

## Dispositions for learning in Sport Education Questionnaire - (DFL-SE)

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### Abstract

Physical Education is recognized for its value in developing personal and social development. However, the instructional approach adopted by the teacher may affect the achievement of positive outcomes. In the traditional pedagogical approaches of Physical Education instruct, the teacher is the instructional leader, and the students often have a passive role. However, the educational reform of the 90's introduced a new teaching paradigm that situates the student as the protagonist of the teaching-learning process, in which the student is the protagonist of the teaching-learning process, and the teacher assumes the role of facilitator. In Physical Education, one of the most prominent and widely researched student-centered model is Sport Education (Siedentop, Hastie, & van der Mars, 2020), designed to provide students with authentic sport experiences in Physical Education, and focused to develop competent, literate and enthusiastic sportspersons. Personal responsibility, confidence, dedication, vigor, enthusiasm, self-confidence, meaning and self-determination, among others, are characteristics that influence students' disposition for learning within the Sport Education model. This study aimed to provide evidence of the validity and reliability of the Dispositions for Learning in Sport Education Questionnaire. Participants were 430 Portuguese students from high-school (143 girls, 287 boys, aged 14-21) Confirmatory factor analysis demonstrated a good fit ( $\chi^2 = 174.509$ ,  $p = .000$ ;  $\chi^2/df = 2.077$ , PCFI = .784, PGFI = .664, CFI = .980, GFI = .948, RMSEA = .050 (90% CI [.040, .061],  $p = .477$ ) and supported a four-factor model. The availability of the Dispositions for Learning in Sport Education Questionnaire provides a valid, reliable, and specific instrument, measuring students' dispositions for learning during Sport Education units within physical education. It allows physical education teachers to select and adopt teaching strategies that stimulate the emergence of these dispositions for learning in their students.

**Key Words:** physical education, confirmatory factor analysis, instrument validity, instrument reliability.

### Introduction

In addition to providing excellent conditions for physical development and adoption of healthy lifestyles, Physical Education (PE) also plays a crucial role in students' emotional, personal and social development (Lu & McLean, 2011). The 2013 Declaration of Berlin reiterates such position stating that "PE...is the most effective means of providing all children and youth with the skills, attitudes, values, knowledge and understanding for lifelong participation in society" (UNESCO, 2015, p. 3). In line with this and corroborating such understanding, Carr and Claxton (2002) argued that the core purpose of education for the 21st Century is to stimulate students to develop the capacity and confidence to engage in lifelong learning being central for this enterprise the "development of positive learning dispositions" (p. 9).

The term disposition refers to a relatively long-term tendency to behave in a certain way and requires cognitive and emotional engagement (Ritchhart & Perkins, 2000). That is, it requires the person to be motivated, to have desire, to be able and to value the task or action. Carr and Claxton (2002) defines dispositions for learning as habits of mind that dispose the learner to "recognize, select, edit, respond, resist, seek and construct learning opportunities" (p. 21) associated with "attitudes and feelings about himself" (Carr & Claxton, 2002, p. 4). Consequently, dispositions for learning affect how students learn and, potentially, their learning outcomes.

The scientific field and educational policies have recognized the value of dispositions for learning. For instance, the Organisation for Economic Co-operation and Development (OECD) published a report called "Ready to learn: Students' engagement, drive and self-beliefs" (OECD, 2013) in which the report states that developing dispositions for learning is considered as important as learning subject-specific content. However, dispositions for learning have been studied mostly in educational research field under a comprehensive and not well-defined theoretical framework (Elaldi, 2015). To the best of our knowledge, only one instrument has been developed and validated that identifies the characteristics and dispositions of effective lifelong learners (ELLI - Evaluating Lifelong Learning Inventory) (Crick & Goldspink, 2014). Results of the research using this instrument have indicated that students' dispositions for learning do matter and teachers must attend for them to

promote learner engagement (Crick & Goldspink, 2014). Although ELLI provides a valid contribution, it is limited in scope in terms of its application to research and practice. In addition, the ELLI does not take in account the type of teaching approach used in the setting in which it is administrated.

Considering that the way students learn is not independent of the way teachers teach, dispositions for learning are not independent of the educational goals, and in particular, the teaching approaches adopted by teachers. In the traditional pedagogical approaches of PE instruct, called teacher-centered approaches (TCA), the teacher is the instructional leader, and the students often have a passive role. By consequence, students are required to be attentive, well-behaved and disciplined, while directing their attention to predominantly motor-oriented than cognitive-oriented tasks (Metzler & Colquitt, 2021).

With respect to PE, in the 21<sup>st</sup> century researchers have moved focus on "alternative curriculum models that represent a second generation of models that build on strong statements of democratic, student-centered practice in physical education" (Ennis, 2014, p. 63). In the student-centered approaches (SCA) the teacher is presented more as a facilitator, and students develop an active role in their own learning in order to promote their personal, social and sportive development (Metzler & Colquitt, 2021).

