The PASS

The Physical Activity and Skills Study

ACKNOWLEDGMENTS

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Introduction ...

It is well known that the proportion of young people who are overweight or obese has increased dramatically over the past 20 years. One way to overcome this trend is to encourage young people to be more active. Apart from helping with weight control, being active has many other important health benefits.

For example, physical activity helps to reduce cardiovascular disease risk factors, such as atherosclerotic lesions, high blood lipids, hypertension, and cholesterol levels. These risk factors track from childhood to adulthood, so childhood physical activity behaviour impacts directly on future health. Fitness is also important, as being fit can also help to prevent cardiovascular disease. And yet, children become less active and fit as they get older.

Being able to perform basic fundamental motor skills (such as throwing, kicking and jumping) is considered an important prerequisite to physical activity participation. The Physical Activity and Skills Study (PASS) aimed to see if children who could perform motor skills well would become more active and fit adolescents.

Although motor skill development theories suggest skilled children will be more likely to become physically active adolescents, no studies have followed children from primary to high school.

How children feel about themselves is also important. We know physical activity helps improve self-esteem and that youth who have a positive physical self-perception do tend to be more active. We might assume that children who are proficient at performing motor skills will develop a positive feeling about their own ability and therefore become active adolescents. But again, no study has followed children over time to see if these assumptions are true.

Knowing whether skilled children become active and fit adolescents will be useful for policy makers, schools, parents and all those interested in ensuring youth are active and healthy. This information will help us to plan and deliver appropriate and effective physical activity experiences in school physical education and sport.

Background to the PASS...

The PASS recruited adolescents who had previously been involved in a primary school-based health promotion project as children called Move It Groove It (MIGI). The one year MIGI project successfully increased primary school children's proficiency in fundamental motor skills. MIGI was conducted in the Northern Rivers region of NSW, Australia, from 1999 to 2000 by the Northern Rivers Health Service, Southern Cross University and the NSW Department of Education. Nine primary schools participated in the project and nine served as comparison schools (meaning that they did not receive the MIGI intervention).

An additional question the PASS aimed to answer was whether the intervention students in MIGI were still more skilled as adolescents than the students in the comparison schools.

Please refer to the published findings about 'Move It Groove It' for more detailed information about the intervention and its findings [13-15].

The MIGI project involved:

- Training pre-service teachers to effectively deliver physical education lessons and then 'buddying' them with classroom teachers to help deliver lessons.
- Professional development of classroom teachers (e.g. in dance and gymnastics).
- Working with a school project team with the goal to create 'physical activity enhancing' school policy.
- Resource allocation in the form of a web-site and funding for sports equipment purchase.

Study Methods ...

Who was invited to be in the study?
The PASS tried to find all the children who had their motor skills tested at the end of the MIGI in 2000 (from both the intervention and comparison schools) who we could identify by name. This meant that we were trying to find students who had originally been assessed in Grades 4 and 5 (2000) at the end of MIGI and who were now in Grades 10 and 11 (six years later).

During the third school term of 2006, this list of nearly 1,000 original MIGI participants was sent to 41 consenting high schools (both state and private) in the Northern Rivers area to identify adolescent students for follow-up. When students' names were identified on the high school register, students were invited to take part in the study. Students who returned a consent form signed by parents/guardian and themselves were included in the PASS.

Who became part of the study?
Many of the MIGI students had left the region or left school, nevertheless, half (n = 481, 52%) of the original participants were located in 28 of these schools. More than half (n = 276, 62%) of the students who had been found agreed to be part of the PASS.

Approximately one third of the original students were followed up. Of the 276 followed up students, there were fairly even numbers of boys and girls and more in Grade 10 than Grade 11. The average age was 16 (range 14 to 18 years).

What did we assess?
The MIGI project already assessed the motor skill ability of each student when they were in primary school for eight different motor skills. In the PASS, we re-assessed six of these same motor skills: catch, kick, overhand throw, hop, side gallop and vertical jump.

The catch, kick and throw are **object control skills** (meaning that an object is manipulated such as a ball) and the hop, side gallop and vertical jump are **locomotor** skills (often termed movement skills). Each skill is made up of a number of features.

