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PHYSICAL ACTIVITY, HEALTH AND EXERCISE

How physically literate are children today? A baseline assessment of Greek children 8-12 years of age

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ABSTRACT

Developing Physical Literacy (PL) in children is considered a promising concept for establishing active lifestyle habits; yet research evidence is scarce. This study aimed at comprehensively assessing PL in 8-12-year-old Greek children. For that purpose, the Canadian Assessment of Physical Literacy (CAPL-2) was administered to 715 children (M age = 10.2, SD = 1.3 years). Analyses of variance were applied on participants' total, domain and individual measures scores, examining potential gender and age differences; whereas, participants' classification and proportion across CAPL-2 interpretive categories were computed. Results revealed that there were no practically important differences ($\eta^2 < .14$) between boys and girls or younger (grades 3 & 4) and older children (grades 5 & 6). Greek children presented insufficient levels of PL (their total score classified them into "progressing" PL level). CAPL-2 domains and individual measures scores showed that participants were highly motivated and felt confident to participate in physical activity (PA); however, they exhibited low PA as well as unsatisfactory physical competence, knowledge, and understanding to value and take responsibility for engagement in PA. Although further research is needed for a comprehensive picture of PL correlates, our findings highlight the need for providing Greek children with ample opportunities to enhance their PL.

ARTICLE HISTORY
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KEYWORDS
Canadian Assessment of Physical Literacy; physical activity participation; children; healthy development

Introduction

During the last decade, several researchers have argued that Physical Literacy (PL) is a promising concept for establishing active lifestyle habits and enhancing holistic development (Roetert, Ellenbecker, & Kriellaars, 2018; Whitehead, 2010). Late childhood is thought to be a critical period for the development of PL (Longmuir, 2013). In those years, the levels of Physical activity (PA) have already started to decline (Farooq et al., 2018) and children are old enough to comprehend concepts that are important for their engagement in PA (Longmuir, Woodruff, Boyer, Lloyd, & Tremblay, 2018b). Considering the multiple benefits of PA to several aspects of health (Venetsanou, Kambas, & Giannakidou, 2015a) as well as to academic achievement (Donnelly et al., 2016), PL is viewed as having potential to promote achieving goals in several fields, including education, sport, PA, recreation and public health (Dudley, Cairney, Wainwright, Kriellaars, & Mitchell, 2017). So far, the breadth and inclusiveness of the PL concept have informed the initiatives of several organisations in relative fields around the globe (e.g., Canadian Sport for Life; Physical and Health Education Canada; SHAPE America; Sport Northern Ireland; Sport Wales [Spengler, 2015]) and have inspired many interventions for children in education and sports (suggestively: Mateus, Gomes, Leite, Santos, & Vaz, 2015; Wainwright, Goodway, Whitehead, Williams, & Kirk, 2016).

Along with PL's dynamic embracement, the demand to assess this novel concept has primarily emerged, since PL assessment would facilitate monitoring, surveillance and programme evaluation (Longmuir & Tremblay, 2016). However, it seems that the PL content have been variously interpreted over the past years (Edwards, Bryant, Keegan, Morgan, & Jones, 2017) and, as a consequence, its assessment has been approached with diverse methods (Edwards et al., 2018) not always reflecting its comprehensive nature. For that reason, in a recent review (Edwards et al., 2018) it is stated that researchers should declare their philosophy and PL definition before embracing any assessment approach.

Until now, our knowledge about the PL level of children worldwide is still very limited, since very few studies have been conducted [two in Canada (McCallum & Sheehan, 2015; Tremblay et al., 2018) and one in Kenya (Tremblay et al., 2014)], not allowing for a deep understanding of how PL is being developed in boys and girls at different ages and/or in different cultural and pedagogical contexts. That is why several researchers underline the need for further research around the world that will shed light into PL, provoke awareness about this multifaceted construct and inform relative initiatives (Longmuir & Tremblay, 2016).

Based on the above, the purpose of this study was to assess PL in 8-12-year old boys and girls in Greece, generating a baseline for them and contributing to their surveillance. Greece is a small country in the Mediterranean region, where PA levels of children are low (Afthentopoulou, Venetsanou, Zounhia, & Petrogiannis, 2018; Venetsanou, Kambas, Gourgoulis, & Yannakoulia, 2019) and childhood obesity prevails (Afthentopoulou, Kaioglou, & Venetsanou, 2017), so

