

Effectiveness of a Program to Improve the Verbal Response of Football Coaches: A Delayed-Intervention Experimental Design

Eficacia de un Programa Piloto para Mejorar la Respuesta Verbal de Entrenadores de Fútbol: Un Diseño Experimental de Intervención Tardía

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Abstract. The pressure that coaches usually apply on their athletes, alongside injuries and the lack of enjoyment during sport practice, are key factors involved in sports abandonment. Behavioral interventions through psychoeducational programs have proven to be useful to improve coaching behaviors, providing appropriate context in sports. This study aims to assess a brief psychological intervention in football coaches to reduce potentially harmful verbal responses and increase the use of positive feedback. Our research was conducted in an amateur football club where 15 coaching staff teams agreed to participate. The experimental design of this study is a randomized controlled trial with control (n=7) and experimental (n=8) groups with delayed intervention. Verbal responses from coaches were collected as count data with an adapted version of the Coaching Behavior Assessment System. Data was analyzed using the Poisson Regression Model. The results show a reduction in hostile feedback by 87.7% (CI = 71% - 94.9%), technical instructions with ball in play by 39.8% (CI = 24.2% - 52.2%), complaints to referees by 95.8% (CI = 82.8% - 99.3%) and an increase in praise contingent with successful action by 87% (CI = 13% - 209%) after the intervention. These findings have important implications for the implementation of programs that seek to improve delivery of instructions in sport coaches, providing a thorough procedure for the shaping of the verbal response. Valuable insights to foster a supportive learning environment for adolescents and young athletes are addressed in the discussion.

Keywords: Psychological intervention, Behavioral intervention, Sport coach, Verbal response, Technical instructions, Randomized controlled trial, Experimental design, Coaching Behavior Assessment System.

Resumen. La presión que suelen ejercer los entrenadores sobre sus deportistas, junto con las lesiones y la falta de disfrute durante la práctica deportiva, son factores clave que intervienen en el abandono deportivo. Las intervenciones conductuales a través de programas psicoeducativos han demostrado ser útiles para mejorar las conductas del entrenador, proporcionando un contexto adecuado en los deportes. Este estudio tiene como objetivo evaluar una intervención psicológica breve en entrenadores de fútbol para reducir respuestas verbales hostiles y aumentar el uso de retroalimentación positiva. Nuestra investigación se llevó a cabo en un club de fútbol amateur en el que aceptaron participar los cuerpos técnicos de 15 equipos. El diseño experimental de este estudio es un ensayo controlado aleatorizado con grupo control (n = 7) y experimental (n = 8) con intervención tardía. Las respuestas verbales de los entrenadores se recogieron como datos de recuento con una versión adaptada del Coaching Behavior Assessment System. Los datos se analizaron utilizando el modelo de regresión de Poisson. Los resultados muestran una reducción del feedback hostil en un 87,7% (IC = 71% - 94,9%), instrucciones técnicas con balón en juego en un 39,8% (IC = 24,2% - 52,2%), quejas a los árbitros en un 95,8% (IC = 82,8). % - 99,3%) y un aumento de los elogios tras la acción exitosa en un 87% (IC = 13% - 209%) después de la intervención. Estos hallazgos tienen implicaciones importantes para la implementación de programas que buscan mejorar el uso de instrucciones en entrenadores deportivos, proporcionando un procedimiento exhaustivo de moldeamiento de la conducta verbal. En la discusión se abordan propuestas relevantes para favorecer un entorno de aprendizaje beneficioso para adolescentes y jóvenes atletas.

Palabras clave: Intervención psicológica, Intervención conductual, Entrenador deportivo, Respuesta verbal, Ensayo controlado aleatorizado, Diseño experimental, Sistema de Evaluación del Comportamiento del Entrenador.

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Introduction

Engaging in regular physical activity is known to offer numerous health benefits, such as reducing the risk of diseases and enhancing overall well-being (Ortiz-Sánchez et al., 2021). However, physical inactivity is a global concern associated with detrimental health consequences and substantial economic burdens on healthcare systems (Batista et al., 2019). Therefore, encouraging participation in sports as a strategy to promote physical activity is a crucial public health challenge, particularly considering the high prevalence of sedentary lifestyles among adults and adolescents around the world. Family models learned gender roles, early-stage experiences and the sporting context can influence adherence to exercise (Delgado et al., 2022; Jaimes-Reyes et al., 2022; Pérez & Viñas, 2011). While it is essential to have a comprehensive intervention involving all

stakeholders to incentivize participation in physical activities, the context itself, including social, cultural, and economic factors, can limit opportunities to engage in sports (Rodríguez et al., 2017).

Cruz (1997) referred to a triad of agents participating in the well-being and performance of athletes: the coaching staff, the athletes themselves and their families (Águila & Padilla-Cazorla, 2022). By implementing comprehensive interventions involving these three parties, it is possible to create a context that promotes adherence to physical exercise, even during emotionally complex stages such as adolescence (Jewett et al., 2019; Montealegre-Mesa, 2023). During this developmental period, physical activity often decreases, leading to potential sports dropout as adolescents prioritize other activities. From these three factors, the role of coaches becomes crucial to promote sports participation and shape the experiences of young athletes

(Cantón, 2016). Coaches not only contribute to skill development, but they also play a vital role in fostering positive communication and providing social support, which are essential for the overall well-being and psychosocial development of their athletes. However, the pressure that coaches usually apply on their athletes, alongside injuries and the lack of enjoyment during sport practice, are key factors involved in sports abandonment (Marracho et al., 2023; Núñez-Aguilar et al., 2023; Witt & Dangi, 2018).

