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Effects of a teaching intervention on the intention to be physically active in students of the advanced vocational training programme in physical conditioning

Efectos de una intervención docente sobre la intención de ser físicamente activo en estudiantes del ciclo formativo de acondicionamiento físico

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ABSTRACT

The present study examined the effects of a teaching intervention aimed at enhancing the motivational climate and examining its effects on the satisfaction of basic psychological needs, motivation, self-esteem, and the intention to be physically active among first-year students enrolled in the Advanced Vocational Education and Training (VET) programme in Physical Conditioning. A quasi-experimental design was adopted, involving a control group (n = 18) and an experimental group (n = 14), with pretest and posttest assessments. The four-week intervention incorporated specific strategies to foster autonomy, competence, relatedness, and novelty. The results revealed a statistically significant difference in favour of the experimental group for the variable intention to be physically active, with a large effect size. No significant differences were observed in the remaining variables, although positive trends emerged in the experimental group, particularly in perceived novelty and certain aspects of motivation. These findings support the educational potential of systematically applying motivational strategies grounded in Self-Determination Theory and suggest that extending the duration and scope of such interventions may be necessary to fully evaluate their impact.

KEY WORDS: basic psychological needs, motivation, sport-related VET, self-determination, quasi-experimental design.

RESUMEN

El presente estudio examinó los efectos de una intervención docente orientada a mejorar el clima motivacional y a analizar su impacto sobre la satisfacción de las necesidades psicológicas básicas, la motivación, la autoestima y la intención de ser físicamente activo en estudiantes de primer curso del ciclo formativo de grado superior en Acondicionamiento Físico. Se adoptó un diseño cuasi-experimental con grupo control (n = 18) y grupo experimental (n = 14), con evaluaciones pretest y postest. La intervención, de cuatro semanas de duración, incorporó estrategias específicas para fomentar la autonomía, la competencia, la relación con los demás y la novedad. Los resultados mostraron una diferencia estadísticamente significativa a favor del grupo experimental en la intención de ser físicamente activo, con un tamaño del efecto grande. No se observaron diferencias significativas en el resto de las variables; no obstante, se apreciaron tendencias positivas en el grupo experimental, especialmente en la novedad percibida y en algunas regulaciones motivacionales. Estos hallazgos respaldan el potencial educativo de aplicar de forma sistemática estrategias motivacionales fundamentadas en la Teoría de la Autodeterminación y sugieren que ampliar la duración y el alcance de este tipo de intervenciones podría ser necesario para conocer plenamente su impacto.

PALABRAS CLAVE: necesidades psicológicas básicas, motivación, formación profesional deportiva, autodeterminación, diseño cuasi-experimental.

INTRODUCTION

Vocational Education and Training (VET) in Spain has experienced substantial growth (1), establishing itself as a strategic pathway for youth employability and social inclusion amid labour market transformations (2–4). Despite longstanding misperceptions (5), its effectiveness for labour market entry is increasingly recognised, partly driven by formats such as Dual VET that seek greater alignment between training and professional demands (6–8).

Research on the motivational factors influencing engagement and educational trajectories of VET students—particularly those in physical activity and sport specialisations—remains limited, however (9). Ryan and Deci's Self-Determination Theory (SDT; 10) offers a robust conceptual framework for addressing this gap. SDT posits that satisfying the basic psychological needs (BPNs) of autonomy, competence, and relatedness (11,12) is essential for the development of self-determined motivation (10,13). Recent investigations have proposed novelty as a potential fourth need (14–17). Self-determined motivation has been linked to positive outcomes including academic engagement, performance, well-being, and the intention to maintain physically active lifestyles (18–21). Within this framework, motivation is conceptualised as a continuum ranging from amotivation to intrinsic motivation, passing through several regulatory styles of increasing self-determination: external regulation, introjected regulation, identified regulation, and integrated regulation (10,18). Each style represents a progressively greater degree of self-determination—from acting

under external pressure or guilt, to engaging out of personal conviction or sheer enjoyment. A student may attend class out of obligation, professional interest, or pleasure, depending on the predominant type of motivation.

