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Research Report

A Pilot Investigation of the Perceived Motor Competence of Children with Visual Impairments and Those Who Are Sighted

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Children with visual impairments are less likely to meet recommended physical activity guidelines than are their sighted peers (Augestad & Jiang, 2015; Haegele & Porretta, 2015). Because children with visual impairments tend to be inactive, they are 1.5 times more likely to be considered overweight or obese than are their sighted peers (Weil et al., 2002). Although some barriers to physical activity have been identified (for example, lack of opportunity and transportation issues; Stuart, Lieberman, & Hand, 2006), little has been done to empirically identify predictors of physical activity among this population.

Perceptions of motor competence, one's thoughts or beliefs with regard to one's own gross motor skill performance (Stodden et al., 2008), are powerful predictors of physical activity (Babic et al., 2014). If children do not believe they are competent in their gross motor skills (for instance, running, kicking, and stability), they are more likely to opt out of participating in sports, games, and other physical activities (Robinson et al., 2015; Stodden et al., 2008). Emergent evidence supports a negative trajectory with regard to the association between perceptions of motor competence and physical activity across developmental time for boys and girls who are sighted (Robinson et al., 2015). Young boys and girls who are sighted tend to over-estimate their actual motor abilities, making them more likely to participate in physical activity and develop gross motor skills (Gallahue, Ozmun, & Goodway, 2012). Furthermore, boys trend with higher levels of perception of motor competence than do girls (Goodway & Rudisill, 1997). As such, girls may be at an increased risk for sedentary behaviors and gross motor skill deficits (Goodway & Rudisill, 1997; Robinson, 2011). If children do not develop their perceptions of motor competence and gross motor skills early, the likelihood of obesity and diseases associated with sedentary lifestyles may increase (Robinson et al., 2015).

Little is known with regard to perceptions of motor competence levels among children with visual impairments. To the knowledge of the authors, just two studies have examined this area of inquiry. Shapiro, Moffett, Lieberman, and Dummer (2005) explored perceptions of motor competence levels of children, aged 9 to 21 years, who attended a seven-day sports camp, and found participants to demonstrate low perceptions of motor competence values ($M = 2.73$, $SD = .77$ out of 4.00). Similarly, among a sample of children with visual impairments aged 8 to 13 years,

Brian, Haegele, and Bostick (2016) also found low perceptions of motor competence values ($M = 2.73$, $SD = .77$). Unfortunately, neither Shapiro et al. nor Brian et al. assessed children younger than 8 years of age. As a result, it is unclear how perceptions of motor competence level change across age bands from early to middle childhood. Moreover, to our knowledge, no study has examined the perceptions of motor competence level of children with visual impairments compared to sighted peers across different age groups. Given the importance of perceptions of motor competence during the early years of childhood, since it predicts physical activity and motor competence during adolescence, it is critical that perceptions of motor competence for young children with visual impairments are understood. Therefore, the purpose of this preliminary study was to examine the developmental trajectory of perceptions of motor competence of children ages 3 to 13 years, with and without visual impairments.

Methods

Participants

Participants ($N = 35$; girls = 20, boys = 15) ages 3 to 13 years (M age = 8.06, SD =2.97 years) included children from a center for blind students ($n = 15$; girls = 10; visually impaired = 15; ages 3–13 years); an early childhood center ($n = 10$; girls = 5; sighted = 10; ages 3–6 years); and an elementary school ($n = 10$; girls = 5; sighted = 10, ages 7–13 years), all within the southern United States. We classified the participants' level of visual impairment using the United States Association of Blind Athletes system (n.d.), in which B1 = 5 participants (no light perception in either eye up to light perception); B2 = 3 participants (visual acuity up to 20/600); B3 = 3 participants (visual acuity above 20/600 and up to 20/200); and B4 = 4 participants (visual acuity above 20/200 up to 20/70). No participant in our sample possessed any documented disability in addition to visual impairment.

Instrumentation

We assessed children's perceptions of motor competence through one of three instruments depending upon age and visual impairment. Using multiple, age-appropriate assessments for perceptions of motor competence is common for evaluating it across a developmental trajectory (De Meester et al., 2016). Children ($n = 10$), ages 3 to 7 years who are sighted completed the Perceived Physical Competence (PPC) subscale of the Pictorial Scale of Perceived Competence and Social Acceptance (PSPCSA; Harter & Pike, 1983). The PPC is valid (content and face) and reliable ($r = .66$; Harter & Pike, 1984). Harter and Pike (1984) presented six items through two side-by-side pictures of either boys or girls completing each skill very well or poorly. The administrator read a script to the child (for example, this boy runs very fast, but this boy runs very slowly. Which one are you like?) and asks the child to point to the picture that he or she believes is "just like him or her." Next, the administrator asks, Is that really true for you or sort of true for you? If the child selects a negative picture, then really true = 1 and sort of true = 2. If the child selects a positive picture, then really true = 4 and sort of true = 3. An overall average score of 4 = very high perceptions of motor competence, 3 = high perceptions of motor competence, 2 = low perceptions of motor competence, and 1 = very low perceptions of motor competence (Harter & Pike, 1983).