The dominant notion in most educational environments, including sports, is that motivation is some form of object that can be categorized based on its origin: intrinsic or extrinsic. This is due in large part to the work of Deci and Ryan (1985), among other authors. Ryan and Deci (2017) claim that internal, intrinsic motivation is the most important type since external incentives can have a negative impact on performance. Hence, this hypothesis suggests that rewarding or praising the performance of particular behaviors during training and competitions may result in a decrease in motivation for the same activity. Despite the fact that this theoretical model has drawn substantial criticism (Akin-Little et al., 2019; Bernstein, 1990; Cameron et al., 2017), this phenomenon appears to take place under certain specific conditions. From the perspective of behavior analysis, factors such as satiation (Martin & Pear, 2019), rule-governed behavior (Martin, 2019), or the misidentification of coercive consequences as potentially positive reinforcers (Carton, 1996), among other processes (Cameron et al., 2017), can explain a decrease in the frequency of a response to which a presumably desirable, contingent stimulus followed. Numerous instances of "lack of motivation" or "losing interest" might therefore be better understood as a lack of continuous and ongoing reinforcement (Michael, 1993) as intermittent reinforcement schedules play a crucial influence in maintaining behavior. Considering how important it is for athletes to feel supported and valued by their coaches (Bianco, 2001; Brewer, 2017; Rubio et al., 2020) and in contrast with Deci and Ryan's theory, coaches should be encouraged to make efforts to understand their athletes and use reinforcement programs accordingly to increase confidence and improve performance (González et al., 2016; Martin, 2019).

The relationship between coaches and athletes is crucial not only for achieving optimal performance but also for setting a context that contributes to adherence to sports (Santos et al., 2021). Coaches play a multifaceted role that includes teaching technical-tactical skills and serving as role models for prosocial behavior (García-Mas et al., 2021; Sáenz-López et al., 2007). Consequently, sports psychology plays a vital role in advising coaches to improve these contexts in order to influence the continuity and commitment of athletes (Cruz et al., 2011). The work of Smoll and Smith (2007) introduced a cognitive-social theoretical model that emphasized the reciprocal impact between coaches and athletes through their interaction. Subsequently, programs have been developed to enhance coach-

es' communication styles, which includes promoting positive and preventing negative interactions (Smoll et al., 2009). Through reward systems and feedback, this strategy, also known as the positive approach, seeks to encourage preferred behaviors while reducing undesirable ones. The process is prioritized above the result of competitions, emphasizing individual growth and effort over final performance or rivalry with other athletes (Weiss, 1992). The importance of the interaction between coaches and team members and how this relationship is perceived is highlighted in recent research (García-Mas et al., 2019).

The negative approach, on the other hand, uses verbal abuse or even physical criticism to try and discourage mistakes and undesirable behaviors. Even though both approaches have their proponents and opponents, the coach-athlete relationship may suffer as a result of the negative approach, increasing the risk of creating an environment of animosity and resentment (Sousa et al., 2006). The Group of Sports Psychology Studies (GEPE) from the Autonomous University of Barcelona developed several Personalized Coaching Counseling Programs comprehended by individual sessions for coaches. These programs aim to create awareness among coaches about their own behaviors in the sport context and analyze which of these responses should be increased, maintained, or reduced (Vives-Ribó & Rabassa, 2020). Through individual interviews and the Coaching Behavior Assessment System (CBAS) tool for observing coaching behaviors (Smith et al., 1977), sport psychologists facilitate increased awareness of the behavioral patterns of coaches and collaboratively plan potential areas of improvement. The ability of brief behavioral interventions to bring about significant and long-lasting change in coaches' verbal response has shown promise (Guzmán et al., 2022; Langan et al., 2013).

This study aims to test a pilot program for assessment and intervention with football coaches from a Spanish amateur club. We predict a reduction in aversive verbal responses and an increase in praise from coaches.

Methods and materials

The primary objective of the pilot program was to increase coaches' awareness of their own verbal behavior and provide an adequate context to help them modify the way they give instructions through role-modeling and shaping techniques for the benefit of their team's performance. The sample consisted of 22 male coaching staff members of 15 youth teams (ages 5 to 18 years old) with a wide range of coaching expertise from an amateur Spanish football club.

The experimental design of this study is a randomized controlled trial with a control group ($n=7$) and an experimental group ($n=8$) with delayed intervention. Stratified random assignment was applied taking into consideration the sports category of coaching teams to control for age group. Over the course of the study, experts in sports psychology collected about 30 hours of voice recordings and

performed ecological observations. Data were gathered by systematic observation using the mobile app EasyTag-Note (2018) and a wireless microphone in real time. The Coaching Behavior Assessment System (CBAS) by Smith et al. (1977), which had previously been adapted to a Spanish version by Conde et al. (2010), was modified to observe and categorize coach instructions. The CBAS of Smith et al. (1977) has an inter-observer reliability of between 88% and 96.4%. The reliability of the CBAS adaptation of Conde et al. (2010) is over 90%. Considering the response rate to measure coaching behavior has several advantages, including the fact that results are easily reproducible (Kazdin, 1983) and it provides a fundamental basis for the concept of action probability, allowing for better prediction of the individual studied behavior (Skinner, 1953; Froxán, 2020).

