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Can Special Olympics coaches accurately report on the motor competence of children with intellectual disabilities?

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Abstract

Background: Motor competence is the ability to perform goal directed human movements in a co-ordinated, accurate and error free manner. The aim of this study was to compare the accuracy of coaches' perceptions of children's motor competence with their actual motor competence.

Method: This study examined the motor competence of children with intellectual disabilities ($n = 100$) and coaches' perceptions of children's motor competence ($n = 10$). Participants were assessed using TGMD-3. Coaches completed an adapted version of the pictorial scale of Perceived Movement Skill Competence.

Results: The predictive power of coaches perceived motor competence versus children's actual motor competence was assessed.

Conclusions: This research will provide insight for sports organisations to determine whether coaches can accurately report on the motor competence of children with intellectual disabilities.

KEYWORDS
children with intellectual disabilities, motor competence, perception, proxy assessments, Special Olympics, sports coaches

1 | INTRODUCTION

Motor competence is the ability to perform 'goal directed human movements in a co-ordinated, accurate and relatively error free manner' (Downs et al., 2020, p. 1). Fundamental movement skills (FMS), also known as gross motor skills, involving large musculature in the arms, trunk and legs (Clark, 1994) are an integral component of motor competence. FMS encapsulates three categories of movements including locomotor (e.g., skipping, running), ball skills (e.g., throwing, catching) and balance (e.g., dynamic and static stability) (Barnett, Stodden, et al., 2016; Logan et al., 2018). Despite the positive benefits associated with higher levels of motor competence, the literature frequently reports that children with intellectual disabilities consistently demonstrate low proficiency in FMS (Kavanagh et al., 2023; Maïano et al., 2019). The condition of an intellectual disability is characterised by limitations in both intellectual functioning and adaptive behaviour, this disability is diagnosed before an individual reaches 22 years of age (Boat and Wu, 2015). Amongst children with intellectual disabilities, low motor competence has been shown to hinder their psychological, social and physical development (Westendorp et al., 2011).

Identifying movement deficiencies and implementing interventions to target these weaknesses during the childhood years is invaluable to helping establish lifelong engagement in sport and physical activity (Ward et al., 2020), particularly for children with intellectual disabilities who exhibit low levels of FMS performance which can impact quality of life (Kavanagh et al., 2023). FMS assessment therefore plays an important role in helping practitioners and researchers to understand movement skill proficiency as well as informing interventions (Barnett et al., 2009; Logan et al., 2015; Ward et al., 2020). For all children globally the responsibility for FMS development typically falls upon primary school teachers as part of the physical education curriculum (Australian Curriculum Assessment Reporting Authority, 2014; Irish Primary School Physical Education Curriculum, 1999). However, research has demonstrated that among primary and secondary school teachers the lack of education on FMS proficiency in their initial training and gaps in professional development means they have limited capacity to advance or assess children's motor competence (Eddy et al., 2021). Furthermore, while there is a curriculum focus on developing children's FMS within the school setting, formal screening and assessment of motor skills is often not common practice with a quarter of teachers indicating they have little to no knowledge of FMS (Eddy et al., 2021).

Similarly, little emphasis has been placed on the importance of sports coaches having the ability to conduct FMS assessments of the children they coach on a regular basis (Eddy et al., 2021; Nagy et al., 2023). The ability too accurately assess and monitor the FMS performance of children should be a top priority for sport coaches for a number of reasons including supporting the individual development of motor skills, measuring progress, success and to correct proficiency deficiencies to avoid long term negative health consequences (Clark & Metcalfe, 2002; Nagy et al., 2023). Particularly for children with intellectual disabilities, motor assessment during the key motor skill development years is essential to highlight developmental delays that need to be addressed as well as progress in physical development over time (Gallahue & Ozmun, 1998; Youngdeok et al., 2012). If motor skill assessment is not taking place in the school setting, there is an increased reliance on sports coaches to have the ability to accurately track and assess children's FMS performance to ensure they are achieving high proficiency as this ultimately can have an impact on their lifelong involvement in sport and physical activity (Hulteen et al., 2018; Lubans et al., 2010; Ward et al., 2020).

