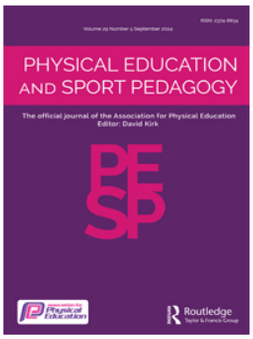
Andrew, M, Ford, PR, McRobert, AP, Whitehead, O, Foster, NC, Miller, MT and Hayes, SJ

Using a coproduced educational workshop to change the focus of verbal instructions delivered by professional youth soccer coaches: a case study



Physical Education and Sport Pedagogy

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/cpes20

Using a coproduced educational workshop to change the focus of verbal instructions delivered by professional youth soccer coaches: a case study

Matthew Andrew, Paul R. Ford, Allistair P. McRobert, Oliver Whitehead, Nathan C. Foster, Matthew T. Miller & Spencer J. Hayes

To cite this article: Matthew Andrew, Paul R. Ford, Allistair P. McRobert, Oliver Whitehead, Nathan C. Foster, Matthew T. Miller & Spencer J. Hayes (22 Feb 2024): Using a coproduced educational workshop to change the focus of verbal instructions delivered by professional youth soccer coaches: a case study, Physical Education and Sport Pedagogy, DOI: 10.1080/17408989.2024.2319056

To link to this article: https://doi.org/10.1080/17408989.2024.2319056

Published online: 22 Feb 2024.

PHYSICAL EDUCATION AND SPORT PEDAGOGY
https://doi.org/10.1080/17408989.2024.2319056

Routledge
Taylor & Francis Group

Using a coproduced educational workshop to change the focus of verbal instructions delivered by professional youth soccer coaches: a case study

Matthew Andrew [a], Paul R. Ford [b], Allistair P. McRobert [c], Oliver Whitehead[c], Nathan C. Foster [d], Matthew T. Miller[c] and Spencer J. Hayes [e]

[a]Department of Sport and Exercise Sciences, Institute of Sport, Manchester Metropolitan University, Manchester, UK; [b]School of Sport, Exercise and Applied Science, St Mary's University, London, UK; [c]Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, UK; [d]Department of Neurology, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany; [e]Department of Psychology and Human Development, IOE, Faculty of Education and Society, University College London, London, UK

ABSTRACT

Background: The predominant instructional method utilised by soccer coaches are verbal instructions that occur whilst (during) players are executing soccer-skill. However, little is known on the specificity of the information contained within. These verbal instructions can guide the learner to either the performance characteristics of a movement (internal focus) or the intended movement effects (external), with the latter known to facilitate superior motor performance, retention, and transfer.

Purpose: The aims in the present study were to quantify the focus of concurrent verbal instructions utilised by professional youth soccer coaches during drill-based (i.e. isolated) practice activities, and to modulate how these instructions are delivered in coaching sessions following the engagement in a coproduced evidence-based educational workshop.

Method: Systematic observation was used pre and post the workshop to quantify the nature of verbal instructions delivered by 5 male coaches (31–47 years of age with 4–24 years of coaching experience) across 34 sessions with players from 8 to 13 years of age. For instructions provided during (concurrent) action-execution, we further quantified whether these instructions were focused on motor performance characteristics (internal) or the intended movement outcome effects (external) using criteria outlined in the revised Arizona State University Observation Instrument. To facilitate behaviour change, all coaches engaged in an educational workshop led by skill acquisition specialists (SAS). The workshop was designed so that educational material related to the principles of skill acquisition, and motor control and learning, were presented using a pedagogical delivery method containing verbal information, data presented in illustrations, and videos. In addition, the results that quantified coaching behaviour during the pre-workshop systematic observation period were presented to coaches as quantitative feedback. To guide the coaches to appraise the

ARTICLE HISTORY
Received 18 July 2023
Accepted 31 January 2024

KEYWORDS
Coaching behaviours; focus of attention; skill acquisition; educational workshop