In PE, one of the most widely implemented and researched second generation models is the Sport Education (SE) (Siedentop et al., 2020). SE is a pedagogical model that incorporates the tenets of SCA recognized by its valences for "learning focused, provide measurable student outcomes, and assist students to become engaged in positive, learning-oriented sport environments" (Ennis, 2014, p. 67). The features that underpin SE aim to fulfil Siedentop's (2020) goal "to educate students to be athletes in the fullest sense and to help them develop as competent, literate and enthusiastic sportspersons" (p. 17), by giving students the opportunity to engage in a variety of roles, such as players, coaches, referees, score keepers, statisticians, members of the sports organizing board or sports director. SE is characterized by prioritizing more implicit and informal teaching strategies allowing students' decisions making in the learning process, encouraging him to learn autonomously, responsibly and with commitment (Siedentop et al., 2020).

With respect of students' personal and social development, the evidence from research on SE shows that the challenging learning environment of SE requires a number of dispositions for learning. These include active engagement (Farias et al., 2022; Farias, Valério, & Mesquita, 2018), commitment (with their own learning and peer mates) (Meroño, Calderón, & Hastie, 2015), autonomy (Fernandez-Rio, Mendez-Gimenez, & Mendez-Alonso, 2017), ownership and agency (Bessa, Hastie, Araújo, & Mesquita, 2019), personal and social responsibility (Bessa, Hastie, Rosado, & Mesquita, 2020), empowerment and self-confidence (Bessa, Hastie, Rosado, & Mesquita, 2021).

Taking in account these evidences, it was hypothesized that the development of a *Dispositions for Learning in Sport Education Questionnaire* (DFL-SE) would include factors of (1) Engagement; (2) Personal-Social Responsibility; (3) Empowerment; and (4) Self-confidence.

Engagement can be conceptualized as a student's energy to learn, work effectively and reach their potential, where cognitive, emotional, and behavioral components are strongly present at the same time. Research has shown that engaging students is linked with high-quality learning outcomes and students who are engaged are more likely to learn and to find the experience rewarding (Krause & Coates, 2008). This variable is considered as a general disposition since is independent of the teaching approach.

The promotion of personal and social responsibility competencies is seen as fundamental for successful student learning and their development (Hellison & Martinek, 2006). Research has supported the relevance of students' personal and social skills to deal with the challenges promoted by SE (García-López & Gutiérrez, 2015).

Self-confidence allows students to believe that they have psychological and mental abilities to reach their full potential, regardless of the talent and skill revealed (Bandura, 1991). Self-confidence tend to lead to feelings of empowerment and good performance, which influence engagement and effort (Robazza & Bortoli, 2007). Although self-confidence can be considered as a general disposition, in SE it seems to be very important because the students are given more opportunities for autonomy, which can bring about greater possibilities for making errors (Ang & Penney, 2013).

Empowerment and learning are concepts that are closely linked. An empowered learner feels more self-confident, acts autonomously and responsibly and has the flexibility to interpret, absorb and apply knowledge (Nonaka, 1994). The central place occupied by students in SE require them to feel empowered with choices and voices, focuses them on effort and self-direction, and creates a positive learning environment in PE (W. Li, Wright, Rukavina, & Pickering, 2008).

In recent decades there has been an increased interest in evaluating students' perspectives (O'Sullivan & MacPhail, 2010) and research suggests that students should have a voice in curriculum changes (Morgan, 2011). Students' perspectives on PE have been examined and suggest that students prioritize (1) being physically active (Zhu, 2013), (2) fun and enjoyment (Zhu, 2013), (3) learning new skills and activities (Phillips & Silverman, 2012), and (4) social skills and teamwork (Cronin et al., 2020).

Until now, in the studies related to SCA in PE, the instruments developed to evaluate student's perceptions have focused on single factors. Examples include responsibility (Wright, Jacobs, Ressler, & Jung,

2016), self-confidence (Woodman, Akehurst, Hardy, & Beattie, 2010), engagement and motivation (Hastie et al., 2020). There are no research instruments that assess student's dispositions for learning specifically in the SE.

The purpose of this study was to provide a valid multidimensional scale designed to assess students' dispositions for learning within SE. The assessment of dispositions for learning considering the features of the SE, from the students' perceptions, has the potential to inform teachers about the core elements of the dispositions for learning within a SE experience, which helps teachers to better plan and develop their PE classes, and consequently to afford better pedagogical conditions for learning context. Of the possible dimensions that are developed from SE (given the space granted to students to reflect, make decisions and solve problems), we choose for this initial validation those that are currently the most relevant from empirical research evidence: engagement, personal-social responsibility, empowerment and self-confidence.

## Material and Methods

### Participants

The participants in this study were 430 high-school students at 8 different schools located in the northwest of Portugal with ages ranged from 14 to 21 years ( $M=16.22$ ,  $SD=1.029$ ); 66.7% were male. Students were in grades 10 ( $n=199$ ), 11 ( $n=181$ ) and 12 ( $n=50$ ) and participated in PE classes designed and taught following the principles of SE. The classes met two times a week during a period of 8 weeks for a total of sixteen 45-min lessons. The teachers involved in this study had received formal instruction and training in SE and had also participated in seasons of SE with their classes prior to this study.

