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# Meaningful movement behaviour involves more than the learning of fundamental movement skills

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## Abstract

*It is argued that focusing on overcoming movement challenges in which skill development plays a role but is not the focus of teaching in physical education, provides a different and more rational perspective than that which has evolved from the current focus on FMS. This argument is supported by findings from sociological research and philosophical theories. Based on the arguments presented in this paper, it is proposed that contextualized (e.g., game-based) approaches are of more value than focusing on FMS only, especially when the aim is to stimulate purposeful physical activity in an educational context.*

\* The authors publish this paper in memory of Len Almond, who inspired them all.

*Keywords:* Pedagogy, physical education, youth sport, sociology, physical literacy

## Introduction

In a recent paper, a group of thirteen scholars (Barnett et al., 2016) responded to a call for debate about the meaning and limitations of adopting Fundamental Movement Skills (FMS) as a focus when discussing the means to influence lifelong physical activity (Afonso, Coutinho, Araujo, Almond, & Pot, 2014; Almond, 2014; Pot & Hilvoorde, 2014). They offered a vigorous defence of the efficacy of FMS against the following criticisms: 1. FMS are not fundamental by definition; 2. The transfer of FMS to sport is limited; 3. Skills are learned by doing rather than being taught; 4. A focus on FMS ignores a constraints-led approach; 5. FMS is a skills and drills

teaching approach; 6. There is little data supporting the association between movement competence and lifelong physical activity. In their paper, Barnett et al. (2016) aimed to invalidate these six points of critique.

The present paper continues the discussion around these six points with the aim of encouraging critical thinking and divergent thought. The critical comments presented in this paper are also based upon some fundamental agreements with the authors; namely concerning the importance and value of physical activities in human life, together with the importance of the educational practices by which the relevant skills can be acquired, transferred and become valued by the children who learn them.

The scientific merits of the research on FMS cited by Barnett et al (2016) are not challenged. Rather, questions on the relevance and implications of testing FMS and on the pedagogical value of their use in educational contexts will be raised in this paper. If *meaningful movement behaviour* (i.e. long-term movement behaviour that matches the possibilities and preferences of each individual) can be defined as the main goal of physical education (PE), what should then be the appropriate pedagogical focus? It is argued that there is a meaningful difference between on the one hand a focus on the learning of isolated skills, and on the other hand a focus on the learning of skills within the rich context of learning situations, such as those provided by game-based activities. In the latter situation, overcoming movement challenges could be identified as the primary aim of the learning. By focusing on overcoming movement challenges, the focus is on the outcome of the movement actions and not on the form of their execution. Overcoming movement challenges appeals to children's search for and need of authentic experiences when they participate in various contexts such as those provided by PE lessons, playgrounds, outdoor settings, leisure and sports clubs. From this perspective, a movement situation involves not simply acquiring the right skill, but children facing the challenges in the situation, discovering the opportunities for movement that might be available and identifying those that will lead to a successful solution.

In this paper, it will be argued that a focus on overcoming movement challenges and acquiring meaningful movement behaviours does not exclude the learning of (fundamental) movement skills, but is more relevant to individual differences in children's learning paths, their motivation, and the ways in which they are triggered to participate in physical activities. This focus on overcoming movement challenges and not on isolated skills is in line with the concept of *Physical Literacy*, as it is defined and explained in its original formulation (Whitehead, 2001). This will be explained in section 5 of the paper.

The aim of this paper is to continue the discussion about the use of FMS by responding to the six points of critique that Barnett et al. (2016) have outlined and the future research questions they posed. Critique 3, 4 and 5 have been responded to in one section (section 3), as they all consider teaching approaches.