CONTACT Matthew Andrew matthew.andrew@mmu.ac.uk Department of Sport and Exercise Sciences, Manchester Metropolitan University Institute of Sport, Manchester, UK

quantitative feedback in relation to the delivered educational material, the SAS built an educational environment that encouraged discussion opportunities for coaches to compare and appraise feedback with other coaches and process the feedback in relation to data and concepts regarding skill acquisition.
Results and findings: The pre-workshop systematic observation data indicated that coaches delivered significantly more (64%) verbal instructions whilst (concurrently) players were executing motor skills, compared to before (15%) or after (21%). Within concurrent feedback, coaches used instructions that had a more internal, compared to external focus of attention. Post-workshop data indicated the coaches significantly changed the utilisation of instructions using a greater proportion of external focus. The data confirms coaches deliver a greater proportion of concurrent verbal instructions during coaching sessions focused training drill-based activities, but engaging in an educational workshop coaches modulated the focus of these instructions from internal to external, indicating behaviour change and an opportunity to facilitate skill acquisition in soccer academy players.

Introduction

Professional soccer academies seek to provide an environment that educates and inspires young players about the technical, tactical, physical, mental, lifestyle and well-being aspects of life and soccer (e.g. Elite Player Performance Plan). In terms of performance, a key aim is to develop youth players to progress to the first (i.e. senior) team (Relvas et al. 2010) and succeed in competition. Soccer clubs employ qualified coaches to deliver training sessions designed to facilitate the acquisition of soccer-related skills needed to reach high levels of performance (e.g. Williams and Reilly 2000; Williams, Ford, and Drust 2020). The design and content of coaching sessions is important given that players accumulate approximately 3–6 thousand hours in this activity prior to reaching adult expert levels of performance (Hendry and Hodges 2018; Hornig, Aust, and Güllich 2016). Coaches provide augmented instruction in these training sessions seeking to expedite skill acquisition, involving strategies such as modelling (Hayes et al. 2007; Shea et al. 2000), feedback (e.g. knowledge of results, knowledge of performance; Bilodeau, Bilodeau, and Schumsky 1959; Salmoni, Schmidt, and Walter 1984) and verbal instructions (e.g. Al-Abood, Davids, and Bennett 2001).

Systematic examination of coaching (recreational-professional; youth-senior) behaviours show the predominant instructional method used are verbal instructions, which accounts for approximately 30-60% of all augmented informational methods (Ford, Yates, and Williams 2010; Millard 1996; Partington and Cushion 2013; Potrac, Jones, and Armour 2002; 2007; Cushion et al., 2012a). Although players engage processes to make their own decisions, or can discover ways, to find solutions to changing game contexts, verbal instructions are used because they are an effective means for describing the solution to a coaching aim (e.g. perform a driven pass), or the informational content expediates a player to discover a solution (e.g. Gentile 1972; Williams and Hodges 2005; 2023). Moreover, whilst manipulating task constraints within coaching activities (e.g. size of grid; size of goals) shapes the emergence of movement behaviours in players (Vilar et al. 2014), verbal instructions, and drill-based practice activities that require players to perform isolated soccer skills (e.g. grid-based passing, turning, ball control) with limited, or no opposition players, are often used because they are effective in making coaching sessions easier to follow for less-skilled players as the attentional (e.g. decision-making) demands are reduced (Ford, Yates, and Williams 2010; O'Connor, Larkin, and Williams 2018; Partington and Cushion 2013).

Verbal instructions are also provided at different time points during a coaching task or session, with concurrent verbal instructions (i.e. short phrases/cues e.g. 'keep your knee bent') delivered

whilst players are executing soccer-skills being the most frequently used (24%) instructional method compared to before (12%) or after (8%) a skill is performed (Cushion and Jones 2001; O'Connor, Larkin, and Williams 2018; Partington and Cushion 2013; Partington, Cushion, and Harvey 2014). While this prescriptive approach can expediate improvements in motor performance thus maximising the time available in coaching sessions (Partington and Cushion 2013; Partington, Cushion, and Harvey 2014), the frequency and timing of instructions can impact the demand on cognitive resources (Lee, Swinnen, and Serrien 1994) whilst players are processing the informational content, which modulates processing away from self-controlled decision making processes that underpins independent problem-solving and discovery learning (Hodges and Franks 2002; Williams and Hodges 2005). One way to encourage these self-controlled learning outcomes is to implement a less prescriptive approach to skill acquisition where coaches reduce the frequency of verbal instructions thus affording players the opportunity to be more flexible in discovering multiple solutions to variations in a sporting context (Ford, Yates, and Williams 2010; Handford et al. 1997; Hendry et al. 2015; Williams and Hodges 2005).