Children (n =10; ages 3–7 years) with visual impairments completed the Test of Perceived Motor Competence for Children with Visual Impairments (TPMC-VI; Brian, Haegele, Lieberman, & Bostick, 2016). The TPMC-VI features the same items and structure as the PSPCSA but was modified for children with visual impairments. Modifications included transforming pictorial plates into written vignettes, which were read aloud by the administrator. The TPMC-VI is valid (Brian et al., 2016; Brian, Bostick, Taunton,

& Pennell, in press) and reliable (α = .68; Brian et al., in press).

Children (n = 15; ages 8–13 years) with (n = 7) and without (n = 8) visual impairments completed the Self-Perception Profile for Children (SPPC, Harter, 2012). The SPPC possesses face, content, and convergent validity (r = .69) as well as internal consistency (α = .76–.91; Harter, 2012). The SPPC contains six items within the Perceived Athletic Competence subscale. The scoring and administration format is the same as the PPC subscale and the TPMC-VI. The SPPC contains written questions such as "Some kids wish they could be a lot better at sports BUT other kids feel they are good enough at sports" (Harter, 2012). All six items were read aloud by the administrator to the child.

Procedures

The Institutional Review Board from the University of Southern California approved all methods. Parents provided informed consent and completed a demographic questionnaire. All children assented to participate. The lead researcher trained all members of the research team by providing a script to practice with children at a nearby child center. After all team members completed training, they then solicited responses from each participant individually by reading the script aloud one-on-one and soliciting responses in a quiet space outside the classroom at all sites. Once all participants submitted responses, we next conducted descriptive analyses, including Pearson Product Moment correlations, to assess associations among age and perceptions of motor competence. Next, we conducted a two-group (visual impairment or sighted) by two age band (3–7 or 8–13 years old) by two genders (girls or boys) ANOVA. Afterwards, we conducted independent samples t-tests as post hoc analyses with an alpha level set a priori at $p \leq .05$.

Results

Descriptive means and standard deviations are located in Table 1. Children with visual impairments, ages 8–13, presented the lowest perceptions of motor competence (M = 2.04, SD = .84; see Table 1 and Figure 1). In contrast, children who are sighted, ages 3–7, revealed the highest perceptions of motor competence (M = 3.55, SD = .35; see Table 1and Figure 1). Age ($r = -.45$, $p < .001$) and degree of visual impairment ($r = -.61$, $p < .001$) were negatively and significantly associated with perceptions of motor competence. ANOVA results show a significant main effect for vision—$F(1, 34) = 17.12$, $p < .001$; $\eta^2 = .36$)—and age—$F(1, 34) = 6.99$, $p = .003$; $\eta^2 = .18$)—but not for gender—$F(1, 34) = .001$, $p = .981$; $\eta^2 = .00$). There were no significant interactions. Children with visual impairments reported significantly—$t(22) = -4.11$, $p < .001$, $d = 1.75$—lower levels of perception of motor competence (M = 2.24, SD = .85) than did their sighted peers (M = 3.26, SD = .51; see Table 1 and Figure 1). Older children (M = 2.50, SD = .83) also revealed significantly lower—$t(33) = 2.83$, $p = .008$, $d = .98$—levels of perceptions of motor competence than did younger children (M = 3.24, SD = .67; see Table 1 and Figure 1).

Discussion

The purpose of this study was to examine the perceptions of motor competence levels of children ages 3 to 13 years with and without visual impairments, across developmental time. Consistent with previous research (Brian et al., 2016; Shapiro et al., 2005), results indicated that children with visual impairments reported low perceptions of motor competence (M = 2.82, SD = .84 out of 4.00). In addition, children with visual impairments had significantly lower perceptions of motor competence than did their sighted peers ($p < 001$). Our findings are consistent with previous comparative studies that found greater deficits in motor skill competence

(Houwen, Visscher, Hartman, & Lemmink, 2007) and physical activity (Haegele & Porretta, 2015) for children with visual impairments contrasted with sighted peers.

To our knowledge, this was the first study to examine the developmental trajectory with regard to perceptions of motor competence of children with and without visual impairments across time. The young sighted children within our sample showed high levels of perceptions of motor competence. This finding is not surprising, given that young children who are sighted tend to show high levels of perceptions of motor competence during the early years (Goodway & Branta, 2003). High estimations may be due to an inability to differentiate between effort (Did I try the task?) and actual competence (Did I do it well?) (Stodden et al., 2008). In contrast, the young children with visual impairments showed significantly lower levels of perceptions of motor competence than did their sighted peers. This finding is alarming given the importance of perceptions of motor competence with regard to physical activity.