A programme that aims to tackle the FMS proficiency deficiencies faced by children with intellectual disabilities is 'Young Athletes', a motor skills programme which was first introduced to the Special Olympics movement in 2004 (Favazza et al., 2013). The Young Athletes programme aims to develop the motor competence of children with intellectual disabilities across the three categories of skills including locomotor skills (e.g., running, skipping, hopping), ball skills (e.g., catching, throwing, kicking) and stability skills (e.g., static, dynamic balance) (Favazza et al., 2013). The Young Athletes programme enabled Special Olympics to fill a gap in their programming and provide an opportunity for children with intellectual disabilities under 8 years of age to participate in Special Olympics for the first time (Favazza et al., 2013; Favazza et al., 2014). This programme can be delivered in a variety of settings including the community, school and at home by sports coaches, teachers and parents (Favazza et al., 2013; Favazza et al., 2014; Young Athletes Programme | Special Olympics Ireland, 2019).

Due to the large role that coaches play in creating supportive environments which foster the development of children's FMS, an area of interest for researchers and practitioners is whether coaches can accurately report on children's actual motor competence (Liong et al., 2015). Previous research from Estevan et al. (2018) and Liong et al. (2015) demonstrated that parents and physical education teachers' perceptions of children's motor competence are significantly associated with children's actual motor competence scores. These results support the idea that both parents and teachers could potentially provide accurate proxy reports of children's actual motor competence. While a small number of studies (Estevan et al., 2018; Liong et al., 2015) have considered the perceptions of parents and teachers providing accurate proxy reports on the actual motor competence of children without intellectual disabilities, to our knowledge no studies to date have examined the potential relationship between coaches' perceptions of children's motor competence and children's actual motor competence.

Sports coaches play an integral role in creating supportive environments which foster the development of motor competence in children with intellectual disabilities (MacDonald et al., 2016), despite this, little research has been carried out investigating whether coaches can accurately report on motor competence levels. The implementation and success of targeted FMS interventions to improve motor competence in this population is partially dependent on the quality of motor competence assessment (Hands & McIntyre, 2015). The main aim of this study was twofold: (1) to compare the accuracy of coaches' perceptions of children's motor competence with their actual motor competence and (2) to evaluate whether coach gender and coaching experience influence the accuracy of coaches' perceptions of children's motor competence.

2 | MATERIALS AND METHODS

2.1 | Participants

Cross-sectional data were collected as part of the *'SO Fun'* project with Special Olympics Ireland. Fifteen Special Olympics Young Athletes clubs were contacted with 10 clubs agreeing to participate in the study. Participants recruited for the study were children with intellectual disabilities who were registered with the Special Olympics Young Athletes programme. Additionally, participants needed to be aged 4–12 years, fully mobile and have the ability to walk without the use of an aid. The Young Athletes programme is a yearlong 'play and sports activity programme' (Favazza et al., 2013) that takes place on a weekly basis and introduces children with intellectual disabilities to a wide range of play activities in a supportive, fun environment (Young Athletes Programme | Special Olympics Ireland, 2019).

A sample of 100 children with intellectual disabilities were recruited from clubs across 8 counties in each of the four provinces of Ireland and Northern Ireland. A total number of 438 children with intellectual disabilities were registered with the Special Olympics Ireland, Young Athletes programme during the period of data collection. Sixty-six percent of the participants had Down syndrome, while the remaining participants reported their condition as an intellectual disability. The sample consisted of 60% boys with an age range of 4–12 years and a mean age of 7.5 ± 2. The Head Coaches, from the 10 participating clubs, were then recruited to participate in the study to rate the children's motor competence of the group they coach. The coaches sample consisted of 50% females with a mean age of 45.1 ± 8.3 years. Their coaching experience delivering the Young Athletes programme ranged from 1.3 to 5.1 years (3.8 ± 0.97 years). Data were collected during the period of October 2021 to June 2022.

Ethical approval was obtained from Dublin City University, Research Ethics Committee (DCUREC/2021/100). The coaches of each of the participating clubs provided initial consent for the research team to visit the club to discuss the purpose of the study. Following this visit, parental consent and participant assent were also obtained and required in order for the children to partake in the study. After agreeing to participate in the study, coaches were sent an informed consent form to complete. Anonymity was maintained with each participant (children and coaches) assigned a unique numerical code.