### **What is the 'Fundamental' in Fundamental Movement Skills**

Barnett et al. (2016) indicate that there is confusion in the literature about the definition of FMS. They state that "FMS ... are defined as basic learned motor patterns that do not occur naturally and are suggested to be foundational for more complex physical and sporting activities" (Barnett et al., 2016, p. 221). A clear definition is indeed necessary for the clarity of the discussion and the definition as a whole will be returned to in several sections of the paper. At this point it is queried as to how it can be determined which movements occur 'naturally' and which do not

occur ‘naturally’? Does naturally mean that motor patterns are innate? In that case, this definition is confusing as the distinction between innate and learned movements may not be easy to make, as most motor patterns are present at birth and alter through maturation and learning (Grillner & Wallén, 2004).

In the first section of their article, Barnett et al. (2016) also refer to identifying skill deficits (based upon a population basis) and “tailor interventions to meet the specific needs of these individuals” (Barnett et al., 2016, p. 221). These statements seem to contradict, if the ‘needs of the individual’, are taken to lie in the deficits based upon the total population, driven by societal and scientific interests. To give an example: a culture may highly value the skill to kick a ball. A part of the population is less skilful in kicking and may not be motivated to become more skilful. For such individuals kicking is clearly not a fundamental movement skill, that is necessary to live a meaningful life. It is a radically different logic to claim that these skills should be considered fundamental by definition (based upon cultural values), and to argue for intervention where there are ‘deficits’, rather than tailoring the sports and skills to match the needs and motivation of the individual.

It should be a pedagogical choice to intervene, rather than one based upon a health perspective. An even stronger claim can be made, namely that interventions based upon ‘cultural appropriateness’ could have detrimental effects on the physical activity behaviour of those individuals that do not conform to that ‘appropriateness’. Instead, pedagogical contexts such as PE should be concerned with issues of diversity and differentiation based upon differences in talent, skill capacities and motivation, as well as differences in patterns of engaging in sports and developing a sport habitus. This point will be elaborated on in the following sections.

### **Skill transfer to sports and other physical activities is limited**

The authors (Barnett et al., 2016) assume a causal link between skills possession and behaviour when they state that FMS are: “... skills that require practice and training ... and which promote engagement in a broad range of culturally relevant and socially driven activities” (p. 222). However, it can be argued that the determinants of behaviour in general, and physical activity behaviour in particular, are more complex than the mere possession of skills to execute certain movements (Pot, 2014). This point will be addressed in three parts.

**Part 1: Intentionality of skills.** First, the concept of FMS assumes that movements can be fundamental, that movements are the same for everyone, without a reference to the environment in which the movements are executed. From this perspective movements are seen as isolated actions of the *substantial body* (Tamboer, 1992). In contrast to this substantial view of the body is the *relational view of the body*, according to which movements are always directed at something. This view draws on a phenomenological tradition (e.g., Husserl, 1991; Merleau-Ponty, 1962), but can also be recognized within current paradigms such as *embodied cognition* or *embodied consciousness* (Araujo & Davids, 2004; Light & Fawns, 2003), in which individuals, their thoughts and movements cannot be understood apart from their physical and meaningful environment (Anderson, 2003). Interactions with the environment are considered crucial for being a human, as humans are ‘beings in the world’ (Martínková & Parry, 2011; Merleau-Ponty, 1962). Each interaction with the environment is steered and structured on the basis of the *intentionality* of the human agent (Husserl, 1991; Martínková & Parry, 2011). Motor intentionality can be

described as “an embodied and concrete way of understanding or being meaningfully directed at ‘things’ in the surroundings” (Standal & Moe, 2011, p. 267), and relies on self-regulated coordinated patterns that emerge in interaction with the task, organismic, and environmental constraints (Anson, Elliott, & Davids, 2005; Araújo, Davids, & Hristovski, 2006). The surroundings can be explored in terms of *affordances* that offer action possibilities (Gibson, 1979). Affordances can be physical (e.g., the built environment; the arrangements in the PE-classroom) or social (e.g., socio-economic status; family context; culture) and allow the performance of certain actions. This implies that the meaning of an action and the attuning to affordances cannot be isolated from the context in which that action is performed. This has been demonstrated in sport research, where for instance context and skill level influence decision making and movement performance, and also in experimental (laboratory) settings which can be manipulated to influence the outcomes (e.g., Afonso, Garganta, McRobert, Williams, & Mesquita, 2014; Bruce, Farrow, Raynor, & Mann, 2012). Therefore, it is crucial to highlight the importance of a ‘situated learning’ perspective (Kirk & MacPhail, 2002). For example, MacPhail, Kirk, and Griffin (2008) stated that “learning to throw and catch involves players’ interpreting, constructing, and responding to the physical-perceptual and social-interactive dimensions of the learning environment” (p. 245). Movement capacities should therefore be understood in interaction with the environment in which they are executed, as, for instance, has also previously been argued within the concept of *physical literacy* (Roetert & MacDonald, 2015; Whitehead, 2007).

