Relating students' participation in sport out of school and performance calibration in physical education

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This study examined associations between students' participation in sport out of school and their calibration of sport performance in physical education. Four hundred twenty nine fifth and sixth grade students reported their sport participation and performed a basketball shooting test after they had estimated their performance in this test. Two calibration indices, bias and accuracy, were calculated. The results showed that most of the students were overconfident. Sport participants compared to non-sport participants were more accurate in estimating their performance, and sport participation predicted students' calibration accuracy. Accurates reported higher sport participation than overestimators, and overestimators were more within non-sport than sport participants. These results were discussed with reference to calibration and self-regulated learning in sport and physical education.

Introduction

A long research tradition in academic setting has focused on the accuracy of students' self-assessment of learning and performance (e.g., Hacker & Bol, 2004) and the factors associated with it (e.g., Serra & Metcalfe, 2009). A growing interest regarding how accurately students estimate their own performance in the settings of sport and physical education has also emerged during the last decade (e.g., Fogarty & Else, 2005). Following this trend and expanding previous research, the present study focused on the associations between students' participation in sport out of school and the accuracy of estimations of their performance in physical education.

The term calibration has been widely used in the literature referring to the accuracy of students' judgments of learning and performance compared to actual and objectively measured performance. In particular, calibration is the degree to which a person's perception of performance corresponds with his or her actual performance (Keren, 1991). That is, a student estimates his or her learning or performance in a task and then this estimation is compared to an objectively determined measure of learning or performance on this task. In the case estimation of performance is very close or identical to actual performance, the student is considered accurate. If the estimation of performance is higher than the actual performance the student is considered an overestimator and if the estimation of performance is lower than the actual performance the student is considered an underestimator.

Calibration has attracted researchers' interest due to important implications regarding motivation, learning, and performance (Schunk & Pajares, 2009). In fact, calibration is associated with students' motivation to learn and practise. For example, students who overestimate their capabilities may attempt very difficult tasks and fail, decreasing their motivation to be involved in further practice. That is, overconfidence may decrease effort exertion when actually needed more (Efklides & Misailidi, 2010). On the other hand, students who believe that their performance is lower than it actually is may avoid challenging tasks, limiting their potential for mastering skills further (Schunk & Pajares, 2004). That is, students who believe that they can do less than they actually can may be reluctant to try new tasks or put effort on improving themselves, thus diminishing their skills acquisition.

Calibration is also involved in the process of self-regulated learning. Current theoretical frameworks of self-regulated learning emphasise the role of accurate metacognitive judgments in enhancing learning and performance (Efklides, 2011; Zimmerman, 2000). Self-regulated learners are self-motivated to self-regulate their learning and are able to self-monitor their thoughts, feelings, and performance before, during or after their involvement with a task (Zimmerman, 2000). Moreover, interactions between person-related factors (e.g., self-concept) and metacognitive estimates (e.g., judgments of learning) take place during self-regulated learning processes (Efklides, 2011). The accuracy of self-monitoring is critical because it can help students to appropriately and effectively monitor and exert self-control over their learning (Hacker, Bol & Keener, 2008). In fact, it has been found that accurate monitoring had a positive effect on improving self-regulation, thus leading to higher performance (Thiede, Anderson & Therriault, 2003). That is, the development of self-regulated learning is inherently related to the accuracy of self-monitoring or calibration (Bol, Hacker, Walck & Nunnery, 2012), because only with accurate monitoring can students be engaged in effective cycles of self-regulated learning (Griffin, Wiley & Salas, 2013). Thus, calibration can be considered an integral component of the process of self-regulated learning and performance (Zimmerman, 2000).

