

## Plan Overview

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*A Data Management Plan created using DMPTool*

**Title:** Dyslexia: Visual structures and dyslexia

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**Funder:** São Paulo Research Foundation (fapesp.br)

**Template:** Digital Curation Centre

### **Project abstract:**

Dyslexia is a specific difficulty in decoding letters or in reading accuracy and fluency, affecting 5 to 10% of the population, leading to important individual, financial and social consequences. Reading is not trivial because involves several cognitive aspects and mechanisms to identify the letters and words and their meaning. Studies have identified eye movement differences in dyslexic children during reading and demonstrated that manipulation of visual cue characteristics can improve reading performances in this population. Others and we have recently demonstrated that colored filters improve performance and reading fluency, changing and improving several characteristics in eye movements. Difference and possible effects of color manipulation may be associated with the organization of involved structures for color detection. Recently, it was observed that visual dyslexic adults differ from non-dyslexic adults in the spatial organization of the foveolar photo-receptors of the retina, specifically in the shape of the region without S cones (responsible for blue color detection), called “Maxwell spot”. Dyslexic adults showed symmetric Maxwell spots whereas in non-dyslexic adults there was asymmetry between the dominant and non-dominant eyes. Based upon this observation, there is a need to further investigate how this eye structure organization differs in dyslexic people. Therefore, the aim of this project is twofold. First, to improve on the current subjective technique used to map the Maxwell spots by developing an objective method using multispectral imaging. Second, to clarify whether the lack of asymmetry in the shape of the Maxwell spots is related to either cause or effect of dyslexia.

Procedures will be performed by both Brazilian and French teams as follow: dyslexic and non-dyslexic children will have the Maxwell's spot identified by a subjective procedure performed by the Brazilian team. Meanwhile, the French team will adapt an existing device and procedures to obtain the Maxwell's spot objectively. Both tests will be compared and adjusted in order to validate the measurements. The device adapted and developed by the French team will be replicated for the Brazilian team who will test dyslexic and non-dyslexic children employing the objective procedure. Finally, both teams will be involved in mapping the Maxwell's spot in young children at risk of diagnosed with dyslexia and in children who were already diagnosed with dyslexia. We hope thereby to develop an innovative method for early dyslexia detection, before reading and writing learning age, and clarify issues of potential causes of dyslexia. In doing so, we would further favor possible specific intervention towards minimizing and/or overcoming such difficulties.

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## **Dyslexia: Visual structures and dyslexia**

### **Data Collection**

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#### **What data will you collect or create?**

Data will be obtained regarding the format of central eye structures (Maxwell Spot) of dyslexic and non-dyslexic children. Data about the size and format of the Maxwell spot will be stored in spreadsheet.

#### **How will the data be collected or created?**

Two methods will be employed. First, Children will look through an ophthalmoscopy with lights being projected, for example green and blue alternately with cyclic ratio adjustable, with one eye, keeping the other's vision obstructed. The child will be asked to draw, in a tablet, the figure that appears as a dark spot on her/his vision, which resembles to the region without the presence of specialized cones for the blue color. This procedure will be performed for each eye, obtaining the image of the dark spot for each eye. Second, the Maxwell spot will be also obtained employing a objective technique of reflectance image.

### **Documentation and Metadata**

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#### **What documentation and metadata will accompany the data?**

Each participant's data will be organized in a directory named with participant's initials, preserving his/her private information. In each directory, information about the measurements and conditions will be stored.

### **Ethics and Legal Compliance**

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#### **How will you manage any ethical issues?**

Children's parents will given written permission by signing a Consent Form prior to his/her son/daughter to participate in the study. Also, each child will given written permission by signing a simplified Consent Form adapted to children. All these documents and procedures will be approved by the Ethical Institutional Committee.

#### **How will you manage copyright and Intellectual Property Rights (IP/IPR) issues?**

Data basis will be stored, preserved and disseminate through the UNESP Institutional Repository and allow open access to scientific use by UNESP researchers and students (<https://repositorio.unesp.br/?locale-attribute=en>)

## **Storage and Backup**

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### **How will the data be stored and backed up during the research?**

Data will be stored and regularly saved using Google Drive made available by the UNESP. The researcher group will be responsible to perform backups and storage of the data. Upon the end of the project, the data basis will be made available, upon previous subscription, to the UNESP Institutional Repository.

### **How will you manage access and security?**

Access to Google Drive and UNESP Institutional Repository will require password that will be manage by the project principal investigator

## **Selection and Preservation**

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### **Which data are of long-term value and should be retained, shared, and/or preserved?**

All data will be important and, therefore, will be retained for future possible use. Data organization will preserve participant's privacy and will be manage by the principal investigator.

### **What is the long-term preservation plan for the dataset?**

Data will be preserved at least for 10 years upon the end of the project.

## **Data Sharing**

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### **How will you share the data?**

During the project execution, data will be published and made available through publication in scientific journal and also in presentation in Congress and Conferences. After the end of the project, data will be made available in the open access format, with the correspondent citation of their source. Also, the UNESP Institutional repository requires that any users fill out a form allowing track of the users of the data.

### **Are any restrictions on data sharing required?**

Considering that the information from this project and set of studies has potential to produce patent, access to the data will be made available partially and/or after going through all the procedures of publishing or patent recognition.

### **Responsibilities and Resources**

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#### **Who will be responsible for data management?**

Data collection and analyses will be performed by students and professionals formally involved in the project at each of the specific project phases. All of these people will be coordinated and managed by the principal investigator. Finally, the principal investigator will be the responsible for any permission and made available to others after the end of the project.

#### **What resources will you require to deliver your plan?**

All the resources are made available by UNESP. The Google Drive is part of the Google G. Suite available to UNESP researchers and the UNESP Institutional Repository is managed by the UNESP main office.

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