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Teacher Feedback as a Predictor of the Type of Motivational Orientation of Physical Education Students

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High jump athlete in mid-flight, performing the Fosbury Flop technique with maximum extension and control over the bar.
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Abstract

The aim of the present study was to analyze the relationship between the feedback provided by teachers and the type of motivation developed by physical education (PE) students in elementary education. To this end, an associative and predictive research design was employed. A total of 416 schoolchildren aged between 10 and 12 years participated in the study (M = 10.78; SD = .67). All participants attended schools in Málaga (Spain) with similar school curricula and sociodemographic characteristics. Data were collected using the Revised Teacher Feedback Perceptions Questionnaire (PTF-R) and the Physical Education Motivation Questionnaire (CMEF-EP). The correlation and linear regression analyses revealed that most self-determined forms of motivational regulation, such as identified motivation and intrinsic motivation, were associated with positive feedback, both verbal and nonverbal, as well as with performance-related feedback. Conversely, positive and performance-related feedback showed an inverse relationship with amotivation and extrinsic motivation, while a positive relationship was observed with negative feedback. Overall, the findings of this study suggest a significant differential relationship between the type of feedback provided by physical education teachers and students' motivational regulation, highlighting the importance of interaction styles in physical education classes and the need for teachers to analyze and structure their instructional practices in order to enhance students' experiences and their adherence to PE classes.

Keywords: enjoyment, feedback, lifestyle, motivation

Introduction

Physical education (PE) during elementary education is fundamental to children's overall development, as it significantly improves motor skills as well as social, cognitive, and emotional abilities (Andermo et al., 2020; Li et al., 2023; Teraoka et al., 2021). Physical education is also an excellent setting for developing active lifestyles and teaching healthy habits, which positively impact student learning and overall well-being (Carse et al., 2018; Zueck et al., 2020). In this day and age, in which passive leisure activities contribute to the development of increasingly sedentary lifestyles, the mandatory nature of this subject represents an opportunity to promote access and adherence to physical activity habits (García-Ceberino et al., 2023; Silva et al., 2018).

Student motivation in PE classes is a decisive factor for their level of adherence, effort, and enjoyment during class (Moreno-Murcia et al., 2018; Muñoz et al., 2018; Leyton-Román et al., 2020). This aspect not only specifically impacts the educational setting, but it also plays a crucial role in the formation of healthy lifestyle habits and the adoption of a long-term active lifestyle (Esqueda-Valerio et al., 2024; López-Alonzo et al., 2021). Understanding the factors that influence student motivation in PE classes is key to determining how teachers should approach their instruction and what strategies can be used to achieve these goals (Fernández-Espínola et al., 2022).

Motivation is a complex and multifaceted construct that encompasses beliefs, perceptions, values, interests, and actions that guide behavior (Deci & Ryan, 1985), and requires analysis based on a strong theoretical framework. Self-determination theory (SDT; Ryan & Deci, 2000, 2017) is one of the main contemporary theories of motivation for understanding human behavior and has been widely used in the context of physical activity and sports, and in PE specifically (Sun et al., 2017). According to SDT, human motivation exists along a continuum ranging from intrinsic or self-determined motivation to amotivation, passing through different degrees of extrinsic motivation (Deci & Ryan, 1985). Self-determined motivation is associated with greater interest, enjoyment, and satisfaction in PE classes, thus increasing the likelihood of adherence (Lonsdale et al., 2019; Vasconcellos et al., 2020). Conversely, extrinsic motivation or amotivation diminishes commitment to PE classes, increasing boredom and reducing the intention to engage in physical activity (Vasconcellos et al., 2020; White et al., 2021).

In the context of SDT, and in relation to these forms of motivation, organismic integration theory (OIT) explains how people internalize reasons for their actions and behaviors, creating different types of regulatory styles that range from more controlled or external to more autonomous (Ryan & Deci, 2000). With external regulation, actions are motivated by external rewards or punishments, and individuals act to meet expectations or avoid penalties. With introjected regulation, individuals experience internal pressure to perform a task, such as feelings of guilt or shame, or a desire to feel useful or competent. In identified regulation, individuals place value on an activity and consider it important to engage in it to achieve a goal, using it as a tool. With integrated regulation, another type, an activity must be aligned with personal values, and individuals consider it a part of their identity and way of life. Finally, with intrinsic regulation, individuals engage in an activity because they enjoy it, it creates satisfaction, and they find it interesting (Ryan & Deci, 2000).