Table 1.
Adaptations made to the CBAS (1977-2023)

Original CBAS (Smith et al., 1977)	CBAS Adaptation (Conde et al., 2010)	Current CBAS Adaptation
Reactive behaviors		
Desirable performance: - Positive Reinforcement - Non-reinforcement	Desirable performance: - Verbal or non-verbal positive reinforcement - Non-reinforcement	Desirable performance: - Praise Contingent with Successful Action (PCSA) - Question Contingent with Successful Action (QCSA)
Mistakes/errors: - Mistake-contingent encouragement - Mistake-contingent technical instruction - Punishment - Punitive Mistake-contingent technical instruction - Ignoring mistakes	Mistakes/errors: - Encouragement - Technical feedback: • Interrogative • Ego-oriented • Task-oriented - Punishment - Technical hostile feedback - Ignoring mistakes	Mistakes/errors: - Mistake-Contingent Encouragement (MCE) - Mistake-Contingent Instruction (MCI) - Hostile Feedback (HF) - Mistake-Contingent Question (MCQ)
Misbehaviors: - Keeping control	Misbehaviors: - Keeping control: • Ignoring • Unseen • Control • Hostile control	
Spontaneous behaviors		
Game-related: - General technical instruction - General encouragement - Organization	Aspects related to the task: - General technical instruction: • Interrogative • Ego-oriented • Task-oriented - General mood instruction: - Organization: • Formal • Not formal	Aspects related to the training or competition: - Technical Instruction with Ball Out of Play (TIOP) - Technical Instruction with Ball in Play (TIP)
Game-irrelevant: - General communication		Complaining to Referee (CR)

In order to support reliable observation and data collection aligned with the goals of this study, a panel of experts with more than ten years of experience in applied sport psychology research carefully considered and modified the CBAS categories to better represent the behaviors of interest. The version used in this study assessed nine verbal instruction categories classified between reactive and

spontaneous behaviors (Table 1). Furthermore, the observers received preliminary training and practiced live observations of training sessions in pairs to achieve higher inter-rater reliability and ensure common criteria. A time interval of three seconds has been established between coaching verbalizations of the same type, to ensure these are counted as two distinct observations. For instance, if the coach says three consecutive phrases such as "C'mon, John! You are not able to tell who has the ball? Ask for it more enthusiastically, darn it!", since they all refer to the same action of the player, it would be counted as a single count of hostile feedback. However, if the coach switches verbal categories, "C'mon, John! Where do you think you should have passed in this situation?", a count of hostile feedback and another of mistake-contingent question would be registered. The study was approved by the Ethics Committee of the Balearic Islands.

The program was divided into four phases:

1. Pre-intervention assessment: Evaluation of coaches' interactions and communication with players in their natural context, both during practice and competition, to establish a baseline for verbal behavior of each coaching team.
2. Training and feedback session on effective communication (psychoeducational phase) to the experimental group.
3. Post-intervention assessment: Evaluation of coaches' interactions and communication with players in their natural context, both during practice and competition, to assess the potential differences in verbal communication after the intervention.
4. Training and feedback session on effective communication to the control group.

All participants voluntarily agreed to participate in the study and signed the confidentiality agreement before the beginning of phase 1. The pre-intervention assessment consisted of systematic observation and audio recording of coaches' communication for a 45-minute training session and one half of a competition match. The intervention consisted of a two-hour group discussion session and an hour-long individual feedback session with each coach. The group discussion introduced the role of the coach and their communication in the players' personal and athletic development, as well as the potential functions of the observed verbal responses, along with the relevance and applicability of each type of coaching instruction studied. The content of the group session included challenging the prioritization of high performance and competitive results when most athletes never reach professional divisions, the importance of the coach as a role model for prosocial values, and an exchange of expectations and opinions regarding the observed results of the club's coaching staff as a whole. Behavioral guidelines and strategies for enhancing communication skills were provided, with a primary emphasis on responses that emerge after successes and failures to foster a supportive learning environment.

Self-confrontational interviews were carried out in one-

on-one sessions based on the audio recordings, with a focus on the motives and effects of the verbal responses of coaches. After receiving inquiries about the content of the group sessions and being given the opportunity to clarify any doubts, coaches listened to audio clips of their verbalizations in practice and competition matches. The main objective of this intervention technique was to promote self-awareness of coaches' behaviors, mainly by analyzing alongside the sport psychologist the behaviors that need to be maintained, increased, or reduced to achieve their goals. Then, the sport psychologist responsible for the session displayed a graph with their own verbal response on the nine observed variables in comparison to the sample's average and then asked the coaching staff for a personal goal for improvement. Finally, the sport psychologist applied modeling and shaping techniques to promote more appropriate responses in line with the coaches' goals. Post-intervention

evaluations were completed two weeks after phase 3.

The post-intervention observations of the training sessions of three teams could not be collected due to circumstances outside the experimenters' control. To ensure homogeneity, only the verbal response of coaches during competitions have been analyzed.

The study measured nine dependent variables: Praise Contingent with Successful Action (PCSA), Question Contingent with Successful Action (QCSA), Mistake-Contingent Encouragement (MCE), Mistake-Contingent Instruction (MCI), Hostile Feedback (HF), Mistake-Contingent Question (MCQ), Technical/Tactical Instruction with Ball Out of Play (TIOP), Technical/Tactical Instruction with Ball in Play (TIP) and Complaining to Referee (CR). Definitions of these variables are provided in Table 2. All quantitative data was analyzed with the statistical software Jamovi (2023).

Table 2.