This contextualized focus has consequences, not only for understanding and executing a movement, but also for learning motor actions. For instance, cycling to school is a different action from cycling the Tour de France, although the biomechanical aspects may be similar (Standal & Moe, 2011). Indeed even under controlled conditions, outdoor cycling produces different results compared to indoor cycling (Mieras, Heesch, & Slivka, 2014). Crucial for motor learning is the intentionality, which is deeply embedded in specific perception-action couplings (Passos, Araújo, Davids, & Shuttleworth, 2008; Renshaw & Davids, 2004). This means that a ‘fundamental’ movement does not exist, because the meaning and evaluation of a movement is intrinsically related to the intentionality with which the movement is performed. This intentionality is related to attributes of the performer (no two persons are alike), the task, organismic, and environmental constraints (Renshaw & Davids, 2004). What follows from this is that there is no ‘fundamental’ way to throw a ball. Reducing throwing to the mere act of moving a ball from point *a* to point *b* (excluding context, meaning, and intentionality) has consequences for both the motivation and meaning, but also -and this is often ignored within the literature on FMS- on the motor performance itself. For instance, a baseball player must be able to throw hard and accurately, but the exact way in which he throws a ball is impossible to identify when neglecting the excitement and tactical situations during a game. When considered from a phenomenological perspective, throwing a baseball varies every time due to the infinite number of different circumstances in which the ball can be thrown. This means that throwing a baseball can only be meaningfully learned if it happens within the context of a baseball situation, with a focus on overcoming the movement challenge (e.g., getting the ball as fast as possible to the catcher). It must be stressed here that the examples used in MacPhail et al.’s study (2008), provide evidence for contextualized learning, as they found that even the production of a catchable pass was not solely a matter of individual competence. They concluded that it “depended on the off-the-ball movement of fellow players and the passing player’s

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ability to read and anticipate their movements within the context of the game form and the physical spaces it constructs” (p. 107). This has also been demonstrated, for example, in studies of bowling in cricket (Renshaw & Davids, 2004). Not only within a single sport can the ways to throw differ infinitely, there are also completely different ways of throwing when comparing different sports, such as basketball, handball, darts, or baseball. This means that the intentionality or goal is crucial for what can be considered a successful execution of a throw, as well as the specificities of each sport such as found in the game rules and game logic. Hence, a fundamental way to throw does not correspond to anything in reality, and the level of its advancement is always related to the intentionality of the throw and to the characteristics and motivations of the thrower. The specific (sport) context structures the meaning of the action, and constrains the variables by which the action can be evaluated. Furthermore, as people change over time, the same person may benefit from different forms of movement execution in two distinct time periods. Similarly, in physical therapy, the limitations of adopting an idealized ‘one-fits-all’ model have been highlighted (Lederman, 2011).

In sports, even more than in other more predictable physical activities (such as walking), actions can be distinguished from isolated (fundamental movement) skills by ‘the sweet tension of uncertainty of outcome’ (Kretchmar, 1975; Standal & Moe, 2011, p. 262). Without that tension (i.e. the excitement of a game or match), the motor actions are not only experienced differently, they are also learned in a different way (cf. Merleau-Ponty, 1962).

