



fundamental movement skills

Fundamental movement skills (FMS) form an integral part of the primary and early secondary school Personal Development, Health and Physical Education (PDHPE) curriculum in NSW. Their prominent position is based upon the importance of motor development to children's physical, cognitive, and social growth and development (Payne & Isaacs, 1995); the fact that the development of FMS is not automatic as a child grows and develops, but is largely influenced by environmental factors; and the understanding that FMS are the foundations of a physically active lifestyle (Gallahue & Ozmun, 2002).

These skills also appear to be related to the health of young people. For example, prior studies have shown that children and adolescents with greater fundamental movement skill proficiency tend to be more physically active (Okely et al., 2001b; Saakslanti et al., 1999; Ulrich, 1987); have higher levels of aerobic fitness (Okely et al., 2001a) and self-esteem (Ulrich, 1987); and are less likely to be overweight (Okely et al., 2004).

Several experimental studies have shown that if these skills can be well-delivered through appropriate professional development programs, teachers will respond positively and find it easy to integrate them into their teaching programs (McKenzie et al., 1998; Okely et al., 2003). Hence, the development of FMS may provide one of the better strategies for encouraging children's participation in physical activity.

In 1997, the *NSW Schools Fitness and Physical Activity Survey* (NSWSFPAS) assessed the fundamental movement skill proficiency of a representative sample of students in Years 4, 6, 8

and 10 (approximately 9.3, 11.3, 13.3 and 15.3 years of age, respectively). It found that, with the exception of one skill, the prevalence of mastery/near-mastery did not exceed 40% for boys and girls in any one Year group (Booth, Okely et al., 1999). As a result of these findings, a recommendation was made to 'provide adequate support and resources to develop FMS among students in NSW, with particular emphasis on primary school-aged children' (Booth et al., 1997).

In response to this recommendation, the NSW Department of Education and Training (NSW DET), developed a resource (*Get skilled: Get active*) and a model of professional development, which have been widely disseminated since 1999, to enhance the teaching of FMS (NSW Department of Education and Training, 2000). They have also supported the evaluation of this resource through several studies, namely, the Gold Medal Fitness Program and the evaluation of the *Get skilled: Get active* resource (Okely & Booth, 2004; Okely et al., 2003). In addition, the two other education sectors in NSW (Catholic Education Commission, CEC; and Association of Independent Schools, AIS) promoted the resource and provided professional development workshops to support its implementation.

The development of FMS is also an integral part of the *Prevention of obesity in children and young people: NSW Government Action Plan 2003-2007* under the 'Healthier Schools' priority area.

The NSW SPANS 2004 is the first state-wide representative study of FMS among NSW children and adolescents since 1997. It provided the opportunity to gather data on the population mastery and sociodemographic distribution of FMS and, to examine trends in skill proficiency over the seven-year period 1997-2004.

MASTERY AND NEAR-MASTERY OF FUNDAMENTAL MOVEMENT SKILLS BY SEX AND YEAR GROUP

The prevalence of mastery and near-mastery of each of the seven FMS among boys and girls in Years 2, 4, 6, 8 and 10 is shown in Figure 9.1 and Table 9.1. The prevalence of proficiency at each component of each fundamental movement skill among boys and girls in Years 2, 4, 6, 8 and 10 is shown in Appendix O.

SPRINT RUN

Approximately 10% of boys in Year 2 displayed mastery of the sprint run, with this proportion increasing to just under 40% among Year 10 boys. Approximately 20% of boys in all Years displayed near-mastery of the sprint run. Five per cent of girls in Year 2 achieved mastery of the run, increasing to 25% among Year 10 girls. Between 15% and 30% of girls in all Years demonstrated near-mastery of the sprint run. As expected, mastery increased linearly for both boys and girls from Year 2 to Year 10. Although this increase was fourfold for boys and fivefold for girls over this time, less than half of the students in Year 10 had mastered the sprint run. In all Years, mastery levels were slightly higher for boys than for girls.

VERTICAL JUMP

Fifteen per cent of Year 2 boys showed mastery of the vertical jump, increasing linearly by approximately 10% per Year to 52% of Year 10 boys. Between 20% and 30% of boys in each Year group displayed near-mastery. Twenty per cent of Year 2 girls displayed mastery of the vertical jump, increasing to 52% of Year 10 girls. Mastery of the vertical jump increased by around 10% in each Year group from Year 2 to Year 8, but did not increase thereafter. Between 15% and 25% of girls in each Year group demonstrated near-mastery.

SIDE GALLOP

Among boys, 13% in Year 2 displayed mastery, increasing to 62% in Year 10. Between 20% and 30% of boys in each Year showed near-mastery. Among girls, 14% achieved mastery in Year 2,

increasing to 68% in Year 10. Between 20% and 35% of girls displayed near-mastery. In all Years, girls demonstrated a higher prevalence of mastery and near-mastery than boys, although the differences were generally small.

LEAP

Less than 10% of boys in any Year mastered the leap, with near-mastery ranging from 7% to 17%. For girls, the proportion who mastered the leap ranged from 6% in Year 2 to just under 30% in Year 10, with the increase linear from Year to Year. Near mastery levels ranged from 8% to 22% among girls. Clearly, more girls demonstrated proficiency in the leap with a fourfold to fivefold difference between boys and girls which increased with age. Well under half of the boys and girls in all Year groups except Year 10 girls displayed mastery and near-mastery of the leap.

KICK

Among boys, mastery of the kick increased from 9% in Year 2 to just under 60% in Year 10, with the proportion achieving mastery doubling from Year 2 to Year 4, and from Year 4 to Year 6. Between 10% and 20% of boys in all Year groups displayed near-mastery. Among girls, the prevalence of mastery for the kick ranged from 2% in Year 2 to just under 10% in Year 10, with about a 2% increase between each Year group. The prevalence of near-mastery showed the same pattern as mastery for girls. The most notable finding, as expected, was the large gender difference, with the prevalence of mastery being around five times higher among boys in each Year group.

OVERHAND THROW

Among boys, mastery of the throw increased from 11% in Year 2 to 58% in Year 10, with between 13% and 26% of boys in each Year displaying near-mastery. Among girls, 0.5% in Year 2 showed mastery, with this increasing by approximately 4% in each Year up to Year 8 where 14% of girls showed mastery of the throw. Between 6% and 20% of girls displayed near-mastery of the throw. A higher proportion of boys in all Years achieved mastery in the throw.

CATCH

Between 15% and 20% of boys achieved mastery in the catch, with the prevalence of near-mastery around 20% in each Year. Among girls, 10% in Year 2 achieved mastery, increasing to 50% in Year 10, with near-mastery between 15% and 25% in each Year. The prevalence of mastery was higher for boys in all Years and exceeded 50% among boys in Years 6, 8 and 10. Mastery among girls also exceeded 50% among Year 10 girls. The prevalence of combined mastery and near-mastery was above 50% among Year 4 boys and for both boys and girls in Years 6, 8 and 10.

Figure 9.1. Prevalence of skill mastery and near-mastery among boys (b) and girls (g) in Years 2, 4, 6, 8 and 10 (%)

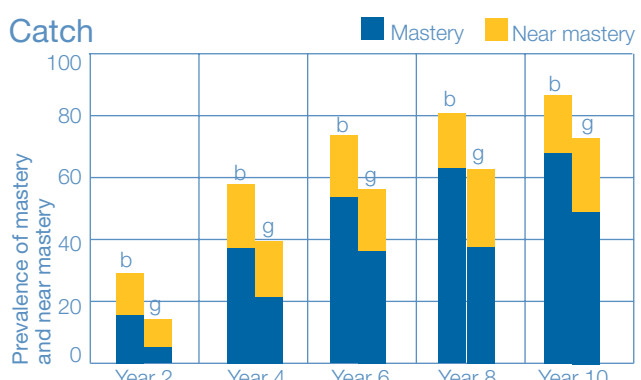
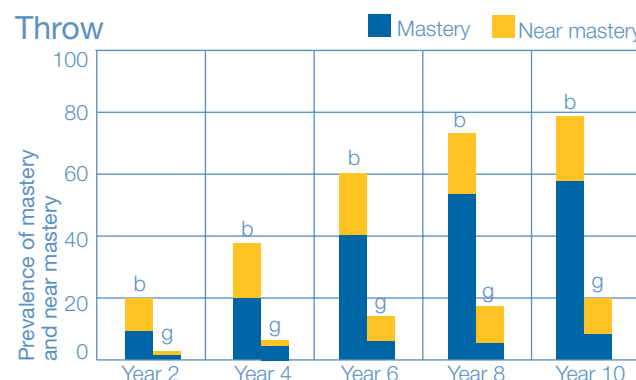
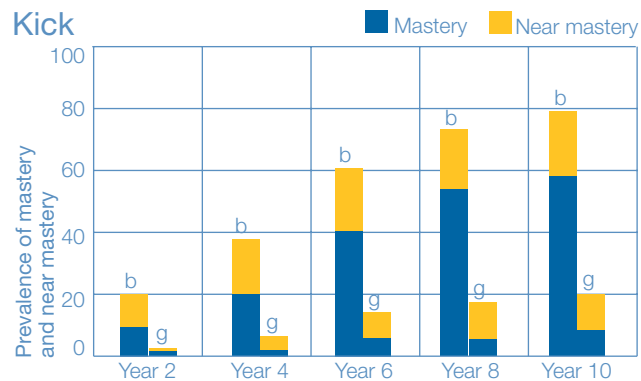
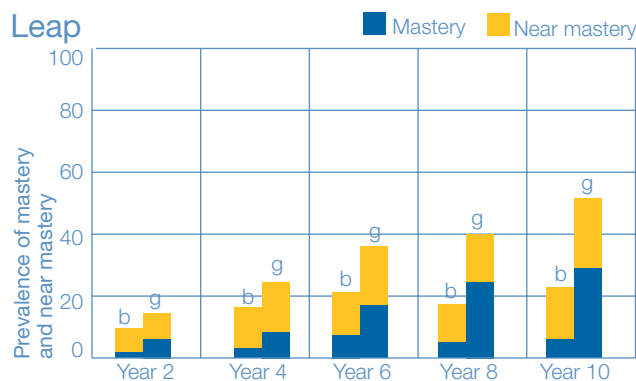
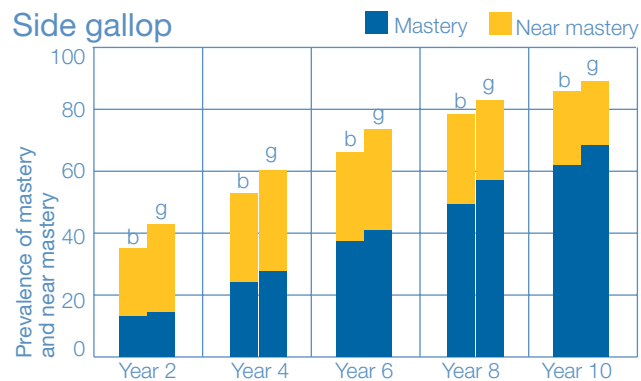
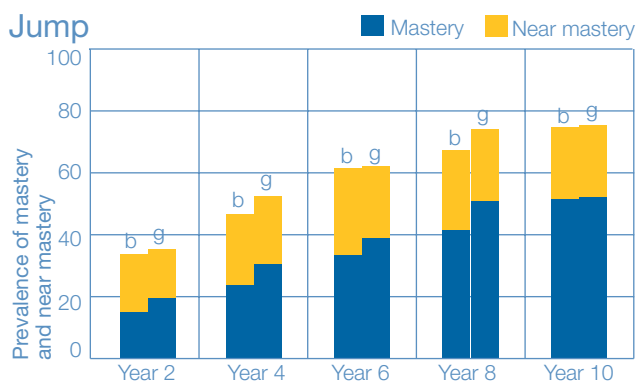
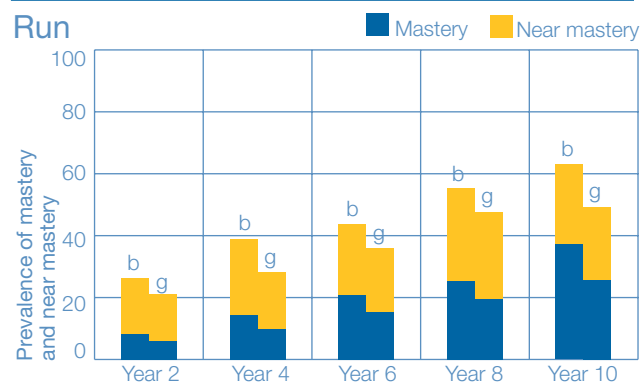


