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# The Importance of Supporting Student Autonomy in Physical Education Classes to Improve Intention to Be Physically Active

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**Abstract:** This study sought to analyze the predictive power of supporting student autonomy in physical education classes on the intention to be physically active based on motivational variables. The Self-Determination Theory was used as a theoretical framework. The study sample comprised 922 students of both sexes, aged between 14 and 18 years old ( $M = 14.95$ ,  $SD = 0.98$ ). Several questionnaires were applied to analyze the measured variables. The results of the model of structural equations revealed that students' perceived autonomy support positively and significantly predicted the satisfaction of the BPN (autonomy, competence and social relations). These, in turn, positively and significantly predicted autonomous motivation; and lastly, the most self-determined type of motivation positively and significantly predicted the intention to be physically active. This finding emphasizes the importance of establishing motivational strategies to support students' autonomy via the satisfaction of psychological needs, enhancing autonomous motivation and, as a consequence, increasing students' intention to practice physical activity.

**Keywords:** structural equation modeling; self-determination theory; motivation; basic psychological needs

## 1. Introduction

The style of teaching used by physical education (PE) instructors can have important consequences for students, as it determines their motivation towards PE classes [1], and their interest in continuing physical activity outside of school hours [2,3]. Negative experiences in PE classes can contribute to the decrease in the practice of physical activity in the future [4,5]. Optimal motivation and student participation in PE classes is crucial for promoting this practice. According to Deci and Ryan [6], autonomy support is understood as the use of a teaching style that is neither controlling nor authoritarian, but which seeks to make students feel that they can participate in their own actions. A context in which autonomy is supported is one in which choice is promoted, pressure for executing tasks in a determined manner is minimized and a sense of initiative is promoted. Ultimately, this means encouraging the active participation of students during learning activities and recognizing their capabilities [7]. The student's perception of autonomy support (defined as students who perceive the support of their teachers towards their autonomous motivation) helps to highlight students' effort and persistence during PE classes [8,9].

Self-Determination Theory (SDT) is a social cognitive theory that defines the concept of autonomous motivation and helps to explain student motivation in the context of PE classes [6,10–13].

The SDT [6,10–13] is a macro theory of human motivation which analyzes the degree to which human behaviors are self-determined; that is to say, the degree to which people perform their actions voluntarily or by their own choice [14]. The SDT establishes that motivation is a continuum, characterized by the following different types of self-determination, ranging from more to less self-determined: intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and demotivation. According to more recent studies [14–17], a new classification of this theory has been established which distinguishes between autonomous motivation (formed by intrinsic motivation and identified regulation) and controlled motivation (formed by introjected and external regulation). According to Deci and Ryan [11], human behavior is motivated by three basic psychological needs (BPN): *autonomy*, which reflects the possibility of carrying out activities by one's own choice [10,18–20]; *competence*, involving a desire, to achieve satisfactory results [10,19,21]; and *relatedness*, which refers to having a good social relationship with others, being a reciprocal relationship [6]. These needs are considered as being innate, universal and essential for health and wellbeing [13,22]. Based on SDT, Vallerand [23,24] developed the Hierarchical Model of Intrinsic and Extrinsic Motivation (HMM). The main contribution of this model was that it establishes three interrelated hierarchical levels (global motivation, contextual motivation and situational motivation), in which motivation can become affected. The global level refers to a general willingness to participate in activities; the contextual level includes motivation in a specific context (e.g., PE classes); and the situational level is the lowest level of the hierarchy, and is experienced when people engage in an activity in a specific time. In addition, the HMM establishes that the social aspects of the environment influence motivation according to whether or not the BPN are satisfied (autonomy, competence and relatedness). In turn, the satisfaction of the same increases autonomous motivation [11,22] and leads to positive affective (e.g., positive emotions), cognitive (e.g., attention) and behavioral (e.g., intention to be physically active) consequences [24]. In contrast, the lack of satisfaction of the same (or mediators) progressively increases controlled motivation and, ultimately, leads to demotivation, resulting in a series of negative affective, cognitive and behavioral consequences [25].

