition is involved in irregular inflection, we expect to observe that producing a regular after having produced an irregular form also takes longer. We found the switch cost from inflecting to reading but not from irregulars to regulars. However, we employed an indirect measure of inhibition, since we were not measuring inhibition itself but its effect on subsequent trials. Previous research has suggested that the basal ganglia plays a role in rule application and inhibition, as well as in domain-general inhibition. Ullman et al. (1997) observed that patients with Parkinson's disease had difficulties with regulars, suggesting a rule application problem. However, Macoir et al. (2005) found no specific difficulties with regulars in these patients. Moreover, whereas Oh et al. (2011) observed in an fMRI study the left caudate to be more active in regular than irregular production, Desai et al. (2006) found the opposite. We will present the results of an ongoing fMRI experiment using the design of our behavioral experiments. By measuring activity in the basal ganglia during the regular and irregular production, and in reading and inflecting, we will obtain direct evidence on the involvement of domain-general inhibition in inflectional encoding.

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Macoir, J., Fossard, M., Mérette, C., Langlois, M., Chantal, S., and Auclair-Ouellet, N. (2013). *The role of basal ganglia in language production: evidence from Parkinson's disease. Journal Parkinsons Disease, 3*, 393-397.

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Pinker, S., & Ullman, M. (2002). The past and future of the past tense. *Trends in Cognitive Science, 6(11)*, 456-463.

Ullman, M. T., Corkin, S., Coppola, M., Hickok, G., Growdon, J. H., Koroshetz, W. J., & Pinker, S. A. (1997). A neural dissociation within language: Evidence that the mental dictionary is part of declarative memory, and that grammatical rules are processed by the procedural system. *Journal of Cognitive Neuroscience, 9*, 289-299.

Poster 42: Distributional learning of visual object categories

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In order to understand the world around us, we need to categorize continuous sensory information. This enables us to distinguish between a wheel and a ball and between the sounds /p/ and /b/. Linguistic research has shown that perception of speech sounds is categorical: within-category differences are more difficult to detect than between-category differences. The frequency distribution of exemplars from a continuum (for example a speech sound continuum from /p/ to /b/) reflects the categories in that continuum: multiple highly frequent exemplars indicate multiple categories. Research suggests that statistical learning is important for learning phonetic categories by picking up these distributional cues (Maye et al., 2002).

Does this distributional learning mechanism also play a role in categorizing *visual* stimuli? In order to answer this research question, we constructed a visual continuum from two novel animate objects, consisting of 11 equal steps (based on Junge et al., 2018). 49 school-aged children were familiarized with tokens from the continuum. There were two conditions reflecting two category distributions (see Figure 1). After familiarization, children were tested on their categorization using three stimuli. Based on the distributional cues in the familiarization conditions, stimuli 2 and 3 were hypothesized to be categorized together for condition 1 learners (Figure 1, blue line), while this was the case for stimuli 1 and 2 for condition 2 learners (Figure 1, orange line). Results show that the familiarization condition significantly influenced the object that the participants selected in the test phase, indicating that distributional learning plays a role in categorizing visual stimuli.

Currently, children with developmental language disorders (DLD) participate in this research. As children with DLD have difficulties with statistical learning (e.g. Obeid et al., 2016), we ask whether this applies to distributional learning of visual categories as well, and whether this ability correlates with vocabulary knowledge.
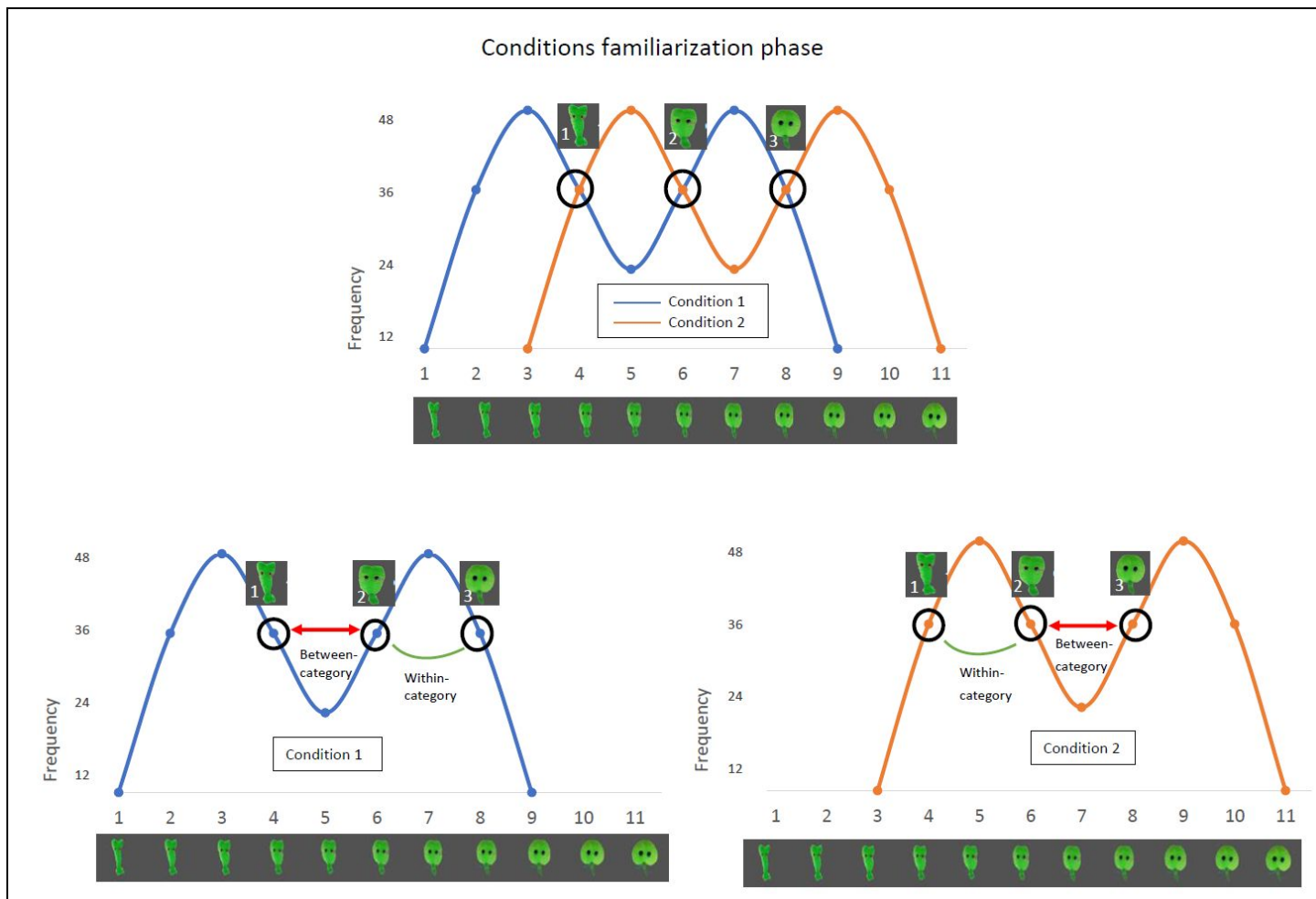
Figure 1. The two conditions of the familiarization phase.

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Maye, J., Werker, J. F. & Gerken, L. (2002). Infant sensitivity to distributional information can affect   phonetic discrimination. *Cognition*, *82*(3), B101–B111.

Obeid, R., Brooks, P. J., Powers, K. L., Gillespie-Lynch, K., & Lum, J. A. (2016). Statistical learning in specific language impairment and autism spectrum disorder: A meta-analysis. *Frontiers in Psychology, 7*, 1245.

Poster 43: An ERP study on the gender congruency effect with European Portuguese speakers: Is transparency modulating gender processing?