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policies for the PL advancement at individual and societal level, based on the results of a sound assessment, appear to be imperative. Following the recommendation of Edwards et al. (2018), it is declared that in this study, the PL definition of International Physical Literacy Association (IPLA, 2017), as it is adopted by the Canada's PL Consensus Statement (2015) was used. IPLA (2017) defines PL as the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life (IPLA, 2017). According to Canada's PL Consensus Statement (2015), PL includes four interconnected elements. These are affective (motivation and confidence), physical (physical competence), cognitive (knowledge and understanding) and behavioural (engagement in PA for life), with the latter expressing the responsibility of the individual to be active. IPLA's definition is grounded on philosophical foundations of monism, existentialism, and phenomenology, reflecting a holistic approach on the concept of PL (Whitehead, 2013). Based on the above underpinnings, qualitative PL assessments seem suitable, since they allow a holistically approach of PL (Edwards et al., 2018). Nevertheless, the implementation of qualitative assessments in children has several limitations (e.g., difficulties in assessing cognitive and affective domains due to the instability of children's thoughts and feelings or the low academic ability of a child; difficulties in using video recording for physical competence assessment) (Edwards et al., 2018) that make them not being the optimal choice for this study. Thus, we moved towards quantitative assessments, trying, however, to minimise their contradictions to Whitehead's PL underpinnings (e.g., assessing only specific PL elements, ignoring movement quality). For that reason, the Canadian Assessment of Physical Literacy CAPL (HALO, 2017) was selected, since it is the only quantitative measure that attempts to collectively assess the domains of PL (Edwards et al., 2018).

Materials and methods

Participants

Participants were recruited from schools and sport clubs (of non-elite level) from several regions of Greece, using convenience sampling procedures. Four schools and twelve sport clubs, which were contacted via their directors and administrators, agreed to participate in the research and allowed children's recruitment. From the total of 756 children that were enrolled in the schools'/sport clubs' programmes, 715 children (corresponding rate: 94.6%) in grades 3, 4, 5, 6 (M_{age} = 10.2, SD = 1.3, 49.2% boys) volunteered to participate, after having being informed about the purpose and procedures of the project. Both children and their parents/guardians were asked to give their verbal and written consent, respectively. Only children that had submitted a medical certificate that allowed them to participate in PE and/or other sporting activities were eligible to take part in the research. The particular research design was approved by the School of Physical Education and Sport Science, National and Kapodistrian University of Athens, Ethics Committee.

Measures

For the assessment of children's PL, the CAPL-2 ([HALO], 2017) was utilised. The CAPL-2 assesses the multi-dimensional nature of PL in four intercorrelated domains, i.e., Daily Behaviour (DB), Physical Competence (PC), Motivation and Confidence (M & C), Knowledge and Understanding (K & U) (HALO, 2017) and according to several studies findings, it provides valid and reliable results when used in children 8–12 years (Gunnell, Longmuir, Barnes, Belanger, & Tremblay, 2018a; Gunnell et al., 2018b; Longmuir et al., 2015, 2018a).

For the assessment of DB domain, that represents children' participation in PA, two measures are used: (a) the weekly self-reported engagement in moderate to vigorous PA (MVPA), which is obtained indirectly by one item of the CAPL-2 questionnaire and (b) the average daily PA, which is directly measured by pedometers. When given the pedometer, each participant is instructed to position it over the hip bone on the right-hand side of his/her body and wear it at the exact same location for seven full days in a row, excluding the time of engaging in water activities, taking bath and sleeping. In this project, the daily steps were recorded by Omron HJ-720IT-E2 pedometers, which have been examined for their validity and reliability (Venetsanou et al., 2015b). The pedometers used were unsealed; however, this does not seem to cause reactivity in children (Ling & King, 2015; Ozdoba, Corbin, & Le Masurier, 2004; Prewitt, Hannon, & Brusseau, 2013). According to HALO (2017), a valid day of pedometer data should include at least ten hours of wear time and recorded steps between 1,000–-30,000, while to obtain a pedometer score three valid days are required.

PC domain includes measures of: (a) motor competence and (b) physical fitness (cardiovascular and musculoskeletal endurance). Motor competence is assessed by the Canadian Agility and Movement Skill Assessment (CAMSA), an obstacle-type protocol, which, according to its authors (Longmuir et al., 2015) provides valid and reliable measures of fundamental (i.e., jumping on two feet, sliding sideways, catching, overhand throw, skipping, hopping on one foot, kicking a ball) and complex (i.e., acceleration, deceleration, dynamic balance, transitions) movement skills. Participants complete two practice and two test trials and forms of evaluation for the two test trials are: (a) time needed to complete the test trial and (b) skill performance according to 14 specific criteria. Best test trials' score is used. Two trained appraisers administer the procedure (one records the time and the other one evaluates the skill performance).

Cardiovascular endurance is assessed by the 15m/20m Progressive Aerobic Cardiovascular Endurance Run [(PACER) Meredith & Welk, 2010). In this project, the 20m PACER was used. For the assessment of muscular endurance, the plank protocol (Boyer et al., 2013) is applied. For this protocol, participants have to maintain the plank position (i.e., body a straight line from head to ankles, supported only on the forearms and toes) for as long as possible (no time limit).