### Instruction Validity

A 6-item checklist (Table I) was adapted from Hastie et al. (2013) in order to confirm the behavioral fidelity of the teacher's instruction according to SE. Videotapes of four randomly selected lessons of each class were examined by two experts with extensive research in instructional models. Analysis across the two experts revealed 100% agreement, confirming the instructional model (SE) used in the lessons.

Table I. Instructional Checklist - Adapted from Hastie et al (2013).

|                              |                                                                                                               |
|------------------------------|---------------------------------------------------------------------------------------------------------------|
| <i>Sport Education Model</i> | 1. Groups of students go to designated home areas and begin warming up with their group.                      |
|                              | 2. Students practice together with their group/team under the direction of a peer leader.                     |
|                              | 3. Students remain a part of easily identifiable groups throughout the lesson and throughout different tasks. |
|                              | 4. Performance records are kept by students.                                                                  |
|                              | 5. Students perform specialized tasks within their group/team.                                                |
|                              | 6. Student performance scores count toward a formal and public scoring system.                                |

### Instruments

Content validity (Cohen, Manion, & Morrison, 2000) of the instruments was carried out by a panel of experts in order to guarantee the quality and suitability of the items to the PE context.

*Personal-social responsibility.* Personal-social responsibility was measured by the Personal-social Responsibility Questionnaire (W. Li et al., 2008), translated and adapted for Portuguese populations by Martins, Rosado, Ferreira e Biscaia (2015). The questionnaire included fourteen items distributed by two dimensions. The first is related to personal responsibility, which is reflective of the basic responsibilities required in order to establish a positive learning environment that reflects effort and self-direction (items 8 to 14). The second dimension refers to social responsibility, reflecting the responsibility required in order to establish a positive learning environment that reflects both respect and caring for others (items 1 to 7). The sample items were comprised, for example by "I try hard" and "I set goals for myself" for the first dimension and "I respect my team colleagues" and "I am helpful to my team colleagues" for the second. All items were measured using a 5-point Likert-type scale that ranged from 1 (Never) to 5 (Always).

*Empowerment.* Spreitzer's (1995) 12-item Psychological Empowerment Scale, translated and adapted for Portuguese populations by Santos et al. (2014), was used to measure empowerment. The items are distributed by four dimensions reflecting an individual's orientation to his or her work role: meaning, competence, self-determination, and impact. Meaning is the value of a work goal or purpose, judge in relation to an individual's own ideals or standards. Competence, or self-efficacy, is an individual's belief in his or her capacity to perform activities with skill. Self-determination reflects autonomy in the initiation and continuation of work behaviors and processes. Impact is the degree to which an individual can influence strategic, administrative, or operating outcomes at work. Example items include, "The role that I have in class is very important to me" for the first dimension, "I am confident with the performance that I have in PE class" for the second dimension, "I have significant autonomy in determining how I do my tasks in PE class" for the third dimension, and "I have a great deal of control over what happens in PE class" for the fourth dimension. All items were measured using a 7-point Likert-type scale that ranged from 1 (Totally disagree) to 7 (Totally agree).

*Engagement.* Engagement was measured with the “Athlete Engagement Questionnaire” (Lonsdale, Hodge, & Jackson, 2007), translated and adapted for Portuguese populations by Martins, Rosado, Ferreira and Biscaia (2015). The questionnaire included sixteen items distributed into four dimensions. The first is related to confidence, which represents a belief in one’s ability to attain a high level of performance and achieve desired goals (items 1 to 4). The second dimension refers to dedication, reflecting the desire to invest effort and time towards achieving goals seen as important (items 5 to 8). The third dimension, vigor, reflects the physical, mental, and emotional energy or liveliness (items 9 to 12). The fourth is related to enthusiasm and is characterized by feelings of excitement and high levels of enjoyment (items 13 to 16). Example items include, “I feel capable of success in PE class” for the first dimension, “I am dedicated to achieving my goals in PE class” for the second dimension, “I feel really alive when I participate in in PE class” for the third dimension, and “I feel excited about PE class” for the fourth dimension. All items were measured using a 5-point Likert-type scale that ranged from 1 (Never) to 5 (Always).

*Self-confidence.* Self-confidence was measured with the self-confidence sub-scale of Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Vealey, Bump, & Smith, 1990) translated and adapted for Portuguese populations by Vasconcelos-Raposo (1995). CSAI-2 has been widely used by researchers as a means of explaining the independent forms of influence of somatic anxiety, cognitive anxiety, and self-confidence on sport performance (Fernandes & Júnior, 2013). Example items include “I feel at ease” and “I feel secure”. All items were measured using a 5-point Likert-type scale that ranged from 1 (Never) to 5 (Always).

### *Procedures*

This study was supported by a grant from the Portuguese Foundation for Science and Technology (FCT) awarded to the first author. Prior to data collection, the study was reviewed by the University Ethics Board. Upon approval, participants were selected. Schools’ principals and physical education teachers were contacted by e-mail or by telephone and were invited to participate.