Table 9.1 Prevalence of skill mastery, near-mastery and advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 (%)

	Year 2		Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Run										
Mastery	8.1	5.8	14.3	9.8	20.7	15.4	25.3	19.6	37.1	25.7
N-mastery	18.1	15.2	24.7	18.4	23.0	20.5	30.0	28.1	26.0	23.4
Advanced	26.2	21.0	39.0	28.2*	43.7	35.9*	55.3	47.7	63.1	49.1*
Jump										
Mastery	15.0	19.5	23.8	30.4	33.5	38.9	41.6	50.9	51.6	52.3
N-mastery	18.6	15.9	22.7	22.2	28.0	23.4	26.5	23.0	23.0	23.1
Advanced	33.6	35.4	46.5	52.6*	61.5	62.3	68.1	73.9	74.6	75.4
Gallop										
Mastery	13.2	14.2	24.0	27.6	37.2	40.8	49.1	56.9	61.7	67.9
N-mastery	21.6	28.6	28.7	32.5	28.6	32.2	29.0	25.7	23.6	20.8
Advanced	34.8	42.8	52.7	60.1*	65.8	73.0*	78.1	82.6	85.3	88.7
Leap										
Mastery	1.7	5.9	2.9	9.1	7.8	16.7	5.2	25.3	6.0	28.4
N-mastery	7.3	8.0	12.6	17.6	14.1	19.1	12.8	15.7	16.8	22.1
Advanced	9.0	13.9*	15.5	26.7*	21.9	35.8*	18.0	41.0*	24.8	50.5*
Kick										
Mastery	9.4	1.6	19.9	2.0	40.3	5.8	53.6	5.3	57.8	8.3
N-mastery	10.6	1.1	17.9	4.3	20.1	8.2	19.4	11.9	21.0	11.7
Advanced	20.0	2.7*	37.8	6.3*	60.4	14.0*	73.0	17.2*	78.8	20.0*
Throw										
Mastery	10.7	0.5	26.4	3.8	41.1	9.7	50.7	13.4	57.8	13.9
N-mastery	14.0	6.0	22.4	7.7	24.1	16.4	25.7	18.6	21.5	20.0
Advanced	24.7	6.5*	48.8	11.5*	65.2	26.1*	76.4	32.0*	79.3	33.9*
Catch										
Mastery	15.4	5.0	37.0	21.2	53.2	35.9	62.4	37.3	67.3	48.7
N-mastery	13.3	9.2	20.4	18.0	20.0	19.9	17.9	24.9	18.6	23.6
Advanced	28.7	14.2*	57.4	39.2*	73.2	55.8*	80.3	62.2*	85.9	72.3*

* Indicates a statistically significant difference at $P < .05$ between boys and girls within each Year group in the prevalence of advanced skills.

MASTERY AND NEAR-MASTERY OF FUNDAMENTAL MOVEMENT SKILLS BY RURALITY, SOCIOECONOMIC STATUS, CULTURAL BACKGROUND, AND BMI CATEGORY

To more clearly explain the differences in fundamental movement skill proficiency between boys and girls residing in urban versus rural locations, and between boys and girls from different socioeconomic and cultural backgrounds, the number of categories of skill proficiency was reduced from three to two. Specifically, the mastery and near-mastery categories were combined into a single category called *advanced skills* for these analyses. In addition, only two BMI categories were used: healthy weight and overweight/obesity combined.

SPRINT RUN

Figure 9.2 and Table 9.2 show the prevalence of advanced skills for the sprint run among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

In every Year group except Year 8, a greater proportion of boys from rural schools displayed advanced skills in the sprint run than boys attending urban schools. The results for girls were somewhat similar and generally indicated that more girls from rural schools displayed advanced skills for the sprint run (except among secondary school girls, where a greater proportion of urban girls displayed advanced skills). These differences, although consistent, were not statistically significant.

Socioeconomic status

There was a generally consistent relationship between socioeconomic status and advanced sprint run skills among boys. A higher proportion of those in the highest socioeconomic tertile displayed proficient running skills, except among Year 2, where more boys in the middle tertile displayed advanced skills. None of these relationships were statistically significant. Among girls, the results were mixed. There was little difference between the three socioeconomic tertiles in Year 2.

In secondary school Years (8 and 10) those girls in the high tertile displayed a greater prevalence of advanced skills, with little difference between those in the low and medium tertile. However, in Years 4 and 6, those in the highest tertiles displayed a lower prevalence of advanced skills compared with those in the low and medium tertiles. The differences between the most socially advantaged girls and the other two tertiles approached statistical significance for Years 8 and 10.

Cultural background

Among boys, the relationship between cultural background and advanced sprint run skills was mixed. There appeared to be little difference between boys from English-speaking, European and Asian backgrounds in Year 8, and only a small difference between all four cultural backgrounds among Year 10 boys. However, a smaller proportion of boys from Middle-Eastern cultural backgrounds displayed advanced skills in the sprint run in Years 4, 6 and 8, with these differences statistically significant in Year 4. Boys from Asian backgrounds also had a much lower proportion with advanced skills in Year 2. Among girls, there was little difference between all four cultural backgrounds in Year 4. However, compared with girls from English-speaking backgrounds, those from Asian backgrounds clearly displayed lower levels of advanced skills in Years 2, 6 and 10, with these differences statistically significant in Year 6 and approaching statistical significance in Year 10. A smaller proportion of girls from Middle-Eastern cultural backgrounds displayed advanced skills in Years 2, 8 and 10.

BMI category

For boys and girls in every Year group, a higher proportion of healthy-weight boys displayed advanced skills for the sprint run than their overweight/obese peers. For boys, the prevalence of advanced skills was 1.5-2.5 times greater among healthy-weight boys compared with overweight/obese boys. Among girls, the proportion with advanced sprint run skills was between 10% and 25% higher among healthy-weight girls. The differences were statistically significant for boys and girls in every Year group apart from boys in Year 2.

Figure 9.2. Prevalence of sprint run advanced skills among boys and girls in Years 2, 4, 6, 8, and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)



Table 9.2. Prevalence of sprint run advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	26.0	38.1	42.9	57.1	62.9
Rural	26.8	43.0	48.5	47.7	64.3
SES					
Low	22.7	38.1	44.4	57.0	59.6
Medium	30.2	36.9	43.7	52.5	63.2
High	25.2	41.8	43.3	56.5	66.9
Cultural background					
English-speaking	27.0	41.1	44.4	55.2	61.4
European	37.5	46.2	60.0	63.6	75.0
Middle-Eastern	30.4	5.6*	29.4	37.5	70.0
Asian	12.9	25.9	39.1	65.2	77.8
BMI category					
Healthy weight	27.5	45.2	51.2	64.5	68.1
Overweight/obese	20.5	22.4*	27.4*	27.8*	49.6*
Girls					
Rurality					
Urban	20.3	27.4	34.3	48.7	49.5
Rural	24.7	33.9	45.5	42.9	47.1
SES					
Low	20.3	26.2	37.4	40.3	45.4
Medium	22.5	34.7	38.7	43.9	44.4
High	20.3	24.9	31.5	58.0	55.9
Cultural background					
English-speaking	22.6 ⁿ	29.1	38.1	45.4 ⁿ	51.5
European	13.3	23.5	25.0	63.6	33.3
Middle-Eastern	0.0	26.1	35.7	0.0	22.2
Asian	13.3	19.2	14.7*	69.2	36.4
BMI category					
Healthy weight	23.0	22.9	39.4	52.8	51.7
Overweight/obese	13.4*	15.0*	23.5*	29.9*	35.9*

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

VERTICAL JUMP

Figure 9.3 and Table 9.3 show the prevalence of advanced skills for the vertical jump among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

Among primary school boys (Years 2, 4 and 6), those from urban schools displayed a higher prevalence of advanced skills in the vertical jump compared with their rural school peers, with these differences statistically significant in Year 6. However, the opposite was true among secondary school boys, where a greater proportion from rural schools displayed advanced skills. The pattern was somewhat similar among girls, with those from urban schools more skilled than their rural school peers in Years 2 and 4, but rural school girls displaying a greater prevalence of advanced skills than urban school girls in Years 6, 8 and 10. None of the differences between urban and rural girls were statistically significant.

Socioeconomic status

The association between socioeconomic status and advanced vertical jump skills was generally consistent and linear. In all but one Year group, boys and girls in the high socioeconomic tertile had a greater proportion of advanced skills compared with those in the low and medium tertiles. Furthermore, boys and girls in the medium socioeconomic tertile had a greater proportion of advanced skills than those in the low tertile in most cases. The association between socioeconomic status and advanced skills was statistically significant among boys in Years 2, 4 and 6, and among girls in Year 2 and Year 8.