Thus, according to SDT, if students have an intrinsic regulatory style and exhibit more self-determined motivation during PE, they are more likely to enjoy the subject and physical activity in general (White et al., 2021). In this context, in addition to other factors, teacher interactions influence student motivation in PE classes, meaning that the strategies teachers use are important during the instructional process (Cheon et al., 2014; Fin et al., 2019; Leo et al., 2022; Vasconcellos et al., 2020).

Among other factors, teaching styles that support student autonomy are those that provide meaningful learning, foster autonomy, show interest in students' progress, personalize learning, and encourage the regulation of intrinsic motivation (Chang et al., 2016; Leo et al., 2020). By contrast, styles that do not individually support student progression are those that do not provide useful information to enhance learning and those based on an approval or disapproval system regarding the final learning outcome, thus promoting the regulation of more extrinsic motivation (Leo et al., 2022; White et al., 2021).

Therefore, educational strategies that support intrinsic motivational regulation promote student adherence and effort (Boulley-Escriva et al., 2018; Polet et al., 2019). The type of interaction between teachers and students is decisive in fostering a motivational and supporting learning environment (Burgueño et al., 2024; Diloy-Peña et al., 2021; Leo et al., 2020).

In this context, feedback provided during the learning process is one of the most common interactions in PE and is a key component of students' learning (Huéscar & Moreno-Murcia, 2012; Koka & Hein, 2003, 2005). In education, Koka and Hein (2005) define feedback as information that teachers give their students regarding their performance and behavior during physical activities. It has been suggested that appropriate feedback that positively reinforces student performance can foster a greater sense of autonomy and may contribute to higher motivation and adherence to physical activity.

This feedback may be verbal or nonverbal and plays a crucial role in regulating student behavior, in students' perceptions of their own abilities, and in their motivation to participate in physical activity (Simpson et al., 2024). Verbal feedback uses language and technical terms to communicate information, while nonverbal feedback includes gestures, facial expressions, and body posture to communicate with students (Rojo-Ramos et al., 2025). The combination of the two types of feedback defines the learning context for the student and creates expectations for it, thereby increasing or decreasing motivation and effort when participating in PE classes (Zhou et al., 2021).

Positive feedback can increase intrinsic motivation in PE students (Mouratidis et al., 2008). Koka and Hagger (2010) noted that positive general feedback has an impact on students' intrinsic motivation, basing this relationship on the satisfaction of basic needs that this type of feedback provides. They also analyzed other types of feedback, including nonverbal feedback, and observed that one type of negative nonverbal information, such as disapproving gestures and expressions of disagreement, led to a decrease in students' self-determined motivation. Meanwhile, Zhou et al. (2021) pointed to the importance of performance-focused feedback, particularly aimed at consolidating motor skills. Leo et al. (2022) highlighted the importance of giving students positive feedback when they perform tasks well, rather than only providing negative feedback when they perform poorly.

This phenomenon can be explained by the hierarchical model from Vallerand (1997), which analyzes motivation holistically and presents a series of social factors that can influence different levels of motivation. According to Vallerand, the social environment is essential for effective learning, as motivation in an achievement-centered context is influenced by the interactions that occur in the classroom. Therefore, feedback provided by teachers may impact some of the dimensions that Epstein (1988) identified as fundamental and that influence the type of motivation that students develop, such as task, authority, recognition, grouping, and time evaluation.

Furthermore, as Cecchini et al. (2019) reported, in line with their circular model, teacher feedback can influence the triangle encompassing intrinsic motivation, effort, and motor skills. Therefore, providing students with adequate feedback should reinforce learning and skills perception, while also fostering more self-determined motivation to engage in physical activity, thereby promoting commitment to such activity.