Once school authorizations were provided participation was secured through an informed consent procedure, which required that active consent was provided. Parents were asked for a signed assent form before approaching the students under 18 years old. Participants were informed that their involvement in the study was voluntary, and their answers would be kept anonymous. They were not paid for their participation and could withdraw their participation in the study at any time. All participants, including those under-18, signed assent forms. Participants completed a survey questionnaire in a classroom setting during school time in the presence of the first author. They were invited to ask for help if confused about an instruction or for the clarity of a particular item. Completion of the survey took approximately 10 minutes.

### *Pilot Study*

A pilot study of the questionnaire was conducted in order to check the survey structure, the functionality of the data collection procedures and to identify potential problems with the wording of the items. A total of 45 high school students completed the survey. As a result, minor wording changes were made to a small number of questions, but no changes were made to the structure of the survey. All participants were able to finish the questionnaire in approximately 10 minutes.

### *Data analysis*

The Statistical Package for the Social Sciences (SPSS) and Analysis of Moments Structures (AMOS 24.0) for Windows (IBM, Armonk, NY, USA) were used, and a confirmatory factor analysis (CFA) was performed to assess the psychometric proprieties of the *DFL-SE*. It is recognized that confirmatory factor analysis is essential in determining whether a previously identified and restricted factor model is confirmed in order to validate the internal structure of a measurement tool (Kline, 2011).

Preliminary analyses were performed on the data in order to scan for evidence of non-normality, univariate and multivariate outliers, and patterns of missing data. The assumption of normality for confirmatory factor analysis was examined using measures of skewness and kurtosis.

The maximum likelihood (ML) method was used, as it is less sensitive to variations in sample size, more stable and more robust to many violations of the assumptions in the evolutionary model, demonstrating higher accuracy in terms of empirical and theoretical fit compared to other estimators (Olsson, Foss, Troye, & Howell, 2000). Standardized factor loadings, standard residuals, and modification indices were analyzed to detect for possible model misspecification.

The 4 scales (personal-social responsibility, engagement, empowerment and self-confidence) were submitted to CFA to assess their psychometric properties. Given that this is a second-order model we used a two-step confirmatory strategy (as suggested by Byrne, 2010; Kline, 2011), testing initially the first-order model, and after, the second-order model.

The appropriateness of the model was investigated using a variety of goodness-of-fit indexes (Hu & Bentler, 1999): the chi-square ( $\chi^2$ ) statistical test, the ratio of  $\chi^2$  to its degrees of freedom ( $\chi^2/df$ ), comparative-of-fit-index (CFI), goodness-of-fit index (GFI), parsimony comparative-of-fit-index (PCFI), parsimony goodness-of-fit index (PGFI), and root mean square error of approximation (RMSEA). The chi-square ( $\chi^2$ ) value was calculated to determine the suitability of the CFA (Schermelleh-Engel, Moosbrugger, & Müller, 2003) and

represents the only true inferential statistic of model testing. However, since the  $\chi^2$  value has been identified as potentially problematic due to sample size sensitivity, and samples of greater than 200 make the conformity of the model difficult and thus lead to misinterpretations, the rate of the degrees of freedom ( $df$ ) to  $\chi^2$  is considered as an important criterion (Schermele-Engel et al., 2003).

To represent a good fit, research practices indicate that values for the  $\chi^2/df$  should be less than 3, PCFI and PGFI must be above .60, for the CFI and GFI should be above .90, and below .05 for the RMSEA (Kline, 2011; Marôco, 2010). Internal consistency (reliability) of the constructs was evaluated through composite reliability (CR), whereby a proper value of CR is  $\geq .7$  (Fornell & Larcker, 1981). Convergent validity was assessed through the average variance extracted (AVE), and we followed the recommendations of Hair et al. (2009) to calculate it, in which it is recommended that values of  $AVE \geq .5$  are appropriate indicators of convergent validity. The discriminant validity was accepted when the AVE value for each construct exceeded the squared correlations between that construct and any other (Anderson & Gerbing, 1988; Fornell & Larcker, 1981).

The significance of the structural weights was evaluated using the Z tests produced by AMOS and statistical significance was assumed at a .05 level. In order to identify DFL-SE' factorial invariance, cross validation procedures were used with a multi-group analysis strategy (Byrne, 2010), tested by comparing the unconstrained model with constrained models (factor loadings fixed and intercepts fixed). According to the chi-square statistic (Marôco, 2010), factorial invariance was accepted when the models did not differ significantly ( $p > .05$ ). However, Cheung and Rensvold's (2002) suggestion that a difference of CFI of less than or equal to .01 is an indication of strong factorial invariance was also considered because the chi-square difference tests represent an excessively stringent test of invariance.

## Results

### Preliminary analysis

No missing data values were detected and it was approximately univariately normal, since items with absolute values of skewness lower than 3 (ranged from -1.939 to .473) and kurtosis lower than 7 (ranged from -.739 to 4.009) did not deviate enough from the normal distribution (Kline, 2011). Analysis of Mardia's coefficient (1970) revealed that data violated the assumption of multivariate normality. As a result, the maximum likelihood estimation in CFA was employed which is less dependent on the normality assumption. Specifically, standard errors and  $\chi^2$  tests statistics were corrected to enhance robustness to departures from normality (C. Li, 2016).