M & C domain of the CAPL-2 encompasses children's motivation to participate in PA and their confidence in their ability to be physically active. For their assessment, participants complete the 12-item CAPL-2 Motivation and Confidence questionnaire

(Gunnell et al., 2018b), which is consisted of four measures that are assessed by three items each: (a) predilection (preference for PA), (b) adequacy (expectations of success), (c) intrinsic motivation (engagement to PA for enjoyment) and (d) perceived competence (perceptions of motor competence). Predilection and adequacy items are taken from the Children's Self-Perceptions of Adequacy in and Predilection for Physical Activity questionnaire [(CSAPPA), Hay, 1992], a scale of an alternative-response format. In these items, a group of children is presented in two different ways, e.g., "Some kids don't have much fun playing sports" against "Other kids have a good time playing sports", and participants are firstly called to decide which of the two descriptions are most like them and then circle weather this is "really true" or "sort of true" for them. The items corresponding to intrinsic motivation (e.g., I am active because … being active is fun) and perceived competence (e.g., I think I do well at activities compared to other children), use a 5-point Likert-respond scale (e.g., ranging from "not true for me" to "very true for me"). Children's PA knowledge and autonomy to engage in PA are assessed by the K & U domain that consists of five items. The first four items, which refer to the knowledge of: (a) PA guidelines, (b) terminology related to heart-related fitness, (c) terminology related to muscular strength, and (d) methods to enhance PC, are multiple-choice questions. For the sixth item, examinees are instructed to choose among provided words and fill in the blanks in a paragraph that associates with PA knowledge. The measures of M & C, K & U domains, and self-reported MVPA, all included in the CAPL-2 questionnaire are completed by the participants individually at their own pace via paper, either in class-room or the gym, while waiting for the next assessment.

The comprehensive scoring system of the CAPL-2 includes individual measure scores (raw scores converted to point scores), domain scores, and an aggregated score (sum of four domains) representing total PL. Total PL score (max of 100 points) is the sum of DB (max of 30 points), PC (max of 30 points), M & C (max of 30 points) and K & U (max of 10 points) domain scores. Based on normative data derived from Canadian children, interpretation of scores by gender and age for total PL and domains is possible through a four-category system, which classifies participants as "beginning" (low level compared to same-age peers), "progressing" (similar level compared to typical same-age peers), "achieving" (meets minimum level recommended/association with expected health benefits) and "excelling" (exceeds minimum level recommended/association with expected health benefits). Moreover, participants can also be classified across the above categories for the individual measures of DB and MC (for more details about CAPL's scoring system, see HALO, 2017).

Before its use in Greek children, the CAPL-2 was cross-culturally adapted and sufficient evidence was gathered regarding its construct validity (Dania, Kaioglou, & Venetsanou, 2020). Moreover, the construct validity, face validity and feasibility of the CAPL-GR questionnaire as well as the construct validity, feasibility, and test-retest reliability of CAMSA were also examined and proved to be sufficient [detailed information is provided elsewhere (Dania, Kaioglou, & Venetsanou, 2018, 2019; Kaioglou, Dania, & Venetsanou, 2019).

Procedure

The CAPL-2 was administered by PE specialists and sport professionals with studies in relative fields, who were trained in the administration of the CAPL-2 measures. Their intra-rater and inter-rater reliability was examined before data collection and found to be excellent (ICC = .93-.99 and ICC = .91- .99, for intra- and inter-rater reliability, respectively). The assessments were organised in groups of 25–30 children, usually conducted by three appraisers in a single session of 90′ or alternatively, in two sessions across two consecutive days. The administration of PACER was always conducted after CAMSA and plank, and necessarily after an adequate rest period. When two sessions were scheduled, on the first testing day, participants were assessed in CAMSA and plank, while on the second, they were assessed in PACER, completed the CAPL-GR questionnaire and were given the pedometers. Data were collected from November 2018 to June 2019 during regular school days and weekends, while holidays were excluded. According to the pre-arranged appointments, data were collected on specific days at each location, usually with no option of extra sessions/days.

Statistical analyses

Average scores for all participants as well as participants' classification and proportion (in %) across the CAPL-2 interpretive categories for total PL, domains and individual PC and DB measures were computed, according to the CAPL-2 manual (HALO, 2017). However, although the manual provides the possibility to calculate total PL scores even if some measures are missing, in this study only participants that had been assessed in all the PL measures obtained total PL scores, so as to achieve a precise picture of their PL.

First, a univariate analysis of variance (ANOVA) was applied on children's total CAPL-2 score to investigate potential associations with gender and age. Additionally, a multivariate analysis of variance (MANOVA) was performed on the four CAPL-2 domains scores, so as to have a closer look on the PL elements. Finally, ANOVAs were utilised on participants' raw scores in DB and physical fitness measures as well as on their CAMSA total score. Each of the aforementioned analyses was conducted on the sample of children that had complete data on the dependent variables used (Table 1). For data analyses, children were classified into two age-groups: (a) younger participants (grades 3 & 4) and (b) older participants (grades 5 & 6), since, according to the Greek curriculum, students in PE are taught the same content across two consecutive grades, implying that developmental expectations are similar for them. Results were evaluated at $p < .05$. Moreover, for results interpretation, apart from the statistical significance, the effect sizes were taken into account, using the η^2 values [only effect sizes with $\eta^2 > .14$ are considered of practical importance (Cohen, 1988)]. The IBM SPSS 26.0 software package was used to conduct data analysis.

Results

In this project no missing data were reported because of injury or refusal of participants to take part in the measures. However, due to the strict schedule of data collection, absent participants

Table 1. Sample sizes (n) and missing data for total PL, domains and individual measures.