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Classical models of speech production (e.g., WEAVER++) state that an agreement context is necessary for the grammatical gender of a noun to be selected. Evidence supporting this comes from studies with Germanic languages using a picture-word interference paradigm (PWIP), in which participants are asked to name a picture using a target bare noun while ignoring a superimposed distractor word. Response times are expected to vary depending on the congruence or incongruence between the gender values of target and distractor. However, whereas null effects are systematically obtained with these languages, effects are observed for Romance languages. We hypothesize that the consistent visibility of gender values in nouns' form through simple cues (in the abovementioned Romance languages, most feminine nouns end in "-a" and masculine nouns in "-o") determines the way speakers acquire and lately process grammatical gender. Thus, gender would be a grammatical characteristic related to nouns themselves in Romance languages, but a syntactic characteristic related to agreement in Germanic languages. If so, in the former, the presence of transparent cues would be relevant to gender retrieval and thus, the time course of gender processing during the production of

transparent and opaque nouns may vary. This because transparent nouns would activate not only a lexical but also a sub-lexical form-route (Gollan & Frost, 2001).

In the present ERP study, we conducted two PWIPs experiments (opaque vs. transparent targets) with 16 native European Portuguese speakers. Three factors were included: (1) the targets' gender value; (2) the target-distractor gender congruency; (3) the target-distractor nominal ending congruency. The results confirmed our hypotheses. Whereas we found gender congruency effects in early electrophysiological time-windows (around 200 ms: conceptual-grammatical encoding) and in behavioral measures (mainly due to opaque nouns), Bürki et al. (2016) found them with German noun phrases only at a late time-window for determiner production.

Bürki, A., Sadat, J., Dubarry, A.-S., & Alario, F.-X. (2016). Sequential processing during noun phrase production. *Cognition, 146*, 90–99. https://doi.org/10.1016/j.cognition.2015.09.002

Gollan, T., & Frost, R. (2001). Two routes to grammatical gender: Evidence from Hebrew. *Journal of Psycholinguistic Research, 30,* 627– 627. https://doi.org/10.1023/A:1014235223566

Poster 44: The effect of speakers' reliability in adult second language cross-situational word learning (CSWL)

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Word learning is guided by the statistical co-occurrence between spoken words and potential referents, through which learners gradually map labels to objects across situations (Yu & Smith, 2007), but communicative context also plays a role (Tomasello, 2000; Yu & Ballard, 2007; Yurovsky, 2018). In the current study we investigated the influence of reliability of the speaker on word-object mapping in two cross-situational word learning (CSWL) experiments. We manipulated the reliability of word-object co-occurrences and associated these with a specific speaker, creating two experimental conditions: reliable speaker condition (RelSpkC) and unreliable speaker condition (UnrelSpkC). In the RelSpkC, the speaker consistently mapped the words to the target object. In the UnrelSpkC, the speaker mapped half of the words to different objects, i.e. unreliably. We tested whether speaker's reliability affected participants' CSWL. We hypothesized that reliably mapped words would be more difficult to learn in the UnrelSpkC, as learners would judge the speaker as less reliable, affecting CSWL. Bayesian analysis of a between-subjects experiment (n = 60) showed that the probability of participants in the RelSpkC performing better than those in the UnrelSpkC in the CSWL task was of undecided significance (BF < 1), which does not allow us to support our hypothesis. We also investigated participants' perception of the speaker's reliability. The participants in the UnrelSpkC perceived the speaker as less reliable than those in the RelSpkC, but these results constitute weak evidence for this effect to occur given our design (BF = 2.13). To reduce the variability across subjects, we designed a second within-subjects experiment (n = 60), which showed a reversed pattern: participants performed worse in the RelSpkC than in the UnrelSpkC, although this finding constitutes weak evidence against our hypothesis (BF = 1). Furthermore, participants did not

perceive the speakers to be significantly less reliable (BF < 1). These results suggest a rather small, yet not conclusive effect of speaker's reliability on adults' CSWL.

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Yurovsky, D. (2018). A communicative approach to early word learning. *New Ideas in Psychology, 50,* 73–79.

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Poster 45: An exploratory fMRI study on metonymy and metaphor processing

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Metonymy and metaphor, among all conversational implicatures, are believed to play a key role in human communication and cognition (Lakoff & Johnson, 1980). Metonymic language uses a particular property of something to refer to it (Song, 2011). For example, based on the physical vicinity between a customer in a cafeteria and the table he is seated at, say number 2, the customer can be referred to as 'table 2'. Conversely, metaphor allows for explaining one thing in terms of another. Juliet can thus become Romeo's sun based on a perceived similarity between the metaphoric allusion, the sun, and its referent, Juliet. However, it remains unclear what brain mechanisms allow for metonymy and metaphor comprehension, and whether these could be modulated by the type of figurative language being processed. We presented participants with metaphoric and metonymic sentences while they were lying in the scanner. Both conditions elicited increased left-lateralized frontotemporal activity compared to the literal counterpart. Metonymy additionally recruited the right inferior frontal gyrus, whereas metaphor downregulated the frontoparietal control system. Both these activity patterns involved brain regions underlying conflict resolution (Seghier, 2012). We explain this dichotomy in terms of the extent of the representational conflict that was elicited by the semantic distance between the metaphoric/metonymic allusions and their referent. The downregulation of the frontoparietal network during metaphor resolution might mirror a decreased semantic control for allowing the system to be more flexible in the semantic search space and thus obviating the greater semantic distance between the metaphoric allusion and the referent. Conversely, given the natural relatedness between metonymic allusions and their referent, metonymy resolution might only rely on the additional involvement of the right homolog of the inferior frontal gyrus. These results suggest a key role for semantic control and conflict resolution during both metaphor and metonymy comprehension.

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Poster 46: Grammar generalisation and statistical learning in adults and children: The role of word learning and explicit awareness

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The learning and generalisation of grammatical regularities is fundamental to successful language acquisition and use. Statistical learning research has examined how this process occurs through implicit learning (e.g. Lany & Saffran, 2010; 2011). The current set of studies examines two potential contributors to this process, and whether they operate differently in children and adults. Firstly, we consider the extent to which word knowledge influences the learning of grammatical regularities (e.g. Bates & Goodman, 1997). Secondly, we consider whether explicit awareness of the regularities contributes to generalisation performance, following recent work demonstrating both implicit and explicit contributions in statistical learning (Batterink et al., 2015). To examine these questions, we utilised an artificial language containing two semantic categories denoted by a co-occurring determiner and suffix, mimicking a grammatical gender system. Experiment 1 asked whether both adults and children would be able to learn the novel words and generalise the grammatical regularities to novel exemplars. We found that both children and adults learned the novel language to a good degree, but adults outperformed children. Only adults were able to successfully generalise the grammatical regularities to novel exemplars. In order to assess the role of word knowledge in generalisation, Experiments 2 and 3 manipulated training to reduce levels of word learning in adults and found that reducing word learning in adults also reduced generalisation. To assess the role of explicit awareness of the regularities to generalisation performance, we used a verbal report measure of awareness in all experiments, and demonstrated an association between explicit knowledge and generalisation performance in adults but not children. These findings suggest a possible developmental difference in the role of explicit awareness in generalisation of newly learned grammatical regularities. The findings will be discussed in the context of models of statistical learning.

Bates, E., & Goodman, J.C. (2001). On the Inseparability of Grammar and the Lexicon: Evidence from Acquisition, Aphasia and Real-time Processing. *Language and Cognitive Processes, 12*, 507-587.

Batterink, L.J., Reber, P.J., Neville, H.J., & Paller, K.A. (2015). Implicit and explicit contributions to statistical learning. *Journal of Memory and Language, 83*, 62-78.