Types, definitions and examples of recorded verbalizations

Verbal Response	Definition	Example
Technical Instruction with Ball in Play (TIP)	Instruction delivered spontaneously according to the game strategy when the ball is in play.	"Look at your teammates before passing the ball." "Get in front of the forward!" "Shoot!"
Technical Instruction with Ball Out of Play (TIOP)	Instruction delivered spontaneously according to the game strategy when the ball is out of play.	The ball goes out of bounds, and the coach takes the opportunity to give instructions to the defenders.
Mistake-Contingent Instruction (MCI)	Instruction or demonstration to correct players' mistakes.	"You have to look before making the pass" (the player missed the pass).
Hostile Feedback (HF)	Negative verbal or non-verbal response after a player's mistake.	"Damn it, man! Always the same! PASS EARLIER!"
Mistake-Contingent Encouragement (MCE)	Encouraging a player after a mistake.	"Come on, it's fine! It's okay!"
Mistake-Contingent Question (MCQ)	A question is asked after a mistake, directing players' attention towards opportunities of improvement.	"Where could you have passed the ball to create an advantage?" "What do you need to do before jumping for the ball (to the keeper in a corner kick)?"
Praise Contingent with Successful Action (PCSA)	Positive verbal or non-verbal response after a successful action or effort.	"Well done on recovering that ball!" "Keep pressing, you're doing great!"
Question Contingent with Successful Action (QCSA)	A question is asked after a successful action, directing players' attention towards desirable effort and decision-making.	"What did you do well to create an advantage in that play?" "How did you make the opponent get trapped without a passing option?"
Complaining to Referee (CR)	Verbal or non-verbal response directed towards match officials.	"Referee, that's a foul!" "Yellow card, right?" "They just touched them. They dove!"

Table 3.

Pre-and post-intervention descriptive statistics of the coaching behavior.

Variable	Group	Pre-Intervention Assessment		Post-Intervention Assessment	
		Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Praise Contingent with Successful Action (PCSA)	Control	47 (30)	30 (55)	34.86 (19.62)	39 (35.5)
	Intervention	47.63 (10.76)	47 (10)	59.88 (33.18)	58 (44.25)
Question Contingent with Successful Action (QCSA)	Control	0.29 (0.49)	0 (0.5)	0.14 (0.38)	0 (0)
	Intervention	0.13 (0.35)	0 (0)	2.13 (3.04)	1 (1)
Mistake-Contingent Encouragement (MCE)	Control	8 (6.51)	5 (9)	10.57 (8.6)	9 (9)
	Intervention	7.38 (4.66)	6.5 (4.25)	13.38 (5.81)	13.5 (9.25)
Mistake-Contingent Instruction (MCI)	Control	13 (10.83)	8 (13)	14.43 (8.56)	19 (10.5)
	Intervention	12.5 (24.06)	15.5 (26.5)	13.13 (7.47)	13 (10.5)
Hostile Feedback (HF)	Control	9.43 (8.62)	10 (7)	24.71 (22.03)	17 (35)
	Intervention	24.13 (24.06)	15.5 (26.5)	5.63 (5.81)	4 (3.75)
Mistake-Contingent Question (MCQ)	Control	2.29 (2.29)	1 (4)	0.71 (1.11)	0 (1)
	Intervention	0.38 (0.52)	0 (1)	3.13 (4.55)	2 (2.25)
Technical Instruction with Ball Out of Play (TIOP)	Control	30.86 (31.56)	23 (39.5)	53.71 (39.86)	71 (50.5)
	Intervention	37.88 (25.56)	45.5 (39.5)	45.63 (26.57)	43.5 (24.25)
Technical Instruction with Ball in Play (TIP)	Control	106.43 (34.51)	106 (54.5)	117 (30.77)	126 (54)
	Intervention	134.63 (67.74)	112.5 (89.5)	71.75 (15.01)	75 (19.75)
Complaining to Referee (CR)	Control	1.43 (1.72)	1 (1)	6.43 (9.41)	4 (5)
	Intervention	3.25 (3.69)	2 (2.25)	0.75 (1.39)	0 (1)

Results

The descriptive statistics of the coaching verbal behavior in the pre-intervention and post-intervention assessments are shown in Table 3. The table describes the results using central trend (mean) and dispersion (standard deviation) indices as they are widely used descriptive statistics. However, as the distribution of count values is asymmetrical and highly variable, robust descriptive statistics such as median and IQR are also included to best describe the data. Before the intervention, the control group shows lower frequency of emission of TIP and HF. The intervention group issues less PCSA, and more CR. The values of the remaining variables are similar in both groups before the intervention. While both groups issue few or no questions after either desirable or undesirable actions, the increase in QCSA is notable after the intervention.

Since all variables were collected as count data, the statistical model used was the Poisson Regression Model (PRM), as recommended by Long (1997), instead of the linear regression model (Hilbe, 2014). The regression test by Cameron & Trivedi (1990) which evaluates equidispersion, one of the basic assumptions of the Poisson Regression Model (PRM), indicates that most of the studied sub-samples did not comply with the assumption of equidispersion, hence Negative Binomial Regression Model (NBRM) was calculated. Table 4 presents the results of the analysis for the increase or decrease in the number of verbal responses of the experimental group. The main results show that after the intervention the number of Hostile Feedback (HF) decreases by 87.7% (CI = 71% - 94.9%), Technical Instruction with Ball in Play (TIP) by 39.8% (CI = 24.2% - 52.2%) and Complaining to Referee (CR) by 95.8% (CI = 82.8% - 99.3%). Regarding Praise-Contingent with Successful Action (PCSA), the intervention increases praise by 87% (CI = 13% - 209%).

Table 4.
Negative binomial estimation results of the intervention.