A recent systematic review and meta-analysis describes a motivational sequence within SDT that explains how motivation is configured in educational settings and how it shapes student outcomes (18). On its bright side, this sequence encompasses four interrelated stages: 1. a BPNs-supportive interpersonal style, exerted by educators who promote choice, active listening, and non-controlling language; 2. the satisfaction of BPNs (autonomy, competence, and relatedness) as a response to the motivational environment; 3. the type of motivation that develops, ranging along the self-determination continuum; and 4. motivational consequences, including academic engagement, performance, and personal well-being. Along these lines, a recent study showed that competence satisfaction and identified regulation positively predicted the intention to be physically active and self-esteem among VET students in physical activity and sport specialisations (9). Self-esteem, in turn, has also been associated with BPNs satisfaction and favourable academic and personal outcomes (22).

Against this background, we designed a pilot study in the VET physical activity and sport context. The primary aim was to evaluate the effects of an educational intervention based on motivational-climate enhancement strategies on academic motivation, the intention to be physically active, and self-esteem among first-year students of the Advanced VET Programme in Physical Conditioning. We hypothesised that students receiving the intervention would exhibit, relative to the control group, higher BPNs satisfaction, greater self-determined motivation, higher self-esteem, and a stronger intention to maintain regular physical activity habits.

MATERIAL AND METHODS

2.1. Design

This study adopted a quasi-experimental design with pretest and posttest measurements, structured across two non-randomised groups from different centres: experimental and control. The experimental group, composed of first-year students enrolled in the Advanced VET Programme in Physical Conditioning, received instruction from a teacher participating in a training programme focused on improving the motivational climate. The control group continued with regular teaching delivered by a different instructor, without any structured intervention.

2.2. Participants

Thirty-two first-year students from the Advanced VET Programme in Physical Conditioning at two centres in the province of Huelva (Spain) participated, after applying inclusion criteria (attendance ≥ 80% and participation

in both measurements: pretest/posttest). The sample comprised 28 men (87.5%) and 4 women (12.5%), aged between 18 and 42 years (M = 20.63; SD = 4.46). The experimental group included 14 students (43.8%) and the control group 18 (56.3%).

2.3. Procedure

The study was approved by the Biomedical Research Ethics Committee of Andalusia (code: TD-MOTFP-2023). The pretest was administered in person under standardised conditions and supervised by the research team. The intervention was implemented from 2 April to 7 May 2024 over eight curricular sessions (two per week, 120 minutes each) within the module "Assessment of Physical Fitness and Emergency Interventions." We applied strategies targeting the satisfaction of the BPNs for autonomy, competence, relatedness, and novelty. These included, for example, allowing students to choose the order of tasks (autonomy), providing informational feedback and setting progressive challenges (competence), organising cooperative activities with shared evaluation (relatedness), and introducing unfamiliar practical materials or situations (novelty). The strategies were distributed through a coded matrix that ensured balanced application, averaging five strategies per session. At the end of the intervention, the posttest was administered following the initial protocol.

2.4. Instruments

A questionnaire comprising sociodemographic variables (age, programme year, grade-point average) and four psychometric scales was administered:

Basic Psychological Needs

We used the Spanish version of the Basic Psychological Needs in Exercise Scale (BPNES; 23), based on the original version by Vlachopoulos et al. (24), supplemented with the novelty factor (14). The instrument comprises 17 items rated on a 5-point Likert scale (1 = *strongly disagree*; 5 = *strongly agree*). Cronbach's alpha values at pretest were .67 for autonomy, .63 for competence, .91 for relatedness, and .80 for novelty. At posttest, reliability values were .74 for autonomy, .69 for competence, .70 for relatedness, and .83 for novelty.

Educational Motivation Scale

The Educational Motivation Scale (EME), validated in Spanish by Núñez et al. (25) and based on the original version by Vallerand et al. (26), was administered. It assesses amotivation, external regulation, introjected regulation, identified regulation, intrinsic motivation toward knowledge, intrinsic motivation toward accomplishment, and intrinsic motivation toward stimulating experiences through 28 items on a 7-point Likert scale. A global intrinsic motivation index was calculated by averaging the three intrinsic subscales (knowledge, accomplishment, and stimulating experiences). Pretest reliability values were .66 for amotivation, .84 for external regulation, .84 for introjected regulation, .84 for identified regulation, and .85 for intrinsic motivation. Posttest values were .83, .94, .84, .92, and .84, respectively.

Intention to be physically active

We used the Measure of Intention to be Physically Active, adapted by Moreno et al. (27) from the instrument of Hein et al. (28). It includes five items rated on a 5-point Likert scale. Cronbach's alpha was .81 at both pretest and posttest.

Self-esteem

The Rosenberg Self-Esteem Scale (29), validated by Martín-Albo et al. (30), was administered. The instrument consists of 10 items, some negatively worded. Reliability was .90 at pretest and .89 at posttest.

