

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	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 18/07/2012	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
Last Edited 29/01/2018	Condition category Other	<input type="checkbox"/> Individual participant data <input type="checkbox"/> 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

Contact name
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Additional identifiers

Protocol serial number
N/A

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

Study design

Single-centre randomised controlled study

Primary study design

Interventional

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