Variable	Estimate	SE	Exp(B)	Lower	Upper	z	p
Praise Contingent with Successful Action (PCSA)	0.628	0.256	1.870	1.130	3.090	2.450	0.014
Question Contingent with Successful Action (QCSA)	2.600	1.171	13.469	1.871	278.500	2.221	0.026
Mistake-Contingent Encouragement (MCE)	0.398	0.307	1.490	0.783	2.830	1.300	0.195
Mistake-Contingent Instruction (MCI)	-0.039	0.314	0.962	0.512	1.800	-0.124	0.901
Hostile Feedback (HF)	-2.964	0.456	0.123	0.051	0.290	-4.600	<.001
Mistake-Contingent Question (MCQ)	1.421	0.893	4.141	0.612	30.750	1.590	0.112
Technical/Tactical Instruction with Ball Out of Play (TIOP)	-0.164	0.437	0.848	0.356	1.990	-0.376	0.707
Technical/Tactical Instruction with Ball in Play (TIP)	-0.507	0.119	0.602	0.478	0.758	-4.255	<.001
Complaining to Referee (CR)	-3.161	0.853	0.042	0.007	0.172	-3.705	<.001

Discussion

The objective of this study was to analyze the intervention of a pilot program focused on training coaches in communication and instructional techniques. Using an adaptation of the CBAS (Conde et al., 2010; Smith et al., 1977), the communication of coaches from a Spanish football club was evaluated, with the aim of intervening in their verbal responses during both training sessions and competitions.

The main focus of the intervention for coaches was to reduce the number of instructions during ball play and hostile feedback, while reinforcing alternative verbal behaviors such as praise, open-ended questions and assertive feedback in response to players' actions.

The results of this study show that a brief behavioral intervention with the coaching team effectively produced changes in line with the positive approach described by Smoll et al. (2009). Specifically, it is observed a reduction in hostile feedback by 87.7%, technical instructions with ball in play by 39.8%, complaints to referees by 95.8%, and an increase in praise contingent with successful action by 87% after the intervention. This program promotes, on the one hand, the achievement of desirable changes in the coaching staff behavior and, on the other, an increased awareness of the effects of the coaches' behaviors on player performance and the relationship built between coaches and players.

These findings align with earlier research on behavioral interventions to foster well-being, pedagogical environments, and impact performance in team sports (Candel-Carrillo et al., 2023; Cruz et al., 2016; Kong, 2015; Sousa et al., 2006). Similarly, to what these interventions suggest for athletes, when coaches participate as active agents of their learning process, the acquisition of knowledge and behavior change is most likely to take place. A crucial characteristic of the Personalized Coaching Counseling Programs is the inclusion of an individualized intervention to take into consideration the unique areas for development of each coach, which translated in improved outcomes when compared to other programs (Cruz et al., 2016). The participants in this study acknowledged the opportunity to discuss with the sports psychologist the behaviors that they should preserve, as well as those they must modify or eliminate from their behavioral repertoire. Among the techniques shared with the coaching staff, the sport psychologists highlighted replacing hostile feedback and excessive instructions while the ball is in play with supporting behaviors such as encouragement after mistakes or emphasizing a successful action before delivering a correction to improve the effectiveness of their instructions.

Overall, the observed coaches frequently praised their players' actions. However, the number of instructions given during ball play can be considered high compared to other verbalizations, potentially causing players to lose concentration, and negatively impacting their performance (Martin, 2019). Furthermore, while the absolute

frequency of hostile feedback is low compared to other categories of instruction among most coaches, the ideal frequency of such verbalizations should be close to zero due to their violent nature and their detrimental effect on creating a motivating climate for sports practice (Buceta, 2020; Smoll et al., 2009). The positive reduction of hostile feedback and technical instructions might have been a result of the increased awareness regarding the function of certain behaviors that coaches emit, such as reducing their own undesirable activation, and how these sorts of feedback affect the players in the short and long term.

The study utilized an appropriate experimental design, with data collection conducted through systematic observational records by experienced sports psychologists trained in using the CBAS tool in natural contexts. This study differs from common self-reported measures found in the literature. As suggested in the cited literature, the intervention was personalized and tailored to the specific behaviors targeted for modification. Although social desirability bias may be present in such observations, the amount of observed time was sufficient to control for this factor, ensuring stable assessment conditions across all data collection sessions (Ambady & Rosenthal, 1992; Ambady et al., 2000).

According to existing literature, hostile feedback and excessive technical-tactical instructions are detrimental to player performance, increasing the risk of engaging in unsportsmanlike interactions among players and potentially interfering with perceived social support in the athlete-coach relationship (Sheridan et al., 2014). Since sports play a crucial role in promoting physical activity, it is important to find efficient and effective ways to intervene with athletes and their staff to maximize performance and well-being. This research adds to the literature highlighting the importance of focusing training dynamics on the athlete's learning process rather than solely on competitive outcomes to enhance adherence to sports. Despite the cultural emphasis on effort and traditional leadership roles, the positive approach benefits both the motivational climate and athletes' performance (Philippe & Seiler, 2006).

During the course of this study, some limitations were encountered. Social desirability bias was a potential concern in the experimental group, as coaches were informed during the intervention of the behaviors observed in comparison to the control group. Additionally, inherent difficulties in observing coaching interactions in a natural context were present. Competition results (position in the rankings, score during matches, perceived difficulty of the opponent by the coaching staff) and confounding variables that might partially explain differences in verbal responses, such as complaints towards referees or years of coaching experience, were not recorded. Lastly, the post-intervention observation was relatively close in time to the intervention.

Future Research

It would be interesting to assess the motivational climate

within teams to establish a connection between coach behaviors and players' perceived support. One useful tool for this assessment could be the Profile of Mood States (POMS) questionnaire developed by McNair et al. (1971). The POMS is a multidimensional questionnaire that provides overall data on the subject's mood state and informs about vigor and fatigue, two important aspects for facing sports situations. Additionally, the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2; Newton et al., 2000) could be utilized to assess adherence to sports practice.

Another aspect to improve in future interventions would be to increase the number of personalized sessions with coaches to establish goals and provide follow-up. The coach-perceived behaviors scale of the CBAS (CBAS-CPBS; Smith et al., 1977) could be useful to measure coaches' perception of their own verbal responses.

