# Physical education

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# Chapter 2

## Physical education teachers' perceptions of sport potential: development of the Scale for Identification of Sport Potential (SISP).

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## ABSTRACT

This study was conducted to develop and validate an instrument to identify sport potential (SP) in physical education (PE). One hundred seventy-two PE teachers (M age= 36.9, SD = 13.19) scored 66 items, measured on a five-point scale, that were formulated on Bailey and Morley's model of talent identification in PE. A Principal Components Analysis resulted in the 27item Scale for Identification of Sport Potential (SISP). Scales were labelled Work Attitude Capacity (M = 4.32, SD = 0.64), Sport Learning Capacity (M = 4.31, SD = 0.50), Motor Capacity (M = 3.89, SD = 0.63), Creative Capacity (M = 3.76, SD = 0.64), Interpersonal Capacity (M = 3.40, SD = 0.66), and Intellectual Capacity (M = 2.95, SD = 0.77). The SISP is proposed as a tool for the initial assessment of SP in the setting of PE although the instrument will need to be validated using longitudinal research designs.

Keywords: Talent, gifts, children, abilities, detection, identification, education, sport

## IINTRODUCTION

Understanding the process of identifying children with the potential to become an elite athlete (i.e., sport potential, SP) is a considerable challenge. Moreover, Baker, Cobley, and Schorer (2011) argued that the greater the time between initial talent assessment and actual demonstration of elite performance, the less accurate talent predictions are, making predictions in childhood especially difficult. Often PE teachers are the first qualified professionals to develop children's sport potential in a structured environment. Although sport and physical education (PE) are not the same, clear similarities exists (Mountakis, 2001) suggesting that PE teachers can act as initial assessors of sport potential (Gulbin, Oldenziel, Weissensteiner, & Gagné, 2010; Thomas & Thomas, 1999). Because of their education and experience, PE teachers generally consider a range of factors that underpin the capacity of young children to realize their potential in sport, which seems to be a more sensible approach than a focus on 'snapshot characteristics' (MacNamara & Collins, 2011). Surprisingly, the existing literature on athlete development and talent identification has paid relatively little attention to those with SP from within curricular PE contexts (Bailey, Tan, & Morley, 2004). To use PE as a setting for the initial assessment of sport potential, PE teachers need to be provided with valid and reliable tools (Gray & Plucker, 2010).

Bailey and Morley (2006) recognized the opportunities provided by PE settings for the identification and development of children with the capacities to excel in PE. Their model of talent development in PE used a multidimensional approach based on Gagné's differentiated model of giftedness and talent (DMGT, 2010). According to Bailey and Morley (2006), PE develops five abilities[1] (psychomotor, cognitive, interpersonal, intrapersonal, creativity), leading to four possible outcomes (lifelong physical activity, rewarding PE experience, sport leadership, and elite sport performance). The current study focused specifically on development towards elite sport performance. Below we define each ability from Bailey and Morley's model and provide a concise summary of research in this area as it relates to the identification of SP.

Psychomotor ability is an individual's capacity for fundamental movement skills (e. g., balance, coordination, flexibility, strength; Abbott & Collins, 2004; Bailey & Morley, 2006). The development of fundamental movement skills at a young age is considered important for future successful performance and involvement in sports (Elferink-Gemser, Jordet, Coelho-E-Silva, & Visscher, 2011; Singer & Janelle, 1999).

Cognitive ability refers to an individual's knowledge of tactical skills and understanding of central physical educational concepts (Bailey & Morley, 2006). Ackermann and Beier (2007) noted that, early in training, general (e.g., IQ, general intelligence) or broad (e. g., verbal or spatial ability) measures of intellectual ability are important predictors of performance in several domains. Cognitive ability also relates to the capacity to understand and use information in decision-making and execution of skill. This is critical as a precursor to the acquisition of sports expertise, especially in team sports (Kannekens, ElferinkGemser, & Visscher, 2011; Thomas &

Thomas, 1999).

