



**23<sup>rd</sup> annual Congress of the  
EUROPEAN COLLEGE OF SPORT SCIENCE  
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Hosted by University College Dublin & Ulster University



# Book of Abstracts

**Edited by:**

Murphy, M.H., Boreham, C.A.G., De Vito, G., Tsolakidis, E.



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**METHODS:** Eight active men were asked to perform 50 cm drop landings over 3 surfaces: an athletic track, a natural turf and a 3rd generation artificial turf. All surfaces were mechanically assessed to quantify their energy-absorbing capacity and vertical deformation. GM fascicles were measured using ultrafast ultrasound imaging (Aixplorer scanner®, Supersonic Imagine, Aix-en-Provence, FRA, 1000Hz). 2D joint angles (i.e. knee, and ankle) were calculated from lower limb kinematics obtained from video analysis (Sony, Tokyo, JAP, 300 Hz). We calculated lengthening amplitude and peak lengthening velocities of the muscle fascicles, tendinous tissues (TT) and MTU. Each landing duration was normalized with respect to time from the ground contact to the maximum knee flexion. Effects were determined using a Kruskal-Wallis test.

**RESULTS:** Artificial turf was the most energy-absorbing and deformable surface (artificial turf > natural turf > athletic track). TT lengthening was much higher than for fascicles (about 8-fold), demonstrating their large contribution for energy dissipation during landing. Unexpectedly, no significant effect of surfaces was found neither in GM fascicles lengthening ( $p = 0.34$ ) nor in peak lengthening velocity ( $p=0.25$ ). Similarly, no between-surface difference was found in TT and MTU lengthening and peak velocities (all  $p>0.91$ ), or ankle and knee range of motion (all  $p>0.91$ ).

**CONCLUSION:** Despite a significant difference in surface mechanical properties, the fact that the GM MTU behavior did not change between surface could be explained by a similar mechanical pattern of landing (similar magnitude of ankle and knee-joint excursion). These preliminary findings need to be emphasized with neuromuscular analysis to better understand how the lower limb mechanics is adjusted to surface with different stiffnesses for energy dissipation purpose (Moritz et al., 2004).

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## Oral presentations

### OP-SH16 Optimising physical education for childrens PA and skill development

#### HOW THE BRIGHT AND DARK SIDE OF SELF-DETERMINATION THEORY INFLUENCE STUDENTS' LIFE SKILLS DEVELOPMENT WITHIN PHYSICAL EDUCATION

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**Introduction:** Physical education is acknowledged as a setting which can promote young peoples' development of life skills. In line with the tenets of self-determination theory, the present study examined the relationships between autonomy supportive and controlling teaching, students' basic need satisfaction and frustration, and life skills development within PE.

**Methods:** This study used a cross-sectional research design and ensured a diverse sample by recruiting female and male students from five schools across England and Ireland. During the middle of the autumn school term, a sample of 406 PE students completed measures of autonomy supportive and controlling teaching, basic needs satisfaction and frustration, and life skills development within PE.

**Results:** Bivariate correlations were consistent with the propositions of self-determination theory. Specifically, teacher autonomy support was positively related to students' basic need satisfaction and life skills development within PE. Conversely, a controlling teaching climate was positively related to students' basic need frustration and not significantly related to students' life skills development within PE. Mediation analysis revealed that satisfaction of students' basic needs of autonomy, competence, and relatedness mediated the relationships between teacher autonomy support and students' perceived development of teamwork, goal setting and leadership skills. Both autonomy and relatedness need satisfaction also mediated the relationships between teacher autonomy support and students' perceived development of social skills, problem solving & decision making, emotional skills, time management and interpersonal communication skills.

**Discussion:** Results suggested that the mechanisms of action in the relationships between teacher autonomy support and students' life skills development within PE are the satisfaction of the needs for autonomy, competence, and relatedness. Therefore, teachers seeking to foster the development of life skills through PE should endeavour to create an autonomy supportive climate that satisfies students' three basic needs.

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#### CONTRIBUTION OF THE PHYSICAL EDUCATION CLASSES TO INCREASE THE PHYSICAL ACTIVITY LEVELS IN ADOLESCENTS

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**Introduction:** Scientific evidence allows affirming that physical activity (PA) practice is related with an optimal state of health (Moore et al., 2016). An important percentage of the daily total amount of moderate to vigorous physical activity (MVPA) is performed in the Physical Education (PE) subject (Viciano, Martínez-Baena, y Mayorga-Vega, 2015). The aim of this study was to analyze the influence of PE in two variables: 1) the daily energy expenditure and 2) the compliance with PA practice recommendations.

**Methods:** The total target population of the study was the school adolescents of the Soria province, northern Spain. The final number of students involved was 694. The Four by one-day Physical Activity Questionnaire (Cale, 1993) was used to gather the levels of the PA.

**Results:** In a PE day, the 64.8% of the students meet with the PA recommendations, compared with the 36.6% in a no PE day ( $p \leq .001$ ;  $d = 0.47$ ). The average energy expenditure in the PE days was 38,17 METs/day ( $SD = 4.61$ ), in front of 35.88 METs/day ( $SD = 4.01$ ) ( $p \leq .001$ ;  $d = 0.44$ ).