Arguably, most readers will agree with the argument that there is not one way to throw. This still leaves open the question why it is necessary to hypothesize the existence of motor actions that should be considered ‘fundamental’, or ‘foundational’ for other movement actions. A baseball throw may very well be considered ‘fundamental’ for playing baseball, but why consider throwing as fundamental for a group of sports? Interestingly, Barnett et al. seem to agree that the varieties in application and complexity of movements should be appreciated:

“... isolating the skill of throwing, as only a “sports skill” with limited applicability and transfer to other types of movements or neuromuscular-related aspects of physical fitness (Stodden, Gao, Langendorfer, & Goodway, 2014) promotes a narrow viewpoint of the complexity of these types of movements and a lack of appreciation of the broad applicability of the high levels of functional coordination and control demanded in many FMS.” (Barnett et al., 2016, p. 222).

However, this statement seems to contradict their initial definition of FMS as “basic learned motor patterns that do not occur naturally and are suggested to be foundational for more complex physical and sporting activities” (Barnett et al., 2016, p. 221).

**Part 2: Stacking of skills.** A second assumption within the concept of FMS that it is necessary to address is that ‘fundamental’ movements are elements of motor actions that can be ‘stacked’ to form more refined movements necessary for physical and sport activities (e.g., Abbott, Collins, Martindale, & Sowerby, 2002; Balyi, 2004). As already argued, the execution and meaning of movements is intrinsically related to the context in which the movements take place. But how should the aggregation of fundamental movements into more refined movement patterns (e.g., sport movements)

be understood? It can be argued that this is not possible at all. Basketball is not a summation of running, catching, jumping and throwing. It is far more than that. This means that learning a movement action relevant for a sport or physical activity in a reflexive way, can only be accomplished when the relevant context is incorporated into the learning of each movement action. This does not mean that learning should always take place in the mature form of a sport. Rather, it can be argued that learning occurs in different ways and children start learning with different capacities. From an educational perspective, children learn together with different skill levels that can also differ from what is required within the sport context. Teachers therefore need to adapt the game-context to the skill levels of the players/learners. This means that a game form should be adjusted by manipulating for example field sizes, number of players and equipment.

These arguments reinforce the idea that the mere linking or stacking of movement skills does not necessarily lead to certain refined or specific movement patterns, such as required for sports. However, building blocks (skills) may be defined, learned and taught, within a meaningful movement context. This may be interesting for elite athletes or talented performers, who want to adjust some details of their movement actions. Yet, if enjoyment and motivation for PE and lifelong sport participation is the goal of teaching, it must be argued that a focus on learning meaningful, context-rich actions is more suitable than a focus on FMS (van Aart, Hartman, Elferink-Gemser, Mombarg, & Visscher, 2017; Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2014; Whitehead, 2010).

**Part 3: The socio-cultural aspects of meaningful physical activity.** Even when movement actions are learned in a context-rich environment, it can be argued that (social) affordances (Gibson, 1979; Kaufmann & Clément, 2007) constrain the possibilities to use these skills in a sport context. These social affordances are the culturally and socially determined boundaries that limit the action possibilities for a given person. Mauss termed these culturally dependent behaviors *habitus* (Mauss, 1934, p. 73). French sociologist Pierre Bourdieu (1978, 1984) used the *habitus* concept to signify the important influence of inherited predispositions on all kinds of thoughts, tastes, judgements and behavior, including sport participation. He described how the possession of different types of capital (economic, social and cultural) unconsciously shape the *habitus* (Bourdieu, 1986). Capital refers to resources that are valuable in a certain area (Bourdieu, 1986; Wacquant, 2006). In sports this would include knowledge about the rules of the sport and the skills to participate in the game, but also knowledge about how to behave within a sports club and the ‘sport mindedness’ of the social network of friends and family. Possession of this kind of *sporting capital* enables one to participate in sports (Bourdieu, 1984; Coalter, 2007; Wilson, 2002). The acquisition or inheritance of sporting capital leads to a natural tendency to participate in sports, something that could be termed *sporting habitus* (e.g., Skille, 2007). As this kind of disposition has a lasting influence on the behavior of an individual, it can be argued that sporting capital and *habitus* are crucial for long-term sport participation. So even when a child possesses the right skills for a sport, whether that child will actually be able to use those skills in a sports context depends on the social aspects of sporting capital, such as knowing the social rules at a sport club and having a social network that endorses sport (Green, Thurston, Vaage, & Roberts, 2013; Jakobsson, Lundvall, Redelius, & Engström, 2012; Light, Harvey, & Memmert, 2013; Nielsen, Grønfeldt, Toftegaard-Stöckel, & Andersen, 2012; Stuij, 2013). Research has further shown that the family plays an important role in the

