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The relation of physical self-perceptions of competence, goal orientation, and optimism with students' performance calibration in physical education

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ABSTRACT

Two studies were conducted to examine associations between students' calibration accuracy with their self-perceptions of competence (i.e., global self-worth, sport competence, perceived competence, and self-efficacy), goal orientation, and dispositional optimism and pessimism. Participants were 138 (study 1) and 236 (study 2) fifth and sixth grade students. An index of absolute accuracy of performance prediction was calculated based on students' predicted and actual performance in a basketball shooting test. Person-related factors were measured with self-reported questionnaires. Results showed no associations between absolute accuracy and students' global self-worth, sport competence, optimism and pessimism (study 1) while students' absolute accuracy was associated with their task orientation, self-efficacy, and perceived competence (study 2). An overconfidence effect was also found in both studies. These results were discussed with reference to previous evidence and views of calibration research in academic, sport, and physical education domains. Interactions between person-related factors and calibration and their effects on the development of students' self-regulated learning of sport skills in physical education were also highlighted.

1. Introduction

Examining cognitive aspects of sport performance has a long tradition in sport psychology. For example, involvement in physical education has been positively associated with students' academic learning (Pesce, Faigenbaum, Goudas, & Tomporowski, 2017). Moreover, self-regulated learning can positively affect sport performance (e.g., Kolovelonis, Goudas, Hassandra, & Dermitzaki, 2012) while metacognitive activity has been related with sport involvement (e.g., Theodosiou & Papaioannou, 2006). Considering that personal characteristics (i.e., self-confidence) are associated with expert athletic performance (Durand-Bush & Salmela, 2002) examining sport performance with respect to metacognitive factors is of great interest.

Efklides (2011) has suggested reciprocal interactions of metacognition, motivation, and affect at two levels of functioning of self-regulated learning. The person level involves interactions between trait-like characteristics such as motivation (e.g., goal orientations) and self-concept while the Task X Person level involves events during task execution and feedback from monitoring used for controlling or regulating learning. Metacognitive feelings and estimates (e.g., judgments of learning) before, during, or after task involvement enhance students' awareness for learning and performance (Efklides, 2011). In this sense, performance judgments are considered metacognitive in nature resulting from conscious processing related to instructions, task characteristics, and metacognitive knowledge of using effective strategies (Efklides, 2009). Metacognitive judgments and performance are related. For example, feelings of difficulty were negatively associated with feelings of correctness in math (Dermitzaki & Efklides, 2003) while students' basketball shooting performance was positively related with their feelings of correctness and negatively with feelings of difficulty (Goudas, Dermitzaki, & Kolovelonis, 2017). However, information derived from metacognitive processes should be accurate for effective self-regulated learning.

1.1. Defining and understanding calibration

A way to view students' monitoring accuracy is calibration, which is the degree of correspondence between judged and actual performance (Keren, 1991). This correspondence can be viewed as absolute (i.e., absolute match of judged and actual performance) or relative accuracy (i.e., discrimination of performance across items) (Schraw, 2009). These types of accuracy were low correlated (Maki, Shields, Wheeler, & Zacchilli, 2005) suggesting that they reflect different aspects of monitoring both important for self-regulated learning (Dunlosky & Thiede, 2013). Absolute accuracy measured as a difference score between judged and actual performance is mostly used in educational contexts

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(Chen & Rossi, 2013). In fact, a common research paradigm involves students in judging their performance and comparing their judgments with an objective measure of performance. If judgments are close to actual performance students are well calibrated. Judgments can be provided before (prediction) or after performance (postdiction), at local (item-by-item) or at global (set of items) level. Research in academics has followed this paradigm measuring absolute accuracy as a difference score using predictions at global level (Bol, Hacker, Walck, & Nunnery, 2012; Muis, Winne, & Ranellucci, 2016; Pieger, Mengelkamp, & Bannert, 2016).

1.1.1. Calibration of performance in sport tasks

The present studies focused on calibration in terms of the absolute value of the difference between predicted and actual performance at global level. This paradigm has been used in educational contexts (see Section 1.1.) and fits properly to the peculiarities of sport tasks. Immediate feedback (i.e., knowledge of results) is often available after sport performance (e.g., a soccer player can see if his shot was successful). Thus, students' judgments usually take the form of predictions which are considered a useful measure of online monitoring (Griffin, Wiley, & Salas, 2013). An alternative paradigm used postdictions excluding external feedback by involving students in dart-throwing over the top of a screen to hit a target lying in the floor behind it (Gasser & Tan, 2005). However, this paradigm lacks ecological validity while the internal feedback produced during performance (Schmidt & Wrisberg, 2008) and environmental cues revealing students' successfulness may interfere with students' judgments of performance making the interpretation of the results difficult.

The use of a single global judgment (i.e., successful shots out of 10) rather than judgments specific to each trial is considered more appropriate for sport tasks because prediction for each trial or set of trials may be affected by the knowledge of the results of the previous trials or set of trials (Avugos, Bar-Eli, Ritov, & Sher, 2013). Possible confounds may be also caused if an underconfidence with practice effect (i.e., shift from overconfidence to underconfidence after the first set of trials; Finn & Metcalfe, 2008) or improvements in accuracy due to experiencing the test (Thiede, Redford, Wiley, & Griffin, 2012) would emerge if a set of trials would used. Moreover, for sport tasks such as basketball shooting, it is more important for students to be well-calibrated regarding the status of their overall performance (e.g., predicting the number of successful shots in a test) instead of predicting if each specific shot will be successful because this awareness at global level can involve them in effective goal setting and self-regulated their learning (Zimmerman, 2000).

1.2. Research evidence

Calibration research in the academic domain has shown that students are often inaccurate in judging their performance with a tendency to overconfidence (e.g., Chen, 2003). Moreover, high performers are usually more accurate with a tendency to underconfidence and low performers usually overestimate their performance (e.g., Hacker, Bol, & Bahbahani, 2008). Calibration accuracy was positively associated with executive functioning, and positive feelings, beliefs, and motivation related to mathematics (Fernández, Kroesbergen, Pérez, González-Castro, & Gonzalez-Pienda, 2015) and with performance gains in mathematics (Rutherford, 2017).

In sport settings only a few studies have examined athletes' calibration. For example, golfers were well calibrated on easier tasks but overconfident on more difficult tasks (Fogarty & Else, 2005), recreational basketball players were overconfident regarding their shooting performance (McGraw, Mellers, & Ritov, 2004), and undergraduate psychology students were poorly calibrated in dart-throwing (Gasser & Tan, 2005). In physical education, students overestimated their basketball dribbling (Kolovelonis, Goudas, & Dermitzaki, 2012b) and chest-pass (Kolovelonis & Goudas, 2012) performance while no differences in calibration were found between students who practiced dribbling receiving feedback and setting goals and control group students (Kolovelonis, Goudas, Dermitzaki, & Kitsantas, 2013).

1.3. Factors associated with performance calibration

Some research has focused on factors related to students' calibration including feedback (Labuhn, Zimmerman, & Hasselhorn, 2010), guidelines and group working for practicing calibration (Bol et al., 2012), attributions (Hacker et al., 2008), and fluency (Pieger et al., 2016). Dinsmore and Parkinson (2013) found that students based their judgments on personal factors (i.e., prior knowledge), task characteristics (i.e., item difficulty), or guessing. Although these studies have provided some evidence regarding factors related to students' calibration, the picture is incomplete and the miscalibration is still not well understood (Dinsmore & Parkinson, 2013).

Considering that metacognitive judgments might reflect stable trait-like properties (Pieschl, 2009) individual differences in calibration might be explained by person related characteristics. For example, self-perceptions are involved in self-regulated learning (Dermitzaki & Efklides, 2000) and may be used for forming predictions of performance (Job & Klassen, 2012). Efklides (2011) suggested that trait-like characteristics (e.g., self-concept) interacting with forms of metacognition (e.g., judgments of learning) may affect students' predictions of performance. It has been also suggested that judgments are generated by both experience-based and theory-based cues (Koriat, Nussinson, Bless, & Shaked, 2008) including students' beliefs regarding achievement and competence. Such person-related factors including aspects of self-perceptions of competence, goal orientations, and dispositional optimism are relevant to the purposes of the present studies and are reviewed next.

1.3.1. Self-perceptions of competence and performance calibration

Various aspects of self-perceptions of ability at global (e.g., self-esteem), subdomain (e.g., sport competence), context specific (e.g., perceived competence in physical education), or task specific (e.g., self-efficacy) level have been studied in sport and physical education as distinct constructs and were involved in these studies.

1.3.1.1. Global self-worth and sport competence. Self-esteem or self-worth (i.e., individuals' feelings about their own value) has been used to explain human behavior (Harter, 1999). It is considered hierarchical and multidimensional in nature with general and more stable perceptions at the apex and domain or task specific and more changeable perceptions at the lower levels of hierarchy (Fox, 1997). In fact, global self-worth is composed of people's self-perceptions in different domains (e.g., physical, academic) which in turn may be differentiated in subdomain self-perceptions (Fox, 1997). For the physical domain four self-perceptions (i.e., sport competence, physical condition, body attractiveness, and physical strength) have been identified (Fox & Corbin, 1989). Sport competence represents perceptions for ability, learning, and confidence regarding sport skills (Fox & Corbin, 1989) and is the most relevant for the aims of this study.

Self-perceptions of ability represent beliefs about what one can achieve or know and thus, students may be based on such perceptions to judge their performance (Stone, 2000). Students' confidence for their answers in cognitive tasks was influenced by self-concept and competence (Kröner & Biermann, 2007) while metacognitice experiences (i.e., estimate of solution correctness) were influenced not only by task characteristics but also by self-concept (Efklides & Tsiora, 2002). This evidence suggested that self-perceptions may be used as a basis of performance judgments especially when cues related to task are not available (Kröner & Biermann, 2007). However, to our knowledge, no study has examined associations between self-perceptions and calibration in physical education. Thus, expanding previous research, students' calibration accuracy was examined with respect to their global self-