In this line, the BPN are determined by the social environment, and the autonomy support is the most studied social factor in the academic context. Autonomy support is considered an important factor which favors the ability of PE students to thrive, therefore improving their personal growth and satisfaction with life [26]. Recent studies, such as that by Aguirre et al. [27], found that the perception of interpersonal styles of autonomy support was negatively related with the frustration of the three BPN and with more autonomous motivation. However, the perception of more controlling styles displayed a positive relationship with the frustration of the same. Gil-Arias et al. [28], applying a methodology that favored autonomy support and decision-making by the student, found positive relationships with the BPN of competence. However, this perception of autonomy by the student, above all, is associated with the BPN of autonomy, as shown in a recent systematic review [29], where most of the studies determined that the autonomy support created by the PE teacher produced different positive effects on the BPN of autonomy [30,31].

In addition, the higher the perception of autonomy support, on behalf of students, the greater levels of autonomous motivation are achieved, thus enhancing the development of positive and adaptive consequences [8,32–35]. Students' perceptions regarding the support that teachers provide to the satisfaction of BPN is important as this will ultimately determine their motivation towards both planned activities and PE [36]. Students who present a more autonomous motivation towards physical activity experience a series of positive health consequences [9,23,24,31,37] and a greater intention of being physically active outside school hours [38–43]. The intention to be physically active refers to a subject's intentionality to continue to practice physical activity in the future or intention is a predictor of behaviors that reflect willpower. Several studies [44–46] have shown that the intention to be physically active is a variable that predicts physical activity, is necessary for the practice of physical activity, and has demonstrated benefits from an early age [47]. The intention to be physically active has often been related with the satisfaction of BPN, showing that the intention to be physically active is associated

with higher levels of autonomy, competence and relatedness in PE classes [39,48–52]. Additionally, Franco et al. [41], with a sample of 1597 PE students, found that the intention to practice physical activity in the future was predicted by self-determined motivation and the practice of physical activity during free time. Ha et al. [50] performed a study based on an intervention program among teachers, empowering these to base their teaching on approaches for the support of student autonomy via tactics such as explaining the significance of physical activities to the students, providing informative feedback and assisting with any difficulties encountered by the students. The satisfaction of BPN improved, together with the students' autonomous motivation towards physical activity, their intention of participating in physical activity, their levels of psychological wellbeing and their physical condition and health.

Therefore, due to the importance of autonomy support provided by teachers, the aim of the present study was to analyze the predictive power of students' perceived autonomy support during PE classes on the intention to be physically active, via motivational variables (BPN and autonomous motivation). The following hypothesis was tested: students' perceived autonomy support will positively predict the satisfaction of BPN, and this, in turn, will positively predict autonomous motivation, which will positively predict the students' intention to be physically active.

## 2. Materials and Methods

This study received the approval of the Commission of Bioethics and Biosecurity in compliance with the Helsinki Declaration. All participants were treated in agreement with the ethical guidelines of the American Psychological Association regarding participant assent, parent/guardian consent, confidentiality and anonymity. All participants and their parents/guardians provided informed written consent.

### 2.1. Design of the Study

This study followed a non-experimental design, whereby the variables described above were not altered; there was only observation of them [53].

This was a quantitative empirical study. A descriptive study was carried out through surveys [47].

### 2.2. Participants

Participants were 922 compulsory secondary students, 430 male and 492 female, from nine secondary schools located in Cáceres (Spain). They were drawn from 50 classes in 3rd and 4th grades. Each class comprised 18–20 students. Students were aged between 14 and 18 years ( $M = 14.95$ ,  $SD = 0.98$ ). Intentional sampling methods were used [53]. Twelve students were excluded from the study. The exclusion was based on answers to questions, those who did not answer were excluded. The schools studied came from rural and urban areas.

There were 9 schools with a total of 50 classes. In Table 1, the distribution of the sample in terms of gender and year-group can be seen.