### Evaluation of Model Fit

The initial model run indicated that not all estimated factor loadings exceed the cut-off point of .50 (see Table II), and according to Hair et al. (2009) "standardized loading estimates should be .50 or higher, and ideally .70 or higher" (p. 679). The goodness-of-fit indices produced for this first order measurement model indicated, also, poor fit [ $\chi^2 = 3058.586$ ,  $p < .01$ ;  $\chi^2/df = 2.509$ , PCFI = .814, PGFI = .681, CFI = .886, GFI = .769, RMSEA = .059 (90% CI [.057, .062],  $p = .000$ )] showing that the hypothesized measurement model is inconsistent with observed data, and it is interpreted as evidence against the adequacy of measuring the model. This poor fit is specifically perceived in the values of the CFI and GFI that were below the cut-off point of .90 (Hair et al., 2009).

Post hoc model adjustments were conducted in an effort to develop a better fitting model. All items that showed unacceptable factor loadings were removed (Byrne, 2010), since, in the interest of scientific parsimony, non-significant parameters are irrelevant to the model. Examination of the modification indices (MI) suggested that an improved model resulted in the elimination of items following the intent of Chartrand, Robbins, Morril, and Boggs (1990) to create "pure measures of each factor" (p. 495) by allowing items to load on only one factor.

Table II. Factor Loadings and Z-values for the sub-dimensions of DFL-SE model.

|                                | DFL-SE Factors/Items                      | Loadings         | Z-value |
|--------------------------------|-------------------------------------------|------------------|---------|
| Personal-Social Responsibility | <i>Social Responsibility</i>              |                  |         |
|                                | 1. I respect others                       | .47 <sup>a</sup> | -       |
|                                | 2. I respect my teacher                   | .39              | 6.046   |
|                                | 3. I help others                          | .62              | 7.959   |
|                                | 4. I encourage others                     | .62              | 7.937   |
|                                | 5. I am kind to others                    | .56              | 7.540   |
|                                | 6. I control my temper                    | .37              | 5.820   |
|                                | 7. I am helpful to others                 | .63              | 8.002   |
|                                | <i>Personal Responsibility</i>            |                  |         |
|                                | 8. I participate in all of the activities | .53 <sup>a</sup> | -       |
|                                | 9. I try hard                             | .79              | 11.168  |
|                                | 10. I set goals for myself                | .63              | 9.893   |

|                        |                                                                                       |                  |        |
|------------------------|---------------------------------------------------------------------------------------|------------------|--------|
|                        | 11. I try hard even if I do not like the activity                                     | .76              | 10.918 |
|                        | 12. I want to improve                                                                 | .78              | 11.059 |
|                        | 13. I give a good effort                                                              | .83              | 11.404 |
|                        | 14. I do not make any goals                                                           | .65              | 10.022 |
| <i>Engagement</i>      | <i>Confidence</i>                                                                     |                  |        |
|                        | 15. I believe I am capable of accomplishing my goals in PE class                      | .78              | 18.367 |
|                        | 16. I feel capable of success in PE class                                             | .92              | 22.764 |
|                        | 17. I believe I have the skills/technique to be successful in PE class                | .88              | 21.449 |
|                        | 18. I am confident in my abilities                                                    | .81 <sup>a</sup> | -      |
|                        | <i>Dedication</i>                                                                     |                  |        |
|                        | 19. I am dedicated to achieving my goals in PE class                                  | .87              | 21.301 |
|                        | 20. I am determined to achieve my goals in PE class                                   | .91              | 22.878 |
|                        | 21. I am devoted to my PE class                                                       | .83              | 19.752 |
|                        | 22. I want to work hard to achieve my goals in PE class                               | .80 <sup>a</sup> | -      |
|                        | <i>Vigour</i>                                                                         |                  |        |
|                        | 23. I feel energized when I participate in PE class                                   | .85              | 20.819 |
|                        | 24. I feel energetic when I participate in PE class                                   | .91              | 22.893 |
|                        | 25. I feel really alive when I participate in PE class                                | .90              | 22.634 |
|                        | 26. I feel mentally alert when I participate in PE class                              | .80 <sup>a</sup> | -      |
|                        | <i>Enthusiasm</i>                                                                     |                  |        |
|                        | 27. I feel excited about PE class                                                     | .76              | 17.174 |
|                        | 28. I am enthusiastic about PE class                                                  | .87              | 20.732 |
|                        | 29. I enjoy PE class                                                                  | .86              | 20.351 |
|                        | 30. I have fun in PE class                                                            | .80 <sup>a</sup> | -      |
| <i>Empowerment</i>     | <i>Meaning</i>                                                                        |                  |        |
|                        | 31. The work I do in PE class is very important to me                                 | .82              | 18.311 |
|                        | 32. The work I do in PE class is personally meaningful to me                          | .87              | 19.931 |
|                        | 33. The work I do in PE class is meaningful to me                                     | .79 <sup>a</sup> | -      |
|                        | <i>Competence</i>                                                                     |                  |        |
|                        | 34. I am confident about my ability to do PE class                                    | .83              | 17.904 |
|                        | 35. I am self-assured about my capabilities to perform PE activities                  | .82              | 17.728 |
|                        | 36. I have mastered the skills necessary for PE class                                 | .76 <sup>a</sup> | -      |
|                        | <i>Self-determination</i>                                                             |                  |        |
|                        | 37. I have significant autonomy in determining how I do PE class                      | .74              | 11.269 |
|                        | 38. I have considerable opportunity for independence and freedom in how I do PE class | .72              | 11.082 |
|                        | 39. I can decide on my own how to go about doing my tasks in PE class                 | .62 <sup>a</sup> | -      |
| <i>Self-confidence</i> | <i>Impact</i>                                                                         |                  |        |
|                        | 40. My impact on what happens in my PE class is large                                 | .71              | 10.051 |
|                        | 41. I have a great deal of control over what happens in my PE class                   | .71              | 10.082 |
|                        | 42. I have significant influence over what happens in my PE class                     | .49 <sup>a</sup> | -      |
|                        | 43. I feel at ease                                                                    | .71 <sup>a</sup> |        |
|                        | 44. I have self-doubts                                                                | -.22             | -4.369 |
|                        | 45. I feel comfortable                                                                | .78              | 15.663 |
|                        | 46. I feel self-confident.                                                            | .86              | 17.287 |
|                        | 47. I feel secure                                                                     | .76              | 15.419 |
|                        | 48. I'm confident I can meet the challenge                                            | .81              | 16.302 |
|                        | 49. I'm confident about performing well                                               | .86              | 17.362 |
|                        | 50. I feel mentally relaxed                                                           | .72              | 14.562 |
|                        | 51. I'm confident because I mentally picture myself reaching my goal                  | .82              | 16.472 |
|                        | 52. I'm confident of coming through under pressure                                    | .80              | 16.147 |