		Gender (n)		Age group (n)		Missing data	
CAPL-2 measures	Total (n)	Male	Female	Younger (8–10 years)	Older (10–12 years)	n	%
DB[a]	576	268	308	287	289	139	19.4
Self-perceived MVPA[b]	713	350	363	357	356	2	.3
Pedometer steps	597	277	320	297	300	118	16.5
PC[c]	576	268	308	287	289	139	19.4
CAMSA[d]	698	340	358	350	348	17	2.4
20m PACER[e]	702	344	358	346	356	13	1.8
Plank	707	348	359	352	355	8	1.1
M & C[f]	576	268	308	287	289	139	19.4
K & U[g]	576	268	308	287	289	139	19.4
Total PL	576	268	308	287	289	139	19.4

Sample sizes (n) are classified by gender and age group. Missing data is presented in absolute numbers (n) and percentages (%).
[a]DB: Daily Behaviour.
[b]MVPA: Moderate to Vigorous Physical Activity.
[c]PC: Physical Competence.
[d]CAMSA: Canadian Agility and Movement Skill Assessment.
[e]PACER: Progressive Aerobic Cardiovascular Endurance Run.
[f]M & C: Motivation & Confidence.
[g]K & U: Knowledge & Understanding.

did not have the chance to complete all measures. Furthermore, pedometer steps data that did not meet the inclusion criteria mentioned above were excluded from the analyses (HALO, 2017). Table 1 summarises available sample sizes and percentages of missing data for total PL, domains and individual measures. As reported also in other studies (Tremblay et al., 2018) pedometer measures yielded the largest percentage of missing data (16.5%).

Participants' total CAPL-2 and domains scores as well as raw scores in DB and PC individual measures are presented in Table 2.

The ANOVA that was applied in the total CAPL-2 score did not reveal a statistically significant interaction between gender and age group; whereas, the main effects of both factors were statistically (though not practically) significant, with boys and older children presenting higher scores. Furthermore, the MANOVA computed on the domains scores showed that the interaction of gender and age group was statistically insignificant (Pillais' trace = .003, F = .460, η^2 = .003), whereas, both main effects were statistically significant (gender: Pillais' trace = .031, F = 4.618, η^2 = .031, age group: Pillais' trace = .132, F = 21.596, η^2 = .132), revealing a nearly large effect size only for the age group. The ANOVAs that followed revealed that the gender effect was statistically significant for two of the four domains (DB and PC), with boys receiving higher scores than girls; whereas, the age group effect was significant for three domains (DB, PC, K & U), with older children scoring higher than the younger ones (Table 2). However, none of the above effects was of practical significance.

Table 2. Means, standard deviations, F ratios, and η^2 values for total PL, domains and individual measures scores by gender and age group.

	Male		Female		Gender*Age group		Gender		Age group	
Scores	Younger	Older	Younger	Older	F	η^2	F	η^2	F	η^2
DB[a] point score	13.1 ± 7.2	13.6 ± 7.7	10.8 ± 5.7	12.6 ± 6.6	1.352	.002	8.308*	.014	4.552*	.008
Self-perceived MVPA[b] (days/week)	4.3 ± 2.0	4.9 ± 1.7	4.3 ± 1.8	4.7 ± 1.6	.210	.000	.249	.000	11.362*	.016
Pedometer steps (per day)	8604.1 ± 4429.9	8260.3 ± 4377.5	7328.6 ± 3248.4	8031.0 ± 3571.3	2.658	.004	5.498*	.009	.312	.001
PC[c] point score	17.3 ± 5.8	20.0 ± 5.7	15.5 ± 5.0	19.2 ± 5.0	1.019	.002	8.013*	.014	51.049**	.082
CAMSA[d] total score	17.6 ± 4.6	21.1 ± 3.8	16.4 ± 4.1	19.9 ± 3.4	.005	.000	14.991**	.021	131.935**	.160
20m PACER[e] (laps)	27.9 ± 14.2	35.7 ± 17.9	22.8 ± 12.7	30.0 ± 16.4	.083	.000	21.201**	.029	41.656**	.056
Plank (sec)	86.2 ± 60.6	88.9 ± 63.0	80.3 ± 48.9	93.1 ± 52.4	1.432	.002	.041	.000	3.307	.005
M & C[f] point score	26.4 ± 3.3	26.5 ± 2.8	25.8 ± 3.5	26.1 ± 2.9	.050	.000	3.547	.006	.431	.001
K & U[g] point score	5.5 ± 2.0	6.7 ± 2.2	5.6 ± 2.2	6.9 ± 1.8	.139	.000	.988	.002	55.210**	.088
Total PL score	62.2 ± 12.4	66.8 ± 11.5	57.7 ± 10.7	64.8 ± 11.4	1.654	.003	11.290*	.019	37.276**	.061

