1.1 Title of Study

An online study of how children read mathematical expressions

|  |  |
| --- | --- |
| **2.1D.1** | What are the main objectives of your study? |
| The project will test whether young children can articulate words and plan articulation in parallel. The main objective is to modify an eye-tracking paradigm that was previously applied in face-to-face behavioural experiments to develop an online testing method that yields data of comparable quality. | |

2.1.d.2

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Experiments that measure children’s behaviour, presented online. The participants will be recorded using a web cam to analyse their spoken language and eye-movements.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | 2.1D.3a | Who are your participants? What criteria will be used in deciding on the inclusion and exclusion of participants in the study | | | |  | |  | | | Participants will be young children. We anticipate the majority of data collection will be from children aged 2 to 4. However, for pilot testing purposes we may assess children older than 4, and we may also assess linguistically advanced children under 2 years, to measure the feasibility of conducting online studies with this population. | |  | |  |  |  |  |  |  | | 2.1D.3b | How will you recruit your participants? How many will you aim to recruit | | | |  | |  | | | We aim to recruit c. 60 participants. Participants will be recruited online by clicking on a link to our experiment's website (hosted on University of Edinburgh servers).  We will advertise a link to the experiment on social media, by emailing nurseries and schools, and by emailing families from the DevLab database.  Social Media: We will advertise a link to our experiment on the Wee Science Facebook page, as well as on related group pages. This will briefly describe the study and will invite parents to click on the link to the website and ask parents to contact the research assistant (Clara Kunst) for more information. A copy of the advert planned for social media is attached to this application.  Schools & nurseries: We will email schools and nurseries briefly describing the study with a link to the experiment and ask them to email parents telling them about the study or advertise the study on their social media pages. The information sheet for parents that we will attach to recruitment e-mails and a copy of the advert planned for social media are attached to this application.  DevLab: We will email families registered in the Developmental Lab database describing the study and ask them to take part in the study by clicking on the link. The information sheet for parents that we will attach to recruitment e-mails is attached to this application.  Adult controls: Adult controls for this study will be recruited by word of mouth and also through social media advertisements via the same channels as described above. The information sheet and advertisement for adult participants will be the same as for families and children, with the only change of addressing these directly to the participants instead of parents of behalf of children. | |  | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2.1D.4a | | | What will your participants be asked to do for your study, and where will you see them/test them | | | | | | | |  |
|  | | | | | | The experiment will be hosted online. Participants will describe pictures, presented as either a computerised game or book. The experiment will take place using video-conferencing tools in Microsoft Teams (a University of Edinburgh ITS approved system). For children, the parent/caregiver will sit with the child (at home) as they complete the experiment. The task will be run on the experimenter’s computer and shared with the participant. Participants will be shown pictures and asked to describe them. With the participant's (for children, the parent’s/caregiver’s) permission, we will record the video-conference session – this will involve the recording of the participants’ face, audio and the screen-share – and save the recordings on Edinburgh's secure server in order to analyse the interactions at a later point. In order to conduct online testing without any face-to-face contact, we will obtain consent via a Qualtrics online form, completed by participants (by the parents/caregivers on behalf of children) prior to the video-conference session. | | | | |  |
|  | | |  |  | |  | | |  | |  |
| .1D.5a | How will consent be obtained (by the person able to consent on behalf of the participant, if the participant is unable) | | | | | | | | | |  |
|  | | Consent indicated by click to the next page on an online form. In addition, we will ask for verbal assent from the child participant to begin the research study. | | | | | | | | |  |
| 2.1D.5b | | Will participants be given an information sheet separate from obtaining consent | | | | | | | | | Yes |
