

## Physical Activity and Sport Studies in Childhood and Adolescence at the 23rd Annual Meeting of the European College of Sport Science

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The number and scope of presentations on youth physical activity was impressive at this second-biggest ever ECSS conference. [Accessing Abstracts](#): links to a search engine and downloads. [The Right-On Factor](#): a plenary on determinants of population voluntary exercise and the six most interesting presentations for physical educators and school-sports practitioners. [Skills and Competencies in Youth](#): influence of implicit attitudes on daily physical activity (PA); relationship between perceived and objectively measured motor competence; cross-cultural differences in perceived and objectively measured motor competence; integration of new training protocols into physical education (PE) and effect on skills and competencies; scheduling of object control and locomotor activities in PE and effects on motor competence; relationship between motor competence and cognitive ability in special populations; new methods of assessing fundamental movements skills in PE. [Optimizing Physical Education](#): contribution of school PE classes to increasing activity levels in adolescents; PE teacher behaviors and effects on life skills, moderate-vigorous physical activity (MVPA), motivation in special populations; prioritization of PE in the middle east; workload of PE teachers in South East Asia. [Active Educating](#): effect of all-day schooling on MVPA; effect of standing desks on MVPA and fatigue; effect of short classroom-based PA breaks on primary school children's motivation to learning and well-being; physical benefits of participation in "the Daily Mile" above engagement in regular PE. [Mental Health](#): review of reviews on the association between PA, self-esteem and self-concept; growing up in Ireland, and the effect of participation in sport on psychological difficulties in childhood. KEYWORDS: adolescents; children; classroom; competence; development; lessons; mental health; motor; movement; physical activity; physical education; school; self-esteem; skills; teachers. ABBREVIATIONS: INT, integrative neuromuscular training; MVPA, moderate-vigorous physical activity; PA, physical activity; PE, physical education; SDT, self-determination theory.

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The following is a report on ECSS 2018 from my home city, Dublin. The usual Irish *cead mile failte* (a hundred thousand welcomes) was extended to delegates and there was uninterrupted sunshine with >20°C heat. Dublin's iteration of ECSS was the second biggest yet. A special mention has to go to our closest colleagues across the Irish Sea in the UK. The representation from English, Scottish and Welsh universities was particularly impressive. For the first time in a long time—according to ECSS President Joan Duda—representation from English universities topped the usual majority representation from Japan. It was also a wonderful occasion to

catch up with colleagues I used to work with at the University of Birmingham.

Compliments to the conference committee and chairs, Marie Murphy (Ulster University), Colin Boreham (University College Dublin) and Giuseppi De Vito (University College Dublin). Congratulations also goes to Massimiliano Ditroilo, who led the impressive volunteering effort supporting session chairs and presenters. Many volunteers were themselves presenting at a conference for the first time.

So, what is the focus of *this* report? At the request of Will Hopkins, I have focused on "anything except for the performance of competitive

athletes!" Since the majority of my recent research has been in physical education (PE) and teacher education, I have focused on physical activity (PA) and school sports studies/interventions in childhood and adolescence. The ECSS young investigator award in the mini-oral presentation category was won in this area. Well done to Henri Tilga of the University of Tartu, Estonia—abstract reviewed [below](#).

### Accessing Abstracts

To find abstracts in your area of interest, go to the [program page](#) at [Dublin conference site](#), where you can link to pages for each tier of presentation. Or download PDFs of the [full program](#) and the [full book of abstracts](#). To find the presentations I have reviewed, copy the presenter's name and initial shown in brackets [...] into the [search engine](#), or if you have downloaded the PDF of the abstracts, copy into the advanced search form (Ctrl-Shift-F) in the Adobe Acrobat PDF reader. Abstracts for this conference will eventually join those of previous conferences in the [EDSS database](#) (login required).

If you can't find your presentation in this report, I offer two reasons as apologies: as part of the conference organizing team, I had chair duties which took me away from sessions which I would have been naturally inclined to attend and report on; and program clashes meant that I often had to choose between several sessions that I would have attended.

