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## ORIGINAL

### QUASI-EXPERIMENTAL STUDY OF A PROGRAM FOR SURVIVAL IN THE NATURAL ENVIRONMENT

### ESTUDIO CUASI-EXPERIMENTAL DE UN PROGRAMA DE SUPERVIVENCIA EN EL MEDIO NATURAL

**Baena-Extremera, A.<sup>1</sup> & Granero-Gallegos, A.<sup>2</sup>**

1 Doctor en Educación Física. Profesor de la asignatura de Deportes de Aventura. Facultad de Ciencias del Deporte (Universidad de Murcia, España) [abaenaextrem@um.es](mailto:abaenaextrem@um.es)

2 Doctor en Educación Física. Profesor de la asignatura de Actividades Físico-Deportivas en el Medio Natural. Facultad de Ciencias del Deporte (Universidad de Murcia, España) [agranero@um.es](mailto:agranero@um.es)

**Spanish-English translation:** I. Vasco, [inesvasc@hotmail.com](mailto:inesvasc@hotmail.com)

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## **ABSTRACT**

The aim of this study was to analyze changes in environmental attitudes and retention time of attitudinal changes in a group of university students, after receiving a survival course in low mountain. The sample was 243 people, divided into a control group (n = 75) and an experimental group (n = 168). As a measuring instrument used a self-administered questionnaire consisting of scales related to environmental attitudes: environmental awareness, ecological concern, the new ecological paradigm scale (NEP) and scale of environmental concern (ECS). Measures were taken before (pretest) and after (postest1) training course, and another (postest2) four months later in the experimental group. After intervention attitudinal changes are observed in ecological and environmental concerns in environmental awareness and ecocentrism. Finally, it proves the permanence of these changes in the pupil four months after intervention.

**KEYWORDS:** environmental education, environmental awareness, ecological concern, NEP, environmental concern.

## **RESUMEN**

El objetivo de este trabajo fue analizar los cambios en las actitudes ambientales y la permanencia en el tiempo de las modificaciones actitudinales, en un grupo de alumnado universitario, tras recibir un curso de supervivencia en baja montaña. La muestra fue de 243 personas, repartidas en un grupo control (n=75) y un grupo experimental (n=168). Como instrumento de medida se utilizó un cuestionario autoadministrado constituido por escalas relacionadas con las actitudes medio-ambientales: conciencia ecológica, preocupación ecológica, escala del nuevo paradigma ecológico (NEP) y escala de preocupación ambiental (ECS). Se tomaron medidas antes (pretest) y después (postest1) del curso de formación, y otra (postest2) cuatro meses después en el grupo experimental. Tras la intervención se observan cambios actitudinales en la preocupación ecológica y ambiental, en la conciencia ecológica y el ecocentrismo. Por último, se demuestra la permanencia de estos cambios en el alumnado cuatro meses después de la intervención.

**PALABRAS CLAVE:** educación ambiental, conciencia ecológica, preocupación ecológica, NEP, preocupación ambiental.

## 1. INTRODUCTION

Environmental Education (EE) attempts to create new ways of thinking and performing, thus contributing to get the population environmentally educated (Carlenton-Hug and Hug, 2010). The contents of Environmental Education are very frequently taught through an educational program, or by means of cross-curricular subjects (Beas, Rodríguez and Martínez, 2009; Granero-Gallegos and Baena-Extremera, 2011), trying to change the students' knowledge of the subject, to improve their affective participation as well as their skills and behaviour.

EE has been present in a wide range of social environments and different cultures (see De White and Jacobson, 1994), and, in the educational field (Granero and Baena, 2007), open air courses (Baena and Granero, 2008) and ecological and environmental educational programs have been very usual in the student's school life (Bogner, 2002).

Ecological consciousness is defined by Bigné (1997) as the information which refers to ecological matters and to those agents causing ecological damage. Thus, EE and ecological consciousness programs are centred on education and on the improvement of the participants' knowledge, attitude and behaviour in relation to the environmental conservation aims, increasing the individual pleasure for nature and offering a compromising approach to change the people's behaviour and attitude towards the environment (Sia, Hungerford and Tomera, 1985).

González and Américo (1999) carried out a research on the environmental attitude of the Spanish population, trying to deepen on the so-called "New Environmental Paradigm", proposed by Dunlap and Van Liere (1978). From this paradigm the Scale of the New Ecological Paradigm (NEP:New Ecological Paradigm) was developed by Dunlap, Van Liere, Merting and Jones (2000), and it has recently been used by Vozmediano and San Juan (2005), who have adapted it to the Spanish population. These authors have distinguished between two dimensions which lie behind the environmental topics, based on the building of attitudes towards environmental concern: *ecocentrism*, in relation to the attitudes based on the protection of the environment as a good in itself which needs to be preserved; and *anthropocentrism*, in relation to the attitudes based on the protection of the environment inasmuch as it improves people's well-being.