We were looking for students who could perform the skill at 'mastery' or 'near mastery' level. 'Mastery' means each feature of the skill was performed correctly, and 'near mastery' means each feature, except one, was correct.

We also summed the number of skill features performed correctly for the three object control and three locomotor skills to calculate composite childhood skill scores which were used in analysis. The NSW Department of Education fundamental motor skill resource for classroom teachers 'Get Skilled Get Active', was used to assess motor skills.[12]. *Please refer to findings on instrument reliability for more information on this aspect [6].*

We also collected information about physical activity, fitness and perceived sports competence, at follow up, when participants were adolescents (in Grade 10 or 11). We used the Australian Physical Activity Recall Questionnaire [7] to assess physical activity. We were looking at moderate-to-vigorous activity (physical activity that makes you 'huff and puff'), organised activity (involving a coach, leader) and non-organised activity (unstructured).

We also assessed cardiorespiratory or aerobic fitness using the Multistage Fitness Test [11] and determined the number of laps students could complete. Perceived sports competence refers to how 'good' at sporting activities the student believed they were. This was assessed using the Physical Self-Perception Profile [9, 10].

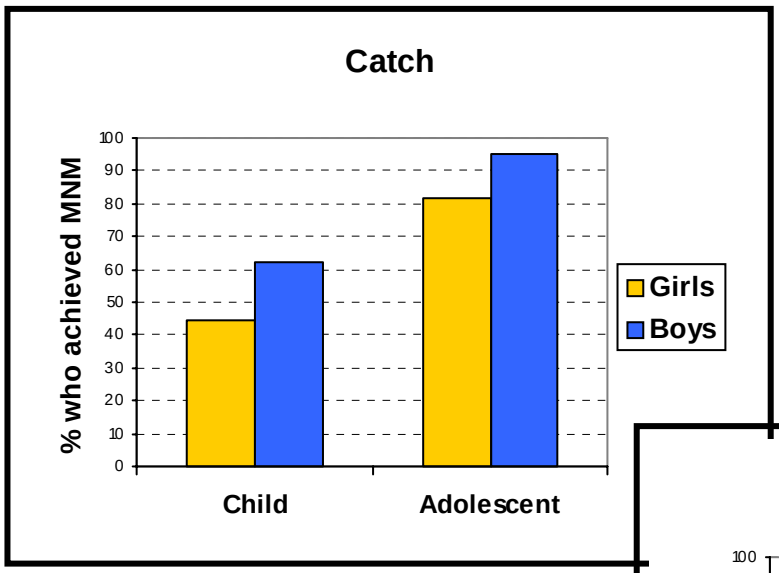
What did we find ...

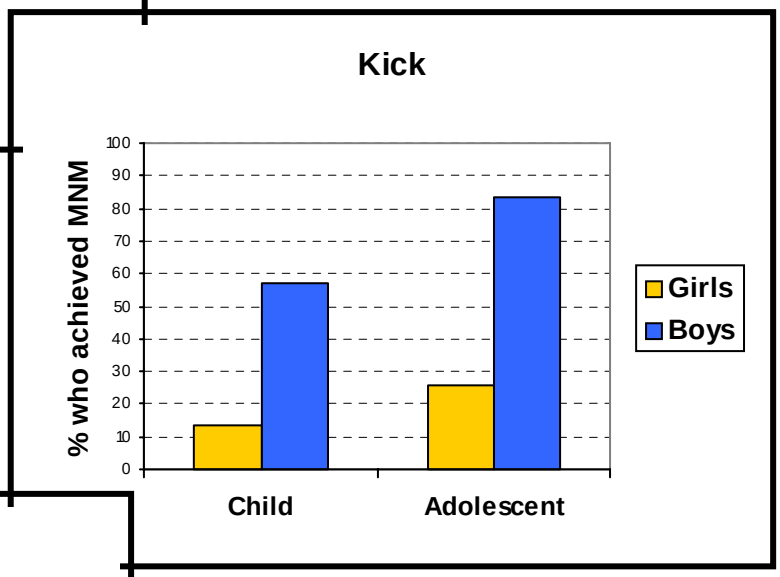
Object control skill proficiency in childhood and adolescence –

