

Acute effects of three types of physical exercise on cognitive performance of children aged 10-13 years

Submission date 12/05/2015	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
Registration date 20/05/2015	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
Last Edited 24/01/2019	Condition category Other	<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Recent studies have shown that in addition to physical and mental health benefits, participation in PA can improve cognitive functioning as well as scholastic performance. Cognitive functions, such as attention, concentration, processing speed and working memory have been shown to improve after single exercise sessions. Above-mentioned cognitive functions are important for learning and classroom behaviour, contributing to scholastic performance. Therefore, conducting exercise sessions in the school setting may yield immediate positive effects for academic learning.

Although there is emerging evidence of positive effects of acute exercise on cognition (e.g. attention, information processing speed, working memory), the characteristics of exercise needed to optimally improve cognitive functioning in children remain largely unknown. For example, little is known regarding the optimal type of acute exercise that benefits cognition most. In this study we will examine the acute effects of three types of exercise on selective attention and information processing speed in children (10-13 years). In addition, we examine the feasibility of conducting 12-minute exercise sessions in the classroom.

Who can participate?

All students in 5th and 6th grade (age 10-13 years).

What does the study involve?

All children participate in 2 experimental days: one exercise day and one control day and therefore acting as their own control. Each class is randomly allocated into one of three exercise sessions (i.e. aerobic, coordination, strength exercises). All exercise sessions take 12 minutes to complete. During each exercise session, a movie clip is shown to all the students in the class. All children are asked to follow and imitate the instructor in the movie, while standing behind their desk. During the control session, students are seated for 12 minutes and listen to an educational lesson about exercise and movement. Before and after the exercise and control session, students are asked to complete two cognitive tasks that measured selective attention and information processing speed.

What are the possible benefits and risks of participating?

There is very little risk to participating in this study. The intensity, duration and content of the exercise sessions are comparable with students physical education lessons and their movement behavior during school-breaks.

Where is the study run from?

Department of Public and Occupational Health, VU University Medical Centre, Amsterdam (Netherlands)

When is the study starting and how long is it expected to run for?

January 2014 to June 2014

Who is funding the study?

NWO (Netherlands Organisation for Scientific Research)

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

WC2014-020; METc VUmc 2014.363

Study information

Scientific Title

Acute effects of three types of physical exercise on cognitive performance of children aged 10-13 years: a randomized cross over trial

Study objectives

Our aim is to examine:

1. The acute effects of 12 minute exercise sessions on selective attention and information processing speed

2. Moderating effects of exercise type, i.e. aerobic, coordination or strength exercise sessions
Hypothesis: we hypothesize to find similar acute effects of different types of exercise on measures of information processing speed and selective attention in 10-13 year olds

Ethics approval required

Old ethics approval format

Ethics approval(s)

Ethics Committee of the Faculty of Human Movement Science, VU University Amsterdam [2014-19] (The Netherlands)

Study design

Experiment; double baseline, within-between subjects design
(within: exercise, control condition, pre- and post-test; between: exercise type)

Primary study design

Interventional

Study type(s)

Other

Health condition(s) or problem(s) studied

Physical exercise and cognitive performance

Interventions

Students participated in one of three exercise sessions (12 minutes in duration)

1. Aerobic exercises; well-known, easy and repetitive movements
2. Coordination exercises; more complex movements that stressed coordinative skills
3. Strength exercises; body-weight exercises

In the control condition, students were seated during 12 minutes and listened to an educational lesson about exercise and movement

Intervention Type

Other

Primary outcome(s)

1. Selective attention (d2 Test of Attention)
2. Information processing speed (Letter Digit Substitution Test)

The cognitive tests were administered four times: before the exercise session (pre-test), after the exercise session (post-test), before the control session (pre-test), after the control session (post-test)

Key secondary outcome(s)

Heart rate was measured during the exercise sessions (Polar heart rate monitor) in order to determine the exercise intensity.

Completion date

01/06/2014

Eligibility

Key inclusion criteria

All children in 5th and/or 6th grade (10-13 years old) in the selected schools were eligible to participate.

Participant type(s)

Healthy volunteer

Healthy volunteers allowed

No

Age group

Child

Lower age limit

10 years

Upper age limit

13 years

Sex

All

Key exclusion criteria

Parents/legal guardians could withdraw their child from the study by signing and returning the objection form. These children were excluded from the study.

Date of first enrolment

01/01/2014

Date of final enrolment

01/03/2014

Locations

Countries of recruitment

Netherlands

Study participating centre

VU University Medical Center

van der Boechorststraat 7

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Sponsor information

Organisation

EMGO Institute for Health and Care Research

ROR

<https://ror.org/0258apj61>

Funder(s)

Funder type

Not defined

Funder Name

Nederlandse Organisatie voor Wetenschappelijk Onderzoek

Alternative Name(s)

Netherlands Organisation for Scientific Research, Dutch National Scientific Foundation, Dutch National Science Foundation, Dutch Research Council (Nederlandse Organisatie voor Wetenschappelijk Onderzoek), NWO:Nederlandse Organisatie voor Wetenschappelijk Onderzoek, Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO), Dutch Research Council, The Dutch Research Council (NWO), Dutch Research Council, Netherlands, NWO

Funding Body Type

Government organisation

Funding Body Subtype

National government

Location

Netherlands

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary

Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	17/05/2016	24/01/2019	Yes	No