Individual interventions have an elevated financial and time cost, resulting in challenges to conduct research with these characteristics. However, the preliminary results attained might support the inclusion of the figure of the sports psychologist in the coaching staff of a wide range of institutions to promote the long-term maintenance of the change accomplished in the intervention and the collection of longitudinal data to evaluate the effectiveness of this type of programs. It is essential to widen the sample of coaches to include different sports disciplines as well as female coaches.

Conclusions

Sports coaches often prioritize performance and the competitive situation over the well-being of players (Moreia & Benavides, 2018). It should be considered that coaches tend to overly rely on technical instructions, which may contribute to distracting players from the game. Furthermore, hostile feedback may elicit negative responses from players and fails to provide a learning experience that improves performance (Buceta, 2020). Therefore, the use of hostile feedback as a coaching instruction should be reduced, if not completely eliminated. Recent research suggests that increasing the use of coping strategies to manage emotional reactions is crucial, with a focus on enhancing athletes' confidence and perceived control (Otten, 2009) and understanding the stimulus contexts of behavioral responses in sports (Fritsch et al., 2021). Implementing these programs will enhance the current efforts to increase adherence in physical activity and sports, benefiting adolescents and young athletes' psychosocial development.

The goals outlined in this paper -reducing TIP and HF in favor of appropriate feedback (e.g., PCSA)- were successfully attained. However, it should be noted that more data are still needed to confirm the findings for definitive conclusions. As in any type of psychological or pedagogical intervention, more assessment and support sessions are needed for the coaches' responses to become consistent.

This study highlights the foundations for the development of a psychological intervention protocol with coaches in sports clubs targeting coaches' verbal communication. The aim is to improve the way coaches communicate with players to create an environment of well-being, learning and, ultimately, high-performance in sports. Behavioral interventions in sports show promise in fostering adequate support networks, motivational contexts for physical activity adherence and a reduction of criticism toward match officials, that translates into the prevention of violence in sports.

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References

- Águila, C. & Padilla-Cazorla, L. (2022). Parental pressure experienced in childhood by professional athletes: the case of Andre Agassi. *Retos*, 46, 1105–1113. DOI: <https://doi.org/10.47197/retos.v46.94745>
- Akin-Little, K. A., Eckert, T. L., Lovett, B. J., & Little, S. G. (2019). Extrinsic Reinforcement in the Classroom: Bribery or Best Practice. *School Psychology Review*, 33(3), 344–362. DOI: <https://doi.org/10.1080/02796015.2004.12086253>
- Ambady, N., Bernieri, F. J., & Richeson, J. A. (2000). Toward a histology of social behavior: Judgmental accuracy from thin slices of the behavioral stream. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, 32, pp. 201-271. San Diego, CA: Academic Press.
- Ambady, N. & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin*, 111, 256-274.
- Batista, M. B., Romanzini, C. L. P., Barbosa, C. C. L., Blasquez Shigaki, G., Romanzini, M., & Ronque, E. R. V. (2019). Participation in sports in childhood and adolescence and physical activity in adulthood: A systematic review. *Journal of Sports Sciences*, 37(19), 2253–2262. DOI: <https://doi.org/10.1080/02640414.2019.1627696>
- Bernstein, B. (1990). *Poder, educación y conciencia. Sociología de la transmisión cultural*. Esplugues de Llobregat (Barcelona): El Roure.
- Bianco, T. (2001). Social support and recovery from sport injury: elite skiers share their experiences. *Research Quarterly for Exercise and Sport*, 72(4), 376-388. DOI: 10.1080/02701367.2001.10608974.
- Brewer, B. W. (2017). Psychological Responses to Sport Injury. *Oxford Research Encyclopedia of Psychology*. DOI: 10.1093/acrefore/9780190236557.013.172
- Buceta, J. M. (2020). *Psicología del deporte de alto rendimiento*. Dykinson.
- Candel-Carrillo, M. J., Mompeán-Rey, R., Olmedilla-Zafra, A., & Giménez-Egido, J. M. (2023). Catastrophic thinking and temporary evolution of mood state in injured football players. *Retos*, 47, 710-719.
- Cameron, J., Banko, K.M., & Pierce, W.D (2017). Pervasive negative effects of rewards on intrinsic motivation: The myth continues. *The Behavior Analyst*, 24, 1–44. DOI: <https://doi.org/10.1007/BF03392017>
- Cameron, A. & Trivedi, P. (1990). Regression-based tests for overdispersion in the Poisson model. *Journal of Econometrics*, 46(3), 347-364.
- Cantón, E. (2016). La especialidad profesional en Psicología del Deporte. *Revista de Psicología aplicada al Deporte y al Ejercicio Físico*, 1(1). DOI: <https://doi.org/10.5093/rpadef2016a2>
- Carton, J.S (1996). The Differential Effects of Tangible Rewards and Praise on Intrinsic Motivation: A Comparison of Cognitive Evaluation Theory and Operant Theory. *The Behavior Analyst*, 19, 237–255. DOI: <https://doi.org/10.1007/BF03393167>
- Conde, C., Almagro, B. J., Sáenz-López, P., Domínguez, A., & Moreno, J. A. (2010). Evaluación e influencia de un programa de formación orientado a la mejora del clima motivacional transmitido por entrenadores de baloncesto. *Motricidad. European Journal of Human Movement*, 25, 165-182.
- Cruz, J. (1994). Asesoramiento psicológico a entrenadores: experiencia en baloncesto de iniciación. *Apuntes. Educación Física y Deportes*, 35, 5-14.
- Cruz, J. (1997). Factores motivacionales en el deporte infantil y asesoramiento psicológico a entrenadores y padres. In J. Cruz Feliu (Ed.) *Psicología del Deporte*. Madrid: Síntesis.
- Cruz, J., Mora, À., Sousa, C., & Alcaraz, S. (2016). Effects of an Individualized Program on Coaches' Observed and Perceived Behavior. *Revista de Psicología del Deporte*, 25(1), 137–144.
- Cruz, J., Torregrosa, M., Sousa, C., Mora, A., & Viladrich, C. (2011). Efectos conductuales de programas personalizados de asesoramiento a entrenadores en estilo de comunicación y clima motivacional. *Revista de Psicología del Deporte*, 20(1), 179-195.
- Dartfish (2018). EasyTag-Note [Mobile Application Software]. Retrieved from <https://www.dartfish.com/mobile>
- Deci, E. L. & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior*. New York: Plenum.
- Delgado, S., Huang, C., González, L., & Castro, M. (2022). Impacto del sedentarismo en la salud mental. *Revista Ciencia y Salud Integrando Conocimientos*, 6(1), 81-86. DOI: <https://doi.org/10.34192/cienciaysalud.v6i1.404>
- Fritsch, J., Redlich, D., Latinjak, A., & Hatzigeorgiadis, A. (2021). The behavioural component of emotions: exploring outward emotional reactions in table tennis. *International Journal of Sport and Exercise Psychology*, 20(2),

