Psychologica Belgica
2012, 52/4, 369-386
DOI: http://dx.doi.org/10.5334/pb-52-4-369

QUASI-EXPERIMENTAL STUDY OF THE EFFECT OF AN ADVENTURE EDUCATION PROGRAMME ON CLASSROOM SATISFACTION, PHYSICAL SELF-CONCEPT AND SOCIAL GOALS IN PHYSICAL EDUCATION

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The aim of this study was to analyse the intrinsic classroom satisfaction, physical self-concept and social goals in students in the 4th year of secondary school after receiving a 9 weeks' Adventure Education programme. The sample consisted of 125 students, divided into an experimental group (n = 76) and a control group (n = 49). The measuring instrument was a questionnaire consisting of Intrinsic Satisfaction Classroom Scale (ISC), Physical Self-Perception Questionnaire (PSQ) and Scale of Social Goals-Physical Education (SGS-PE). Measures were taken before (pretest) and after the intervention programme (post-test) for both groups. We undertook a multivariate analysis (MANOVA) 2×2 (Group × Time) in order to analyse the effects of the intervention programme. Significant differences were found in all nine dimensions analysed, particularly satisfaction/enjoyment, self-esteem and physical condition with highest rates of gain and the significant relationship between body image and physical condition.

Introduction

The natural environment has been used throughout history as a setting that enables outdoor experiences to be used for educational purposes, among other reasons, because it is a stimulating medium for students' development, especially at the psychological level (Cornell, Hadley, Sterling, Chan, & Boechler, 2001). Learners' educational needs and interests are changing as society changes, and many expressed needs cannot be covered adequately by traditional physical education based on content developed in the arena or sports stadium (Granero-Gallegos & Baena-Extremera, 2011). Every day more teachers include outdoor activities and adventure sports in their programming in order to achieve a more comprehensive and up-to-date education for their

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students that is not only developed from the standard classroom (Baena-Extremera, 2011).

Several decades ago, teachers began working with sports and adventure activities in physical education at school, teaching orientation, climbing and hiking, which evolved to form what is now known as Adventure Education (AE). These programmes are totally new in Spain, and parts of Europe but have a long tradition, especially in the USA (Zmudy, Curtner-Smith, & Steffen, 2009a). For this reason, the present research is an interesting contribution for the scientific community, since it enables the results obtained in various countries to be compared.

One of the most important aspects of AE programmes is that the focus of the activities emphasises challenge and adventure. Its main aim is to make students face different problems, feeling that the resolution of that activity involves some risk (subjective), so that they have to bring into play all their mental and physical abilities (Granero-Gallegos & Baena-Extremera, 2011). The proper design and development of the sessions should gradually increase the difficulty of the tasks and the effort that students must make. Carrying out these activities and overcoming the challenge posed will bring about personal growth in the students, both psychologically and physically (Iso-Ahola & Graefe, 1988; Witman, 1995). In this regard, several studies (Gass, 1995; Luckner & Nadler, 1997) indicate that performing various learning units followed by challenging and adventurous activities can lead to positive psychological and physical improvements, which are associated with the effects of AE.

The main goals of AE programmes focus on promoting the students' emotional, physical and social development, through increased self-esteem, self-awareness, self confidence, improved communication skills, cooperation with others and especially problem-solving skills (Bisson, 1999; Prouty, 1999). Gehris, Kress, and Swalm (2010) were able to see, after applying an AE programme, how the students had enjoyed themselves so much that many of them decided to practice many adventure activities like rock climbing outside school hours. In this line, Ebbeck and Gibbons (1998) found that students who participated in "team building" activities were happier with themselves, less bored and did better in tests of sporting skills. In addition, these authors concluded that the students improved their body image, since they saw themselves as better and more popular.