Lany, J., & Saffran, J. R. (2010). From statistics to meaning: infants' acquisition of lexical categories. *Psychological Science, 21*(2), 284-291.

Lany, J., & Saffran, J. R. (2011). Interactions between statistical and semantic information in infant language development. *Developmental Science, 14*(5), 1207-1219.

Poster 47: The role of images in the learning and consolidation of novel words: An ERP study

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The complementary learning systems (CLS) theory posits that newly learned words are initially encoded as episodic memory traces in the hippocampal system, separate from one's existing lexicon (Davis & Gaskell, 2009). After a period of offline consolidation (e.g. overnight sleep), these memory traces gradually become lexicalized and achieve stable and longer-term neocortical representations (Davis & Gaskell, 2009). To study whether the lexicalization of novel words can be expedited by integrated learning of verbal definitions and images (relative to verbal definitions learning only, e.g., Bakker et al., 2015, Liu & van Hell, in press), monolingual speakers were trained on two unique lists of novel words, one on Day 1 and another on Day 2. Both lists were tested using an EEG recorded semantic priming task on Day 2 and Day 8. Lexicalization of the novel words was studied by examining the N400 and LPC time windows. Day 2 ERP data show that, only for novel words learned on Day 1 (with overnight consolidation), but not for novel words learned on Day 2 (without overnight consolidation), novel words preceded by semantically related primes elicited an enhanced positive LPC response relative to novel words preceded by unrelated primes. By Day 8, novel words learned on Day 1 and on Day 2 demonstrated an LPC effect. No N400 effects were found for any novel words on both testing days. These findings support the CLS account, as novel words needed overnight consolidation to demonstrate LPC effects. The ERP results found in this study parallel the ERP results in Liu and Van Hell (in press). Neurally, the two training conditions – verbal definition only (Liu and Van Hell, in press) and verbal definition and visual image (this study) – do not appear to differ as they show the same pattern of LPC semantic priming effects.

Bakker, I., Takashima, A., Van Hell, J. G., Janzen, G., & McQueen, J. M. (2015). Tracking lexical consolidation with ERPs: Lexical and semantic-priming effects on N400 and LPC responses to newly-learned words. *Neuropsychologia, 79*, 33-41.

Davis, M. H., & Gaskell, M. G. (2009). A complementary systems account of word learning: neural and behavioural evidence. *Philosophical Transactions of the Royal Society B: Biological Sciences, 364*(1536), 3773-3800.

Liu, Y., & Van Hell, J. G. (in press). Learning novel word meanings: An ERP study on lexical consolidation in monolingual, inexperienced foreign language learners. *Language Learning.*

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Poster 48: Consolidation of newly learned words in the L2

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According to the complementary learning systems theory (CLS; Davis & Gaskell, 2009), consolidation occurs when a speaker establishes semantic and phonological connections between newly and previously acquired words, thereby integrating the newly learned words into their mental lexicon. Sleep facilitates the consolidation process. In the present study, we extend the CLS account to L2 learning. Sixty-four L1 Polish-L2 English speakers listened to a fictitious story containing 12 novel English words. They were tested immediately after exposure and 24 hours later. To measure lexical integration, they completed a pause detection task. Pauses were inserted into real words (daffodil) resembling the novel words (daffodat) from the story; only once novel words are integrated into the mental lexicon it takes longer to identify pauses in existing words. In an additional forced-choice task, participants heard the 12 novel words paired with a novel foil (daffodat vs. daffodan) and decided which one they had heard in the story. Results revealed a strong correlation between RTs in the pause detection task on Day2 and accuracy on the forced-choice task on Day1 and Day2. Thus, even though no statistically significant consolidation effect emerged in the overall analysis of the pause detection task, participants who performed better on the forced-choice task on Day1 showed greater consolidation of novel words, as measured by their RTs on the pause detection task on Day2. These findings suggest that vocabulary consolidation in the L2 proceeds similarly as in the L1, but the magnitude of L2 consolidation is dependent on learners' ability to recognize novel lexical forms.

Davis, M. & Gaskell, G. (2009). A complementary systems account of word learning: Neural and behavioral evidence. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences, 364,* 3773-800.

Henderson, L, Devine, K, Weighall, A, Gaskell, G (2015). When the daffodat flew to the intergalactic zoo: Off-Line consolidation is critical for word learning from stories. *Developmental Psychology, 51*(3), 406-417.

Poster 49: Fronto-temporal contributions to basic semantic composition: Evidence from lesion behavior mapping

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Semantic composition is the ability to combine single words to form complex meanings and is an essential component for successful communication. Evidence from neuroimaging studies suggests that semantic composition engages widely distributed left-hemispheric areas, with a key role of left angular gyrus, anterior temporal lobe and inferior frontal gyrus (Bemis & Pylkkänen, 2012; Price et al., 2015; Schell et al., 2017). To date, the respective contributions of these regions within the semantic network remain unclear. Notably, patients with post-stroke aphasia often show impaired semantic composition, leading to comprehension deficits. Here we investigate the impact that lesions to key regions in the semantic network have on basic semantic composition, targeting correlations between lesions and specific aspects of semantic composition.

We included 36 native German speaking participants with chronic lesions to the language network after left-hemispheric stroke (*Ma*ge = 56.8y, *SD* = 7.7y) showing different types and severities of language impairment. Participants performed a meaningfulness judgment task on auditorily presented adjective-noun phrases that were either meaningful ("fresh apple"), anomalous ("awake apple") or had the noun replaced by a pseudoword ("awake gufel"), as well as a single-word control condition ("apple"). Lesion-behavior correlations were conducted using

the support-vector-regression lesion-symptom mapping (SVR-LSM) toolbox (DeMarco & Turkeltaub, 2018) with accuracy and reaction time for each condition as dependent measures. The analyses revealed that reduced accuracy for anomalous phrases was associated with lesions in left anterior inferior frontal gyrus (aIFG), whereas increased reaction times for anomalous phrases correlated with lesions in anterior-to-mid temporal lobe (ATL/MTG). These differential effects of lesion location are in line with a crucial role of aIFG for executive semantic control and a key contribution of ATL/MTG to conceptual processing. Together, these results help to disentangle the functional contributions of semantic key regions to meaning composition.

Bemis, D. K., & Pylkkänen, L. (2012). Basic linguistic composition recruits the left anterior temporal lobe and left angular gyrus during both listening and reading. *Cerebral Cortex, 23*(8),

Price, A. R., Bonner, M. F., Peelle, J. E., & Grossman, M. (2015). Converging evidence for the neuroanatomic basis of combinatorial semantics in the angular gyrus. *Journal of Neuroscience*, *35*(7), 3276-3284.

Schell, M., Zaccarella, E., & Friederici, A. D. (2017). Differential cortical contribution of syntax and semantics: An fMRI study on two-word phrasal processing. *Cortex, 96*, 105-120.

DeMarco, A. T., & Turkeltaub, P. E. (2018). A multivariate lesion symptom mapping toolbox and examination of lesion-volume biases and correction methods in lesion-symptom mapping. *Human Brain Mapping, 39*(11), 4169-4182.