Interpersonal ability (e.g., leadership, teamwork) is one's capacity to positively influence the (social) environment to enable a successful negotiation of the path to excellence (Bailey & Morley, 2006). Factors within the environment include the child, the coach/teacher, the family, and other significant others (Côté, 1999). A supportive and encouraging environment can generally help athletes in their development of expertise (Côté, 1999; MacNamara, Button, & Collins, 2010).

Intrapersonal ability reflects an individual's capacity for self-control, self-efficacy and emotional intelligence (Bailey & Morley, 2006). Several studies have shown that becoming an expert in sport requires an extensive involvement in deliberate practice (Ericsson, 1993; Helsen, Starkes, & Hodges, 1998). During this period, an athlete undoubtedly has to overcome difficulties and disappointments; therefore, excellent self-motivational beliefs (i.e., self-efficacy, outcome expectations, task interest/valuing, and goal orientation) underlie efforts to self-regulate (Zimmerman, 2007). In sports, Abbott and Collins (2004) showed that self-regulatory learning strategies play an essential role in determining an athlete's potential. Self-regulation is an integrated learning process, consisting of the development of a set of constructive behaviors that facilitate one's learning and that is related to current and future level of performance in sports (Jonker, Elferink-Gemser, & Visscher, 2010; Toering, Elferink-Gemser, Jordet, & Visscher, 2009).

Creativity is the capacity to respond to challenges and tasks with fluency, originality and sensitivity (Cropley, 2001). It requires other cognitive capacities such as working memory and cognitive flexibility and plays a role in the production of innovations (Weisberg, 2007). In sport, creativity reflects the capacity to produce varying, rare, and flexible decisions during competition and has to be practiced and stored from early childhood to be able to perform at a high level in later stages of the career (Memmert & Roth, 2007).

Although previous research has emphasized the importance of single factors (e.g., Bloomfield, Blansky, Auckland, & Elliot, 1985) or, on rare occasions multiple factors for level of performance (e.g., Elferink-Gemser, Visscher, Lemmink, & Mulder, 2007), our understanding of the value of these capacities for the identification of those with SP, particularly within childhood PE settings, is limited. Moreover, assuming that PE settings provide a beneficial environment for the examination of sport potential in children and youth, it is important to understand the perceptions of PE teachers regarding this potential since they may be critical agents in its development. Understanding PE teachers' perceptions of what factors best describe those with SP (not to mention determining the validity of these perceptions) would be helpful for developing tools that PE teachers can use to more accurately identify and improve the process of talent development. In this way, PE can be used as a setting of initial assessment of potential to be confirmed in a later stage of athlete development (Gulbin, et al., 2013). However, to the authors' knowledge, no test to measure SP in PE exists. Therefore, this study was conducted to develop and begin validation of an instrument to identify sport potential of children six to eight

years of age based on PE teachers' perceptions. A questionnaire was developed based on the abilities in Bailey and Morley's model of talent development in PE and psychometric characteristics were determined.

## METHOD

### *Sample*

Onehundred and seventytwo participants (83 women, 89 men, Mage = 36.9, SD = 13.19) with experience and specific skills in teaching PE in primary education participated in this research.

### *Procedure*

All data were collected through the use of a self-administered digital questionnaire specifically developed for this study. For the development of the questionnaire guidelines as described in Thomas & Nelson (1996) were used. The Dutch Union of Physical Education sent two emails and newsletters to all PE teachers in The Netherlands who subscribed for 'primary education'. The email, with short information about the study, contained a hyperlink that directed participants to the digital questionnaire. For data collection, secure sockets layer (SSL) was used and privacy and security of the data were ensured for all participants. The sampling process resulted in a representative group of PE teachers in The Netherlands. The study followed the established ethical standards for sports medicine (Harris & Atkinson, 2011).