|  | | Written information about the experiment and contact details of the research assistant (Clara Kunst) will be included in the online consent form. | | | | | | | | |  |
|  | | |  | |  | |  |  | |  | |
| 2.1D.6 | | | Are you gathering (potentially) identifiable information about participants | | | | | | | Yes | |
|  | | |  | |  | |  |  | |  | |
| 2.1D.6a | | | What (potentially) identifiable information are you gathering | | | | | | |  | |
|  | | | | | | | We will be collecting demographic information (parent's/participant's e-mail address, participant's date of birth and biological sex) and video and audio recordings. | | |  | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2.1D.6d | If you have identified risks which are possible or probable and, if manifest, either significant or severe, please explain in more detail, and identify measures you will take to reduce or eliminate these risks | | | | |  |
|  | | | | We will video-record the test sessions via Microsoft Teams for later analysis. Once a recording has been stopped, it will automatically save to the project's Microsoft Teams account online. Subsequently, the recording will be moved to a password protected computer for transcription and data analysis. During online storage and storage on a password-protected computer with an internet connection, the recordings could potentially be hacked and leaked. However, we take safety measures to ensure that the video recordings are protected at all times. Microsoft Teams is a secure University of Edinburgh approved system. The project's Teams account will only be accessible by researchers associated with the research project. For security during subsequent data analysis, the video recordings will be stored on password-protected computers, accessible only to researchers associated with the research project. In the possible but unlikely event that this data should be hacked or leaked despite the measures taken, the resulting severity of harm would be minimal, as we are not collecting data that would compromise any individuals. | |  |
|  |  | |  |  |  |  |
| 2.1D.6e | How will the identifiable data (including consent forms) be stored during the data collection period? What will happen to the data after the data collection period has finished? How will you maintain secure storage of this data? What data formats will you use to ensure long-term usability | | | | |  |
|  | | Only researchers associated with the research project will have access to identifiable information.  Parent/participant email addresses: will be stored on a password-protected excel spreadsheet (.xlsx) within an encrypted container on the University of Edinburgh's OneDrive. Email addresses will be deleted after the day of the test appointment or sooner, if the parent/participant asks for their information to be deleted.  Demographic Info: Demographic information (participant's date of birth and sex) will be stored on a password-protected Excel spreadsheet (.xlsx) within an encrypted container on the University of Edinburgh's OneDrive, which will only be accessible by researchers associated with the research project.  Video recordings: For online testing, we will video-record participants’ test sessions. Once the recording has been stopped, it will automatically save to the project’s Teams account. Microsoft Teams is a secure University of Edinburgh approved system and the project's Teams account will only be accessible by researchers associated with the research project. Subsequently, the recording will be moved to a password protected computer for transcription and data analysis. To ensure security during the data analysis, the video recordings will be stored on password-protected computers, accessible only to researchers associated with the research project. Participants’ responses and eye-movements will be coded by the experimenter and saved in an Excel spreadsheet (.xlsx). This data will be pseudonymised by labelling with the participant ID number and stored separately from the videos within an encrypted container on the University of Edinburgh's OneDrive, which will only be accessible by researchers associated with the research project. The information about what ID number belongs to which participant will be stored separately from the videos and the coded and analysed data within an encrypted container on the University of Edinburgh's OneDrive, which will also only be accessible by researchers associated with the research project.  All data will be maintained in accordance with the requirements of the Data Protection Act, until the project has ended, when recordings will be destroyed and personal information deleted. Only the non-identifiable data will be retained as a record of the experiment to permit checking of our data. | | | |  |