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Poster 50: Shared neural resources during the discrimination of speech and music timbre information: An electrophysiological study

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The influence of the music training on speech information processing has been widely explored, suggesting the possibility of the transfer effect between music and language domains. Despite the robust finding of shared neural resources when processing higher-order structures (e.g., syntactic and harmonic violations), little is known whether similar overlapping occurs when processing lower-level information such as phonemes and notes. This study aimed to observe whether shared neural resources are also present when analyzing the discrimination of timbre information of speech sounds and notes of musical instruments. To establish the transfer effect between both domains at lower-level, similar early electrophysiological responses were expected to be observed in response to both types of stimuli. We selected a sample of 19 young adults who completed a brief survey about their musical background to identify the possible influence of music training on performance level. The stimuli were presented in the oddball paradigm while subjects were asked to attend a silenced video. The results show the MMN component in between-category speech stimuli and all deviant music stimuli. Other event-related potentials such as P1 and P2 were observed during both the discrimination of speech and music stimuli, but only music stimuli elicited a late N500 component. The correlation analyses indicated that individuals who discriminate difficult timbre information of musical instruments are better in discriminating between-category syllables stimuli, and worse in discriminating within-category vowels, suggesting that higher discrimination of musical timbre information leads to a better representation of speech categories. Interestingly, those individuals who have music training background showed better discrimination of within-category vowels, indicating that music training may negatively affect the categorical representation of speech sounds. This study concludes that similar early electrophysiological responses are elicited during the discrimination of music and language timbre information, and raises the possibility of transfer-effect when processing lower-level information.

Atherton, R., P., Chrobak, Q., M., Rauscher, F., H., Karst, A., T., Hanson, M., D., Steinert, S. W., & Bowe, K., L. (2018). Shared processing of language and music evidence from a cross-modal interference paradigm. *Experimental Psychology, 65*(1), 40-48. https://doi.org/10.1027/1618-3169/a000388

Čeponienė, R., Alku, P., Westerfield, M., Torki, M., & Townsend, J. (2005). ERPs differentiate syllable and nonphonetic sound processing in children and adults. *Psychophysiology, 42*(4), 391-406. https://doi.org/10.1111/j.1469-8986.2005.00305.x

Kühnis, J., Elmer, S., Meyer, M., & Jäncke, L. (2013). The encoding of vowels and temporal speech cues in the auditory cortex of professional musicians: An EEG study. *Neuropsychologia, 51*(8), 1608-1618. https://doi.org/10.1016/j.neuropsychologia.2013.04.007

Siedenburg, K., & McAdams, S. (2018). Short-term Recognition of Timbre Sequences: Music Training, Pitch Variability, and Timbral Similarity. *Music Perception: An Interdisciplinary Journal, 36*(1), 24-39. https://doi.org/10.1525/mp.2018.36.1.24

Poster 51: The effect of category interest on novel-word retention in toddlers

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Children are astonishingly fast word learners (Frank et al., 2016). However, word learning is a complex process and not all initially-formed word-object associations (WOAs) are retained over longer periods. What determines whether a word eventually enters the child's lexicon? Horst and Samuelson (2008) show that increased object salience facilitates retention in 24-month-olds. At the same time, interest boosts children's learning outcomes (e.g. Begus et al., 2014). Ackermann et al. (2019) found that this effect extends to the category level: 30-months-olds showed better recognition for WOAs from high-interest categories. In the present eyetracking study, we investigated whether interest in a natural category – e.g. animals or vehicles – helps children retain newly-acquired WOAs by highlighting referents from high-interest categories, comparable to the experimental manipulation of salience by Horst and Samuelson (2008). 24-months-olds (*n* = 44) and 38-month-olds (*n* = 46) were presented with pictures of familiar objects from four semantic categories while we measured their pupil dilation as an index of interest. Children were then exposed to one novel member from each category and their labels. Using intermodal preferential looking, we assessed word recognition immediately after exposure, five minutes later and 24 hours later. Analyses indicate that 24-months-olds do not show retention of novel WOAs. However, target looking is boosted for words from broad semantic categories after five minutes, in keeping with Borovsky et al. (2016). After 24 hours, category interest modulates recognition, suggesting a beneficial, but not sufficient, influence. Older children show a different pattern: 38-months-olds robustly recognize novel words at all time points. After five minutes, category interest and interest in the object itself positively affect target recognition. These results suggest a developmental trajectory: For younger children, category size seems to be the driving force. As differences in category sizes across children level off with age, individual interests become more important.

Ackermann, L., Hepach, R., Mani, N. (2019): Children learn words easier when they are interested in the category to which the word belongs. *Developmental Science. Advance online publication.* https://doi.org/10.1111/desc.12915

Begus, K., Gliga, T., & Southgate, V. (2014). Infants learn what they want to learn: Responding to infant pointing leads to superior learning. *PloS One, 9*(10), e108817. https://doi.org/10.1371/journal.pone.0108817

Borovsky, A., Ellis, E. M., Evans, J. L., & Elman, J. L. (2016). Lexical leverage: Category knowledge boosts real-time novel word recognition in 2-year-olds. *Developmental Science, 19*(6), 918–932. https://doi.org/10.1111/desc.12343

Frank, M. C., Braginsky, M., Yurovsky, D., & Marchman, V. A. (2016). Wordbank: An open repository for developmental vocabulary data. *Journal of Child Language, 44*(3), 677–694. https://doi.org/10.1017/S0305000916000209

Horst, J. S., & Samuelson, L. K. (2008). Fast mapping but poor retention by 24-month-old infants. *Infancy, 13*(2), 128–157. https://doi.org/10.1080/15250000701795598

Poster 52: The Tripod model: A minimal reduction of the dendritic tree and its functional relevance for neural processing

Alessio Quaresima

In spoken word recognition, sequences of sounds combine in unpredictable temporal patterns. The language system processes and interprets this stream through the Mental Lexicon in a few hundred milliseconds, but the details of how the brain performs these operations are unknown. Most importantly, it is unknown the mapping between the linguistic categories -words and phonemes- and the neurophysiology (Poeppel, 2012). This poster examines how a model of the biological neuron can already support several essential functions, posing questions about the level of description required to address word-recognition. For this purpose, we have introduced the Tripod model. It implements a minimal structure of the dendritic tree, a biologically motivated reduction that maintains the combinatorial properties of real arborizations. We test this model on a set of fundamental results of single-cell physiology. Our results are in line with experimental evidence about localized inhibition, NMDA-spikes and synaptic clustering. Thus, it achieves similar results than more complex many-compartment models, yet with a simpler architecture that can be implemented in large networks. Afterwards, we show the dendritic structure can support sequence processing. Previous work has already proven that ad-hoc supervised learning rules enable neurons to recognize temporal patterns (Gütig and Sompolinsky, 2006). Here, we show that the nonlinearities in the dendrites of the cell provide a plausible toolset to process time-structure (language-like) inputs.

Gütig, R., Aharonov, R., Rotter, S., & Sompolinsky, H. (2003). Learning input correlations through nonlinear temporally asymmetric Hebbian plasticity. *Journal of Neuroscience*, *23*(9), 3697-3714.

Poeppel, D. (2012). The maps problem and the mapping problem: two challenges for a cognitive neuroscience of speech and language. *Cognitive neuropsychology*, *29*(1-2), 34-55.

Poster 53: Feedback in spaced or massed retrieval practice affects word learning in adults

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Repeated testing (requiring retrieval practice) is often claimed to be more effective for word learning than restudying. Similarly, spacing repeated tests across several days is often claimed to lead to superior long-term retention of novel words, relative to massed testing. However, whether any effect of spacing tests over multiple days is at least partly influenced by periods of sleep, and whether testing effects are dependent upon feedback, remain unclear. We examined if spaced testing over a day leads to an advantage in word learning that emerges before sleep and maintains after sleep. Adults were taught rare animal names (e.g. JERBOA) and practised retrieving these in five test sessions; three on Day 1 (spaced or massed), and one on Days 2 and 7. Each test session included a cued recall, picture naming, and base animal match task. Crucially, Study 1 did not incorporate feedback into the tests; in Study 2, feedback was provided in the Day 1 tests.

In Study 1, both spaced and massed testing without feedback revealed small improvements in performance across tests on Day 1, with performance maintaining on Day 2 and 7, but no spacing benefit. In Study 2, with feedback, massed testing led to greater improvements over the three tests on Day 1, compared to spaced testing. However, spaced performance caught up with massed on Day 2, with performance maintaining on Day 7.