Note. Factor Loadings <.50 items are in boldface

<sup>a</sup> Factor loading fixed to 1.00

Each potential modification was evaluated according to the theoretical underpinnings of each individual construct, and only the justifiable modifications were made (Schreiber, 2008). In order to improve the convergent and discriminant validity, items were also eliminated because they showed a low factorial weight on their constructs.

The number of items eliminated was as small as possible and took in account that a minimum of three items must load significantly on each factor in a multi-dimensional scale for all of the subscales to be successfully identified (Raubenheimer, 2004).

As reported in Table III, standardized items loadings and the z-values provided evidence that the items accurately captured their respective factors (Anderson & Gerbing, 1988).

Table III. DFL-SE Re-specified 1<sup>st</sup> Order Model - Factor Loadings, Z-values, Composite Reliability (CR), and Average Variance extracted (AVE).

| DFL-SE Factors/Items           | Loadings         | Z-value | $\alpha$ /CR | AVE |
|--------------------------------|------------------|---------|--------------|-----|
| <i>Personal Responsibility</i> |                  |         | .86          | .67 |
| Item 9                         | .79 <sup>a</sup> | -       |              |     |
| Item 11                        | .75              | 15.711  |              |     |
| Item 12                        | .76              | 15.942  |              |     |
| Item 13                        | .80              | 16.936  |              |     |
| <i>Self-efficacy</i>           |                  |         | .90          | .75 |
| Item 16                        | .88 <sup>a</sup> | -       |              |     |
| Item 17                        | .89              | 24.443  |              |     |
| Item 18                        | .83              | 21.898  |              |     |
| <i>Meaningfulness</i>          |                  |         | .94          | .79 |
| Item 32                        | .91              | 25.543  |              |     |
| Item 33                        | .90              | 24.904  |              |     |
| Item 34                        | .85 <sup>a</sup> | -       |              |     |
| Item 41                        | .76              | 18.653  |              |     |
| <i>Ataraxis</i>                |                  |         | .91          | .73 |
| Item 43                        | .79 <sup>a</sup> | -       |              |     |
| Item 45                        | .87              | 19.415  |              |     |
| Item 47                        | .82              | 18.274  |              |     |
| Item 50                        | .77              | 16.934  |              |     |

Note. <sup>a</sup> Factor loading fixed to 1.00

After these procedures, the indices of fit indicated improvement of the hypothesized first-order model. The results obtained demonstrated the model adjusted to the data, since the values represents a good fit [ $\chi^2 = 174.509$ ,  $p = .000$ ;  $\chi^2/df = 2.077$ , PCFI = .784, PGFI = .664, CFI = .980, GFI = .948, RMSEA = .050 (90% CI [.040, .061],  $p = .477$ ]. Composite reliability values ranged from .86 (personal responsibility) to .94 (meaningfulness), indicating that the constructs were internally consistent (Hair et al., 2009). Evidence for convergent validity was obtained, since most AVE values ranged from .67 (personal responsibility) to .79 (meaningfulness), being greater than the recommended standard of .50 (Fornell & Larcker, 1981) (see Table III).