Arcury, Johnson and Scollay (1986) defined ecocentrism as the information around ecological questions and agents causing ecological damage, to make it different from ecological concern, which relates to a certain feeling of preoccupation about nature's deterioration (Grunert and Jorn, 1995). In some studies, there is an important connection between ecological consciousness, concern and attitudes (Ling-Yee, 1997). In order to measure these changes,

several studies and inquiries on the analysis of attitude and behaviour towards the environment have been carried out (D'Agostino, Schwartz, Cimetta, and Welsh, 2007; Smith-Sebasto and Semrau, 2004).

Leeming, Dwyer, Porter and Cobern (1993) analyzed 34 studies published between 1974 and 1993, to find out that there appeared some changes in the participants' knowledge, attitude and behaviour after an EE program. An example of this can be the research carried out by Hines, Hungerford and Romera (1987), who found out some connections between some students' knowledge/attitude and their behaviour towards the environment after an EE program.

In the following years, Bogner and Wiseman (1999) made a linear analysis of structural equations to find some additional evidence of a questionnaire competence to measure Western European teenagers' specific environmental perceptions. Bogner (1999) compared two different studies, one outdoor and indoor another, to check the evolution of the attitudes towards the environment after an intervention program, the first study showing a better result.

With respect to ecological consciousness, Kals (1996) assessed it by means of a questionnaire in which he used three scales to measure different types of predisposition ( that of adopting easy behaviours, that of adopting difficult behaviours and that of accepting the government prohibitions), as predictors of ecological behaviour

Grodzinska-Jurczak (2002) carried out a study with 200 secondary school students to analyze the level of ecological consciousness they showed, as well as the knowledge and their attitude to responsible behaviours. They could see their lack of knowledge and attitude towards this problem. Kuhar, Bettinger, Lehnhardt, Townsend and Cox (2007b) developed a practical intervention program in Kalinzu forest. This educational preservation program showed the increase of knowledge of the environment, the improvement of the attitudes and behaviours of those students who live near the forest, by means of a series of learning interactive sessions as well as by actually walking through the forest. Besides, these authors could see a short-term improvement of the students' knowledge and attitude after a part time educational program carried out with five-year-old school children in the surroundings of Kalinzu forest (Kuhar Bettinger, Lehnhardt, Townsend and Cox, 2007a).

Finally, in relation to the former research, Kuhar Bettinger, Lehnhardt, Tracy and Cox, (2010) carried out a parallel study with primary school children, who were given a practical intervention program in the forest in 2004, adding a pretest and a posttest. In later years, continuous reinforcement activities have been added to the program objectives until 2006, to check that the increase of environmental knowledge is not temporary.

Taking into account what has previously been said, the main objective of the present study was to analyze the changes in the environmental attitudes, as

well as how long they lasted, after a group of university students were given a low mountain survival course.

## **2. METHOD**

### **2.1 Development of the intervention proposal**

Once the bibliography has been revised, it is necessary to say that the intervention proposal presented in this document focuses on a low mountain survival course taken by some university students, within a university training plan in different Spanish provinces. For this objective, several courses were taken, hosted by the Vice-rectors for Teaching Training and Innovation in European Convergence and endorsed by several prestigious Spanish universities, such as Murcia and Granada.

The courses main content was about survival in the low mountain. Each course consisted of two four-hour-long theoretical lectures, in which the students were taught some technical aspects of mountain survival (shelters, water purification, first aid, etc.). Moreover, food resources based on the edible vegetation of the camp area and several cooking techniques (drying, preservation, maceration, infusion, decoction) were presented, making food, ointments, vapors, etc of them. The following sessions were developed by means of a four-day camp activity in the low mountain, where all the contents designed for the course were put into practice, during which the students got from the wild vegetation all the necessary resources, such as edible plants, aromatic plants for infusions and medicinal plants for emergencies.

During the camp days, early in the morning, the students were given a one-hour talk about the plants that were to be picked up that day, in which they were given an explanation on the characteristics of each plant, the necessary treatments and the most important instructions to make good ecological use of the surrounding. From that, several groups were organized to collect the plants, first for breakfast (aromatic plants for infusions) and later for lunch and dinner (edible plants). The whole activity was closely supervised by the professors, who tried to explain the possible damage to the environment.

### **2.2 Design**

Given the characteristics of these training courses, a sectional, descriptive and quasi-experimental design was chosen, as well as a non-equivalent control group (because they have not be assigned at random), in which there were students of other training courses not directly related with survival in wild nature, but with contents related with the environment. An experimental group was included on which an intervention program was applied to establish contrasts. Several measures were taken: a pretest before the course, a posttest (1) at the moment the teaching activity was finished and a posttest (2), after four months, where the same questionnaire was given to the experimental groups.

## 2.3 Population and demonstration

According to Ingenkamp, Parey and Tent (1973), in studies of this type both groups, the control group and the experimental group, cannot be compared if they have not undertaken outdoor experiences, because it would be inadequate to compare a group with outdoor experiences to another with only indoor experiences. For that reason, the control group consisted of students who had been given courses on Physical Education experiences dealing with the environment, whereas the experimental group was formed by only those students who had participated in the survival courses offered by the previously mentioned universities.

In the selection process the following process was carried out: 1) A filter question to get to know the students' participation in other training courses; 2) At the data introduction stage, those students who had previously participated in training courses were opted out, and only 243 participants remained for the research, from whom 75 were assigned to control groups and the rest, 168, took part of experimental groups.

## 2.4 Hypotheses

The hypotheses posed for this research are:

1<sup>st</sup>. Starting from homogeneous groups, there will not be significant differences in marks average in the pretest, according to the punctuation taken out from the analyzed dimensions, between the experimental and control groups (inter-groups pretest).

2<sup>nd</sup>. It is believed that, after the intervention, significant differences in marks average will exist in the first posttest (posttest 1) among the participants in experimental groups in relation to the pretest (inter-groups posttest).

3<sup>rd</sup>. After the program application, it is believed that the attitudinal changes of the experimental group participants will still remain (posttest 2 measurement).

## 2.5 Instruments

Some bibliography was consulted and variables and factors were selected, which had been used in other relevant studies related with attitudes towards the environment. This instrument included several batteries of questions which were useful to get information about two types of behavioural and attitudinal variables.

On the one hand, the *Ecological Consciousness Scale*, adapted from Bohlen, Schlegelmilch and Diamantopoulos (1993), was used to get information about the consciousness of ecological damage and the impact of one's actions over

nature. This scale consists of 4 items, with answers in a five-point scale of Likert type. The value of its factor structure and its reliability have been proved in Spanish by Díaz, Beerli and Martín (2004), with Cronbach alpha values ( $\alpha$ )=.88. In our research Cronbach alpha reliability results show a high inner consistency in the pretest ( $\alpha$ =.86), posttest1 ( $\alpha$ =.84) and posttest2 ( $\alpha$ =.85).

On the other hand, the *Ecological Concern Scale*, adapted from Dunlap and Van Liere (1984) and Grendstad (1999), was used to get information about concern for natural balance and the possibility of an ecological crisis. This scale consists of 4 items, with answers in a five-point scale of Likert type. The value of its factor structure and its reliability have been proved in Spanish by Díaz et al. (2004), with values of  $\alpha$ =.67. In our research Cronbach alpha reliability results show an acceptable inner consistency in the pretest ( $\alpha$ =.69), posttest1 ( $\alpha$ =.70) and posttest2 ( $\alpha$ =.67). Although this dimension shows a lower alpha value and reliability than recommended .70 (Nunnally, 1978; Peterson, 1994), due to the reduced number of its items (4), the inner value observed can be accepted (Hair, Anderson, Tatham and Black, 1999; Nunnally and Bernstein, 1994).

*New Ecological Paradigm Scale (NEP)*. The Spanish version of Dunlap et al. (2000) NEP scale was used (Vozmediano and Sanjuán, 2005). The reduced Spanish version consists of 11 items and it proves to be the best tool to study our beliefs about nature and the relationship between human beings and their environment. It is divided into two subscales, *Anthropocentrism* (6 items) and *Ecocentrism* (5 items), following the terminology used by Thompson and Barton (1994). The answers were compiled in a Likert type scale (from 0 to 10). The inner consistency obtained by Vozmediano and Sanjuán (2005) for both factors was  $\alpha$ =.71. In our study the reliability results show an acceptable inner consistency: *Anthropocentrism* (pretest:  $\alpha$ =.70; posttest1:  $\alpha$ =.71; posttest2:  $\alpha$ =.70); *Ecocentrism*, (pretest:  $\alpha$ =.70; posttest1:  $\alpha$ =.72; posttest2:  $\alpha$ =.71).

*Environmental Concern Scale (ECS)*, from the original *Environmental Concern Scale*, by Weigel and Weigel (1978) whose adaptation was already used with good results by other authors (Aragonés and Amérigo, 1991; Amérigo and González, 1996; González and Amérigo, 1999). It consists of 16 items with answers in a five-point scale of Likert type. This scale is the traditional measure of environmental concern, and it deals with preservation and pollution, appropriate topics to measure this theory by Van Liere and Dunlap (1981). The inner consistency of its adaptation to Spanish obtained by González and Amérigo (1999) was  $\alpha$ =.70. In the present study the reliability results show an acceptable inner consistency in the pretest ( $\alpha$ =.71), posttest1 ( $\alpha$ =.72) and posttest2 ( $\alpha$ =.71).

## 2.6 Educational agents and procedure

The intervention program was carried out by five teachers in each course, three of whom were graduated professors with a Doctorate in Physical Activity and

Sport Sciences related to the Natural Environment, and two military experts on Survival from the Command Indoctrination of the Spanish Defense Ministry. The fieldwork was carried out from September 2008 to June 2010. In each training course an individual and self-administered questionnaire was passed in the first session and again at the end of the activity. Four months later, the same questionnaire was passed to the experimental group participants to check the permanence of the studied variables.

## 2.7 Data analysis

The descriptive statistics were calculated, media (M) and Standard Deviation (SD) for each of the items. Relevant evidence of normality and homoscedasticity was applied in order to assure variance homogeneity. Asymmetry and kurtosis indices were calculated as being, in general, about 0 and  $<2$ , as Bollen and Long (1994) recommend, which shows similarity with the normal curve in a univariate way and allows us to use factorial techniques. Kolmogorov-Smirnov's analysis confirmed the normality of the sample distribution ( $Z$ , between .63 and .92;  $p > .06$ ). The reliability of every suggested dimension has been calculated through Cronbach's alpha inner consistency index. Before the intervention, so as to check if there were any relevant statistical differences between both groups, the Test-T was applied to independent samples with the data obtained from the pretest (experimental vs control). Furthermore, in order to study the intragroup differences in the different tests (pre, posttest1 and posttest2), an analysis of the punctuation of difference or analysis of *punctuation of gain* (Best, 1970). For this, the difference between posttest1 and pretest for each participant has been calculated, analyzing the intragroup differences by means of the Test-T for related samples. Besides, the differences were again calculated after four months of the intervention, although in this case, the punctuation obtained in posttest2 and posttest1 applied to the experimental group was taken into account. A canonical correlation analysis was also carried out, and the statistic pack SPSS in its Windows 17.0 version was applied.

## 3. RESULTS

### 3.1 Preliminary analysis

In the first place, in order to check if the initial groups were homogeneous, their inter-group differences were analyzed by means of the Test-T for independent samples. The most relevant data, which make reference to M and DT of the pretest and the Test-T measures, are shown in table 1. In the first hypothesis it was believed that there would not exist relevant differences in the averages of the pretest in the different scales. The obtained data showed that there did not exist significant differences in any of the analyzed dimensions, and that the starting groups were homogeneous: *ecological consciousness* ( $F=4.19$ ;  $p \leq .103$ ), *ecological concern*, ( $F=1.34$ ;  $p \leq .796$ ), *anthropocentrism* ( $F=3.46$ ;  $p \leq .192$ ), *egocentrism* ( $F=3.47$ ;  $p \leq .119$ ), *ECS* ( $F=6.32$ ;  $p \leq .958$ ).

**Table 1.** Media (M) and Standard Deviation (SD) of pretest, posttest1, posttest2 and punctuation of gain. Intragroup differences in experimental and control groups. Test-T for related samples.

Dependent Variables		Experimental Group			Control Group		
		M	DT	Punctuation of gain	M	DT	Punctuation of gain
Ecological Consciousness	Pretest	3.56	.41		3.45	.40	
	Posttest1	4.12**	.32	.56	3.51	.41	.06
	Posttest2	4.10	.32	-.02			
Ecological Concern	Pretest	3.77	.32		3.68	.33	
	Posttest1	4.43**	.17	.66	3.48	.32	-.20
	Posttest2	4.53	.17	.10			
Anthropocentrism	Pretest	5.31	.76		5.24	.77	
	Posttest1	5.80*	.68	.49	5.35	.79	.11
	Posttest2	6.15	.68	.35			
Ecocentrism	Pretest	3.87	.87		3.78	.87	
	Posttest1	4.91**	.73	.57	3.61	.86	-.17
	Posttest2	4.74	.73	-.17			
ECS	Pretest	4.02	.29		4.10	.28	
	Posttest1	4.49**	.12	.93	3.99	.28	-.11
	Posttest2	4.42	.12	-.07			

\* $p < .05$ ; \*\* $p < .01$

Taking the experimental group as a reference, in order to check the existing connection between the different theories, an analysis of the bivariate correlations was carried out of the pretest results (table 2). A significant positive correlation between *ecological consciousness* and *ecological, environmental concern* and *ecocentrism* can be observed. The correlation between *ecological concern* and *ECS* is also important. However, it is important to pay attention to the negative and significant relation between *anthropocentrism* and the different dimensions studied, above all, *ECS*.

**Table 2.** Correlation of the subscales analyzed in the experimental group in the pretest and posttest1.

Dimensions	I	II	III	IV	V
I. Ecological Consciousness		.26**	-.13*	.20**	.29*
II. Ecological Concern	.43**		-.23*	.29**	.44**
III. Anthropocentrism	-.36**	-.38**		-.09	-.37**
IV. Ecocentrism	.57**	.45**	-.19		.25**
V. ECS	.61**	.64**	-.19	.54**	

\* $p < .05$ ; \*\* $p < .01$

Note.- pretest correlations are shown in upper diagonal and posttest1 correlations in lower diagonal.

### 3.2 Interventions effects

When we compare the results obtained by the experimental and the control groups in the pretest and posttest1 at the end of the intervention (table2), the Test-T shows relevant differences between the groups in relation to the measures of the studied five dimensions. No relevant differences were found in

the control group. However, in the experimental group the most important differences were found on *ecological concern* ( $F=14.67$ ;  $p\leq.000$ ) and *ECS* ( $F=12.32$ ;  $p\leq.000$ ), with a punctuation of gain of .66 y .93, respectively. Then *ecological consciousness* ( $F=9.89$ ;  $p\leq.004$ ) and *ecocentrism* ( $F=5.19$ ;  $p\leq.032$ ), with a gain of .56 and .57, respectively. Finally, it is in *anthropocentrism* dimension ( $F=7.67$ ;  $p\leq.004$ ) where less differences were shown, although they were significant. It can be claimed that the second proposed hypothesis is fulfilled, and that the program has been efficient. The participants' level of awareness was shown in the five studied subscales.

After the intervention, with the experimental group as a reference, a new analysis of bivariate correlations was applied to check the existing relations in the different theories. As it can be observed in table 2, the correlations are increased. *Ecological consciousness* presents a high and positive correlation, mainly with *ECS* and *ecocentrism*, as well as the correlation between *ecological concern* and *ECS*, and between *ecocentrism* and *ECS*. On the other hand, *anthropocentrism* is still relating negatively and significantly with the rest of dimensions, and it must be highlighted the fact that its relevance and coefficient of correlation have increased, above all with *ECS*.

### **3.3 Permanence of intervention**

After four months from the program, at the end of the intervention, the results obtained in posttest(1) were compared with the results obtained after the four months with respect to the same participants belonging to the experimental group. A second posttest(2) was carried out to check the permanence in time of the attitudes and values analyzed in the different dimensions studied. In this case, the punctuation of gain was calculated by subtracting the posttest1 result from the posttest2 results. As it can be seen in table 1, the Test-T does not show any differences between the punctuation rates in both tests. This implies that the different attitudes and values acquired by the participants of the intervention program have remained the same and have consolidated on different people along time.

## **4. DISCUSSION**

The main objective of the research is to study the influence of the application of a low mountain survival course as an EE program, on the university students' attitudes, which have been measured before and after the program by means of standard scales used in previous research.

The results of the first hypothesis are parallel to Bogner's work (1998), who claims that doing simple outdoor activities without a well-developed program within an ecological context would not show any change on teenagers' environmental perception. Thus, it can be understood the fact that in order to improve environmental attitudes it is necessary to carry out a structured and guided educational proposal, of a practical and interactive type. After the

application of the program, it can be said that there is a coincidence with Bogner (1998) and Ewert, Place and Sibthorp (2005), when it is confirmed that it is possible to influence on such variables as ecological consciousness and ecological concern for the natural environment, because, as it has been proved in this research, there are relevant differences in all the dimensions. Szagun and Pavlov (1995) suggest that ecological consciousness and concern are partially a function dependent on experience; thus, to be able to influence on the students' attitudes, apart from theoretical lessons, practical activities are necessary where the students can interact with environmental experiences.

According to the results given by Ewert et al. (2005) and Kuhar et al. (2007), it can be seen how the participants of this research have modified their attitudes towards the natural environment, as well as their ecological consciousness and interest in EE. As Fazio and Zanna (1981) have claimed, it is confirmed that the students' possible attitudinal changes tend to be permanent when they are caused by a real experience in wild nature. This makes us think that there exist several circumstances which influence the people's attitudes towards the environment, such as the quantity and quality of the experiences (Corcoran, 1999) or formal education received (Palmer, 1993), among others. Actually, Bogner (2002) and Kuhar et al. (2010) are in favour of outdoor activities, so that the students get aware of the existing concern for natural environment. For this reason, from what has been exposed in the present research, it is believed essential to carry out a camping activity as a final practice in programs of this type.

With respect to concern for the environment, González and Amérigo (1999) conclude that the people who usually recycle household waste are more ecocentric and more anthropocentric than those who do not recycle. This research also coincides with Kortenkamp and Moore (2001), where the participants were university students as well, because it has been shown that, when theoretical lessons have been included about the environmental impact of the activities designed within the intervention program, ecocentrism and anthropocentrism have increased. Thus, we can observe that the students' actions to collect the plants and natural resources to survive had an effect on the increase of environmental concern and ecocentrism (Ewert et al., 2005; Thompson and Burton, 1994), probably due to the continuous disappearance of the nearest natural resources. The results shown here manifest the correlations found between the different dimensions studied, because ecocentrism, ecological consciousness and ecological and environmental concern are correlated. The studies carried out by Díaz et al. (2004), Fraj, Grande and Martínez (2003), Martín and Simintiras (1995) and Ling-Yee, (1997) can also be added because these authors could see a positive correlation between ecological consciousness, ecological concern and attitudes measured by means of ECS.

On the other hand, one of the most interesting results is the permanence of modifications in the studied variables after the survival intervention program, thus the third hypothesis being confirmed. It is also necessary to highlight that

the correlation between the different studied theories is also increased after the program. Different authors, Randler, Ilg and Kern (2005) and Dettman-Easler and Pease, (1999) have suggested the possibility for future interventions to check whether at the end of the intervention program, after 4-5 weeks, would exist variations in those variables. Several studies have proved a short-term increase to participate in preservation activities, although the attitudes can decrease with the lack of reinforcement in subsequent experiences (Dotzour, Houston, Manubay, Schultz and Smith, 2002). On the other hand, other researchers have shown (the present study coincides with the results obtained by Kuhar et al. (2010)) that the improvement of the studied variables can last for a long time. These authors show that the students keep the contents of their EE program for a long time, and that the performance is not only reduced to pre-program levels, but that it is also increased.

## 5. CONCLUSIONS

As a general conclusion, we can assert that the three hypotheses have been proved as expected. In the first one, the data showed that there did not exist significant differences in any of the analyzed dimensions, thus starting from homogeneous groups.

In the second hypothesis, it was shown that the intervention program was efficient, which intensified the correlations between the scales. Above all, the connection between *ecological consciousness* and *ECS* and *ecocentrism* was increased. In addition, there was an improvement of the relation between *ecological concern* and *ECS*, on the one hand, and between *ecocentrism* and *ECS*, on the other. Finally, the negative relation of *anthropocentrism* and the rest of the dimensions remained the same.

With respect to the third hypothesis, we can conclude that it is one of the most interesting points in this research, because the permanence of the modifications taken in the variables studied after the survival intervention program was checked, thus confirming the hypothesis.

From all the data and results obtained in the present research, we can get some suggestions and relevant information so as to improve the EE plans, carried out by both public and private institutions (see Luque, Baena-Extremera and Granero-Gallegos, 2011). In addition, there may be some limitation in the research, when we take a group of university students to participate in survival courses, because it is presupposed that these participants are interested in the contents related to this topic, thus being of interest to take this experience to other people in different training activities. Another limitation is the assessment of the attitudinal and not the behavioural changes. In relation to the strengths of the research, we could highlight the fact that it is relatively new in Spain and some European countries. Moreover, the research is innovative when it presents an intervention survival course parallel to the methodology proposed

by Baena-Extremera (2011). Finally, it is important to mention that the research has been extremely useful to revise previous studies.

## 6. REFERENCES

- Amérigo, M. y González, A. (1996). Preocupación medioambiental en una población escolar. *Revista de Psicología Social Aplicada*, 6, 75-92.
- Amérigo, M., González, A. y Aragonés, J. I. (1995). Antropocentrismo versus ecocentrismo en una muestra de estudiantes. En E. Garrido & C. Herrero (Comps.), *Psicología Política, Jurídica y Ambiental* (pp. 337-344). Salamanca: Eudema.
- Aragonés, J.I. y Amérigo, M. (1991). Un estudio empírico sobre las actitudes ambientales. *Revista de Psicología Social*, 6, 223-240.
- Arcury, T.A., Johnson, T.P. y Scollay, S.J. (1986). Ecological world view and environmental knowledge: The "new environmental paradigm". *Journal of Environmental Education*, 17(4), 35-40.
- Baena-Extremera, A. (2011). Programas Didácticos para Educación Física a través de la Educación de Aventura. *Espiral. Cuadernos del Profesorado*, 4(7), 3-13.
- Baena, A. y Granero, A. (2008). Las actividades físicas en la naturaleza en el currículum actual: contribución a la educación para la ciudadanía y los derechos humanos. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación*, 14, 48-53.
- Beas, M., Rodríguez, F. y Martínez, A.J. (2009). El entorno natural y las actividades físicas en el medio natural como base para un proyecto educativo multidisciplinar. *Espiral. Cuadernos del Profesorado*, 2(4), 56-65.
- Best, J.W. (1970). *Research in education*. New Jersey: Prentice Hall.
- Bigné, E. (1997). El consumidor verde: bases de un modelo de comportamiento. *Esic-Market*, 50, 237-251.
- Bogner, F.X. (1998). The Influence of short-term outdoor ECDIDgy education on long-term variables of environmental perception. *Journal of Environmental Education*, 29, 17-29.
- Bogner, F.X. (1999). Empirical evaluation of an educational conservation programme introduced in Swiss secondary schools. *International Journal of Science Education*, 21, 1169-1185.
- Bogner, F.X. (2002). The influence of a residential outdoor education programme to pupil's environmental perception. *European Journal of Psychology of Education*, 17(1), 19-34.
- Bogner, F.X. y Wiseman, M. (1999). Toward Measuring Adolescent Environmental Perception. *European Psychologist*, 4, 139-151.
- Bohlen, G., Schlegelmilch, B. y Diamantopoulos, A. (1993). Measuring ecological concern: a multi-construct perspective. *Journal of Marketing Management*, 9, 415-430.
- Bollen, K. y Long, J. S. (1994). *Testing structural equation models*. Newbury Park, CA: Sage.
- Carleton-Hug, A. y Hug, J.W. (2010). Challenges and opportunities for evaluating environmental education programs. *Evaluation and Program Planning*, 33, 159-164.

- Corcoran, P.B. (1999). Formative influences in the lives of environmental educators in the United States. *Environmental Education Research*, 5, 207-220.
- D'Agostino, J.V., Schwartz, K.L., Cimetta, A.D., y Welsh, M.E. (2007). Using a partitioned treatment design to examine the effect of project WET. *Journal of Environmental Education*, 38(4), 43-50.
- De White, T.G. y Jacobson, S.K. (1994). Evaluating conservation education programs at a South American zoo. *Journal of Environmental Education*, 25(4), 18-22.
- Dettman-Easler, D. y Pease, J.L. (1999). Evaluating the effectiveness of residential environmental education programs in fostering positive attitudes toward wildlife. *Journal of Environmental Education*, 31(1), 33-39.
- Díaz, G., Beerli, A. y Martín, J.D. (2004). El modelo de hábito de reciclado según el perfil sociodemográfico de los consumidores. En, *Libro de Actas del XVI Encuentro de Profesores Universitarios de Marketing*, pp. 191-207.
- Dotzour, A., Houston, C., Manubay, G., Schultz, K. y Smith, J.C. (2002). Crossing the Bog of Habits: an evaluation of an exhibit's effectiveness in promoting environmentally responsible behaviors. Master's thesis. University of Michigan, Ann Arbor, MI.
- Dunlap, R.E. y Van Liere, K.D. (1978). The new environmental paradigm. *Journal of Environmental Education*, 9(4), 10-19.
- Dunlap, R.E. y Van Liere, K.D. (1984). Commitment to the dominant social paradigm and concern for environmental quality. *Social Science Quarterly*, 65(4), 1013-1028.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G. y Jones, R.E. (2000). Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. *Journal of Social Issues*, 56, 425-442.
- Ewert, A.; Place, G. y Sibthorp, J. (2005). Early-Life Outdoor Experiences and an Individual's Environmental Attitudes. *Leisure Sciences*, 27, 225-239.
- Fazio, R.H., y Zanna, M.P. (1981). Direct experience and attitude-behavior consistency. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, 14, 161-202. New York: Academic Press.
- Fraj, E., Grande, I. y Martínez, E. (2003). Las variables de actitud y de conocimiento como determinantes del comportamiento ecológico. *Investigación y Marketing*, 77, 32-42.
- González, A. y Américo, M. (1999). Actitudes hacia el medio ambiente y conducta ecológica. *Psicothema*, 11, 13-25.
- Granero, A. y Baena, A. (2007). Importancia de los valores educativos de las actividades físicas en la naturaleza. *Habilidad Motriz*, 29, 5-14.
- Granero-Gallegos, A. y Baena-Extremera, A. (2011). Juegos y deporte de aventura en la formación permanente del profesorado. *Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte*, 11(43), 531-547.
- Grendstad, G. (1999). The new ecological paradigm scale: examination and scale analysis. *Environmental Politics*, 8(4), 194-205.

- Grodzinska-Jurczak, M. (2002). Environmental Knowledge and Awareness in Secondary Polish Education. *Environment Science & Pollution Research* 9(3) 215-216.
- Grunert, S. y Jorn, H. (1995). Values, environmental attitudes, and buying of organic foods. *Journal of Consumer Marketing*, 16, 39-62.
- Hair, J.F., Anderson, R.E., Tatham, R.L. y Black, W.C. (1999). *Multivariate Data Analysis*. Upper Saddle River, New Jersey: Prentice-Hall.
- Hines, J.M., Hungerford, H.R. y Tomera, A.N. (1987). Analysis and synthesis of research on responsible environmental behavior: a meta-analysis. *Journal of Environmental Education*, 18(2), 1-8.
- Ingenkamp, K.H., Parey, E., y Tent, L. (1973). *Schatzen und Messen in der Unterrichtsforschung*. Beltz: Weinheim,
- Kals, E. (1996). *Verantwortliches Umweltverhalten: Umweltschützende Entscheidungenerklären undfordern [Responsible ecological behavior: Predicting and promoting conservational decisions]*. Weinheim, Germany: Beltz, PVU.
- Kortenkamp, K.V. y Moore, C.F. (2001). Ecocentrism and anthropocentrism: moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology*, 21, 261-272.
- Kuhar, C.W., Bettinger, T.L., Lehnhardt, K., Townsend, S. y Cox, D. (2007a). Evaluating the impact of a conservation education program in the Kalinzu Forest Reserve, Uganda. *International Zoo Educators Association Journal*, 43, 14-17.
- Kuhar, C.W., Bettinger, T.L., Lehnhardt, K., Townsend, S. y Cox, D. (2007b). Into the forest: the evolution of a conservation education program at Kalinzu Forest Reserve, Uganda. *Applied Environmental Education & Communication*, 6, 159-166.
- Kuhar, C.W.; Bettinger, T.L.; Lehnhardt, K., Tracy, O. y Cox, D. (2010). Evaluating for Long-Term Impact of an Environmental Education Program at the Kalinzu Forest Reserve, Uganda. *American Journal of Primatology*, 72, 407-413.
- Leeming, C.L., Dwyer, W.O., Porter, B.E. y Cobern, M.K. (1993). Outcome Research in Environmental Education: a critical review. *Journal of Environmental Education*, 24, 8-21.
- Ling-Yee, L. (1997). Effect of collectivist orientation and ecological attitude on actual environmental commitment: the moderating role of consumer demographics and product involvement. *Journal of International Consumer Marketing*, 9(4), 31-53.
- Luque, P., Baena-Extremera, A. y Granero-Gallegos, A. (2011). Buenas prácticas para un desarrollo sostenible en los eventos deportivos en el medio natural. *Interciencia. Journal of Science and Technology of the Americas*, 7(36), 531-537.
- Martín, B. y Simintiras, A. (1995). The impact of green product lines on the environment: does what they know affect how they feel?. *Marketing Intelligence & Planning*, 13(4), 16-23.
- Nunnally, J.C. (1978). *Psychometric Theory*. New York: Mc-Graw-Hill.

- Nunnally, J.C. y Bernstein, I.H. (1994). *Psychometric Theory*. New York: McGraw-Hill.
- Palmer, J. (1993). Development of concern for the environment and formative experiences of educators. *Journal of Environmental Education*, 24(3), 26-30.
- Peterson, R.A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 21(2), 381-391.
- Randler, C., Ilg, A. y Kern, J. (2005). Cognitive and emotional evaluation of an amphibian conservation program for elementary school students. *Journal of Environmental Education*, 37(1), 43-52.
- Sia, A., Hungerford, H. y Tomera, A. (1985). Selected predictors of responsible environmental behavior. *Journal of Environmental Education*, 17(2), 31-40.
- Smith-Sebasto, N.J. y Semrau, H.J. (2004). Evaluation of the environmental education program at the New Jersey school of conservation. *Journal of Environmental Education*, 36(1), 3-18.
- Szagun, G. y Pavlov, I.V. (1995). Environmental awareness: A comparative study of German and Russian adolescents. *Youth and Society*, 27, 93-113.
- Thomson, S. y Barton, M. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of Environmental Psychology*, 14, 149-157.
- Van Liere, K.D. y Dunlap, R.E. (1981). Environmental Concern: Does it Make a Difference How It's Measured? *Environment and Behavior*, 13, 651-676.
- Vozmediano, L. y San Juan, C. (2005). Escala Nuevo Paradigma Ecológico: propiedades psicométricas con una muestra española obtenida a través de internet. *Medio Ambiente y Comportamiento Humano*, 6(1), 37-49.
- Weigel, R.H. y Weigel, J. (1978). Environmental concern: The development of a measure. *Environment and Behavior*, 10, 3-15.

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