In addition to reducing the frequency of verbal instructions, coaches can also modulate the specificity of the informational content of an instruction. For example, verbal instructions that direct the locus of attention to an external (i.e. intended movement effects of an object – i.e. ball flight trajectory) rather than internal (i.e. intended movement pattern – i.e. bend the knee during a driven pass) aspect of a motor skill typically leads to benefits in motor performance, learning, and transfer (Chua et al. 2021; McNevin, Shea, and Wulf 2003; Williams and Hodges 2023; Wulf 2013; Wulf, Höß, and Prinz 1998). A soccer specific example that illustrates the nature of these different verbal instructional methods is as follows: *external* (e.g. 'Make sure to hit the ball just below its midline to lift the ball'), compared to *internal* ('Concentrate on hitting the ball exactly with the inner side of your foot') focus of attention instructions (see Table 1 in Schwab, Rein, and Memmert 2018). Focusing attention away from the body during practice facilitates motor learning by increasing neuromuscular efficiency (Chua et al. 2021; Parr et al. 2023) between agonist and antagonist muscles of the primary motor effector(s), which engages lower-level automatic processes to control motor execution (Wulf 2013; Wulf, McNevin, and Shea 2001). Whereas focusing internally can lead to the engagement of top-down (conscious) control that intervenes and inadvertently disrupts the coordination of automatic (i.e. self-organising) processes that typically controls movement (see McNevin, Shea, and Wulf 2003 for a discussion of the 'constrained action' hypothesis).

An understanding of how verbal instructions can facilitate motor performance and learning is therefore important because it can be used as the theoretical basis for creating pedagogical resources to optimise coaching practice. Such evidence-based methods can expediate the learning process, resulting in higher skill levels and match performance (Chua et al. 2021). A pedagogical approach for delivering evidence-based knowledge exchange is via coach education programmes (Cope et al. 2022; Eather et al. 2020; Jones et al. 2023; Raya-Castellano et al. 2021; 2022; Stodter and Cushion 2014) that are designed to provide coaches with opportunities to develop and acquire theoretical knowledge that can be synthesised with existing soccer-related experiential knowledge (Mallett et al. 2009). Coach education programmes are suggested (Sawiuk, Taylor, and Groom 2016; Stodter and Cushion 2016) to be more effective if they are presented in an informal manner such as a workshop delivered within a familiar soccer environment. To optimise the informal nature of the delivery style and content of a workshop, we employed a 'coproduction' method (Andrew et al. 2021) that has been used in other sport settings (Smith et al. 2022). The coproduction process created an environment where the leadership team (academy director; AD) and skill acquisition specialists (SAS) (i.e. individuals with academic experience around motor control and learning, Williams and Ford 2009) worked collaboratively to co-create the rationale and delivery method (i.e. evidence-based workshop) for a coach education programme that was specific to the needs of the club. For example, to create the workshop content we observed various age-group coaching sessions at the academy and had group discussions regarding practice and instruction in terms of why and how it was implemented by coaches. A central theme that emerged from the discussions

was the nature and specificity of 'practice activities'. To develop a coach education programme around practice activities, the SAS first utilised systematic observation to measure practice activities used by professional youth soccer coaches. The data collected was used to inform the creation of pedagogical resources (video explainers; figures illustrating proportion of practice activity types; reflective practice discussions etc.) that coaches received within a workshop led by the SAS. After the workshop, the coaches and leadership agreed to use the evidence-based information to modulate existing practice activities across a series of follow-up sessions. These sessions were filmed, and the data indicated that coaches significantly changed the type of practice activities (increased use of games-based activities such as small-sided games, phases of play, conditioned and possession games) delivered across U7-U13 age groups. The direction of behaviour change was in line with the theoretical content of the educational workshop, and interview data indicated that coaches reported the workshop as the primary reason for behaviour change.