### The Right-On Factor

So, what is actually worth reporting? For a conference to be worthwhile, Will Hopkins has a smallest important threshold of at least one presentation that, quote, makes him say **Wow!** Will and I agreed that a plenary on **determinants of regular voluntary exercise** [DE GEUS, E.] was worthy of this endorsement. After presenting convincing evidence that genetic factors are the main determinants of physical activity in **adults**, he put up this "inequality":

**Genetics ≠ Predestination.**

To explain, he then got us all to read out loud:

**Genetics are about the variance.**

**Interventions are about the mean.**

In other words, genetic factors are responsible for differences in physical activity between individuals, but with an intervention you can make everyone more active without altering the genetic contribution. It's not quite that simple, be-

cause the effect of interventions aimed at increasing population physical activity will be modified by genetic factors to some extent, but the take-home message is one of hope rather than despair.

My own threshold for having attended a meaningful conference is somewhat different. I have identified six presentations that were **Right on!**: either clearly progressive (i.e., evidence of good practice in new settings or in developing nations) or reaffirming positive messages for practitioners working in school settings (i.e., evidence of an intervention that might help PE teachers, or evidence of a beneficial intervention that was delivered by PE teachers). In order of appearance below: the effects of [plyometric training with school children](#); effects of [scheduling activities in PE sessions](#) on motor competence; the extent to which life-skills development is supported or inhibited by [autonomy supportive and controlling teaching in PE](#); the effects of a web-based intervention on [PE teachers' autonomy supportive and controlling behavior](#); physiological profiles of the first [Saudi female PE teachers](#); and workload of [PE teachers in Singapore](#).

### Skills and Competencies in Youth

Manuel Muecke presented research on the influence of **implicit attitudes** on **daily PA in 11- to 14-year old children**. Recent emphasis on the role of digitally-mediated social influences on sporting preferences and PA levels in this age group makes this area (of implicit-associations research) particularly important. Grasping the effect of implicit attitudes is difficult by definition. However, from what I garnered from my notes and the abstract, this research is suggesting that implicit attitudes are related more closely to the quality (rather than the quantity) of PA. Or, as Manuel put it in the abstract, "...basic **motor competencies**, but not the amount of everyday **moderate-to-vigorous physical activity** (MVPA), are related to non-conscious attitudes." The effect size was not presented, though it appeared to be a small to moderate association. The sceptic in me would question the degree to which the computerized implicit attitudes task was itself simply measuring accuracy and response-time motor competency [MUECKE, M.].

My notes state that Visa issues prevented a group from China presenting on the differences in **perceived physical abilities** and **objectively measured motor competency** among **German**

**and Chinese children aged 6-8 years.** Although the abstract gives no rationale for the comparison of children from these two countries, East-West cultural differences were obviously under investigation. Results from the abstract appear to indicate that the only significant differences were in perceived motor ability—or, more accurately, in **self-efficacy** (the children's belief in their ability to successfully execute the behaviors necessary to achieve a desired outcome). Unfortunately, the abstract gives no indication of the size or direction of the difference. Do German children perceive themselves as more efficacious than Chinese children? Beats me! There is a reaffirmation to practitioners here of the importance of sensitivity to cultural difference in PE [YIN ET AL.]. For a related poster presentation undertaken in an English context comparing early and middle childhood see [LAWSON, C.].

Leanne Walker presented a study from her PhD at Coventry University, in which she assessed whether **integrative neuromuscular training** (INT) should be incorporated into PE in **9- to 10-year olds** (middle childhood). I recall Leanne reporting enthusiastically that it should. INT was associated with improvements in both **fundamental motor skills** and **sprint speed**. Statistical significance was used throughout the presentation. It would have been really neat to see the magnitude and uncertainty of the effects too—especially given the potential practical application. From what I can tell, the  $p$  values appear to be presented incorrectly in the abstract ( $p >$  rather than  $p <$ ), so perhaps follow up with the authors directly if these data are related to a study you are currently undertaking [WALKER, L.J.].

The outcomes of Walker's study seemed to be replicated in Raquel Font-Llado's research in another national context. Raquel, from the University of Girona (Spain), also assessed the efficacy of a block of **integrative neuromuscular training** (INT) for enhancing **motor competence** in **primary school-aged children** (aged 8). She too found that INT is additionally beneficial over regular PE, particularly in relation to **locomotor** and **object control** skills. As with [WALKER, L.J.], I would have really liked to see some effect sizes and magnitudes to assess how much more effective INT is when compared to regular PE.