Cultural background

There appeared to be little difference between boys from English-speaking and Asian cultural backgrounds in Year 6 and only a small difference between all four cultural backgrounds among Year 2, 8 and 10 boys. However, a clearly smaller proportion of boys from Middle-Eastern cultural backgrounds displayed advanced vertical jump skills in Years 4 and 6, with these differences statistically significant in Year 4. Boys from European cultural backgrounds also had a much lower prevalence of advanced skills in Years 4 and 6. Among Year 4 and Year 8 girls, there was little difference between those from English-speaking, European, and Asian cultural backgrounds. However, compared with English-speaking and European backgrounds, those from Asian cultural backgrounds had a noticeably lower prevalence of advanced skills in Year 2 and Year 10. In every Year except Year 10, girls from Middle-Eastern backgrounds displayed a lower prevalence of advanced skills.

BMI category

In each Year group, more healthy-weight boys and girls displayed advanced vertical jump skills compared with their overweight/obese peers. For boys, those in the healthy-weight group displayed advanced skills that were between five and ten percentage points higher than those in the overweight/obese group. Among girls, the prevalence of advanced skills was between 10% and 20% higher among healthy-weight girls. These differences either approached statistical significance or were statistically significant in every group except Year 2 boys.

Figure 9.3. Prevalence of vertical jump advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)



Table 9.3. Prevalence of vertical jump advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	34.4	48.0	65.0	67.7	74.0
Rural	29.6	39.2	40.9*	69.9	77.8
SES					
Low	27.4*	37.4*	51.6*	67.2	75.5
Medium	25.5*	39.5*	59.1	63.6	76.4
High	46.8	62.3	72.1	74.1	71.7
Cultural background					
English-speaking	34.5	49.3	63.5	69.7	74.4
European	37.5	30.8	46.7	63.6	75.0
Middle-Eastern	26.9	16.7*	29.4	62.5	70.0
Asian	31.3	29.6	62.5	56.5	81.5
BMI category					
Healthy weight	34.7	49.7	64.2	70.4	77.0
Overweight/obese	29.4	38.4*	55.3*	61.3	67.8
Girls					
Rurality					
Urban	35.6	53.6	61.5	73.3	73.8
Rural	34.3	46.2	66.7	76.9	82.9
SES					
Low	24.6*	44.3	59.7	62.6*	71.4
Medium	33.6*	53.0	61.8	75.5	75.7
High	49.3	60.0	65.3	83.3	78.8
Cultural background					
English-speaking	36.9	54.8	64.3	74.6 ⁿ	77.0 ⁿ
European	42.9	47.1	46.2	72.7	100.0
Middle-Eastern	11.1	18.2*	35.7	0.0	87.5
Asian	26.7	52.0	56.8	65.8	59.1
BMI category					
Healthy weight	39.6	55.3	65.2	76.0	77.6
Overweight/obese	20.0*	46.6	52.0*	66.7	64.1*

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

SIDE GALLOP

Figure 9.4 and Table 9.4 show the prevalence of advanced skills for the side gallop among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

There was a fairly consistent pattern in the side gallop between urban and rural boys and girls. In every Year group except Year 2 boys and Year 10 girls, urban students had a higher prevalence of advanced skills than rural students. However, the differences between urban and rural students were not statistically significant for boys or girls in any Year group except Year 6 girls.

Socioeconomic status

The relationship between socioeconomic status and advanced side gallop skills was also generally consistent. For both boys and girls, the proportion displaying advanced skills increased with increasing socioeconomic status. The relationship approached, but did not reach, statistical significance for boys and girls in any of the Year groups apart from Year 8 girls.

Cultural background

Among boys, the relationship between cultural background and advanced side gallop skills was mixed. In Years 4, 6 and 8, there was little difference between boys from English-speaking, European and Asian backgrounds. However, boys from Middle-Eastern backgrounds displayed lower levels of advanced skills in Years 4, 6 and 8. Year 10 boys from European cultural backgrounds displayed a clearly lower prevalence of advanced skills than the other groups. Among girls, a clearer pattern was evident, with those girls from Middle-Eastern backgrounds having a markedly lower prevalence of advanced skills in side gallop compared with the other three cultural backgrounds. This was statistically significant among Year 6 girls.

BMI category

Similar to the sprint run and vertical jump, higher proportions of healthy-weight boys and girls in every Year group displayed advanced skills for the side gallop compared with overweight/obese students. For both boys and girls, the prevalence of advanced skills was approximately 10 percentage points higher in the healthy-weight group compared with the overweight/obese group. These differences were statistically significant for boys in Years 4, 6 and 8, and girls in Years 2, 4, 6 and 8.

Figure 9.4. Prevalence of side gallop advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

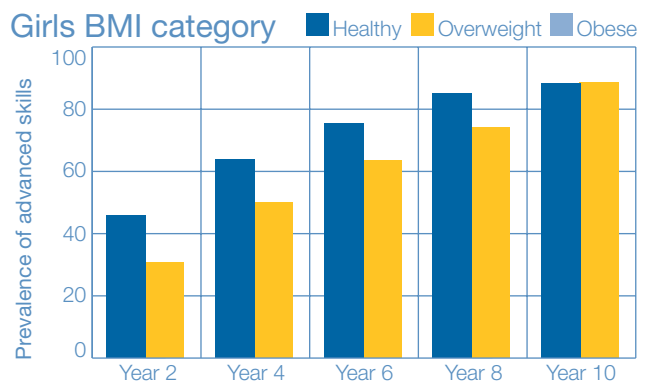
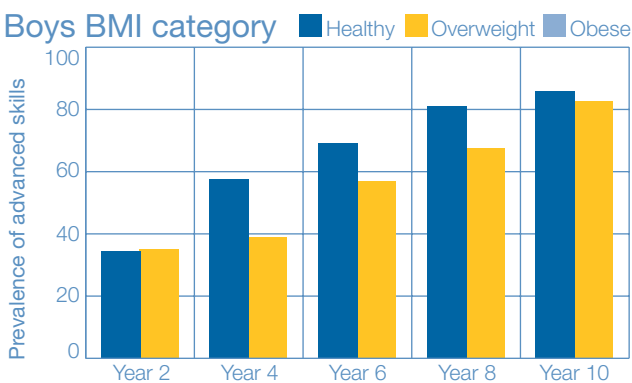
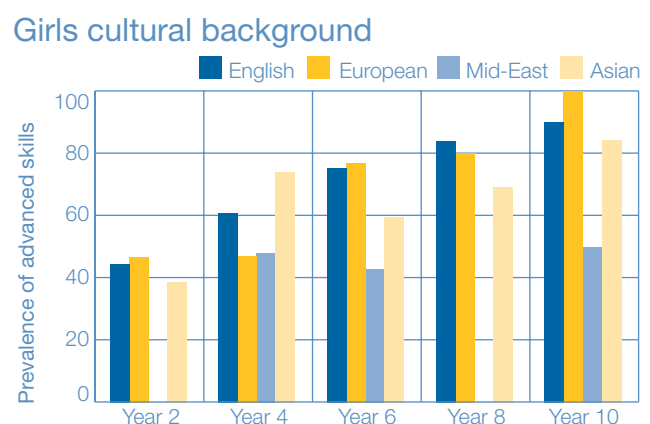
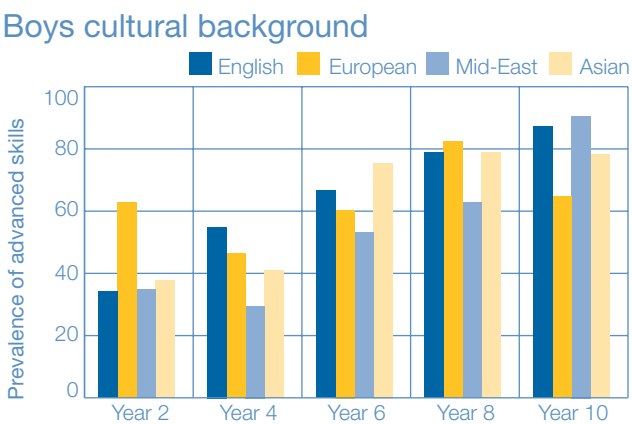
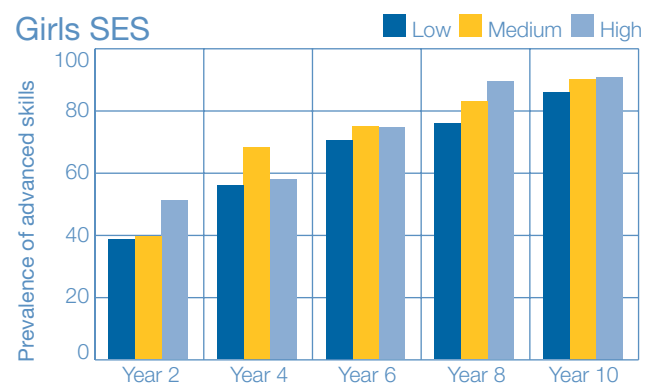
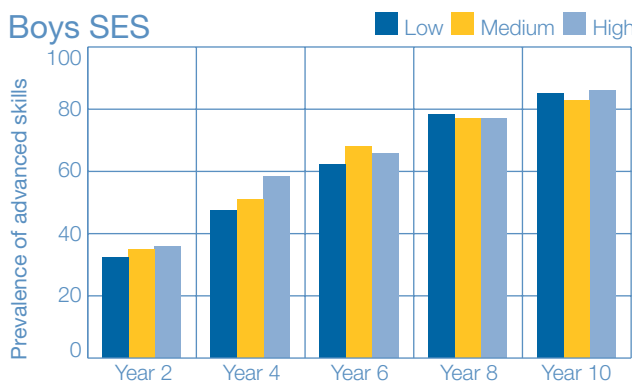
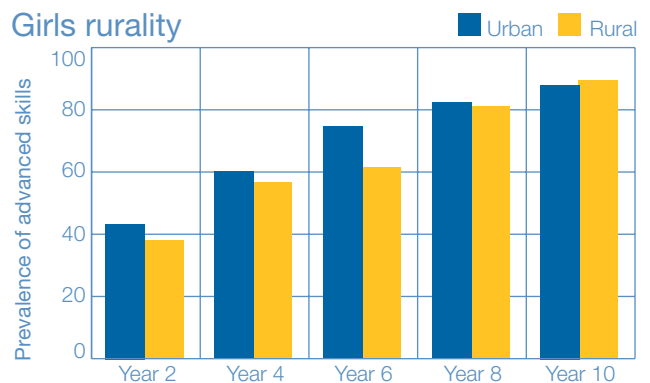
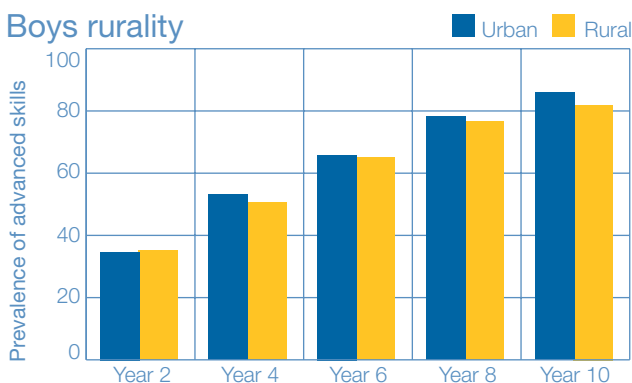