### *Item pool development*

The questionnaire was developed in several steps:

1. Based on a literature search, items were created corresponding to each ability related to elite sport performance in Bailey and Morley's (2006) model of talent development in PE.
2. A draft questionnaire was circulated for critique among four PE teachers and academics. In a plenary session the professionals shared and discussed their critique. Based on their feedback (i.e., relevance, distinctness, overlap), questions were rephrased or omitted to improve the precision of data collection.
3. A revised version of the questionnaire was sent for a second critical review to the same PE teachers and academics. This process resulted in modification of some items.
4. A digital version of the questionnaire was pilottested with twelve fourth year PE students and three academic PE teachers, who provided feedback about the use of the digital questionnaire, the instructions and statements and time needed to complete it. Their feedback resulted in some slight modifications, primarily in the instructions.

The final digital questionnaire contained 66 items. Most items were about intrapersonal ability (20) and psychomotor ability (17), followed by interpersonal ability (12), cognitive ability (9), and creative ability (8) (see Table 1, Note 2). The different number of items was due to differences in existing knowledge of each ability in relation to elite sport performance. Items were randomly divided over the questionnaire. The specific response stem was "A 68 year-old child with the capacity to become an elite athlete in the future is a child who..." followed by the list of 66 items. Respondents scored their level of agreement on a five-point Likert scale (1 = strongly disagree to 5 = agree very much). Thirty-nine participants (19 women, 20 men, Mage = 33.10, SD = 12.93), who were representative of the total sample, completed the questionnaire for a second time to determine test-retest reliability. The time interval between both measurements was between two to six weeks. Participants were not informed that the second data collection was for reliability analysis.

### *Statistical analyses*

A principal component analysis (PCA) was conducted on the 66 items with orthogonal rotation (varimax). A Kaiser-Meyer-Olkin (KMO) measure above .70 was considered good (Hutcheson & Sofroniou, 1999) with KMO values for individual items above .50 (Field, 2009). Based on our sample size, communalities above .60 were considered adequate (MacCallum, Widaman, Zhang, & Hong, 1999) and items that loaded higher than or equal to .55 with a factor were selected to make interpretation of the inventory possible (Kline, 1994). Interitem correlations, inter-scale correlation, and Cronbach's coefficients alpha for internal consistency were assessed. If interitem correlations were positive and had a correlation of .3 or higher (Field, 2009), inter-scale correlations did not exceed a value of .80 (Carron, Widmeyer, & Brawley, 1985), and a Cronbach's coefficient alpha of .70 was met (Kline, 1999), results were considered acceptable. Temporal stability of the questionnaire was examined by determining the relative and absolute test-retest reliability. The relative test-retest reliability was examined by performing one-way random consistency analyses of variance to compute average measures Intraclass Correlation Coefficients (ICCs) for the repeated measures. For all ICCs, 95% confidence intervals were calculated (Rankin & Stokes, 1998), and ICCs had to be at least .70 to be acceptable (Litwin, 1995). Absolute test-retest reliability indicates how the scores on repeated tests vary for individuals, without regard to the individual's rank in a sample (Atkinson & Nevill, 1998, 2001). The mean difference between the first and second measurements was taken as a measure of absolute test-retest reliability. One-sample t-tests with a significance level of .05 were performed to determine whether the difference between measurements differed from zero. The measurements were considered unbiased if the t-test results were nonsignificant.

## RESULTS

KMO values verified the sampling adequacy for the analysis, KMO = .80, and KMO values for individual items were all above .57. With the exception of one item, 'good in expressing feelings', all communalities were above .60 with an average communality of .72. Bartlett's test of sphericity $\chi 2$ (2145) = 6053.09, $p < .001$, indicated that correlations between items were large for PCA. The scree plot justified extracting six factors, each with three or more item loadings of .55 or higher (see Table 1). These factors accounted for 46% of the variance.

Twentyseven of the 66 items met the criterion of .55 factor loading and are indicated in Table 1. Factor 1 consisted of items 28, 29 and 30. Factor 2 consisted of items 23, 24 and 25. Factor 3 and Factor 4 consisted of items 14, 15, 16, 17, 18 and 19 and items 1, 2, 3, 4, 5, 6, 7, 8, and 9. Finally, Factor 5 consisted of items 37, 38 and 39 whereas factor 6 consisted of items 33, 34 and 35. These six factors made up the six scales in the 27 item Scale for Identification of Sport Potential (SISP; see Table 2).