**Table 1.** Distribution of the sample according to gender and year group.

Year-Group	Male	Female	Total
3°	247	265	512
4°	183	227	410
Total	430	492	922

In Table 2, the distribution of the sample in terms of organizations that participated in the study and year-group is represented.

**Table 2.** Distribution of the sample according to the school and the year-group.

School	3°		4°		Total
	Male	Female	Male	Female	
School 1	22	20	16	10	68
School 2	19	27	11	3	60
School 3	22	36	24	32	114
School 4	54	56	47	48	205
School 5	29	19	22	32	102
School 6	42	43	18	60	163
School 7	18	21	0	0	39
School 8	41	43	38	35	157
School 9	0	0	7	7	14
Total	247	265	183	227	922
Total Year-Group	512		410		922

### 2.3. Instruments

**Perceived Autonomy Support.** The Perceived Autonomy Support Scale for Exercise Settings (PASSES) was used. This scale has been validated by Hagger et al. [54] and adapted to Spanish by Moreno-Murcia et al. [55]. The PASSES scale is comprised of 12 items that evaluate a single factor: autonomy support (e.g., The teacher provides me with different options, such as performing sports exercise in my free time). Regarding the confirmatory factor analysis (CFA), acceptable adjustment indices are reported [56]:  $\chi^2 = 28.49$ ,  $df = 9$ ,  $p < 0.001$ ,  $\chi^2/df = 3.17$ , CFI = 0.99, TLI = 0.99, RMSEA = 0.05 (90% CI = 0.03, 0.07). The reliability in the present study was  $\omega = 0.90$  and  $\alpha = 0.93$ .

**Basic Psychological Needs.** The Basic Psychological Needs in Exercise Scale (BPNES) [57] was used, validated to Spanish by Moreno-Murcia et al. [58]. This scale comprises 12 items divided into three subscales of four items each: autonomy (e.g., I think I can make decisions in my workouts), competence (e.g., I have faith to do exercises), and relatedness (e.g., I feel attached to my colleagues). Regarding the CFA, acceptable adjustment indices are reported [56]:  $\chi^2 = 57.79$ ,  $df = 24$ ,  $p < 0.001$ ,  $\chi^2/df = 2.41$ , CFI = 0.99, TLI = 0.99, RMSEA = 0.04 (90% CI = 0.03, 0.05). The reliability for the autonomy subscale was  $\omega = 0.80$  and  $\alpha = 0.84$ ; for the competence subscale was  $\omega = 0.80$  and  $\alpha = 0.84$ , and for the relatedness subscale was  $\omega = 0.85$  and  $\alpha = 0.89$ .

**Levels of Self-Determined Motivation.** The Perceived Locus of Causality in Physical Education (PLOC) was used. The original scale was designed by Goudas et al. [59], and was validated in Spanish by Moreno-Murcia et al. [60]. This consists of 20 items divided into 5 factors. In the current study, a single factor was used: autonomous motivation. Autonomous motivation is composed of intrinsic motivation (e.g., Because the PE is fun) and identified regulation (e.g., Because I can learn skills that I could use in other areas of my life). Regarding the CFA, the results reveal acceptable adjustment indices [56]:  $\chi^2 = 296.79$ ,  $df = 62$ ,  $p < 0.001$ ,  $\chi^2/df = 4.35$ , CFI = 0.96, TLI = 0.97, RMSEA = 0.06 (90% CI = 0.05, 0.07). Results have shown evidence of reliability ( $\omega = 0.88$ ;  $\alpha = 0.91$ ).

**The Intention to be Physically Active.** The questionnaire of the measurement of intentionality to be physically active was applied (MIFA). An adapted version by Hein et al. [61] was used for the present study; this is known as the "Intention to be physically active"; the Spanish validation was performed by Moreno-Murcia et al. [62]. This questionnaire is formed by five items which comprise a single factor: intention to be physically active (e.g., I intend to practice physical activity during my free time in the next 6 months). Regarding the CFA, the results showed acceptable adjustment indices [56]:  $\chi^2 = 7.58$ ,  $df = 2$ ,  $p < 0.05$ ,  $\chi^2/df = 3.79$ , CFI = 0.99, TLI = 0.99, RMSEA = 0.06 (90% CI = 0.02, 0.09). These items have been reliable in the present study ( $\omega = 0.86$ ;  $\alpha = 0.92$ ).