Table 9.4. Prevalence of side gallop advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	34.7	53.1	65.9	78.3	85.9
Rural	35.2	50.6	65.2	76.7	81.9
SES					
Low	32.6	47.7	62.9	78.9	85.8
Medium	35.3	51.3	68.6	77.5	83.4
High	36.1	58.9	66.3	77.6	86.7
Cultural background					
English-speaking	34.0	54.6	66.2	78.3	86.6
European	62.5	46.2	60.0	81.8	64.3*
Middle-Eastern	34.6	29.4	52.9	62.5	90.0
Asian	37.5	40.7	75.0	78.3	77.8
BMI category					
Healthy weight	34.7	57.9	69.5	81.4	86.1
Overweight/obese	35.3	39.0*	57.4*	67.7*	82.9
Girls					
Rurality					
Urban	43.6	60.6	75.1	82.8	88.4
Rural	38.4	56.9	61.8*	81.5	90.0
SES					
Low	38.5	55.8	70.3	75.6*	85.6
Medium	39.3	68.1	74.7	82.6	89.9
High	51.0	57.8	74.3	89.1	90.5
Cultural background					
English-speaking	44.5 ⁿ	60.8	75.3	83.7 ⁿ	90.1 ⁿ
European	46.7	47.1	76.9	80.0	100.0
Middle-Eastern	0.0	47.8	42.9*	0.0	50.0
Asian	38.7	73.9	59.5*	69.2	84.1
BMI category					
Healthy weight	46.0	64.2	75.9	85.4	88.7
Overweight/obese	31.0*	50.3*	63.6*	74.4*	88.9

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

LEAP

Figure 9.5 and Table 9.5 show the prevalence of advanced skills for the leap among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

There was virtually no difference in the prevalence of advanced skills between boys from urban and rural schools. Among girls, the results were mixed. Rural girls displayed slightly a higher prevalence of advanced skills in Year 2, while there was no difference between urban and rural girls in Year 4. In Years 6, 8 and 10, girls from urban schools were more proficient at the leap than their rural school counterparts, with these differences approaching statistical significance among Year 8 and Year 10 girls.

Socioeconomic status

The relationship between socioeconomic status and advanced leap skills among boys did not demonstrate any clear or consistent pattern. The low levels of overall proficiency among boys created a 'floor effect' which probably clouded any relationship that may exist. Among girls, there was a strong and direct association between leap proficiency and socioeconomic status, which was statistically significant among Year 8 girls.

Cultural background

Among boys, the differences across cultural backgrounds in the leap demonstrated no consistent pattern. In Years 4 and 10, boys from Middle-Eastern backgrounds displayed the highest prevalence of advanced skills, whereas in Years 2 and 6, boys from Asian backgrounds had the highest prevalence, with the difference statistically significant for Year 2 boys. Boys from English-speaking backgrounds had the highest prevalence of advanced skills in Year 8. Among girls, those from Middle-Eastern backgrounds displayed the lowest prevalence of advanced skills in all Year groups. There was little difference between English-speaking, European and Asian backgrounds among primary school girls. Among secondary school girls, the prevalence of advanced skills was clearly lower among girls from Asian cultural backgrounds than among those from English-speaking and European backgrounds, with the difference statistically significant for Year 10 girls.

BMI category

There was a consistent pattern in the relationship between BMI category and advanced skills for the leap. For boys and girls in every Year group except Year 2 boys, overweight/obese students were less proficient at the leap than their healthy-weight peers, with these differences statistically significant for Year 4 boys and girls and approaching statistical significance for Year 2 girls.

Figure 9.5. Prevalence of leap advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)



Table 9.5. Prevalence of leap advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	9.1	15.6	23.1	17.8	22.2
Rural	8.6	15.5	15.2	19.2	25.4
SES					
Low	10.7	16.5	21.9	11.0	21.1
Medium	6.5	17.0	22.4	20.8	25.4
High	10.0	13.5	21.5	22.8	22.0
Cultural background					
English-speaking	8.9 ⁿ	15.8	20.4	19.4*	22.6
European	0.0	15.4	20.0	9.1	27.3
Middle-Eastern	9.1	17.7	35.3	0.0	44.4
Asian	11.1	12.0	40.9*	8.7	16.0
BMI category					
Healthy weight	8.4	18.3	23.7	19.8	23.8
Overweight/obese	12.0	8.5*	17.9	12.9	19.6
Girls					
Rurality					
Urban	12.8	26.5	37.2	43.4	52.6
Rural	19.4	27.7	28.4	29.7	41.2
SES					
Low	11.8	21.9	32.7	29.2*	47.7
Medium	12.7	28.9	10.6	39.8	47.1
High	17.2	29.4	34.3	53.3	55.5
Cultural background					
English-speaking	15.3 ⁿ	28.4	37.3	42.2 ⁿ	52.9
European	8.3	11.8	25.0	54.6	66.7
Middle-Eastern	0.0	13.0	14.3	0.0	25.0
Asian	3.8	23.8	32.3	19.2	36.4*
BMI category					
Healthy weight	15.5	31.3	37.5	42.7	52.2
Overweight/obese	7.9	15.7*	30.9	36.3	41.9

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

KICK (STATIONARY BALL)

Figure 9.6 and Table 9.6 show the prevalence of advanced skills for the kick among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

Boys from urban schools displayed a slightly higher prevalence of advanced skills in every Year except Year 4, where the reverse was the case. None of these differences were statistically significant. Among girls, there was virtually no difference between urban and rural students for the kick, although this absence of difference may be masked by the 'floor effect' seen among girls (that is, a very low prevalence of advanced skills).

Socioeconomic status

There was no clear or consistent relationship between socioeconomic status and kicking proficiency for either boys or girls and only the relationship among Year 8 girls was statistically significant. Among Year 8 girls, the prevalence of advanced skills for the kick was significantly lower for the medium socioeconomic status tertile.

Cultural background

The relationship between cultural background and advanced skills for the kick was fairly consistent among boys. Briefly, boys from Asian backgrounds had the lowest prevalence of advanced skills in all Year groups except Year 10, with these differences statistically significant in Years 4, 8 and 10. There was little difference between boys from the other three cultural backgrounds, with the exceptions of Year 10 boys, where those from European backgrounds had a significantly lower prevalence than those from English-speaking backgrounds, and Year 2 boys where those from Middle-Eastern backgrounds had a higher prevalence than those from English-speaking backgrounds. Among girls, the floor effect resulting from a low prevalence overall made it difficult to examine any differences between cultural backgrounds and advanced skills, and the number of students in each group was too low to make any clear statement about patterns across different cultural groups.

BMI category

Among boys, the prevalence of advanced skills was higher among the healthy-weight students than among overweight/obese students in all Year groups except Year 10, where the reverse was true. A similar pattern was found among girls with a higher prevalence occurring in Years 2, 6 and 8. Among girls in Year 4 and Year 10, the opposite was found. None of the differences were statistically significant for either boys or girls, although they did approach statistical significance among boys in Years 4 and 6.

Figure 9.6. Prevalence of kick advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)



Table 9.6. Prevalence of kick advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	21.1	36.7	61.0	73.5	79.6
Rural	14.1	43.7	57.6	71.2	74.7
SES					
Low	19.4	41.6	60.9	75.8	82.6
Medium	18.0	37.8	60.5	71.2	79.3
High	22.4	33.8	59.9	72.3	73.9
Cultural background					
English-speaking	19.8	39.0	60.3	75.3	80.8
European	28.6	46.2	80.0	83.3	42.9*
Middle-Eastern	38.1	44.4	58.8	75.0	90.0
Asian	9.4	11.1*	54.6	46.7*	63.0*
BMI category					
Healthy weight	20.1	40.5	63.4	74.1	77.3
Overweight/obese	19.1	30.8	53.9	69.8	83.2
Girls					
Rurality					
Urban	2.6	5.9	14.2	17.6	18.4
Rural	2.7	9.5	13.2	15.6	27.1
SES					
Low	2.6	7.2	18.2	19.1	22.3
Medium	2.7	6.2	9.3	10.2*	19.8
High	2.7	5.7	14.2	21.0	17.9
Cultural background					
English-speaking	2.3 ⁿ	6.4 ⁿ	14.3 ⁿ	17.9 ⁿ	21.3 ⁿ
European	13.3	5.9	33.3	0.0	0.0
Middle-Eastern	0.0	8.7	0.0	0.0	37.5
Asian	3.6	0.0	9.7	15.4	8.7
BMI category					
Healthy weight	3.1	5.8	14.2	18.8	19.3
Overweight/obese	1.1	7.6	12.8	12.2	23.1

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

OVERARM THROW

Figure 9.7 and Table 9.7 show the prevalence of advanced skills for the overarm throw among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background, and BMI category.

Rurality

Although the prevalence of advanced skills was higher in every Year among urban boys, the differences were almost negligible. Among girls, the differences between urban and rural students were small and non-significant.

Socioeconomic status

Among boys, with the exception of Year 2, where a direct statistically significant association was found, there was no apparent relationship between socioeconomic status and advanced skills in the throw. Among girls, the figure suggested a weak, but direct relationship between socioeconomic status and throwing proficiency, which was marginally significant for Years 6 and 8.

Cultural background

Among boys, those from English-speaking and European backgrounds displayed the highest proportion of advanced throwing skills in every Year group except Year 10, where the highest proportion were displayed by boys from English-speaking and Asian backgrounds. None of the differences were statistically significant apart from Asian boys in Year 2 and Middle-Eastern and European boys in Year 10, whose skill levels were significantly lower than English-speaking background boys. Among girls, there were no clear patterns across the four cultural groups for the throw. The only exception to this appeared for Year 10 girls where those from Asian backgrounds displayed lower skill levels than those from English-speaking backgrounds. Once again, the very low levels of proficiency for the throw among girls may have clouded any real differences that may exist across cultural backgrounds among girls.

BMI category

The relationship between BMI category and advanced skills in the throw was fairly consistent for both boys and girls. Overweight/obese students were less proficient than their healthy-weight companions in every Year group except Year 6 girls. These differences between overweight/obese and healthy-weight students were statistically significant for Year 4 boys and approached statistical significance among Year 10 boys.

Figure 9.7. Prevalence of advanced skills for the overarm throw among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)



Table 9.7. Prevalence of advanced skills for the overarm throw among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	25.1	49.4	65.6	76.4	79.7
Rural	22.6	45.8	63.6	76.4	77.8
SES					
Low	20.5	51.6	64.5	80.5	82.5
Medium	19.4*	50.0	66.7	71.8	74.0
High	32.7	44.8	64.9	77.2	81.8
Cultural background					
English-speaking	26.8	50.3	64.7	76.8	81.4
European	25.0	46.2	81.3	90.9	57.1*
Middle-Eastern	18.2	33.3	58.8	75.0	40.0*
Asian	6.5*	37.0	60.9	60.9	77.8
BMI category					
Healthy weight	25.4	52.1	67.4	77.6	81.5
Overweight/obese	21.5	40.5*	60.7	72.8	73.2
Girls					
Rurality					
Urban	5.9	11.6	25.5	31.6	34.5
Rural	9.6	10.9	29.4	33.9	40.0
SES					
Low	6.3	12.6	23.2	24.6	35.1
Medium	5.7	9.4	22.0	31.8	29.7
High	7.4	12.2	33.6	39.1	35.9
Cultural background					
English-speaking	6.9 ⁿ	11.5	27.5	31.4 ⁿ	36.9 ⁿ
European	0.0	5.9	16.7	36.4	0.0
Middle-Eastern	0.0	13.0	14.3	0.0	44.4
Asian	6.9	12.0	18.8	34.6	10.9
BMI category					
Healthy weight	7.3	12.6	26.3	31.1	34.4
Overweight/obese	3.3	8.9	24.7	36.1	31.3

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

CATCH

Figure 9.8 and Table 9.8 show the prevalence of advanced skills for the catch among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status, cultural background and BMI category.

Rurality

The relationship between rurality and advanced skills in the catch was identical for boys and girls. In primary school (Years 2, 4 and 6), the prevalence of advanced skills was greater among urban students. However, in secondary school the reverse was true, with the prevalence being slightly higher among rural students. None of these differences were statistically significant.

Socioeconomic status

Among boys, there was a mixed pattern in the relationship between advanced skills in the catch and socioeconomic status. Specifically, the prevalence of advanced skills increased with increasing socioeconomic status in Year 2 and Year 8, with the relationship statistically significant for Year 2, but decreased with increasing socioeconomic status among Year 10 boys. Among Year 4 and 6 boys, there did not appear to be any relationship between socioeconomic status and advanced skills. Among girls, there appeared to be a more consistent relationship. For most Year groups, the prevalence of advanced skills increased with increasing socioeconomic status. This relationship was statistically significant for Years 8 and 10.

Cultural background

Among boys, those from English-speaking and European cultural backgrounds displayed higher prevalences of advanced skills than those from Middle-Eastern and Asian cultural backgrounds in Years 2, 4 and 8, with the difference statistically significant among Year 4 boys from Asian cultural backgrounds. Among Year 6 and Year 10, boys from Middle-Eastern and European backgrounds, respectively, displayed lower prevalences than the other three cultural backgrounds. Among girls, the prevalence of advanced skills was lower among those from an Asian cultural background in Years 2, 6 and 10, with the difference statistically significant in Year 6. Year 10 girls from Middle-Eastern backgrounds also displayed a low prevalence.

BMI category

Among primary school boys, the prevalence of advanced skills was higher in the healthy-weight group than the overweight/obese group. There were no substantial differences between overweight/obese and healthy-weight boys in Year 8, but in Year 10, overweight/obese boys displayed a slightly higher prevalence of advanced skills. None of these differences were statistically significant. For girls, the prevalence of advanced skills was higher in every Year group except Year 2. The differences for girls were statistically significant in Year 6 and Year 10 and approached statistical significance in Year 4.

Figure 9.8. Prevalence of catch advanced skills among boys and for girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

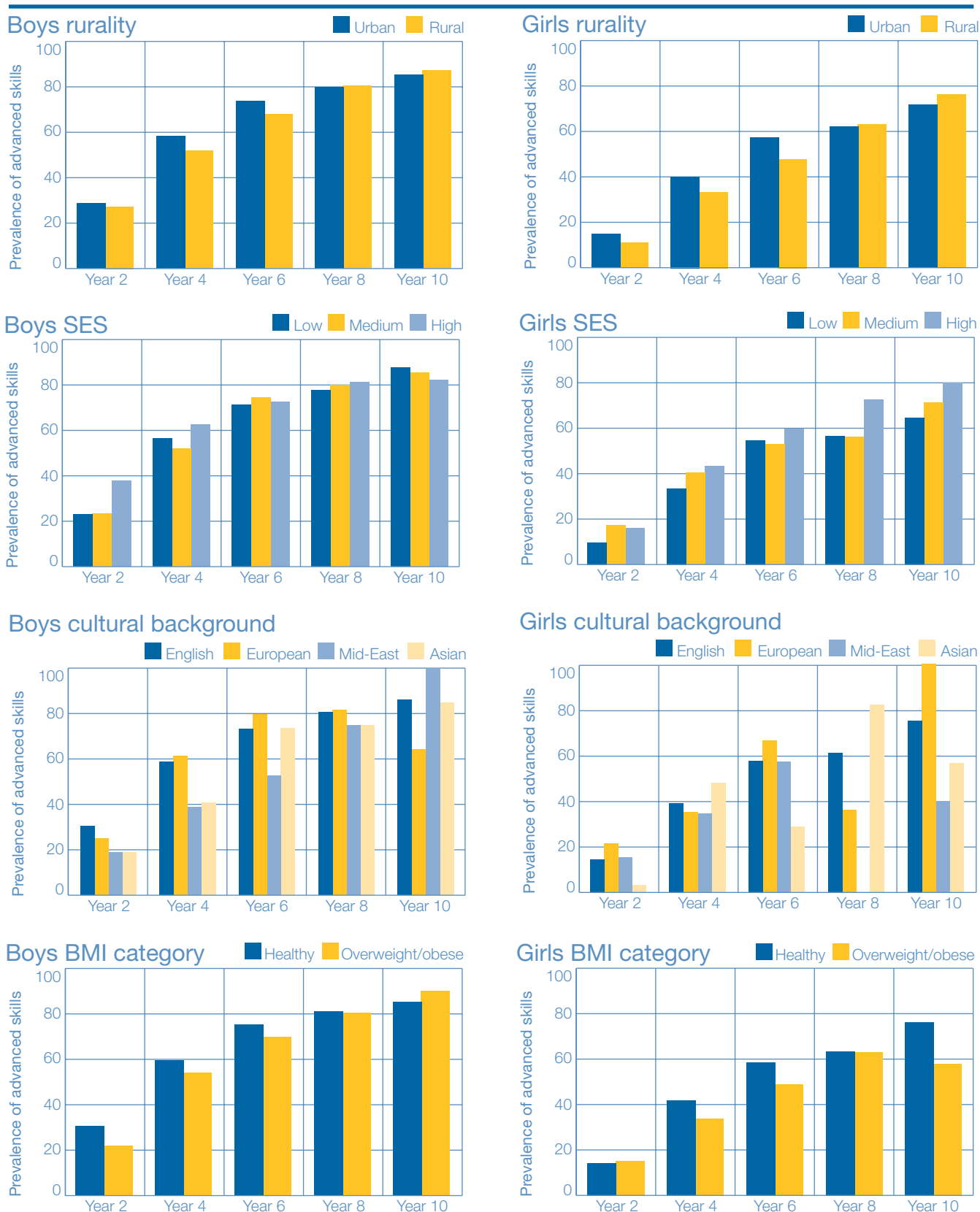


Table 9.8. Prevalence of catch advanced skills among boys and girls in Years 2, 4, 6, 8 and 10 by rurality, socioeconomic status (SES), cultural background and BMI category (%)

	Year 2	Year 4	Year 6	Year 8	Year 10
Boys					
Rurality					
Urban	29.0	58.5	74.1	80.1	85.6
Rural	27.4	52.0	68.2	80.8	87.5
SES					
Low	23.1*	56.8	71.7	78.3	88.5
Medium	23.5*	52.3	75.0	80.7	86.0
High	38.1	63.1	73.2	81.9	82.9
Cultural background					
English-speaking	30.5	58.9	73.6	80.9	86.6 ⁿ
European	25.0	61.5	80.0	81.8	64.3
Middle-Eastern	19.0	38.9	52.9	75.0	100.0
Asian	18.8	40.7*	73.9	75.0	85.2
BMI category					
Healthy weight	30.4	59.1	74.9	80.4	84.6
Overweight/obese	22.0	53.7	69.4	79.8	89.6
Girls					
Rurality					
Urban	14.9	40.1	57.3	62.0	71.5
Rural	11.0	33.3	47.8	63.1	76.1
SES					
Low	9.9	33.5	54.8	56.7	64.9*
Medium	17.4	40.5	53.1	56.1*	71.2
High	15.9	43.3	59.9	72.5	79.9
Cultural background					
English-speaking	14.7	39.1	57.6	61.2 ⁿ	75.2 ⁿ
European	21.4	35.3	66.7	36.4	100.0
Middle-Eastern	15.4	34.8	57.1	0.0	40.0
Asian	3.3	48.0	29.0*	82.1	56.5
BMI category					
Healthy weight	14.0	41.6	58.0	62.8	75.5
Overweight/obese	15.2	33.6	48.5*	62.4	57.4*

* Indicates a statistically significant difference at $P < .05$. Comparisons are: between urban and rural; low and medium socioeconomic status compared with high socioeconomic status; European, Middle-Eastern and Asian cultural backgrounds compared with English-speaking cultural background; and overweight and obese compared with healthy weight. Comparisons are within each sex/Year group category.

ⁿ Indicates that statistical significance could not be calculated due to low numbers.

TRENDS IN FUNDAMENTAL MOVEMENT SKILLS MASTERY 1997-2004

Figure 9.9 to 9.13 and Tables 9.9 to 9.13 show the prevalence of mastery of the sprint run, vertical jump, overarm throw, catch, and kick in 1997 and 2004 for boys and girls in Years 4, 6, 8 and 10.

SPRINT RUN

Figure 9.9 shows that, for both boys and girls, the results were fairly consistent with the prevalence of mastery of the sprint run increasing from 1997 to 2004 among all Year groups. Among boys, increases ranged from 0.7% in Year 6 to 10% in Year 4 with the latter increase statistically significant. Among girls, the increases were small and non-significant among primary school years ranging from 0.8% in Year 6 to 4% in Year 4. However, increases in secondary school years were large and highly statistically significant, ranging from 12% in Year 10 to 16% in Year 8.

Figure 9.9. Prevalence of sprint run mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

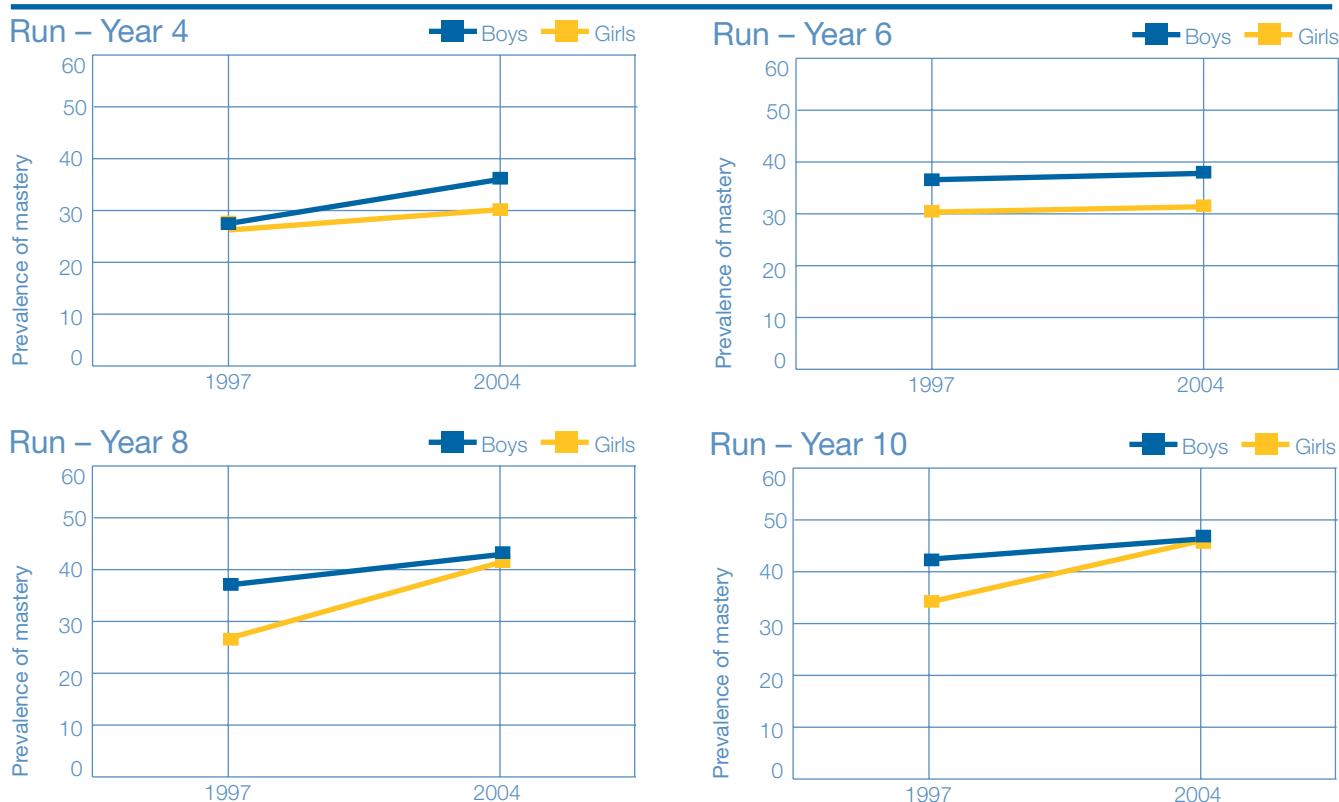


Table 9.9. Prevalence of sprint run mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

	Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1997	25.2	25.7	36.6	29.9	37.1	27.2	42.9	34.5
2004	46.5*	35.5*	29.7	37.3	30.8	43.9	42.7*	47.0

* Indicates a statistically significant difference at P<.05 between 1997 and 2004 within each sex/Year group.

VERTICAL JUMP

Figure 9.10 shows the proportion of boys and girls in Years 4, 6, 8 and 10 who displayed mastery of the vertical jump in 1997 and in 2004. Secular trends in vertical jump mastery were consistent for boys and girls across all Year groups. Mastery increased significantly in all Year groups except Year 4 boys

from 1997 to 2004. Among boys in Years 6, 8 and 10, these increases ranged from 10% to 16% and all were statistically significant. Among girls, the increases in vertical jump mastery were highly statistically significant in all Year groups, ranging from 9% in Year 4 to 22% in Year 8.

Figure 9.10. Prevalence of vertical jump mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

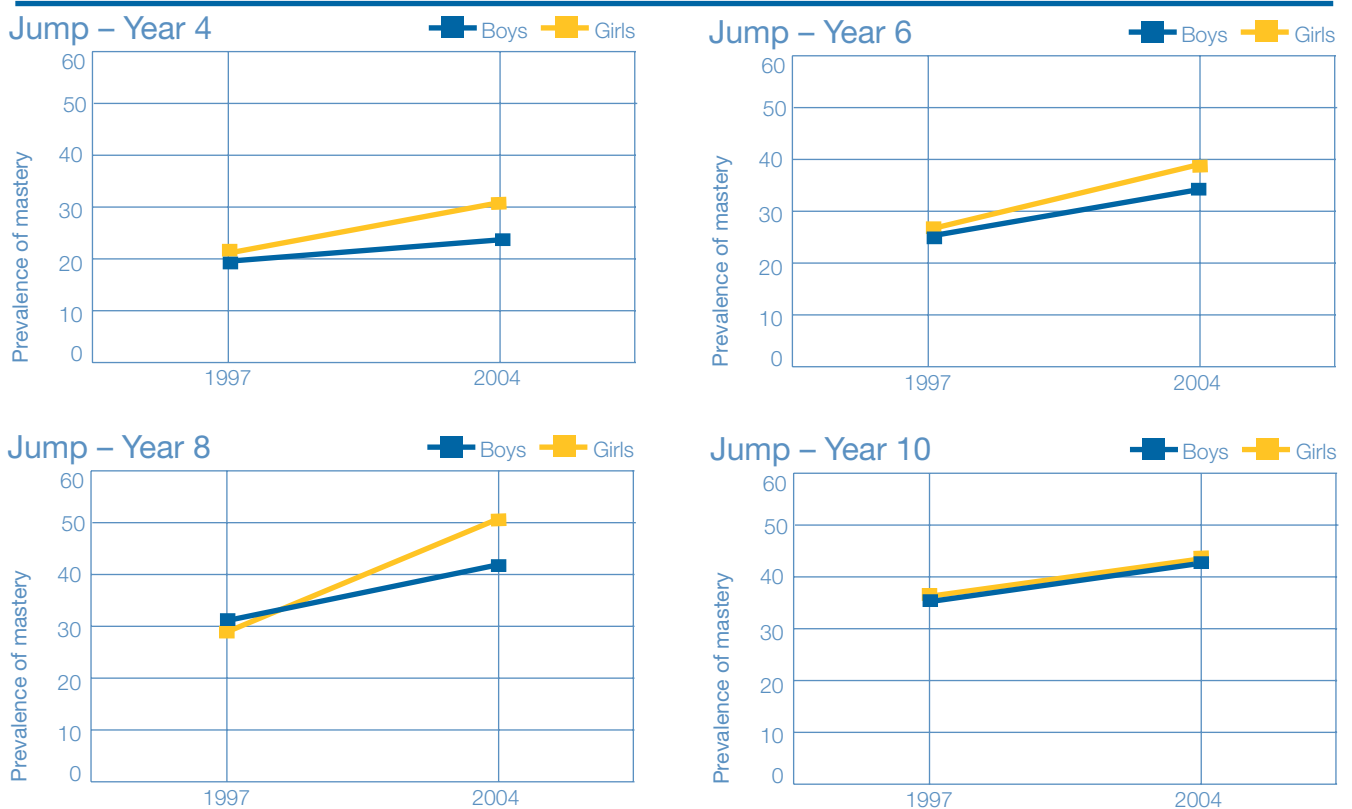


Table 9.10. Prevalence of vertical jump mastery among boys and girls in Years 4, 6, 8, and 10 in 1997 and 2004 (%)

	Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1997	20.4	21.3	24.0	25.4	30.5	29.0	35.8	36.6
2004	23.8	30.4*	33.5*	33.5*	41.6*	50.9*	51.6*	52.3*

* Indicates a statistically significant difference at $P < .05$ between 1997 and 2004 within each sex/Year group.

OVERARM THROW

Figure 9.11 shows the proportion of boys and girls in Years 4, 6, 8, and 10 who displayed mastery of the overarm throw in 1997 and in 2004. A clearly different trend was evident between boys and girls for overarm throw mastery. However, the trends within sexes were

consistent, with boys showing vast and statistically significant improvements in all Year groups ranging from 8% in Year 4 to 14% in Year 8 from 1997 to 2004. Among girls, the results were not as positive, with no changes occurring for any Year group from 1997 and 2004.

Figure 9.11. Prevalence of overarm throw mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

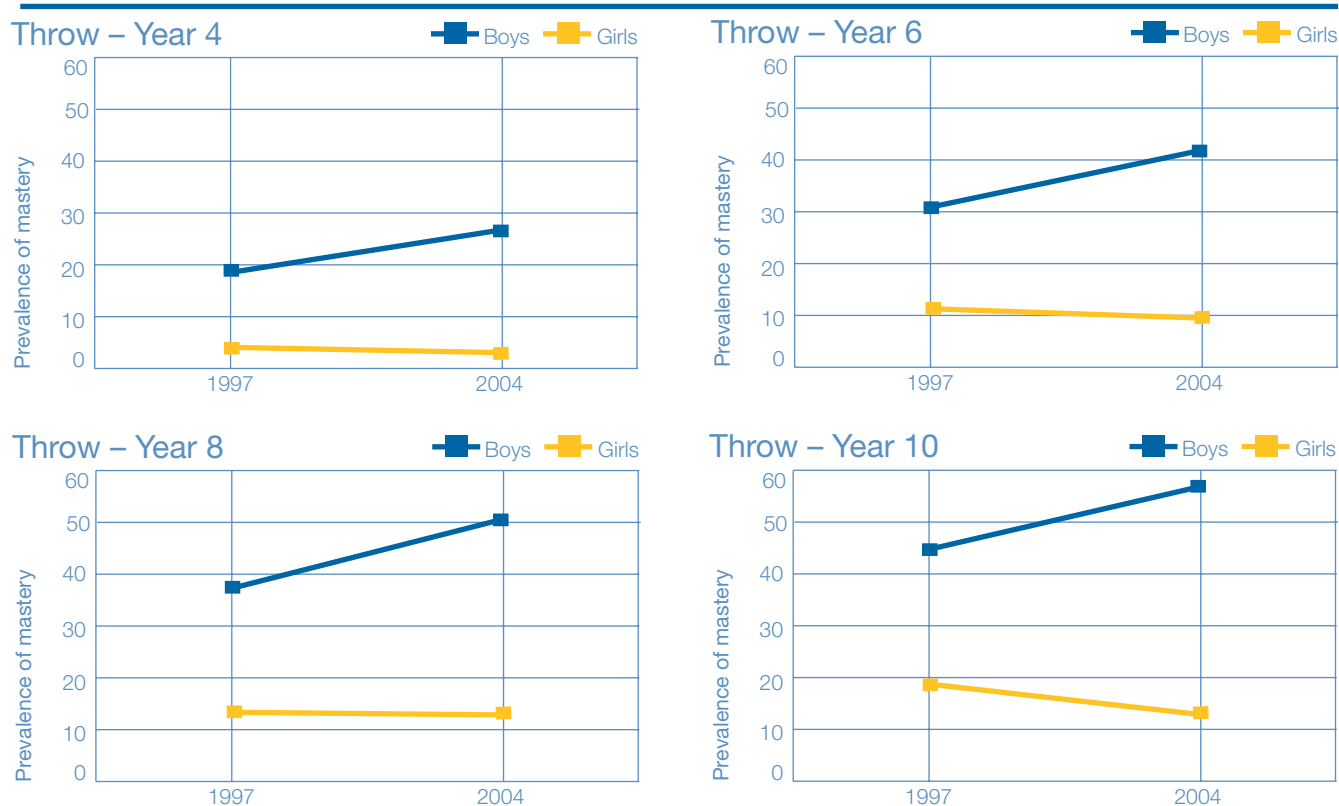


Table 9.11. Prevalence of overarm throw mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

	Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1997	18.5	4.2	30.1	10.5	36.6	13.5	45.0	18.6
2004	26.4*	3.8	41.1*	9.7	50.7*	13.4	57.8*	13.8

* Indicates a statistically significant difference at P<.05 between 1997 and 2004 within each sex/Year group.

CATCH

Figure 9.12 shows the proportion of boys and girls in Years 4, 6, 8 and 10 who displayed mastery of the catch in 1997 and in 2004. The results for the catch were consistent and noticeable. Boys and

girls in every Year group displayed highly significant increases in mastery of the catch from 1997 to 2004. For boys, these increases ranged from 22% in Year 4 to 34% in Year 8. Among girls, the increases ranged from 17% in Year 4 to 32% in Year 10.

Figure 9.12. Prevalence of catch mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

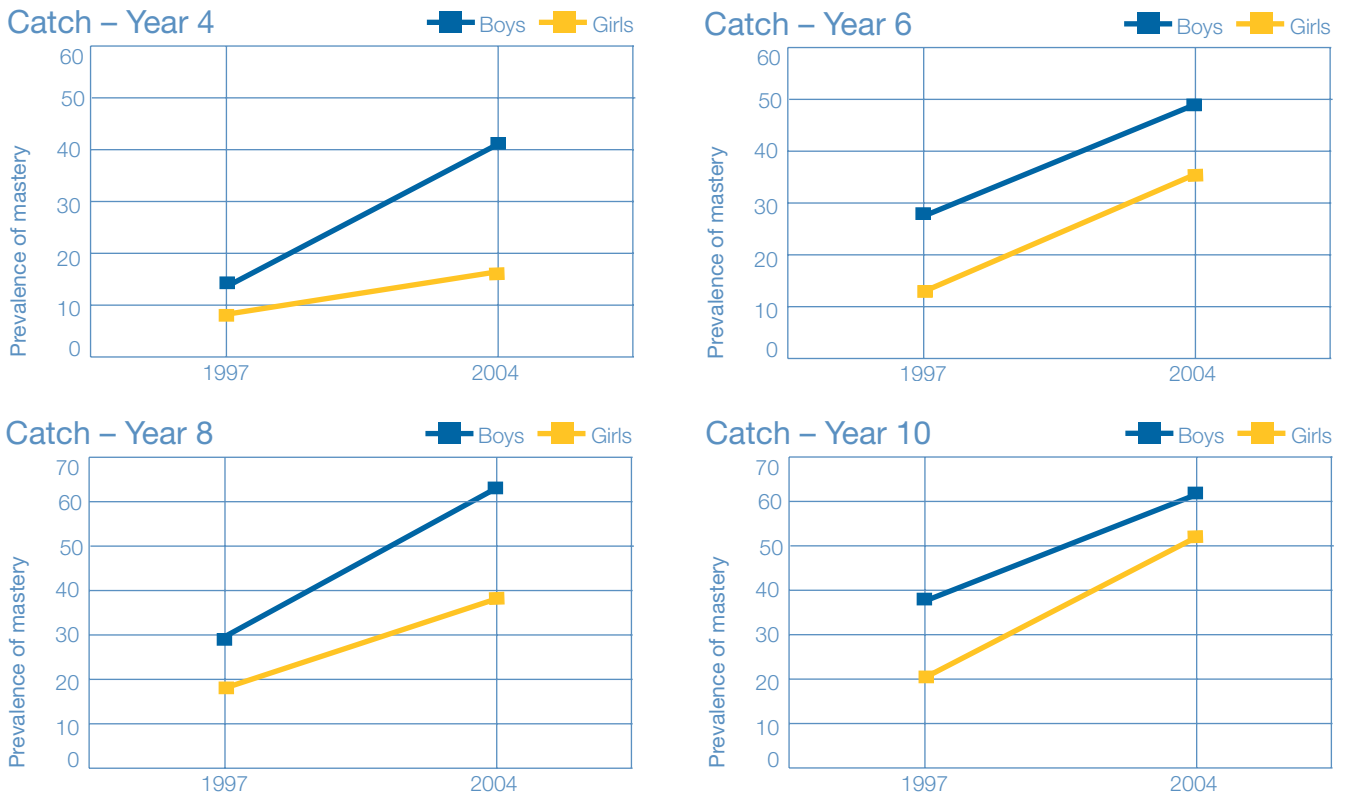


Table 9.12. Prevalence of catch mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

	Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1997	13.9	8.8	26.9	13.1	29.0	17.5	38.1	19.5
2004	40.8*	25.3*	49.3*	34.6*	63.2*	39.2*	61.1*	51.6*

* Indicates a statistically significant difference at $P < .05$ between 1997 and 2004 within each sex/Year group.

Kick

Figure 9.13 shows the proportion of boys and girls in Years 4, 6, 8 and 10 who displayed mastery of the kick in 1997 and in 2004. Among boys, there were increases in skill mastery in each Year group over the seven-year period. These increases ranged from 8% in Year 6 to 16% in Year 8, with Year 4 the

only Year group where the improvement was not statistically significant. The proportion who displayed mastery of the kick did not improve from 1997 to 2004 among girls in Years 4, 6, and 8. Year 10 were the only group of girls where the proportion clearly increased, with a 4% improvement from 1997 to 2004, which approached statistical significance.

Figure 9.13. Prevalence of kick mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

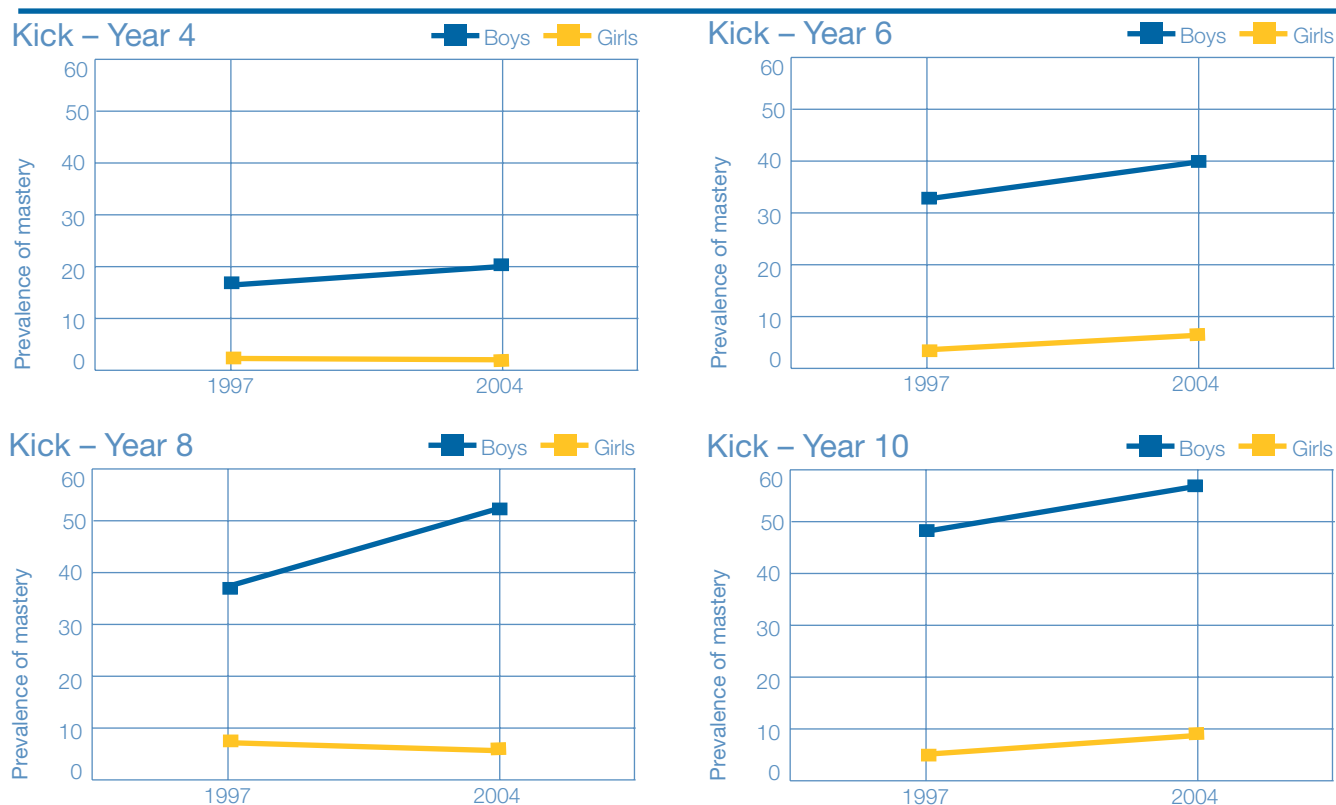


Table 9.13. Prevalence of kick mastery among boys and girls in Years 4, 6, 8 and 10 in 1997 and 2004 (%)

	Year 4		Year 6		Year 8		Year 10	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1997	16.8	2.1	32.2	3.1	37.8	6.9	48.7	4.6
2004	19.9	2.0	40.3*	5.8	53.6*	5.3	57.8*	8.3

* Indicates a statistically significant difference at P<.05 between 1997 and 2004 within each sex/Year group.