Feedback is likely the most common type of interaction in PE classes and has a lasting effect on students' perceptions of their participation, influencing how they evaluate their skill level and enjoyment. Based on these premises, it is likely that the type of feedback given also affects the type of motivation that students develop. Accordingly, this study aimed to analyze the relationship between feedback provided by teachers in PE classes and the type of motivation that elementary school students developed. To this end, we used the Revised Teacher Feedback Perceptions Questionnaire (PTF-R), which evaluates students' perceptions of the feedback they received, focusing on feedback quality, quantity, and impact, as well as how it influences motivation and performance in PE settings (Huéscar & Moreno-Murcia, 2012; Koka & Hein, 2003, 2005). The results of the study are expected to contribute to a better understanding of how pedagogical practices in PE, and teacher feedback specifically, influence student motivation. The findings could provide PE teachers with practical guidance on how to structure and deliver feedback to foster intrinsic motivation in students or, at minimum, more self-determined motivation.

Method

Participants

A total of 416 students aged 10 to 12 years participated in this study (M = 10.78; SD = 0.67). All of them attended four schools in Málaga (Spain), with similar school curricula and sociodemographic characteristics. All were public schools with similar educational approaches. The students were in the 5th and 6th years of compulsory elementary education

and had three hours of physical education classes per week. Of the total, 49.76% (n = 207) were male and 50.24% (n = 209) were female. G*Power software (v.3.1.9.7; Heinrich-Heine, Universität Düsseldorf, Düsseldorf, Germany) was used to calculate whether the sample size was adequate. For the tests used in this study, with a 5% probability of error, a 95% confidence level, and statistical power of .95, the required minimum sample size was 158 participants. The inclusion criteria were as follows: (a) not having repeated a grade; (b) being aged between 10 and 12 years; (c) having regularly participated in physical education classes (> 90%) since the beginning of the school year; and (d) not having presented any injuries in the two weeks prior to starting the research.

Instruments

Revised Teacher Feedback Perceptions Questionnaire (PTF-R) (Huéscar & Moreno-Murcia, 2012; Koka & Hein, 2003, 2005). This scale evaluates students' perceptions of the feedback received from teachers within the context of physical education classes. It includes 14 items and four factors: (a) perceived positive general feedback (e.g., "My work is frequently encouraged by the teacher."); (b) perceived knowledge of performance (e.g., "The teacher often instructs me when performing in class."); (c) perceived negative nonverbal feedback (e.g., "The teacher shakes their head when I perform incorrectly."); and (d) perceived positive nonverbal feedback (e.g., "The teacher praises me even though I don't deserve it."). The questionnaire uses a Likert scale ranging from 1 (false) to 5 (true). For this study, we evaluated the internal consistency of the questionnaire and obtained the following values (Cronbach's alpha): perceived positive general feedback, α = .72; perceived knowledge of performance, α = .70; perceived negative nonverbal feedback, α = .76; and perceived positive nonverbal feedback, α = .77.

Motivation in Physical Education Questionnaire (CMEF-EP, by its Spanish acronym) (Leo et al., 2016). This scale evaluates students' types of motivation in the context of physical education classes. It includes 18 items and five factors: (a) intrinsic motivation (e.g., "Because physical education is fun."); (b) identified regulation (e.g., "Because this subject provides knowledge and skills that I think are important."); (c) introjected regulation (e.g., "Because I think it is necessary for me to feel good about myself."); (d) external regulation (e.g., "To show the teacher and my classmates that I'm interested in the subject."); and (e) amotivation (e.g., "I actually feel like this subject is a waste of my time."). The questionnaire is answered using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). For this study, we evaluated the internal consistency of the questionnaire and obtained the following values (Cronbach's alpha): intrinsic motivation, α = .71; identified regulation, α = .78; introjected regulation, α = .73; external regulation, α = .70; amotivation α = .74.

Procedure

The sample was selected from multiple educational centers in Málaga, Spain. The study used convenience sampling, a type of nonprobability sampling. The schools were similar in terms of their physical education curricula, number of weekly class hours, material resources, and socioeconomic characteristics. The first step involved requesting authorization to participate in the research from the school principal. Second, we explained in depth the aim of the study to the students, their families, and the PE teachers. Written informed consent was obtained from the participants and their parents or legal guardians. We stated that student participation was voluntary and anonymous, and that the data would be used only for this study.

