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Gender differences in perceived movement competence in childhood

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Abstract

Perceived movement competence (MC) has been identified as one of the potential correlates of physical activity (PA) during childhood. The aim of the present study was to examine perceived MC differences between boys and girls. One hundred and forty-two children (65 boys), aged 6-9 years (M=7.6, SD=0.9 years) volunteered to participate. Children's perceived MC was assessed with the Pictorial Scale of Perceived Movement Skill Competence-Greek version (Venetsanou, Kossyva, Valentini, Afthentopoulou, & Barnett, under review) that comprises of two sub-scales [object control (OC) and locomotor (LOC)]. To investigate perceived MC differences between genders, multivariate analysis of covariance was utilized, using "age" as a covariate. According to the results, "age" did not differentiate children's perceived MC. Moreover, boys had higher perceived OC than girls ($F_{1,139}$=7.3, p= .008, η^2= .05), whereas there were no gender differences in children's perceived LOC (p= .88) or MC (p= .11). It seems that, between 6 and 9 years, gender differences in perceived MC are small and are located only in OC, a finding that can be linked to the kind of activities children participate in. Strengthening perceived MC in both genders, through developmentally appropriate movement experiences, positive feedback and equal expectations may contribute to improving their PA levels.

Key-words: perceived physical competence, Pictorial Scale of Perceived Movement Skill Competence, fundamental movement skills

Introduction

In recent decades, with the prevalence of childhood obesity reaching alarming levels (Kumar & Kelly, 2017) and the percentage of children who are physically active continuously being reduced (Colley et al., 2011; Kambas et al., 2015; Krug, Jekauc, Poethko-Müller, Woll, & Schlaud 2012; Taylor et al., 2009), actions to promote physical activity (PA) are considered of great importance for public health (World Health Organization, 2011).

With the need to increase the levels of PA during childhood being urgent, many researchers have investigated the potential correlates of PA, with perceived physical competence as a critical one among others. Children's positive perceptions about their physical competence are a key correlate of PA (e.g., Babic et al., 2014; Morales, González, Guerra, Virgili, & Unnithan, 2011; Planinšec & Fošnarič, 2005; Timo, Sami, Anthony, & Jarmo, 2016), as positive perceptions affect motivation towards participation in PA (Craven & Marsh, 2008; Harter, 1982, 1985; Ulrich, 1987). Towards this, higher levels of perceived physical competence are positively associated with increased physical activity involvement of children (Babic et al., 2014; de

Meester et al., 2016) and youth (Inchley, Kirby, & Currie, 2011; Marsh, Papaioannou, & Theodorakis, 2006; Timo et al., 2016).

As perceived physical competence is a multidimensional construct (Fox & Corbin, 1989), for several years, a considerable number of studies have assessed its different components. According to the findings, various characteristics, such as children's age and gender, may differentiate their self-perceptions. More specifically, young children, almost until the age of eight, tend to have inflated perceptions of their physical competence (Harter, 1978, 1999; Harter & Pike, 1984; Horn, 2004; McKiddie & Maynard, 1997; Nicholls, 1978, 1979; Rudisill, Maharm, & Meaney, 1993; Slykerman, Ridgers, Stevenson, & Barnett 2016), as their cognitive skills make it difficult for them to distinguish between their effort and the result of their action (Harter, 1978; Harter & Pike, 1984; Goodway & Rudisill, 1997). In addition, at these young ages, children are not capable of comparing their performance with their peers, but they can only support the formation of their self-perception on their own previous performance (Harter, 2006).