Research in academic settings has shown that students are often inaccurate in judgments of their capability on a task or test (Chen, 2003; Hacker & Bol, 2004), with a tendency to overconfidence (Hacker, Bol & Bahbahani, 2008; Keren, 1991). Calibration accuracy was positively associated with performance gains in mathematics (Rutherford, 2017). In general, higher achievers are usually better at judging their own performance compared to students with lower ability (Hattie, 2013) while underconfidence is usually associated with higher performance and overconfidence with lower (Hacker et al., 2008). That is, students with lower performance are less skilled and at the same time tend to be less accurate without, however, understanding their inaccuracy or how far they are from the desired level of learning or performance (Dinsmore & Parkinson, 2013). Some research in academic settings has focused on examining factors associated with students' calibration (Serra & Metcalfe, 2009). This research has shown that students who received feedback compared to those who did not were more accurate in their self-evaluative judgments (Labuhn, Zimmerman & Hasselhorn, 2010), while providing guidelines and working in groups for practising calibration (Bol et al., 2012) and informing about the consequences of making overconfident judgments (Roelle, Schmidt, Buchau & Berthold, 2017) had positive effects on students' calibration accuracy. Furthermore, the use of cues that are not valid indicators of performance (e.g., the ease of processing when studying the information, how familiar students feel with a task) may result in poor levels of judgment accuracy (van Loon, de Bruin, van Gog & van Merrienboer, 2013).

Calibration research in sport and physical education is limited. Fogarty and Ross (2007) found that tennis players were well calibrated on the easier serve task, but overconfident on the more difficult task (i.e., smaller target area). In a similar study (Fogarty & Else, 2005) golfers were well calibrated on easier tasks (putting) and overconfident on more difficult tasks (chipping and pitching). McGraw, Mellers and Ritov (2004) found that most recreational basketball players were overconfident regarding their shooting performance. Preliminary calibration research in physical education has shown that students overestimated their basketball performance (Kolovelonis, Goudas & Dermitzaki, 2012) while those who practiced dribbling receiving social feedback and setting goals estimated their performance with similar levels of accuracy as control group students (Kolovelonis, Goudas, Dermitzaki & Kitsantas, 2013). Recently, research in physical education settings showed that calibration of sport performance was associated with person-related factors such as students' task orientation, self-efficacy, and perceived competence (Kolovelonis & Goudas, 2018).

This research has shown that miscalibration is common among students in both academic and physical education settings. However, further research examining factors associated with students' accuracy of performance estimations is needed, especially in the domains of sport and physical education. Dinsmore and Parkinson (2013) suggested that personal characteristics (e.g., prior knowledge or experience) may be used for establishing confidence judgments. Thus, sport experience may be considered as a potential factor that may be associated with the accuracy of students' estimations of their performance. Involving in sport is a popular form of physical activity worldwide (Tremblay et al., 2014). The health benefits of physical activity during childhood and adolescence, including psychological and social health benefits (Eime, Young, Harvey, Charity & Payne, 2013), are well documented (e.g., Janssen & Leblanc, 2010). Participation in sport and games can also have positive effects on students' cognitive development (Pesce et al., 2016). Moreover, it has been suggested that as students become more experienced in a field they may become much better at discriminating between what they know or do not know in this field (Bol, Hacker, O'Shea & Allen, 2005). Thus, students who have experienced participation in a sport, especially those with higher experience, may know better what they can or cannot do in this sport.

A few studies examining associations between sport experience and calibration in sport settings have shown mixed results. Fogarty and Ross (2007) found that expert tennis players were better calibrated compared to novice players, but only in the more difficult and not in the easier serve tasks used. Moreover, Toward (1997) found that expert female undergraduate basketball players (in terms of the total number of seasons having played competitive basketball) monitored and predicted outcomes better than their novices peers. In contrast, Fogarty and Else (2005) found no differences in calibration between golfers with respect to their level of expertise (as measured by official club handicap). Undoubtedly, further research is needed to shed light on the associations between sport experience and calibration of sport performance in physical education.