To this end, the first aim of the present case study, which is a concentrated investigation of a single group (Heale and Twycross 2018), was to replicate previous work (Cushion, Ford, and Williams 2012a; Ford, Yates, and Williams 2010) by quantifying the temporal location of verbal instructions delivered by professional youth soccer coaches during drill-based activities. We predicted that concurrent verbal instructions, those provided during motor-execution, will be the most utilised (Cushion, Ford, and Williams 2012a) instructional method compared to instructions delivered before and after motor-execution. To extend this work, our second aim was to quantify the specificity of verbal instructions that coaches utilised in terms of locus of attention (i.e. internal or external focus of attention). Instructions that refer to a player's body movements is related to 'internal focus' of attention and instructions that direct a player's attention away from their body movements and to the effects that these movements have on the environment (i.e. ball flight trajectory) is related to 'external focus' of attention (Wulf, Höß, and Prinz 1998). In line with reports from athletes of collegiate soccer coaches (Diekfuss and Raisbeck 2016), and others in the field (Yamada, Higgins, and Raisbeck 2022), we predicted that that coaches would use instructions that have an internal focus of attention. Our third aim, given the evidence illustrating greater facilitation of skill acquisition following external focus of attention instruction (Chua et al. 2021; Wulf 2013), and previous reports of a limited knowledge of the principles of the focus of attention research (Powell et al. 2021), was to coproduce (with a leadership team; AD and head of sport science (HSS) of a professional soccer club) an evidenced-based and data informed coach education 'learner-centred' workshop (Araya, Bennie, and O'Connor 2015) aimed to encourage coaches to increase the utilisation of external focus instructions during drill-based activities. Based on our previous work that used a similar coproduction methodology (Andrew et al. 2021), we predicted professional youth soccer coaches would significantly increase the proportional use of verbal instructions that had an external focus of attention following the opportunity to engage in the workshop.

Materials and methods

Participants

Volunteers that participated in the study were professional youth soccer coaches ($n = 5$) from an English Soccer Association Youth Academy. The coaches worked with players from 8 to 13 years of age (U9-U13). All coaches were male, aged 31–47 years, and had 4–24 years of experience. All coaches possessed Union of European Football Associations (UEFA) coaching licenses by the English Football Association (The FA). One participant possessed an UEFA 'A' coaching license (Level 4/5 in the coaching qualification pyramid), and the remaining four participants possessed UEFA 'B' coaching licenses (Level 3/5). All participants provided written informed consent. The study was designed in accordance with the Declaration of Helsinki (2013) and approved by the local university ethics board.

Coproduction process

To coproduce the educational workshop, a similar approach to our previous study (Andrew et al. 2021) was employed whereby the SAS (final author) had meetings with the AD of the professional soccer club, and head of sport science (HSS). To achieve the aim of continuing to promote and employ evidence-based coaching behaviours within the club, the following steps were undertaken:

(1) The first meeting focused on continuing to work together to create evidence-based practice instructional information that could be implemented across the academy. Discussions started by reflecting on our specificity of practice work (i.e. Andrew et al. 2021) and then moved onto the nature and delivery method of verbal instructions. During these discussions, we explored the concept of focus of attention (external vs. internal) in terms how a locus of attention influences skill acquisition. For example, the SAS indicated, by synthesising the key literature (McNevin, Shea, and Wulf 2003; Wulf, Höß, and Prinz 1998) into context-specific lay language, that skill acquisition is enhanced using external focus of attention as it increases movement efficiency (Chua et al. 2021; Parr et al. 2023) and motor control (i.e. enhanced automatic control between agonist and antagonist muscles of the primary motor effector; Wulf 2013; Wulf, McNevin, and Shea 2001). Whereas focusing internally can hinder and disrupt automatic (i.e. self-organising) motor control processes (i.e. McNevin, Shea, and Wulf 2003 for a discussion of the 'constrained action' hypothesis). The SAS provided soccer specific examples of *external* (e.g. 'make sure to hit the ball just below its mid-line to lift the ball') and *internal* ('concentrate on hitting the ball exactly with the inner side of your foot') focus of attention instructions (i.e. Schwab, Rein, and Memmert 2018).
(2) The second meeting discussed the process of coproducing the educational workshop and the working parameters. Logistics were discussed surrounding the systematic observation (i.e. dates/times). The lead researcher discussed the preferred method to feedback the data to the coaches (Andrew et al. 2021; Nosek et al. 2021). It was agreed that a hybrid of the workshops employed in Andrew et al. (2021) would by employed where a video presentation alongside a small laminated A5 infographic-based report would be produced to convey the quantitative information associated with proportional data indicating when instructions are delivered (before, concurrently, or after motor-execution) and the direction of focus (external vs. internal) of attention contained in the instructions.