Regarding gender, research findings are contradictory. In numerous studies boys were found to have a more positive perceived physical competence than girls both in preschool (Noordstar, van der Net, Jak, Helders, & Jongmans, 2016; Robinson, 2011) and school years (Carroll & Loumidis, 2001; Noordstar et al., 2016; Raudsepp & Liblink, 2002; Rudisill et al., 1993; Sollerhed, Apitzsch, Råstam, & Ejlertsson, 2008), as well as in adolescence (Barnett, Morgan, van Beurden, & Beard, 2008; Inchley et al., 2011; Lubans & Morgan, 2009; Morano, Colella, Robazza, Bortoli, & Capranica, 2011; Rose, Larkin, Parker, & Hands, 2015; Timo et al., 2016). The only exception is a study where girls aged 4-6 years showed higher perceived physical competence than their male peers (LeGear et al., 2012). However, an important limitation of this study was the kind of skills assessed, with half of them relating to locomotor skills (LOC), which are practiced by girls in a larger extend, since in their daily lives, girls choose to participate in activities involving this type of fundamental skills (Blatchford, Baines, & Pellegrini, 2003), and none of them evaluating children's perceptions of their competence on object control skills (OC).

Nevertheless, only a limited number of studies focusing on preschool children (Goodway & Rudisill, 1998; Lopes, Barnett, & Rodrigues, 2016; Mantzicopoulos, 2006; Perez & Sanz, 2005) and children between 6-7 years of age (Mantzicopoulos, 2006; Planinšec & Fošnarič, 2005) did not reveal any gender differences, with girls and boys presenting the same level of perceived physical competence. The above conflicting results could be attributed to children's

cultural and social context differences and their impact on the formation of self-perceptions (Hagger, Ashford, & Stambulova, 1998).

Recently, strong research interest has emerged focusing on a specific dimension of perceived physical competence, this of perceived *movement competence* (MC). The perceptions of a child for his/her motor skills are thought to be important not only for the everyday activities but, also, for his/her successful participation in PA (Babic et al., 2014; Stodden et al., 2008). In the very few studies focusing on perceived MC that have been conducted (Barnett, Ridgers, & Salmon, 2015; Liong, Ridgers, & Barnett, 2015; Slykerman et al., 2016), boys were found to express higher perceived movement competence than girls in OC skills (Liong et al., 2015; Slykerman et al., 2016).

Taking into consideration that children with low perceived MC are less likely to participate in PA compared to their peers with higher perceived MC (Stodden et al., 2008), the identification of factors that associate with children's perceived MC is of great importance. In accordance to the above mentioned evidence, the aim of the present cross-sectional study was to explore gender differences in perceived MC in a group of children aged 6-9 years old.

Methods

Participants

One hundred and forty-two children (65 boys; 77 girls), aged 6-9 years (M=7.6 years, SD=0.9) volunteered to participate in this study. All the participants lived in Athens and the region of Nafplio, Greece. Their parents (or legal guardians) signed a written informed consent before the children's participation in the study.

Measures

The Pictorial Scale of Perceived Movement Skill Competence for Young Children (PMSC; Barnett, Ridgers, Zask, & Salmon, 2015) was developed in 2015, aiming to assess young children's perceptions about their competence on the fundamental movement skills (LOC and OC skills) that are presented in the Test of Gross Motor Development (TGMD; Ulrich, 2000). In addition, the structure of the PMSC and the presentation of its items were based on the "physical competence" subscale of the Pictorial Scale of Perceived Competence and Social

Acceptance for Young Children (PSPCSA; Harter & Pike, 1984). As a new version of the TGMD (TGMD-3; Ulrich, 2014) was released, an adapted version of the PMSC (Johnson, Ridgers, Hulteen, Mellecker & Barnett, 2016) was developed matching to the 13 items in the TGMD-3. Seven questions of this newer PMSC version assess perceived OC skills and six more the LOC skills.

During the administration of the PMSC, each child is shown a gender specific drawing with a good execution and a drawing with a poor execution of each skill. In turn, the child chooses which drawing is like him/her. If the child selects the competent drawing, he/she is then asked if he/she is 'really good' at the skill or 'pretty good'. If the child selects the not so competent drawing, he/she is then asked if he/she is 'not too good' at this skill or 'sort of good' (e.g. "this child is pretty good at hopping in one leg, this child is not that good at hopping in one leg. Which child is most like you?"). Questions are rated in a four point Likert scale ranging from 1 (very poor perception) to 4 (very high perception). The scores of items are summed into LOC and OC subscales (score ranges from 6-24 for LOC subscale and 7-28 for the OC subscale). In addition, a total score is produced by adding the LOC and OC scores (score range=13-52).