inheritance of a sporting habitus for children (e.g., Birchwood, Roberts, & Pollock, 2008; Dagkas & Quarmby, 2012; Pot, Verbeek, Zwan, & Hilvoorde, 2014; Wheeler, 2012). For instance, an underprivileged child might learn the ‘fundamental movement skills’ of baseball during PE, but without the possession of sporting capital, such as parents or friends that know the game and social world of baseball, it is not likely that the child will continue to participate in baseball throughout its life. Moreover, there are mechanisms in certain sports that can exclude some children from participating in them (Collins & Kay, 2014). When considering ways to engage more children in sports, it is important to recognize the influence of sporting capital (or *social affordances*, see: (Kaufmann & Clément, 2007) that may or may not facilitate sport participation in the long run. In addition, when looking at learning baseball during PE lessons, there is evidence that the social context influences the learning of baseball significantly (Koekoek & Knoppers, 2015). The research of Koekoek and Knoppers (2015) showed that children were highly influenced by perspectives and judgements of others in their team. Even (so called fundamental) skills as bowling or batting seems to be influenced by the judgements of peers. Some children in this study articulated that their learning and pleasure in playing baseball can be disturbed by the negative contribution of their classmates. The social context highly influences children’s experiences and valuation of sport activities.

In summary, it is argued that skills only become relevant and meaningful within a context, such as sport. The practice of such activities is steered by socio-cultural circumstances. The isolation and learning of skills only, do not ‘lead’ to practice and enjoyment of sport by itself, although it can be one important aspect among others. It can be concluded that a focus on the context in which movements are executed allows for a more authentic learning environment than a focus on (fundamental) movement skill development. Although it is not argued that such skills are not important and should not be part of what children need to learn, it is argued that a focus on FMS is not necessarily meaningfully related to long-term physical activity and sport participation. Besides the learning of mere skills, there are social, cultural and psychological factors of influence on participation in physical activity and sport (Holfelder & Schott, 2014).

### **The teaching of skills and teaching approaches using the FMS concept**

In this section responses to the points of critique 3, 4 and 5 of Barnett et al. (2016) will be made together, as they all involve the consideration of teaching approaches. As already argued above, participating in sport or physical activity encompasses more than just possessing the skills that are considered relevant parts of those activities. An important question then is how can we engage children in learning both relevant sport actions and the social aspects of sporting capital?

Barnett et al. (2016) stress that FMS is not an approach but a focus. They further argue that the ways in which FMS are taught are variable and depend on the pedagogical approach one uses. FMS is presented by Barnett et al. (2016) as an unproblematic and desired outcome of PE (at least, that is a possible interpretation of what the authors mean by a focus). This is highly debatable, and can be considered as a rather narrow perception of the goals of physical education. Focusing on FMS as an outcome of learning easily transfers (if read and used uncritically) into pedagogical approaches within PE dominated by decontextualized activities, and a progression to ‘teaching to the test’ (Feingold, 2013). This is reinforced through suggestions to