Coach observation

We utilised systematic observation (Ford, Yates, and Williams 2010; Partington and Cushion 2013) within the study to observe, record, and analyse coaching behaviours and events based upon on preset guidelines and criteria (Franks, Hodges, and More 2001). We used the Arizona State University Observation Instrument (ASUOI) to create an in-house system to measure verbal instructional behaviours defined as 'verbal statements to a player(s) to explain how to execute a skill, play, strategy and so forth associated with the sport, that are delivered before (prior to), concurrently (during), or after (following) motor-execution' (Cushion and Jones 2001). We examined the focus of concurrent verbal instructions as internal or external (Wulf 2007). Instructions with an internal focus of attention were those that focused 'on the body and movements of the learner', whereas instructions with an external focus of attention were those that focused on 'the effects of executing a skill or play'. We implemented the five-stage procedure outlined by Brewer and Jones (2002): (1) observer training: two coders were recruited that had experience with systematic observation and definitions of the activity categories, (2) we refined the instrument to ensure content validity and (3) face validity: both of which have already been tested in our previous work (Ford, Yates, and Williams 2010), (4) we established inter-observer reliability in order to obtain

reliability with the categories and definitions and time analysis of the activities, and (5) we established intra-observer reliability to obtain test–retest reliability.

Procedure

Two blocks of systematic observation (pre-workshop; post-workshop) were performed where 34 separate sessions were filmed. In the pre-workshop, 20 sessions (4 per coach) were filmed, while in the post-workshop only 14 sessions (3 per coach and 2 for the U11 coach) were filmed due to unforeseen playing and coaching constraints (cancellations of formal training sessions). The observed sessions took place within an indoor training facility (40 × 40 m) and were filmed using a digital video camera (Sanyo, Japan) mounted on a stationary tripod (Libec, U.S.). The camera was located 10 m from the coaching perimeter to minimise interference with the session whilst still allowing for all movements of the players and coaches to be recorded. The focus of each session was on the group, rather than an individual (coach or player). Each coach wore a head-set microphone and a hip-mounted radio transmitter (Sennheiser, Germany). The radio transmitter sent a signal to a radio receiver, which was connected and mounted to the camera, enabling the simultaneous recording of video and audio signals, which were then transferred to an Apple iMac computer (Apple, U.S.). The video footage was analysed using Studio Code software (Sportstec, Australia) using the continuous recording method (Darst, Zakrajsek, and Mancini 1989; Ford, Yates, and Williams 2010). All analyses followed a set procedure (see Brewer and Jones 2002) to ensure the process was consistent and valid. Two trained coders with experience of systematic observation coded the instructional behaviour data at separate times and locations, allowing time to analyse all aspects of the footage and to increase validity and reliability (Patton 2002). The two coders carried out inter- and intra-observer reliability agreements that were calculated using the equation: (agreements/[agreements + disagreements]) × 100 (Darst, Zakrajsek, and Mancini 1989). Inter- and intra-observer reliability were 94% and 91%, respectively for instructional behaviours, and 95% and 93%, respectively for focus of attention, all of which exceeded the minimum acceptable level of 85% (Darst, Zakrajsek, and Mancini 1989).

Coach educational workshop

Based on our previous work (Andrew et al. 2021), we utilised an educational workshop that was delivered to coaches in two phases. First, qualitative, and quantitative feedback was provided to each coach via a video presentation and a small A5 laminated infographic. Qualitative feedback contained definitions of the verbal instructional behaviours that were recorded and analysed, and how they influence skill acquisition in soccer (Cushion, Ford, and Williams 2012a; Ford, Yates, and Williams 2010). Quantitative feedback included the proportion (%) of instructional behaviours from the systematic observations illustrated as pie charts alongside descriptive statistics (means and SDs). To aid discussion during the workshop, data relating to similar soccer instructional behaviours recorded by Cushion and Jones (2001) and Partington and Cushion (2013) were illustrated to allow comparison with other professional youth soccer coaches.

