Teaching motor and emotional competencies in university students

Enseñar competencias motrices y emocionales en estudiantes universitarios

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Abstract

The aim of this study was to examine the relationship between motor and emotional competencies in physical education students produced by different sporting games classified into four domains of motor action (psychomotor, co-operation, opposition, and co-operation/opposition).

The sample was composed of 357 students (155 female and 202 male) from three universities: Barcelona and Lleida in Spain, and Coimbra in Portugal. Through a quasi-experimental study, the students indicated the intensity felt for thirteen positive, negative, and ambiguous emotions on a questionnaire after playing games. The 37,128 observations were analysed using a model based on generalised estimating equations (GEE), Gaussian family, identity link, and exchangeable correlation.

The emotions varied notably between the sociomotor competencies (cooperation, opposition and cooperation/opposition) and the psychomotor ones. This research confirmed the key role that games can play when it comes to teaching motor and emotional competencies to university students.

Key words: Education, motor action domains, emotions, motor praxeology, competencies, games.

Resumen

El objetivo de este estudio fue examinar la relación entre las competencias motrices y emocionales en estudiantes de educación física producidas por diferentes juegos deportivos clasificados en cuatro dominios de acción motriz (psicomotor, cooperación, oposición y cooperación/oposición).

La muestra estuvo constituida por 357 estudiantes (155 chicas y 202 chicos) de tres universidades: Barcelona y Lleida en España, y Coimbra en Portugal. A través de un estudio cuasi-experimental los estudiantes indicaban en un cuestionario, una vez realizado cada juego, la intensidad que sintieron en trece emociones positivas,negativas y ambiguas. Las 37.128 observaciones registradas se analizaron usando un modelo basado en ecuaciones de estimación generalizadas (GEE), familia Gaussian, enlace identidad y correlación intercambiable.

Las emociones variaron notablemente entre las competencias sociomotrices (dominios cooperación, oposición y cooperación/oposición) y los juegos psicomotores. Esta investigación confirma el papel relevante de los juegos cuando se trata de enseñar competencias motrices y emocionales en estudiantes universitarios.

Palabras clave: Educación, dominios acción motriz, emociones, praxiología motriz, competencias, juegos.

Introduction

In 1999, various EU member states initiated the Bologna Process, the aim of which was to ensure more comparable, compatible and coherent systems of higher education in Europe. One of the key changes to result from this process has been to include the teaching of competencies in university syllabuses. In the field of physical education (PE) this means that university studies must ensure that graduates have a deep understanding of what it means to use the notion of motor competency in their professional practice (Graber & Locke, 2007; Martinek & Ruiz, 2005).

This paper describes a pedagogical study conducted with students in their first year of a PE degree course, the specific focus being on traditional sporting games corresponding to different families or domains of motor action (Parlebas, 2001). However, the students' task went beyond the mere performance of a list of games, since they were asked to identify the effects that each family of games had had on their motor behaviour. To this end, they had to demonstrate that they had been competent in recognising the emotions produced in each of the game situations.

Teaching motor competencies. The study was based on the theoretical tenets of motor praxeology, also known as the science of motor action (Parlebas, 2001). This discipline aims to analyse and develop knowledge about the features that characterise any motor task or game, as well as the praxic consequences that result from them.

In accordance with this discipline the notion of motor competency is associated with the person's ability to conduct any kind of motor experience that may be used by the physical education professional. This can be better understood by considering the concept of motor action domain.

Motor action domains. PE teachers have to constantly decide which motor tasks they are going to propose to their students. Any rigorous approach to this entails analysing the principal kinds of motor task, revealing the logic underlying their functioning, and describing the influence they exert over the motor behaviour of participants. It is, therefore, essential to have a classification of motor games or tasks. The science of motor action incorporates the notion of motor action domain, which refers to the "*field in which motor practices are considered to be homogeneous with respect to pertinent and precise criteria of motor action*" (Parlebas, 2001, p.161).

Parlebas (2001) upholds the concept of internal logic and employs systems theory to develop a systemic classification of games and sports (motor action domains). Each category of games produces different types of relationships and, therefore, different kinds of impacts on its players.

- Psychomotor games in which the participant takes part without any opponent countering his/her physical actions. These games call for motor competencies associated with effectiveness, the measurement of physical force, self-discovery and knowledge of the body, and they help participants identify their strengths and weaknesses. The long jump and throwing something at a target are examples of this category.
- Cooperation games, in which different players have to help each other to reach a common goal. These games require motor competencies associated with social dialogue, an agreement with or favourable response to others. Dancing with a partner or passing a ball without letting it fall to the ground are examples of this category.
- Opposition games, in which players have to challenge one or more of their opponents to attain their goal. In these games the players have to activate motor competencies associated with making decisions, anticipating moves, perceiving their rivals' actions and challenging other players. Chasing and catching an opponent and sports such as judo and tennis fall into this category.
- Cooperation/opposition games, in which various players form part of a team and have to beat their opponents, who are usually also organised in teams. These games activate motor competencies associated with collective strategy, decision making and group challenge. Examples of this category are sports such as football, basketball, handball and other team games.

