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and other aspects of health. However, as noted by Robinson et al. (2015), there is limited longitudinal evidence on the dynamics among motor competence, physical activity, physical fitness and weight status over time as proposed by Stodden and colleagues (2008). As such, this symposium will explore developmental trajectories of physical health in children with a focus on motor competence and physical fitness. The first presentation examines the relationship between motor competence and physical fitness from early childhood to early adulthood using meta-analysis. The second presentation investigates (in)consistencies between developmental pathways of physical fitness and norm scores derived from cross-sectional data. The third presentation explores the dynamics between motor competence, physical fitness and weight status over time to gain insights into the mechanisms underlying changes in these health outcomes. The final presentation focuses on the developmental pathways of weight status and the role of motor competence and physical fitness therein.

The relationship between motor competence and physical fitness from early childhood to early adulthood: A meta-analysis

Till Utesch, University of Muenster, Germany; Farid Bardid, University of Strathclyde, Scotland; Dirk Büsch, University of Oldenburg, Germany; Bernd Strauss, University of Muenster, Germany

Motor competence and physical fitness are important for the development of positive trajectories of health over time (Robinson et al., 2015). In their conceptual model, Stodden et al. (2008) highlighted the role of both factors in physical activity. Furthermore, the authors hypothesized that the relationship between motor competence and physical fitness is reciprocal and changes over time (see also Burton & Rodgerson, 2001). Although more research investigating this relationship has been conducted recently, there is still little known on changes in associations across age. The present meta-analysis synthesizes the research on associations between motor competence and physical fitness from early childhood to early adulthood to have a better understanding on this relationship and possible changes across age. Following the PRISMA guidelines, we identified 60 studies between 1990 and 2016. Thirteen studies comprising of 27 samples and 15,101 participants aged 4.5 to 20.4 years ($Mage = 12.94$, $SD = 4.84$) were included in the analysis. A random effects model was conducted for the meta-analysis with age as a moderator using R. The association between motor competence and physical fitness was moderate to strong ($r = .48$, 95% CI [.38–.57], $p < .001$) after controlling for multiple effects including dependent samples and small sample sizes. Additionally, age was not a significant moderator of the effect size, but was positive from a descriptive point of view. The findings provide support for a medium to strong relationship between motor competence and physical fitness, which does not substantially change from early childhood to early adulthood.

(In)consistency between longitudinal developmental pathways and normative data: The case of cardiorespiratory fitness

Luis Paolo Rodrigues, Instituto Politécnico de Viana do Castelo, Portugal; Vitor Lopes, Instituto Politécnico de Bragança, Portugal

The assessment of cardiorespiratory fitness (CRF) is of paramount importance in the field of human health and sports sciences. The maintenance of satisfactory cardiorespiratory fitness levels is related with the prevention of cardiovascular disease (Ortega et al., 2008), diabetes and obesity (Dwyer et al., 2009), and school-based interventions have proved a positive effect in promoting cardiorespiratory fitness (Minatto et al., 2016). Since the more direct measurement of CRF (VO_{2max}) is complex and expensive, a variety of indirect tests have been used in field-based protocols such as the 20-m endurance shuttle run (PACER). International normative data for the PACER is well established (Tomkinson et al., 2016). Both percentile and average values show that PACER values are expected to increase from 9-to-

17 years of age, although more for boys than girls. Furthermore, CRF values in youth are expected to track into adulthood. In this presentation we will show that individual developmental pathways of PACER can be quite distinct from the widely used normative data. Two hundred and twenty nine children (56% boys) were followed longitudinally from age 9 to 15. Multilevel modelling of changes was conducted in HLM 6.0 software. Ordinary least square (OLS) regressions were used to estimate each child's linear regression equation for the PACER test. Children were clustered into three groups according to their rate of change (slope values), thus representing distinct developmental pathways (Low, Average and High Rate of Change). These three developmental pathways were tested on a hierarchical linear regression (measures within persons), resulting on a very good model fit. Outputs were compared with the normative data setting. Results showed that three groups of children with similar rate of change on their developmental PACER performance can be found, but these pathways do not fully copy with the normative tables' information. In conclusion, we suggest that developmental pathways, using longitudinal information, should be preferably used for predicting present and future outcomes.