Average scores and corresponding SD for male and female stratified by age group (younger: 8–10 years/older: 10–12 years). Interaction, gender and age group effects are reported with F values and corresponding effect sizes (η^2). Total PL score (max of 100 points) is the sum of DB (max of 30 points), PC (max of 30 points), M & C (max of 30 points) and K & U (max of 10 points) domain scores. CAMSA total score (max of 28 points).
[a]DB: Daily Behaviour.
[b]MVPA: Moderate to Vigorous Physical Activity.
[c]PC: Physical Competence.
[d]Canadian Agility and Movement Skill Assessment.
[e]PACER: Progressive Aerobic Cardiovascular Endurance Run.
[f]M & C: Motivation & Confidence.
[g]K & U: Knowledge & Understanding.
*p < .05, **p < .001

Additionally, according to the ANOVAs conducted in DB and PC individual measures scores, there were not statistically significant interactions between gender and age group in any measure. However, gender was found statistically significant for pedometer steps, CAMSA and PACER (boys scored higher than girls); whereas, age group was significant for self-reported MVPA, CAMSA and PACER (older children obtained higher scores that the younger ones) (Table 2).

As far as the classification of children across the CAPL-2 interpretive categories is concerned, based on their average scores, participants were classified as "progressing" for total PL, and DB, PC, K & U domains, whereas as "excelling" for M & C. Regarding their distribution (in %) across the CAPL-2 interpretive categories, more than half (52.4%) were located at the "progressing" category for their total PL score. The proportion of Greeks across the CAPL-2 interpretive categories for each domain with respect to the distribution of the Canadian CAPL reference sample (Tremblay et al., 2018) is presented in Figure 1.

The greatest percentage of Greek children were found at the "progressing" level for DB (45.9%), PC (35.1%), and K & U (36.7%) domains; whereas, at the "excelling" level for M & C (65.5%). In respect of the individual measures, the greatest percentage of Greek children were classified as "progressing" for CAMSA, PACER and plank, as "achieving" for the self-reported MVPA, whereas as "beginning" for pedometer steps (Figure 2).

Discussion

As enhancing children's PL is considered promising for launching lifelong PA participation and holistic development (Roetert

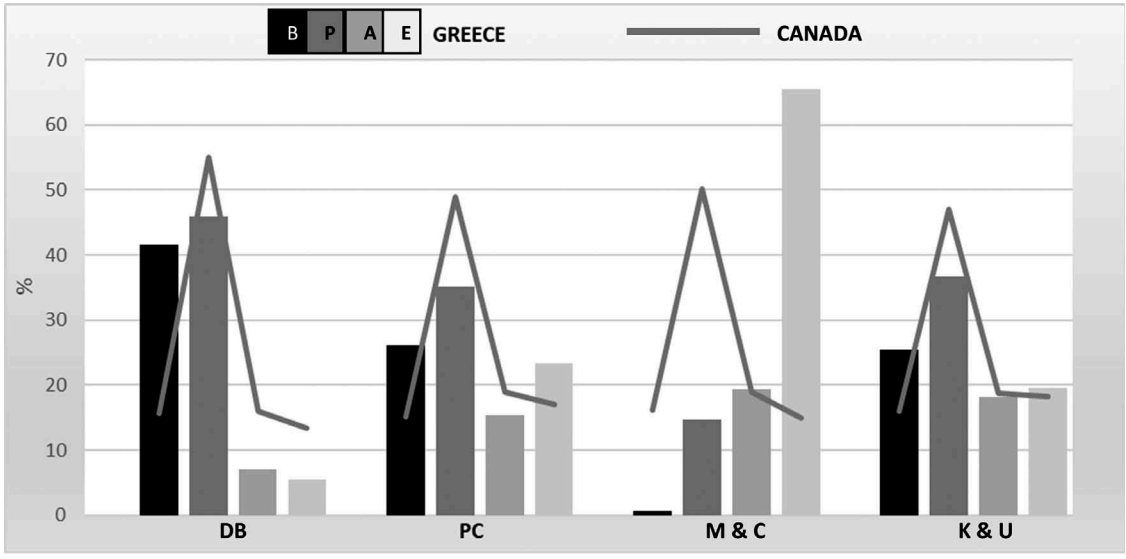

Figure 1. Proportion of Greek children (in %) across the CAPL-2 domain interpretive categories with respect to the distribution of the Canadian CAPL reference sample.