- 397–415. DOI: <https://doi.org/10.1080/1612197x.2021.1877324>
- Froxán, M. J. (2020). *Análisis funcional de la conducta humana. Concepto, metodología y aplicaciones*. Pirámide.
- García-Mas, A., Olmedilla, A., Laffage-Cosnier, S., Cruz, J., Descamps, Y., & Vivier, C. (2021). Forever Young! Tintin's Adventures as an Example of Physical Activity and Sport. *Sustainability*, 13(4), 23-49. DOI: <https://doi.org/10.3390/su13042349>
- García-Mas, A., Núñez Prats, A., Olmedilla, A., Ruiz-Barquín, R., & Cantón, E. (2019). Levels of Cognitive Congruence between Managers and Team Members' Perceptions of Cooperation at Work. *Sustainability*, 11(21). DOI: <http://dx.doi.org/10.3390/su11216111>
- González, L., García-Merita, M., Castillo, I., & Balaguer, I. (2016). Young athletes' perceptions of coach behaviors and their implications on their well-and ill-being over time. *The Journal of Strength & Conditioning Research*, 30(4), 1147-1154. DOI: <https://doi.org/10.1519/JSC.0000000000001170>
- Guzmán, J. F., Madera, J., Marín-Suelves, D., & Ramón-Llin, J. (2022). Effects of a notational analysis-based intervention on coaches' verbal behaviour according to physiological activation during competition. *Heliyon*, 8(10). DOI: <https://doi.org/10.1016/j.heliyon.2022.e11077>
- Hilbe, J. M. (2014). *Modeling Count Data*. Cambridge University Press.
- Jaimes-Reyes, A. L., Betancourt-Ocampo, D., Tellez-Vasquez, M. H., Rubio-Sosa, H. I., & González-González, A. (2022). Parents as models of physical activity in Mexican boys and girls. *Retos*, 43, 742–751. DOI: <https://doi.org/10.47197/retos.v43i0.88527>
- Jewett, R., Kerr, G., & Tamminen, K. (2019). University sport retirement and athlete mental health: a narrative analysis. *Qualitative Research in Sport, Exercise and Health*, 11(3), 416-433. DOI: <https://doi.org/10.1080/2159676X.2018.1506497>
- Kazdin, A. (1983). *Historia de la modificación de conducta*. Desclée de Brouwer S. A.
- Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. *Computers & Education*, 89, 16-31.
- Langan, E., Blake, C., & Lonsdale, C. (2013). Systematic review of the effectiveness of interpersonal coach education interventions on athlete outcomes. *Psychology of Sport and Exercise*, 14(1), 37-49. DOI: <https://doi.org/10.1016/J.PSYCHSPORT.2012.06.007>
- Long, J. (1997). *Regression models for categorical and limited dependent variables. Advanced quantitative techniques in the social sciences*. Thousand Oaks: Sage Publications.
- Marracho, P., Rocha Teles de Castro Coelho, E. M., Almeida-Pereira, A. M., & Venda da Graça Nery, M. (2023). Mistreatment behaviours in the Athlete-coach relationship. *Retos*, 50, 790–798. DOI: <https://doi.org/10.47197/retos.v50.98143>
- Martin, G. L. (2019). *Sport Psychology: Practical Guidelines from Behavior Analysis* (6th ed.). Winnipeg, MB, Canada: Sports Science Press.
- Martin, G. & Pear, J. J. (2019). *Behavior Modification: What it is and how to do it*. Routledge.
- McNair, D. M., Lorr, M., & Droppleman, L. F. (1971). *Manual for the Profile of Mood States*. San Diego, CA: Educational and Industrial Testing Service.
- Michael, J. (1993). Establishing operations. *The Behavior Analyst*, 16, 191–206.
- Montealegre-Mesa, L. M., Rincón-Bolívar, N. J., & Montealegre-Mesa, A. (2023). Carga de entrenamiento y respuesta psicológica de futbolistas en aislamiento por Covid-19. *Revista Digital: Actividad Física y Deporte*, 9(1). DOI: <http://doi.org/10.31910/rdafd.v9.n1.2023.230>
- Moreia, V. & Benavides, L. (2018). Efectos del fútbol actual en el modelo social del niño. *Revista internacional de ciencias sociales de la actividad física, el juego y del deporte*, 14, 11-23.
- Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the Perceived Motivational Climate in Sport Questionnaire - 2 in a sample of female athletes. *Journal of Sports Sciences*, 18(4), 275-290. DOI: <https://doi.org/10.1080/026404100365018>
- Núñez-Aguilar, M., Brambila-Torres, E. F., González-Ramírez, V., & Padrós-Blázquez, F. (2023). Evaluación de la sintomatología depresiva y el estado de ánimo en futbolistas lesionados e ilesos. *Revista Digital: Actividad Física y Deporte*, 9(1). DOI: <http://doi.org/10.31910/rdafd.v9.n1.2023.2111>
- Ortiz-Sánchez, J. A., del Pozo-Cruz, J., Alfonso-Rosa, R. M., Gallardo-Gómez, D., & Álvarez-Barbosa, F. (2021). Effects of sedentary school-age children: a systematic review of longitudinal studies. *Retos*, 40, 404–412. <https://doi.org/10.47197/retos.v0i40.83028>
- Otten, M. (2009). Choking vs. clutch performance: a study of sport performance under pressure. *Journal of Sport and Exercise Psychology*, 31(5), 583-601.
- Pérez, M. & Vinas, J. (2011). *Los hábitos deportivos de la población escolar en España* [Archivo PDF]. https://estaticos.csd.gob.es/csd/docs/Los_habitos_deportivos_en_la_poblacion_escolar.pdf
- Philippe, R. A. & Seiler, R. (2006). Closeness, co-orientation and complementarity in coach–athlete relationships: What male swimmers say about their male coaches. *Psychology of Sport and Exercise*, 7(2), 159–171. DOI: <https://doi.org/10.1016/j.psychsport.2005.08.004>
- Rodríguez, M. P., Cruz, J., & Torregrosa, M. (2017). Programa de intervención con entrenadores y padres de familia: Efectos en las conductas del entrenador y el clima motivacional del equipo. *Revista de Psicología del Deporte*, 26(2), 181-187.
- Rubio, V. J., Quartiroli, A., Podlog, L. W., & Olmedilla,