Cronbach's α ranged from .73 to .87 (Table 2), indicating sufficient internal consistency. The interitem correlations for each factor were positive. For Factor 1 they ranged between .35 and .58, for Factor 2 between .45 and .67, for Factor 3 between .35 and .67, for Factor 4 between .30 and .60, for Factor 5 between .48 and .57, and for Factor 6 between .56 and .60. As can be seen in Table 2, interscale correlations did not exceed .80 (r = .11 to .46).

The ICC's varied between .71 and .90 (see Table 3) indicating that all scales had sufficient relative temporal stability. The mean differences between both measurements were nonsignificant for each scale ($p > .05$). Therefore, absolute temporal stability was considered stable for all six scales.

Factor labels. Factor 1 contained three items and was labeled motor capacity based on the content of the items. In the domain of sport, outstanding motor skills are clearly necessary to excel. Therefore, it is no surprise that PE teachers felt that good motor capacities were important in sport potential. The items that underlie this capacity (e.g., good balance skills, jump capacity) largely reflect the construct as described in Bailey and Morley's model. Based on the content of the three items,

Factor 2 was labeled intellectual capacity. These items generally represent the intellectual capacity of the child under consideration (e.g., has a high intelligence, is one of the smartest students in class) and suggest that, according to PE teachers, general measures of cognitive/intellectual capacity have a role in the identification of sport potential. This is similar to Ackerman and Beier's (2007) position that in certain settings, intellectual capacity is an important predictor for performance. In sport, the relevance of intellectual capacity might be explained by the high perceptualcognitive demands in many sports (Thomas & Thomas, 1999), if we assume that a certain intellectual threshold is necessary to acquire and demonstrate these types of skill. The validity of this assumption provides an interesting direction for future work.

Interpersonal capacity (Factor 3) contained six items that generally reflect a capacity to positively influence the social environment (e.g., has the capability to make class mates enthusiastic, often takes the lead in group work). Several studies have shown that a supportive and encouraging environment can facilitate athletes' development of expertise (Côté, 1999; MacNamara, et al., 2010). The results of this study suggest that SP is not just dependent of the environment but in some way has the capacity to positively influence an athlete's environment (see also the DMGT 2.0; Gagné, 2010).

Factor 4, labeled sport learning capacity, contained nine items (including characteristics such as has rapid acquisition of (exercise) skills, likes to learn new movements). These items generally express a child's potential to develop in sports. This quality seems similar to concepts like educability (Penney, 2000), which have typically been difficult to measure empirically. Work attitude capacity (Factor 5) was made up of three items (i.e., always tries to get the best out of himself, is goal oriented, and has a desire to constantly improve), all related to an attitude of achievement. The importance of this capacity was also demonstrated by Thomas and Thomas (1999), who showed that characteristics such as work ethic and demonstrating a positive attitude distinguished children who became experts from those who were seen as having the potential but did not become experts.

Finally, Factor 6 included three items related to one's capacity to be creative. Creative capacity (e.g., make use of original solutions for movement problems) was described as the use of unusual, original and innovative solutions for movement problems. According to Memmert and Perl (2007), the capacity to be creative is dependent on one's cognitive capacity; however, the relationship between these factors as they relate to the identification of those with sport potential is not known and provides another intriguing avenue for future research.