In relation to students' perception of their competence, research has shown that participation in adventure activities produces a positive improvement in the perception of that competence (Sibthorp, 2003). A study by Vogel (1989) concluded that by participating in outdoor adventure activities, people gain a better understanding of themselves and even came to realise that their potential was greater than they thought.

AE programmes have also been studied in relation to physical condition. Gehris et al. (2010) in their survey identified that the majority of students expressed the intention of improving their physical condition after an adventure programme, with greater strength and overall physical condition, but they felt that endurance might decrease. Fersch and Smith (1978) also found that AE programme participants scored significantly higher on tests such as abdominals, 300-yard races, press-ups and so on, thus demonstrating the progress in their overall physical condition.

Self-esteem has been one of the most studied variables in adventure programmes. Several research papers have been published on the outcomes of these programmes in developing self-esteem, noting that such programmes are effective in this field (Ewert, 1983; Hazelworth & Wilson, 1990).

In relation to responsibility, Kern and Schmidt (2001) show that this type of learning is able to promote individual responsibility and independence and to foster improved self-confidence.

Finally, we would mention Sakofs and Schuurman (1991), who investigated young people, aged 13 to 18. These authors sought therapeutic outcomes in the participants through the application of an AE programme designed to be implemented in the desert. The experimental group scored significantly more positively than the control group in 10 of the 33 psychometric and behavioural evaluations conducted, highlighting the improvement in the locus of control, asocial orientation and responsibility. Other authors such as Glass and Benshoff (2002) assert that AE programmes improve social relationships among students and group cohesion among adolescents, even improving their behaviour (Garst, Scheider, & Baker, 2001). Similarly, the study of Ebbeck and Gibbons (1998) asserts that students who received these types of programmes had more positive feelings about their schoolwork, improving their social relationships and conduct.

As suggested by Zmudy, Curtner-Smith, and Steffen (2009b), there is currently some need for increasing research on the effects of AE on students. There has been little such research and it is necessary to compare it to confirm the effects of various existing programmes with samples from different countries, ages, ethnicities, etc. Therefore, it is proposed to analyse three factors relevant to social-cognitive development of students, such as intrinsic satisfaction, physical self-concept and social goals in secondary school students after receiving an AE programme. These variables have been chosen because similar work has already been undertaken in other countries and this will enable us to compare the results with other samples. Moreover the influence on satisfaction has already been shown (Baena-Extremera, Granero-Gallegos, Bracho-Amador, & Perez-Quero, 2012). Equally, the concept of physical self-conception and socials relationships (Baena-Extremera & Granero-Gallegos, 2012) resulting from physical education has been demonstrated, but it

is not known whether this can also be produced by AE programmes. Thus, the hypothesis is that the intervention will have a positive effect on satisfaction, physical self-concept and social goals of responsibility and relationship.

Method

Participants

This research involved a total of 125 students (59 boys and 66 girls) in the 4th year of Compulsory Secondary Education (ESO), aged between 15 and 16 years (M = 15.67, SD = .71). They attended a public education centre in the province of Almería (Spain). The classes were mixed and the contents covered in the experimental group corresponded to an AE programme. The control group received a programme of games and sports during the same period and with the same number of sessions that was carried out within the sports facilities of the centre.

Instruments

Some studies on AE have been criticised for using only quantitative or qualitative methods (Cason & Gillis, 1994; Pommier & Witt, 1995), or for using unreliable assessment tools. Given existing criticisms, it was decided to use instruments with a proven validity and reliability factor structure to enable us to collect measures in accordance with the approach of this study.