In the early years, physical activity tends to drive gross motor skill development (Stodden et al., 2008). If young children with visual impairments already have poor perceptions of motor competence, then they will potentially be unwilling to participate in physical activity, which can result in gross motor delays (Robinson et al., 2015). If children do not learn gross motor skills before adolescence, then they will face greater difficulty in doing so later on in life (Seefeldt, 1980), which increases the risk of gross motor developmental delays (Gallahue et al., 2012). Gross motor delays and low perceptions of motor competence during the early years increase children's disengagement with physical activity (Stodden et al., 2008). Children's disengagement with physical activity tends to strengthen across developmental time (for example, low physical activity leads to lower gross motor skills and lower perceptions of motor

Table 1
Descriptive results for PMC, age, VI, means and gender.

	VI (n = 15)			Sighted (n = 20)			Overall (N = 35)		
Population	Boys	Girls	Overall	Boys	Girls	Overall	Boys	Girls	Overall
3–7 years *SD*	n/a	2.63 (.77)	2.63 (.77)	3.47 (.45)	3.63 (.25)	3.55 (.35)	3.47 (.45)	3.13 (.76)	3.24** (.67)
8–13 years *SD*	2.10 (.59)	2.00 (1.05)	2.04 (.86)	3.00 (.33)	2.92 (.74)	2.97 (.50)	2.64 (.64)	2.37 (1.00)	2.50** (.83)
Overall *SD*	2.10 (.59)	2.29 (.95)	2.24**‡ (.85)	3.21 (.44)	3.31 (.62)	3.26**‡ (.51)	2.29 (.69)	2.75 (.95)	2.82 (.84)

PMC = perceived motor competence, VI = visual impairment. **‡ = results from independent samples t-test for VI with $p < .001$. ** = results from independent samples t-test for age with $p < .001$.

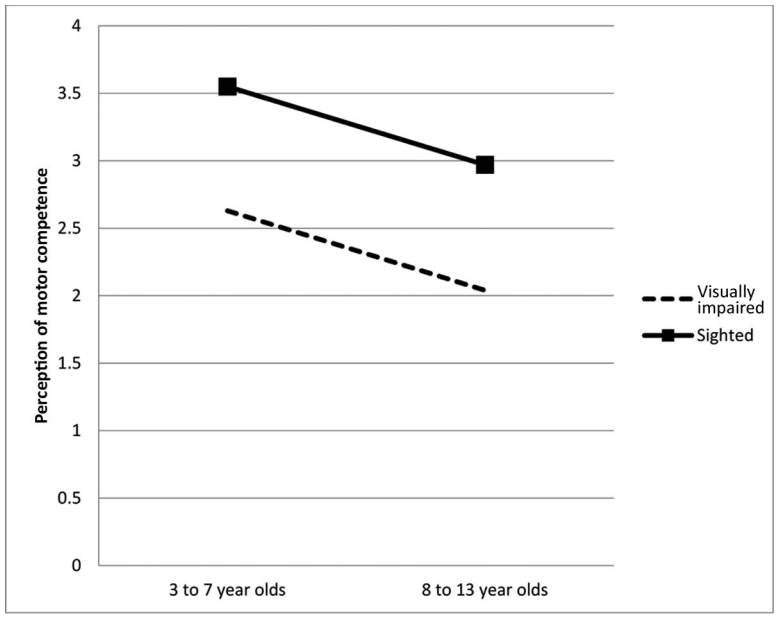

Figure 1. Perceptions of motor competence.

competence) (Robinson et al., 2015), which can increase the risk of obesity and diseases associated with sedentary behaviors (Stodden et al., 2008).

The negative trajectory with regard to perceptions of motor competence appears to be parallel but lower for children with visual impairments compared to their sighted peers. Older children demonstrated lower perceptions of motor competence than did younger children across both groups. Drops in perceptions of motor competence were parallel with lower levels of perception of motor competence for children with visual impairments across developmental time when compared to sighted peers. Given the preliminary data presented within this study, it is no surprise that children with visual impairments have lower gross motor skills (Houwen et al., 2007; Wagner, Haibach, & Lieberman, 2013), levels of physical activity (Haegele & Porretta, 2015), and higher incidences of obesity than do their sighted peers (Weil et al., 2002).

In conclusion, children with visual impairments demonstrate low levels of perception of motor competence with greater deficits than do their sighted peers. Although research is surging in this area for sighted youths (Robinson et al., 2015), motor skill competence, perceptions of motor competence, and physical activity are yet to be comprehensively evaluated for individuals with visual impairments (Haegele, Brian, & Goodway, 2015). Future research should consider examining associations among perceived and actual motor competence and physical activity within the same sample of children with visual impairments. Furthermore, structured gross motor opportunities are desperately needed for all children, but particularly for children with visual impairments. Intervention strategies should focus upon developing both perceived and actual motor competence during the early years in order to combat obesity.

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