**Table 1.** Summary of Exploratory Factor Analysis Questionnaire of Children 6-8-year-old with High Sports Potential filled in by PE teachers (N = 172).

| | **"A 6-8-year-old child with the capacity to become an elite athlete in the future is a child who...."** | **Factor** | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. | has rapid acquisition of (exercise)skills | .03 | -.06 | -.06 | **.77** | .07 | .17 |
| 2. | likes to learn new movements | .14 | -.08 | -.08 | **.70** | .19 | .17 |
| 3. | has strong perseverance | .08 | .02 | -.05 | **.65** | .23 | -.02 |
| 4. | moves fluently | .09 | .08 | .16 | **.65** | .06 | .02 |
| 5. | has well developed coordination between lower and upper body | .20 | .00 | .04 | **.64** | -.02 | .02 |
| 6. | likes to work hard | .00 | .10 | .00 | **.58** | .35 | .05 |
| 7. | is able to customize on changing situations | .00 | .18 | .12 | **.57** | -.01 | .26 |
| 8. | quickly picks up clues | .07 | .17 | .01 | **.56** | .07 | -.02 |
| 9. | is constantly looking for new challenges | .04 | .19 | .16 | **.56** | .12 | .01 |
| 10. | often chooses difficult exercises | .07 | .04 | .12 | .53 | .04 | .16 |
| 11. | quickly understands a new game | .05 | .04 | .00 | .52 | -.02 | .19 |
| 12. | learns from one's own mistakes | -.01 | .07 | -.02 | .43 | .13 | .17 |
| 13. | has well developed agility skills | .35 | -.07 | .00 | .42 | -.04 | .29 |
| 14. | has the capability to make class mates enthusiast | .08 | .01 | **.80** | .06 | .13 | .08 |
| 15. | often takes the lead in group work | .03 | .19 | **.74** | -.04 | -.01 | .00 |
| 16. | has the capability to cope with different persons | .17 | .26 | **.70** | .12 | .02 | .01 |
| 17. | possesses leadership skills | .10 | .17 | **.67** | -.10 | .15 | -.05 |
| 18. | is a teamplayer | .01 | .00 | **.65** | -.06 | -.04 | .11 |

**Table 1.** continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 19. | has the capability to cooperate | -.03 | .14 | **.62** | .21 | .20 | .08 |
| 20. | has much respect of class mates | .14 | .26 | .51 | .01 | -.12 | -.02 |
| 21. | has a good relationship with the teacher | .02 | -.01 | .46 | .21 | .14 | .26 |
| 22. | is good in expressing feelings | .08 | .37 | .43 | -.12 | -.08 | .18 |
| 23. | has a high intelligence | .08 | **.80** | .06 | .07 | .14 | .05 |
| 24. | is one of the smartest students in a class | .14 | **.76** | .27 | .07 | -.06 | -.02 |
| 25. | reports an above-average score for 90% of subjects at school | -.05 | **.71** | .27 | .05 | -.06 | .04 |
| 26. | prioritizes own interests | .04 | .50 | .12 | -.18 | .04 | -.03 |
| 27. | has many peers | .02 | .44 | .40 | .25 | .12 | .16 |
| 28. | has good balance skills | **.80** | .19 | .10 | .16 | .05 | -.06 |
| 29. | has a good sense of balance[a] | **.77** | -.03 | .14 | -.07 | .04 | .08 |
| 30. | has a big jump capacity | **.55** | .19 | .03 | .28 | -.08 | -.02 |
| 31. | has much strength in the thrunk (strong muscles in belly, back) | .52 | -.01 | -.02 | .25 | -.09 | .05 |
| 32. | has a good reaction force | .47 | -.03 | -.06 | .28 | .11 | .16 |
| 33. | makes use of original solutions for movement problems | -.02 | -.02 | .17 | .27 | .01 | **.80** |
| 34. | makes use of unusual solutions for movement problems | .07 | .15 | .08 | .03 | .02 | **.74** |
| 35. | makes use of innovative solutions for movement problems | -.08 | -.01 | -.10 | .43 | .06 | **.60** |
| 36. | is able to achieve objectives in different ways | .12 | .02 | .12 | .02 | .28 | .50 |
| 37. | always tries to get the best out of himself | .02 | .10 | .07 | .25 | **.67** | -.12 |
| 38. | works goal oriented | .12 | -.03 | .04 | .07 | **.67** | .07 |
| 39. | has a desire to constantly improve | -.01 | -.11 | .17 | .21 | **.62** | .08 |