- A. (2020). Understanding the dimensions of sport-injury related growth: A DELPHI method approach. *Plos ONE*, 15(6). DOI: <https://doi.org/10.1371/journal.pone.0235149>
- Ryan, R. M. & Deci, E. L. (2017). *Self-Determination Theory. Basic Psychological Needs in Motivation, Development and Wellness*. London: Guilford Press.
- Saenz-López, P., Jiménez, A., Giménez, F., & Ibáñez, S. (2007). La autopercepción de las jugadoras de baloncesto expertas respecto a sus procesos de formación. *Cultura, ciencia y deporte: revista de ciencias de la actividad física y del deporte de la Universidad Católica de San Antonio*, 7, 35-41.
- Santos, F., Rathwell, S., Trindade, A., Lima, R., Gobbi, V., & Gaion, P. (2021). Brazilian coaches' role in facilitating positive development through university sport. *Retos*, 40, 186-197. DOI: <https://doi.org/10.47197/retos.v1i40.82353>
- Sheridan, D., Coffee, P., & Lavallee, D. (2014). A systematic review of social support in youth sport. *International Review of Sport and Exercise Psychology*, 7(1), 198-228.
- Skinner, B. F. (1953). Some contributions of an experimental analysis of behavior to psychology as a whole. *American Psychologist*, 8, 69-78.
- Smith, R. E. & Smoll, F. L. (2007). Social-Cognitive Approach to Coaching Behaviors. In S. Jowette & D. Lavallee (Eds.), *Social Psychology in Sport* (pp. 75-90). Human Kinetics. DOI: <https://doi.org/10.5040/9781492595878.ch006>
- Smith, R., Smoll, F., & Hunt, E. (1977) A System for the Behavioral Assessment of Athletic Coaches, Research Quarterly. *American Alliance for Health, Physical Education and Recreation*, 48(2), 401-407. DOI: <https://doi.org/10.1080/10671315.1977.10615438>
- Smoll, F. & Smith, R. (1989). Leadership behaviors in sport: A theoretical model and research paradigm. *Journal of Applied Social Psychology*, 19(18), 1522-1551. DOI: <https://doi.org/10.1111/j.1559-1816.1989.tb01462.x>
- Smoll, F., Smith, R., Cruz Feliu, J., & Garcia Mas, A. (2009). *Claves para ser un entrenador excelente*. Barcelona: INDE.
- Sousa, C., Cruz, J., Torregrosa, M., Vilches, D., & Viladrich, C. (2006). Evaluación conductual y programa de asesoramiento personalizado a entrenadores (PAPE) de deportistas jóvenes. *Revista de Psicología del Deporte*, 15(2), 263-278.
- The jamovi project (2023). *jamovi* (Version 2.3) [Computer Software]. Retrieved from <https://www.jamovi.org>
- Vives-Ribó, J. & Rabassa, N. (2020). Intervención sobre la comunicación del entrenador para aumentar la confianza de los deportistas. *Revista de Psicología Aplicada al Deporte y El Ejercicio Físico*, 5(1). DOI: <https://doi.org/10.5093/rpadef2020a1>
- Weiss, M. R. & Chaumeton, N. (1992). Motivational orientations in sport. In T.S. Horn (Ed.), *Advances in sport psychology* (pp. 61-99). Champaign, IL: Human Kinetics.
- Witt, P. A. & Dangi, T. B. (2018). Why Children/Youth Drop Out of Sports. *Journal of Park and Recreation Administration*, 36(3), 191-199. DOI: <https://doi.org/10.18666/jpra-2018-v36-i3-861>