The items of the measuring instruments were rated according to a Likert scale of five points, ranging from 1 (strongly disagree) to 5 (strongly agree).

#### 2.4. Process

Nine schools and their directors were contacted in order to explain the objectives of the study. For the students under 18 years old, a consent form was provided for the parents to sign.

The date and time for visiting the schools and application of questionnaires were marked. The questionnaires were applied without the presence of the PE teacher and in a session of PE. The time employed for the completion of the questionnaires was 40 minutes per class.

#### 2.5. Data Analysis

We computed descriptive analyses and Pearson correlations between the major variables. Cronbach's alpha ( $\alpha$ ), and McDonald's omega ( $\omega$ ) were used to analyze the evidence of reliability of the measurement instruments. Cronbach's alpha values above 0.70 are indicators of reliability [63]. In the case of McDonald's omega, the established range is between 0 and 1, with the highest values providing the most trustworthy measurements [64]. The CFA was calculated in order to verify the construct validity of the questionnaires. This respected the criterion of eliminating those items with a regression weight that did not present an adequate value (greater than 0.40) [65]. All the items used in the present study presented adequate values.

The hypothesis raised was tested by Structural Equation Modeling (SEM). Regarding the estimation method, given that the participants' responses were obtained through a Likert scale, we decided to use weighted least squares means and variance adjusted (WLSMV) estimators. This method has proved to be more accurate than the Maximum Likelihood [66], which does not require multivariate or univariate normality [67].

To prevent any problems underlying the violations of independence, the students were grouped by classes, as recommended by Stapleton et al. [68]. It is important to note that the data may not be independent, since students were nested within classes and schools. To statistically correct these nests and underestimate the standard errors produced by the independence violations [69], standard errors were estimated using a sandwich-type estimator [70].

We used the delta method [71] to test the indirect effects, where the 0 value should not be in the confidence interval (95%) around the indirect effect. Subsequently, the indirect effects in the SEM were estimated: the effect of the perception of support for autonomy on the intention to be physically active, via the BPN and autonomous motivation.

To test the fit of the hypothesized model to the sample data, we used the chi-square test ( $\chi^2$ ), the degrees of freedom (df), the significance ( $p$ ), the  $\chi^2/df$ , the RMSEA (Root Mean Square Error of Approximation), the CFI index (Comparative Fit Index) and the Tucker-Lewis Index (TLI). The  $\chi^2/df$  is considered acceptable when it is less than five, the RMSEA with values lower than 0.05, and the CFI and TLI with values between 0.90 and 0.95 or higher, are considered as an acceptable to excellent fit [56,72].

For the descriptive analyses, Pearson correlations, and Cronbach's alpha, we used the SPSS 21.0 statistical program. Concerning the McDonald's omega, the calculations were made with the "psych" 1.4.2.3 [73] of R 3.0.3 (RCore-Team, 2014). The CFA and the SEM was performed using Mplus 8.3 [70].

### 3. Results

#### 3.1. Preliminary Analyses

Descriptive statistics (means and standard deviations), and Pearson's correlation for major variables are displayed in Table 3.