**Table 1.** continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 40. | if necessary asks for help when learning a skill | -.06 | .26 | .34 | .09 | .50 | .19 |
| 41. | has a good endurance capacity | .11 | .07 | .08 | -.07 | .22 | .03 |
| 42. | is well able to continue physical exercises | .16 | .07 | .16 | .21 | .02 | -.04 |
| 43. | prioritizes interest of the team | -.04 | -.07 | .44 | -.18 | .21 | .19 |
| 44. | has a good strength in the arms | .40 | .25 | .32 | .07 | .00 | -.17 |
| 45. | is aware of one's own limitations | .08 | .14 | .14 | .05 | .06 | .21 |
| 46. | is aware of one's own capabilities | .10 | .09 | .24 | .23 | .14 | .01 |
| 47. | is able to peak under pressure | .06 | -.08 | .07 | .30 | .12 | .13 |
| 48. | has the capability to communicate | -.02 | .11 | .13 | .26 | .08 | .05 |
| 49. | quickly puts information into action | .15 | .10 | .12 | .22 | .17 | .13 |
| 50. | has a good understanding of games | .16 | -.12 | .07 | .02 | .08 | .00 |
| 51. | often takes a correct tactical decision in game situations | -.10 | .03 | .08 | .40 | -.05 | .28 |
| 52. | has a good control of all fundamental movement skills | .24 | .04 | .08 | .13 | .06 | .01 |
| 53. | in games, thinks one or two steps ahead | -.07 | .03 | .10 | .36 | .08 | .18 |
| 54. | is able to keep emotions under control | -.05 | .10 | .28 | .22 | .05 | .17 |
| 55. | is very well able to stay in control over nerves | .24 | .05 | .08 | .34 | .02 | .13 |
| 56. | is well able to work independently | .07 | .30 | .43 | .06 | .06 | .09 |
| 57. | is well able to sprint | .26 | .17 | .06 | .16 | .06 | -.08 |
| 58. | has good perceptual capabilities | .07 | .17 | .13 | .19 | .36 | .23 |
| 59. | has a high operational speed while moving | .23 | .11 | .12 | .39 | .00 | -.12 |
| 60. | always wants to be the best | .17 | .18 | .01 | .19 | .15 | -.13 |

**Table 1.** continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 61. | has well developed eye-foot coordination | .16 | .01 | -.01 | .17 | .05 | .24 |
| 62. | has a flexible body | .45 | .01 | .12 | .02 | .10 | -.14 |
| 63. | is very curious | .09 | .17 | .33 | .28 | .15 | -.02 |
| 64. | takes risks | .19 | .02 | .16 | .25 | -.09 | .17 |
| 65. | has a good self-confidence | .06 | .04 | .11 | .12 | .42 | .07 |
| 66. | is interested in sport and exercise | .03 | -.06 | .23 | .27 | .10 | .05 |

Note1. Items were rated on a five point scale on how much a participant agrees that a statement characterizes a 6-8 year old child with high potential in sports (1 = strongly disagree to 5 = agree very much). Factor loadings > .55 are in boldface. Six factors with three or more items were found. Factor 1 = Items 28, 29, 30 is labeled Motor Capacity; Factor 2 = Items 23, 24, 25 is labeled Intellectual Capacity; Factor 3 = Items 14, 15, 16, 17, 18, 19 is labeled Interpersonal Capacity; Factor 4 = Items 1, 2, 3, 4, 5,6, 7, 8, 9 is labeled Sport Learning Capacity; Factor 5 = Items 37, 38, 39 is labeled Work attitude Capacity; Factor 6 = Items 33, 34, 35 is labeled Creative Capacity.