2.2 | Measures

Children's demographics including age, gender and physical activity levels were collected through the consent forms and questionnaires completed by parents. Children's motor competence was assessed using a subset of the process-oriented fundamental movement skill (FMS) assessment battery, the Test of Gross Motor Development—3rd Edition (TMGD3) (Ulrich, 2019). The TGMD-3 is an individually administered test that assesses two components of FMS, locomotor and ball skills (Ulrich, 2019). The subset of skills assessed for the purpose of this study included locomotor skills (run, skip, horizontal jump, hop) and ball skills (catch, kick, stationary dribble, overhand throw, underhand throw, one hand strike) (Ulrich, 2019). The skills of the gallop, slide and two-hand strike were omitted from the test battery. The skill of slide and two-hand strike are most commonly seen in American based sports such as baseball and were not culturally relevant for this sample of participants. Additionally, the criteria examined in the skill of gallop are assessed also in the skills of hop, skip and run. Therefore, due to the time constraints that became apparent for data collection during the pilot phase, the researchers made a decision to remove these three skills from the test battery. The TGMD-3 has established clinical validity (Pitchford & Webster, 2021; Temple & Foley, 2017), reliability ($\alpha = .81$) and instructional sensitivity (Staples et al., 2021) for children with intellectual disabilities in this age cohort (Magistro et al., 2018).

Coaches' demographics of age, gender and coaching experience were provided from the Special Olympics Ireland database. Coaches rated the children's motor competence using an adapted version of the pictorial scale of Perceived Movement Skill Competence (PMSC). The original pictorial scale of PMSC is used with children to assess their perceived motor competence and is composed of 12 pictographic tasks corresponding to the FMS assessed using the TGMD-2nd Edition (Barnett, Vazou, et al., 2016). This original scale was transformed into a written survey, with each FMS named and supported with an accompanying image (Estevan et al., 2018; Liong et al., 2015). Both parents and physical education teachers have used this survey to assess children's motor competence (Estevan et al., 2018; Liong et al., 2015). The rating scale in the PMSC survey is based on the same 4-point Likert scale that is used in the children's version, that is, a score of 1 means 'not good at' while a score of 4 means 'very good at'. The range of scores for the total scale and subscales was thus the same as in the children's version (Estevan et al., 2018). As detailed by Estevan et al. (2018), the 'gatekeepers' version of the survey demonstrated test–retest reliability (13.4 days) with 21 Australian parents of children aged 6.3 years and was found to be highly reliable (intra-class correlation 1/4 0.90, 95% CI 0.77e0.96).

2.3 | Data collection

Formal training was provided to all members of the research team to ensure an in-depth understanding of the TGMD-3 assessment battery, in addition to establishing consistency for the visual demonstration of the skills to each participant. The research team was provided with opportunities to practice skill demonstrations as well as marking assessments. Visual demonstrations of each skill followed Ulrich's (2019) protocol. The research team attended the children's Young Athletes club training session and individually administered the TGMD-3 assessment battery to each participant. A practice trial was provided to participants so they could become accustomed with each skill, followed by two opportunities to perform the skill. Participants received no verbal feedback or cues. The participants' performances were video recorded.

Retrospectively, a trained member of the research team assessed and scored each skill component. If the participant successfully performed the criteria a score of 1 was given while if the participant failed to meet the criteria, they received a score of 0. Participants' raw scores per skill were calculated by collating the scores from both trials. Once all skills were assessed, raw subtest scores for locomotor and ball skills were calculated.

After the research team assessed the children's actual motor competence, individual meetings were set up with each participating coach wherein they received an explanation and training on how to complete the survey. The coaches were asked to rate the children's motor competence using the PMSC survey during the weekly Young Athletes club training session. Assistance to coaches during this period was also provided by phone, email or video meeting platforms when required. Coaches completed the PMSC survey for each child that participated in the actual motor competence assessment with the research team. The coaches returned the surveys for each participating child to the research team upon completion.

2.4 | Data analysis

All data were analysed using R (R Core Team, 2022. To describe the characteristics of the data, means and standard deviations on the variables of interest were computed (see Table 1). The data of the children's actual motor competence ($n = 100$) was analysed and aligned

TABLE 1 Descriptive statistics of participants.