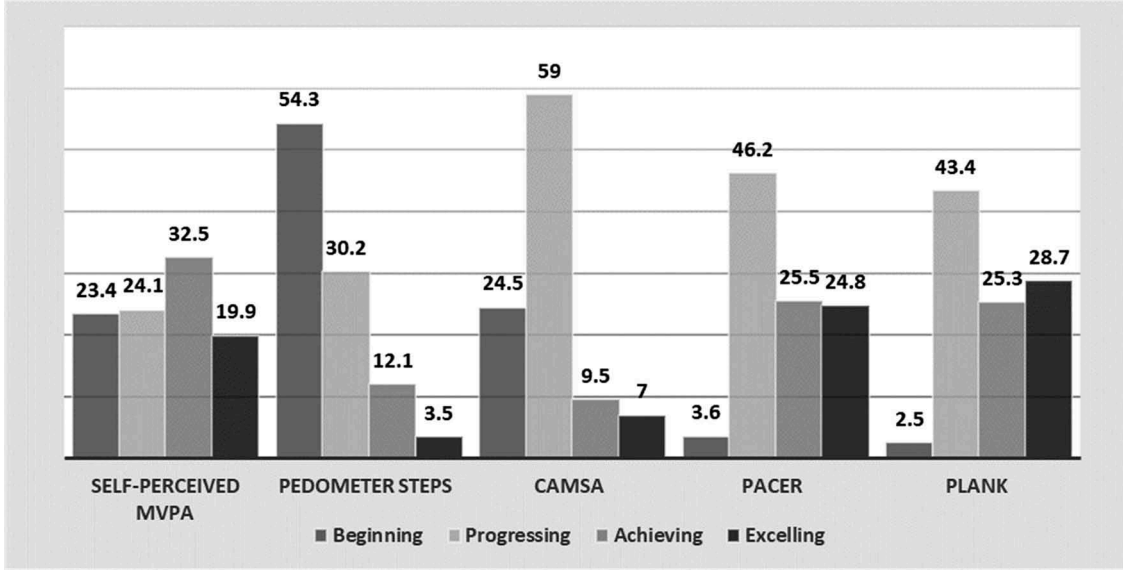

Figure 2. Participants (in %) across the CAPL-2 interpretive categories for DB and PC individual measures.

et al., 2018; Whitehead, 2010), the comprehensive assessment of children's PL is imperative if awareness about PL is to be achieved and effective PL interventions are to be planned. This study was the first that measured PL in Greek children, and among the first studies worldwide that provide a comprehensive empirical picture of concepts that at an individualistic level may lead to the nurturing of PL in childhood. Having used a measure that attempts to collectively assess the domains of PL, our key-finding was that 8-12-year-old Greek children present insufficient levels of PL, irrespectively of their gender and age. Although they were highly motivated and felt confident to participate in PA, they had unsatisfactory PC, knowledge, and understanding to value and take responsibility for engagement in PA, whereas their PA was low. Our findings are discussed below in the light of current literature, in an attempt to interpret them and offer information that can provoke awareness in policy makers and advise relative actions. Nevertheless, it should be noticed here that focusing on each PL element and using normative data to evaluate children's PL aims only at generating a baseline assessment that will reveal significant aspects of PL, which either the physical education or the sport sectors have not sufficiently cultivated in Greek children so far. This should not be confused with the PL assessment aiming at providing the necessary evidence for fostering each child's PL journey. The latter should be individualised and ipsative in nature (Durden-Myers, Green, & Whitehead, 2018).

A first look at children's PL is provided by the total CAPL-2 score that in our study was 62.8 ± 12.0 points. This score is similar to that found (62.7 ± 12.2 points) in the very recent large-scale study with approximately 10,000 Canadian children of the same age (Tremblay et al., 2018). According to the CAPL-2 interpretation system (HALO, 2017), children in both countries are at the "progressing" level of PL, meaning that although they have similar scores compared to typical same-age peers, they do not meet the minimum level that is recommended for expected health benefits (HALO, 2017). It is informative to know that, as it is the case with the Greek study, the Canadian reference sample was recruited using convenience sampling techniques from various provinces of the country. These studies' findings are in alignment with previous studies conducted in Canada (McCallum & Sheehan, 2015) and Kenya (Tremblay et al., 2014) and underline the need for the enhancement of today's children's PL if their health and life quality is to be safeguarded.

Since PL results from the interaction of its key-elements, the examination of children's domain scores would provide an informative picture of what led to that low PL level and shed light into potential cultural specificities that should be taken into account when planning PL interventions. According to our results, Greek children showed relatively low average scores in DB, PC, and K & U domains; whereas, they had a very high score in M & C. This is in contrast to the Canadians, who seemed to be less motivated and confident, but obtained higher scores in knowledge and understanding measures (their K & U was classified as "achieving") (McCallum & Sheehan, 2015; Tremblay et al., 2018); whereas, children in Kenya were found to be at "progressing" level in all PL domains (Tremblay et al., 2014). The higher scores that Canadians obtained in K & U domain can be attributed to the fact that the CAPL-2 questionnaire items constituting this domain are informed by the goals and content of the Canadian physical education curriculum, so those children are expected to have been taught issues addressed in the questionnaire (e.g., heart-related fitness). Regarding Greek children, potential factors that may have adversely affected their performance in the K & U domain are (a) the prominence of disciplinary mastery orientations within the primary Greek PE curriculum, which place an emphasis on performance oriented outcomes (Karandaidou, 2005) and (b) PE teachers' limited self-efficacy in implementing and supporting health-based PE instruction (Gorozidis, Papaioannou, & Diggelidis, 2012). Since the generalisation and maintenance of PA is dependent upon goal-setting and self-monitoring behaviours (Haerens, Kirk, Cardon, & De Bourdeaudhuij, 2011), it seems that Greek PE teachers should spend more time on concepts-based fitness education to foster their students' understanding of the associations between sport-related outcomes and lifelong engagement in PA. However, since cognition entails all forms of knowing and awareness (Edwards et al., 2017), experiential forms of learning are recommended for students to appreciate the pleasure and benefits acquired from PA.

