

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

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<b>Registration date</b> 18/07/2012	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 29/01/2018	<b>Condition category</b> 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?  
Emma Walker  
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## Contact information

**Type(s)**  
Scientific

**Contact name**  
Miss Emma Walker

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## Additional identifiers

**EudraCT/CTIS number**

**IRAS number**

**ClinicalTrials.gov number**

**Secondary identifying numbers**  
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

**Secondary study design**

Randomised controlled trial

**Study setting(s)**

School

**Study type(s)**

Other

**Participant information sheet**

Not available in web format, please use the contact details below to request a patient information sheet

**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 measure**

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.

### **Secondary outcome measures**

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.

### **Overall study start date**

25/06/2012

### **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

### **Age group**

Child

### **Lower age limit**

13 Years

### **Upper age limit**

14 Years

### **Sex**

Both

### **Target number of participants**

24

### **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**

England

United Kingdom

**Study participating centre**

**University of Southampton**

Southampton

United Kingdom

SO17 1BJ

## Sponsor information

**Organisation**

University of Southampton (UK)

**Sponsor details**

Shackleton Building

Highfield Campus

Southampton

England

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SO17 1BJ

**Sponsor type**

University/education

**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**

**Publication and dissemination plan**

Not provided at time of registration

**Intention to publish date****Individual participant data (IPD) sharing plan****IPD sharing plan summary**

Not provided at time of registration