Raquel also noted that future research should assess potential benefits of INT using motor competency measures which isolate balance skills.

For a really well written abstract in this broad area, see the poster by Olyvia Donti from the United States Sports Academy (USSA) in Greece (not America!) [DONTI, O.]. She reported that **plyometric training** is beneficial for **primary schoolchildren aged 8**, and that the benefits to a child's ability to **change direction, jump**, and **sprint** were small, moderate and large, respectively. Olyvia's poster gets a big **Right on!** for presenting magnitudes. I would have given the poster a **Wow!** for presenting confidence limits (as opposed to  $p$  values) and for using Will Hopkins' thresholds (which are well-accepted in sport science as modification of Cohen's). A trial comparing **plyometrics** and **integrative neuromuscular training** would make for an interesting future study.

The final presentation of the session was from Silke De Waelle from Ghent University in Belgium, who presented on the relationship between actual **motor competence** and four different instruments for measuring **perceived motor competence**. Her subject group were **secondary school students** across ten different schools. Silke reported statistically significant differences among the instruments; however, the size of these differences was clearly trivial when I compared them using resources here at [sportssci.org](http://sportssci.org) (all  $r < 0.1$ ). The implication for me at least is that it doesn't really matter what measure of perceived motor competence you use. A really neat follow-up would be to conduct a reliability study across each of these four measures. It was also a pity that the group from China (abstract reviewed above) were not present in the room. An interaction between these two presenters on the sensitivity and specificity of motor competency measures could have enhanced the overall discussion during the question and answer session, in my opinion [DE WAELLE, S.].

The extent to which improvements in motor competence are moderated by differencing programming and in subject characteristics was also addressed, here and there, at ECSS, across oral sessions. For example, Michael Duncan from Coventry University presented a study on the effects of the **scheduling of object control** and **locomotor activities** on **motor competence** during a block of integrative neuromuscular training

(INT) in **primary school PE (6-7 year old children)**. In other words, does programming matter? Yes, it does –scheduling object control skills first in the INT session was additionally beneficial to the development of motor competence (over scheduling locomotor first, and over a control condition) [DUNCAN, M.]. I give Michael's presentation a **Right on!**, because he cut through a lot of the jargon in this field by saying that INT is "just good PE". Though, as with [WALKER, L.J.] and [FONT-LLADO, R.], some indication of effect sizes and magnitudes would have enhanced the practical relevance of the study. Duncan's lab at Coventry University seems to be producing a number of PhDs in this area, so any prospective researchers in this area should definitely check out these abstracts.

According to research presented by Wei-Ya Ma from the National Taiwan Normal University, developing **motor coordination in children with autistic spectrum disorder (ASD)** is especially important. There are at least two reasons for this: children with ASD perform poorer in motor tasks than typically developing children; and the relationship between **motor coordination** and **cognitive ability** is stronger in children with ASD than in typically developing children [MA, W.Y.]. As with [MUECKE, M.], reviewed above, I would like clarification on the extent to which the cognitive ability tasks were themselves assessing motor competency. That another group found no benefits to cognition of an intervention in ASD children [SUNG, M.C.] reaffirms my suspicion here.

There was one more presentation in this area worth highlighting. For any PE researchers or practitioners who are interested in **assessment of fundamental motor skills in elementary and middle school students**, please read an abstract from Université de Moncton in Canada about the validation of a new **PE criteria-based test battery**. I think that this presentation was really useful for highlighting what is happening in their lab. I personally found that there was a lot of content to take in here in ten minutes. However, clearly, Iancu and his collaborators gave the audience a sense of some very rigorous pedagogical work in progress [IANCU, H.D.]. It was also interesting to see a trend towards standardization of assessment in PE in the North American context though. This trend seems very much at odds with my experience of PE research in the UK.

The focus here seems to be on embracing diversity and inclusion in mainstream classroom settings and challenging PE teachers to cater for individualized programming and differentiated learning.

### Optimizing Physical Education

There was much agreement across the conference that the school setting and PE lessons in particular could be improved to promote beneficial bio-psycho-social outcomes in children.