The present study

The present study examined the relationships between students' participation in sport out of school and the accuracy of their estimations regarding sport performance in physical education. The main research question of this study was whether there were differences between students who participated regularly in sport out of school, compared to those who did not, regarding the accuracy of their estimations of sport performance in physical education. Differences in students' experiences in participating in sport out of school may be considered as a factor for explaining differences in the accuracy of their estimations of sport performance in physical education. It has been suggested that greater experience with various tasks informs students regarding the skills needed to succeed (Schunk & Pajares 2009) and that the level of expertise should affect confidence in ability and calibration (Stone, 2000). Moreover, it has been theorised that students' predictions of their learning outcomes are associated with task demands as represented by the prior knowledge in this domain (Efklides, 2011). That is, students may use their prior knowledge and experience to form their estimations of performance when they are involved in the process of regulating their own learning and performance (Bandura, 1986). The knowledge and skills students gain from their participation in sports may help them to develop performance criteria and standards that they can use to make judgments of their skill competencies in similar performance situations (Horn & Hasbrook, 1987). For example, students who were involved in an intervention for enhancing their self-regulated learning of a basketball shooting skill, also improved their learning of the main technical aspects of this skill (Goudas, Dermitzaki & Kolovelonis, 2017).

Gender may be associated with performance calibration and thus it should be involved in calibration research (Fogarty & Else, 2005). It has been found that boys compared to girls usually report higher levels of perceived academic (Cole, Martin, Peeke, Seroczynski & Fier, 1999) and athletic (Trew, Scully, Kremer & Ogle, 1999) competence. However, less research has focused on comparing boys and girls in calibration accuracy and bias while the respective results are rather mixed (e.g., Chen, 2003; Gutierrez & Price, 2017). For example, when the accuracy of estimations regarding motor or sport performance was compared, no differences between boys and girls were found (Gasser & Tan, 2005; Kolovelonis et al., 2012). Chen (2003) also reported no gender differences in self-efficacy and calibration bias and accuracy in academic settings. Regarding the direction of calibration, research in physical education has shown no differences between genders in calibration bias (Kolovelonis et al., 2012). However, in these studies (e.g., Chen, 2003; Gasser & Tan, 2005; Kolovelonis et al., 2012) mean scores of calibration bias index in analysis of variances or in correlational analysis had been used, an approach that has been criticised (Griffin et al., 2013; Stankov, Lee, Luo & Hogan, 2012). In other research, when comparisons of frequencies of accurates, underestimators, and overestimators (formed based on calibration bias index) were considered, significant differences were found between boys and girls in calibration bias of language and math performance (Gonida & Leondari, 2011). Thus, the present study examined further the role of gender in calibration accuracy and bias regarding sport performance adopting appropriate measures and analyses for both calibration accuracy and bias indexes (see method section for details).

The aim of the present study was to examine the relationships between students' participation in sport out of school and their calibration of sport performance in physical education. Moreover, potential effects of gender were examined. It was hypothesised that students with longer experience in sport participation out of school would be better calibrated in a sport task in physical education, compared to their classmates without experience in sport participation out of school. No specific hypothesis for gender effects was stated due to the mixed previous results.

Method

Participants

Participants were 429 Greek students aged 11-12 years (*M* age = 11.32, *SD* = 0.77, 210 boys and 219 girls) who attended nine fifth grade (178 students, 90 boys and 88 girls) and 13 sixth grade (251 students, 120 boys and 131 girls) physical education classes from 10 elementary schools located in two middle sized cities in central and south Greece. Both cities had sport facilities and clubs providing students with rich opportunities for involving in a wide variety of team and individual sports outside of school.

Measures

Sport participation

A modified measure of students' participation in sport out of school was used (Booth, Okely, Chey & Bauman, 2001). In particular, students responded to the following question: "Do you participate in organised sports and physical activities out of school (e.g., basketball, volleyball, soccer, track and field, swimming, gymnastics, etc.)? The answers were given in "yes or no" format. Students who responded "yes" were asked to indicate the type of sport, the years of participation in this sport, the frequency of participation (how many times per week), and the mean duration of each session. Students who reported sport participation for more than one year, with frequency of more than two times per week and one hour mean duration each time were considered to be sport participants out of school. Moreover, total years of participation in sport were used in analysis as a separate indicator of sport participation. Students were also classified as participants in team or individual sport (Jacobs, Vernon & Eccles, 2005). Team sport included soccer, basketball, volleyball, and dance (both traditional and modern). Individual sport included track and field, martial arts, swimming, gymnastics, and other.