The questionnaires were self-administered, and any questions that arose were answered. A classroom was provided in which groups of 10-25 students could complete the questionnaires. It took approximately 30 minutes to answer the questions, and the process was completed without incident. The entire research process was conducted in accordance with the ethical principles of the Declaration of Helsinki. The University of Málaga Research Ethics Committee (CEUMA: 67-2025-H) also granted approval to conduct the study.

Data Analysis

Descriptive and inferential analyses were conducted. We estimated means, standard deviations, skewness, and kurtosis. Data normality was assessed using the Kolmogorov-Smirnov test. Correlation analyses were then conducted using Pearson's bivariate correlation coefficient (± .01 to ± .19 = very low correlation; ± .20 to ± .39 = low correlation; ± .40 to ± .59 = moderate correlation; ± .60 to ± .79 = high correlation; Evans, 1996). Multiple linear regression analyses were also

conducted to assess the predictive capacity of the teachers' feedback on students' motivational styles. We estimated Durbin-Watson values, coefficients of determination (R^2), β values, student's *t*-test, tolerance index (*T*), and the variance inflation factor (VIF). The data were processed using SSPS software package version 25.

Results

Table 1 presents values for the means, standard deviations, skewness, and kurtosis for the study variables, as well as their correlations. The Kolmogorov-Smirnov test was also applied, and in all cases adequate values were obtained ($p > .05$). As shown in Table 1, positive general feedback and performance-related feedback were positively associated with intrinsic and identified motivation and negatively associated with external motivation and amotivation. Positive nonverbal feedback was positively associated with intrinsic, identified, and introjected motivation. Lastly, negative nonverbal feedback was positively associated with introjected and external motivation and amotivation.

Table 2 presents the analyses of the multiple linear regression models generated. The independent variables were the feedback dimensions provided by the teachers, and the dependent variables were the motivation dimensions studied. The data met the assumptions of linearity in the relationship between the dependent and independent variables, as well as homoscedasticity and normality of the residuals, whose mean value was 0 and the standard deviation approximately 1 (.99). In addition, the Durbin-Watson values were satisfactory, ranging from 1.59 to 1.91 (Pardo & Ruiz, 2005).

As shown, the model predicting intrinsic motivation explained 20% of the variance ($R = .46$; $R^2_{adj} = .21$; $F = 27.37$; $p < .001$), and the model predicting identified motivation explained 19% ($R = .44$; $R^2_{adj} = .19$; $F = 24.55$; $p < .001$). In both cases, positive general feedback and positive verbal feedback were statistically significant independent variables, with the former having a greater weight in the model. The model for introjected motivation explained 4% of the variance ($R = .22$; $R^2_{adj} = .04$; $F = 5.28$; $p < .001$), with two nonverbal feedback dimensions emerging as significant independent variables. For extrinsic motivation, the model explained 6% of the variance ($R = .27$; $R^2_{adj} = .06$; $F = 8.06$; $p < .001$), with negative nonverbal feedback and performance-related feedback having the greatest negative weights. Lastly, positive general feedback, (negative weight) and negative nonverbal feedback predicted 12% of amotivation ($R = .35$; $R^2_{adj} = .12$; $F = 14.75$; $p < .001$).

Table 1
Descriptive statistics and correlation measures

	M	*SD*	S	K	2	3	4	5	6	7	8	9
1. Positive general FB	3.36	0.97	–0.13	–0.66	.55**	.54**	–.07	.44**	.43**	.08	–.10*	–.25**
2. Execution FB	3.67	0.88	–0.47	–0.34	-	.43**	–.08	.31**	.26**	–.02	–.14**	–.14**
3. Positive NV-FB	2.72	0.85	0.19	–0.46		-	.07	.32**	.31**	.14**	.03	–.07
4. Negative NV-FB	1.92	0.90	1.04	0.49			-	–.05	–.06	.16**	.22**	.27**
5. Intrinsic motivation	4.12	0.85	–1.18	1.01				-	.45**	–.01	–.04	–.42**
6. Identified motivation	3.92	0.85	–0.70	0.04					-	.17**	.13**	–.28**
7. Introjected motivation	2.78	1.15	0.15	–0.74						-	.35**	.21**
8. External motivation	2.98	0.96	–0.03	–0.59							-	.20**
9. Amotivation	1.71	0.90	1.37	1.23								-

Note. *M* = Mean; *DT* = Standard Deviation; S = Skewness; K = Kurtosis; FB = Feedback; NV = Nonverbal.
*$p < .05$, **$p < .01$.