Note2. Items were formulated based on the five abilities that according to Bailey and Morley (2006) are developed in PE and have according to literature a relationship with the outcome elite sport performance. Item 4, 5, 13, 28, 29, 30, 31, 32, 41, 42, 44, 52, 57, 58, 59, 61, 62 were related to Psychomotor Ability; Item 1, 11, 23, 49, 50, 51, 53, 56, 66 were related to Cognitive Ability; Item 14, 15, 16, 17, 18, 19, 20, 21, 26, 27, 43, 48 were related to Interpersonal Ability; Item 2, 3, 6, 8, 9, 10, 12, 22, 37, 38, 39, 40, 45, 46, 47, 54, 55, 60, 64, 65 were related to Intrapersonal Ability: Item 7, 24, 25, 33, 34, 35, 36, 63 were related to Creative Ability

[a]In Dutch for balance several words are used which have a slightly different meaning

**Table 2.** Means, Standard Deviations, Cronbach's Alpha Coefficients and Inter-scale Correlations for Scale of Identification of High Sport Potential in PE (N = 172).

| Factors | M | SD | α | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Motor capacity | 3.89 | 0.63 | .73 | - | | | | | |
| 2. Intellectual capacity | 2.95 | 0.77 | .78 | .28* | - | | | | |
| 3. Interpersonal capacity | 3.40 | 0.66 | .85 | .26* | .43* | - | | | |
| 4. Sport learning capacity | 4.31 | 0.50 | .87 | .35* | .20* | .17* | - | | |
| 5. Work attitude capacity | 4.32 | 0.64 | .76 | .29* | .11* | .21* | .46* | - | |
| 6. Creative capacity | 3.76 | 0.64 | .76 | .14 | .14 | .16* | .20* | .45* | - |

*p < .05

**Table 3.** Test-retest Statistics for Scale of Identification of High Sport Potential in PE (n = 39).

| Factors | M t1 (SD) | M t2 (SD) | t1-t2 | SE of t1-t2 | 95% CI for t1-t2 | ICC | 95% CI for ICC |
|---|---|---|---|---|---|---|---|
| Motor capacity | 3.77 (0.51) | 3.69 (0.71) | .08 | .09 | [-0.10, 0.25] | .77 | [0.55, 0.88] |
| Intellectual capacity | 3.10 (0.59) | 2.93 (0.63) | .17 | .09 | [0.00, 0.34] | .76 | [0.54, 0.87] |
| Interpersonal capacity | 3.61 (0.56) | 3.50 (0.55) | .11 | .07 | [-0.03, 0.25] | .83 | [0.67, 0.91] |
| Sport learning capacity | 4.25 (0.48) | 4.20 (0.55) | .05 | .05 | [-0.05, 0.15] | .90 | [0.81, 0.95] |
| Work attitude capacity | 4.44 (0.53) | 4.38 (0.48) | .06 | .07 | [-0.09, 0.21] | .72 | [0.47, 0.86] |
| Creative capacity | 3.80 (0.68) | 3.85 (0.47) | -.05 | .09 | [-0.23, 0.13] | .71 | [0.45, 0.85] |

Note. t1 - t2 = mean difference between scores on the first and second testing time; SE of t1 - t2 = Standard Error of the mean difference; 95% CI for t1 - t2 = 95% Confidence Interval for the mean difference; ICC = Intraclass Correlation Coefficient; 95% CI for ICC = 95% Confidence Interval for Intraclass Correlation Coefficient.

## DISCUSSION

In order for PE to become better involved in the initial assessment of sort potential, they need to be provided with a reliable assessment tool (Gray & Plucker, 2010). To this end, we identified PE teachers' perceptions of SP, which resulted in a 27-item questionnaire, the SISP. This is a first step in the development and validation of a tool to assist PE teachers in identifying SP in PE settings.