Furthermore, all constructs were considered to exhibit discriminant validity because AVE values exceeded the appropriate square factor correlations (Fornell & Larcker, 1981), as reported in Table IV. Overall, the measurement model was within the required criteria and showed good psychometric proprieties (Figure 1). Table IV. Discriminant validity for DFL-SE Re-specified 1<sup>st</sup> Order Model.

|        | PR  | SELFEF | MEAN | ATAR |
|--------|-----|--------|------|------|
| AVE    | .67 | .75    | .79  | .75  |
| PR     | 1   |        |      |      |
| SELFEF | .51 | 1      |      |      |
| MEAN   | .66 | .59    | 1    |      |
| ATAR   | .52 | .71    | .61  | 1    |

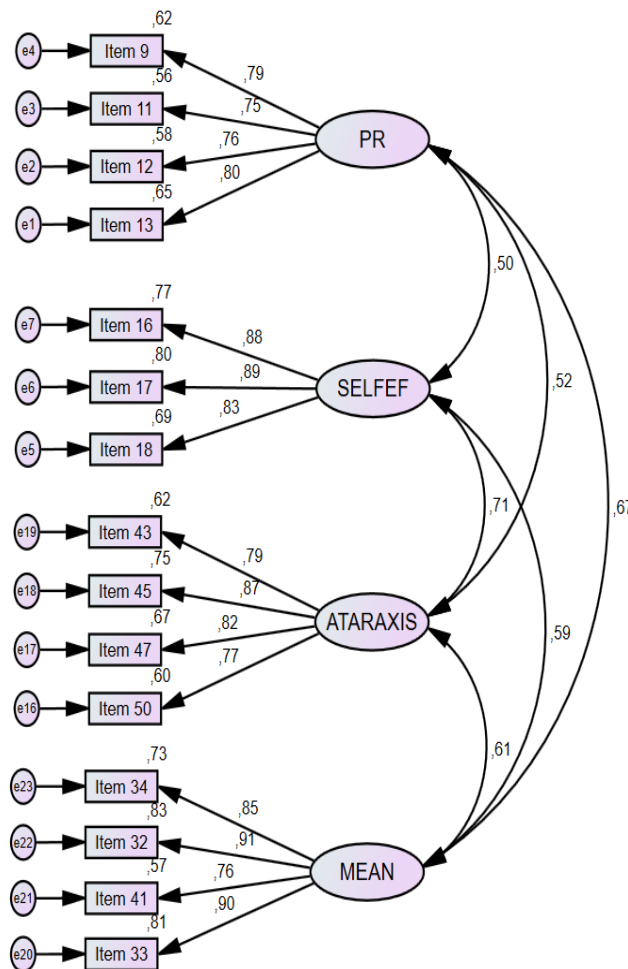
Note. PR = Personal responsibility; ATAR = Ataraxis; MEAN = Meaningfulness; SELFEF = Self-efficacy

Table V. Results of the Multi-Group Analysis across the Unconstrained Model and the Constrained Models of the DFL-SE (Testing Sample:  $n = 206$ ; Validation Sample:  $n = 224$ ).

| MODEL                      | $\chi^2$ (df)    | $\chi^2/df$ | $\Delta\chi^2(\Delta df)p$ | CFI( $\Delta$ CFI) |
|----------------------------|------------------|-------------|----------------------------|--------------------|
| <i>Model 1</i>             |                  |             |                            |                    |
| Full configural invariance | 302.482(168)     | 1.800       | -                          | .970               |
| <i>Model 2</i>             |                  |             |                            |                    |
| Full metric invariance     | 313.696(179)     | 1.752       | 11.213*(11)<br>.426        | .970(.000)         |
| <i>Model 3</i>             |                  |             |                            |                    |
| Full scalar invariance     | 333.085<br>(197) | 1.717       | 19.389*(15)<br>.197        | .969<br>(.001)     |

Note.  $\chi^2$  = chi-square;  $df$  = degrees of freedom;  $\Delta\chi^2$  = chi-square difference;  $\Delta df$  = degrees of freedom difference;  $p$  =  $p$ -value; CFI = comparative fit index;  $\Delta$ CFI = comparative fit index difference.

\* $p$ -value > .05



Note. PR = Personal responsibility; ATAR = Ataraxis; SELF EF = Self-efficacy; MEAN = Meaningfulness  
Figure I. Re-specified first-order model of the Dispositions for Learning in Physical Education

#### Cross-validity

For the cross-validity study, a multi-group analysis was performed using a test sample ( $n = 206$ ) and validation sample ( $n = 224$ ) based on a random division of the data collected (Marôco, 2010). The analyses of Table V support the model's invariance in the two independent samples. The fit of the unconstrained model (Model A:  $\chi^2(168) = 302.482$ ,  $p = .000$ , PCFI = .776, CFI = .970, RMSEA = .043) was good. The fit of this model provides the baseline value against which all subsequently specified invariance models are compared (Byrne, 2010). The models with constrained factor loadings (Model B:  $\chi^2(179) = 313.696$ ,  $p = .000$ , PCFI = .827, CFI = .970, RMSEA = .042), and with constrained intercepts (Model C:  $\chi^2(194) = 333.085$ ,  $p = .000$ , PCFI = .895, CFI = .969, RMSEA = .041), showed a very good fit. The  $\chi^2$  statistic difference showed no significant dissimilarities between Model A and Model B [ $\chi^2 \text{dif}(11) = 11.213$ ;  $p = .426$ ], and also no significant differences between Model A and Model C [ $\chi^2 \text{dif}(15) = 19.389$ ;  $p = .197$ ]. Furthermore, there were no significant differences in the CFI values for all model comparisons, demonstrating that the factorial structure of the scale was stable in the two independent samples (Cheung & Rensvold, 2002).