The strength of the PMSC, compared to previous instruments, is that it provides comprehensive information about the movement skills needed for children's participation in sports and/or PA (Barnett et al., 2015b). The validity and the reliability of the first version of PMSC were investigated initially in an Australian sample (Barnett et al., 2015b). Moreover, the PMSC has been translated in other languages in order to assess the perceived fundamental movement skills competence in different cultural samples (Lopes et al., 2016; Valentini et al., 2017). The first version of the scale (Barnett et al., 2015b) has acceptable face validity, good test-retest reliability (ICC_{OC} = .78, ICC_{LOC} = .82, and the overall 12 skills scale ICC = .83), and internal consistency (alpha coefficient range = .60–.81). Concerning the second version of the scale (Johnson et al., 2016), it has a very good test-retest reliability (ICC_{OC} = .86, ICC_{LOC} = .84, and the overall 13 skills scale ICC> .89).

In the present study the Greek adaptation of the PMSC was used (PMSC-GR; Venetsanou, Kossyva, Valentini, Afthentopoulou, & Barnett, under review). The PMSC-GR has satisfactory face validity, whereas its temporal stability was confirmed for the total perceived MC score as well as for both the LOC (ICC= .80, [95% CI = .62 to .89]) and the OC (ICC= .91, [95% CI = .82 to .95]) subscales. The scores of the PMSC-GR and the Greek version of the PSPCSA (Makri-Botsari, 2001)-physical competence subscale were correlated to a low level (ICC_{OC} =

.26; [95% CI = -.041 to .463]; p= .032, ICC_{LOC} = .25; [95% CI = -.020 to .302]; p= .043). Moreover, appropriate internal consistency was confirmed for the total score as well as for the LOC and OC scores (polychoric correlations: PMSC-GR .80; LOC .60; OC .76). Finally, confirmatory factor analysis supported the construct validity of a one-factor and two-factor model (OC-LOC) (Venetsanou et al., under review).

Procedure

Participants were individually assessed with the PMSC-GR, by the first author. The measurements at the main study were conducted between April and June 2016 and they took place in an indoor area. The duration of the scale administration was approximately 8-10 minutes per participant.

Statistical analysis

For the statistical analysis, participants were divided into three age groups (1st: 6-6.11, 2nd:7-7.11, 3rd:8-8.11 years) and a multivariate analysis of covariance was performed (MANCOVA). "Gender" was defined as independent variable, whereas three scores of PMSC-GR (perceived MC, perceived OC, and perceived LOC) as dependent variables with "age" defined as a covariate. The statistical significance was set at p= .05. In addition to *p* values, effect sizes as measured by η^2 values were utilized for data interpretation, following Cohen's (1988) guidelines (η^2 values of $\geq$ .14 are considered sufficiently large to be of any importance). Statistical analyses were performed using IBM SPSS Statistics 22.0.

Results

Children's perceived MC, perceived OC and perceived LOC by gender are presented in Table 1.

Table 1. Means and standard deviations of children's perceived MC, OC and LOC by gender

Variables	Score range	Boys Mean (SD)	Girls Mean (SD)	F	p
Perceived MC	13-52	45.71 (5.01)	43.35 (4.90)	2.57	.11
Perceived OC	7-28	23.94 (4.18)	22.48 (3.60)	7.3	.008*
Perceived LOC	6-24	21.50 (2.22)	20.91 (2.32)	0	.88

*p< .05

The results of the MANCOVA revealed that "age" was not a significant covariant (p= .93) in the relationship between "gender" and "perceived MC". Regarding gender differences in perceived OC skills, boys expressed statistically significant higher perceptions than girls (η^2= .05), whereas the perceptions of both genders on LOC skills or MC were not differentiated.