Table 2
Multiple linear regression models

Criterion	*R*	R^2_{adj}	D-W	Predictors	*Beta*	*t*	*T*	VIF
Intrinsic motivation	.46	.21	2.01	(Constant)		13.37***		
				Positive general FB	.34	5.98***	.58	1.73
				Execution FB	.07	1.29	.67	1.49
				Positive NV-FB	.11	2.04*	.67	1.49
				Negative NV-FB	–.02	–.54	.97	1.03
Identified motivation	.44	.19	1.91	(Constant)		13.10***		
				Positive general FB	.35	5.94***	.58	1.73
				Execution FB	.02	.31	.67	1.49
				Positive NV-FB	.12	2.28*	.67	1.49
				Negative NV-FB	–.05	–1.05	.97	1.03
Introjected motivation	.22	.04	1.70	(Constant)		7.39***		
				Positive general FB	.08	1.23	.57	1.73
				Execution FB	–.10	–1.75	.67	1.49
				Positive NV-FB	.13	2.21*	.67	1.49
				Negative NV-FB	.15	2.97**	.97	1.03
Extrinsic motivation	.27	.06	1.56	(Constant)		12.61***		
				Positive general FB	–.08	–1.25	.57	1.73
				Execution FB	–.12	–2.16*	.67	1.49
				Positive NV-FB	.11	1.87	.67	1.49
				Negative NV-FB	.20	4.12***	.97	1.03
Amotivation	.35	.12	1.81	(Constant)		8.77***		
				Positive general FB	–.26	–4.30***	.57	1.73
				Execution FB	–.01	–.06	.67	1.49
				Positive NV-FB	.06	1.02	.67	1.49
				Negative NV-FB	.24	5.16***	.97	1.03

Note. D-W = Durbin–Watson; *T* = Tolerance; VIF = Variance Inflation Factor; FB = Feedback; NV = Nonverbal.
*$p < .05$, **$p < .01$, ***$p < .001$

Discussion

The aim of this study was to analyze the relationship between feedback provided by physical education teachers and the types of motivation developed by a group of elementary school students. The results showed statistically significant relationships between the studied constructs. They indicated that the most self-determined forms of motivational regulation were positively associated with positive feedback, both general and nonverbal, while the most extrinsic forms of motivation and amotivation were positively associated with negative nonverbal feedback or inversely associated with positive or performance-related feedback.

Firstly, the results show that the most self-determined forms of regulation, such as identified and intrinsic motivation, were positively associated with both verbal and nonverbal positive feedback as well as with performance-related feedback, which is consistent with the previous literature. For example, a study by Koka and Hein (2005) in adolescent physical education students showed that positive general feedback was perceived as a stronger predictor of intrinsic motivation. Similarly, Fin et al. (2019) found that students who participated in a specific autonomy-support program exhibited self-determined motivation, greater satisfaction from engaging in physical activity, and higher levels of satisfaction of basic psychological needs compared to the control group.

The results of this study show that both positive general feedback and positive verbal feedback were statistically significant predictors of these forms of motivational regulation. This finding is consistent with the results reported by numerous authors (Koka & Hagger, 2010; Leo et al., 2022; Mouratidis et al., 2008) who have found that positive teacher feedback can foster student enjoyment and increase students' intrinsic motivation to participate in physical activity. Among other reasons, this type of interaction may promote meaningful learning, as it provides students with information about their progress, while also serving as emotional support for engaging in these contexts and individualizing learning to adapt to the needs of each student (Chang et al., 2016; Leo et al., 2020). Therefore, the results underscore the importance of positive feedback as a pedagogical element that enhances perceived competence, autonomy, and relatedness with teachers—three essential factors according to self-determination theory (Leo et al., 2022; Ryan & Deci, 2017).