The fact that Greek children appeared to be excessively motivated and confident for PA, although surprising, is very promising, given that these elements are critical within the PL construct (Whitehead, 2010), as children's intrinsic motivation is thought to positively associate with PA participation (Sebire, Jago, Fox, Edwards, & Thompson, 2013); whereas, their self-perceptions of competence may predict their future active behaviour (Timo, Sami, Anthony, & Jarmo, 2016). Also in previous studies in Greek children, a high level of perceived PC is reported and considered as a "window of opportunity for enhancing PA participation" (Afthentopoulou et al., 2018); however, it cannot lead alone to an active lifestyle. Each separate domain contributes significantly to the development of PL and should be sufficiently cultivated. The fact that in this study motivation and confidence appeared to be an important part of children's "moving self" is a promising but not sufficient condition for reinforcing positive and repeated lifestyle behaviours, such as PA. The distribution of Greek children across the CAPL-2 interpretive categories for each of the PL domains (Figure 1), shows that, actually, far more than half of them were within the two low-level categories and specifically for DB, a very large percentage can be characterised as "beginning", describing an inactive population. Perhaps children lack the opportunities to participate in PA. This is might due to the fact that the time Greek children spend on sporting activities associates with the affluence of their families (Yannakoulia et al., 2016) in a period when Greece is facing a financial crisis. That is probably why Greek children present high percentages of screen time and a strong association between screen time and ambulatory activity (Venetsanou et al., 2019). However, the above finding has to be interpreted with caution, since during PL lifelong development, participation in PA should be realised as a versatile process interwoven with individual traits (Shortt, Webster, Keegan, Egan, & Brian, 2019). Why children were not offered adequate PA opportunities or were not encouraged to participate or chose not to participate, all have to be examined in relation to the way PL determinants or outcomes are communicated. The latter could help articulate a coherent

paradigm of how theoretical assumptions could be translated in practical guidelines or instructions.

Focusing on individual items of PC and DB, low scores of Greek children (both boys and girls; older and younger ones) were also revealed. Starting with children's motor competence, according to their scores in CAMSA, our participants were found to be not competent enough. As it was expected, older children had significantly better performance compared to younger ones, whereas there were gender differences favouring boys, although of no practical importance. Since CAMSA assesses a combination of various gross motor skills and not only ball skills, where boys are usually better than girls (Barnett, van Beurden, Morgan, Brooks, & Beard, 2010), the absence of practically important gender differences in motor competence was expected in that age group (Hardy, King, Farrell, Macniven, & Howlett, 2010; Mukherjee, Ting Jamie, & Fong, 2017). Nevertheless, although information about the motor competence of different age groups and genders is valuable for informing educational practices, the low motor competence of the Greek sample is worth discussing. Their score in CAMSA was lower than that of their Canadian peers (20.6 points; Tremblay et al., 2018); however, children from both countries presented motor competence levels that were far from being considered satisfactory (Healthy Active Living and Obesity Research Group [HALO], 2017). This is in contrast to previous studies with younger Greek children that report a sufficient level of motor competence (Afthentopoulou et al., 2018; D'Hondt, Venetsanou, Kambas, & Lenoir, 2019) nevertheless, in those studies, an assessment tool measuring both gross and fine motor skills was utilised. Our findings are in alignment with several studies that used tools for assessing gross motor skills and underline the low motor competence of today's children (Mukherjee et al., 2017; Spessato, Gabbard, Valentini, & Mary Rudisill, 2013) that may be a result of their lifestyle patterns that impose sedentary behaviours and decreased PA (Bardid, Rudd, Lenoir, Polman, & Barnett, 2015). Considering that children's motor competence associates with PA participation both in short (Kambas et al., 2012) and in long-terms (Venetsanou & Kambas, 2017), this finding should be taken into consideration when PL programmes are to be designed. Similarly low was children's performance in physical fitness tests, with older children and boys receiving higher scores in PACER (small effect size). Moreover, although Greeks had higher muscular endurance and heart-related fitness compared to their Canadian peers (Tremblay et al., 2018), most of the children in both countries were at the "progressing" level. Since heart-related fitness is thought to mediate the relationship between motor competence and PA (Stodden et al., 2008) and also reinforcing positive attitudes towards PA (Chen & Gu, 2018), and towards PL as a whole (Lang et al., 2018), alike the motor competence, children's physical fitness needs to be further developed. The development of physical fitness in conjunction with children's preferences for movement and PA further enable purposeful participation in physical pursuits and help them effectively cope with the physiological and mechanical stress that is applied to their body during PA participation (Moreno, 2013). At a practical level, "narrow activity" instructional models are not adequate to initiate such behavioural changes (Newton & Bassett, 2013). We believe that broader curriculum models are needed, ones that could provide flexible pathways to encourage youth motivation, engagement and understanding along with the development of a variety of physical and motor attributes.