Discussion

The purpose of this study was to explore gender differences in perceived MC in children. According to the results, "age" was not found to be a significant covariate in the relationship between perceived MC and gender. This finding is in accordance with previous relevant studies in children (Nobre, Bandeira, da Silva Ramalho, Nobre, & Valentini, 2015; Noordstar et al., 2016; Raudsepp & Liblink, 2002; Rudisill et al., 1993), that have revealed that the developmental change in perceived physical competence during the elementary school period is not clear (Noordstar et al., 2016).

With reference to gender differences, boys held statistically higher perceptions than girls only in OC skills. This is in accordance with the finding of both Liong and colleagues (2015) and Slykerman and colleagues (2016). In these studies, with 5-8 years old children, boys were found to present statistically higher self-perceptions than girls only in OC skills. Similar were the findings in the study of Barnett and colleagues (2015a), wherein, however, only the perceived OC skills have been studied in children aged 4-8 years.

Higher perceptions of boys have been, also, highlighted in studies that assess other components of perceived physical competence, such as strength, fitness, body attractiveness, perceived sport competence (Babic et al., 2014; Lubans & Morgan, 2009; Sollerhed et al., 2008; Timo et al., 2016); nevertheless, the findings of those studies cannot be directly compared with

the current ones. However, there are, also, a few studies which have not identified an association between "gender" and "perceived physical competence" (Goodway & Rudisill, 1998; Lopes et al., 2016; Mantzicopoulos, 2006; Perez & Sanz, 2005; Planinšec & Fošnarič, 2005).

Despite the statistical significant gender differences found in this research in perceived competence in OC skills, it is worth mentioning that the value of η^2, which did not exceed the Cohen's limit of .14 (Cohen, 1988), revealed that these differences were not of practical significance. As previous studies (Barnett et al., 2015; Liong et al., 2015; Slykerman et al., 2016) having found significant gender differences did not report effect sizes, but only statistical significance, doubts arise about how "real" the gender differences found in those studies actually were. The statistically significant gender differences which were revealed in the present study could potentially be explained by the daily activities in which children choose to participate (Pellegrini, Blatchford, Kato, & Baines, 2004), with boys being more involved in activities that include ball skills and girls in activities that foster fine motor skills and balance skills (Blatchford, Baines, & Pellegrini, 2003; Du Toit & Pienaar, 2002).

Nevertheless, interpreting the results under the prism of effect size values shows that the "tendency" of boys to feel more competent in OC skills compared to girls is not of great importance. It seems that there is an attempt of significant others in children's life to provide both genders with developmentally appropriate movement experiences, positive feedback and equal opportunities to develop their fundamental movement skills. Taking into consideration that gender-stereotyping beliefs may affect children's participation in specific activities, this finding could be considered critical in order not to reproduce long lasting gender-stereotypes. To that direction, parental awareness of the negative consequences of these gender-stereotyping beliefs not only on children's daily life but also later in life, is valuable, as parents may directly affect their child's perceptions of skill competence (e.g., by enrolling their daughter in a dance school but not allowing their son to a similar activity) (Greendorfer, 1992; Jacobs & Eccles, 1992) and should be examined.

The study has some limitations that should be taken into account, such as the relative small convenience sample and its cross sectional design. Nevertheless, despite its limitations, it provides an insight into gender differences in one of the multiple dimensions of perceived physical competence less investigated, so far. Since perceptions of competence may be related to PA (Babic et al., 2014; de Meester et al., 2016; Timo et al., 2016) and to actual competence (Barnett et al., 2015a; Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2007) or even more to

mediate the relationship between PA and MC (Barnett et al., 2008; Barnett, Morgan, Van Beurden, Ball, & Lubans, 2011; Khodaverdi, Bahram, Stodden, & Kazemnejad, 2016; Stodden et al., 2008), carefully designed interventions that target both actual and perceived MC are needed with particular attention to providing both genders with equal opportunities in order to ensure that no child will be excluded from the PA.

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