2.5. Data Analysis

Normality assumptions were verified through skewness and kurtosis (±2; 31), and homogeneity of variances was assessed using Levene's test. Means, standard deviations, and Cronbach's α coefficients were computed to evaluate internal reliability for each scale at pretest and posttest. To test baseline equivalence between groups, independent-samples t-tests were conducted on pretest scores. Subsequently, ANCOVA was used to compare posttest scores between groups, with pretest scores entered as covariates. Effect sizes were calculated using partial eta squared (ηp^2; small ≥ .01; moderate ≥ .06; large ≥ .14; 32). All analyses were performed in R (v4.3.1) using the *car, effectsize, haven, lavaan*, and *dplyr* packages.

RESULTS

Table 1 presents the descriptive statistics for all variables at pretest, differentiated by control and experimental group. Independent-samples *t*-tests were performed to verify baseline equivalence between groups. No statistically significant differences were observed for any variable, indicating that both groups were comparable prior to the intervention.

Table 1. Descriptive statistics and between-group comparison at pretest (control vs. experimental)

Variable	Control *M (SD)*	Experimental *M (SD)*	*t*	*p*
S. Autonomy	3.93 (0.60)	4.02 (0.52)	-0.43	.669
S. Competence	4.36 (0.59)	4.20 (0.48)	0.85	.404
S. Relatedness	4.71 (0.66)	4.57 (0.56)	0.62	.539
S. Novelty	4.31 (0.60)	4.33 (0.49)	-0.09	.930
Amotivation	1.86 (0.89)	2.05 (1.06)	-0.56	.581
External regulation	5.22 (1.34)	5.77 (0.91)	-1.30	.202
Introjected regulation	4.50 (1.52)	4.52 (1.36)	-0.03	.973
Identified regulation	6.04 (1.08)	6.25 (0.62)	-0.64	.524

Variable	Control	Experimental	*t*	*p*
Intrinsic motivation	5.29 (1.24)	5.08 (0.76)	0.57	.575
Self-esteem	3.34 (0.49)	3.18 (0.73)	0.77	.449
Intention to be physically active	4.77 (0.44)	4.81 (0.30)	-0.35	.729

Note. S. = Satisfaction of the basic psychological need for; *t* = Student's *t*.

After controlling for pretest scores through ANCOVA, results indicated a single significant effect for the intention to be physically active, with higher posttest scores in the experimental group and a large effect size, $F(1, 29) = 5.45$, $p = .027$, $\eta p^2 = .16$. No significant between-group differences were found for the remaining outcomes (posttest adjusted for pretest; $p > .05$) (see Table 2).

Table 2. ANCOVA results by variable (posttest adjusted for pretest)

	Control (*n* = 18)		**Experimental (*n* = 14)**				
	Pretest	**Posttest**	**Pretest**	**Posttest**			
Variable	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	***M* (*SD*)**	***F* (Group)**	***p* (Group)**	***Partial ηp²***
S. Autonomy	3.93 (0.60)	3.86 (0.55)	4.02 (0.52)	4.04 (0.60)	0.53	.471	0.02
S. Competence	4.36 (0.59)	4.40 (0.54)	4.20 (0.48)	4.25 (0.46)	0.06	.803	0.00
S. Relatedness	4.71 (0.66)	4.68 (0.52)	4.57 (0.56)	4.68 (0.39)	0.58	.452	0.02
S. Novelty	4.31 (0.60)	4.13 (0.57)	4.33 (0.49)	4.39 (0.49)	1.96	.172	0.06
Amotivation	1.86 (0.89)	1.81 (0.93)	2.05 (1.06)	2.02 (1.23)	0.06	.804	0.00
External regulation	5.22 (1.34)	5.46 (1.56)	5.77 (0.91)	5.82 (0.96)	0.35	.557	0.01
Introjected regulation	4.50 (1.52)	4.75 (1.57)	4.52 (1.36)	4.93 (1.11)	0.19	.663	0.01
Identified regulation	6.04 (1.08)	6.14 (0.98)	6.25 (0.62)	6.00 (0.89)	2.63	.116	0.08
Intrinsic motivation	5.29 (1.24)	5.43 (1.14)	5.08 (0.76)	5.26 (0.76)	0.00	.978	0.00
Self-esteem	3.34 (0.49)	3.38 (0.52)	3.18 (0.73)	3.23 (0.62)	0.02	.878	0.00
Intention to be physically active	4.77 (0.44)	4.63 (0.49)	4.81 (0.30)	4.86 (0.28)	5.45	.027	0.16

Note. S. = Satisfaction of the basic psychological need for

DISCUSSION

This study examined the effects of an SDT-based educational intervention on motivational variables, the intention to be physically active, and self-esteem among VET students in a sport-related specialisation. Although no significant

changes were observed on most variables, we identified a significant improvement in the intention to be physically active in the experimental group. This finding is particularly relevant given that this construct is widely recognised as a predictor of future physical activity behaviour (19,33). It suggests that even brief interventions can foster active lifestyles (34).