Counter to previous claims, no spacing benefit was evident in either study. Instead, it appears that, at least in the early stages of word learning, adults benefit from massed (rather than spaced) retrieval practice, but only when feedback is available. These findings emphasize the importance of considering word learning as a prolonged process, and further understanding how training regimes might impact on both the early stages of word learning and sleep-associated consolidation.

Poster 54: Top-down or bottom-up? Investigating the benefit of perceptual anchoring in early language acquisition with fNIRS

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Adult listeners show an enhanced performance in two-tone frequency discrimination tasks when the frequency of one tone is kept constant across tone pairs (Ahissar, 2007). This benefit from a repeated tone, which may function as an anchor for tone comparisons, is referred to as perceptual anchoring. The fact that perceptual anchoring is reduced or even absent in individuals with developmental dyslexia suggests a potential link between this acoustic phenomenon and successful language learning. This hypothesis is supported by recent electrophysiological findings in infants indicating that perceptual anchoring might be at play in language acquisition (Männel et al., 2019). The present functional near-infrared spectroscopy (fNIRS) study aims to 1) provide evidence for the relevance of perceptual anchoring in language acquisition and 2) explore which brain regions support anchoring to disentangle perception-driven bottom-up processes and prediction-driven top-down processes (see Emberson, Richards, & Aslin, 2015, Skeide & Friederici, 2016). The interplay between both aspects of learning has been broadly allocated to temporal and frontal cortices, respectively. To this aim, we recorded 6.5-month-old infants' functionally induced cortical oxygenation responses during an auditory familiarization-test

experiment. First, infants were familiarized with syllable pairs under two conditions: in the anchor condition the frequency of the first syllable in each pair was kept constant, as opposed to the no-anchor condition. Each familiarization condition was followed by a test phase, where infants were presented with previously heard syllables (second syllables in each pair) and novel syllables. A difference in the oxygenation response between familiar and novel syllables will support the notion that infants recognize previously heard syllables depending on the presence of anchors in the preceding familiarization. Comparing the topography of brain responses in the anchor and no-anchor familiarization may allow us to tease apart contributions of pre-frontal and temporal cortices to perceptual anchoring and thus, specify the perceptual and cognitive processes driving perceptual anchoring.

Ahissar, M. (2007). Dyslexia and the anchoring-deficit hypothesis. *Trends in Cognitive Sciences, 11*(11), 458–465. https://doi.org/10.1016/j.tics.2007.08.015

Männel, C., Obrig, H., Villringer, A., Ahissar, M., & Schaadt, G. (2019). Basic acoustic features of the learning context shape infants' lexical acquisition. Talk presented at *Eleventh Annual Meeting of the Society for the Neurobiology of Language (SNL)*. Helsinki, Finland.

Emberson, L. L., Richards, J. E., & Aslin, R. N., (2015). Top-down modulation in the infant brain: Learning-induced expectations rapidly affect the sensory cortex at 6 months. In *Proceedings of the National Academy of Sciences,* 112(31), 9585–9590. https://doi.org/10.1073/pnas.1510343112

Skeide, M. A., & Friederici, A. D. (2016). The ontogeny of the cortical language network. *Nature Reviews Neuroscience, 17*(5), 323. https://doi.org/10.1038/nrn.2016.23

Poster 55: Pragmatic abilities in early Parkinson's disease

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Parkinson's disease (PD) is a neurodegenerative disorder characterized by motor dysfunctions. Moreover, the impairment of executive functions and the vulnerability of language and non-verbal communication have been reported as well. Some studies suggested that pragmatic abilities are impaired in PD, especially the understanding of figurative language and other implicit contents (Pell & Monetta, 2008). In addition, a link between pragmatic abilities, executive functions and Theory of Mind (ToM) has been hypothesized (McNamara & Durso, 2003). Previous studies enrolled PD patients whose symptom severity was highly heterogeneous; thus, the main goal of this study is to investigate whether pragmatic skills are already impaired in early-stage PD. Our second aim is to explore the relationship between pragmatic skills and a cluster of selected cognitive functions.

20 early PD patients and 21 healthy controls were enrolled. The assessment included (i) a test for pragmatic abilities (APACS) and ii) tests for working memory, verbal fluency, shifting, inhibition, semantic memory, and ToM. Separate between-group analyses were conducted with the data collected (i) from APACS and (ii) from the battery of neuropsychological measures. Correlation and multiple regression analyses were performed separately for PD patients and healthy controls to investigate the relationship between pragmatic skills and each of the selected neurocognitive measures. The Wilcoxon rank-sum test showed that general pragmatic abilities, comprehension and production are already compromised in early PD patients. Overall, our data show a general effect of inhibition on pragmatic abilities in both groups; however, protective

factors such as good general cognitive skills, education, and low levels of motor symptoms seem to support PD patients' pragmatic competence.

Pell, M. D., & Monetta, L. (2008). How Parkinson's disease affects non-verbal communication and language processing. *Language and Linguistics Compass*, *2*(5), 739-759.

McNamara, P., & Durso, R. (2003). Pragmatic communication skills in patients with Parkinson's disease. *Brain and Language*, *84*(3), 414-423.

Poster 56: Eye-movement comparison in reading in deaf and hearing Russian sign language speakers

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Reading is difficult for deaf individuals as they cannot rely on the phonological codes and must rely only on spelling. At the same time, deaf readers have certain advantage: they have highly developed peripheral vision. This confirm both reading and visual attention studies. However, it is not clear whether the enhanced peripheral vision results from structural reorganization of the brain caused by deafness or from extensive exposure to and the use of sign language.

To answer that question, we compared eye movements while reading in partially hearing (n = 12, using both speech and sign language) and deaf (n = 14, only using sign language) Russian Sign Language (RSL) speakers. They read 144 sentences of Russian Sentence Corpus. A study of visual attention was also conducted to check participants' ability to search objects in the limited and unlimited perception field modes.

The results of the reading task demonstrate highly comparable reading skills. There was an indication that deaf individuals profit from peripheral vision more: they had a more pronounced speed-up in reading times closer to the end of the sentence than hearing signers. Additionally, in comparison to hearing signers, deaf people were less likely to skip predictable words and less likely to fixate frequent words less than infrequent. For visual attention experiment, we are still collecting the data. However, we expect it to correlate with reading experiment results.
Thus, we found some support for the results demonstrate that not RSL usage but hearing loss itself affecting parafoveal processing, and through that, reading.

Bavelier, D., Dye, M. W., & Hauser, P. C. (2006). Do deaf individuals see better? *Trends in Cognitive Sciences, 10*(11), 512-518.

Bélanger, N. N., Slattery, T. J., Mayberry, R. I., & Rayner, K. (2012). Skilled deaf readers have an enhanced perceptual span in reading. *Psychological Science, 23*(7), 816-823.

Bélanger, N. N., & Rayner, K. (2013). Frequency and predictability effects in eye fixations for skilled and less-skilled deaf readers. *Visual Cognition, 2*1(4), 477-497.

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Laurinavichyute, A. K., Sekerina, I. A., Alexeeva, S., Bagdasaryan, K., & Kliegl, R. (2019). Russian Sentence Corpus: Benchmark measures of eye movements in reading in Russian. *Behavior Research Methods, 51*(3), 1161-1178.

Poster 57: Indirect requests comprehension in High-Functioning Autism and typical Development

Eleonora Marocchini

The literature on indirect requests (IRs) comprehension in typical development is limited and focused on conventionalized IRs (Carrell, 1981; Shatz, 1978). Overall, previous studies suggest that IRs are difficult compared to direct requests, performed in the same context. Therefore, IRs are expected to be impaired in High Functioning Autism (HFA), like other pragmatic tasks possibly requiring Theory of Mind (ToM) skills, traditionally thought to be compromised in HFA (Baron-Cohen, 2000).