Second, the coaches engaged in an educational workshop led by a SAS, the HSS, and the AD and lasted for approximately 60 min. The results, content and design of the educational workshop was created with input from 5 SAS who were academics holding doctoral qualifications in the areas of motor learning and control, expert performance, skill acquisition, systemic observation, and talent identification/development. They have published extensively in skill acquisition and 2 SAS are qualified UEFA 'B' coaches that have extensive coaching experience in UK soccer academies. There was conflict of interest with the SAS and club as they held no official role at the soccer club. In the workshop, definitions of instructional behaviours and the concept of differences in external vs. internal focus of attention were defined, explained, and discussed. To relate to the environment, soccer-specific examples of focus of attention instructions were provided to coaches via a video explainer

and images presented via a PowerPoint presentation (see Table 1). All coaches were asked to be an active part of the process by interpreting the proportion of instructional behaviours data presented in the report. The educational workshop was designed to encourage conversational dialogue, interaction, and integration across coaches, and with the SAS, to foster a 'learner-centred', rather than a traditional 'teacher-centred', approach to coach-education, which coaches reported as being optimal to learning as the process is specific to the sport and context (Araya, Bennie, and O'Connor 2015). For comparison, and to encourage discussion on the current findings, our coaches were asked to compare data from the first systematic observation to those reported by previous studies (Cushion and Jones 2001; Partington and Cushion 2013). These data indicated that professional youth coaches spent on average 28% of time using concurrent verbal instructional behaviours. To promote the rationale for modifying the focus of attention, the educational workshop was designed to outline the scientific principles underpinning the advantages of developing motor skills through using instructions that have an external focus rather than an internal focus of attention (e.g. Wulf 2013). Coaches were encouraged to be active in the process by discussing the principles of instructional behaviours (peer-to-peer learning and coach to researcher learning) to establish how, why, and when they could change their previous instructional behaviours. Finally, all coaches, the HSS and AD agreed to the merits of modulating the focus of instruction and collectively agreed to implementing the workshop principles in a series of follow-up sessions.

Data analysis

We calculated the frequency of behaviours used by coaches across sessions and then converted these to 'proportion (%) of total behaviours' per session (Ford, Yates, and Williams 2010). Proportions were calculated by dividing each independent behaviour category by the total number of behaviours (Lacy and Darst 1985). Proportion was calculated for each block (pre- and post-workshop) of systematic observation. Data was only coded when players performed 'drill-based' activities (for definition, see Andrew et al. 2021), and during the 'transition' period that occurred before and after a drill-based activity.

We collapsed proportion data across coaches and ran a one-way analysis of variance (ANOVA) on three instructional time points (before-, concurrent-with-, after-execution) to examine if there were differences in the temporal delivery of verbal instruction behaviour during pre-workshop systematic observation period. ANOVA was used as it is considered a robust test against the normality assumption (Field 2017). We ran a one-way multivariate analysis of variance (MANOVA) to examine the influence of the nominal independent variable across the two systematic observation blocks (pre-; post-workshop) on the 'focus of concurrent instructions´ (external; internal). Based on our sample size, the test statistic chosen for interpretation was Pillai's Trace (Tabachnick and Fidell 2007), where the closer Pillai's trace is to 1 (range = 0–1), the stronger the evidence that the explanatory variable has a statistically significant effect on the values of the response variables. Significant main effect or interaction from the MANOVA were followed up with univariate ANOVAs As changes in the proportion of focus of instructions across workshop are dependent on each other, that is, when coaches use a large proportion of one focus, they can only use a small proportion in the other focus, only the variable of greatest interest (i.e. external) that was targeted by the

Table 1. Definitions and examples of verbal concurrent instructions.

	Internal Instruction that focuses on the body and movements of the learner	External Instruction that focuses on the effects of executing a skill or play
Dribbling	*'Use the inside and outside of your foot'.*	*'Move the ball left and right'.*
Passing	*'Lift the back of your heel, then quickly bring your foot forward'.*	*'Sharply hit the bottom of the ball, think about the spin on the ball'.*
Shooting	*'Keep your shoulders over the ball and your toe down'.*	*'When shooting look to keep the flight of the ball as low as you can'.*

workshop was assessed statistically. Statistical significance was set at $p < 0.05$ and partial eta squared (η_p^2) expressed the size of the effect. *Post-hoc* tests were analysed using LSD. To provide a description of a significant difference across experimental phases (pre- to post-workshop), we calculated a percentage change score (see Vincent and Weir 2012) using for the following equation: ([post-workshop – pre-workshop]/[pre-workshop]) × 100.

