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

Submission date	Recruitment status	<ul><li>Prospectively registered</li></ul>
20/06/2012	No longer recruiting	<pre>Protocol</pre>
Registration date	Overall study status	<ul><li>Statistical analysis plan</li></ul>
18/07/2012	Completed	Results
Last Edited	Condition category	Individual participant data
29/01/2018	Other	<ul><li>Record updated in last year</li></ul>

#### 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? Emma Walker ew1g10@soton.ac.uk

## Contact information

#### Type(s)

Scientific

#### Contact name

Miss Emma Walker

#### Contact details

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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

#### **Study outputs**

Output type

Details

Date created Date added Peer reviewed? Patient-facing?

Participant information sheet Participant information sheet 11/11/2025 No

Yes