Studies on IRs in HFA provide conflicting evidence: some found difficulties in IRs comprehension (MacKay & Shaw, 2004), others found HFA even outperformed typically developing (TD) children (Kissine et al., 2015). Howover, no study has investigated ToM and linguistic skills' role in IRs comprehension development.

This study investigates IRs and highly IRs, and looks at ToM and language skills' potential
influence. Sixty-one Italian children participated: 14 HFAs (MA = 10.6; SD = 1.17), 28 age-matched TDs (MA = 11.03; SD = 0.61), 19 younger TDs (MA = 5.35; SD = 0.48). Children were asked to help the experimenter recreate a drawing. Requests (n = 24) were presented in three conditions: direct (What colour is the grass?), indirect (I don't remember the colour of the grass), highly indirect (The colour of the grass is hard to remember). Linguistic and ToM skills were tested through a validated morphosyntactic test and two false-belief tests.

Children's accuracy was measured and analyzed: all groups performed above chance. An effect of condition emerged both for older TDs and HFA, but with a different trend: older TDs performed better with direct than both IRs; HFAs performed better with indirect than highly IRs. ToM skills significantly predicted older TDs accuracy for highly IRs; linguistic skills did not emerge as a predictor. These results suggest that IRs comprehension is preserved in HFA, though older TDs and HFAs seem to rely on different strategies, with older TDs possibly relying more on their ToM skills.

Baron-Cohen, S. (2000). Theory of mind and autism: A review. *International Review of Research in Mental Retardation, 23*, 169-184.

Carrell, P. L. (1981). Children's understanding of indirect requests: Comparing child and adult comprehension. *Journal of Child Language, 8*(2), 329-345.

Kissine, M., et al. (2015). Children with Autism Understand Indirect Speech Acts: Evidence from a Semi-Structured Act-Out Task. *PLOS ONE, 10*(11), e0142191.

MacKay, G., & Shaw, A. (2004). A comparative study of figurative language in children with autistic spectrum disorders. *Child Language Teaching and Therapy, 20*(1), 13-32.

Shatz, M. (1978). Children's comprehension of their mothers' question-directives. J*ournal of Child Language, 5*(1), 39-46.

Poster 58: Eye-movements during reading in children with hearing loss

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Learning to read is more difficult for deaf than for hearing children because the deaf cannot rely on the phonological codes and must rely exclusively on spelling (Bélanger, 2013). However, deaf readers also exhibit some eye movement patterns typical for proficient readers: developed peripheral vision allows them to discern more characters to the right of the current fixation than hearing readers (Bélanger, 2015).

This study explores whether children learning to read already have the advantage in reading due to more developed peripheral vision. We analyzed eye movements while reading in primary school children with (n = 4, Mage = 8.75, range 8 – 10 years old, 3 female; data collection is ongoing) and without hearing loss (n = 38, Mage = 8, range 7–9 years old, 19 female). Children with hearing loss communicate in Russian sign language (RSL) on the daily basis from birth or early age. All children read the same 33 sentences comprising the child version of the Russian Sentence Corpus (Korneev et al., 2017) and answered two-choice comprehension questions after 10 sentences.

Confirming early benefits of developed peripheral vision and greater parafoveal preview, children with hearing loss exhibited many characteristics of more efficient readers: they had a saccade landing position closer to the center of the word; they also had higher probability of skipping a word and lower probability of fixating a word more than once. They slowed down on longer words less than hearing, and had shorter single fixation durations and gaze durations (no difference in other duration measures). At the same time, their comprehension question response accuracy was lower, most probably due less experience with Russian language. Children with hearing loss additionally took part in a vocabulary test and a visual search experiment targeting peripheral vision. The outcomes of these tests will be reported in the poster.

Bélanger, N. N., Mayberry, R. I., & Rayner, K. (2013). Orthographic and phonological preview benefits: Parafoveal processing in skilled and less-skilled deaf readers. *The Quarterly journal of experimental psychology, 66*(11), 2237-2252.

Bélanger, N. N., & Rayner, K. (2015). What eye movements reveal about deaf readers. *Current Directions in Psychological Science, 24*(3), 220-226.

Korneev, A. A., Matveeva, E., & Akhutina, T. V. (2017). Silent Reading in Russian Primary Schoolchildren: an Eye Tracking Study. *Psilhologiya. Zhurnal Vysshey shkoly ekonomiki, 14*(2), 219-235.

Poster 59: Early neuronal traces of lexical memory during language development
María Eugenia Arthuis Blanco

Before and around the age of 24 months, the infant brain starts to acquire novel words rapidly and build more stable word representations. However, the neurobiological basis of word acquisition remains largely understudied. In the adult brain, a short (~30 minutes) exposure to novel word- forms enhances the brain activity (already at 50 ms after the word divergence point) in response to novel pseudo-words, demonstrating a cortical mechanism for rapid formation of neural word memory circuits (e.g., Kimppa, Kujala, Leminen, Vainio, & Shtyrov, 2015). Similar findings have been obtained in school-aged children (Partanen, Leminen, de Paoli, Bundgaard, Kingo, Krøjgaard, & Shtyrov, 2017). Here, we investigated whether similar enhancement occurs in toddlers by measuring event-related potentials (ERPs) in response to native pseudo-words in monolingual French-learning 24-month-olds. The real words and pseudo-words could be recognized only from their second syllables allowing us to define the divergence point after which the word lexicality could be identified. The ERPs were averaged according to word type (real versus pseudo-words) and experimental phase (early, middle, and late, each lasting three minutes). The results showed that a negative waveform starting ~200 ms after the word divergence point was more pronounced for known words than for pseudo-words at the beginning of the experiment. However, after around six minutes of exposure, the waveform in response to pseudo-words became similar to that of known words, suggesting the formation of neural circuits for novel word-forms in the developing brain. The results suggest that the ERP modulation might be related to lexical learning in young children, and it occurs after less exposure in the developing than in the mature brain. The ERP findings will be correlated with individual vocabulary skills to further investigate whether neuronal enhancement correlates with lexical abilities.

Kimppa, L., Kujala, T., Leminen, A., Vainio, M., & Shtyrov, Y. (2015). Rapid and automatic speech-specific learning mechanism in human neocortex. *Neuroimage, 118,* 282-291.
Partanen, E., Leminen, A., de Paoli, S., Bundgaard, A., Kingo, O. S., Krøjgaard, P., & Shtyrov, Y. (2017). Flexible, rapid and automatic neocortical word form acquisition mechanism in children as revealed by neuromagnetic brain response dynamics. *Neuroimage, 155,* 450-459.

Poster 60: Variation in the association between polygenic risk for psychiatric disorder and social skill sets in the general population reveals disorder specific profiles
Fenja Schlag

Many complex heritable neurodevelopmental conditions including Attention-Deficit/Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), Bipolar Disorder (BP), Major Depressive Disorder (MDD) or Schizophrenia (SCZ) are linked to a spectrum of different social behavioural problems. These social difficulties are thought to reside at the extreme end of an underlying continuum of symptoms that is shared with social behaviour in the general population; a theory that is supported by studies investigating common genetic overlap between traits and disorders. However, social behavioural skills can change during development and entail multiple different traits that can be context-specific. This behavioural complexity may shape detectable polygenic links with disorder though our knowledge of these genetic continuities is scarce. Here, we investigate association between polygenic risk of five psychiatric disorders and a spectrum of social behaviour scores in the general population. Specifically, we study associations between polygenic risk scores (PGS) for ADHD, ASD, BP, MDD and SCZ, as informed by genome-wide summary statistics from large consortia, and longitudinally assessed parent- and teacher-reports of (i) low prosociality and (ii) peer problems in participants of the ALSPAC cohort (4 to 17 years, $n \leq 6174$). For each psychiatric disorder, we subsequently study the heterogeneity in polygenic effects using a random effects meta-regression, accounting for age-, reporter-, and trait- related differences in social scores. Our findings provide evidence for shared genetic liability between social behaviour and ADHD, ASD, MDD, and SCZ, but not BP. Polygenic associations with social behaviour were developmentally stable for all psychiatric disorders, but varied across reporters and the studied social traits for ADHD, MDD, and SCZ. These variations revealed dissociable patterns across psychiatric disorders showing distinct polygenic associations in respect to reporter- and trait-specific social behaviour. Together, our results suggest distinct disorder-informed polygenetic association profiles with social behavior types that may reflect differences in underlying genetic aetiologies.