|  |
| --- |
|  |
| 2.1D.6f | How will the identifiable data be used? Who will have access to them? How will you share them? How will participants be informed about these issues | |  |
|  | | Only researchers associated with the research project will have access to identifiable information; participants (parents/carers on behalf of children) will agree to this via consent forms.  Parent/participant email addresses: will be stored on a password-protected excel spreadsheet (.xlsx) within an encrypted container on the University of Edinburgh's OneDrive. The email addresses will be used to make test appointments with participants and deleted after the day of the test appointment or sooner, if the parent/participant asks for their information to be deleted.  Demographic information (participant's date of birth and sex) will be stored on a password-protected Excel spreadsheet (.xlsx) within an encrypted container on the University of Edinburgh's OneDrive, which will only be accessible by researchers associated with the research project. The date of birth will be used to calculate the age of participants on the date of testing. Their age and biological sex will be used in the data analysis.  Recordings will automatically save to the project's Teams account. Microsoft Teams is a secure University of Edinburgh approved system and the project's Teams account will only be accessible by researchers associated with the research project. Subsequently, the recording will be moved to a password protected computer for transcription and data analysis. To ensure security during the data analysis, the video recordings will be stored on password-protected computers, accessible only to researchers associated with the research project. Participants’ responses and eye-movements will be coded by the experimenter and saved in an Excel spreadsheet (.xlsx) for data analysis. This data will be pseudonymised by labelling it with the participant ID number and stored separately from the videos within an encrypted container on the University of Edinburgh's OneDrive, which will only be accessible by researchers associated with the research project. |  |
| 2.1D.7a | | What non-identifiable data are you collecting |  |
|  | | No non-identifiable data will be collected. The recordings will be processed into a non-identifiable format in common file formats (e.g., Microsoft Word .doc, Excel .csv, SPSS .sav). |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2.1D.7b | | How will this non-identifiable data be stored during the data collection period? What will happen to the data after the data collection period has finished? How will you maintain secure storage of your data? What data formats will you used to ensure long-term usability | | | | | | |  |
|  | | | | | | Non-identifiable data will be stored as Excel (.xsls .csv and SPSS .sav) files within an encrypted container on the University of Edinburgh's OneDrive, which will only be accessible by researchers associated with the research project. | | |  |
|  | |  | |  | |  | |  |  |
| 2.1D.7c | | How will this non-identifiable data be used? Who will have access to it? How will you share it? How will participants be informed about these issues | | | | | | |  |
|  | | | | | | Non-identifiable data will be used for analysis and will be shared with the research team. Our data will be shareable with other researchers once it has been processed as this will allow our findings to be open to scrutiny. Some journals now require data to be made publicly available. The participant (parent/caregiver) consent form highlights that non-identifiable data might be used in this way. | | |  |
|  | |  | |  | |  | |  |  |
| 2.1D.7d | | If any non-identifiable information is likely to be passed on to external companies or organisations in the course of the research, please describe. If the project is a funded collaboration with an external company, please give that information here | | | | | | |  |
|  | | | | | | Our data will be shareable with other researchers once it has been processed as this will allow our findings to be open to scrutiny. Some journals now require data to be made publicly available. The participant (parent/caregiver) consent form highlights that non-identifiable data might be used in this way. | | |  |
|  | |  | |  | |  | |  |  |
| 2.1D.8 | | Explain how you will allow participants to withdraw from the study after data collection and specify a date | | | | | | |  |
|  | | | | | | Consent forms verify that participants (and parents/caregivers on behalf of children) can withdraw from the study, for any reason, without penalty, until two weeks after the date of testing. On the day of testing, participants (and parents/caregivers) are verbally reminded of the same. | | |  |
|  | |  | |  | |  | |  |  |
| 2.1D.9 | | How will you ensure that potential participants do not feel compelled or coerced into taking part | | | | | | |  |
|  | | | | | | Informed consent is required from parents/caregivers and adult participants, as a precondition of participation in the study. To verify children's willingness to take part, a simple verbal explanation (incorporating visual aids, if necessary) will be given to them by a researcher on the day of testing, and verbal assent obtained from children themselves for their participation. Children are reminded throughout testing that they can withdraw their participation at any time. | | |  |
|  | |  | |  | |  | |  |  |
| 2.1D.10 | | How will the data be fed back to the public | | | | | | |  |
|  | | | | | | We will present our analysis and results at conferences and within academic journals. We may also present our results at knowledge exchange events and workshops. | | |  |
| 2.1E.2 | Describe the measures that will be used to recruit, protect, and inform vulnerable participants | | | | | | | |  |
|  | | | | | We will take special care to ensure that children both understand and agree to participation. We will monitor carefully for any signs of unwillingness or distress, and will terminate the session immediately if necessary. | | | |  |
|  |  | |  | |  | |  | |  |