Results

For the temporal delivery of verbal instructions (Figure 1), the ANOVA revealed a significant difference in the location of instructions [$F(2, 8) = 18.53$, $p < 0.01$, $\eta_p^2 = 0.82$]. Follow up post-hoc tests indicated that during the pre-workshop only, coaches used significantly more instructions concurrent-with (64.2 ± 14.5%) compared to before (15.1 ± 4.3%; $p < 0.01$), and after (20.7 ± 5.7%; $p = 0.02$) motor-execution, with no significant difference between instructions before and after ($p = 0.34$).

For focus of attention using in the concurrent instructions (Figure 2), the MANOVA revealed a significant effect for focus of instructions (external; internal) across systematic observation block

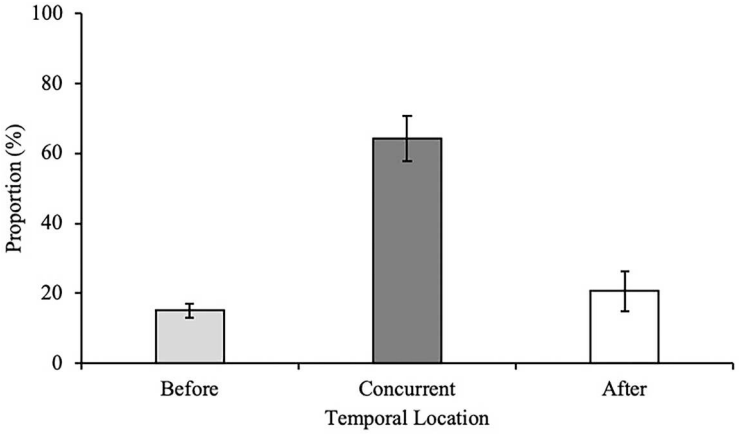


Figure 1. Mean (error bars = standard error of mean) proportion for temporal location of verbal instructions during pre-workshop.

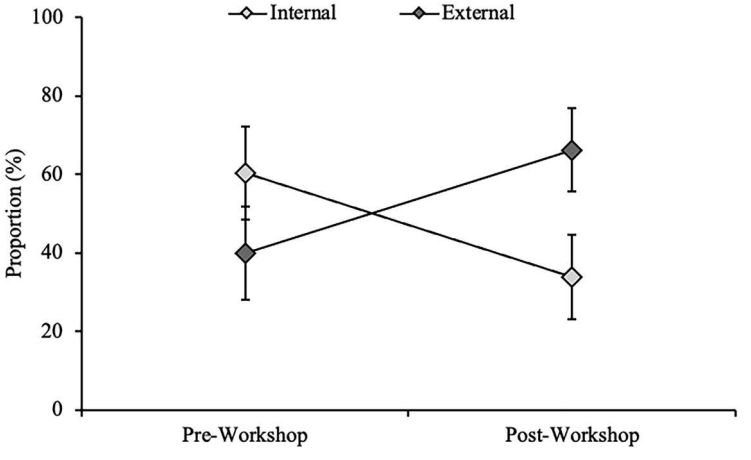


Figure 2. Mean (error bars = standard error of mean) proportion for focus of concurrent instructions presented as a function of focus and workshop.

[$F(1, 4) = 11.00$, $p = 0.03$, $\eta_p^2 = 0.73$, Pillai's Trace = 0.73]. The follow up post-hoc test indicated that the proportion for external focus of attention (dark-grey markers) was significantly greater in post-workshop (66.2 ± 10.7%; $p = 0.03$) compared to pre-workshop (39.8 ± 11.9%). This significant difference is described by a 26-unit change across workshops.