#### Discussion

The purpose of this study was to develop and provide initial validity and reliability evidence for the DFL-SE, an instrument for measuring students' dispositions for learning in SE, as well evidence of the model's potential to develop students' personal and social competencies.

The DFL-SE was proposed to contain four dimensions (personal and social responsibility, engagement, empowerment and self-confidence) but the CFA performed presented a lack of strong statistical support. A new CFA using a re-specified model was then conducted and showed a good fit for the study sample and confirmed a four-factor structure in which these factors were named: personal responsibility, ataraxis, self-efficacy and meaningfulness. This four-dimensional model was examined regard to reliability, construct validity, convergent validity, discriminant validity and invariance. The results provided general support for initial validity and

reliability suggesting that students perceived that being responsible and committed, being effective, assigning meaning to their actions, and feel confident and determinate to perform, them are the core elements to have disposition for learning in PE in the light of SE features.

Because ataraxis, self-efficacy and meaningfulness are proposed as new constructs, it is important to be clear about its conceptual nature. Ataraxis is the sense of serenity and tranquility in performing the proposed activities. The four items on the ataraxis construct identify these patterns, namely, expressing how students feel during the activities. Self-efficacy is, according to Bandura (1991) a personal judgement about how well one can execute the required activities to deal with prospective situations. The three items that make up this construct reflect the students' beliefs regarding their ability to successfully achieve the proposed activities. The items of the meaningfulness construct express the importance and usefulness that the activities represent for the students, the meaning they attribute to them.

In SE, teachers encourage students to participate in decision-making processes, to set goals, to solve problems, to cooperate within a group and to perform different tasks and roles more autonomously (Ennis, 2014). The four dimensions perceived by the students of this study have been related to these fundamental features of SE insofar as they express the need for an engaged, committed, confident and determined participation in learning. It is noticed that the students in this study, among all the aspects associated with the DFL, emphasized the importance of feeling motivated for learning. These results are corroborated by different authors (Farias, Mesquita, & Hastie, 2016; Hastie, Martínez de Ojeda, & Calderón, 2011; Layne & Hastie, 2014), when they suggest that students with higher levels of engagement reveal a greater involvement in more challenging and interesting work, accenting the construction of knowledge. To be active learners, having responsibility to plan and make decisions is in line with the findings of Li et al. (2008) in which students with higher levels of responsibility are more likely to enjoy and be intrinsically motivated to participate in pedagogical environments that promote their autonomy, enable them to act and to take decisions, in a culture of responsibility.

The students in our study also recognized the importance of an active and committed participation in their own learning given the different challenges proposed. Beyond that, they also highlighted the greater value of being determined and able to accomplish the suggested tasks with confidence and autonomously. This is in line with research evidence, which has shown that the strategies used during a SE season have influence on the development of students' self-confidence (e.g., Bessa et al., 2021). These findings are thought to result from particular roles students take on a SE season, such as coach or referee, which encourage them to make decisions and interact with each other. Furthermore, an empowered learner feels more self-confident, act autonomously and responsibly, has flexibly to interpret, absorb and apply knowledge.

While the findings supported the psychometric properties of the scores derived from the DFL-SE, the questionnaire validation is an ongoing process and requires evidence from multiple independent studies (Weiss, Bolter, & Kipp, 2014). The current study is an initial validation of the DFL-SE for a group of students at a given time and with particular characteristics. Therefore, further studies must be done considering other samples with different ages and from different cultures, contexts, and languages, as well with other variables.

For instance, validation in other languages, namely in English, would be helpful for an extended dissemination of the DFL-SE. Moreover, future studies should consider other variables related with SCA, such as curiosity, initiative, or creativity (e.g., Elaldi, 2015). Besides, the concurrent validity was not performed because the required data was not collected, therefore, it is also suggested for future studies the criterion validity (concurrent or predictive) analysis of the factors identified in the DFL-SE. Nevertheless, as verified in other studies (Lyrra, Leskinen, & Heikinaro-Johansson, 2015) this limitation does not compromise the validation of the instrument.

## Conclusions

The current study provided evidence of validity and reliability for the DFL-SE, a specific tool to measure student DFL in PE classes within SE.

The DFL-SE seems to have the potential to help teachers improve the SE model's curriculum designs, the work dynamics, and the students' social agenda. Indeed, recognizing and understanding students' perspectives is a prior condition to any meaningful attempt to improve curriculum designs that challenge students as active learners, as is the case of SE.

Our results demonstrate that the DFL-SE provides relevant information to help teachers and researchers to verify the extent to which SE students feel more disposed to learn in PE. In SE, students have differentiated behaviors due to the active role they have in the teaching-learning process, developing the capacity to instruct their peers, evaluate, learn, collaborate, and be resilient (Bessa et al., 2019). Specific tools are needed to measure student DFL in SE that consider and are sensitive to the approach's features and, consequently, the model used by the teacher.

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