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Graphogame Rime: Testing a computer programme designed to improve pupils' literacy through teaching phonics via "rhyme analogy"

Submission date
16/09/2015

Recruitment status
No longer recruiting

Registration date
17/09/2015

Overall study status
Completed

Last Edited
11/07/2018

Condition category
Other

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
GraphoGame Rime is a computer game developed to teach pupils to read by developing their phonological awareness (i.e. awareness of the sound structure of words). Originally developed by a Finnish University, the GraphoGame group of programmes employ algorithms that analyse a child's performance and constantly adjust the difficulty of the content so that the challenge matches the learner's ability. The English version of GraphoGame Rime was developed by the lead grantee, the educational neuroscientist Usha Goswami, building on research into "rhyme analogy". This is the notion that pupils learning to read in English learn not just through phonemes ("a","t") but also rimes ("at"). Pupils sit at a computer, laptop or tablet with headphones on, and play the game for around 10 minutes a day. Instruction is focused on helping children to match auditory patterns with groups of letters (e.g. rimes) displayed on the screen. The game first focuses on rimes that are most common in English. But each child has a personal log-in, and the game offers increasingly challenging levels as they improve their skills. This project explores how insights from neuroscience can be used to improve education. Several studies have shown GraphoGame works well in developing reading skills. GraphoGame Rime has been the subject of two small studies, which have resulted in promising results on specific measures such as spelling and phonemic awareness (the ability to hear, identify and manipulate the smallest units of sounds with meaning). However, the studies have limitations and further research is needed to test these results. GraphoGame Rime is a simple intervention (programme) which, if shown to work well, could easily be used in many schools.

Who can participate?
Year 2 pupils attending one of 10 schools in Cambridgeshire and that have low levels of phonological awareness.

What does the study involve?
Pupils are initially tested on a number of neurocognitive educational measures (e.g. vocabulary, executive function – for example memory, reasoning, problem solving etc) while also doing an initial reading and spelling test that will be used in the final evaluation. They are then randomly allocated to use either GraphoGame Rime for 10 minutes daily in literacy lessons, or have normal

tuition. The intervention begins in the second term of each year and continues until midway through the third term, with pupils receiving around 12-16 weeks of intervention. All pupils are then asked to sit a standard reading and spelling test. The study is run for two years, with two new sets of Year 2 pupils.

What are the possible benefits and risks of participating?
Previous work has shown that using Graphogame helps children's spelling and their ability to break down words into sounds. It is not known whether this translates into improved reading at school. If this is the case, it is anticipated that more schools will offer Graphogame as a reading support method within the school day. There are few disadvantages and risks. The reading and spelling assessments do take a little time to complete but the researchers will ensure that they are completed at a time when it will cause minimal disruption to the pupils school work. The assessments may feel challenging and some children may feel a little self-conscious about completing them (for example, if their reading is not as good as they would like it to be). However, all results will remain confidential to the research team. The results will also be shared with the child's teacher to help them plan the best ways to continue to improve their reading skills.

Where is the study run from?
Ten schools in Cambridgeshire with high levels of disadvantage.

When is the study starting and how long is it expected to run for?
August 2014 to November 2017

Who is funding the study?
Education Endowment Foundation (UK)

Who is the main contact?
Mr Jack Worth

Contact information

Type(s)
Public

Contact name
Mr Jack Worth

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The Mere
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Study information

Scientific Title
Neurocognitive factors governing response to intervention with GraphoGame Rime

Study objectives
Does playing Graphogame Rime as part of literacy lessons improve pupils' development of reading ability, compared to 'business as usual' participation in literacy lessons?

Ethics approval required
Old ethics approval format

Ethics approval(s)
Cambridge Psychology Research Ethics Committee, 14/07/2015, ref: Pre.2015.050
NFER's Code of Practice Group, 03/07/2015

Primary study design
Interventional

Study design
Multi-site pupil-randomised controlled trial

Study type(s)
Quality of life

Health condition(s) or problem(s) studied
The literacy ability of year 2 (age 6-7) pupils

Interventions
Graphogame Rime is a computer game developed to teach pupils to read by developing their phonological awareness. Originally developed by a Finnish University, the Graphogame group of computer programs employ algorithms that analyse a child's performance and constantly adjust the difficulty of the content so that the challenge matches the learner's ability. The English version of Graphogame Rime was developed by educational neuroscientist Usha Goswami, building on research into "rhyme analogy".

Pupils are randomly allocated to one of two groups:
1. Intervention: Pupils sit at a computer, laptop or tablet with headphones on and play the game for around 10 minutes a day. Instruction is focused on helping children to match auditory signals with groups of letters (rimes) displayed on the screen. The game first focuses on rimes that are most common in English. Each child has a personal log-in and the game offers increasingly challenging levels as they improve their skills. Pupils receive around 12-16 weeks of intervention.
2. Control: Pupils receive normal tuition.

Intervention Type
Device

Primary outcome(s)

The raw score on the New Group Reading Test (NGRT) Level 2. The paper version of the test will be used, provided by GL Assessment. The tests will be administered by independent NFER test administrators, who will not know the group allocation of the pupils being tested.

To be measured before and after the intervention period.

Key secondary outcome(s)
1. The GL Assessment single-word spelling test
2. Subject to availability through the National Pupil Database, the spelling component of the end of Key Stage 1 grammar, punctuation and spelling test

To be measured before and after the intervention period.

Completion date
01/11/2017

Eligibility

Key inclusion criteria
1. Ten primary or infant schools in Cambridgeshire that have Year 2 pupils from one of ten primary or infant schools in Cambridgeshire
2. Pupils must score below a certain score on the phonics screening check*

* Using the government's required standard of 32 marks out of 40 as the eligibility criteria is an option, though it might lead to a sample that is too small. In 2014, 26% of Year 1 pupils in Cambridgeshire did not meet the required standard and the proportion has been decreasing each year. NFER will select an eligibility threshold in the region of 32-35 marks that ensures a large enough sample size for the evaluation while also including the pupils with the lowest level of phonological skill in the trial. The eligibility criteria will be the same for each school and, once decided, will remain the same over the two years.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Child

Sex
All

Key exclusion criteria
1. Pupils in private schools, special schools, or schools without Year 2 pupils
2. Pupils that are not in Year 2

Date of first enrolment
01/04/2015

Date of final enrolment
01/07/2015

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
National Foundation for Educational Research
Slough
United Kingdom
SL1 2DQ

Sponsor information

Organisation
Education Endowment Foundation

ROR
https://ror.org/03bhd6288

Funder(s)

Funder type
Charity

Funder Name
Education Endowment Foundation

Alternative Name(s)
EducEndowFoundn, The Education Endowment Foundation (EEF), Education Endowment Foundation | London, EEF

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
As standard for all projects commissioned by the Education Endowment Foundation, the data will be stored in the FFT archive. A link to more details of the archive and the process is here: https://educationendowmentfoundation.org.uk/projects-and-evaluation/evaluating-projects/evaluator-resources/submitting-your-data-to-the-fft-archive/. Unfortunately there is currently no process for requesting access, as the details are still being worked out with the ultimate data owner (the government department). Participants were informed that their data would be archived in this way at the outset of the project and have had the opportunity to withdraw their data. The data is linked to the national pupil database, so is not anonymised.

IPD sharing plan summary
Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Funder report results	results			No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes