# The relationship of family characteristics, parental beliefs and parenting behaviours with the fundamental movement proficiency of primary school children in South East Wales

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**Abstract**

The aim of this study was to investigate the relationship between the fundamental movement skills (FMS) of primary school children and aspects of their home environment. Four hundred and eighty-four primary school children were recruited to the study and consisted of 255 boys and 229 girls, aged between 9-11 years. Participants were assessed on eight different FMS and placed into different ability profiles according to the similarity of their FMS proficiencies. Four hundred and eighty-four parent questionnaires were completed and matched to the profile membership of the participants. For boys, positive relationships were found between their FMS ability and the variables of parent-child interaction in video gaming, parental beliefs concerning the importance of social development, motor development and children's participation in physical activity, parental awareness of their own child's extracurricular participation in community sports clubs and physical activity preferences. For girls, positive relationships with FMS proficiency were found for parental beliefs concerning the importance of participation in physical activity for social function and the importance of participation in physical activity for learning rules. In the case of girls only, several family characteristics were also significantly related to FMS proficiency. These were: the involvement of members of the extended family in their before and after school care provision; their parents' employment status; and their mother's physical activity participation. In conclusion, parental beliefs and behaviours have the potential to influence children's FMS performance and their impact needs to be considered in any interventions to improve the FMS of children of primary school age.

**Keywords**

Fundamental movement skills, physical activity, socializing agents, parents, primary school children.

## Introduction

The development of fundamental movement skills (FMS) has been suggested as a key factor in promoting lifelong physical activity (Cohen et al., 2014). It is argued that the early development of FMS in children is a primary underlying mechanism that promotes engagement in physical activity which in turn contributes to children's psychosocial development (Stodden et al., 2008). Hence, competence in FMS can contribute to an explanation as to why children decide to participate in or avoid physical activity (Barnett et al., 2008). Yet, recent studies suggest that research has to date failed to consider adequately the dynamic role that FMS competence plays in both the initiation and maintenance of physical activity (Breslin et al., 2012; Stodden et al., 2008). Thus, researchers and practitioners continue to explore factors that positively relate to FMS competence and are both modifiable and responsive to interventions in order to increase participation in physical activity (Kenyon et al., 2012).

Schools have been identified as essential sites and facilitators of physical activity and, as such, are being called upon to give greater attention to their physical education programmes and in particular the development of FMS (Naylor and McKay, 2009; Pate et al., 2006). Consequently, FMS are now an integral component of physical education curricula in the United Kingdom (UK) and several other countries worldwide (Australian Curriculum, Assessment and Reporting Authority, 2012; Department for Education, 2013; Society of Health and Physical Educators, 2013). School is where children spend a large proportion of their day and it provides an environment where both formal physical education lessons and informal extracurricular sports and physical activity programmes can be provided to promote and enable physical activity (Ridgers et al., 2006). However, although the school environment is seen as an effective place to develop, enhance and promote FMS and physical activity involvement for future health, it has been recognised that both children's motor skill

performance and their physical activity participation have declined worldwide (Hardy et al., 2013). The underlying causes contributing to this observed decline are however unclear (Tompsett et al., 2014).

Ferreira et al. (2007) have suggested the need to examine other environmental influences on children and youth physical activity (e.g. home and neighbourhood) and not just at school to better inform the development of interventions that will improve physical activity levels. Indeed, Barnett et al. (2013) and Morgan et al. (2019) have suggested that the best chance of improving children's FMS lies with parents and immediate family members, as much of children's free time outside of the structured routine of daily activities (i.e. school) is spent in the context of the family. However, as Faigenbaum et al. (2013) highlight, many parents assume that their children take part in enough physical activity through the agency of the school and that they are thus competent in movement skills. Welk (1999) has argued that for a child to develop active patterns of living, it is important for them to receive activity promoting messages and experiences at home. It has been suggested that, children who are encouraged and supported in their physical activity outside of school develop FMS earlier, are more competent and thus more likely to do well at and enjoy formalised sport and physical activity, in contrast to those who receive minimal encouragement and support (Kirk, 2005; Van Der Horst et al., 2007).

A useful theoretical model to explain parental influence on physical activity is the expectancy-value model of Eccles and Harrold (1991). Welk (1999) suggests that this model has clear application to success and participation in sport and physical activity in that socialization behaviours are thought to be influenced jointly by parental expectation for the child's success in a given area and the value parents place on that success. The model suggests that there are various ways that parents can socialize their children to be physically active. These include encouragement (e.g. to play outside, the limitation of television

111 viewing, the transfer of knowledge), involvement (playing or practising skills with their
112 children), facilitation (providing access to facilities, programmes, equipment) and role
113 modelling (living a personally active lifestyle). Thus, children who live with parents who fail
114 to exercise and consistently engage in sedentary type behaviour, are more likely to mimic the
115 lifestyles they see and retain these habits into adulthood (Fogelholm et al., 1999; McGuire et
116 al., 2002). Eccles and colleagues (Eccles et al., 1998; Fredericks and Eccles, 2004) also
117 suggest that the beliefs parents hold will influence their patterns of interaction with their
118 children and affect their child's motivation. For example, parents may deliberately engage in
119 practices that they feel will help to protect their children from and overcome the risks in their
120 environment which can unintentionally prove to be detrimental to increasing physical activity
121 (Lee, 2014).

122 Cools et al. (2011) examined the FMS performance of a sample of Belgian preschool
123 children in relation to their family context (n = 846, ages 4-6 years old). They suggested that
124 the socialization process, in which parents are involved, is one of the major environmental
125 mechanisms constraining children's movement skill performance. They highlighted several
126 positive and negative family correlates of preschool children's FMS performance but noted
127 that there was a degree of complexity in many of the relationships they found. For example,
128 although level of paternal education was unequivocally positively related to preschool
129 children's FMS performance, the variable level of fathers' personal physical activity showed
130 a far more complex relationship with their children's FMS performance. Children whose
131 fathers were physically active less than once a month and those whose fathers were engaged
132 daily in physical activity both had significantly lower FMS performances than those whose
133 fathers were physically active once or several times a week. A gender difference was also
134 reported in that the general positive association with fathers' physical activity was found with
135 boys but not with girls. Nonetheless, Cools et al. concluded that the physical activity and

competence of preschool children might be enhanced by interventions with family members to emphasize the importance of providing sufficient opportunities to be physically active as a part of supporting the child's overall development.

Although the preschool years have been widely identified as a critical period for FMS development (Hardy et al., 2010) and the influence of parents is significant during this time (Cools et al., 2011) it has been pointed out by Gabbard (1992) that the development of FMS continues throughout mid to late childhood (i.e. throughout the primary school years). This is a time when children are more acutely aware of their perceptions of competence which can influence their persistence in a task or activity with permanent effect (Faigenbaum et al., 2013; Stodden et al., 2008). Therefore, encouragement and support from parents can also be significant in the process of the development of elementary patterns of FMS into more mature patterns of movement and proficiency. At present, and to the authors' knowledge, there have been very few studies investigating the relationships between parental socialisation behaviours and children's FMS proficiency at the primary school stage in the UK. Therefore, further investigation of this link is clearly warranted.

## Methods

### Participants and setting

Following approval by the university's Human Research Ethics Committee, a total of 27 primary schools in South East Wales was invited to participate in the study, 18 of which accepted. Schools were briefed on the purpose of the study and issued with informed consent packs and copies of the Parental Behaviour Questionnaire (PBQ). Only those children returning signed parental consent and child assent forms participated in the study. A total of 640 completed consent packs were returned. Subsequently, each school attended the FMS test centre at the University on separate dates. A total of 553 complete FMS data sets were recorded for children, aged 9-11 years old. The Parental Behaviour Questionnaire was

subsequently returned by 502 parents of children in this study and a total of 484 fully completed questionnaires was subsequently matched to children with complete FMS data sets. A total of 255 boys (*M* age = 10.9 years, *SD* = 0.62), and 229 girls (*M* age = 10.7 years, *SD* = 0.64) were then included in the study.

## Instruments and measures

### Fundamental movement skills

FMS proficiencies were assessed using process-oriented checklists taken from the Australian resource *Get Skilled: Get Active* (NSW Department of Education and Training, 2000) which has been validated for use with both children and adolescents (Okely and Booth, 2000). The resource includes skills from all categories of FMS (locomotor, manipulative, and stability; Gallahue and Donnelly, 2003). In this study, eight individual FMS, including four locomotor skills (run, vertical jump, side gallop, leap), three manipulative skills (catch, overhand throw, kick), and one stability skill (static balance) were assessed. *Get Skilled: Get Active* was preferred to other measures of FMS (e.g. the Test of Gross Motor Development-2; Ulrich, 2000) as it includes a stability component of FMS assessment, and is appropriate and culturally acceptable for use with children in this population (Jarvis et al., 2018).

The FMS assessments were video recorded (Sony video camera, Sony, UK) and analysed using performance analysis software (Studio Code, NSW, Australia) in accordance with the *Get Skilled: Get Active* guidelines. The *Get Skilled: Get Active* process-oriented checklists and guidelines were used to determine the total number of components performed correctly for each skill. The total number of components performed correctly were summed to give a score for each skill (range 0 to 6). All analyses were undertaken by the first author, an experienced FMS practitioner. Inter and intra-rater reliability analyses were performed on a randomly selected sample of the completed data sets using a second experienced FMS practitioner and reliability was determined using linear weighted Kappa (Fleiss et al., 2003).

Reliability for all FMS measures displayed a level of agreement that was good (Kw range = .73 to .93) or above (Kw range = .61 to .79) based on Altman's (1991) criteria.

**Parental behaviour questionnaire**

The PBQ was based on that developed and used by Cools et al. (2011). Their study represented a significant initial contribution to this area of research and as such its measures were seen as providing a useful baseline against which to interpret and assess our own findings. The development of the questions used had demonstrated strong face and content validity. Using a test-retest study with a small sample its authors had also reported high reliability (> 0.80) for measures of family characteristics, physical activity participation, use of transport, and rating of the importance of selected developmental aspects. For more subjective aspects such as appreciation of social development and characteristics of child's equipment, physical activity and play more moderate stability coefficients, ranging between 0.50 and 0.78 were reported. Questions relating to the physical environment, parental educational attainment and the provision of equipment were not included due to their potentially intrusive and socially desirable nature and thus having potential to impact on data quality. Parents therefore responded to questions relating to the family characteristics, parental behaviour, parental beliefs, and their awareness of their child's activity involvement.

The first group of variables concerned characteristics impacting on the family environment such as the family structure, parents' employment status and workload. Family structure included its composition (i.e. one parent, two parents or other responsible care givers), identification of the provision of care to the child before and after school, the duration of this care provision, and the number of siblings living at home. Parental employment status was subdivided into: (a) active (i.e. employed/employable) and (b) passive (i.e. non-employable/poor-health/retired). Workload was categorised as (a) full-time working, (b) part-time working, and (c) not working. Parental behaviours included the parents' involvement in

their child's play activities, transport habits to and from school, communication with the school teacher related to the child's FMS, the parents' own physical activity behaviours, frequency of their participation in various leisure activities with their child and the frequency/likelihood of performing physical activity together with their child. The third group of variables focused on parental beliefs about the importance of selected general aspects of children's development and the specific learning that participation in physical activity would provide. Their personal awareness as parents of their child's activity involvement formed the final group of variables. These included questions relating to after school sports participation, frequency of play, play with their contemporaries, and knowledge of their child's play activities.

**Statistical analysis**

FMS data were split by gender in accordance with previous practice (Malina et al., 2004) and a preliminary analysis confirmed that the boys' and girls' groups were statistically different ($p < .05$). Ward's two-way hierarchical cluster analysis (JMP version 10.02; SAS Institute, Marlow, U.K.) was used to classify participants into groups based on their performance in all the FMS tasks. Separate analyses were conducted for boys and girls. This multivariate approach to group categorisation has the advantage that it retains all information and groups individuals that display similar characteristics, when taking into account the full range of skills measured. It was adopted in order to address the problem observed when relying on a sum of scores or an arbitrary threshold as generally practised (e.g. Okely et al., 2001). In such cases the same band may contain individuals with a similar aggregate score but very different skill profiles (Parsonage et al., 2014). Once the cluster analysis was performed, the scree plot of distances was then used to visually identify the number of clusters. As a result, three distinct profiles of FMS were identified for boys and two for girls (for further details refer to Jarvis et al., 2018). Therefore, all pupils were placed into one of the five possible profile

groups. The defining features of each group in relation to their ability to perform the FMS tasks were identified by means of a decision tree induction (DTI) method. This application of DTI to reduce a rich data set into a more parsimonious and manageable framework has been described in detail elsewhere (e.g. Morgan et al., 2013).

With the PBQ, descriptive statistics are reported for parents' responses to questions relating to characteristics of the family environment, parental behaviour, parental beliefs, and awareness of their child's activity involvement. To identify any significant differences in parental responses between members of the FMS groups, the Kruskal-Wallis H test was used on continuous and ordinal questionnaire responses with boys' FMS groups. Post hoc examination of significant effects were run and interpreted with pairwise comparisons and a Bonferroni correction for multiple comparisons. For girls, the Mann-Whitney U test was used to examine differences between the FMS groups. Asymptotic $p$-values $< 0.05$ were considered statistically significant with mean rank scores used for further examination of significant effects. Responses across the FMS proficiency groups for the categorical variables were assessed by Pearson's chi square test for association.

## Results

### FMS group classification and proficiency

As previously described three groups emerged from the boys' FMS data sets ($N$ = 255). These were labelled as: Low ($n$ = 29*;* total FMS = 18 ± 4), Intermediate ($n$ = 160; total FMS = 25 ± 4), and High ($n$ = 66; total FMS = 31 ± 3) Proficiency. A comparison of the total FMS scores for members of these groups showed that the means differed significantly (Low versus High = 13 (95% CI = 11–14); Low versus Intermediate = 7 (95% CI = 5–8), and Intermediate versus High = 6 (95% CI = 5–7)). From the girls' FMS data set ($N$ = 229) members of the Low ($n$ = 92) and High ($n$ = 137) Proficiency groups had total FMS scores of 21, ± 4 and 28, ± 3, which were also significantly different (mean difference = 6, 95% CI = 5–7). The final

DTI model revealed that the vertical jump ($G^2$= 78.03), overhand throw ($G^2$= 62.26) and leap ($G^2$= 31.19) were the tasks that best differentiated the boys' cluster groups. In girls, the static balance ($G^2$= 84.36) best differentiated the groups followed by the catch ($G^2$ = 44.51), the vertical jump ($G^2$= 27.34), and the leap ($G^2$= 10.84).

**Characteristics of the family environment**

A summary of parental responses to the questions concerning the family environment is presented in Table 1. It shows that the majority of the children lived in a home with two parents with approximately two thirds of fathers in full time employment and around a third of mothers either in full time or part time employment. Between 20 – 26% of the children were in after school childcare for more than an hour's duration each day. Around 85% had other siblings living at home. Mothers were overwhelmingly (86% boys; 80% girls) the person responsible for the children's outside of school care. Most children were transported by car to school although approximately a third travelled by foot.

**Insert table 1 about here**

There were no significant differences ($p < .05$) between the boys' groups regarding any of the questions relating to their family environment characteristics. However, for the girls, the provision of before and after school care by grandparents ($p$ = .02, $U$=7336, $z$ = 2.32, $r$ = .15) and members of their extended family ($p$ = .01, $U$=7435, $z$ = 3.21, $r$ = .21) were associated with membership of the higher FMS group. In addition, the parental employment status of both fathers p = .01, $\chi^2$ (1) = 7.16, $\varphi$ = .18 and mothers $p$ = .02, $\chi^2$ (1) = 5.25, $\varphi$ = .15 had significant associations with girls' FMS group membership. There was a higher proportion of fathers in active employment in the high FMS group (81%) compared to those in the low group (65%). For mothers, there were more mothers in passive employment for those in the high FMS group (72%) when compared to those in the low FMS group (57%). These significant relationships are summarised in Table 2

**Insert Table 2 about here**

## Parental behaviours

Just over a third of both mothers and fathers reported that they participated in their own physical activity for less than one hour a week with less than a third (31% fathers: 26% mothers) accruing five hours or more a week. In 2015, national data reported that 37% of men and 23% of women were active on five or more days in the previous week and that almost half of women in Wales (47%) were active on one day or less in the last week (Townsend et al., 2015). Although it is impossible to directly compare the data from this study with that reported by Townsend et al. the figures presented in Table 3 could be inferred as reflecting a level of physical activity participation at the lower end of the national involvement if not beneath it.

**Insert Table 3 about here**

In terms of parents' direct involvement with their child's play activities the most popular shared activity comprised of watching television, where, 45% reported that this occurred more than five hours a week. The next most popular was reading books (21%) whereas only 19% reported being involved with active play for a similar amount of time. However, when asked about physical activity that was specifically undertaken by parents and children together parents suggested that this frequently occurred spontaneously (44%) or at their children's request (39%), suggesting that parents were seldom initiators of this involvement. Further, in looking at the environments where general parent and child activity occurred, shopping was the most frequent activity shared together outside of the home with 89% saying this occurred more frequently than five times a year. Parks and playgrounds were the next most popular sites for family interactions.

Few of the identified parent behaviours appeared to relate to children's FMS profiles. The only significant finding for boys was seen on the question relating to parent and child activity

together and the computer gaming variable p = .04, $\chi^2$ (2) = 6.42. Boys in the low FMS group experienced significantly more parent involvement with this activity than boys in the high and intermediate groups. For girls, a significant relationship was found between the mother's frequency of physical activity per week and membership of the high FMS group, $p$ = .01, $U$=5131, $z$ = -2.48, $r$ = .16. Finally, it was disappointing to note that less than 10% of the parents enquired about their child's physical activity with the class teacher on a regular basis, suggesting a low priority for physical and motor development in the expectations of the parents for their children's overall educational development.

**Parental beliefs**

The majority of the parents subscribed to the belief that social development, cognitive development, the provision of sufficient sleep and participation in physical activity (in that order) were all important aspects of their children's development (see Table 4). With regards to the values of participation in physical activity they reported that enjoyment, learning of rules, social function and the support of motor development were all important elements.

**Insert Table 4 about here**

With regard to the relationship between these parental beliefs and values and their children's FMS level, some significant differences could be observed with regard to the boys in the low skill group whose parents held lower values for the importance of motor development ($\chi^2$ (2) = 8.71, $p$ = .01), social development ($\chi^2$ (2) = 11.10, $p$ = .004) and participation in physical activity ($\chi^2$ (2) = 9.41, $p$ = .01) than the parents of children in the intermediate and high FMS groups ($p$ = .023, $r$ = .19, p = .003, r = .23 and p = .010, r = -.30 and $p$ = .013, $r$ = .29, respectively).

In the girls, a significant difference was found between the importance parents of the children in the two ability groups placed on some of the characteristics most salient to children's participation in physical activity. Namely parents of children in the high FMS

group placed more weight on the importance of the social function $p$ = .04, $U$=7129, $z$ = 2.01, $r$ =. 13 and the learning of rules $p$ = .01, U=7286, $z$ = 2.34, r = .16. These significant points of difference in parental beliefs are summarised in Table 5.

**Insert Table 5 about here**

**Parental awareness of their child's activity involvement**

The parents' awareness of their children's activity and play involvement outside of the school environment is reported in Table 6. They reported their children as being almost equally involved indoors and outdoors. The majority of that activity was in the company of friends, particularly in the outdoors. Although television viewing and gaming involved 67% and 46% respectively, active play was seen as dominating their time and calm play and books as involving comparatively less of their involvement. Further, up to 75% of the children were involved in after school sport clubs with 60% of them attending at least six times or more a year. The swimming club and community sports clubs also appeared to be important supplements to the after-school sports clubs but only catered for less than 50% of the children.

**Insert Table 6 about here**

On closer inspection, a significant difference was demonstrated for the boys with community sports club membership $p$ = .01, $\chi^2$ (2) = 9.41. It was clear that the boys in the high FMS group had a greater involvement with the community sports clubs. This difference was most significant between the high and low groups (p = .006, r = -.31). No such difference was found between the girls' groups.

**Discussion**

This study chose to build on the pioneering work of Cools et al. (2011) with Belgian preschool children and their family contexts. The data presented here have sought to present a picture of how primary school children's home life might interact with their physical activity

and movement experiences. At a time when school physical education and sport programmes are probably better resourced than they have ever been (Department for Education, 2014), it makes sense to look beyond school day interventions for understanding the reasons behind declining physical fitness and competence amongst young people. It is only through a deeper understanding of all of children's movement environments that we can hope to identify the causes of this problem and find means of addressing it. However very few significant relationships were found and potential explanations for them suggest a degree of complexity that requires further and deeper study.

**Family characteristics**

One of the significant associations in this study was found around the influence of the family environment and a positive link between the provision of care provided by grandparents and other extended family members prior to and after school and girls' FMS performance. These findings remind us of the work of Brustad (1996), and Weigand et al. (2001), who suggested that a variety of other family members apart from parents are profoundly influential in shaping the goal orientations of physical activity of children. Contributing to their cognitive development, children rely heavily on parental and significant other family adult feedback to judge personal competency. During childhood, when a significant proportion of time is spent within the family context before the child has developed firm social contacts outside, family are the biggest influence on the child's effort, enjoyment, and interest in physical activity (Carr et al., 2000). However, what is of interest in this study, in addition to providing a reminder of the breadth of influences beyond that of the parents alone, is why it should be evident with the girls but not the boys.

The significant association between parents' occupational status with girls' FMS ability in this study revealed that the fathers of girls with high FMS ability demonstrated a higher active employment rate than fathers of girls with low FMS ability. In contrast, the mothers of

girls with high FMS ability demonstrated a higher passive employment rate than mothers of girls with low FMS ability. The higher FMS ability of children with mothers in passive employment may be helped somewhat due to these mothers being salient socialization agents for their children at this age range, perhaps because they are most likely to be involved in the day-to-day activity choices of their children (Brustad, 1996; Fredericks and Eccles, 2004). Conversely, the busy working patterns of many mothers in active employment may result in them not having the time to engage with their children in physical activity, monitor their child's inactivity or plan for the child to be able to engage in organised physical activity (Lee, 2009).

**Parental behaviour**

It was clearly identified that the mothers of girls with high FMS levels reported a higher frequency of physical activity participation on a weekly basis. The importance parents place on their own involvement in physical activity has been found to significantly influence the involvement of their child (Mattocks et al., 2008). Mattocks et al. (2008) further suggested that whether this interaction with physical activity is seen in one or both parents then children are more likely to be physically active themselves and that relationship seems to be linear.

Although the present study demonstrated a positive relationship between parental behaviour and FMS proficiency, the findings also demonstrated a potential negative impact of the amount of computer gaming activity conducted by the parent and child each week, thus providing further support for the importance of modelling desired behaviours. Boys with low FMS proficiency spent the most time in this type of sedentary activity with a parent and those with high FMS proficiency the least, although follow up analysis failed to distinguish specific differences between the groups. Nevertheless, it has been suggested by Cools et al. (2011) and Kohl and Hobbs (1998) that greater involvement in sedentary activities such as playing computer games and watching television may limit a child's FMS performance. Indeed, such

evidence suggests that this might plausibly reflect the result of missing opportunities to adequately engage in and develop FMS. Significantly, Hardy et al. (2010) highlighted that on weekend days, 80% of primary school children spend more than two hours on small screen recreation with this prevalence consistently higher among boys. Consequently, given the increasing prevalence of this type of sedentary activity, the continued willingness of parents to frequently interact and encourage this type of behaviour with their child could develop a social norm where children consider this type of sedentary behaviour as acceptable and 'the thing to do'.

**Parental beliefs**

With regards to the relationship between parental beliefs and values and children's FMS level, some significant differences were observed with the boys in the low skill group whose parents held lower values for the importance of motor development, social development and participation in physical activity. These findings may support the notion by Cools et al. (2011) that children demonstrating better FMS proficiency have parents who are acutely aware or have a greater understanding of such variables to establishing emotional and physical bonds for sustaining physical activity and promoting FMS competency. Similarly, Bois et al. (2005) have suggested that the value placed on these key developmental aspects are shaped from the parents' own perceptions of competence and perceptions about the relative value of physical activity in the child's overall development. Further, Bailey et al. (2015) suggest that these personal beliefs influence their patterns of interaction with the child and range from encouragement to the provision of opportunities and experiences that, in turn, affect their child's motivation to develop their physical proficiency. Therefore, such beliefs of parents maybe most important as they are associated with positive socio-emotional development of the child. Thus, high levels of positive beliefs about the values associated with physical activity can become just as important as they lead to the promotion of FMS and

physical activity through pathways that may not be directly aimed at just the physical level (Bois et al., 2005).

Similarly, in the case of the girls, a significant difference was found between the importance parents placed on some of the characteristics most salient to children's participation in physical activity. Namely parents of children in the high FMS group placed more weight on the importance of the social function and the learning of rules. Jago et al. (2012) suggested that having a sound social support network for girls in physical activity was associated with higher levels of physical activity. Likewise, Bailey et al. (2015) observed that providing opportunities to be with friends, developing close relationships and gaining recognition and social status seem to be motivations associated with this heightened physical activity trend. Finally, Green (2004) suggested, that if girls are afforded the opportunity to grasp a basic understanding of sports games and how activity is supposed to be played opposed to the focus on the competitive element more commonly promoted it may, in turn, develop greater confidence to participate in physical activity, enhance social function and develop their FMS.

**The children's physical activity and play involvement**

The boys' group that demonstrated the highest level of FMS proficiency attended sports clubs most frequently. Much of the existing literature suggests that parents are solely responsible for influencing children's physical activity participation outside of the school environment, often through enrolling them in sports clubs, or influencing their decision to start participating (Light et al., 2013). These findings are therefore consistent with the suggestion of Bailey et al. (2015) that the parents of such children may have developed an understanding and awareness of the potential benefits participation in such extracurricular activity brings. In contrast, this may not be possible for many parents as Ferreira et al. (2007) suggests that with increasing age the participation in extracurricular physical activities becomes more time

demanding and financially costly (e.g. sport club fees) for parents which in turn may reduce the opportunities for children from lower income families. Further, many parents of children who are inactive and generally have poor motor skill proficiency wrongly believe their children meet or exceed physical activity recommendations each day via the school environment (Faigenbaum et al., 2013). Overall, FMS proficiency across all groups in this study was low compared to normative data. Encouraging and educating parents especially those of girls in this cohort, to enrol their child into affordable, structured and organised extracurricular physical activity and enhance opportunities to practice and nurture FMS presents as a potentially valuable intervention for a group such as this.

**Study limitations**

A number of limitations to the present study need to be acknowledged. In addition to the usual problems of questionnaire data of this nature such as recall bias and social desirability responses, responses were obtained by only one parent in each household. Two parent families might not share similar appraisals of their child's aptitudes and abilities and it is likely that one parent might be more influential in shaping the child's achievement-related beliefs than the other (Jacobs and Eccles, 1992). A related limitation pertains to the fact that it may be possible that on some occasions both parents may have completed the questionnaire together. Nonetheless it is believed that the findings tentatively presented here add to an understanding of the need to embrace the broader life space and environment of the participants if we are to address the growing problem of hypoactivity amongst young people. The various serious implications for not just physical health and well-being but also mental, social and cultural health are still emerging (The Children's Society, 2017).

**Conclusions**

In conclusion, the development of fundamental movement proficiency and the provision for all children to achieve it is a key responsibility for educational and community institutions

alike and one which needs to involve families as partners. It is therefore important that parents develop a heightened awareness of the potential impact their actions and behaviours may have in developing either positive or negative aspects of FMS and physical activity with their child of primary school age. It is important to bear in mind that identifying those children with poorer FMS and their parents who may require support is critical. Wheeler (2012) highlights that many current measures to promote physical activity participation are most likely (if not restricted) to impact upon the section of the population in possession of some form of sporting predisposition, and highly unlikely to impact upon the section without. Therefore, the responsibility of schools for identifying, educating, and encouraging both primary school children and their parents to enhance their awareness, attitudes and behaviour towards FMS and physical activity remains a key link in positively impacting future physical activity trends.

## References


Altman D (1991) *Practical statistics for medical research.* Boca Raton: Chapman and Hall.

Australian Curriculum, Assessment and Reporting Authority (2012) *Australian Curriculum Health and Physical Education: Foundation to Year 10.* Sydney, Australia: Australian Curriculum, Assessment and Reporting Authority.

Barnett LM, Hardy LL, Lubans DR, et al. (2013) Australian children lack the basic movement skills to be active and healthy. *Health Promotion Journal of Australia* 24(2): 82-84.

Barnett LM, Van Beurden E, Morgan PJ, et al. (2008) Perceived sports competence mediates the relationship between childhood motor skill proficiency and adolescent physical activity and fitness: a longitudinal assessment. *International Journal of Behavioural Nutrition and Physical activity* 5(40): 1-12.

Bailey R, Cope E and Parnell D (2015) Realising the benefits of sports and physical activity: The human capital model. *Retos* 28(1): 147-154.

Bois JE, Sarrazin PG, Brustad RJ, et al. (2005) Elementary school children's perceived competence and physical activity involvement: The influence of parents' role modelling behaviours and perceptions of their child's competence. *Psychology of Sport and Exercise* 6(4): 381-397.

Breslin G, Murphy M, McKee D, et al. (2012) The effect of teachers trained in a fundamental movement skills programme on children's self-perceptions and motor competence. *European Physical Education Review* 18(1): 114-126.

Brustad RJ (1996) Parental and peer influence on children's psychological development through sport. In Smoll FL and Smith RE (eds) *Children and youth in sport: A bio psychosocial perspective.* Madison: Brown and Benchmark.

Carr S, Weigand DA and Jones J (2000) The relative influence of parents, peers, and

523 sport heroes on the goal orientations of children and adolescents in sport. *Journal of Sport*
524 *Pedagogy* 6(2): 34-56.
525 Cohen KE, Morgan PJ, Plotnikoff RC, et al. (2014) Fundamental movement skills and
526 physical activity among children living in low-income communities: a cross-sectional
527 study. *International Journal of Behaviour Nutrition and Physical Activity* 11: 49
528 Cools W, DeMartelaer K, Samaey C, et al. (2011) Fundamental movement skill performance
529 of preschool children in relation to family context. *Journal of Sport Sciences*, 29(7): 649-
530 660.
531 Department for Education (2013) *Physical Education Programmes of Study: Key Stages 1*
532 *and 2, The National Curriculum*. London: Department for Education.
533 Department for Education (2014) *PE and Sport Premium for Primary Schools.* London:
534 Department for Education.
535 Eccles JS and Harrold RD (1991) Gender differences in sport involvement: Applying the
536 Eccles' expectancy-value model. *Journal of Applied Sport Psychology* 3(1): 7-35.
537 Eccles JS, Wigfield A and Schiefele U (1998) Motivation to succeed. In N. Eisenberg (ed),
538 *Social, emotional and personal development.* New York: Wiley.
539 Faigenbaum AD, Chu DA, Paterno PT, et al. (2013) Responding to exercise deficit disorder
540 in youth: Integrating wellness care into pediatric physical therapy. *Pediatrics Physical*
541 *Therapy* 25(1): 2-6.
542 Ferreira I, Van der Horst K, Wendel-Vos W, et al. (2007) Environmental correlates of
543 physical activity in youth a review and update. *Obesity Reviews* 8(2): 129–154.
544 Fleiss JL, Levin B and Paik MC (2003) *Statistical methods for ratters and proportions* (3rd
545 ed.). Hoboken: John Wiley and Sons.

546 Fogelholm M, Nuuttinen O, Pasanen E, et al. (1999) Parent-child relationship of physical
547 activity patterns and obesity. *International Journal of Obesity and Related Metabolic*
548 *Disorders* 23(12): 1262-1268.
549 Fredericks JA and Eccles JS (2004) Parental influences on youth involvement in
550 sports. In Weiss MR (eds) *Developmental sport and exercise psychology: A lifespan*
551 *perspective*. Morgantown: Fitness Information Technology, 144-164.
552 Gabbard C (1992) *Lifelong motor development*. Dubuque: Wm. C. Brown Publishers.
553 Gallahue DL, and Donnelly FC (2003) *Developmentally physical education for all*
554 *children.* Fourth edition. Champaign: Human Kinetics
555 Green K (2004) Physical education, lifelong participation and 'the couch potato society'.
556 *Physical Education & Sport Pedagogy* 9(1): 73-86.
557 Hardy L, King L, Espinel P, et al. (2010) *NSW schools physical activity nutrition survey*
558 *(SPANS)*: Full report. Sydney: New South Wales Ministry of Health.
559 Hardy LL, Barnett L, Espinel P, et al. (2013) Thirteen-year trends in child and adolescent
560 fundamental movement skills: 1997-2010. *Medicine and Science in Sports and Exercise*
561 45(10): 1965-70.
562 Jacobs JE and Eccles JS (1992) The impact of mothers' gender-role stereotypical beliefs on
563 mothers and children's ability perceptions. *Journal of Personality and Social Psychology*
564 63(6): 932-944.
565 Jago R, Page AS and Coopers AR (2012) Friends and physical activity during the transition
566 from primary to secondary school. *Medicine & Science in Sport & Exercise* 44(1): 111-
567 117.
568 Jarvis S, Williams M, Rainer P, et al. (2018) Interpreting measures of fundamental movement
569 skills and their relationship with health-related physical activity and self-concept.
570 *Measurement in Physical Education and Exercise Science* 22(1): 88-100.

571 Kenyon DB, Kubik MY, Davey C, et al. (2012) Alternative high school student's physical
572 activity: Role of self-efficacy. *American Journal of Health Behaviour* 36(3): 300-310.
573 Kirk D (2005) Physical education, youth sport and lifelong participation: The importance of
574 early learning experiences. *European Physical Education Review* 11(3): 239-255.
575 Kohl HW and Hobbs KE (1998) Development of physical activity behaviours among
576 children and adolescents. *Pediatrics* 101(3): 549-54.
577 Lee H (2009) *The Influence of parenting practices and behaviours in the relationship*
578 *between social disadvantage and physical inactivity risk in the transition to young*
579 *adulthood*. Extended abstract submitted to the Population Association of America.
580 Lee H (2014) The role of parenting in linking family socioeconomic disadvantage to physical
581 activity in adolescence and young adulthood. *Youth and Society* 46(2): 255-285.
582 Light RL, Harvey S and Memmert D (2013) Why children join and stay in sports clubs: case
583 studies in Australian, French, and German Swimming clubs. *Sport, Education and Society*
584 18(4): 550-566.
585 Malina R, Bouchard C and Bar-Or O (2004) *Growth, maturation, and physical activity.*
586 Second edition. Champaign: Human Kinetics.
587 McGuire MT, Neumark-Sztainer DR and Story M (2002) Correlates of time spent in physical
588 activity and television viewing in a multi-racial sample of adolescents. *Pediatric Exercise*
589 *Sci*ence 14(1): 75–86.
590 Mattocks C, Ness A, Deere K, et al. (2008) Early life determinants of physical activity in 11
591 to 12-year olds: cohort study. *British Medical Journal* 336(7634): 26-29.
592 Morgan PJ, Young MD, Barnes AT, et al. (2019) Engaging Fathers to Increase Physical
593 Activity in Girls: the "dads and Daughters Exercising and Empowered" (DADEE)
594 Randomized Controlled trial, *Annals of Behavioural Medicine*, 53(1): 39-52.

595 Morgan S, Williams M and Barnes C (2013) Applying decision tree induction for
596 identification of important attributes in one-versus-one player interactions: A hockey
597 exemplar. *Journal of Sport Sciences* 31(10): 1031-1037.
598 Naylor PJ and McKay HA (2009) Prevention in the first place: Schools a setting for action on
599 physical inactivity. *British Journal of Sports Medicine* 43(1): 10-30.
600 New South Wales Department of Education and Training (2000) *Get Skilled: Get Active.*
601 Sydney: New South Wales Department of Education and Training.
602 Okely AD, Booth M and Patterson JW (2001) Relationship of physical activity to
603 fundamental movement skills among adolescents. *Medicine and Science in Sports and*
604 *Exercise* 33(11): 1899-1904.
605 Okely AD and Booth ML (2000) "The development and validation of an instrument to assess
606 children's fundamental movement skill ability." In Book of Abstracts, Pre-Olympic
607 International Conference on Sports Science, Sports Medicine and Physical Education,
608 Brisbane, Australia, September 7-12, 2000 p. 245.
609 Parsonage JR, Williams RS, Rainer P, et al. (2014) Assessment of conditioning-specific
610 movement tasks and physical fitness measures in talent identified under 16-year-old rugby
611 union players. *Journal of Strength and Conditioning Research* 28(6): 1497-1506.
612 Pate RR, Almeida MJ, McIver KL, et al. (2006) Validation and calibration of an
613 accelerometer in preschool children. *Obesity* 14(11): 2000–2006.
614 Ridgers ND, Stratton G and Fairclough SJ (2006) Physical activity levels of children during
615 school playtime. *Sports Medicine* 36(4): 359-371.
616 Society of Health and Physical Educators SHAPE America (2013) *National Standards and*
617 *Grade-Level Outcomes for K-12 Physical Education*. Champaign: Human Kinetics.

Stodden DF, Goodway JD, Langendorfer SJ, et al. (2008) A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. *QUEST* 60(2): 290-306.

The Children's Society (2017) *The Good Childhood Report 2017*. London: The Children's Society

Tompsett C, Burkett B and McKean MR (2014) Development of physical literacy and movement competency: A literature review. *Journal of Fitness Research* 3(2): 53-74.

Townsend N, Wickramasinghe K, Williams J, et al. (2015) *Physical Activity Statistics 2015*. London: British Heart Foundation

Ulrich DA (2000) *Test of Gross Motor Development.* Second edition. Austin: Pro-Ed.

Van Der Horst K, Paw MJ, Twisk JW, et al. (2007) A brief review on correlates of physical activity and sedentariness in youth. *Medicine and Science in Sports and Exercise* 39(8): 1241-1250.

Weigand DA, Carr S, Petherick C, et al. (2001) Motivational climate in sport and physical education: The role of significant others. *European Journal of Sport Science* 1(4): 1-13.

Welk GJ (1999) *Promoting physical activity in children: Parental influences.* ERIC Digest (ERIC Publications #ED436480). Washington: Teaching and Teacher Education.

Wheeler S (2012) The significance of family culture for sports participation. *International Review for the Sociology of Sport* 47(2): 235-252.

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**Table 1.** Characteristics of the family environment (*n* = 484).

| **Questions** | **Frequency of response (%)** | | |
|---|---|---|---|
| Family structure at home | Single parent | Two parents | Co-parenting |
| | 15 | 78 | 6 |
| Parent employment status | Passive | Active | |
| Father | 27 | 72 | |
| Mother | 32 | 67 | |
| Employment status of active parent | Not working | Part-time | Full-time |
| Father | 28 | 4 | 68 |
| Mother | 33 | 34 | 33 |
| Number of siblings residing at home | None | One | 2 or More |
| | 14 | 48 | 38 |
| Care of child prior to / after school | Never | Occasionally | Frequently |
| Father | 33 | 19 | 49 |
| Mother | 13 | 4 | 83 |

| | | | |
|---|---|---|---|
| Grandparent | 61 | 8 | 32 |
| Other family | 84 | 8 | 8 |
| Babysitter | 95 | 2 | 3 |
| School | 87 | 4 | 10 |
| Duration of daily childcare | None | 0-1 Hour | > 1 Hour |
| Pre school | 75 | 19 | 5 |
| After school | 68 | 9 | 23 |
| Typical mode of daily transport to / from school | Never | Occasionally | Frequently |
| Public transport | 86 | 6 | 7 |
| Bicycle | 95 | 5 | 0 |
| On foot | 36 | 35 | 29 |
| Motorised | 35 | 18 | 46 |

**Table 2**. Significant characteristics of the family environment related to girls' membership of FMS group

| **Question** | ***p*** |
|---|---|
| Care of child prior to / after school | |
| Grandparent | .02* |
| Extended family | .01* |
| Parent employment status | |
| Father (Active/Passive) | .01* |
| Mother (Active/Passive) | .02* |

**Note: ***Significant value $p < 0.05$.

**Table 3.** Parents' engagement with their child's physical activity and play ($n$ = 484)

| **Nature of engagement** | **Frequency of response (%)** | | |
|---|---|---|---|
| Enquiry of child's physical activity with class teacher | Never | Occasionally | Frequently |
| Father | 72 | 22 | 5 |
| Mother | 59 | 32 | 8 |
| Parents' involvement in child's play activities | < 1 Hour a week | 1-4 Hours a week | > 5 Hours a week |
| Calm play | 76 | 18 | 5 |
| Active play | 51 | 30 | 19 |
| Creative play | 65 | 26 | 8 |
| Gaming | 70 | 15 | 14 |
| Television viewing | 19 | 37 | 44 |
| Books | 42 | 37 | 21 |
| Dance | 67 | 20 | 13 |
| Physical activity participation of parent and child together | Never | Occasionally | Frequently |
| Spontaneous | 19 | 37 | 44 |
| At child request | 19 | 41 | 39 |
| Parent request | 49 | 31 | 19 |
| Parents' own level of physical activity participation | < 1 Hour a week | 1-4 Hours a week | > 5 Hours a week |
| Father | 34 | 35 | 31 |
| Mother | 34 | 40 | 26 |
| Parent and child general activity undertaken together | < 1 Time a year | 2-4 Times a year | >5 Times a year |
| Playground | 25 | 8 | 67 |
| Forest | 29 | 22 | 49 |
| Park | 12 | 11 | 77 |
| Walking pets | 47 | 4 | 49 |
| Cinema | 13 | 31 | 55 |
| Museum | 58 | 29 | 13 |
| Shops | 5 | 6 | 89 |

**Table 4.** Parental beliefs about children's development and involvement in physical activity (*n* = 484).

| **Belief** | **Frequency of response (%)** | | |
|---|---|---|---|
| Importance of developmental aspect | Low importance | Moderate importance | High importance |
| Cognitive development | 11 | 16 | 73 |
| Social development | 9 | 16 | 74 |
| Motor development | 16 | 24 | 59 |
| Participation in physical activity | 12 | 22 | 65 |
| Provision of healthy nutrition | 21 | 28 | 51 |
| Provision of sufficient sleep | 9 | 19 | 71 |
| Importance of physical activity participation elements | Low importance | Moderate importance | High importance |
| Enjoyment | 3 | 12 | 84 |
| Support motor development | 8 | 21 | 70 |
| Experiencing success | 44 | 29 | 26 |
| Social function | 5 | 28 | 66 |
| Learning rules | 6 | 25 | 68 |
| Developing sport specific skills | 23 | 30 | 47 |
| Experiencing a variety of physical activity | 15 | 32 | 51 |
| Producing high performance | 53 | 24 | 22 |

**Table 5.** Parental beliefs significantly related to children's FMS performance.

| **Belief** | ***p*** |
|---|---|
| Importance of developmental aspect *(with boys only)* | |
| Social development | .01* |
| Motor development | .01* |
| Participation in physical activity | .01* |
| Importance of physical activity participation elements *(with girls only)* | |
| Social function | .04* |
| Learning rules | .02* |

**Note: ***Significant value $p < 0.05$.

**Table 6.** Parental report of their child's activity and play involvement ($n$ = 484).

| **Activity involvement** | **Frequency of responses (%)** | | |
|---|---|---|---|
| Nature of child's activities | < 1 Hour a week | 1-4 Hours a week | > 5 Hours a week |
| Calm play | 64 | 28 | 7 |
| Active play | 11 | 18 | 70 |
| Creative play | 42 | 35 | 22 |
| Gaming | 22 | 33 | 46 |
| Television viewing | 7 | 27 | 67 |
| Books | 34 | 34 | 32 |
| Dance | 52 | 33 | 23 |
| Place of child's play activity | Several times a month | Several times a week | Daily |
| Indoors | 9 | 33 | 58 |
| Outdoors | 7 | 39 | 53 |
| Involvement of child's play activity with friends | Several times a month | Several times a week | Daily |
| Indoors | 18 | 41 | 40 |
| Outdoors | 10 | 39 | 49 |
| Child's physical activity participation after school | < 1 Year | 2-5 Times a year | > 6 Times a year |
| After school sports clubs | 25 | 15 | 60 |
| Swimming club | 50 | 13 | 36 |
| Sports camps | 83 | 12 | 5 |
| Community sports clubs | 57 | 9 | 34 |