The increase in the intention to be physically active, in the absence of changes in BPNs or motivational regulation types, points to an incipient motivational activation. As proposed by Vallerand's hierarchical model (35), certain behavioural variables—such as this intention—may be more responsive to immediate contextual modifications than more stable constructs. Previous studies have reported comparable effects after brief exposure to BPNs-supportive environments, particularly when novelty- or choice-related elements are incorporated (36,37). In the present study, novelty satisfaction yielded a moderate effect size, albeit without reaching statistical significance, a pattern consistent with research highlighting its potential association with intrinsic motivation (15,16).

One possible explanation is that certain positive motivational experiences—such as enjoyment of the proposed tasks, feelings of competence, or satisfaction derived from the teacher–student relationship—may have facilitated the observed change. Although these variables were not analysed here, several studies have reported their direct contribution to the development of intention to be physically active in comparable educational settings (27,38,39). The literature suggests that these factors, especially when activated through brief contextualised strategies, can generate early effects on intentional components without necessarily modifying more stable constructs such as motivational regulation. This hypothesis reinforces the idea that motivational processes in VET may follow partial or sequential trajectories, modulated by the sensitivity of certain variables to the immediate pedagogical context.

Several recent studies have noted that, in educational contexts, the effects of motivational interventions can manifest partially, initially activating behavioural variables such as intention before influencing more stable SDT constructs. For instance, some studies have observed that autonomy support does not directly predict behaviour but does so through the mediation of BPNs satisfaction (18,40). In the VET sport-related domain, prior work has shown that both competence satisfaction and identified regulation are positively associated with the intention to remain physically active, whereas amotivation operates in the opposite direction (9). These findings are consistent with reviews underscoring the greater sensitivity of intention compared with structured motivational interventions in brief contexts (36), and they suggest the possibility of sequential motivational trajectories modulated by the immediate environment.

However, whereas intention to be physically active was particularly sensitive to change, more stable variables such as self-esteem and self-determined motivation did not show significant effects after the intervention. The brevity of the programme and contextual variability in VET may have limited its

lasting effects. The literature suggests that deep motivational changes require more prolonged interventions, applied systematically and adapted to the educational setting (18,41,42). Accordingly, previous studies have reported significant improvements in motivation and intention following extended school-based interventions (41), as well as increases in self-esteem and adherence in eight-week exercise programmes (43). These discrepancies reinforce the notion that more stable motivational mechanisms demand sustained strategies with rigorous and context-sensitive implementation (18,42).

LIMITATIONS AND FUTURE DIRECTIONS

This study analysed the effects of an SDT-based pedagogical intervention on the intention to be physically active, BPNs satisfaction, motivation, and self-esteem among students in a VET Physical Conditioning programme. Although the findings regarding the improvement in the intention to be physically active are promising, they should be interpreted with caution. The small sample size, lack of randomisation, brief programme duration, and limited statistical power constrain the generalisability and magnitude of the observed effects.

Despite these limitations, the results indicate that implementing motivational strategies is feasible in this educational context, particularly for enhancing students' intention to be physically active. Nonetheless, more rigorous studies incorporating longitudinal designs, longer durations, and procedural standardisation are warranted.

From an applied perspective, sustained educational experiences should be designed not only to increase physical participation but also to promote lasting habits through the strengthening of more self-determined motivational processes. Teacher training and contextual adaptation will be key to maximising the effectiveness of such interventions in VET settings.

CONCLUSIONS

This study examined the effects of an SDT-based teaching intervention in a VET physical activity and sport programme. The experimental group showed an improvement in the intention to be physically active. No statistically significant differences were found, however, in BPNs satisfaction, motivational regulations, or self-esteem among participating students. These results highlight the need for longer interventions, accompanied by teacher training and tools enabling the assessment of implementation fidelity and student perceptions. Taken together, the findings underscore the educational value of SDT-grounded motivational strategies for creating pedagogical environments that foster active lifestyles.

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