	Means (±SD)			
	Children's MC score	Score range	Coaches perceptions	Score range[a]
Locomotor subset	12.1 ± 7	0–30	9.9 ± 1	1–16
Run	5.6 ± 2.5	0–8	3.1 ± 1	1–4
Skip	0.8 ± 1.6	0–6	2 ± 0.9	1–4
Hop	2.3 ± 2.6	0–8	2.2 ± 1	1–4
Horizontal jump	3.6 ± 2.8	0–8	2.6 ± 1	1–4
Ball skills subset	14.7 ± 9.6	0–44	16.2 ± 1	1–24
Dribble	1.7 ± 2.1	0–6	2.2 ± 1	1–4
Catch	3.0 ± 1.7	0–6	2.7 ± 0.9	1–4
Kick	3.9 ± 2.2	0–8	3 ± 1	1–4
Overhand throw	1.3 ± 2.1	0–8	2.9 ± 1	1–4
Underhand throw	3.3 ± 2.6	0–8	3.2 ± 0.9	1–4
Strike	1.5 ± 2.3	0–8	2.2 ± 1	1–4
POMP scores				
Locomotor subset	40%	0%–100%	61.6%	0%–100%
Ball Skills subset	33.3%	0%–100%	67%	0%–100%
Physical activity levels				
No. Days per week active	4.34 ± 1.8			0–7
No. Days active in last 7 days	4.25 ± 1.9			0–7
Coaches Experience (years)			3.8 ± 0.97	
Age (years)	7.5 ± 2		45.1 ± 8.3	
Gender	60% M		50% M	

Note: Coaches perceptions – Objective FMS scores = POMP (%).
Abbreviations: ES, Cohens d; M, males; MC, motor competence; POMP, percent of the maximum possible; Score range, max possible score.
[a]1—Not too good at 2—Sort of good at 3—Pretty good at 4—Really good at.

with the coaches' proxy reports from the PMSC survey ($n = 10$). Pearson's correlation was performed to determine the relationship between the children's actual motor competence and the coaches' perception of children's motor competence for each individual skill, locomotor and ball skills scores (see Table 2). Additionally, the Percent of the Maximum Possible (POMP) method (Cohen et al., 1999) was used to compare the children's actual motor competence scores to the coaches' perception's proxy report scores. The POMP method ([(observed − minimum)/(maximum − minimum)] × 100), was applied to the children's actual locomotor and ball skill subtest scores along with the coaches perception's (CP) proxy report scores and were converted into new variables (e.g., Actual_Locomotor_POMP/CP_Locomotor_POMP). The means and standard deviations of the converted POMP scores for children's actual motor competences scores and coaches' perception's proxy report scores were then calculated. The final percentage score was calculated by deducting the CP POMP score from the Actual POMP score. The score assigned to each participant is a percentage, reflecting the participants position on the scale as a 'percent of the maximum possible score achievable on that scale' (Cohen et al., 1999). This enabled the researchers to determine whether the coaches were underestimating or overestimating the children's motor competence compared to the gold standard TGMD-3 assessment tool assessment of their motor competence.

In preparation for the mixed effects analysis, we tested the assumptions, normality residuals of the dependent variable in the mixed effects model by comparing the residuals to the fitted values. Based on the findings we ran the linear mixed effects model. Multilevel mixed-effects regression models were conducted to assess the predictive power of coaches' perceptions of the children's motor competence (i.e., locomotor and ball skills) on children's actual motor competence. Each model included the coach as a random effect and was adjusted for coach gender and years of experience. Standard errors were calculated, and model assumptions were checked with residual plots and histograms. To quantify the proportion of variance explained by the fixed effects model both determine the marginal R-squared (R^{2m}) and conditional R-squared (R^{2c}) was calculated. Furthermore, the multilevel mixed-effects models were compared using the Akaike's information criterion (AIC) and Bayesian information criterion (BIC). A smaller AIC and BIC value suggests a better model. Table 3 represents the results from the random intercept only model as this outperformed the random intercept and random slope model.

