Specific neurophysiological markers of developmental dyslexia in automatization and auditory perception

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

Summary

ID

NL-OMON38874

Source
ToetsingOnline

Brief title
Specific neurophysiological markers of developmental dyslexia

Condition

- Other condition

Synonym
Dyslexia, Specific Reading Disorder, Wordblindness

Health condition

dyslexie

Research involving
Human

Sponsors and support

Primary sponsor: Rijksuniversiteit Groningen
Source(s) of monetary or material Support: IDEALAB (International Doctorate for Experimental Approaches to Language and Brain)

Intervention

Keyword: Diagnosis, Dyslexia, EEG, Reading

Outcome measures

Primary outcome

The current study consists of two ERP experiments. In the first experiment, we investigate the automatization deficit of dyslexia by looking at two neuronal activities that are closed related with automaticity acquisition, i.e., orienting response and its habituation. The main study parameters are the amplitude and latency of two ERP components i.e., N1 and P3, both of which are the neurophysiological correlates of orienting response and its habituation. In the second experiment, we investigate neurophysiological markers of dyslexia in the domain of auditory perception. The main study parameter is the mismatch negativity, an ERP component which is an objective measure of the accuracy of auditory perception.

Secondary outcome

Not applicable.

Study description

Background summary

Developmental dyslexia is a learning disorder that impairs a child*s ability to read and write. Estimates of the prevalence of dyslexia range from 3% to 10% of

the population. Among children at familial risk for dyslexia (defined as children with at least one dyslexic parent), the prevalence is up to 60%, demonstrating a clear genetic basis of the disorder. Moreover, there is high degree of comorbidity between dyslexia and other developmental disorders. Dyslexia has lifelong persistence, posing a severe risk to academic attainments, occupational perspectives and psycho-somatic well-being. In order to minimize the detrimental effects of dyslexia, it is vitally important to detect cases of dyslexia at the youngest possible age. Since dyslexia is partially hereditary and often overlaps with other developmental disorders, detecting specific cases of dyslexia involves not only setting apart dyslexic and typically developing children, but also at-risk children who develop dyslexia and who do not, as well as dyslexic children and children with other developmental disorders. Despite decades of intensive research, there is relatively little research that has investigated specific markers of dyslexia. The proposed study is intended to fill this gap. In the current study, two Event-Related Potential (ERP) experiments will be conducted to reveal specific neurophysiological markers of dyslexia. In both experiments, we use ElectroEncephaloGraphy (EEG) to record brain activities of the children. On the basis of previous research, we predict specific differences in the pattern of brain activities between groups, which allow us to detect specific cases of dyslexia.

Study objective

The objective of the current study is to reveal specific neurophysiological markers of dyslexia, thus contributing to the early diagnosis and intervention of dyslexia. To fulfill this objective, two ERP experiments will be conducted in the domain of automatization and auditory perception, respectively. In both experiments, the primary objective is to reveal robust group differences in the pattern of brain activities between dyslexic and control children. Secondly, in order to test the specificity of the ERP measures as determinants for dyslexia, we aim at investigating the differences between dyslexic children and at-risk children who do not develop dyslexia. In addition, since dyslexia has a high degree of comorbidity with specific language impairment (SLI), identifying specific cases of dyslexia involves setting apart dyslexia and SLI. Thus an additional study will be conducted in collaboration with Potsdam University to investigate the differences between dyslexic children and SLI children in the domain of auditory perception.

Study design

The current study is a quasi-experimental observational study consisting of two ERP experiments. In both experiments, group assignment is based on performance of the children in the Diagnosis of Dyslexia study, a behavioral study targeting the diagnosis of dyslexia.

Study burden and risks

The children and their parents will be invited to the Ambulatorium of the University of Groningen. During the experiments, the ElectroEncephaloGraphy (EEG) will be recorded while the children are listening to sounds presented via a headphone or viewing pictures displayed on a screen. Including preparation of the EEG facility, the recording lasts 90-120 minutes. The EEG technique is frequently used in studies with newborns and young children, and poses no risks to the health of the participants. Besides, the children will be tested under passive paradigms, i.e., they do not have to make any response. Thus the study costs only time. The main benefit for the children is that possible reading problems can be detected at an early stage of reading acquisition, which is vitally important if we are to minimize the negative effects of dyslexia. In addition, the children will receive a small present for their participation.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Children (2-11 years)

Inclusion criteria

- If the child has normal hearing and vision (possibly after correction)
- If the child is in good health
- If the child attends a regular primary school

Exclusion criteria

- If the child has serious health or mental problems
- If the child has brain damage as a result of injury or a medical condition
- If the child wears contact lenses and does not have glasses with a similar strength
- If the child has a history of speech and language problems
- If the child attends special education

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Diagnostic

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-06-2013
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO

Date:	16-04-2013
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

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	NL43354.042.13