As far as PA is concerned, although Greeks reported that they engaged more than four days per week for 60 min in MVPA, their objectively measured daily PA was low (boys: 8,437.8 steps; girls: 7,693 steps), revealing that they overestimated their PA participation. This was expected, since adherence to PA recommendations is lower when objective methods are used comparing to subjective ones (Troiano et al., 2008). Moreover, it underlines the fact that, although self-reported PA provides valuable information regarding the activities children take part in, objective PA data (using pedometers or accelerometers) should also be used if a precise picture of PA is to be obtained. In the present study, the ambulatory activity of participants was on average much lower than that of Canadian children (boys: 12,355 steps/day; girls: 10,779 steps/day) (Tremblay et al., 2018) and far below PA recommendations (13,000–15,000 steps/day and 11,000 – 12,000 steps/day for boys and girls, respectively) (Tudor-Locke et al., 2011). Furthermore, it was impressing that the PA of more than half of our participants was characterised as "beginning" (Figure 2). This finding that highlights the inactive profile of Greek children is not surprising, since previous studies in younger Greek children report similarly low PA levels (Afthentopoulou et al., 2018; Venetsanou et al., 2019). Moreover, it confirms the results of studies in several countries [suggestively: Basterfield et al., 2011; Farooq et al., 2018 (England); Troiano et al., 2008 (USA)] according to which, PA levels of children of this age range are low.

In the attempt to take a critical look into this study's findings, it becomes clear that the inactive lifestyle that Greek children adopt along with their unsatisfactory physical competence, knowledge, and understanding led them to low levels of PL. Nevertheless, PL assessment is only the first step that should be taken for PL enhancement. As being conceptualised in PL's definition (IPLA, 2017), the enhancement of PL elements derives from their interaction, a process that is often viewed like a circle with active participation in PA to be the starting and the ending point of this circle (Taplin, 2013). Taking the responsibility to maintain purposeful physical pursuits, like PA, throughout life requires PA experiences that are PL informed. Physical education teachers and sport coaches should create a safe, inspiring and supportive environment that will encourage children to keep on their participation in PA (Durden-Myers et al., 2018). As suggested by Whitehead and Almond (2014), PL programmes should aim at developing personal qualities of children, such as empowerment and agency to make the right choices and achieve personal goals, autonomy, responsibility for one's actions, imagination to realise the multiple possibilities which could contribute to their well-being.

This study has some limitations that should be noticed. The convenience sample that was used weakens the possibility that our results apply to the entire Greek children population of that age. However, to strengthen the information that is provided by this study, data were collected from several regions of Greece, including both metropolitan and provincial areas. In addition, in this research only gender and age were examined,

excluding other factors that may relate to PL development, such as children's' previous experiences, learning environment, parents' education and economic status, ethnicity, etc. Furthermore, the CAPL-2 interpretive categories that were used to evaluate Greek children's current PL level should be used with caution, since these categories are informed by Canadian data. Future studies could fruitfully explore further this issue by developing culturally-sensitive interpretive categories before validating the kinds of conclusions that were drawn from this study. However, this study has several strengths. To begin with, a comprehensive approach to PL assessment that aligns with PL definition was used, providing information about all PL elements. Moreover, the simplicity of the CAPL-2 delivery mode (i.e., detailed manual instructions and training guidelines), along with the convenient time frame of assessment, all address everyday school-classroom and/or sport setting considerations that can easily be adopted. As such, the claim for adopting and implementing practice-referenced PL assessment procedures is further substantiated. Finally, the large number of children, with similar proportions of boys and girls, from various regions of Greece that participated, strengthen our results.

What this study adds is that Greek children regardless of gender need to be enhanced in their PL journey and for this to be possible they should be given the opportunities to engage in various physical activities informed by PL within multiple contexts. Fortunately, their motivation and confidence for PA is a significant advantage; however, given that motivation declines during the last grades of elementary school (Xiang, McBride, & Guan, 2004), special care should be taken to maintain and further enhance this PL element with the aim of provoking improvements in children's total PL. Taking into account that PA levels, also, start to decline in late childhood (Basterfield et al., 2011; Farooq et al., 2018) and that childhood obesity outlines a problem that requires solution, the enhancement of PL in childhood should be the primary focus of those involved in the promotion of PA. Hopefully, the findings of this research will provoke awareness in policy makers and leaders of education and sport about the pedagogical and health implications of PL advancement and, consequently, inform interventions in that direction.

Conclusion

This study offers the first evidence-based PL baseline assessment in Greek children 8–12 years, facilitating monitoring and surveillance purposes. Greek children, both boys and girls, were identified as having low PL level; however, they do not differ significantly from other same age children elsewhere. Unfavourably, children in Greece adopt very inactive behaviours; however, an important finding to build upon is that they demonstrate excessive motivation and confident for PA. Given the pedagogical and health implications of PL advancement, the overall findings of this project should provoke awareness in policy makers and leaders of education and sport and inform relative actions, so as children receive the encouragement, they need along their PL journey. Further research is necessary to enlarge the current PL database and confirm whether the gender and age specific criteria adopted from the CAPL-2 are suitable for the Greek population.

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