Similarly, the results highlight the role of verbal and nonverbal feedback in students' development of motivation, which is considered essential to their in-class experience (Simpson et al., 2024). Verbal feedback uses language as a vehicle to transmit information, this being a clear and direct communication channel. However, nonverbal feedback is also a powerful tool for communicating approval and support for students, as other authors have previously noted (Rojo-Ramos et al., 2025). Therefore, it is important to develop strategies that use both types of feedback in order to increase the likelihood of positively impacting student motivation (Zhou et al., 2021). Moreover, although it may not have played a prominent role in the regression models, the performance-related feedback variable was positively associated with intrinsic and identified motivation. As such, it should be taken into consideration, as Zhou et al. (2021) emphasized, given its impact on the progress and consolidation of motor skills in physical education students. These results may also be influenced by contextual factors such as teacher experience, the methodology used, or the prosocial classroom climate, which could affect how students perceive and evaluate different types of feedback (Mouratidis et al., 2008; Rojo-Ramos et al., 2025).

Secondly, external motivational regulation and amotivation were negatively associated with positive general feedback and performance-related feedback, and positively associated with negative nonverbal feedback. These results reveal significant differences in how different types of teacher feedback are related to motivational regulation patterns, highlighting the importance of teacher interactions in students' development of motivation (Huéscar & Moreno-Murcia, 2012; Koka & Hein, 2003, 2005). Furthermore, the findings suggest that a lack of perceived positive feedback—whether verbal or nonverbal—as well as performance-related feedback, could hinder the development of more self-determined motivation and, consequently, increase external motivation or even amotivation (Rojo-Ramos et al., 2025; Simpson et al., 2024; Zhou et al., 2021). This is particularly relevant in PE, as motivation regulated by external factors or amotivation, in addition to potentially reducing in-class participation, may also affect the development of an active lifestyle and reduce the potential positive effects of physical activity on individuals' well-being (Eime et al., 2013; Wang & Chen, 2022). These findings reinforce the need for teachers to be aware of their behavior and its impact, avoiding actions that could result in negative experiences and hinder the development of self-determined forms of motivation.

In particular, negative nonverbal feedback was a significant predictor of external motivation and amotivation, highlighting the importance of signs of disapproval that physical education teachers may consciously or unconsciously transmit (Rojo-Ramos et al., 2025). Therefore, teachers must be aware of the impact that a gesture or facial expression can have on young students, influencing their enjoyment, perception of classes, and ultimately their participation. Negative nonverbal feedback is most likely to occur when teachers adopt a more controlling interaction style that focuses on performance outcomes. This approach provides students with less emotional support, does not emphasize on the improvement process (Fin et al., 2019), and may further contribute to amotivation in children and adolescents.

Limitations

The present study has several limitations. Firstly, an associative design was used, which allows for the identification of relationships between variables but does not permit causal conclusions. Therefore, longitudinal or quasi-experimental research is needed to determine the developmental processes underlying different forms of motivational regulations. Such studies could also determine whether other factors influence the development of motivation. At a minimum, explanatory research incorporating mediating or moderating variables could provide additional insight into the relationships among the study variables.

Secondly, although our sample was large, it was nonprobabilistic, which limits the generalizability of the results. Future studies could improve the representativeness of the sample to strengthen the conclusions obtained here. In addition, this research did not examine gender differences, which could be an important variable for future studies. Exploring this aspect could provide a more in-depth understanding of how teacher-student interactions may differ by gender, thereby offering valuable insights for designing more effective teaching strategies.

Conclusions

The study results demonstrate the importance of teacher interaction styles, specifically regarding feedback, and their impact on student motivation. This highlights the need to analyze in-class behavior and develop strategies that promote accurate student perceptions, with the aim of fostering motivational regulation models that enhance enjoyment, learning, and adherence to physical education programs (Burgueño et al., 2024; Mazer, 2013). Overall, the results indicate that the most self-determined forms of regulation are associated with positive feedback—both verbal and nonverbal—as well as performance-related feedback. Conversely, amotivation and extrinsic motivation are strongly associated with negative feedback and inversely related to positive and performance-related feedback.

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