3 | RESULTS

The results of Pearson's correlations are presented in Table 2, determining the relationship between the children's actual motor competence at the individual skill level and the coaches' perception of children's motor competence, highlighting how strong or weak the associations between the two variables are. The results of the POMP method indicate that coaches rate children's motor competence higher by 21.5% in the locomotor subset and 33.8% higher in the ball skills subset compared to the objective TGMD-3 assessment tool scores.

A linear mixed-effect model was used to investigate the relationship between actual locomotor score of the children and coach's perceived performance rating, gender, and years of experience while controlling for the effect of individual coaches. The analysis revealed a significant association between the perceived locomotor score of coaches and the actual locomotor score of children ($\beta = 1.36$, $SE = 0.16$, $t(95.76) = 8.64$, $p < .001$). This indicates that an increase in coaches' perceived performance rating was linked to higher actual locomotor performance in children. However, the gender of the coach ($\beta = -1.12$, $SE = 2.28$, $t(7.49) = -0.49$, $p = .638$) and years of experience ($\beta = -.0005$, $SE = 0.003$, $t(8.37) = -0.19$, $p = .853$) did not show a significant effect on the actual locomotor score. The model also revealed significant variance between coaches ($\sigma^2 = 1.36$, $SD = 0.16$, $p < .001$) and within-coach residuals ($\sigma^2 = 23.17$, $SD = 4.81$). The overall model fit for the mixed effects model was assessed using the conditional and marginal R-squared values. The conditional R-squared value was .58 indicating that ~58% of the variance in the outcome variable was explained by the fixed and random effects in the model. The marginal R-squared value was .40, indicating that ~40% of the variance in the outcome variable was explained by the fixed effects alone.

Similarly, a linear mixed-effect model was used to investigate the relationship between actual balls skills score of the children and coach's perceived performance rating, gender, and years of experience while controlling for the effect of individual coaches. The model showed a significant effect of coaches perceived ball skills score on children's actual ball skills score ($\beta = 1.13$, $SE = 0.17$, $t(72.09) = 6.60$, $p < .001$), indicating that an increase in coaches perceived performance rating was associated with higher actual ball skills performance. Similarly, there was a significant effect of coach gender ($\beta = -7.74$, $SE = 2.98$, $t(5.12) = -3.46$, $p < .01$). There was no significant effect of years of experience ($\beta = -.0005$), $SE = 0.003$, $t(8.37) = -0.19$, $p = .853$) on actual ball skills score. The model also revealed significant variance between coaches ($\sigma^2 = 1.13$, $SD = 0.17$, $p < .001$) and within-coach residuals ($\sigma^2 = 52.84$, $SD = 7.27$). The overall model fit for the mixed effects model was assessed using the conditional and marginal R-squared values. The conditional R-squared value was .42 indicating that ~42% of the variance in the outcome variable was explained by the fixed and random effects in the model. The marginal R-squared value was .37, indicating that ~37% of the variance in the outcome variable was explained by the fixed effects alone.

TABLE 2 Pearson correlation (Pearson) between children's actual MC and coaches perceptions of children's MC.

Actual vs. perceived MC	Correlation coefficient	Strength of correlation[a]
Locomotor subtest		
Run	.37	Weak
Skip	.40	Moderate
Hop	.50	Moderate
Horizontal jump	.33	Weak
Ball skills subtest		
Dribble	.54	Moderate
Catch	.25	Weak
Kick	.20	Weak
Overhand throw	.20	Weak
Underhand throw	.30	Weak
Strike	.32	Weak
Combined scores		
Total locomotor subtest score	.59	Moderate
Total ball skills subtest score	.47	Moderate

[a].00–.19: Very weak correlation, .20–.39: Weak correlation, .40–.59: Moderate correlation, .60–.79: Strong correlation, .80–1.00: Very strong correlation (Kirch, 2008).