In PE teachers' perceptions, six capacities characterize SP. The multidimensionality of these capacities and their focus on potential rather than performance may reflect the educational background and expertise of PE teachers. PE teachers (a) observe and teach a range of learners engaged in a variety of activities, (b) have knowledge about children and their motor, cognitive and social development, and (c) have the skills and capacities necessary to identify a child's potential to develop in sport and exercise (Bailey et al., 2004; Thomas & Thomas, 1999). In particular, the capacity of PE teachers to identify determinants of sport potential might significantly contribute to the improvement of talent identification processes since most competitive sport programs at this phase of development focus on determinants of performance rather than element of long-term athlete development (Abbott & Collins, 2004). Currently, the most common method to identify talent is to focus on physical ability, which does not reflect the multidimensionality and dynamics of talent (Gray & Plucker, 2010; Vaeyens, Lenoir, Williams, & Philippaerts, 2008). Due to this one-dimensional approach, a significant number of potentially talented children are overlooked and, as a result, never have the opportunity to realize their potential (Abbott & Collins, 2004). A talent identification system that connects to Kirk and Gorely's (2000) inclusive model of the PE and sport performance relationship, and makes use of the expertise of PE teachers, would offer unique opportunities. As the SISP is a multidimensional instrument that can be easily used by PE teachers, it may become a valuable tool to support PE teachers in the identification of SP.

Several important issues remain, most notably how to objectively assess the capacities identified in the setting of PE. Tools have to be developed based on the capacities found that are applicable in the setting of PE, with all its constraints. As children of this age require unique considerations (i.e., cognitive, physical, mental) in terms of the type of research instruments that should be used (Kearney, 1999), the development of such tools will be a remaining challenge. A second issue concerns the need to better understand the relative trainability or 'plasticity' of each capacity across development, and to relate it to a child's mindset as described by Dweck (2006). A longitudinal research design would provide the opportunity to distinguish between capacities that are relatively fixed and those that are relatively modifiable. Similarly, the relative significance of each capacity needs to be clarified for the identification of sport potential. The high scores on the more psycho-behavioural 'work attitude capacity' and 'sport learning capacity' is in line with Abbott and Collins (2004) model and with Jonker, Elferink-Gemser and Visschers' (2010) work on effective learning strategies. However, more extensive longitudinal studies are necessary to determine the relative significance of each capacity over time and across different sports. In sports like gymnastics and

rowing, the relative importance of components may have a different impact on performance than in sports like soccer and handball (Vaeyens et al., 2008). As a result, the predictive value of identifying SP in some sports may be higher than in other sports where performances are influenced by variables that are more dynamic and changeable (and therefore more difficult to predict).

Although this study adds to our understanding of the capacities that PE teachers believe are relevant for developing SP, there were some limitations. The questionnaire that was designed for this study, started from the model of Bailey and Morley. However, it is possible that Bailey and Morley's model does not encompass all of the relevant factors related to talent identification and development in PE. It is also possible that the perceptions of the PE teachers are incorrect and the components they believe are most relevant are less consequential. However, the PE teachers in this study worked regularly with children in PE settings with a wide range of qualities and it seems reasonable to assume that they have a good idea about the capacities that characterizes SP. We acknowledge the relative small sample size (n = 172) in relation to the number of questionnaire items (66). Although a larger sample would have been desirable, our results are in line with those of other studies (Abbott & Collins, 2004; Bailey & Morley, 2006; Vaeyens et al., 2008) and the statistical analyses met preset criteria for factor analysis of this nature. Nevertheless, future longitudinal and prospective studies are recommended to determine the validity of the proposed model.

In conclusion, the results of this study showed that PE teachers' perceptions of a child with SP can be generally characterized by six capacities. The SISP is proposed as a tool for the initial assessment of SP in the setting of PE. To validate the results of this study longitudinal research designs are necessary as are tools that can objectively assess the factors found in this study. Ultimately, research in this area will create the opportunity to make use of the potential of PE settings as an initial assessment of SP and provide youth with SP with a suitable learning environment for optimal development.

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[1]The motor learning and skill acquisition literature distinguishes between abilities, which represent qualities that are more innate and stable across development, and skills, which are the result of learning and remain dynamic across development. In the current study we use the term 'ability' in its generic sense as 'the quality of being able to do something'