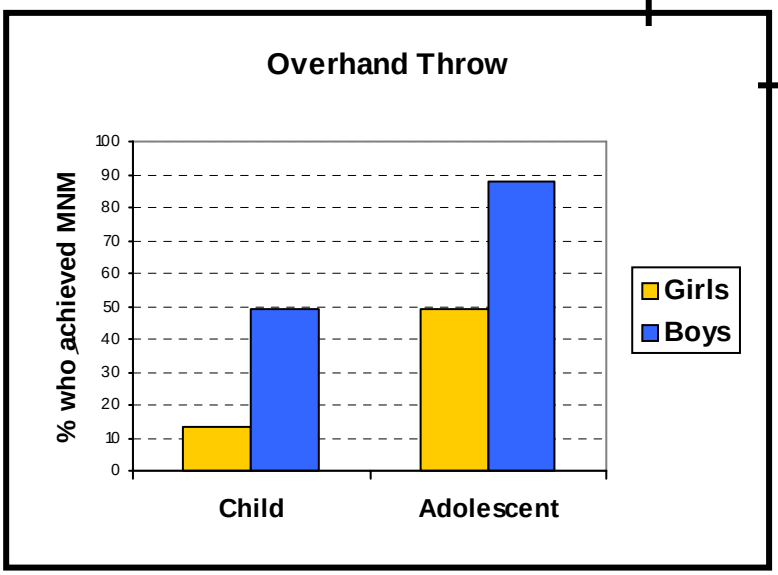
- Boys were better at the object control skills than girls, in both childhood and adolescence.

- By adolescence, three times as many boys compared to girls, reached mastery/near mastery for the kick, and almost twice as many for the overhand throw.

At least 1 in 10 students had not reached mastery/near mastery in each object control skill by adolescence (except for boys in the catch) *Please refer to the motor skill findings for more information on this aspect of the results*[2].





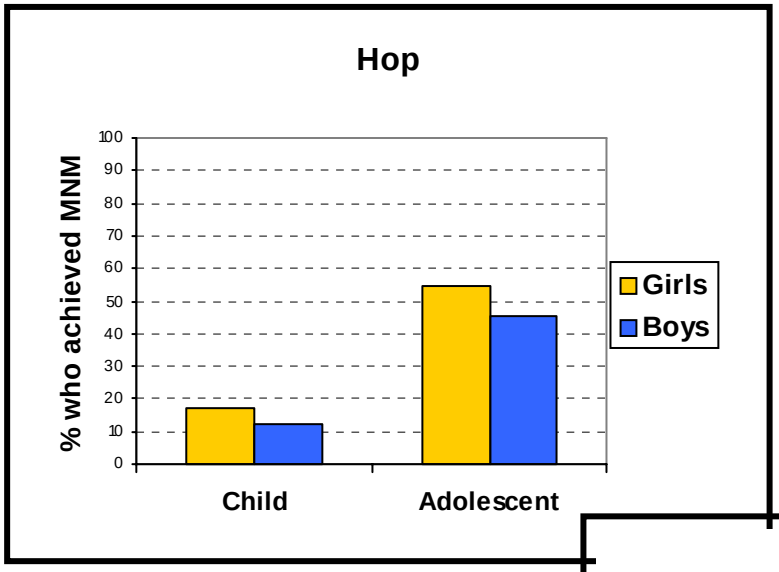


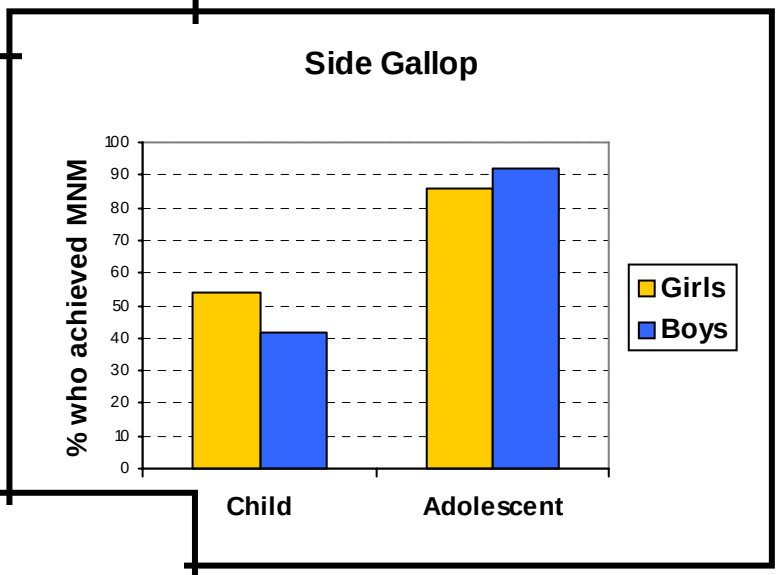
Figures 1-3 show the percentage of girls and boys who achieved mastery/near mastery (MNM), in childhood and in adolescence, in the object control skills