In a PE day, the 29% only perform MVPA in PE classes. PE contributes 32.5% of the MVPA in those days.

**Conclusion**

The PA performed in the PE classes, increases significantly the average daily energy expenditure and raises in a 28.2% the commitment with the PA recommendations. The 15.6% of the students only achieve MVPA levels in PE classes.

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## PHYSICAL EDUCATION TEACHERS INITIATIVE TO MOTIVATE STUDENTS WITH SPECIAL NEEDS

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**Introduction:** Regular physical activity practice is associated with major benefits for students with special needs (Bailey, 2006; Côté et al., 2009), but only 18% of boys and 8% of girls between 5 and 11 years old are sufficiently active (Statistics Canada, 2013). Physical education (PE) classes represent a favorable environment to promote physical activity (Sallis et al., 2012), and PE teachers play an important role in supporting students' motivation toward physical activity. In this study, PE teachers from 4 schools set up a project to motivate their students with special needs to be physically active. Based on self-determination theory (Deci & Ryan, 2000) and expectancy-value theory (Eccles & Wigfield, 1995), the objectives were to verify if students' participation to that project 1- increased their perceived competence and relatedness in PE, 2- influenced their subjective values (attainment, interest, utility, cost) toward PE, 3- reduced the pressure they feel in PE, and 4- increased their physical activity practice.

**Methods:** Eighty-four (84) elementary school students between 9 and 11 years old (M age = 9.56 +/- .57, boys = 34.6%) were randomly assigned to an experimental (67.9%) and a control group (32.1%). Only students from the experimental group were introduced to new physical activities (half a day in February). Afterwards, these physical activities were, for both groups, reinvested in learning situations in PE classes until the end of the school year. Self-reported questionnaires were completed on 3 occasions. Multivariate analyses of variance and univariate analyses were used to compare the scores: with the factor Group (experimental and control), with the factor Time (time 1, 2 and 3), and with the interaction of the 2 factors (Group X Time).

**Results:** The results of the MANOVAs were significant ( $F(4, 460) = 2.767, p = .027$ ) only for the factor Time on pressure and costs, and the results of the within-subject effects test showed that it was the pressure felt by students that increased over time ( $F = 3.096, p = .047$ ).

**Discussion:** The pressure increase could be explained by the arrival of the final assessments. Even though there was no significant changes, it seems important to encourage these types of initiatives from PE teachers and to help them increase their effectiveness in the future.

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## ASSESSMENT AND PROGRESSION IN SPORT AND PHYSICAL EDUCATION: A METHODOLOGY FOR ESTIMATING INDIVIDUAL RESPONSES AND IDENTIFYING POSITIVE, NEGATIVE AND NON-RESPONDERS

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**INTRODUCTION:** Assessment and progression in sport and physical education is of enduring concern to pedagogical scholars. This challenge is not lessened today by the need for greater inclusion, whereby it is expected that children with special educational needs and/or disabilities can progress and be assessed alongside their peers. In this presentation, our analytic illustrations use data from a therapeutic dance intervention that was piloted in a micro-teaching scenario for children with cerebral palsy (CP). Given that individual responses were highly likely in this subject group – due to the substantial motor and cognitive impairments associated with CP – an innovative approach to statistical analysis known as magnitude-based inferencing was utilised to estimate positive, negative and potential non-responders to the intervention.

**METHODS:** Eight children with CP (ages 9-14; 75% female) participated in the study, which lasted 6 weeks. Inclusion criteria were: a diagnosis of CP and the absence of health problems that would preclude participation in exercise. Data analysed in this presentation are derived from the Hearts and Flowers test, which has three trials: (i) congruent, (ii) incongruent, and (iii) combined. This test was incorporated into our testing battery as a validated measure of Executive Functions (EFs), including attention, working memory, inhibitory control and cognitive flexibility. Data were collected pre- and post-intervention, as well as before and after a single ballet session in week 4 to assess acute effects. Data were analysed using mixed modelling, and a typical error from a reliability study was used to: (i) derive an overall standard deviation representing individual responses; and (ii) calculate confidence limits with which to estimate the magnitude of each individual responder's change score.

**RESULTS:** Group outcomes were very likely trivial (Difference\* 0.1; CL±13.7), likely small (22.2; ±16.8) and unclear (5.0; ±12.9) for the congruent, incongruent, and combined trials, respectively. However, standard deviations representing individual responses to the intervention were clear and very likely large (Standardized Effect\*\* 0.7; CL ±0.4). This meant that, in the case of each EF trial, there were positive, negative and potential non-responders to the intervention. Follow-up analysis of individual responders revealed three findings: (i) there was only one clear positive responder for the congruent trial; (ii) over half of the subjects were positive responders for the incongruent trial; and (iii) positive responders for the combined trial were only evident in the test of acute effects.

**CONCLUSION:** Whilst group analyses may fail to demonstrate improvement in EFs after a therapeutic ballet intervention for children with CP, further analysis of individual responses and responders suggests that over half of participants improved EFs over the course of the intervention and that there were possible short-term EF gains as well.

\*Smallest worthwhile change, SWC = 10.0