**Table 3.** Mean, Standard Deviations and Pearson's Correlations.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Autonomy support	3.22	1.00					
2. Autonomy	2.97	0.91	0.42				
3. Competence	3.67	0.94	0.38	0.54			

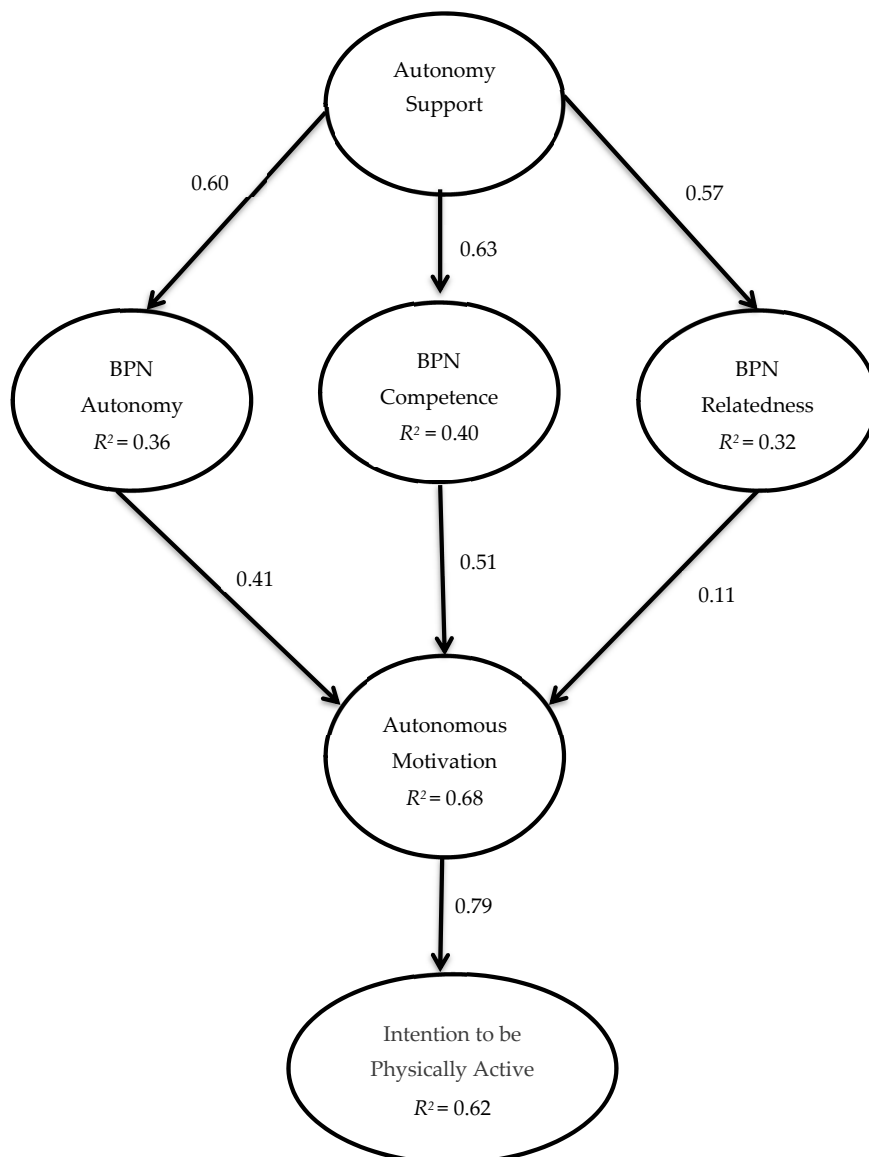
Table 3. Cont.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
4. Relatedness	3.89	0.93	0.34	0.47	0.57		
5. Autonomous motivation	3.68	0.87	0.43	0.61	0.61	0.48	
6. Intention to be physically active	3.88	1.00	0.34	0.39	0.64	0.40	0.58

Note. All correlations are significant  $p < 0.01$ .

### 3.2. Structural Equation Modeling

In accordance with the HMM [13,74], the antecedent variables (perceived autonomy support), the mediators (satisfaction of the BPN), self-determined types of motivation (autonomous motivation) and consequences (intention to be physically active) were included (Figure 1).



**Figure 1.** SEM. Prediction of intention to be physically active based on perception of the support of autonomy and the motivational variables. All parameters are standardized and are statistically significant ( $p < 0.01$ ).