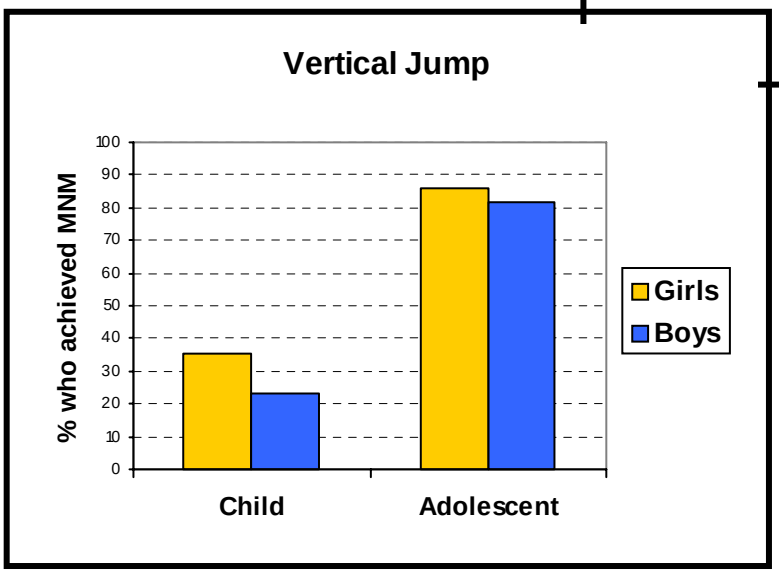
Locomotor skill proficiency in childhood and adolescence –

- There were **no significant differences** between boys and girls **in locomotor skill ability** in either childhood or adolescence.
- At least 1 in 10 students had not reached mastery/near mastery in each locomotor skill by adolescence (except for boys in the side gallop)

Please refer to the motor skill findings for more information on this aspect of the results[2].







Figures 4-6 show the percentage of girls and boys who achieved mastery/near mastery (MNM), in childhood and in adolescence, in the locomotor skills

Physical Activity in Adolescence

- More than **1 in 5 students did not meet the minimum recommendation** of one hour of moderate-to-vigorous physical activity per day.

- **Boys were more active** than girls

  Adolescent boys reported significantly more physical activity than girls. Boys spent more time in both non-organised and organised activity than girls.

- **Grade 10 students were more active** than Grade 11 students, with Grade 11 girls the least active.

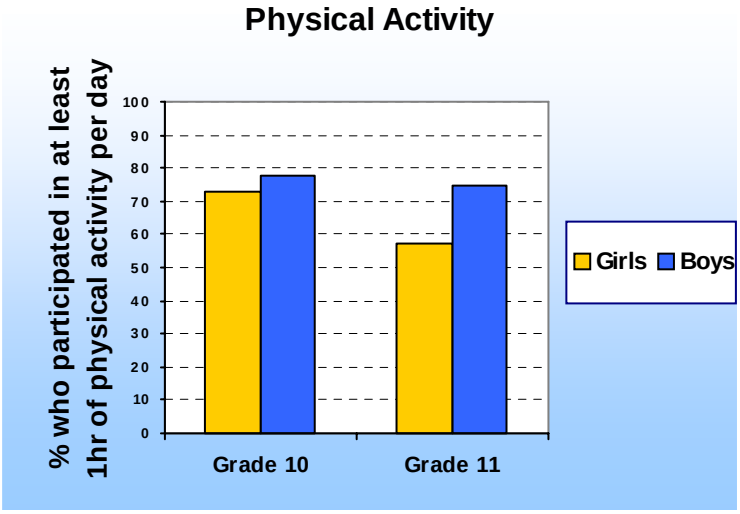


Figure 7: Percentage of girls and boys in each grade who participated in at least one hour of physical activity each day.