Calibration of basketball shooting performance

Two indices of calibration (i.e., bias and accuracy) were calculated based on students' actual and estimated performance in a basketball shooting accuracy test. For measuring basketball shooting performance a modified shooting accuracy test consisted of 8 shots from a distance of 2.5 metres in front of the basket without time limit was used (Pojskić, Šeparović & Užičanin, 2011). The number of successful shots was each student's score in the basketball shooting test. Satisfactory test-retest reliability (intraclass correlation coefficient = .92) has been reported for this test (Pojskič et al., 2011). Prior to the test students reported the estimation for their performance in the basketball shooting test responding to the question: "How many of your shots out of 8 will be successful from this position in the following test?" Students' answers were their scores in estimation of shooting performance. Next, the two indexes of calibration bias and accuracy were calculated. In particular, calibration bias score was computed as students' estimated performance score minus the actual performance in shooting test. Calibration bias is an index of the direction of the calibration. Positive bias indicates overestimation of performance and negative bias underestimation. The absolute values of the bias scores resulted in the accuracy index which reflects the magnitude of calibration error. Values closer to zero in the accuracy index indicate higher calibration accuracy (Schraw, 2009).

Procedures

Ethical approval for this study was granted by the University Ethics Review Committee. Permissions were also obtained from the school principals and physical education teachers. Students participated in the study voluntarily after a parental consent was obtained. One week prior to the field experiment students completed the sport participation questionnaire in their classrooms. They were assured that their answers would be confidential and that they would not be used for evaluation purposes. The experiment took place in schools' outdoor basketball courts during physical education lesson and students participated individually. Students were informed that they would perform a shooting test consisted of 8 shots from the distaste of 2.5 metres. Before performing the basketball shooting test students were asked, standing in the shooting position, to estimate their performance (i.e., number of successful shots) in this test. Then, they were provided with oral instructions regarding key elements of the shooting skill, observed the experimenter's shooting demonstration, performed trial shots for a minute to be familiarised with the testing procedures, and finally were tested in shooting.

Statistical analyses

The nature of the two calibration indexes (i.e., accuracy and bias) was considered in the statistical analyses used in this study (Griffin et al., 2013; Stankov et al., 2012). Calibration accuracy index was used as dependent variable while calibration bias index for classifying students in groups of accurates, underestimators, and overestimators. In particular, sport participation (yes - no) X gender analysis of variance with students' calibration accuracy as dependent variable was conducted. Moreover, type of sport participation (team - individual) X gender analysis of variance with students' calibration accuracy as dependent variable was conducted. Regression analysis was also conducted to examine if years of sport participation could predict students' accuracy.

Regarding calibration bias, following approaches used in previous studies in the academic domain (e.g., Gonida & Leondari, 2011), scores in this index were used for classifying students as accurates (score: zero), underestimators (negative scores), and overestimators (positive scores). Frequencies of these groups were calculated with respect to sport and non-sport participants, team or individual sport, and the specific sport. Potential differences between these categories were examined with chi square tests. Moreover, differences between accurates, underestimators, and overestimators in years of sport participation were examined through analysis of variance followed by post hoc tests. In the cases of significant differences, effect sizes of η^2, partial η^2 and Cohen's *d* were calculated (Cohen, 1988).

Table 1: Means, standard deviations, and correlations for all variables of the study

Variables	Sport participants n=248		Non-sport participants n=181		Correlations			
	M	*SD*	*M*	*SD*	1	2	3	4
1. Shooting performance	3.58	1.97	2.38	2.04	-			
2. Estimation of performance	4.26	1.98	3.86	1.71	.35**	-		
3. Calibration bias	0.68	2.28	1.48	2.17	-.63**	.51**	-	
4. Calibration accuracy	1.85	1.50	2.21	1.41	-.36**	.19**	.49**	-
5. Years of sport participation	3.61	1.93	-	-	.20**	.08	-.12*	-.11*

$^*p < .05$, $^{**}p < .01$

Results

Means, standard deviations, and correlations for all variables are presented in Table 1. Two hundred and forty eight students (57.8%) reported being sport participants out of school while 181 students reported no sport participation. Nonsignificant differences were found in frequencies of sport participants with respect to gender, $\chi^2(1) = 0.48$, $p = .495$, and grade, $\chi^2(1) = 0.42$, $p = .429$,. Correlation between years of sport participation and students' calibration accuracy was weak ($r = -.11$). Regression analysis showed that years of sport participation could predict students' accuracy (Beta = -.11, $p = .026$).

The sport participation (yes - no) X gender analysis of variance showed a nonsignificant interaction, $F(1, 425) = 0.45$, $p = .505$, in calibration accuracy. Only a significant main effect for sport participation was found, $F(1, 425) = 6.54$, $p = .011$, partial $\eta^2 = .015$, with sport participants to be more accurate compared to non-sport participants. The type of sport (team - individual) X gender analysis of variance showed a nonsignificant interaction, $F(1, 243) = 1.89$, $p = .172$, in calibration accuracy. The main effects for type of sport and gender were also nonsignificant.

Frequencies of accurates, underestimators, and overestimators for sport and non-sport participants, team or individual sport, and for each specific sport are presented in Table 2. Cross tabulation of frequencies of accurates, underestimators, and overestimators with respect to gender in total sample showed nonsignificant differences, $\chi^2(2) = 2.15$, $p = .342$. Similarly, cross tabulation of frequencies of bias groups and gender was nonsignificant within sport participants, $\chi^2(2) = 1.92$, $p = .381$, and non-sport participants, $\chi^2(2) = 0.63$, $p = .731$. Cross tabulation of frequencies of students' classification as accurates, underestimators, and overestimators in sport and non-sport participants conditions showed significant differences, $\chi^2(2) = 13.82$, $p < .001$. In both sport and non-sport participant groups the overestimators were much more than accurates and underestimators. However, the percentage of overestimators among non-sport participants was higher compared to sport participants (69.1% vs 51.6%) while the percentage of accurates (11% vs 20.6%) and underestimators (19.9% vs 27.8%) lower. Within sport participants, cross tabulation of frequencies of the type of sport (team - individual) and bias groups (accurates, underestimators, overestimators) showed nonsignificant differences, $\chi^2(2) = 1.27$, $p = .531$.

One-way ANOVA showed significant differences between accurates, underestimators, and overestimators in years of sport participation, $F(2, 426) = 4.03$, $p = .018$, $\eta^2 = .019$. Tukey post hoc showed that accurates reported much more years of participation in sport ($M = 2.63$, $SD = 2.50$, $p = .027$, $d = 0.33$) compared to overestimators ($M = 1.84$, $SD = 2.25$).

Table 2: Frequencies of accurates, underestimators, and overestimators within sport and non-sport participants

	Accurates	Underestimators	Overestimators
Sport participants	51	69	128
Team sport (total)	36	43	79
Soccer	10	14	29
Basket	14	11	27
Volley	5	8	8
Dance	7	10	15
Individual sport (total)	15	25	49
Track and Field	6	10	13
Martial arts	2	5	10
Swimming	4	7	15
Gymnastics	0	1	2
Other	3	3	9
Non-sport participants	20	36	125
Total sample	71	105	253

Discussion

The results of this study provided evidence regarding associations between students' participation in sport out of school and the calibration (i.e., bias and accuracy) of their performance in a basketball shooting task in physical education. More than half of the students were overconfident with the percentage of overestimators among non-sport participants to be higher compared to sport participants. Sport participants were more accurate in estimating basketball shooting performance compared to non-sport participants and accurates reported much more years of sport participation compared to overestimators. These results are discussed next with reference to the factors associated with students' calibration of sport performance. Theoretical and practical implications are also highlighted.

Associations between sport participation out of school and students' calibration accuracy of basketball shooting were found in this study. In fact, sport participants were more accurate in estimating their basketball shooting performance compared to non-sport participants. Regression analysis showed that years of sport participation could significantly predict students' calibration accuracy. However, it should be noted that the correlation between years of sport participation and students' calibration accuracy was weak. These findings, consistent with previous ones (e.g., Fogarty & Ross, 2007; Toward, 1997), provided evidence supporting the associations between students' experience from participating in sport out of school and their calibration of sport performance.

However, previous research examining associations between expertise and calibration in sport settings has also shown mixed results. For example, Fogarty and Else (2005) found no differences in calibration between less and more skilled golfers. Probably the criteria that have been used for classifying students or athletes as sport participants may have played a role in these mixed results. For example, in the present study the years of sport participation were considered. Similarly, Toward (1997) used as a criterion the seasons that competitive basketball members had played. On the other hand, Fogarty and Else (2005) determined the level of expertise based on official club handicap. Discussing their result, these authors provided as a possible explanation the idea that good calibration depends on experience as much as expertise (Fogarty & Else, 2005). Therefore, future research should further explore the associations between sport participation and performance calibration in sport and physical education settings considering the role of both students' experience from participating in sport (as measured by years of sport participation) and the level of expertise (as measured by the level of mastering skills) students develop during these years of sport participation.

Regarding the direction of the calibration bias, results showed that more than half of the students, regardless of sport participation, overestimated their performance. This tendency for overconfidence is consistent with previous research evidence in academic (e.g., Chen, 2003), sport (e.g., Fogarty & Else, 2005) and physical education settings (e.g., Kolovelonis et al., 2012). Moreover, sport participation seems to have affected the direction of calibration bias. In particular, although in both sport and non-sport participants groups the overestimators were much more than accurates and underestimators, the percentage of overestimators within non-sport participants was higher compared to sport participants while the percentage of accurates and underestimators lower. Moreover, accurates reported much more years of participation in sport compared to overestimators.

All these results supported the hypothesis of this study that sport participation out of school would be associated with students' calibration bias and accuracy. In fact, the present results imply that students who participate in sport out of school are better calibrated compared to their classmates who lack such experience. However, due to the cross sectional nature of this study, no causal effects can be inferred from the present findings. These results supported previous suggestions that level of expertise may affect confidence in ability and calibration (Stone, 2000). It seems that participation in sport helped students to gain greater experience with various sport tasks, increased their awareness regarding the skills needed to succeed in sport environments (Schunk & Pajares 2009) and facilitated their cognitive development (Pesce et al., 2016). These students had more time for practising motor and sport skills compared to their classmates who experienced only the participation in physical education in schools.

Prior knowledge regarding task demands has been connected with students' capacity to predict learning and performance (Efklides, 2011) because as students become more experienced in a field, they may also become better at discriminating between what they know or do not know (Bol et al., 2005). Moreover, prior knowledge and experience can be used in forming estimations of performance during the process of self-regulated learning and performance (Bandura, 1986). In fact, the accuracy of these estimations is important because they can inform effective goal setting, monitoring, and evaluation processes during the self-regulation of learning or performance (Zimmerman, 2000). For example, the accuracy of feedback generated by self-monitoring or monitoring of peers performance were positively associated with students' performance in physical education (Kolovelonis & Goudas, 2012).

It should be noted that the type of sport (team - individual) did not affect the results regarding calibration accuracy and bias, suggesting that the general sport experience may have positive effects on students' calibration. This is consistent with previous evidence showing a positive correlation between self-reported metacognition in physical education and the frequency of vigorous physical activity out of school (Theodosiou & Papaioannou, 2006). Whilst the present study focused on sport participation without considering the level of expertise and the type of sport task used, previous research has shown differences in self-regulatory skills among athletes with respect to the competitive level and type of sport (team - individual) (Jonker, Elferink-Gemser & Visscher, 2010). Therefore, this issue should be further examined in future research comparing directly students who are athletes in various levels of expertise in different sports in relation to their calibration in tasks from both team and individual sports.

Gender was not associated with calibration accuracy and bias. Indeed, consistent with previous findings (Gasser & Tan, 2005; Kolovelonis et al., 2012) no differences between gender and no interaction between gender and sport participation in calibration accuracy were found. Moreover, the present results showed similar patterns regarding the direction of miscalibration (i.e., accuracy, overestimation, and underestimation) between boys and girls for both sport and non-sport participants. These results expanded previous findings by adopting appropriate measures and analyses that considered the nature of both calibration accuracy and bias indexes (Gonida & Leondari, 2011; Griffin et al., 2013; Stankov et al., 2012). Thus, the positive effects of sport participation found in the present study seems to be equally beneficial for both boys' and girls' accuracy of metacognitive judgments.

From an applied perspective, sport performance is facilitated when students or athletes are involved in the process of self-regulating learning and performance (Goudas, Kolovelonis, & Dermitzaki, 2013; Zimmerman, 2000). Indeed, self-regulatory processes such as goal setting, self-recording, and social feedback have been associated with higher sport performance (e.g., Kolovelonis, Goudas & Dermitzaki, 2010, 2011). However, the accuracy of metacognitive judgments (e.g., calibration of performance) is associated with the effectiveness of these processes and is considered vital for the effectiveness of self-regulated learning (Efklides, 2014). Thus, considering that more than half of the students in this study were overconfident, the implementation of interventions for increasing students' accuracy of their estimations of performance is warranted. At the same time, the results of this study showed that the percentage of overconfident students was lower among sport participants. That is, participation in sport out of school may have positive effects on students' performance calibration. Enhancing students' sport experience through their participation in sport may help them to increase their awareness regarding the demands of sport tasks (Bol et al., 2005; Schunk & Pajares 2009), become better calibrated, and involve in successful cycles of self-regulated learning development (Zimmerman, 2000).

Moreover, increasing calibration may help students or athletes sustain their motivation to be involved in challenging tasks and learning from their mistakes (Schunk & Pajares, 2009). Thus, physical educators and coaches should involve students and athletes in reflecting on their judgments about their performance, providing appropriate feedback (Labuhn et al., 2010), guidelines, and opportunities for practising to increase their calibration accuracy (Bol et al., 2012). All these interventions should focus on promoting students' self-regulated learning (Kitsantas, Kolovelonis, Gorozidis & Kosmidou, 2018) and should be implemented in learning environments, enhancing students' task involvement. In fact, evidence in physical education has suggested that task orientated students were more accurate in estimating their basketball shooting performance (Kolovelonis & Goudas, 2018).

Limitations of the present study should be acknowledged. In the present study the measurement of sport participation included only organised sport activities, considering evidence showing that structured activities organised by adults, compared to informal activities, are associated with more positive youth adjustment (Larson, 2000). However, future research may want to capture a wider range of sport and physical activities that students are involved in their leisure time. Moreover, the present study focused exclusively on students' participation in sport out of school regardless of the level of their competence in this sport. Considering previous findings in academic settings regarding the effects of expertise on performance calibration (e.g., Kruger & Dunning, 1999), future research should explore the associations between sport participation, level of expertise, and performance calibration in various sport tasks. Furthermore, in educational and athletic environments students and athletes are involved in social comparisons, making predictions that are better or worse than their peers. Considering recent evidence showing that these predictions may be associated with calibration accuracy (Kolovelonis & Dimitriou, 2018), further research should explore this issue in relation to students' or athletes' experiences from sport participation.

To conclude, this study provided initial evidence regarding the associations between students' calibration accuracy and their participation in sport out of school. Indeed, sport participants were more accurate in estimating their basketball shooting performance compared to non-sport participants. However, this relation was weak and thus it should be further confirmed in future research.

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