The neural correlates of age-related variability in word learning: a neuroimaging study of maturation effects on word learning

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Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON48125

Source
ToetsingOnline

Brief title
Variability in word learning

Condition

- Other condition

Synonym
brain research, human cognition

Health condition

None, this research will be conducted with healthy participants to investigate word learning.

Research involving

Human

Sponsors and support

Primary sponsor: Radboud Universiteit Nijmegen
Source(s) of monetary or material Support: NWO (Language in Interaction: https://www.languageininteraction.nl/)

Intervention

Keyword: Cognitive neuroscience, Development, Language learning, Memory

Outcome measures

Primary outcome

In the proposed study, the main study parameters are the brain activation patterns of two fMRI tasks that probe language learning. The main outcomes of this study are the age-related differences in the neural correlates of language learning i.e. functional MRI BOLD activity. We will relate those neural responses to behavioural word learning & artificial language learning success.

Secondary outcome

In addition to the primary study parameters/outcomes, we will relate the maturational status of the participants* brain to both the activation patterns of the fMRI tasks and the behavioural assessments examining language and cognitive abilities.

Maturation of the brain will be assessed using measures of white matter integrity, such as fractional anisotropy, as well as indices reflecting cortical structure, such as cortical thickness.

The behavioral assessments will include variables like first and second language proficiency in vocabulary and more general language related abilities

like verbal fluency.

Study description

Background summary

Successful second language learning is becoming increasingly important in today*s ever more connected world. To date, the reason why second language learning becomes more difficult during one*s teens is not fully elucidated. Words are one aspect of a second language that can be learned with relative ease, especially when compared to the phonology or grammar of a second language. Behaviourally, evidence exists suggesting that how words are learned shifts during development. However, surprisingly little is known about this change in the neural mechanisms underlying word learning across development. Potentially, the differentially protracted development of brain regions supporting word learning play a role in this shift. New insights into this developmental process could elucidate the mechanisms that allow both children and adults to be good word learners in their own right. The proposed study aims to take an interdisciplinary approach bridging the fields of psycholinguistics, human memory and developmental cognitive neuroscience to answer this question. Here, we aim to examine the age-related differences in brain activation in relation to word learning and linguistic knowledge acquisition in children, adolescents and adults.

Study objective

The objective of the proposed study is to determine whether the neural mechanisms of word learning change with age. In line with this, we aim to investigate whether the activity of brain regions in this L2 word learning process relate to neural patterns of activity during artificial language learning.

Study design

The proposed study uses two fMRI tasks investigating word learning in participants between the ages of 8 and 30 to assess the relationship between age-related word learning skills and neural patterns.

Study burden and risks

The goal of this study is to investigate the neural mechanisms underlying word learning across development in neurotypical children, adolescents and adults. Due to the child-friendly study design of the tasks used, there are only

negligible risks associated with participation in the study.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adolescents (12-15 years)
Adolescents (16-17 years)
Adults (18-64 years)
Children (2-11 years)
Elderly (65 years and older)

Inclusion criteria

-Healthy children, adolescents and adults between 8 and 30 years of age
-Normal/ corrected to normal vision
-Normal hearing
-Willingness and ability to understand the nature and content of the study

Exclusion criteria

-History of neurological or psychiatric treatment
-History of brain surgery or epilepsy
-Any current psychological diagnosis according to the DSM criteria
-Any acute or chronic neurological disorders
-Pregnancy
-MRI incompatability (metal parts in upper body, implants, medical devices or medial plasters)
-Claustrophobia

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	17-09-2021
Enrollment:	240
Type:	Actual

Ethics review

Approved WMO Date:	16-03-2021
Application type:	First submission
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	22-07-2021
Application type:	Amendment

Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	29-12-2022
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)
Approved WMO Date:	13-07-2023
Application type:	Amendment
Review commission:	CMO regio Arnhem-Nijmegen (Nijmegen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL72058.091.19