assess the FMS of children (Barnett et al., 2016). Such a focus on FMS, ignores the interaction with the environment, as it does not seem to matter *where, when, with whom* and *why* movement actions are performed. It only matters *how* these actions are performed in assessments that compare a movement execution to the ideal movement execution (e.g., Cools, Martelaer, Samaey, & Andries, 2009), with the avowed aim of assessing progress and following children in their motor development. The question needs to be asked as to what is exactly being assessed, when measuring ‘placing dots’, ‘collecting matches’, ‘grasping tissue between the toes’, ‘jumping jacks’ or ‘turning jumps’ (Cools et al., 2009)? It is not argued that assessments like these have no relation with concepts such as ‘balance’, ‘bilateral coordination’ and ‘strength’ for example. However, it is argued that any relationship with enjoying meaningful physical activity and sport is problematic because these ‘fundamental’ movement tasks have little or no meaning beyond the context of their assessment. A different focus could be proposed, in which physical education stimulates children to overcome movement challenges, increasing in difficulty within which children can achieve progress. From a theoretical perspective on learning, these movement challenges could also be considered within the tenets of Vygotsky’s (1980) work regarding zone of proximal development and the emphasis on interactions and its influence on learning. The way in which children overcome these challenges (i.e. which skills they use and how they perform them) is secondary to the challenge that is generated by the movement activity and presence of other people itself. This should not be considered as an argument against accountability for the values of PE (Feingold, 2013). Rather an observation, that there are many relevant alternatives to the assessment of isolated skills, such as outcomes related to play, decision making in games, flow, human flourishing or enjoyment (e.g., R. J. Lloyd, 2016).

Barnett et al. (2016) argue that teaching FMS will lead to better proficiency in FMS, based on several studies (e.g., Morgan et al., 2013). That is hardly surprising, as that is exactly what has been taught. The question is what does this approach imply for the voluntary adoption of meaningful physical activity pursuits later in life. As has been argued above, focusing on and assessing FMS may have serious consequences for the motivation to be active later in life and consequently even hamper health outcomes. An alternative perspective can be found within game-based approaches (Harvey & Jarrett, 2014; Oslin & Mitchell, 2006), such as Teaching Games for Understanding (Thorpe, Bunker, & Almond, 1986) and Game Sense (Light, 2012). In addition, the Sport Education (SE) model (Hastie & Wallhead, 2015; Siedentop, 1987; Siedentop, Hastie, & Van der Mars, 2011) indicates that meaningful and in depth learning of sport skills can better take place when children are engaged and motivated. The SE model makes sport and the motivation to be engaged in sport activities accessible for children in school by offering them sport specific features and skills on the basis of authentic (real and adapted) experiences. Children play several roles (e.g. player, coach, referee, manager, journalist) during an extensive sport season in PE. Such a curriculum approach facilitates the central goals of SE, namely, to facilitate children to be literate, enthusiastic, and competent (Siedentop, 1987). These models try to circumvent the limitations of reductionist technical approaches that put abstract, idealized movements at the centre of the learning process. It has been suggested that the enjoyment and motivation of children is higher when they learn skills during games without an explicit focus on the skill learning itself, than when experiencing a skill-centered approach such as FMS (Allison & Thorpe, 1997; Harvey & Jarrett, 2014; Perlman, 2012). Evidence that skills are learned better and in a more reflexive

way in a game-based approach compared to a skill-centered approach has also been provided by Pritchard, Hawkins, Wiegand, & Metzler (2008).

Barnett et al. acknowledge integrated approaches such as TGfU, yet they still consider FMS to be the desired outcome. They thereby promote a process of reductionism by cutting the activity into parts, as a means to expedite assessment and research possibilities. If, as argued in the present paper, the primacy is in the activities itself, the reduction (what movement can be improved in order to improve the overall performance) only becomes relevant if it is clear for the participant why the training of a specific movement skill is beneficial for doing that specific sport. Therefore, if assessment and measurement is an aim, what is needed are reliable tests for measuring motor actions within game-based approaches. Although test validity and reliability can be complex, it should not mean that we need to settle for measurable yet less relevant constructs.