4 | DISCUSSION

At a macroscopic level, this study investigates the accuracy of coaches' perceptions of children's motor competence using the PMSC survey, compared to children's actual motor competence scores. Firstly, the findings demonstrate that on an individual skill level, the Pearson correlations highlighted weak to moderate associations (Kirch, 2008) between the children's actual motor competence and the coaches' perception of the children's motor competence. These findings are supported by those found by Estevan et al. (2018) who reported physical education teachers provided moderate proxy report associations and parents provided weak-moderate proxy report associations compared to the actual motor competence of children without intellectual disabilities. Similarly, the results from the POMP indicate that coaches perceive the children's motor competence ability to be higher in the locomotor subset by 21.5% and in the ball skills subset by 33.8% compared to the assessments conducted by the research team using the objective TGMD-3 assessment tool. These combined results illustrate that sports coaches can provide weak-moderate reports on the individual fundamental movement of children with intellectual disabilities.

In the same way, Youngdeok et al. (2012) identified that amongst three highly qualified Adapted Physical Activity Specialists who were experienced in utilising the TGMD-2 to assess the FMS proficiency of children with intellectual disabilities, the severity level for each

TABLE 3 Mixed effects model analyses for coaches' perception of children's motor competence predicting children's actual motor competence.

	n	*C*	Adj. coeff. 95% CI	SE	AIC ‖ BIC	χ^2	*df*	*p*	R^{2m}	R^{2c}
ATL (outcome) CP	100	10	1.36 (0.80, 1.44)	0.16	4619.93 ‖ 630.35	54.35	1	.001	.40	.58
ATBS (outcome) CP	100	10	1.13 (1.04, 1.66)	0.17	4704.43 ‖ 713.86	33.21	1	.001	.37	.42

Note: All mixed effects models were adjusted for coach gender and years of experience (results shown in text). AIC = Akaike's information criterion. BIC = Bayesian information criterion (smaller AIC and BIC values suggest a better model). Clusters = number of coaches involved. R^{2m} and R^{2c} represents the proportion of variance explained by the model.

Abbreviations: Adj. coeff., adjusted unstandardised coefficients; ATBS, actual total ball skills; ATL, actual total locomotor; *C*, clusters; CP, coaches perception; *df*, degree of freedom; $p < .001$, significant difference; R^{2c}, conditional R-squared; R^{2m}, marginal R-squared; SE, standard error.

assessor varied significantly across the skills within the TGMD-2. Erguvan and Aksu Dunya (2020, p. 4) define rater severity as 'the tendency of a rater to assign higher or lower ratings on average than those assigned by other raters'. One assessor rated the children's FMS proficiency with a more severe standard compared to the other assessors in this study, the large variances found were accounted by the rater effects in the individual subtests of the TGMD-2 (Youngdeok et al., 2012). These results indicate that despite the experience of the assessors, they too were assigning higher or lower FMS performance scores of the children with intellectual disabilities whose skill performance they assessed.

Our study suggests that sports coaches have the potential to offer valuable insight into children's motor competence in the child's natural environment of their sports session. As the sports coaches in this study had not received any formal training on assessing children's motor competence, the findings are important for establishing the need for further coach education opportunities and to highlight the potential ability of sports coaches to provide accurate proxy reports on the motor competence of children with intellectual disabilities. Furthermore, these results demonstrate the importance of educating sports coaches on how to assess the motor competence levels of children with intellectual disabilities. If sports coaches receive adequate training and upskilling in the area of motor competence assessments, they can act as a first line of defence in identifying motor impairments (similar to physical education teachers) (Logan et al., 2014) among children with intellectual disabilities, and have the ability to tailor FMS programmes to effectively target motor competence weaknesses for this population. In line with the recommendations from previous research (Erguvan & Aksu Dunya, 2020; Youngdeok et al., 2012), practitioners undertaking motor skill assessments should be provided with rater training workshops, regardless of prior experience, in order to achieve inter-rater reliability, and reliable, valid measurements of the motor competence of children with intellectual disabilities.