Fitness in Adolescence

- **Boys were more fit** than girls

  Boys completed an average of 63 Multistage Fitness Test laps compared to 39 laps for girls. Around 60% of students were considered fit (according to different standards proposed for boys and girls [8]).

- There were no significant differences between Grades 10 and 11 for fitness.

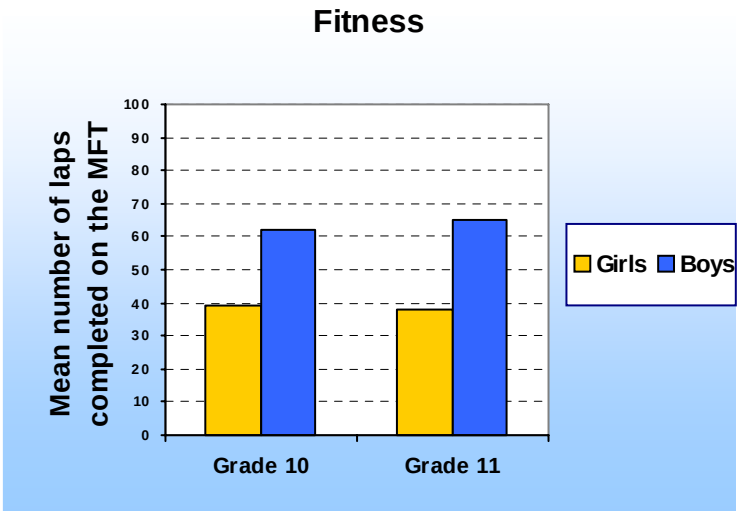


Figure 8: The mean number of laps completed on the Multistage Fitness Test (MFT) by girls and boys in grades 10 & 11

Link between childhood skills and adolescent perceived sports competence, physical activity and fitness

- Object control skilled children become more **active** adolescents.

Children skilled in the catch, kick and overhand throw were more likely to be active as adolescents. They spent more time in overall moderate-to-vigorous physical activity and more time in organised activity. Being a skilled child translated to roughly half an hour more activity per day as an adolescent.

Also, Figure 4 shows that children with good object control skills (i.e. >10) had a much greater chance of participating in at least some vigorous activity in adolescence, compared with those with poor object control skills (<5).

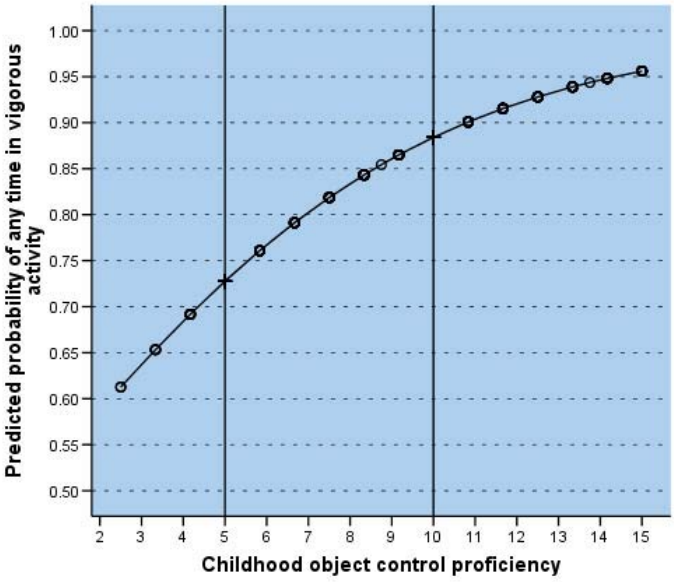


Figure 9: Predicted probability of an adolescent spending time in any vigorous activity (in terms of hours per day) based on a given childhood object skill score.
Please refer to the physical activity findings for more information on this aspect of the results [4]

- Object control skilled children become more **fit** adolescents.

Students skilled in the catch, kick and throw as children became fitter adolescents. This translated to adolescents being able to do, on average, more than six additional Multistage Fitness Test laps compared to those with poor object control skills.
Please refer to the published fitness findings for more information [5].