Dynamics between motor competence, cardiorespiratory fitness and weight status in children: A cross-lagged longitudinal analysis

Farid Bardid, University of Strathclyde, Scotland; Till Utesch, University of Muenster, Germany; Matthieu Lenoir, Ghent University, Belgium

Motor competence plays a crucial role in children's overall health. In their conceptual model, Stodden et al. (2008) stipulated that the relationship between motor competence and other health-related factors such as physical fitness (which includes cardiorespiratory fitness, musculoskeletal fitness, and flexibility) changes over time. Although recent literature has supported some of the relationships proposed by Stodden and colleagues (2008), there is limited evidence on the dynamics between these health factors across childhood (Robinson et al., 2015). Using cross-lagged analysis, the present study investigated the reciprocal relationships between motor competence, cardiorespiratory fitness and weight status among 664 children aged 6–9 years, over a 3-year time period with one measurement per year ($t1-t3$). Children's motor competence was evaluated using the Körperkoordinationstest für Kinder (KTK) and cardiorespiratory fitness was assessed using the endurance shuttle run test (EUROFIT). Height and weight were also measured to compute BMI. Structural equation modelling with robust standard errors ($p < .05$, $CFI = .97$, $SRMR = .03$) revealed that motor competence ($t3$; $R^2 = .75$) is predicted by prior levels of motor competence, cardiorespiratory fitness and BMI. Similarly, cardiorespiratory fitness ($t3$; $R^2 = .58$) is predicted by preceding levels of fitness, motor competence and BMI. In contrast, BMI ($t3$; $R^2 = .92$) is only predicted by previous levels of BMI. This study provided some evidence for the inter-relationship between motor competence, cardiorespiratory fitness and weight status over time as proposed by Stodden et al. (2008). However, motor competence and cardiorespiratory fitness were not found to be predictors of future weight status when controlled for one another. Further longitudinal and multivariate research into the dynamics between motor competence and other health-related factors is needed in order to gain a better understanding of mechanisms underlying positive (or negative) developmental trajectories of health during childhood.

Classes of developmental trajectories of body mass index: Differences in motor competence and physical fitness

Vitor Lopes, Polytechnic Institute of Bragança, Portugal; Till Utesch, University of Muenster, Germany; Luis Paolo Rodrigues, Polytechnic Institute of Viana do Castelo, Portugal

Purpose: To identify classes of different developmental trajectories of body mass index (BMI) and testing it for differences in motor competence (MC) and

physical fitness (PF). Methods: This is a mixed longitudinal study lasting five years. Participants were N=147 of both sexes (69 girls) divided in 8 cohorts, at baseline the youngest and the oldest cohorts had 4 and 11 years of age respectively. Height and weight were assessed and BMI was calculated [weight (kg)/height (m²)]. MC was assessed with KTK, TGMD-2 and PF was evaluated with one-mile run/walk. Developmental trajectories of BMI were identified using latent class mixed modeling. Post-hoc analyses were calculated using linear models. Results: Modeling revealed four based on the information criteria minimum. However, two classes show very low numbers (n < 6). Therefore, two meaningful classes were identified based on modelling and content related considerations. Class 1 (36%) show larger initial BMI and a larger slope compared to class 2 (64%). No differences were identified in locomotion and object control. For Class 2 increases faster compared to class 1 (p < .05) and class 2 shows better physical fitness (p < .05). Conclusion: This study identified two meaningful trajectories for children based on their BMI development across five time points. In line with previous research, children with slower increasing BMI showed better physical performances and performance improvements. This shows the importance and interplay between multiple indicators of physical health.

Cross-cultural comparisons of perceived and motor competence and health-related fitness in children and adolescents with and without disabilities

Symposium organizer(s): Carlos Luz, Instituto Politécnico de Lisboa, Portugal; David Stodden, University of South Carolina

Symposium discussant: Priscila Caçola, University of Texas at Arlington

Overview abstract

Carlos Luz, Instituto Politécnico de Lisboa, Portugal; David Stodden, University of South Carolina