Previous research has investigated the ability of paediatric movement professionals and primary school teachers' to accurately report on the FMS performance of primary school going children using a process-oriented FMS assessment tool (e.g., TMGD-2) (Ward et al., 2020). The results demonstrate that regardless of assessor experience, real time rating of children's FMS performance using proficiency criteria is challenging (Ward et al., 2020). Paediatric movement professionals and primary school teachers can provide good to excellent (ICC > 0.8) assessments of overall FMS proficiency however, accuracy of reporting at the individual criteria level for skills was moderate for both groups. (Ward et al., 2020). This study highlights an important consideration for sports organisations, schools and test developers that the demanding environment during real-time FMS assessments for school aged children in field-based tests has a negative impact on the ability of assessors to accurately report on individual FMS criteria, even amongst experienced assessors (Ward et al., 2020). A solution to this problem is using a simplified FMS assessment tool that does not require reporting at the individual criteria level, such as the PMSC survey which is aligned with the TGMD-2, utilised in this study and by Liong et al. (2015) and Estevan et al. (2018) for practitioners such as sports coaches and teachers. Longitudinally, Estevan et al. (2023) demonstrated that physical education teachers are capable of accurately reporting on children's motor competence over time using the PMSC survey.

Coaching children with intellectual disabilities who have mixed levels of motor competence requires specific training and expertise (Smits-Engelsman & Verbecque, 2022). The results from the linear mixed-effects model demonstrated that an increase in accuracy of coaches' perceived performance rating was associated with higher actual locomotor and ball skills performance and that all coaches demonstrated similar rating abilities. Years of coaching experience did not significantly influence accuracy of coaches' perceived motor competence scores, however, coach gender significantly influenced accuracy of coaches' perceived ball skill scores. Comparable results in terms of model fit variability are seen in the study by Estevan et al. (2018) which demonstrated that physical education teachers were more accurately able to assess the ball skill subset ($\eta^2 = 0.47$) then the locomotor subset ($\eta^2 = 0.24$). Similarly, our findings suggest that coaches are can more accurately recognise the ball skill subset ($R^2 = .58$) rather than the locomotor subset ($R^2 = .42$).

Coach gender was included as a variable in the multilevel mixed-effects regression model because, to the authors knowledge no study to date has taken into consideration the gender of the motor competence assessor (coaches, teachers or parents). Prior research by Rivard et al. (2007) investigated teachers' perceptions of motor difficulties amongst children with developmental coordination disorder, found that depending on the gender of the child, teachers may have different stereotypical expectations of their motor competence, however, the gender of the teacher was not taken into consideration in this study. Additionally, the majority of coaches in youth sport are male, with only 31% of women in volunteer coach roles compared with 53% of men (McCleery et al., 2023). Research carried out by Gosai et al. (2021) demonstrated that 'coaches' behaviours and interactions with the athletes they coach are affected by their own and their athletes' individual difference in characteristics, including gender' (p. 222). Yet, gender differences and how they relate to coaching behaviours particularly in the youth sport context are largely understudied (McCleery et al., 2023). Majority of studies look at coaching behaviour based on the gender of the athletes and/or on the gendered interaction in coach-athlete relationships with few focusing specifically on differences between the coaching behaviours of males and females (e.g., Gosai et al., 2021; Jowett & Nezlek, 2012). Millard (1996) examined coach gender and how it related to observable coaching behaviours during a competition among high school soccer coaches. The findings demonstrated that 'male coaches were found to engage significantly more frequently in keeping control and general technical instruction and significantly less frequently in general encouragement then the female coaches" (p. 1). Therefore, based on the aforementioned literature the authors hypothesised that coach gender would have an impact on the coaches' ability to accurately assess the motor competence of children with intellectual disabilities. However further research is required to derive firm conclusions about coach gender and its impact on assessing children's motor competence.

The ability to appropriately differentiate (i.e., adjusting the learning method or approach to meet the needs of the individual participants) for various motor competence levels within a sports session is a core competency needed by sports coaches (Smits-Engelsman & Verbecque, 2022). However, in order for coaches to develop this skill set, training needs to be provided by the National Governing Body of Sport to support the coaches' continuous professional development (CPD) and ensure that they have the skills required to enhance the development of FMS amongst children with intellectual disabilities. Previous research in school-based FMS interventions has shown physical education programmes that provide CPD opportunities for teachers in the areas of FMS instruction, session management, and session observations can increase the rate of motor competence development in children (Cohen et al., 2015). A recent 'best practice' example of a Special Olympics programme currently offering this style of CPD training for their coaches is Special Olympics Canada, who are providing a Coaching Association of Canada recognised FMS qualification alongside Young Athletes programme specific training (Temple & Field, 2023a). The FMS training module focuses on helping coaches develop their ability to coach and teach FMS, including identifying FMS criteria, recognising errors, providing feedback to children as well as designing and leading developmentally appropriate sessions (Temple & Field, 2023a). The researchers found that coaches experienced a significant increase in confidence in planning, monitoring and implementing the programme after they undertook the training (Temple & Field, 2023a). However, in follow-up interviews with coaches which ranged from 6 to 12 months post training, the researchers recommended that skill mastery and the need for repetition in skill practice should be emphasised more in the coach education materials, particularly practical methods of how the same FMS can be practiced in multiple ways that are enjoyable for the athletes (Temple & Field, 2023b). This form of CPD should be available to all Special Olympics coaches to provide them with a better understanding of the FMS and the importance of developing and reinforcing these skills with the children that they coach. Having coaches who are trained in delivering FMS would enhance the number of opportunities available to children with intellectual disabilities to practice, reinforce and learn these vital skills (Barnett, Stodden, et al., 2016), which are a prerequisite for the development of sports specific skills and lifelong physical activity participation (Stodden et al., 2008).

Additionally, Bolger et al. (2018) recommended the introduction of annual formal assessments of FMS for children in primary schools to monitor motor competence over time, as seen in many countries across Europe. This idea could potentially be implemented by trained coaches in community sports clubs with support from volunteers or parents, particularly for children with intellectual disabilities who have exceptionally low motor competence (Kavanagh et al., 2023). These assessments would provide encouragement to sports coaches to develop and improve the motor competence of children with intellectual disabilities, enable coaches to track the progress of each child in their session, as well as highlight to parents' particular skills which require continued work and development (Bolger et al., 2018). Such assessments also provide meaningful data to evaluate and review the impact and efficiency of the programmes. Overall, appropriately trained coaches can develop tailored FMS programmes to target specific skill weaknesses to address the low levels of motor competence seen in this population in a cost and time effective manner (Liong et al., 2015).

5 | LIMITATIONS

There were several limitations within this study. Firstly, as mentioned in the methods section of the paper, due to the time constraints presented to the researchers during data collection, the full battery of the TGMD-3 was not administered. Gallop and slide from the locomotor subset and two hand strike from the ball skills subtest were not included. As a consequence, these skills were also then omitted from the PMSC survey. Therefore, this decision impacted the authors ability to compute the total gross motor quotient for the TGMD-3 to provide a true reflection of children's total motor competence score. Another limitation important to note, is that intra-rater reliability correlations were not calculated as part of this study. Coaches only completed one PMSC survey for each individual child and therefore the same assessment was not completed by the same rater on two or more occasions. Going forward, it would be better practice to ensure intra-rater reliability is assessed. Furthermore, the same number of children were not assessed by each coach as larger numbers of children were recruited from certain clubs depending on the number of children registered to participate with the given club. Finally, the linear mixed-effects model demonstrated a significant effect of coach gender on coaches' perceived ball skills score performance rating. There is currently little evidence available in the literature discussing the cause of this relationship and further research is required in order to be able to derive firm conclusions as to the cause of the association.

6 | PERSPECTIVE

Results of this study highlight that sports coaches can provide weak-moderate proxy reports on the motor competence of children with intellectual disabilities. Coaches are seen as gatekeepers for creating environments which foster children's motor competence development. However, there is a lack of CPD opportunities available to coaches on the importance of FMS and best practices in teaching/ assessing these skills. From the findings, it is clear that currently coaches rate the motor competence of children with intellectual disabilities higher compared with the objective TGMD-3 assessment tool scores. This has the potential to impact on their ability to develop and progress the FMS of the children they coach. The results presented will provide insight for sports organisations to determine whether coaches can accurately report on the motor competence of children with intellectual disabilities and will act as a motivator for SO to implement more coach education opportunities. Further research should seek to reassess the coaches' ability once specific training has been implemented. This would enable researchers to get a clearer understanding whether sports coaches can accurately report on the motor competence of children with intellectual disabilities. It is suspected that upskilling coaches on assessing the motor competence of children with intellectual disabilities will have a positive impact on their ability to develop and tailor FMS programmes targeting specific weaknesses, in addition to assisting in tracking and progressing the overall motor competence levels of children with intellectual disabilities.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to report.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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