DISCUSSION

In 1997, the prevalence of mastery did not exceed 40% for any of the skills except the overarm throw among Year 10 boys. In 2004, the prevalence of mastery exceeded 40% on 19 occasions, and for five out of seven skills, with even Year 6 students reaching this proportion in three of the skills. Another noticeable finding is that, unlike 1997, where there seemed to be a plateau in mastery after Year 6, especially for girls, the plateau seems to have disappeared with increases in mastery fairly linear from Year 6 into Year 8 and then into Year 10.

Similar to previous studies (Booth, Okely et al., 1999; Okely & Booth, 2004; van Beurden et al., 2002), more prevalent mastery in object control skills (catch, kick and throw) was found among boys and for three of the four locomotor skills (vertical jump, side gallop and leap) among girls. These differences between boys and girls were consistent across all Year groups and there are several explanations for these findings. First, these skills are reinforced through traditional activities and sports in which there is a clear gender difference in participation rates. For example, the object-control skills of catching, kicking and throwing are the foundation of ball sports such as cricket and soccer, whereas the locomotor skills of vertical jump, side gallop and leap are more commonly used in dancing and gymnastics. Recent data from the Australian Bureau of Statistics (2003) suggest that participation rates in cricket and soccer are five to 10 times higher among boys than girls and that participation rates in dance and gymnastics are three to 15 times higher among girls. As such, many more boys and girls are being exposed to formal environmental conditions that will develop their object-control and locomotor skills, respectively.

In addition to the many formal and organised opportunities for boys to develop object-control skills and for girls to develop locomotor skills, there are also many non-organised opportunities. These occur through casual games played among family members and friends and quite often are the same activities that boys and girls participate in formally through organised sports. For example,

boys who play cricket for a club are also likely to play it with friends at recess, at lunch and after school. Similarly, girls who participate in formal dance lessons are also likely to play dance and rhythm games such as skipping and hopscotch informally with friends during free-time opportunities at school and after school. As such, there is an informal, and quite gender-specific environment reinforcing cultural norms that boys and girls participate in certain activities.

For skills that are not as gender-specific, such as the sprint run, it is not surprising that the differences are quite small and not significant between boys and girls. The ubiquitous nature of the sprint run means that boys and girls are probably likely to be learning it no matter what sport or activity they participate in. This reinforces the theory that the differences between boys and girls are, almost exclusively, environmentally and not biologically determined (Thomas, 2000) and that, given opportunities to develop these skills through encouragement, feedback and practice, boys and girls can be equally proficient in any skill.

The study found that skill proficiency was generally higher among boys and girls from higher socioeconomic backgrounds and that the relationship was stronger for girls. This finding is consistent with previous studies (Booth, Okely et al., 1999; Okely & Booth, 2004) and may reflect the greater access to and affordability of organised sports and their equipment for those with higher socioeconomic status. In addition to access and affordability, there is evidence that those from higher socioeconomic backgrounds are given greater social and parental encouragement and support to participate in organised sports (Yang et al., 1996).

The study also found that skill levels were generally lower among children and adolescents from Middle-Eastern cultural backgrounds, especially among Middle-Eastern girls. This finding is identical to previous NSW data (Booth et al., 1997) and it is hypothesised that it is a result of organised sports and non-organised activities not being as highly valued (and as such, participated in) as in other cultures.

With respect to comparisons by BMI category, it was found that overweight/obese boys and girls had significantly lower skill proficiency in the locomotor skills (sprint run, vertical jump, side gallop and leap). This finding is consistent with previous studies (Okely et al., 2004; Southall, Okely & Steele, 2004) and can be explained by the difficulty and discomfort overweight/obese children have in moving their body mass from one place to another (as is required for locomotor skills), and the increased pressure in their feet when they are performing weight-bearing activities (Dowling et al., 2001). It was also found that although overweight/obese children tended to have poorer proficiency in the object-control skills (kick, throw and catch) compared with healthy weight children, the differences were not as large as for the locomotor skills and not consistently statistically significant. This finding is also similar to prior studies (Okely et al., 2004; Southall et al., 2004) and is largely because these skills, unlike locomotor skills, do not require as much movement of the body from one place to another.

The most substantial findings for FMS from this study are the changes in skill proficiency from 1997 to 2004. For boys, every skill in every Year group improved, with these improvements being statistically significant in three-quarters of the cases. In fact, for boys in Years 6, 8 and 10, there were statistically significant improvements in mastery for four out of five skills (vertical jump, throw, catch and kick). Among girls, results were almost as impressive. For every Year group, mastery levels for each skill either stayed the same (in five out of 20 cases) or improved (in 15 out of 20 cases). In more than half of the cases, these improvements were statistically significant.

The most marked improvements were seen among girls. Year 8 girls showed significant improvement in three of the five skills (sprint run, vertical jump and catch) while Year 10 girls improved significantly in four of the five skills (sprint run, vertical jump, catch, and kick). That significant improvements are being seen in object-control skills (catch and kick), which are not traditionally skills in which girls display high levels of proficiency, is a tremendously encouraging finding.

These very positive findings are likely to be the results of a planned, sequential and sustained focus on the development of FMS, especially in NSW DET primary schools since 1997.

The implementation of the *Get skilled: Get active* resource (NSW Department of Education and Training, 2000) in every NSW primary school, its dissemination through long-term professional development of teachers, and the employment of specialist PDHPE consultants in every DET district from 1997 to 1999 has contributed to making FMS a focus of primary school PDHPE over the past five years. Increasing opportunities to participate in activities that develop FMS has also been a key objective for the priority area of 'Healthier Schools' in the *Prevention of Obesity in Children and Young People: NSW Government Action Plan 2003-2007* (NSW Department of Health, 2003). It is extremely encouraging to see that such a concerted effort over the past five years has had a significant impact.

REFERENCES

- Australian Bureau of Statistics 2003, Children's participation in cultural and leisure activities, *Australia: Catalogue No. 4901.0*, Canberra: Australian Bureau of Statistics.
- Booth M, Macaskill P, McLellan L, Phongsavan P, Okely A, Patterson J 1997, *NSW Schools Fitness and Physical Activity Survey*, Sydney: NSW Department of School Education.
- Booth ML, Okely AD, McLellan L, Phongsavan P, Macaskill P, Patterson J 1999, Mastery of fundamental motor skills among New South Wales school students: Prevalence and sociodemographic distribution, *Journal of Science and Medicine in Sport*, 2, 93-105.
- Dowling AM, Steele JR, Baur LA 2001, Does obesity influence foot structure and plantar pressure patterns in prepubescent children? *International Journal of Obesity*, 25, 845-852.
- Gallahue DL, Ozmun J 2002, *Understanding motor development: Infants, children, adolescents, adults* (5th ed.) New York: McGraw-Hill.
- McKenzie TL, Alcaraz JE, Sallis JF, Faucette N 1998, Effects of a physical education program on children's manipulative skills, *Journal of Teaching in Physical Education*, 17, 327-341.
- NSW Department of Education and Training 2000, *Get skilled: Get active. A K-6 resource to support the teaching of fundamental movement skills*, Ryde, NSW: NSW Department of Education and Training.
- NSW Department of Health 2003, *NSW Child Obesity Summit: Government response 2003*, Sydney: NSW Department of Health.
- Okely AD, Booth ML 2004, Mastery of fundamental movement skills among children in New South Wales: Prevalence and socio-demographic distribution, *Journal of Science and Medicine in Sport*, 7, 358-372.
- Okely AD, Booth ML, Chey T 2004, Relationships between body composition and fundamental movement skills among children and adolescents, *Research Quarterly for Exercise and Sport*, 75, 238-248.
- Okely AD, Booth ML, Patterson JW 2001a, Relationship of cardiorespiratory endurance to fundamental movement skill proficiency among adolescents, *Pediatric Exercise Science*, 13, 380-391.
- Okely AD, Booth ML, Patterson JW, 2001b, Relationship of physical activity to fundamental movement skills among adolescents, *Medicine and Science in Sports and Exercise*, 33, 1899-1904.
- Okely AD, Booth ML, Wright J, Hearne D, Konza D 2003, *Evaluation of the Gold Medal Fitness Program*, Sydney: NSW Department of Education & Training.
- Payne VG, Isaacs LD 1995, *Human motor development: a lifespan approach* (3rd ed.), Mountain View, CA: Mayfield.
- Saakslahki A, Numminen P, Niinikoski H, Rask-Nissila L, Viikari J, Tuominen J 1999, Is physical activity related to body size, fundamental motor skills, and CHD risk factors in early childhood?, *Pediatric Exercise Science*, 11, 327-340.
- Southall JE, Okely AD, Steele JR 2004, Actual and perceived competence in overweight and non-overweight children, *Pediatric Exercise Science*, 16(1), 15-24.
- Thomas JR 2000, Children's control, learning, and performance of motor skills, *Research Quarterly for Exercise and Sport*, 71, 1-9.
- Ulrich BD 1987, Perceptions of physical competence, motor competence and participation in organized sport: Their interrelationships in young children, *Research Quarterly for Exercise and Sport*, 58, 57-67.

van Beurden E, Zask A, Barnett LM, Dietrich UC 2002, Fundamental movement skills – how do primary school children perform? The ‘Move it Groove it’ program in rural Australia, *Journal of Science and Medicine in Sport*, 5(3), 244-252.

Yang X, Telama R, Laakso L 1996, Parents’ physical activity, socioeconomic status and education as predictors of physical activity and sport among children and youths: A 12-year follow-up study, *International Review for the Sociology of Sport*, 31, 273-294.