Intrinsic Satisfaction Classroom Scale (ISC)

We used the Spanish version (Balaguer, Atienza, Castillo, Moreno, & Duda, 1997) of the original Intrinsic Satisfaction Classroom Scale (ISC) (Duda & Nicholls, 1992; Nicholls, Patashnick, & Nolen, 1985). This instrument measures the degree of satisfaction and intrinsic interest in school. The questionnaire consists of 8 items divided into two scales measuring satisfaction/enjoyment (5 items) and boredom (3 items) in the practice of academic activities. Participants respond on a scale of polyatomic items ranging from "strongly disagree" (1) to "strongly agree" (5). Research has demonstrated the validity of the exploratory and confirmatory factor structure in both subscales and their reliability in different measures in physical education classes. Cronbach alpha coefficients (α) found ranges between .71 and .82 (Balaguer et al., 1997; Duda & Nicholls, 1992, Nicholls et al., 1985). In the present study the reliability results demonstrate acceptable internal reliability in the pre and post-test, *satisfaction/enjoyment*, α = .73 and α = .71; *boredom*, α = .76 and α = .75.

Physical Self-Concept Questionnaire (PSQ)

This scale is an adaptation to Spanish (Moreno & Cervelló, 2005), of the original Physical Self-Perception Profile (PSPP) (Fox, 1990; Fox & Corbin, 1989) to measure physical self-concept. The original questionnaire consists of 30 items and five factors: perceived competence, body image, physical condition, physical strength, and self-esteem. In the Spanish-language adaptation there are also five subscales, but with a different factor structure. This Spanish version is labelled Physical Self-Concept Questionnaire (PSQ) and α levels were found between .69 and .89 for the five subscales. The answers to the questions are listed on a scale of polyatomic items, from "strongly disagree" (0) and "strongly agree" (10). Other recent Spanish studies with adolescents have demonstrated the validity of the exploratory and confirmatory factor structure of the five subscales and the reliability of the subscales was satisfactory with alpha values between $\alpha = .68$ and $\alpha = .87$, being similar to those of Moreno, Moreno, and Cervelló (2009). In this study, the following items were removed to improve the reliability of the subscales: "I am always satisfied with how I am physically," "I always maintain a high level of endurance and physical condition" and "I think that often I am admired because my physique or my type of figure is considered attractive". The reliability results obtained demonstrate an acceptable internal consistency in the pre and post-test: perceived competence, $\alpha = .76$ and $\alpha = .77$; strength, $\alpha = .68$ and $\alpha = .69$; physical condition, $\alpha = .87$ and $\alpha = .86$; self-esteem, $\alpha = .77$ and $\alpha = .78$; body image, $\alpha = .81$ and $\alpha = .83$.

Scale of Social Goals in Physical Education (SGE-PE)

The Spanish version was used (Moreno, González-Cutre, & Sicilia, 2007) of the Social Goal Scale-Physical Education (SGE-PE) of Guan, McBride, and Xiang (2006). The scale measures the responsibility goal (5 items) and the relationship goal (6 items). The response format used a scale of polyatomic items that varied from 1 (strongly disagree) to 7 (strongly agree). Recent studies have demonstrated the validity of the exploratory and confirmatory factor structure in both subscales and their reliability measures with adolescents in physical education classes (González-Cutre, Sicilia, & Moreno, 2011; Moreno et al., 2007), with values $\alpha = .68$ to $\alpha = .75$ (responsibility subscale) and $\alpha = .72$ to $\alpha = .83$ (relationship subscale). In this work the reliability results show a satisfactory internal consistency in the pre and post-test: responsibility goals $\alpha = .84$ and $\alpha = .86$; goals; relationship goals, $\alpha = .77$ and $\alpha = .78$.

Design

A quasi-experimental, descriptive and sectional design was used. We worked with a non-equivalent control group, because the school had already established the composition of class groups according to the students' choice of optional subjects each academic year. Five groups of 4 º ESO were involved. A lottery was held in order to choose three experimental groups at random, which were designated by the school as A, C and E, consisting of 24, 27 and 25 students, respectively, for a total of 76 people. The groups designated as B and D were the two control groups and were composed of 26 and 23 students, respectively, a total of 49 people. Each group received sessions of Physical Education and AE from the same teacher during the period of investigation. The experimental groups received three teaching units of AE, while, during the same period, the control group continued with the usual classes of the annual course, with two teaching units of team sports (volleyball and soccer) and another of individual sports (athletics).

We studied the centre's annual programming and then reorganised the curriculum for experimental groups A, C and E in order to avoid their losing other learning units through the introduction of the AE programme. After studying these possibilities, we obtained formal written permission from the competent bodies, namely the School Council, parents and guardians.

During the lessons several measures were made of factors of satisfaction/enjoyment, boredom, body image, perceived competence, physical condition, strength, self-esteem, responsibility and relationships, using the questionnaires (on paper) described in the section of instruments above. We applied a pretest to all groups before starting the intervention and a post-test immediately after the experimental groups' AE programme and the teaching units of the control group's block of games and sports finished. The questionnaires of those who did not attend at least fourteen sessions during the period were discarded. This resulted in the loss of 8 post-test subjects in the experimental groups and 5 in the control group.

The independent variables established were the content in the different sessions of Physical Education. The dependent variables were intrinsic satisfaction, physical self-concept and social goals.

To ensure the internal, external and ecological validity of this design, we carefully reviewed the experimental mortality and the selection of the control and experimental groups. We sought to avoid any possible effect of the pretest and the AE expert, as seen in the next section and ensured that the groups studied had had experiences of outdoor activities in previous years to avoid the effect of the novelty of the programme.

Programme development

Curriculum planning in AE programmes means that students undertake activities based on the characteristics of the stages of adventure proposed, according to the authors of reference (Bisson, 1999; Rohnke, 1989, among others). To develop the programme we followed the characteristics described by Hattie, Marsh, Neill, and Richards (1997), using Rohnke's (1989) proposals for the design of the sessions.

These took place between April and June 2009. The school chosen had the minimum infrastructure necessary to develop content such as climbing, rock-climbing, abseiling, adaptations of "bungee jumping", etc. A Physical Education teacher, advised by an expert teacher in teaching methodology and AE who designed the intervention programme, conducted the programme. The AE expert was commissioned to conduct the design of the programme after making several initial assessments of the participating students (types of teaching units undertaken previously, experience and knowledge of outdoor activities) to be able to know the students well and to start from their initial level. The activities were also designed in such a way that all students would be able to succeed in order to increase the positive effects of the programme (Walsh & Golins, 1976). With this information, the AE expert designed the programme and advised the PE teacher to carry it out with complete confidence. We considered it desirable that the expert was present during the AE classes, should it be necessary make some kind of correction or improvement in the educational intervention. So that students would not reject the expert, he attended the students' physical education classes once a week during the two months prior to the start of the programme in order to integrate within the group and for the students to get to know him. Table 1 shows the final proposal. The first teaching unit consisted primarily of challenge and adventure content (sessions 1 to 6), the second of climbing techniques (sessions 7 to 12) and third adventure games and sports (sessions 13 to 18).

Data analysis

Descriptive statistics, means (*M*) and standard deviation (*SD*) were calculated for each of the items of the tests. Relevant tests for normality and homoscedasticity were carried out to ensure homogeneity of variance. We calculated the asymmetry and kurtosis indices that were generally close to zero and < 2.0, as recommended by Bollen and Long (1994), indicating similarity to the normal curve and enabling univariate factorial techniques to be used. The Kolmogorov-Smirnov analysis confirmed the normal distribution of the sample (Z, between .71 and .97, $p = .12$). We calculated the reliability of each dimension given by the index of Cronbach alpha internal consistency. A preliminary analysis used the Student *t-test* for independent samples, comparing

Table 1

Distribution of the sessions during the intervention period in the experimental group (AE programme) and the control group

	Distribution of Sessions	
	Control Group	**Experimental Group**
	VOLLEYBALL	
1	Rules and technical elements	Challenge and confidence building activities
2	Technical elements	Adventure and confidence activities
3	Technical elements	Problem-solving games
4	2×2	Knots
5	3×3	Theory and practice of ropes
6	Global work	Hanging rope bridges
	FOOTBALL	
7	Rules and technical elements	Climbing and rock-climbing activities
8	Technical elements	Initiation to rock-climbing sensations
9	Technical elements	Initiation to rock-climbing, games and activities
10	Tactics	Abseiling and self-secured abseiling -initiation
11	Attack and defence	Rock-climbing
12	Global work	Rock-climbing
	ATHLETICS	
13	Racing techniques	Zip lines
14	Racing techniques	Adventure games with safety nets
15	Hurdling	Activities and games of vertical techniques
16	Hurdling	Vertical techniques
17	High jump	Initiation to free-fall sensations
18	Competition	Ropes and bungee-jumping

the experimental group with the control group with the aim of checking whether the two groups were homogeneous. This analysis took into account the value of the *Levene* test of homogeneity of variances. Then, considering the recommendations of Arnau (2007) and Arnau and Bono (2008), we undertook a multivariate analysis (MANOVA) 2×2 (Group × Time) in order to analyse the effects of the intervention programme. All data were analysed using the statistical Windows package SPSS version 17.0.

Results

Preliminary analysis

To check if it was based on two homogeneous groups, it conducted a preliminary study that examined inter-group differences by *t-test* for independent samples. Table 2 shows the most relevant data and sets out the *M* and *SD* of the pretest measures (Time 1). Taking the pretest statistics of both the experimental and control groups as reference, a *t-test* was carried out showing that there were no significant differences in any of the dimensions between the experimental group and the control group: satisfaction/enjoyment ($t_{(111)}$ = 4.23, p = .12), boredom ($t_{(111)}$ = 5.42, p = .65), body image ($t_{(111)}$ = 5.87, p =

.21), perceived competence ($t_{(102,\ 874)} = 3.45$, $p = .14$), physical condition ($t_{(111)} = 2.03$, $p = .74$), strength ($t_{(111)} = 4.59$, $p = .47$), self-esteem ($t_{(107,\ 068)} = 4.25$, $p = .23$), responsibility ($t_{(111)} = 5.71$, $p = .10$), relationships ($t_{(111)} = 5.39$, $p = .12$). Thus the two groups are homogeneous.

Effects of the intervention

In order to analyse the effect of the intervention, we carried out a MANOVA 2×2 (Group × Time) as a procedure for analysing repeated measures in which the independent variables were Group (experimental = group 1 and control = group 2) and Time (pretest = Time 1 and post-test = Time 2) and the dependent variables of the dimensions of classroom satisfaction, physical self conception and social responsibility. The homogeneity of covariance was examined through Box's M test; and given the results the null hypothesis of adjustment of data was rejected (M Box = 223.85, $F = 1.95$, $p < .000$). Therefore, we followed the suggestions of Olson (1976) and of Tabachnick and Fidell (1996) to use Pillai's Trace instead of Wilk's Lambda to evaluate the multivariate significance of the principal effects and interactions. The multivariate comparison demonstrated significant differences and interaction effects between the independent variables (group × time) (Pillai's Trace = .31, $F_{(8,\ 215)} = 13.44$, $p < .000$). The multivariate analysis showed significant differences according to the group concerned (experimental and control) (Pillai's Trace = .48, $F_{(8,\ 215)} = 27.84$, $p < .000$) the time (pretest and post-test) (Pillai's Trace = .34, $F_{(8,\ 215)} = 15.40$, $p < .000$).

Significant differences were found in the dimensions of satisfaction/enjoyment ($F = 8.93$, $p = .002$, $R^2 = .27$), boredom ($F = 20.09$, $p < .000$, $R^2 = .38$), body image ($F = 7.34$, $p = .001$, $R^2 = .19$), perceived competence ($F = 114.90$, $p < .000$, $R^2 = .37$), physical condition ($F = 2.23$, $p = .046$, $R^2 = .32$), self esteem ($F = 46.10$, $p < .000$, $R^2 = .29$), responsibility ($F = 36.25$, $p < .000$, $R^2 = .42$), relationships ($F = 7.64$, $p = .003$, $R^2 = .35$); however, no significant differences were found in strength ($F = 3.13$, $p = .132$, $R^2 = .15$) . In relation to Time (Time 1 = pretest; Time 2 = post-test), the analyses showed significant differences in the following dimensions: satisfaction/enjoyment ($F = 10.45$, $p < .000$, $R^2 = .18$), boredom ($F = 31.15$, $p < .000$, $R^2 = .29$), body image ($F = 15.96$, $p < .000$, $R^2 = .23$), perceived competence ($F = 15.42$, $p < .000$, $R^2 = .37$), physical condition ($F = 4.59$, $p = .039$, $R^2 = .19$), strength ($F = 3.87$, $p = .046$), self-esteem ($F = 25.64$, $p < .000$, $R^2 = .20$), responsibility ($F = 12.60$, $p < .000$, $R^2 = .16$), relationships ($F = 12.60$, $p < .000$, $R^2 = .17$). As can be seen from Table 2, in the experimental group the measures of the different dimensions are higher in the post-test than in the pretest, with the exception of boredom, which is lower in the post-test. In the control group, however, there are hardly any differ-

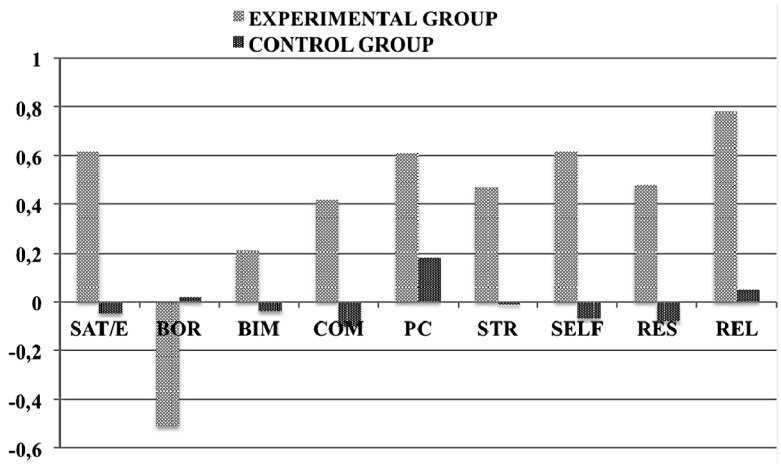

Figure 1

Differences between obtained scores in EXPERIMENTAL GROUP and CONTROL GROUP: post-test scores (time 2) minus pretest scores (time 1) in the studied dimensions

The horizontal axis has sub-scales with the following abbreviations: SAT/E = Satisfaction/Enjoyment; BOR = Boredom; BIM = Body Image; COM = Perceived Competence; PC = Physical Condition; STR = Strength; SELF = Self esteem; RES = Responsibility; REL = Relationships

ences between post-test and pretest measures (Figure 1). In the light of these results it can be said that, with respect to the hypothesis of the study, the programme has been effective.

Table 2

Descriptive statistics of the dimensions of ISC, PSQ and EMSEF according to group (experimental – control) and time (pretest – post-test)

	Experimental group				Control group			
	Pretest (time 1)		Post-test (time 2)		Pretest (time 1)		Post-test (time 2)	
	M	DT	M	DT	M	DT	M	DT
Satisfaction/enjoyment	2.79	.79	3.41	.56	2.83	.80	2.78	.55
Boredom	3.30	1.04	2.79	.75	3.23	1.05	3.25	1.03
Corporal image	2.32	.65	2.53	.54	2.39	.64	2.35	.62
Perceived Competence	2.71	.62	3.13	.61	2.60	.59	2.50	.54
Physical condition	2.00	.66	2.61	.56	2.05	.62	2.23	.54
Strength	2.48	.72	2.95	.69	2.51	.74	2.50	.62
Self-esteem	2.86	.76	3.48	.72	2.92	.76	2.85	.66
Responsibility	5.39	1.22	5.87	1.12	5.32	1.19	5.24	.99
Relationships	5.44	1.13	6.22	1.03	5.52	1.16	5.57	1.21

Discussion and conclusions

A major criticism of AE and its research has been the over-reliance on measures of attitudes, especially in self-concept and self-esteem (Ewert, 1987). For this reason, Brown (2006) noted the need for further research in an examination of AE and its benefits to students.

The results of this research shows how after the implementation of the AE programme, students improve in satisfaction/enjoyment, as opposed to boredom. These data coincide with the project Go North!, by Doering and Veletsianos (2008), who pointed out that students who learn specific content through adventure projects are very happy and motivated. This is possibly due, among other reasons, to the novelty of the programme, the type of activities and the teaching methodology used, which are very different from the traditional physical education to which all students are accustomed.

In relation to body image, Gehris et al. (2010) obtained feedback from students who thought that Adventure Physical Education had not affected their body shape or weight, and that their appearance had remained the same; however, they considered that excess weight caused some difficulty in performing climbing tasks, making it harder to achieve success and producing embarrassment. The results of this investigation revealed a significant relationship between body image and physical condition and between body image and self-esteem in the post-test. These data are consistent with the study of Nichols and Fines (1995) who argue that taking part in an AE programme for 3 months enabled everyone to improve their vision of their body image and increased their feelings of self-esteem and confidence, becoming more physically active by participating in activities. Thus, it seems that AE programmes help the students perceive and evaluate their body image more highly, even producing improvements in the perception and appreciation of their self-esteem and level of physical condition.

Gehris et al. (2010) argue that most students were more competent after receiving an AE programme than they were before. The results of this research show that perceived competence improved in the experimental group and was positively related to physical condition and strength. Thus, we can say that AE helps to improve perceived competence and self-efficacy in problematic situations, agreeing therefore with the results of Priest (1996) and Paxton (1999). This suggests, as indicated by Rogoff, Gauvain, and Gardner (1987), that if children are faced with activities in extreme situations in a natural environment, they will be able to create a deliberate plan to remedy the situation. This, as Vogel (1989) states, results in students perceiving their true potential or competence.

Brown (2006) argues that there is insufficient evidence that Adventure Physical Education improves physical condition but does admit that few

studies have investigated this outcome. This present work shows that the experimental group perceived an improvement in their physical condition and strength, in contrast to the control group, after receiving different content. In this sense, Marsh and Peart (1988) claimed that people who complete their AE programme returned home realising that their physical condition had improved, leading to increased self-esteem. In fact, there is a tendency for these subjects to compare themselves with individuals in their immediate environment as reference, rather than with other programme participants.

An important aspect to note is that the progression between sessions should be well organised to achieve physiological effects on students, so that they can perceive that their level has improved, without having to take a test or undergoing any trials of their physical condition. Thus, our research agrees with that of other authors, such as Gehris et al. (2010), in stating that despite the limitations of these studies, they demonstrate how students view Adventure Physical Education as beneficial for their physical self-concept.

Several studies on AE programmes show that they improve self-confidence and self esteem (Ewert, 1983; Hazelworth & Wilson, 1990; McDonald & Howe, 1989). A clear example can be seen in the work of Iso-Ahola and Graefe (1988), which showed that athletes who achieved success in rock climbing significantly increased their self-esteem. On this point it should be noted that, according to Kimball and Bacon (1993), the activities are often structured in AE programmes so that success and mastery are not only possible but probable. However, there are also studies that have found no effect of improvement (Jernstedt & Johnson, 1983; Powers, 1983).

Hattie et al., (1997), after conducting a meta-analysis of 96 studies of AE, concluded that the effects of such programmes on self-esteem were higher than in educational programmes. Another review by Crompton and West (2001) stated that outdoor adventure programmes improved self-esteem and reduced recidivism for youth at risk. Bertolami (1981) also reported that both men and women increased their self-esteem after an AE programme as well as their locus of internal control. The results presented in this investigation are in line with the works mentioned, as self-esteem improved following the implementation of AE in the experimental group. Another example is the work of Autry (2001), who concluded that a rambling course produced positive developments in adolescent girls at risk, improving self-confidence and self-esteem, teamwork and recognition of personal values. However, they stressed that the targeted women had low levels in these areas before starting the programme. In line with these results, this research shows that secondary school students improved both in self-esteem, and in relationship with others after team work activities.

This study also demonstrated that responsibility and relationships among students improved following the AE programme. These results are consistent with the work of Doering and Veletsianos (2008), who state the adventure projects helped students to increase their commitment to the tasks, learned to find solutions to real problems and collaborated with peers and experts, even helping and encouraging independent work (Doering, 2006; Doering & Veletsianos, 2008). As the group began to work together, the students discovered the characteristics, needs and peculiarities of each member. As a result, they learned to work as a team to overcome weaknesses and build on the strengths of the group (Hopkins & Putnam, 1993). In this way, they balance individual needs with group needs. Equally important are the relationships that exist among the group, as according to research by Witman (1995) many students described the relationship as one of the most important aspects of these programmes, to "feel part of the group".

Several researchers agree that this type of learning has been widely used in young people who, for various reasons, do not fit neatly into school or society, either because they live in a negative environment or because they lack the skills and values to help them become responsible members of society (Cross, 2002). The experimental group showed greater responsibility after the AE programme, interacting positively with perceived competence and self-esteem in the post-test. Other research programmes of this type have been used to increase responsibility for therapeutic purposes in individuals with various problems (Autry, 2001; Kelley & Coursey, 1997; Neill, 2003) among others.

Hattie et al. (1997) concluded that certain interpersonal dimensions (such as relationships or interpersonal communication) improved after a programme like the present one. In this research, relationships improved in the experimental group and were significantly related to self-esteem after the implementation of the programme, as occurred in Bloemhoff's (2006) work with students. The implementation of an AE programme allowed participants to work together, which meant an increase in self-esteem and their ability to maintain complex social relationships with others.

Lipsey and Wilson (2000) show through a meta-analysis that AE programmes and the challenge of the desert where students are involved in intense physical activity, produced therapeutic benefits, improved relationships and reduced students' antisocial and delinquent behaviour. Furthermore, Bensoff and Glass (2002) and Hatch and McCarthy (2005) found that all adventure programmes improved relationships and group cohesion among adolescents and among students, as in the present research. Ewert (1989) also comments that the cooperation that occurs between students to identify and find solutions to challenging situations is among the benefits of these programmes.

Study limitations and strengths

Research would be necessary to consider other courses, ages, and even to compare different content of Physical Education with AE. It should be borne in mind that quasi-experimental studies in natural situations are limited by the existence of numerous variables and effects that cannot be controlled. Even so, in this work the size of the control and experimental groups is substantial, and the contents to be compared are the most common in this area. Another major problem of this work was the organisation of schedules, of when to introduce the teaching units of the programme. It would be desirable to design classroom programming and the simultaneous development of the research prior to the start of the course.

As strengths, we should highlight the purpose of this research, because it is innovative in Spain and parts of Europe. Another important point is implementing the intervention, because little work of this type has been done in Europe generally, and even less in Spain. We would also emphasise the importance of using AE, because it is a completely new type of work in the education system in this country. Finally, we would point out that this research has permitted the existing research to be discussed.

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Received February 6, 2012
Revision received April 15, 2012
Accepted May 2, 2012