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Poster 61: Dissociating intonation-driven syntactic and semantic processing in the left inferior frontal gyrus using rTMS

Stan van der Burght

Sentence processing guided by prosody has been shown to involve the left inferior frontal gyrus (LIFG; Van der Burght et al. (2019)). Prosodic cues, such as pitch accents, are known to interact closely with both syntax and semantics, and these processing domains can in turn be dissociated within LIFG (Hagoort & Indefrey, 2014; Friederici et al., 2017). Yet, the functional relevance of this functional-anatomical double dissociation remains unclear. This study used focal perturbations induced by repetitive transcranial magnetic stimulation (rTMS) to probe the causal role of respectively the posterior part of LIFG in syntactic processing, and the anterior part in semantic processing. Healthy participants performed a sentence completion task with a syntactic and a semantic decision. The pitch accent in the truncated spoken utterance cued the more suitable of two visually presented sentence endings, which participants selected by button-press. Subjects (N = 30) underwent three sessions where 10 Hz rTMS bursts were applied over either anterior or posterior LIFG, or vertex (control region). rTMS was applied 100 ms after visual stimulus onset. We used generalised linear mixed models to analyse reaction times and accuracy (pre-registered at the Open Science Framework). Although we found no significant interactions between rTMS site and decision type, a main effect of rTMS site indicated decreased task accuracy in both decision types after posterior IFG stimulation versus vertex. These preliminary results provide tentative evidence for the functional relevance of posterior LIFG in syntactic and semantic processing guided by prosodic cues. The lack of regional specificity may be explained by the compensatory involvement of other language regions. Given the considerable inter-individual variability within the IFG, this study may have benefitted from a functional localiser. Finally, results showed a learning effect across sessions, which may have masked task-specific rTMS effects.

Friederici, A. D., Chomsky, N., Berwick, R. C., Moro, A., & Bolhuis, J. J. (2017). Language, mind and brain. *Nature Human Behaviour*, *1*(10), 713-722.

Hagoort, P., & Indefrey, P. (2014). The neurobiology of language beyond single words. *Annual review of neuroscience*, *37*, 347-362.

Van der Burght, C. L., Goucha, T., Friederici, A. D., Kreitewolf, J., & Hartwigsen, G. (2019). Intonation guides sentence processing in the left inferior frontal gyrus. *Cortex*, *117*, 122-134.

Poster 62: Investigating the role of content support in L2 writing: Focus on writing performance and L2 learners' engagement

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Due to the demanding nature of L2 writing acquisition, it is of high interest to explore the instructional techniques and tasks that can lead to the effectiveness of L2 writing instruction. Task-based language learning is one of the most influential teaching methods nowadays, where much of the research explores how task features can be manipulated to enhance the effectiveness of a task. One of the most commonly researched features in task design is task complexity (Robinson, 2011), the cognitive load of the task placed on learners' memory and attentional resources. This study intends to investigate the potential effects of task complexity on L2 learners' writing performance and their engagement in writing and to develop a self-report instrument to measure engagement in L2 writing tasks. We operationalize task complexity as content support which is the provision of ideas and content in writing tasks (cf. Ong & Zhang, 2010; Révész, Kourtali, & Mazgutova, 2017) and will conduct an experiment between two groups both with and without content support. Based on the engagement literature, we measure the L2 learners' engagement in writing in terms of cognitive, behavioral and emotional components. Specific indicators of student engagement from previous research are identified and revised to correspond with L2 writing. Learner's engagement questionnaire will be administrated in pre-test and post-test sessions. Participants will perform tasks on computers with a keystroke logging software, which records their writing performance and behaviors. The current study will help identify how the content support influences writing performance and how learners are engaged in writing tasks with the content support. So far, we have constructed and piloted the questionnaire on learner's engagement in L2 writing, which will be presented in the poster. However, the design of content support and data collection are to be arranged.

Ong, J., & Zhang, L. J. (2010). Effects of task complexity on the fluency and lexical complexity in EFL students' argumentative writing. *Journal of Second Language Writing, 19*(4), 218–233. https://doi.org/10.1016/j.jslw.2010.10.003

Révész, A., Kourtali, N. E., & Mazgutova, D. (2017). Effects of Task Complexity on L2 Writing Behaviors and Linguistic Complexity. *Language Learning, 67*(1), 208–241. https://doi.org/10.1111/lang.12205

Robinson, P. (2011). *Second language task complexity, the Cognition Hypothesis, language learning, and performance.* In P. Robinson (Ed.), Second Language Task Complexity: Researching the Cognition Hypothesis of Language Learning and Performance (pp. 3–38). John Benjamins. https://doi.org/10.1075/tblt.2.05ch1

Poster 63: Early semantic facilitation in blocked cyclic naming is due to facilitatory top-down effects on object recognition

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A reliable finding in blocked cyclic picture naming experiments is a semantic facilitation effect in the first cycle (cf. Belke 2017). Here we tested the hypothesis that the facilitation effect originates from a-priori information about the target category, which is implicitly available in blocked presentations and may accelerate the process of concept recognition.

Experiments 1 and 2 tested to what extent the required level of shape detail for concept identification is reduced by blocking compared to explicit a-priori category information. Pictures were presented in gradually de-blurring image sequences. Blurring levels (visual filter radii) permitting correct object naming were measured. The required level of details was significantly reduced by a-priori category knowledge, irrespective of whether category knowledge was implicitly (blocking) or explicitly provided (category names). The findings support the assumption that both paradigms similarly induce a top-down effect on concept recognition such that less specific visual features become sufficiently distinctive for target identification.

Experiment 3 tested (a) whether a-priori category information induces a similar naming time advantage as that observed in blocking paradigms and (b) whether this effect arises at a semantic or at a perceptual level. Objects from visually consistent and visually variable categories were presented in precise and blurred picture versions. In different conditions, the category name (semantic), the averaged category shape (perceptual), or no category information was shown prior to the pictures. The results indicate that both types of a-priori category knowledge can accelerate first naming, but with a complex effect. The naming time advantage was generally larger for blurred (than precise) versions, larger for visually consistent (than variable) categories and larger for perceptual (than semantic) a-priori knowledge.

In sum, facilitation observed for the first naming of objects in cyclic blocking paradigms can be explained by a top-down effect of a-priori category information on object recognition.

Belke, E. (2017). The role of task-specific response strategies in blocked-cyclic naming. *Frontiers in Psychology, 7,* 1955.