Competitive and non-competitive games. Each of these four motor action domains can be performed with or without competition, in other words, with or without a final victory. The possibility of winning guides the actions of players and the emotions they experience. When a sporting game has a desired outcome that is determined by its internal logic, as in the case of handball, the affective experience of players is intensified as the game progresses, reaching a maximum when the referee blows his whistle and the winner is decided (Rosenblueth, Wiener & Bigelow, 1943). Conversely, if there is no competition, ultimate purpose or conclusion, the experience is an accumulation of motor actions, a diffuse collection of non-directed anecdotal behaviours as occurs in the well-known game of tag (Etxebeste, 2012; Lavega, Filella, Agulló, Soldevila, & March, 2011).

Teaching emotional competencies. Emotions should be understood as multi-component processes (Bisquerra, 2000; Frijda, 1986; Lazarus, 1991, 2000; Planalp, 1999). The emotional process consists of a network of changes in a variety of subsystems (or components) of the organism (Scherer, 2005; Sutton & Wheatley, 2003).

Motor behaviour refers to the unified intervention of the person across the cognitive, affective/emotional and social dimensions (Parlebas, 2001; Lagardera & Lavega, 2003, 2004). Hence, on the emotional level each person will activate different kinds of emotions depending on how the motor task is experienced.

When responses are favourable, then positive emotions (joy, humour, love and happiness) are activated. However, if the behaviour has proved ineffective, negative emotions (fear, anxiety, anger, sadness, rejection, shame) may be produced. Finally, there are other emotions, referred to as ambiguous or borderline emotions (surprise, hope and compassion) which, depending on how the game evolves, may end up being positive or negative (Bisquerra, 2000; Lazarus, 1999, 2000).

According to general emotional competence, the first stage comprises the individual's ability to recognise their own emotions, or emotional awareness (e.g., Wong & Ang, 2007; Bar-On & Parker, 2000; Bisquerra, 2000; Denham, Bassett & Wyatt, 2007; Eisenberg, Cumberland & Spinrad, 1998). Some research has suggested that general emotional competence is an important protective factor, which protects individuals from psychological problems and contributes to social and psychological well-being (Bar-On & Parker, 2000; Ciarrochi & Scott, 2006; Wong & Ang, 2007).

In this regard, the present study sought to investigate the emotions aroused by different kinds of motor experience gained as a first step to educate emotional and motor competencies. There was a main aim: to identify the positive, negative and ambiguous emotions among the participants in games associated with the different motor action domains, these games being both competitive and non-competitive (with and without victory).

Method

Participants

Participants were 357 first-year students (155 women, 202 men, M_{age} = 19.8 years, SD = 3.9) in degree courses for physical activity and sport. The courses were offered by three universities: the universities of Barcelona and Lleida, in the region of Catalonia, Spain (131 women, 135 men, M_{age} = 19.7 years, SD = 3.6) and the University of Coimbra, in the region of Coimbra, Portugal (24 women, 67 men, M_{age} = 20.1 years, SD = 4.6).

All the students gave their informed consent to participate in this research.

Measures

An exhaustive review of the specialist literature on sporting games and emotions revealed no instrument capable of relating positive, negative and ambiguous emotions, identified by authors such as Lazarus (1991, 2000) or Bisquerra (2000) with the four domains of motor action and the presence or absence of competition (Parlebas, 2001). Therefore, two years of work were dedicated to developing an instrument through the collaborative work of a specialised international research group for sporting games (GREJE) and a pedagogical research group (GROP) specialised in teaching emotional skills.

This instrument consisted of the following parts: 1. Participants' identification details; 2. Classification of each game situation; 3. Victory/no victory: identification of the game played in one of the two options, and 4. Emotions: (a) Positive emotions: joy, humour, love and happiness; (b) Negative emotions: Fear, anxiety, anger, sadness, rejection, and shame; and (c) Ambiguous emotions: Surprise, hope and compassion. The subject was asked to rate each emotion on a scale from 0 to 10 depending on the intensity felt after participating in each game.

The questionnaire was originally produced in Spanish and then translated into Portuguese using a back-translation procedure: two Spanish-language specialists from the University of Coimbra translated the original text into Portuguese, and this Portuguese version was then translated back into Spanish by two Portuguese specialists from the University of Lleida, the aim being to ensure that the two versions were equivalent enough to enable the results to be compared (see Appendix A for Psychometric properties of the questionnaire).