### **The relationship between movement competency and physical activity**

As Barnett et al. (2016) stated, there are indeed studies indicating a positive correlation between training for FMS and physical activity patterns (e.g., Barnett, Beurden, Morgan, Brooks, & Beard, 2009; Capio, Sit, Eguia, Abernethy, & Masters, 2015). However, other studies have failed to show a relationship between motor competence and physical activity levels in young children (Barnett, Ridgers, & Salmon, 2015) and question whether this relationship is strong (Fisher et al., 2005). Regardless of whether there is or is not any correlation between movement skills and amount of physical activity, there is a dearth of evidence showing a strong and causal relationship between the teaching of FMS and (motivation for) being active throughout life (Holfelder & Schott, 2014; Robinson et al., 2015), as Barnett et al. (2016) concede (p. 224). The question then arises why the authors assume that there is a causal relationship in which FMS lead to physical activity (Barnett et al., 2016, p. 225; Stodden et al., 2008). An alternative hypothesis might also be possible: As healthy parents are more active (e.g., Bauman, 2004; WHO, 2010) and active parents have more active children (e.g., Isgor, Powell, & Wang, 2013), it is no less rational to hypothesize that healthy parents engage their children more in active play. The opposite has already been shown, as family risk of obesity has been shown to be correlated with lower levels of PA in children (e.g., Finn, Johannsen, & Specker, 2002; Klesges, Eck, Hanson, Haddock, & Klesges, 1990). Engagement in active play may very well lead to a higher movement skill competency (Sääkslahti et al., 1999), although other evidence suggests that structured activity leads to better FMS compared to free play (Cohen, Morgan, Plotnikoff, Barnett, & Lubans, 2015). Just as healthy people are wealthier (Pollack et al., 2007) and are more highly educated (Cutler & Lleras-Muney, 2006), a relationship between health and movement skill competency does not mean that increasing the movement skill competency, or the wealth and education level, leads to healthier people. Causal directions are almost impossible to establish in this field of research, as there are so many factors associated with physical activity behavior (Bauman et al., 2012), that even well-designed experiments will always have to control for a large number of possible moderating or mediating variables.

### Further research directions

In this section, Barnett et al. posed some questions, one of which the question whether the “‘typically accepted’ FMS [are] universal across cultural contexts?” (Barnett et al., 2016, p. 225) will be addressed here. A part of the answer to this question can be found in the sociological literature. Mauss (1934) argued that the execution of movement actions are essentially shaped by culture. Some techniques, as Mauss termed movement actions, are executed differently in different societies. Mauss illustrated this by comparing the different marching and digging techniques of French and English soldiers. As Mauss (1934) demonstrated, these techniques are not just a product of physical arrangements and biomechanics, but are shaped by individual, social and cultural circumstances and therefore have no universal status. In addition, recent research shows that postures and movements may not be as universal as often thought, with people presenting large deviations in relation to idealized postures, as well as accentuated body asymmetries, without these translating into inefficient mechanics or pathology (Lederman, 2011). Indeed, human posture is increasingly being recognized as a dynamic, evolving entity, deeply intertwined with multisensory perceptions. Yet, still little is known about its dynamics and long-term effects (Chiba, Takakusaki, Ota, Yozu, & Haga, 2016)..

The culturally dependent manifestation of motor actions can also be illustrated by differences in ball games, as the authors suggested (Barnett et al., 2016, p. 221). In most popular North American sports like baseball, basketball and American football, the ball is mostly played with the hands, whereas in Europe’s most popular ball game (football/soccer), the ball is primarily played with the feet. This means that the FMS of throwing may be less ‘fundamental’ in Europe compared to North America. At the very least this means that what is considered ‘fundamental’ is already culturally shaped and that the term ‘fundamental’ is misleading, as it assumes that these skills are universal fundamentals. Defining skills as fundamental on a global level obscures or even undermines the local cultures of sports and may even contribute to the colonization of local sports (Houlihan, 1994). Although there may be movement actions that are common across cultures, these examples show that the answer to Barnett et al.’s question about the universality of FMS cannot be answered with a simple yes or no.