- Object control skilled children **possessed higher levels of perceived sports competence** and this translated to more activity and greater fitness as adolescents.

Being able to perform object control skills in childhood may build a positive sports competence perception, in turn increasing adolescent physical activity and fitness.
Please refer to the published findings on the role of perceived sports competence [1].

- Children who were proficient in performing locomotor skills were **no more active or fit** as adolescents.

Please refer to the published physical activity and fitness findings for more information on this aspect of the results [4, 5].

Were MIGI intervention students still ahead?

- MIGI intervention students were **still better at the catch** as adolescents than comparison school students.

More students from the MIGI intervention schools could catch as adolescents, but there were no differences between intervention and comparison students for the other five skills. Intervention students were no more active than comparison students as adolescents.

More information on this aspect of the results is in unpublished form in Lisa's PhD [3].

Conclusions ...

The PASS has shown that being skilled as a child does contribute to being more active, more fit and having a better physical self-perception as a teenager. Our findings highlight the importance of fundamental motor skill development in childhood.

With the current climate of youth obesity, physical activity and fitness are often a priority in physical education lessons. Whilst these are important outcomes, motor skills need to still be a focus of physical education programs in primary schools.

The skills that are important to focus on are the object control skills (in our study; catching, kicking and throwing), although other object control skills such as striking may also be important.

This does not mean that locomotor skills should not be taught, as these skills still play a part in sport and physical activity.

All the skills assessed are considered 'fundamental' with the expectation that they be mastered by the end of primary school. Yet, 1 in 10 students had not mastered these skills by adolescence (except for boys in the catch and side gallop). In particular, girls were much less skilled in performing object control skills, with the overhand throw and kick very poorly performed, even in adolescence. So, girls may need to be provided with quality instruction and opportunities to practice these skills.

Schools

Considering the importance of motor skill development to subsequent activity and fitness, strategies need to be devised to ensure children receive adequate motor skill instruction during primary school; often referred to as the 'golden years' of skill learning.

Schools should be provided with professional learning opportunities for all staff in the teaching of motor skills, as some classroom teachers may not feel confident or competent to teach motor skills.

Considering Grade 10 girls are more active than Grade 11 girls, non-compulsory physical education in the upper years of high school should be revisited with a view to increasing older students' activity. Or, strategies to increase physical activity in other settings, such as school sport, should be considered.

Teachers

- Ensure physical education programs are delivered that provide students with the opportunity to learn and practice fundamental motor skills. Teachers need to be able to detect and correct errors in performance and provide skill specific feedback so students can learn and improve.
- When teaching motor skills, it is still important to maximise active learning time in physical education lessons so students are on task and active as much as possible.
- Do focus on the needs of girls in skill development. Students may need to be separated (by gender or by high and low skill) and taught in an environment that is conducive to skill building.
- Activities on offer should appeal to girls' interests.
- Do focus on object control skill development.
- Do teach in a way that will build self esteem and a perception of skill competence amongst all students. That is, students need to be taught skills in a non-competitive, non-threatening learning environment where all children have an opportunity to receive positive reinforcement, encouragement and success.
- Teachers in high school may need to consider remedial motor skill programs.

Parents

Do try to encourage and provide opportunities for your child to develop and practice motor skills:

- Practice, practice, practice with your child. Playing simple ball games and having fun are great ways to enjoy activity with your child.
- Enrol your child in sports and activities where they will feel empowered and develop skills, especially for girls and especially in activities involving object control skills.
- Inform your school of the importance of teaching object control skills and help if you can with their motor skill program.

Future Research

We need more longitudinal studies to understand more about what factors in childhood help to encourage physically active behaviour in adolescence. We need more interventions to help encourage children to be active and we need to follow up these interventions later so we can understand more about not just what worked at the time, but what works for the long term.

Useful Resources ...

- New South Wales Department of Education and Training, *Get Skilled Get Active A K-6 resource to support the teaching of fundamental movement skills*. 2005, Multimedia Production Services Centre for Learning Innovation: NSW.
- Booth, M., et al., *NSW Schools Physical Activity and Nutrition Survey (SPANS) 2004 Full Report*. 2006, NSW Department of Health: Sydney, NSW.

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