The contribution of each of the factors of prediction for other variables was examined via standardized regression weights. As shown in Figure 1, the autonomy support perception, positively and significantly predicted the satisfaction of autonomy BPN ( $\beta = 0.60$  [0.56, 0.64]), competence ( $\beta = 0.63$  [0.57, 0.68]) and relatedness ( $\beta = 0.57$  [0.50, 0.63]). Moreover, autonomous motivation was positively and significantly predicted by the satisfaction of the autonomy BPN ( $\beta = 0.41$  [0.35, 0.47]), competence ( $\beta = 0.51$  [0.48, 0.54]) and relatedness ( $\beta = 0.11$  [0.05, 0.17]). In addition, autonomous motivation positively and significantly predicted the intention to be physically active ( $\beta = 0.78$  [0.73, 0.83]).

The results of the model of structural equations showed a good alignment to the data [56,72]:  $\chi^2 = 1272.62$ ;  $df = 268$ ;  $p < 0.001$ ;  $\chi^2/df = 4.75$ ; CFI = 0.93; TLI = 0.92; RMSEA = 0.06 (IC 90% = 0.06, 0.07).

Regarding the indirect effects between the latent variables, the results can be seen in Table 4.

**Table 4.** Indirect effects in Structural Equation Model.

Variables	Effects	<i>p</i>
Autonomy Support → Autonomous Motivation	0.64	0.00
Autonomy Support → Intention to be Physically Active	0.50	0.00
Satisfaction BPN Autonomy → Intention to be Physically Active	0.33	0.00
Satisfaction BPN Competence → Intention to be Physically Active	0.40	0.00
Satisfaction BPN Relatedness → Intention to be Physically Active	0.09	0.00

*p*, significance index.

Table 4 shows the totals of the indirect effects. However, the results revealed that the indirect effects of the autonomy support perception ranging to autonomous motivation varied according to the means. Thus, via satisfaction of autonomy BPN was  $\beta = 0.25$  [0.21, 0.28], via satisfaction of competence BPN  $\beta = 0.32$  [0.29, 0.35] and via satisfaction of relatedness BPN  $\beta = 0.06$  [0.03, 0.10]. Additionally, regarding the indirect effects, including the perception of support for autonomy to the intention to be physically active, we found the following results: via satisfaction of autonomy BPN  $\beta = 0.20$  [0.16, 0.23], via satisfaction of competence BPN  $\beta = 0.26$  [0.22, 0.28] and via satisfaction of relatedness BPN  $\beta = 0.05$  [0.02, 0.08].

#### 4. Discussion

Scientific literature has shown that teachers who promote students' autonomy support in the classroom meet their BPN [29]. This implies that students have more autonomous motivation and more positive cognitive, emotional, and behavioral consequences [9,23,24,31,37]. Thus, in this research, we propose to analyze the relationships between autonomy support, BPN, autonomous motivation and the students' intention to be physically active, as a consequence of behavioral type.

We hypothesize that students' perceived autonomy support will positively predict the satisfaction of BPN, and these will positively predict autonomous motivation, which, in turn, will positively predict the students' intention to be physically active. In relation to the reported findings, this hypothesis is fulfilled as we were able to demonstrate that students' perceived autonomy support positively and significantly predicted the satisfaction of the BPN (autonomy, competence and social relations). These, in turn, positively and significantly predicted autonomous motivation; and lastly, the most self-determined type of motivation positively and significantly predicted the intention to be physically active.

The results of the studies underline the importance of supporting student autonomy to satisfy the three BPN of autonomy, competence and relatedness [75–77], and for improving the more self-determined motivation [78–80], thus supporting the results of the present study. Autonomous motivation takes place when students perceive that they are in an environment that supports autonomy [81–84], as many studies have determined the existence of a relationship between the satisfaction of BPN with more self-determined forms of motivation during PE classes [85–89]. This more

self-determined motivation is associated with positive consequences, such as the intention to be physically active. In this sense, several studies highlight the importance of the relationship between the more self-determined forms of motivation during PE classes and the intention to be physically active [41,90,91], which is in accordance with the results of the current research.