Procedure

The research procedure involved the following stages:

Educating students' emotions

Participants received four hours and thirty minutes of theoretical and practical knowledge in emotions according to Bisquerra's (2000), Lazarus' (2000) and Mayer and Salovey's model (1997). In these sessions, students learnt how to identify their own emotions by means of exercises involving game situations.

The main practical component of the study was conducted once it had been confirmed that the students had no further doubts in terms of identifying their own emotions.

Data recording. Each student was given a questionnaire and a pen. The teacher began by explaining the game that the students had to take part in (see Appendix B). After playing each game, the students had to immediately fill out the questionnaire, rating the intensity of the different emotions experienced on a scale of 0 to 10, where 0 meant they had not felt that emotion and 10 that they had felt it with maximum intensity. The questionnaire was answered individually.

The study was conducted primarily in the INEFC centres attached to the University of Lleida and University of Barcelona and a few weeks later in Coimbra. In order to ensure the same conditions were established in all the centres, the teaching sessions in Spain were filmed and subsequently explained to the staff who would be implementing the study protocol in Coimbra.

Statistical analysis

The data were analysed using a model based on generalised estimating equations (GEE), Gaussian family, identity link and exchangeable correlation. The statistical software used included SPSS v.15.0 and STATA v.11.

The model considered three within-subjects factors and three between-subjects factors. The within-subjects factors were: 1) Motor action domain (psychomotor, cooperation, opposition and cooperation/opposition); 2) Score/no score (with and without victory); and 3) Type of emotion (positive, negative and ambiguous). The three between-subjects factors were: 1) Gender (male/female); 2) Age; and 3) Region (Catalonia in Spain and Coimbra in Portugal).

Results

The 357 participants generated 37,128 observations under the different experimental conditions. For each student the minimum and maximum numbers of observations were, respectively, 13 and 104 (average 64) (Wald chi^2 (40) = 14959.74; Prob. > chi^2 = .000).

The Coimbra region and Catalonia

In general, there were no significant differences between the results obtained in the Portuguese region of Coimbra (University of Coimbra) and the Spanish region of Catalonia (universities of Barcelona and Lleida) (p = .397; 95% CI -0.21, 0.53). In accordance with the theoretical framework of reference this, therefore, supports a more detailed examination of the different variables studied (See tables 1 and 2).

Motor action domains and games with or without victory

The results revealed significant differences between the psychomotor domain and each of the socio-motor domains: cooperation (p = .000; 95% CI 1.46, 2.07), opposition (p = .000; 95% CI 0.57, 1.25), and cooperation/opposition (p = .005; 95% CI -0.78, -0.14). Regarding the magnitude of the ratings obtained, they can be presented in descending order as follows: (a) cooperation (M = 2.64, SD = 3.75), (b) opposition (M = 2.47, SD = 3.43), (c) cooperation/opposition (M = 2.33, SD = 3.12), and (d) psychomotor (M = 1.96, SD = 3.09). There were also significant differences according to the gender of participants (p = .001; 95% CI 0.12, 0.47), although in both cases the order of the domains (according to the ratings obtained) was the same:

Table 1. Results obtained when applying the GEE population-averaged model to the main variables.

Variables	Coef.	Std. Err.	p	95% CI	
				LL	UL
Catalonia region	-0.26	.10	.010	-0.46	0.06
Female gender	0.29	.09	.001	0.12	0.47
Age	-0.03	.01	.149	-0.39	0.031
Cooperation domain	0.39	.05	< .001	0.58	0.77
Opposition domain	0.56	.05	< .001	0.46	0.66
Cooperation/Opposition domain	-0.46	.05	< .001	0.29	0.50
Negative emotion	-4.57	.04	< .001	-4.65	-4.49
Ambiguous emotion	-3.07	.05	< .001	-3.16	-2.97
Game without victory	-0.16	.04	< .001	-0.23	-0.80

Note. CI = confidence interval; LL = lower limit; UL = upper limit; Reference category for the independent categorical variables in the GEE population-averaged model: Domain = Psychomotor, Score/no score = Game with victory, Emotion = Positive, Gender = Female, Region = Catalonia.

Table 2. Results obtained when applying the GEE population-averaged model to all the variables.

Variables	Coef.	Std. Err.	p	95% CI	
				LL	UL
Catalonia region	0.16	.19	.397	-0.21	0.53
Age	-0.01	.01	.148	-0.36	0.01
Female gender	0.32	.15	.036	0.02	0.62
Cooperation domain	1.76	.16	< .001	1.45	2.07
Opposition domain	0.91	.17	< .001	0.57	1.25
Cooperation/Opposition domain	-0.46	.16	.005	-0.78	-0.14
Negative emotion	-4.39	.13	< .001	-4.65	-4.13
Ambiguous emotion	-2.77	.16	< .001	-3.08	-2.47
Loser in game	-2.34	.18	< .001	-2.68	-1.99
Player in game without victory	-1.70	.14	< .001	-1.98	-1.42
Coop. domain — Loser in game	0.09	.18	.616	-0.26	0.44
Coop. domain — Player in game without victory	0.77	.15	< .001	0.49	1.06
Opposition domain — Loser in game	0.01	.20	.062	-0.38	0.40
Opp. domain — Player in game without victory	0.85	.16	< .001	0.53	1.17
Coop./Opp. domain — Loser in game	1.70	.20	< .001	1.31	2.08
Coop./Opp. domain — Player in game without victory	1.17	.15	< .001	0.88	1.47
Cooperation domain — Negative emotion	-2.41	.11	< .001	-2.62	-2.20
Cooperation domain — Ambiguous emotion	-1.84	.13	< .001	-2.09	-1.59
Opposition domain — Negative emotion	-1.36	.11	< .001	-1.56	-1.14
Opposition domain — Ambiguous emotion	-1.09	.13	< .001	-1.35	- .83
Coop./Opp. domain — Negative emotion	1.13	.12	.279	-0.36	0.10
Coop./Opp. domain — Ambiguous emotion	-0.19	.14	.171	-0.46	0.82
Negative emotion — Loser in game	2.34	.14	< .001	2.07	2.62
Neg. emotion — Player in game without victory	0.93	.11	< .001	0.71	1.15
Ambiguous emotion — Loser in game	0.97	.17	< .001	0.65	1.29
Ambiguous emotion — Player in game without victory	0.25	.13	.062	-0.01	0.51
Coimbra region — Cooperation domain	-1.16	.11	.165	-0.38	0.06
Coimbra region — Opposition domain	-0.37	.12	.003	-0.61	-0.13
Catalonia — Coop./Opp. domain	-0.53	.12	< .001	-0.77	-2.28
Catalonia — Loser in game	0.89	.18	.620	-0.26	0.44
Catalonia — Game without victory	-0.12	.14	.403	-0.40	0.16
Catalonia — Negative emotion	0.46	.09	.626	-0.14	0.23
Coimbra region — Ambiguous emotion	-0.18	.11	.111	-0.40	0.04
Male — Cooperation domain	-0.14	.10	.154	-0.33	0.52
Male — Opposition domain	-0.04	.10	.708	-0.24	0.16
Male — Coop./Opp. domain	-0.01	.11	.909	-0.22	0.20
Male — Loser in game	0.06	.14	.641	-0.20	0.33
Male — Player in game without victory	0.04	.11	.696	-0.17	0.26
Male — Negative emotion	-0.33	.08	< .001	-0.49	-0.17
Male — Ambiguous emotion	0.47	.10	< .001	0.28	0.65

Note. CI = confidence interval; LL = lower limit; UL = upper limit; Reference category for the independent categorical variables in the GEE population-averaged model: Domain = Psychomotor, Score/no score = Winner, Emotion = Positive, Gender = Female, Region = Catalonia.

– Women: (a) cooperation (M = 2.49, SD = 2.96), (b) opposition (M = 2.35, SD = 3.38), (c) cooperation/opposition (M = 2.19, SD = 3.10), and (d) psychomotor (M = 1.77, SD = 2.96).
– Men: (a) cooperation (M = 2.77, SD = 3.75), (b) opposition (M = 2.57, SD = 3.46), (c) cooperation/opposition (M = 2.44, SD = 3.13), and (d) psychomotor (M = 2.12, SD = 3.19).

The variable 'score/no score' also produced significant differences between games with and without victory (p = .000; 95% CI -0.60, -0.19). The GEE statistical model revealed significant differences between winners and losers (p = .000; 95% CI -2.68, -1.99), as well as between winners and participants in games without victory (p = .000; 95% CI -1.98, -1.42).

In terms of the magnitude of the ratings obtained according to success or failure in the games, they can be presented in descending order as follows: a) winners (M = 2.80, SD = 3.77), (b) participants in games without victory (M = 2.29, SD = 3.33), and (c) losers (M = 2.25, SD = 3.25). The results for men and women showed the same trend in this aspect of the analysis.

Analysis of the interaction between the variables 'motor action domain' and 'score/no score' revealed the following results (see Figure 1).

The domain which yielded the highest ratings in games without victory was cooperation (M = 2.66, SD = 3.86). This was also the domain which showed the highest ratings for winning players (M = 3.18, SD = 3.94), while, in terms of the magnitude of ratings, it was the second ranked domain for the losers (M = 2.20, SD = 3.07).

Opposition was the domain which produced the second highest ratings both for games without victory (M = 2.51, SD = 2.43) and winning players (M = 2.95, SD = 3.94). By contrast, this domain corresponded to the lowest ratings given by losers (M = 1.90, SD = 2.90).

The cooperation/opposition domain only produced the highest ratings in the case of games with victory and for losing players (M = 3.12, SD = 4.17). In games without victory, it was the third ranked domain in terms of the magnitude of ratings (M = 2.17, SD = 2.78), and it received the lowest ratings among winners (M = 2.29, SD = 3.15).

The psychomotor domain yielded the lowest ratings among participants in games without victory (M = 1.78, SD = 2.92). However, in games with victory it achieved higher ratings than one of the socio-motor domains for both winning players (M = 2.89, SD = 3.94) and losers (M = 1.90, SD = 2.90).

In terms of the magnitude of the ratings obtained according to success or failure in the games, they can be presented in descending order as follows:

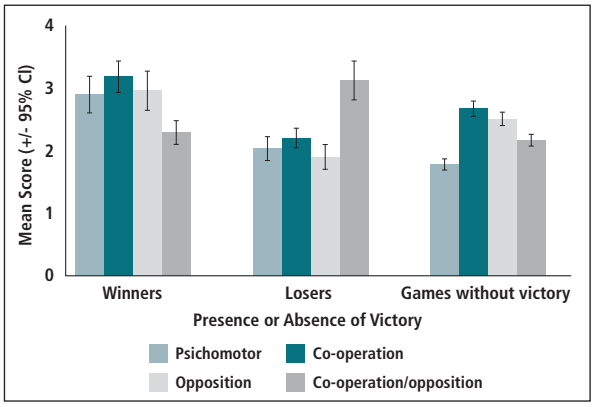

Figure 1. Mean differences (+/- 95 % CI) in the ratings for each type of player according to the motor action domain. Standard errors are represented in the figure by the error bars attached to each column.

– Winners: (a) cooperation (M = 3.18, SD = 3.94, (b) opposition (M = 2.95, SD = 3.94), (c) psychomotor (M = 2.89, SD = 3.94), and (d) cooperation/opposition (M = 2.29, SD = 3.15).
– Losers: (a) cooperation/opposition (M = 3.12, SD = 4.17), (b) cooperation (M = 2.20, SD = 3.07), (c) psychomotor (M = 2.03, SD = 2.92), and (d) opposition (M = 1.90, SD = 2.90).
– Games without victory: (a) cooperation (M = 2.66, SD = 3.86), (b) opposition (M = 2.51, SD = 2.43), (c) cooperation/opposition (M = 2.17, SD = 2.78), and (d) psychomotor (M = 1.78, SD = 2.92).

Emotions

Significant differences were observed between positive and negative emotions (p = .000; 95% CI -4.65, -4.13), as well as between positive emotions and ambiguous emotions (p = .000; 95% CI -3.08, -2.47).

In all four domains, the highest ratings produced by the games corresponded to positive emotions (M = 5.17, SD = 3.58), while the lowest ratings related to negative emotions (M = 0.61, SD = 1.73). Ambiguous emotions were given intermediate ratings (M = 2.11, SD = 3.15). This trend for the different types of emotions was the same for both men and women.

In terms of the magnitude of the ratings obtained for the various emotions, the different types of motor experience can be ordered as follows (see Figure 2).

– Intensity of positive emotions (descending order): (a) cooperation (M = 6.27, SD = 3.60), (b) opposition (M = 5.48, SD = 3.43), (c) cooperation/opposition (M = 4.63, SD = 3.30), and (d) psychomotor (M = 4.09, SD = 3.52).
– Intensity of negative emotions (ascending order): (a) cooperation (M = 0.42, SD = 1.52), (b) psychomotor (M = 0.59, SD = 1.75), (c) opposition (M =

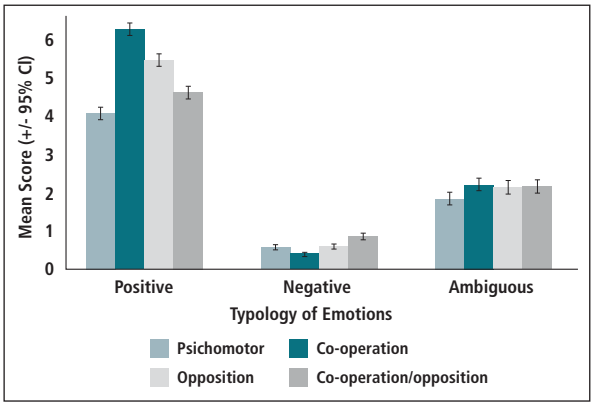

Figure 2. Mean differences (+/- 95% CI) in the ratings for each type of emotion according to the motor action domain. Standard errors are represented in the figure by the error bars attached to each column.

0.61, SD = 1.76), and (d) cooperation/opposition (M = 0.86, SD = 1.92).
- Intensity of ambiguous emotions (descending order): (a) cooperation (M = 2.23, SD = 3.37), (b) cooperation/opposition (M = 2.17, SD = 2.99), (c) opposition (M = 2.16, SD = 3.16), and (d) psychomotor (M = 1.86, SD = 2.99).

The GEE statistical model revealed no significant differences between the psychomotor and cooperation/opposition domains when comparing positive emotions with either negative emotions (p = .279; 95% CI -0.36, 0.10) or ambiguous emotions (p = .171; 95% CI -0.46, 0.82).

As regards gender, there were significant differences between men and women when comparing positive emotions with both negative emotions (p= 0.000; 95% CI -0.49, -0.17) and ambiguous emotions (p < .001; 95% CI 0.28, 0.65).

In general, there were significant differences between the emotions aroused by games with and without victory (p < .001; 95% CI -5.96, -1.19). In terms of the magnitude of the ratings obtained according to success or failure in the games, the participants can be ordered as follows:
- Intensity of positive emotions (descending order): (a) winners (M = 6.13, SD = 3.60), (b) participants in games without victory (M = 5.16, SD = 3.52), and (c) losers (M = 4.41, SD = 3.58).
- Intensity of negative emotions (ascending order): (a) games without victory (M = 0.50, SD = 1.54), (b) winners (M = 0.58, SD = 1.81), and (c) losers (M = 1.02, SD = 2.24).
- Intensity of ambiguous emotions (descending order): (a) winners (M = 2.78, SD = 3.62), (b) participants in games without victory (M = 2.02, SD = 3.04), and (c) losers (M = 1.86, SD = 3.62).

Regarding the interaction between the variables 'gender' and 'score/no score', there were no significant differences between the ratings of men and women for games with and without victory (p = 0.322; 95% CI -0.24, 0.078).

Discussion

This study examined the relationship between emotions and different types of games used to teach competencies to physical education undergraduates.

The emotions experienced in the four motor action domains

Participation in the various games triggered, above all, pleasant and positive experiences, thereby confirming the enormous value of traditional games as a pedagogical tool (Etxebeste, 2001; Lavega, Filella, Agulló, Soldevila, & March, 2011; Lavega & Lagardera, 2003; Orlick, 1981; Parlebas, 2001).

The findings also showed that motor action domains are a highly useful tool for teachers, since they enable any sporting game to be divided into coherent categories on the basis of motor behaviour. Furthermore, the criterion of motor interaction, on which this classification is based, has been shown to be much more robust and predictive than the criterion of the material used. Indeed, all the games were played with a tennis ball, and yet the results were very different from one motor situation to the next. This reaffirms the need to make use of criteria that have a more decisive influence, such as the type of motor communication established between participants (Parlebas, 2001, 2005; Parlebas & Dugas, 1998).

Emotions when playing individually

The reported emotions varied notably between the socio-motor experiences (cooperation, opposition and cooperation/opposition) and the psychomotor ones. These data are consistent with previous studies which have shown that these two broad families of games trigger very different processes, although not necessarily in an antagonistic relationship to one another (e.g. Lavega, Filella, Agulló, Soldevila, & March, 2011; Oboeuf, Collard, & Gerard, 2008; Parlebas & Dugas, 1998).

The absence of motor interaction with other players, teammates or opponents led the participants to experience motor challenges in which they themselves were the centre of attention, thereby impeding the flow or exchange of relational affectivity. This could

explain why psychomotor games triggered fewer positive experiences than did the other domains, in which the actions of others introduced a degree of unpredictability and the need to adapt constantly to what the other players were doing. Such a conclusion is supported by previous research showing that the type of emotion experienced is related to the type of physical or sporting activity (e.g., Hanin, 1999; Jones & Sheldon, & Swain, 1992; Krane & Williams, 1987; Mann et al., 1988) or to the kind of relationship that is established between the participants (Lazarus, 2000).

Taking part in games without victory did not produce any change in the above trend. However, when games involved competition or rivalry between individual players (opposition) or teams (cooperation/opposition), negative emotions were less intense in the psychomotor domain. Indeed, even losing players gave higher ratings here than in the opposition domain. Furthermore, the ratings of winners were higher than those in the cooperation/opposition domain. We conclude, therefore, that when it comes to provoking more intense emotions, the variables winning or losing and playing without an opponent have more of a decisive influence than does the absence of motor interaction.

Emotions when playing cooperatively

The domain which produced the most intense emotional experiences was cooperation. Making a pact with others, negotiating decisions, positive motor interaction and the challenge of achieving a common goal (Parlebas, 2005) were decisive ingredients in terms of ensuring emotional vitality, this being linked to the pleasant experiences of both Spanish and Portuguese students. This finding is consistent with the results obtained by other authors (Dyson & Grineski, 2001; Martinek & Ruiz, 2005; Orlick, 1981).

Achieving a common goal through cooperation triggered more intense positive and ambiguous emotions, and also, according to the ratings, reduced the experience of negative emotions to the minimum. This explains why it was the cooperation domain which showed the greatest difference between the intensity of positive and negative emotions (5.85 points). This domain also produced the highest ratings regardless of whether or not the game involved victory. However, the students' ratings indicated that the emotions felt were more intense in games with victory than in those where there was no possibility of winning or losing. A more detailed examination of the results, however, shows that this relationship only holds for winners, since losing players reported less intense emotions here than when cooperating without a competitive rival. These findings are in line with those reported by Mateu et al. (2010), who studied emotions in cooperative situations related to body language. At all events, and as highlighted by many other studies (for a review see Johnson, Johnson & Stanne, 2000), the affective impact produced by experiences in this domain support the socialising potential of cooperation, as opposed to practices based on individual performance.

Emotions when playing against an opponent

The interpersonal relationships present in the opposition and cooperation/opposition domains, and associated with the continuous need for decision making, were infused with affectivity (Bisquerra, 2000; Collard, 2008; Parlebas, 2001). In the socio-motor activities (involving motor interaction with other people) the presence of an opponent produced lower ratings than in cooperative games. The results also showed that rivalry between individual players (opposition) aroused more intense experiences than did games involving both teammates and adversaries. This suggests that when the player's attention is focused exclusively on the rival, the intensity of the experience is greater than in those situations where the same player is seeking to achieve shared objectives with teammates in order to beat the opponent.

This same trend was observed in games without victory. Indeed, these situations appear to trigger a system of motor communication that is characterised by a constant relational interchange with other people, and the emotional responses in question are produced by the cyclical sequences of role changes (from chasing to being chased, from catching to being caught, from helping to hindering, etc.). Although the ratings were slightly lower than those for games with victory, these conditions meant that these games nonetheless served to foster socio-affective relationships (Collard, Oboeuf & Ahmaidi, 2007; Oboeuf Luc Collard, & Gerard, 2008; Parlebas, 2005).

It should be noted, however, that in games with victory, i.e. those involving a contest between individuals or teams, the winners and losers responded differently. Among winners, the domain clearly associated with the lowest ratings was cooperation/opposition, while opposition produced the second highest ratings. However, this trend was reversed among losers: for them the contest between teams (cooperation/opposition) produced the highest ratings, whereas opposition was associated with the lowest ratings. This is an interesting finding that merits further investigation, since it appears that losing made a greater emotional impact in team games, whereas winning made the biggest impact in the opposition domain. This finding is related to the

results obtained by various authors who have studied emotions in competitive sports, in which the interventions are subjected to the stress of winning or losing (e.g., Hanin, 1999; Jones & Sheldon, & Swain, 1992; Kleine, 1990; Krane & Williams, 1987; Lazarus, 2000).

Emotions, geography and motor domains

Despite the geographical distance between the Portuguese city of Coimbra and the two Spanish cities, Lleida and Barcelona, on an emotional level, the experience of the sporting games produced similar reactions in Portuguese and Spanish participants in each of the motor action domains and for the different types of emotions. Indeed, the results show that it was the internal logic, i.e. the rules or properties of the traditional games used, which produced similar relationships, learning experiences and emotional responses in participants from two European countries that have shared a considerable part of their cultural history. These data are consistent with previous findings from studies of traditional games in various European regions that are culturally close to one another: Catalonia (Lavega, 2006), Murcia (Alonso et al., 2006) and the Basque Country (Etxebeste, 2001) in Spain; Baixo Guadiana and Lousa in Portugal (Araujo, Jaqueira, & Rodriguez, 2006); and the Midi-Pyrénées in southern France (Lavega, 2006).

Two cornerstones of the present study were, from the perspective of motor praxeology, the classification of sporting games into broad families of motor experiences or motor action domains, and the distinction proposed by Parlebas (2001) between games with and without victory (score/no score). The different motor action domains and games with or without victory acted here as independent variables which were responsible for activating different relationships and processes, this being revealed through the changing intensity of the emotions reported. In this regard, the classification of emotions proposed by Bisquerra (2000) on the basis of Lazarus' model (Lazarus, 1991, 2000) enabled us to demonstrate that the three kinds of emotions (positive, negative and ambiguous) appeared to varying degrees depending on the kind of motor experiences.

Conclusions

The pedagogical experiment on which this research is based confirms the key role that games can play when it comes to teaching motor and emotional experiences to university students. Indeed, and as has already been noted by several authors (e.g. Dyson & Grineski, 2001; Johnson et al., 2000; Orlick, 1981), the combination of games and emotions creates the ideal conditions in which to offer advanced training to physical education (PE) students. The three kinds of emotions (positive, negative and ambiguous) appeared to varying degrees depending on the kind of motor experiences.

The distribution of physical and sporting activities into motor action domains provides teachers with a series of anchors around which they can organise the pedagogical projects in PE. However, this distribution into motor action domains is not simply a matter of convention or an academic standard but rather a rational way of organising motor tasks in accordance with the effects that one is seeking to obtain (Parlebas, 2001, 2005).

By applying the theoretical tenets of motor praxeology (Parlebas, 2001) and the emotional model of Bisquerra (2000), investigators can open up a productive line of research into the ways in which emotional literacy can be achieved through games. In this context, the present study illustrates the importance of socio-affective relationships in generating positive experiences. Furthermore, emotions have been shown to play a key role in socio-motor experiences, especially as regards cooperative activities. These findings confirm that the socialisation of motor action goes hand-in-hand with the socialisation of emotions.

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Appendix A Psychometric properties of the questionnaire

The questionnaire was validated (Lavega, March & Filella, 2013) by studying the following properties: (a) Acceptability: For each question, ceiling and floor effects, skewness and kurtosis were calculated; (b) Reliability: Internal consistency as measured by Cronbach's alpha was good for the whole scale (n = 357; α = 0.92), and similar results were obtained for each type of emotion: Positive (α = 0.92), negative (α = 0.88) and ambiguous (α = 0.93); (c) Construct validity: Confirmatory factor analysis was used to test the structure of the questionnaire and reproduced this structure adequately. The final model, which consisted of twelve factors, showed good fit indices (χ^2 = 7125.79, df = 4174). The model does not include an overall higher-order factor.

Appendix B Selection and application of sporting games

Two games representative of each of the motor action domains were selected: One competitive game involving winners and losers and another non-competitive game. Most of the situations were inspired by traditional games and they all used a tennis ball, thereby controlling for the variable 'material used'.

Participants were distributed into groups of forty students. The same teacher worked with all the groups and gave the same instructions to all the participants. All the games sessions were conducted under the same conditions. Each group played four games in each of the two 90-min sessions. The games used were:

1. Psychomotor with Victory: Throw, contact and win (challenge by precision throwing). Players stood in pairs 2 m apart and an object was placed on the floor between them. They had to throw the ball and try to hit the object. They got one point for every time they hit the object. The winner was the one with the most points.

2. Psychomotor without Victory: Get to know your tummy (body exploration). Each player took a ball and squeezed it, exploring different areas of his/her tummy according to the teacher's instructions.

3. Cooperation with Victory: Pass and win. Each team formed a circle. Players tried to pass several balls at the same time to make the most passes for the team.

4. Cooperation without Victory: Chains behind. In pairs, one player sat behind his/her partner, who stretched his/her body and legs until his/her hands were at a height of one handspan from the floor. While the latter lowered and raised his/her body the other participant gave him/her a gentle back massage, pressing and running a tennis ball along either side of the spinal column. The roles were then switched.

5. Opposition with Victory: Hand win (singles). Two players stood on either side of a net and tried to make the ball bounce twice in the opponent's court. They got one point each time the opponent was unable to return the ball. The winner was the player with the most points.

6. Opposition without Victory: Copy-Chase. One participant moved around the room in whatever way he/she wished while carrying a tennis ball. The other players, who also had a ball, had to copy the first player's movements. When they caught the first player, they switched roles.

7. Cooperation/Opposition with Victory: Hand win (teams). The rules were the same as in hand win (singles), but in this case it was played in pairs.

8. Cooperation/Opposition without Victory: Sitting ball. Paradoxical game in which players could either bounce the ball to each other (cooperation action) or throw it (opposition action). The player who received the ball by a bounce stayed alive, but if they received it in the air they were caught and had to sit down. They could be saved if they could intercept the ball and pass it to another player who was then caught. All the players could decide to cooperate or oppose as they wished, with no logical criteria.

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