In the last decade, a growing number of researchers around the world have investigated relationships among physical activity (PA), motor competence (MC), perceived motor competence (PMC), health-related physical fitness (HRF) and weight status in youth (see Robinson et al., 2015). Comparing strengths of associations among variables in studies among countries is difficult as cultural and climate differences may influence how children develop. In addition, culture may influence the types of movement skills in various test batteries and may lead to differences in performance in skills by individuals in different countries as well as their relationship to other health-related variables. Due to the potential impact that culture and climate differences may have on children's motor development, it is critical to conduct cross-cultural studies. These studies will provide a better understanding of differences and similarities in MC and other health-related variable levels on a global level. The first presentation compares Portuguese and U.S. boys and girls (average age) performance on HRF (e.g. PACER test) and MC variables (e.g. kicking velocity). The second presentation explores how MC differs in three very different European countries and discusses how differences change with age and weight status. The third presentation emphasizes the differences in performance in a new MC task (Supine to Stand) among Brazilian and U.S. children and adolescents. The fourth presentation focuses on the differences between PMC and MC between Belgian and Australian adolescent girls. The last presentation is centered on the performance of Latvian and U.S. children with special needs (visual impairments) on several variables (PA, PMC e MC). The discussant will focus on the importance of gaining more insight in the country specific factors that might lead to differences in motor competence (e.g. differences in school systems, obesity rates, safety for outdoor activities, parents' attitudes, etc), and will discuss recommendations for future research.

A cross-cultural comparison of motor competence and health related fitness variables between Portuguese and American children

Carlos Luz, Instituto Politécnico de Lisboa & CIED, Portugal; Rita Cordovil, Universidade de Lisboa, Portugal; Luís Paulo Rodrigues, Instituto Politécnico de Viana do Castelo, Portugal; Zan Gao, University of Minnesota; Jacqueline Goodway, Ohio State University; Ryan Sacko, Ohio State University; Danielle Nesbitt, University of South Carolina; Rick Ferkel, Central Michigan University; Larissa True, State University of New York at Cortland; David F. Stodden, University of South Carolina

Objectives: Cultural contexts are expected to influence motor competence (MC) and health-related fitness (HRF), but the extent to which the development of these factors in childhood are similar or different across countries is not known. The purpose of this study was to compare MC and HRF data of boys and girls from Portugal and the U.S. Methods: The sample consisted of 1,218 children, between 6 and 13 years of age, from Portugal (52% boys; age = 10.14 +/- 2.13 y) and the USA (48% boys; age = 9.48 +/- 1.62 y). Raw MC variables (ball skills [kicking velocity, throwing velocity] and standing long jump [SLJ]) and HRF data (handgrip and PACER test) were assessed. The sample was analyzed according to sex and two age groups (6–9 and 10–13 year-olds). To investigate the differences between countries and interaction effects, ANOVAs were used in kicking and throwing velocity, and ANCOVAs were used for the handgrip, PACER and SLJ tests with body mass index as the covariate due to its known influence in these tasks. Results: Main effects for age (p < 0.001) and country (p < 0.001) were consistent for all variables except for girls (by country) in the SLJ. Not surprisingly, older boys and girls outperformed their younger counterparts. For both sexes, Portuguese children presented significantly higher scores in SLJ and PACER tests, and US children demonstrated significantly higher scores in handgrip and throwing velocity tests. For kicking velocity, Portuguese boys outperformed American boys, but American girls outperformed Portuguese girls. Moreover, US girls tend to be better at ball skills and the differences in ball skills between the two countries became more pronounced in the older age group. Conclusions: A clear cultural effect was noted depending on the type of task. Portuguese children (specifically boys) had better skill and HRF in tasks that involved the lower extremity whereas US children's skill and HRF was better in tasks involving the upper extremity. Such findings may tie to the sporting/cultural environment in the respective countries.

Cross-cultural differences in children' motor competence are accumulating along the age and in the interaction of body weight status

Vitor Lopes, Polytechnic Institute of Braganca, Portugal; Arto Laukkanen, University of Jyväskylä, Finland; Farid Bardid, University of Strathclyde, Scotland; Matthieu Lenoir, University of Ghent, Belgium; Tommi Vasankari, Pauliina Husu, UKK-Institute, Finland; Arja Sämslähti, University of Jyväskylä, Finland

Objectives: The present study examined differences in 5–9-year-old children's motor competence (MC) across Northern-, Central-, and Southern European countries using the Körperkoordinationstest für Kinder (KTK). A secondary aim was to examine whether the cross-cultural differences in MC accumulate in the interaction with children's age group and body weight status determined as being normal or overweight. Methods: Data was pooled from four independent studies conducted in Finland (mean age 7.31 +/- 1.38 years, n = 360 + 432), Belgium (mean age 8.19 +/- 1.14 years, n = 1936) and Portugal (mean age 8.31 +/- 1.02 years, n = 758) between years 2008 and 2016. Differences between countries in the raw scores of KTK and the interaction effects were tested by using one- and two-way analyses of covariance. Age, sex and BMI percentile were