There are several studies that have analyzed the relationship between autonomy support and motivational and consequent variables, such as the intention to be physically active. However, similar to our results, a study by Chicote-López et al. [39] with PE students, applied a structural equations model and found positive and significant predictions between the social environment, generated by PE teachers, with the BPN of autonomy, competence and relatedness, and these with intrinsic motivation; while, in the last level of prediction, the form of more self-determined motivation predicted physical activity and the students' intention to be physically active. In addition and in keeping with the findings of the present study, Cheon et al. [92], and, more recently, Cheon et al. [7] in an intervention study to evaluate the effects of a training program with PE teachers on strategies for the autonomy support, determined that the increase in the autonomy support perception on behalf of students also increased the satisfaction of BPN. Likewise, González-Cutre et al. [93] conducted an intervention based on assigning PE students' autonomy and found that, in the experimental group, the levels of autonomy support perception had increased, together with identified regulation and practice of physical activity in the leisure time.

This study, according to the postulates of the HMM, highlights the importance of promoting support of autonomy, obtaining higher levels of self-determined motivation through the satisfaction of the BPN, leading to positive behavioral consequences, such as increase of intention to be physically active as a non-analyzed aspect in previous studies, which had measured physical activity in the leisure time.

Despite the proven importance of teachers performing strategies to improve the perception of support for student autonomy, Franco and Coterón [8] found that, for PE professors, strategies oriented at favoring the satisfaction of autonomy were more viable when compared with those oriented to the development of motor competence, to obtain a greater self-determined motivation, satisfaction of the BPN of autonomy and competence, and importance towards PE classes by the students. In this sense, teachers can change their style of teaching and create environments that favor autonomy support [85]. In concordance with both Brian et al. [85] and our results, we consider it is vitally important to underline that this perception by the teachers shifts towards the use of strategies that increase the support for autonomy and facilitates orientation programs towards the use of these strategies. An example of this is the recent project by Moreno-Murcia et al. [26], which promotes an educational method implemented by PE teachers for the support of autonomy among their students. Some of the strategies proposed are asking the students their preference in relation to a task, letting the students take the initiative or using the students as a model for the demonstration of tasks. Therefore, the experiences of teachers in PE classes will determine the practice of physical-sports activity, in which teachers must promote satisfaction of BPN in the classrooms. In PE classes, teachers are a key figure for the process of teaching and for highlighting the importance of using strategies for increasing the autonomy perception on behalf of students, such as granting increasing autonomy to the pupils for the proposal of tasks and contents to develop during the academic year, involving them in decision-making, and encouraging them to participate in their process of teaching, as well as explaining to students what to do and why to do it, so that they can fully comprehend everything that occurs in PE classes. All this, combined with the availability of a wide variety of activities, will provide students with the possibility of choosing what they like the most, both within and outside the school timetable, therefore increasing the possibility that the future intention of physical activity practice will be greater.

The present study sought, on the one hand, to improve the process of teaching-learning of the student, as well as getting to know the necessary aspects so that adherence to the practice of physical activity outside the school timetable could be higher. This is a multidisciplinary work, in which, from the point of HMM, both the motivational variables are reflected as well as background variables



and their consequences. However, it is true that by solely issuing questionnaires, the research findings can be limited, as opinions are only obtained based on a response scale. Methodological triangulation was not performed in this study, which could be revealing. We have also not taken into account the “class effect” potential in the results. Another limitation of the present study is the impossibility of establishing cause-effect relations to determine the effect that the application of different strategies may have on the variables under study. Therefore, it would be interesting to perform a quasi-experimental intervention-based study, comprising students of different ages, and from different environments (rural and urban).

## 5. Conclusions

Based on the theoretical basis of HMM, it was concluded that students who perceive autonomy support from their teacher would feel that their BPN (autonomy, competence and relatedness) are satisfied, which will increase the autonomous motivation and, therefore, consequently, positively derive in an increased intention to be physically active. The importance of training teachers to implement methodological strategies in the classroom that support student autonomy is emphasized, which will lead to a greater intention for students to participate in physical activity and have a healthier life.

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