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Understanding pathways to maths achievement in year nine pupils: an exploration of working memory and metacognitive skills

Submission date
20/06/2012

Recruitment status
No longer recruiting

Registration date
18/07/2012

Overall study status
Completed

Last Edited
29/01/2018

Condition category
Other

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
One-to-one tutoring is a common form of support offered in schools for pupils underachieving in mathematics, but there is little evidence that it is effective. It is therefore vital that we evaluate its effectiveness. Studies have also found that working memory (short-term memory) is associated with maths achievement. For example, children who completed a computer-based working memory training programme (CogMed) showed increased maths achievement. Working memory training has also been found to have broader benefits including reduction of anxiety. This study will therefore explore the effectiveness of these two interventions on maths achievement in secondary school pupils. Specifically, it will investigate the impact of a working memory training programme and one-to-one tutoring on mathematics achievement, working memory, and maths anxiety in pupils who show difficulties in maths in the first year of their GCSE course (year nine).

Who can participate?
Pupils in year nine (age 13/14) underachieving in mathematics at the participating secondary school in Hampshire.

What does the study involve?
Participants are randomly allocated to one of two groups. One group receives one-to-one maths tutoring with a qualified teacher for one hour, twice a week, for five weeks. The other group use CogMed for 35 minutes a day for at least 20 days over five weeks. Participants complete maths, working memory and anxiety tests on three occasions.

What are the possible benefits and risks of participating?
This study may provide data about effective ways to support maths achievement, which may benefit pupils. There are no real risks, but pupils may feel negative after completing anxiety questionnaires.

Where is the study run from?
Southampton University (UK).

When is the study starting and how long is it expected to run for?
June 2012 to July 2013.

Who is funding the study?
Southampton University (UK).

Who is the main contact?
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Contact information

Type(s)
Scientific

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Additional identifiers

Study information

Scientific Title
Understanding pathways to maths achievement in year nine pupils: an exploration of working memory and metacognitive skills - a randomised control study

Study objectives
It is hypothesised that the computerised working memory intervention will improve maths achievement via an increase in working memory capacity and a decrease in anxiety. It is also hypothesised that one to one tutoring will improve maths attainment, but this will be achieved through improved metacognition.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. University of Southampton Ethics Committee, 19/06/2012
2. Research Governance Office, 20/06/2012

Primary study design
Interventional

Study design
Single-centre randomised controlled study

Study type(s)
Other

Health condition(s) or problem(s) studied
Pathways to mathematical achievement

Interventions
One to one mathematics tutoring
Half of the participants will receive one to one maths tutoring at school with a qualified teacher, for one hour, twice a week, for five weeks. All maths tutoring content is based on a set of objectives devised by the school based on common 'gaps' in this group's knowledge. The tutor's role is to develop a pupil's understanding of how to use strategies for solving maths problems.

CogMed
The other half of the participants will use CogMed, a computerised working memory training programme facilitated by the researcher. Participants will work for 35 minutes a day in school for at least 20 days over five weeks on computer based tasks designed to develop verbal and visuo-spatial short term and working memory, which adapt trial by trial to required difficulty level.

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
Mathematics achievement (standardised score and national curriculum levels)

Pre- measures will be collected in July 2012, post measures in October/November 2012 and follow-up in January 2013.

Key secondary outcome(s)
1. Working memory (standard score)
2. Metacognition (questionnaire score)
3. Maths anxiety (questionnaire score)
4. Generalised anxiety score (questionnaire score)

Pre- measures will be collected in July 2012, post measures in October/November 2012 and follow-up in January 2013.

Completion date
23/07/2013

Eligibility

Key inclusion criteria

Participants will be selected if their school has chosen them to receive one to one tutoring. Criteria for this are:
1. Achieved National Curriculum (NC) level 3a - 4c at the end of Key Stage 2 (KS2) (age 11 years) and failed to reach benchmark of NC level 5 by end of year 8 (age 13 years).
2. On roll at participating secondary school
3. In year nine (age 13/14 years)

Participant type(s)
Other

Healthy volunteers allowed
No

Age group
Child

Lower age limit
13 Years

Upper age limit
14 Years

Sex
All

Key exclusion criteria
Persistent school absence (below 80% attendance)

Date of first enrolment
25/06/2012

Date of final enrolment
23/07/2013

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
University of Southampton
Southampton
United Kingdom
SO17 1BJ

Sponsor information

Organisation
University of Southampton (UK)

ROR
https://ror.org/01ryk1543

Funder(s)

Funder type
University/education

Funder Name
University of Southampton (UK)

Alternative Name(s)
University of Southampton UK

Funding Body Type
Government organisation

Funding Body Subtype
Universities (academic only)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration