

# Assessment of the basic psychological needs in physical education according to age, gender and educational stage

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## ABSTRACT

The aim of this study was to determine what happens to the basic psychological needs during elementary school, analysing these according to age, gender and educational stage. A total of 743 students from Primary (n = 311) and Secondary (n = 432), 333 children and 410 girls participated;  $M_{age} = 12.99$ ,  $SD = 2.07$ . Statistically significant differences were found in the age factor in autonomy ( $p = .043$ ), perceived competence ( $p < .001$ ) and relation with others ( $p < .001$ ). Results show a decrease in the AUT COMP and the RELAT in the passage from primary to secondary, as these variables are higher in boys than in girls. Based on these results, a reflection on the teaching practice and methodology used in these stages of PE should be made, because children have different needs and perceptions of being competent, of being autonomous and of relating to the in PE classes. Therefore, we must consider the approach of activities that do not promote excess competition, providing activities with different difficulties and different opportunities to choose the activities to be carried out, aimed at the development of these three basic psychological needs of students so that the perception of autonomy, competence and relationship, are increased. **Keywords:** AUTONOMY, PERCEIVED COMPETENCE, RELATIONSHIP WITH OTHERS, PHYSICAL EDUCATION, SCHOOLCHILDREN.

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## INTRODUCTION

The basic psychological needs construct (BPN) has been adapted to different areas of physical activity and sports, becoming more specific and discrete concerning to the studied field due to varied investigations on the sport area (Lonsdale & Hodge, 2011; Pulido, Sanchez-Oliva, Gonzalez-Ponce, Amado & Chamoro, 2016), exercise area (Moreno, Marzo, Martínez-Galindo & Conte, 2011; Sánchez & Núñez, 2007; Vlachopoulos & Michailidou, 2006; Vlachopoulos, Ntoumanis & Smith, 2010; Wilson, Rogers, Rodgers & Wild, 2006) and also investigations related to academical Physical Education (PE) area (Castaño-López, Navarro-Patón & Basanta-Camiño, 2016; Gómez-Rijo, Hernández-Moreno, Martínez-Herráez & Gámez-Medina, 2014; Menendez & Fernández-Río, 2018; Moreno, González-Cutre, Chillón & Parra, 2008; Navarro-Patón, Rodríguez & Eirin, 2016; Pires, Cid, Borrego, Alves & Silva, 2010; Sánchez-Oliva, Leo, Amado, Cuevas & García-Calvo, 2013; Vlachopoulos, Katartzi & Kontou, 2011).

In order to study the BPN we should start talking about the Self-determination Theory (SDT) (Deci & Ryan, 2017). The SDT is a general motivation macro-theory based on other mini-theories and among them it is placed the one related to BPN (Deci & Ryan, 2017). This mini-theory says that the three BPN (autonomy, competence, and relatedness) are directly related to the social context of each person (Menéndez & Fernández-Río, 2018). Autonomy can be understood by the desire and the ability of each one to make their own choices and control their behaviour (Deci & Ryan, 2017); competence is referred to how each one sees their capacity to carry out effective actions with a high chance of success within the social context in which the activity is developed (Deci & Ryan, 2017; García-Calvo, Sánchez, Leo, Sánchez & Amado, 2011; González-Cutre, Sicilia & Águila, 2011) finally, the relatedness has to do with the necessity of been linked to others and the perception of being accepted by them (García-Calvo, et al., 2011; González-Cutre et al., 2011; Moreno & Martínez, 2006; Standage, Duda, & Ntoumanis, 2005).

With regard to autonomy, scientific evidence shows that boys obtain higher punctuation than girls on PE classes and this one goes down as the time goes by and their ages increase (Barreal-López et al., 2015; Gómez-Rijo et al., 2014; Navarro et al., 2016; Soini, Liukkonen, Jaakkola, Leskinen & Rantanen, 2007). When we talk about the perceived competence, there are investigations which show that boys are more likely to get higher punctuations than girls, and again, this one decreases as they get older (Barreal-López et al., 2015; Gómez-Rijo, et al., 2014; Navarro et al., 2016). About the relatedness, recent researches demonstrate that it is also higher in boys and also decreases as the age increases (Barreal-López et al., 2015; Gómez-Rijo et al., 2014; Navarro et al., 2016).

As it is shown, it is really important to promote the development of socio-traction values related with a regular sportive practice helping to improve the autonomy, competence and relationships (Álvarez, Balaguer, Castillo & Duda, 2009; Taylor, Ntoumanis, Standage & Spray, 2010) as well as the improvement of intrinsic motivation and with it, the intention of being physically active (Deci & Ryan, 2017; Hagger, 2014; Moreno-Murcia, Zomeño, Marín, Ruiz, & Cervelló, 2013; Vallerand & Lalande, 2011), within the PE academic context, in which kids and teenagers are going to develop physical activities and spend so much time during their mandatory school ages (Navarro, Arufe & Basanta, 2015). Following these guidelines would lead to help reaching the objective established by World Health Organization (WHO, 2015) in order to promote kids and teenagers' health, since the scientific evidence showed that the 70% of the youth will leave the sportive practice at the age of 13 (Engh, 2002).

Therefore, this investigation's aim has been to determine what happens with the BPN regarding PE during mandatory school ages. First of all, BPN were analysed in a general way, in order to know the lowest or

higher students' satisfaction of them in schools of Galicia (Spain) regarding PE. Secondly, BPN were analysed by educative stage, age, and gender in order to know how they change regarding these three items and how they evolve over the years. That is why, the initial hypothesis is that the BPN will decrease as the time goes by and the students grow. The second hypothesis is that the NPB items will be higher regarding Primary Education than Secondary Education kids, and also, higher in boys than girls.

## METHOD

### *Design*

In order to carry out this investigation and give an answer to the established objectives, it was used a transversal, descriptive, analytical relational comparative design (Ato, López & Benavente, 2013).

The sample selection was incidental and of convenience since the access to the sample was due to the cooperation of different schools in a disinterested and altruist way.

### *Participants*

743 Primary Education (n=311) and Mandatory Secondary Education (n=432) students participated. From them, 333 were boys and 410 girls; Mage = 12.99, SD= 2.07 from different education centres placed on the provinces of Lugo, A Coruña, Orense and Pontevedra (Galicia, Spain).

### *Measure*

Basic Psychological Needs in Exercise Scale (BPNES) was used in order to evaluate psychological and social aspects. More specifically, an adaptation to EF of the scale of basic psychological needs on the Vlachopoulos and Michailidou (2006) exercise by Moreno et al. (2008). The scale has 12 items headed with the sentence "During my Physical Education classes...". The items corresponded to a Likert scale, from 1 (totally disagree) to 5 (totally agree). There were three factors: autonomy (for example "I have the chance to choose how to carry out the exercises"), competence (f.e, "I do the exercises effectively ") and relation with the others (f.e "I relate with my classmates in a friendly way")

### *Procedure*

First of all, the school directors were contacted in order to request their cooperation to carry out the investigation, and it was given further information about it. Finally, it was obtained the parental informed approval of every single student participating. This investigation was always respectful with the ethical values for studies like this one, under the ethical rules of Helsinki Declaration (1975).

The tool detailed before in order to measure the BPN during PE classes, was applied by the researchers during a PE session handed over in an altruist way to do this task. For it, the teacher was asked not to be present, in order to avoid any interferences in the students' answers.

There were given 20 minutes to answer the quiz, and depending on the age of the students, it was also given a time to explain and answer questions before they started the questionnaire. During this time, it was also clarified that it was not an exam, and there were also no correct or incorrect answers. This way the students would give fearless and honest answers. During the time given to respond, the researchers answered all the doubts that came up about the quiz.

### Statistical Analysis

First of all, the descriptives were calculated (Mean and standard deviation) of all the variables in the study as well as the bivariate correlations with Pearson's Correlation Coefficient. Then, the reliability of the different dimensions with the alfa Cronbach Coefficient (Table 1). First of all, it was carried out the analysis of variance (ANOVA) in order to verify what happened with the age factor regarding BPN dimensions, using Bonferroni to evaluate the meaning in pairs. Later, the bifactorial variance analysis was done for every single variable studied. The first factor was the group educative stage with two levels (Primary Education and Secondary Education) and the second factor was the variable gender (man-woman). The main effects were studied and also the interaction between factors, using the Bonferroni statistical to evaluate the significance. The statistical package used was IBM SPSS Statistics v. 20.0. The confidence Interval was established on 95% of confidence.

## RESULTS

### Descriptive analysis, reliability analysis and bivariate correlations

Table 1 shows the statistical descriptions of the used variables, the reliability analysis and their correlation. The results of the reliability analysis showed suitable values of all the studied dimensions. Referring to the correlation analysis, it is outstanding the good and positive significance between AUT and COMP, as well as between COMP and RELAT. It may be also highlighted the positive and significative relation between AUT and RELAT.

As it can be observed, the values of asymmetry and kurtosis fulfil the normal standard proposed by Curran, West and Finch (1996).

Table 1. Means, standard deviation, asymmetry, kurtosis, reliability analysis and bivariate correlations between the studied dimensions of BPNES

Dimensions	M	SD	A	K	$\alpha$	AUT	COMP	RELAT
Autonomy (AUT)	3.45	.89	-.47	-.07	.773	1	.521**	.394**
Perceived competence (COMP)	3.89	.82	-.69	-.09	.794	1	1	.466**
Relatedness (RELAT)	3.56	1.14	-.41	-.78	.908	-	-	1

Note: M = Mean; SD = Standard deviation; A = Asymmetry; K = Kurtosis;  $\alpha$  = Alpha of Crombach; \*\* The correlation is significative at a level 0,01 (Bilateral)

### Variance Analysis regarding the age

Table 2 shows the Means and standard deviations of the BPNES variables collected in the quiz, according to the age of the students.

The ANOVA results show the existence of an effect statistically significative between the age of the students and AUT ( $F(7, 735) = 2.087$ ;  $p = .043$ ,  $\eta^2 = .02$ ), COMP ( $F(7, 735) = 7.071$ ;  $p < .001$ ,  $\eta^2 = .06$ ) and the RELAT ( $F(7, 735) = 47.799$ ;  $p < .001$ ,  $\eta^2 = .31$ ).

The multiple comparisons indicate that in AUT there are statistical significative differences between the group of 14 and 15 years old ( $p = .026$ ) being higher the first ones.

The multiple comparisons also show in COMP that there are statistical significant differences between the 10-year-old group and the 14-year-old group ( $p < .001$ ), 15 ( $p < .001$ ) and 16 ( $p = .001$ ), it is higher in 10-year-olds than for the other ages. There were also found differences between the group where the ages were 11 and 12, with the 15-year-old group ( $p = .002$ ) as well as the 13-year-old group with the 15-year-old one ( $p = .006$ ).

Table 2. Descriptive data of the variables of the BPNES analysed. Mean, Standard Deviation, regarding the age

	10 (n=110)		11 (n=109)		12 (n=106)		13 (n=107)		14 (n=109)		15 (n=100)		16 (n=70)		17 (n=32)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
AUT	3.55	.98	3.48	.91	3.50	.84	3.45	.88	3.58	.85	3.17	.86	3.37	.81	3.43	.98
COMP	4.19	.70	4.02	.80	4.02	.78	3.99	.77	3.71	.87	3.57	.83	3.68	.81	3.75	.80
RELAC	4.29	.86	4.48	.64	3.85	1.08	3.45	1.15	3.07	.97	2.83	.93	2.67	.91	3.10	1.14

Note: M: Mean. SD: Standard Deviation. AUT: Autonomy; COMP: Competence; RELAT: Relatedness.

Regarding RELAT, the multiple comparisons indicate the existence of statistical significant differences between the group of 10 and 11-year olds with the 13-year-old group ( $p < .001$ ), 14 ( $p < .001$ ), 15 ( $p < .001$ ) and 16 ( $p = .001$ ) and 17 years ( $p < .001$ ). Between the 12-year-old and 10-year-old ( $p = .021$ ) and 11-year-old ( $p < .001$ ) and between 13 and 14 years ( $p < .001$ ), 15 ( $p < .001$ ) and 16 ( $p = .001$ ).

**Factorial variance analysis regarding the educative stage and gender**

Table 3 shows the means and standard deviations of the BPNES variables gathered in the quiz, according to the educative stage on a general way and gender.

Table 3. Descriptive data of the BPNES analysed variables. Mean, Standard Deviation, regarding gender and educative stage

Variable	Educative Stage	Total		Boys		Girls	
		M	SD	M	DE	M	DE
AUT	Primary	3.51	.90	3.55	.94	3.49	.88
	Secondary	3.40	.88	3.45	.87	3.37	.89
COMP	Primary	4.13	.71	4.18	.70	4.10	.72
	Secondary	3.72	.85	3.64	.87	3.78	.83
RELAT	Primary	4.40	.77	4.48	.70	4.33	.83
	Secondary	2.95	.96	3.00	.95	2.90	.97

Note: M: Mean. SD: Standard deviation or standard. AUT: Autonomy; COMP: Competence; RELAT: Relatedness

The ANOVA factorial results carried out regarding AUT indicated that there is not a main significative effect of the educative stage factor ( $p = .102$ ), nor the gender factor ( $p = .304$ ) or the interaction between both factors ( $p = .899$ ).

For its part, the ANOVA factorial results regarding COMP indicated that there is a main significative effect of the educative stage factor ( $F(1, 739) = 512,720$ ,  $p < .001$ ,  $\eta^2 = .06$ ). There was not a principal effect regarding the gender factor ( $p = .670$ ), and neither an effect of interaction between the educative stage and gender factor ( $p = .078$ ).

Regarding the comparison in pairs in COMP, based on the obtained results on the stage factor, there were significative statistical differences between boys in primary education vs secondary education ( $p < .001$ ) and the same happened with the girls ( $p < .001$ ) of the two stages, higher on Primary Education than Secondary.

The factorial ANOVA results obtained regarding RELAT, indicated the existence of a significative main effect of the educative stage factor  $F(1, 739) = 476.531$ ,  $p < .001$ ,  $\eta^2 = .39$ . There was not a significative main effect of the gender factor ( $p = .063$ ) and there was not either a significative interaction effect between the educative stage and gender factors ( $p = .724$ ).

The comparison in pairs regarding COMP, looking at the obtained results with the stage factor, there were statistical significative differences between boys in primary school vs secondary school ( $p < .001$ ) and the same happened with girls ( $p < .001$ ) in both stages, the same that happened with the previous dimension.

## DISCUSSION

With this research, it has been studied the BPN regarding age, educative stage, and the students' gender. Importance and innovation of this study consists in the fact that it considers two educative stages (5<sup>o</sup> and 6<sup>o</sup> Primary Education and Secondary Education) in which takes place a critical period because students quit PE practice and so they are not enough active (Moscoso, Martín, Pedrajas & Sánchez, 2013), and this could lead to have health and also psychological problems.

Generally, the obtained results of this study, indicate that the students of those ages, show positive results due to the high average grade regarding autonomy, competence and relatedness. Also, the academic strategies may have huge importance developed by teachers as it has been said by Sánchez-Oliva, et al., (2013) and Abos, Servil, Sanz, and García (2015).

Regarding the age, this investigation shows that there are statistical significative differences in all the dimensions studied. There is a trend to decrease from the 10-year-olds to the 15-year-olds regarding AUT and COMP, then, increases until 17, but never reaching the level of the younger students. Regarding RELAT, it was revealed the same decreasing trend, and even more strong until the 17. Generally, regarding the age, the three dimensions show more grade within the younger ones (10, 11 and 12 years old), in this way they decrease as the age increases, like it happened in the researchers carried out by Barreal-López et al., 2015, Gómez-Rijo et al., 2014, Navarro et al., 2016 and Soini, et al., 2007.

Due to these results, we can accept the first established hypothesis.

Regarding the educative stage, statistical significative differences were found with regard to COMP and RELAT, the points of the Primary Education students were higher than Secondary Education ones. These

results establish the same than the investigations done by Barreal-López et al. (2015), Gómez-Rijo et al. (2014) and Navarro et al. (2016). This can be due to the fact that the younger students, because of the method carried out by the teachers (Sánchez-Oliva, et al., 2013) may believe that their capacity to carry out the task during classes, is more efficient for them than for the older ones (García-Calvo, et al., 2011; González-Cutre, et al., 2011).

Regarding gender, this research has also proved that there are statistical significant differences. Boys reach more points than girls on every single dimension studied, just like it was revealed in researches such as the one by Barreal-López et al., 2015, Gómez-Rijo et al., 2014 and Navarro et al., 2016. If it is considering the punctuation intra-gender, there are higher on kids from Primary Education than Secondary Education.

Because of this, we should accept the second established hypothesis due to the higher punctuations during the primary stage and also higher regarding boys than girls.

Therefore, summarizing the results we obtained with this research regarding educative stage, we can say that they show that the Primary Education students have higher punctuations on AUT, COMP and RELAT, as well as a higher average regarding boys than girls of this stage. We could prove that as the age increased the students feel less autonomy, less competence in order to carry out the tasks and perceive less relation with the other classmates. These results may have been this way, part of them, because of the method of the PE teacher, because during the classes there is a competition climate which empowers a higher competence most of all with the boys (Granero-Gallegos & Baena-Extremera, 2014) or maybe it is because there is not enough content which the girls usually prefer such as corporal expression or dance (Amado et al., 2014; O'Neill, Pate & Liese, 2011).

## LIMITATIONS

We should be careful reading the results of this study because there are limitations to it that should be taking into account. The first one is due to the sample selection, which was not random, but the one the researchers had access to. Another factor could be not having in mind the type of content given during the classes when the data was collected, which could affect to the three basic psychological needs. Another possible limitation is the transversal design of the investigation; therefore, we consider interesting to develop a longitudinal research, with an experimental group, in which the effects on the variables can be known after a determined intervention, because this kind of study could lead to a training programme for teachers in order to promote the autonomy, the perceived competence, and the relatedness.

## CONCLUSIONS

Complying with the established objectives of this study, autonomy was evaluated, as well as competence and relatedness within the mandatory education in Spain (Primary Education, 5<sup>o</sup> and 6<sup>o</sup> and Secondary Education); this way it is proved the existence of higher values on the three dimensions regarding Primary Education than Secondary Education and also higher regarding boys than girls on both stages. The results show that as the age increases, students perceive less competence and less relatedness and increases at age 17 with the last Secondary Education course.

It is also important to deepen the reasons why this is like it is. Therefore, these reasons should be discovered and then take action on them, most of all, adapting the teacher's method to the needs of each group of age and gender and this way help to increase the three basic needs because if they are satisfied, there would be

an intrinsic motivational increase of the self-activity and consequentially, it may take place the fact of following a healthier way of life which would lead to a physical and psychological welfare of the person (Cuevas, Contreras, Fernández & González-Martí, 2014).

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