Poster 64: The influence of grammatical categories on verbal fluency performance in people with aphasia

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People with aphasia (PWA) typically exhibit deficits in verbal fluency (VF) tasks (Basso et al., 1997). Both linguistic and executive abilities are required for successful performance in VF tasks (Shao et al., 2014), yet it is still unknown to what extend reduced VF in PWA is caused by linguistic deficits or is a result of impaired executive functioning (Bose et al., 2017; Stielow, 2017). To evaluate how linguistic abilities influence lexical VF skills, the current study focuses on the analysis of grammatical categories. 9 people with mild to moderate aphasia and 9 matched healthy controls (HC) were examined on four letter fluency tasks (h, d, n, s). All participants spoke German at a native level. As expected, PWA produced less words than HC. Correct words were analysed regarding their grammatical category. Results were summed for both groups across the four tasks. While both groups produced mainly nouns, PWA produced proportionally more nouns than HC. The groups therefore exhibited differences in the use of other grammatical categories: Besides nouns, HC also generated verbs and modifiers. PWA generated almost no words in those categories. Function words did not make up a substantial proportion of words produced in either group. Based on these results, it can be concluded that during VF tasks healthy adults access different classes of content words (nouns, verbs and modifiers) while PWA seem to rely heavily on nouns, not accessing other classes of content words. It appears that aphasic search space is restricted to nouns mainly, which results in a reduced number of words in the potential search space. The results suggest a large influence of linguistic abilities on lexical VF performance in PWA.

Basso, A., Burgio, F., & Prandoni, P. (1997). Semantic category and initial letter word fluency in left-brain-damaged patients. *European Journal of Neurology, 4*(6), 544–550. https://doi.org/10.1111/j.1468-1331.1997.tb00404.x

Bose, A., Wood, R., & Kiran, S. (2017). Semantic fluency in aphasia: Clustering and switching in the course of 1 minute. *International Journal of Language & Communication Disorders, 52*(3), 334–345. https://doi.org/10.1111/1460-6984.12276

Shao, Z., Janse, E., Visser, K., & Meyer, A. S. (2014). What do verbal fluency tasks measure? Predictors of verbal fluency performance in older adults. *Frontiers in Psychology, 5*, 772. https://doi.org/10.3389/fpsyg.2014.00772

Stielow, A. (2017). *The contribution of executive functions to performance in word retrieval tasks in aphasic patients and healthy controls* [Dissertation]. Ruhr-University Bochum, Bochum.

How to use Zoom Breakout rooms

During the virtual drinks and some of the workshops, you will be invited to join a breakout room. In order to access the breakout room, click on "Join".
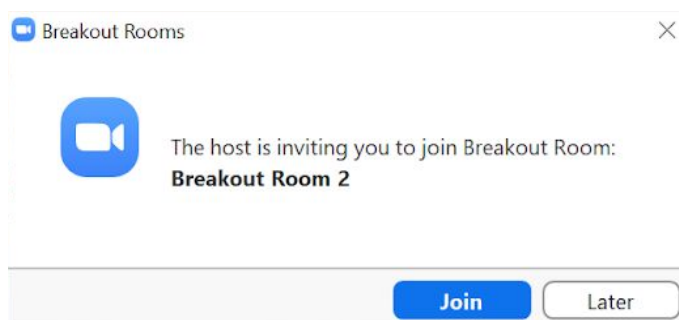
Once you are in a breakout room, you can also have an overview of the other breakout rooms that you can join, if there are any. In order to do so, click on the "Breakout Rooms" tab in the horizontal bar at the bottom of the page. To join a different breakout room, click on "Join". In some workshops, you might not be able to switch breakout rooms on your own, depending on the instructor's settings.
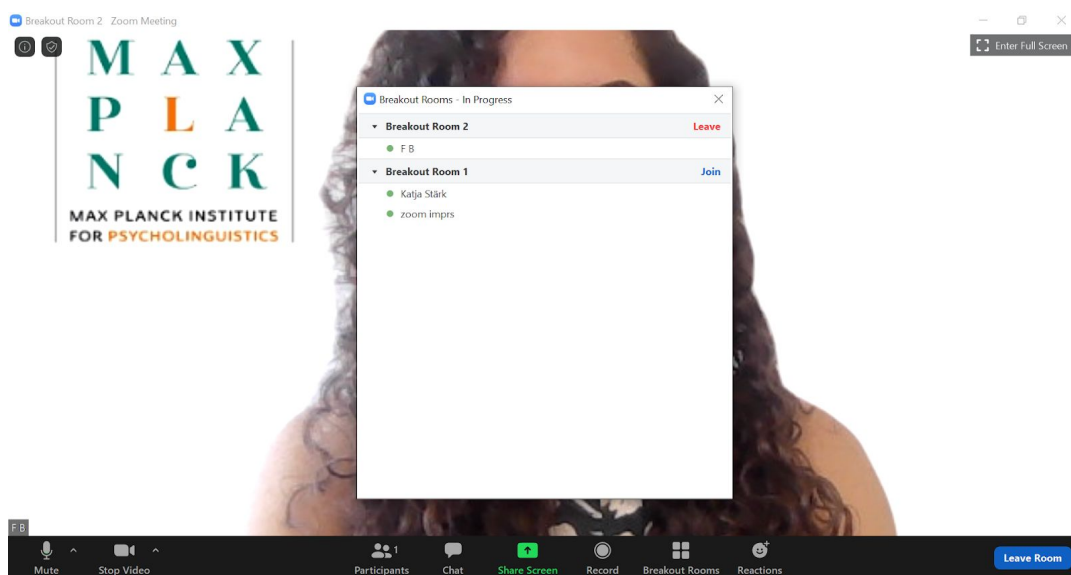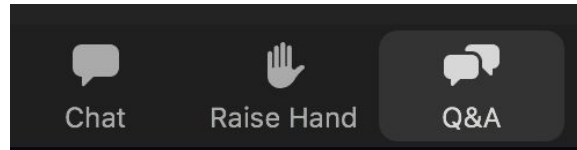
In order to leave a breakout room, click on "Leave Breakout Room". Please note that, if you click on "Leave Meeting", you will leave the workshop/virtual drinks altogether.
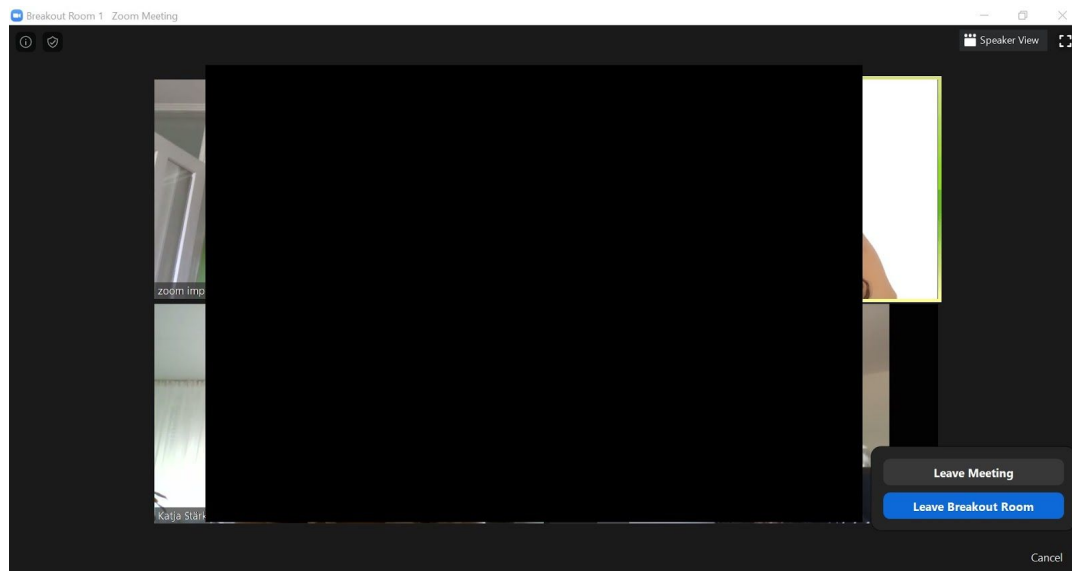
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If you want to ask a question during a talk or discussion session, use the Q&A feature.

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