German Ruiz-Tendero, from Complutense University of Madrid, presented on the **contribution of school PE classes to increasing activity** in adolescents (a question which was asked across a number of sessions). The subjects of this research were **secondary school children in Northern Spain**. There were some language barriers here that made the presentation and the abstract difficult to interpret. (I can only imagine how difficult it is to present in a second language.) However, German seemed to be reporting that, on a PE day, ~65% of children reported meeting the PA recommendations, compared with ~40% on non-PE days. The implication here, of course, is that in Northern Spain at least, PE can contribute to children's achievement of recommended daily PA. The use of self-report data on PA was heavily scrutinized by the audience, however [RUIZ-TENDERO, G.].

What about optimizing the work of physical educators? There is actually some consensus within the literature that much of the opportunity for optimizing PE is in the quality of delivery and in extent to which a positive PE environment can be supported by teacher behaviors. My fellow Irishman Lorcan Cronin gets a big **Right on!** for delivering a presentation in this area – one of the clearest and most concise presentations that I sat in on all week. His focus was on male and female **secondary school students** in England and Ireland and the degree to which **life skills development in PE** can be supported or inhibited by **autonomy supportive** and **controlling teaching**, respectively. The outcomes of the research replicate those from a great many **self-determination theory** (SDT) studies which have been conducted in PA, PE and school sport: that autonomy supportive teacher behaviors are positively associated with life skills development; and that life-skills development can be enhanced through the satisfaction of pupil needs for autonomy, competence and relatedness [CRONIN,

L.]. See also [TILGA, H.] for a similar study using a randomized controlled trial and [KNISEL, E.] for a similar study in youths from low-income families.

A **Right on!** also goes to Young Investigator Award winner Henri Tilga from the University of Tartu, Estonia, who presented outcomes from a randomized controlled trial evaluating the effect of a **web-based PE intervention on teachers and pupils**. As with [CRONIN, L.] above, Henri's data replicates tenets of SDT in a new context: (web-based SDT interventions can enhance autonomy supportive teacher behaviors; and their pupils also report that they are more autonomy supportive. When asked about challenges associated with the web-based intervention, Henri said that regular checks on the fidelity of the intervention were key [TILGA, H.].

Another PhD researcher from the University of Tartu, Hanna Kalajas, also added to the research on **self-determination theory in PE**. Here, however, Hanna showed that autonomy supportive **teacher** behaviors were positively associated with **MVPA in pupils**. Or, more specifically, "PE teachers autonomy supportive behavior was indirectly related to... MVPA through competence need satisfaction and students' intrinsic motivation". This finding reaffirms the link between intrinsic motivation and PA—and evidence that teachers can play an important mediating role. For a similar line of research which assesses differences in the extent to which male and female PE teachers provide psychological needs support, see [CASTILLO, I.]. Again, I highlight the lack of data in the abstract, which makes it impossible for other researchers to incorporate these outcomes into their future studies and systematic reviews.

For two more studies on the effects of programming relatedness-based **activities in PE**, see posters from [UENO, K.] and [MARINHO, A.]. The simple message here—given appropriate programming of activities and scaffolding of learning by **teachers, pupils** can also satisfy each other's needs in PE.

Stephanie Girard presented on a very topical issue—the extent to which PE teachers could enhance the **motivation of pupils with special needs** to engage in PE. The context for Stephanie's study was elementary school students between the ages of 9-11, and she conducted a **SDT**-based controlled trial to assess the effects of an **inclusive PE** intervention across four

schools. According to Stephanie, the demands of other subjects—subjects which are assessed more formally at school—were a major factor inhibiting interest in PE. It would be ironic if children with severe physical and intellectual impairments do not have the luxury of prioritizing engagement in PE over preparedness for "more important" literacy- and numeracy-based assessment—ironic, given the weight of the evidence on the relationship between MVPA, engagement in sport and in meaningful PE, and cognitive ability. See [MEMMERT, D.] [NEVILLE, R.D.] [SUNG, M.C.] [SHIMANO, A.].