However, the authors’ suggestion to extend the field, and that we “should examine whether competence in other types of skills becomes more important later in life” (Barnett et al., 2016) deserves a more sympathetic response. Indeed, quality of life entails more than mere striving for health, or living as long as possible. Nonetheless it might be expected that the skills that become more important later in life to live a meaningful life similarly cannot be reduced to mere health or movement skills.

In the final part of their paper, Barnett et al. make reference to physical literacy (Whitehead, 2010) as a holistic focus of which FMS should be an important component. However, the existentialistic and phenomenological theories that underpin the concept of physical literacy, highlight that only the holistic movement action matters and a focus on components (such as FMS in this case) is not in line with their assumptions. As has already been argued, although skills are important to be able to interact with the environment, these skills only become meaningful as a part of the interaction with that environment. Focusing on physical literacy as the outcome of PE, demands a contextualized teaching approach which has its main focus on motivating children to overcome movement challenges in a joyful manner, so children are able to

interact with confidence in challenging environments (Whitehead, 2010). Although skills are necessary for this purpose, the type of skill, proficiency of its execution and the order of the skill pattern are not the focus of concern. Therefore, FMS cannot be one of the components within the physical literacy construct. Even though it is acknowledged that skills are necessary for overcoming movement challenges, they cannot be considered fundamental in any way, as they vary every time and in every place (context), for each person in every challenge. More importantly it is important to stress that a focus on physical literacy should mean a focus on individual progress and confidence, not on attaining some absolute level that has been designated as appropriate for children of a certain age (Whitehead, 2010).

### Conclusion

In this paper, the position of Barnett et al. (2016) on the value and meaning of the concept of FMS has been addressed from a critical perspective. The aim has been to increase understanding of what should be considered as fundamental movement skill and show how research from the sociological and philosophical fields may contribute to the understanding of different approaches to engaging children in meaningful physical activity. A debate drawing on diverging scientific perspectives is highly valuable and indeed necessary. The main underlying topic which we have identified as ensuring physical activity is accessible for all, requires a multidisciplinary approach. A serious discussion between academics from different disciplinary backgrounds is not always evident, as far too often scientists remain captured within their own paradigmatic focus. Therefore, the statement of Barnett et al. (2016) that knowledge and ‘forces’ from various disciplines should be joined if the goal is to develop the physical literacy of children is strongly endorsed. With that goal in mind, the conclusion has been drawn in this paper that it is more useful to focus teaching in physical education and sport on the fun of playing meaningful games than to concentrate on a limited number of skills in a set of narrowly defined activities and assessing whether children can perform these isolated ‘fundamental’ movements.

The objections raised in this paper may contribute to an explanation for the absence of convincing evidence for a relationship between FMS proficiency and physical activity and sport participation (Holfelder & Schott, 2014; Lai et al., 2014; Lloyd, Saunders, Bremer, & Tremblay, 2014). Besides the more fundamental objections raised against the use of FMS as a frame of reference, it has been questioned what the consequences are for physically disabled children, if they learn that, for instance, “if you can’t run, you won’t take part in tennis” (Canada, n.d.). An extreme focus on “fundamental” skill development may seriously reduce motivation for disabled children to participate in adapted sport. Moreover, engaging children in lifelong meaningful physical activity, including socialization into sport, should be regarded as a qualitative process in which skills are matched to the specific, individual preferences (*habitus*). If a context-rich approach is taken as a way of engaging young people and encouraging them to become more physically active and committed to these pursuits on a regular basis, skill development and beneficial health outcomes may be beneficial by-products.

Based on the philosophical, sociological and pedagogical arguments presented in this paper, the dangers of promoting FMS as the focus of PE, should be clear. It is recognized that knowledge about skill acquisition is crucial for developing context-rich, meaningful activities for children to participate in. However, the pedagogical and

cultural 'story' of sports should be told and absorbed, before skills can become meaningful, contribute to the development of a sustainable physical literacy and have a lasting influence on sport participation and - often following from that - on a healthy lifestyle.

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