The optimization of PE and continued trend towards gender equity in the Middle East gives me occasion for a fifth **Right on!** Well, kind of. Mohammad Alahmadi from Taibah University in Saudi Arabia was thrilled to announce that, for the first time in **Saudi Arabia, girls at public school** will be taught PE. The problem he identified, however, was that there was still no one sufficiently qualified to teach them, because the first cohort of Saudi Arabian PE teachers are not due to graduate for another three years. In the meantime, Mohammad reported that fitness and nutrition graduates have been recruited to fill the gap, and he was interested to see how they shaped up by assessing their **fitness profiles**. Mohammad reported that the **bodyfat percentage** of these incumbent PE teachers is well in excess of international norms, so the suitability of this group to lead PE has been called into question. He was asked why he had not focused in this study on much more important pedagogical matters, such as the preparedness of these new teachers, to which he responded "because I am a physiologist!" [ALAHMADI, M]

A final nod to the work of PE teachers secures **Right on!** number six. In a quick-fire two-minute oral presentation, Muhammad Ridhuan Johari (Nanyang Technological University, Singapore) reported that PE teachers in Singapore work at least as hard as cable workers and much harder than steel workers—at an average age of 40 years old too... Take from this what you will! [JOHARI, M.R.]. A related presentation by the same group also reveals the injury incidence in PE teachers in Singapore. Clear message here—optimizing the workload of PE teachers can "affect the quality of PE delivery and achievement of learning outcomes" [MUKHERJEE, S.].

### Active Educating

There were a number of interesting studies on the school setting and on the opportunity for increased MVPA within the school day.

Arvid Kuritz from the University of Konstanz shared news of social reform in Germany—namely, the introduction of all-day **elementary schooling** (half day was the norm previously). Her data may assuage concerns about the effects of increased sedentariness, as she reported no **MVPA** differences in children attending traditional half-day vs new full-day school [KURITZ, A.]. For a similar study, see the abstract for Ryo Tanaka's poster presentation. Ryo assessed on the effects of **standing desks in elementary school** in Japan—pupils total daily steps increased and their subjective feelings of sleepiness decreased when compared with sedentary state schooling [TANAKA, R.].

Oline Anite Bjorkelund from Aalborg Universitet in Denmark spoke about the effect of **short classroom-based PA breaks** on motivation to learn in **primary school students** and their well-being. Simple messages here: non-didactic forms of teaching can be fun and can provide environmental conditions in the classroom that are beneficial for learning. Disappointing that there were no data reported in the abstract [BJORKELUND, O.A.]. For a similar message, see the poster from Peggy Cheung. A simple study, but clear outcome: children are more active when their teachers are more active [CHEUNG, P.P].

A specific form of break for PA advocated in the UK and Ireland is **The Daily Mile**: a 15-min break from the classroom for children to engage in additional running or jogging outside. Mandy Gault from the University of Chichester, addition of the Daily Mile over two terms (26 weeks) produced limited **physical benefits** for **9- to 10-year old school children**. Additional assessment of the cognitive and social-emotive effects of the daily mile would have been in keeping with the broader PE literature [GAULT, M.]. For a related line of research in the UK and Ireland, see [CARLIN, A.].

### Mental Health

The focus on PE and school sports at ECSS was very much on physical benefits. I would like to conclude this report by drawing readers' attention to two studies focused on psycho-social and emotive outcomes.

Are such benefits maintained in the long term? Simone Ciaccioni from the Italian University of Sport and Movement reported findings from a systematic review of the effects of **PA** on **self-esteem** (SE) and **self-concept** (SC) in **children and adolescents aged 5-18**. In line with previous research in adults, Ciaccioni reported that **PA** can lead to improvements in **SE** and **SC** ("with effect sizes ranging from large to small"). Interestingly, the association between PA and self-worth—a subcomponent of SE—appears to be more sustainable over time than the association between PA and body image—a subcomponent of SC [CIACCIONI, S.]. For evidence that PA interventions aimed at improving mental health need to be longitudinal in nature, see a review of meta-analyses presented by [BUDDE, H.].

Collaborating with one of the conference chairs (Colin Boreham) from UCD, Ye Guo from Guangzhou University analyzed data from the *Growing Up in Ireland infant cohort* (children aged 5). Disconcertingly, Ye reported that, by age 5, approximately half of the cohort studied were never active in sport (47%). Ye's main analyses revealed that **participation in organized sport** of an hour or more a week is associated with a moderate **reduction in psychological difficulties**—though the extent of this association appears to be diminished by lower socioeconomic status (SES) [GUO, Y.]. Further studies on the extent to which the physical benefits of PA proffered across ECSS are moderated by SES and related household factors are clearly indicated here.

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