Discussion

We extended our understanding of coaching behaviour by quantifying the temporal location of verbal instructions used by professional youth soccer coaches during drill-based activities (Cushion, Ford, and Williams 2012a; Ford, Yates, and Williams 2010). In line with previous research (Cushion and Jones 2001; Partington and Cushion 2013), and our prediction, the pre-workshop data indicated that coaches delivered a greater proportion of verbal instructions that were concurrent-with-execution (64%) compared to instructions delivered before-execution (15%) or after-execution (21%). The concurrent verbal instructions used by coaches were prompts, reminders, or cues related to a skill that was being coached during a drill-based activity. The fact that over half (64%) of all verbal instructions were concurrent suggests that coaches may have opted to use instructions because of the need to coach (Williams and Hodges 2005; 2023) and/or they determined the youth players required further information and guidance to understand the goal of executing certain soccer-based motor techniques (Hall, Gray, and Sproule 2016; Partington, Cushion, and Harvey 2014). Whilst this prescriptive approach to instruction can expediate gains in motor performance, it can result in an information overload, thus preventing players from taking ownership of their own independent problem-solving and discovery learning, thus leading to less effective skill acquisition (Williams and Hodges 2005; 2023).

The pre-workshop data confirmed our second prediction by indicating coaches delivered a greater proportion of concurrent verbal instructions that had an internal (60%), rather than an external (40%), focus of attention. The preference to direct attention to the characteristics of a movement is consistent with observations by coaches of track and field athletes (85%; Porter, Wu, and Partridge 2010), ballet dancers (36%; Guss-West and Wulf 2016), baseball players (69%; van der Graaff et al. 2018) and paralympic swimmers (49%; Powell et al. 2021). In terms of soccer, 50% of collegiate level players reported that coaches used instructions that directed focus of attention to the internal motor control aspects of a movement, compared to 13% directed at the external effects that these movements have on the environment or object (Diekfuss and Raisbeck 2016; Yamada, Higgins, and Raisbeck 2022). The implication is that motor performance and learning is negatively affected (Wulf, McNevin, and Shea 2001) in these contexts because explicitly focusing attention to the internal motor execution processes interferes, and disrupts (i.e. the 'constrained action hypothesis'; Wulf, McNevin, and Shea 2001), the operation of the automatic motor control processes that regulates movement execution (see also Kal, Van der Kamp, and Houdijk 2013). Although we did not measure why coaches used more internal focus of attention instructions, interview data from paralympic swimming coaches, who also predominantly used (49%) internal focus instructions, indicated they had limited knowledge of the scientific principles of focus of attention and therefore appeared to adopt their own (from informal learning opportunities; personal experience of what works) practice-informed theories of how to coach (Powell et al. 2021).

We met our third aim as the coproduced evidenced-based educational workshop underpinned a significant difference in the nature of instructions used by coaches after they engaged with the workshop activities. The post-workshop data indicated that coaches increased the proportion of instructions that had an external focus of attention by 26 percentage points. We suggest that the change in the post-workshop coaching sessions would have provided a learning environment that had the potential to facilitate skill acquisition across academy players as focusing attention to the intended movement action effects (the trajectory of a ball) would have constrained the neuromuscular self-organisation processes to operate with greater automaticity in terms of movement control (Nicklas et al. 2022; Wulf 2013; Wulf, McNevin, and Shea 2001). The behaviour change of

coaches was achieved by creating an environment where skill acquisition specialists worked collaboratively with the leadership team (AD and HSS) to coproduce the rationale and delivery method (workshop) for the evidence-based education programme. The coproduction method was specifically delivered in an informal, rather than a traditional formal (e.g. instructor led coaching course), style because it encourages an effective learning environment for coach education (Sawiuk, Taylor, and Groom 2016; Stodter and Cushion 2016). In our case, the evidenced-based approach (Cope et al. 2022; Eather et al. 2020; Raya-Castellano et al. 2021; 2022; Stodter and Cushion 2014) was implemented to provide coaches with domain-specific scientific information (from journals and books) to acquire or consolidate knowledge and understanding (Mallett et al. 2009) on the impact of different forms of verbal instructions.

The method of linking information from evidence-based sources to the individual coach and group verbal instruction data recorded during the two systematic observation sessions was important as it created a 'learner-centred' environment (Araya, Bennie, and O'Connor 2015). This combined pedagogical approach replicated our previous method (Andrew et al. 2021) by providing a data-informed process where coaches interpreted and evaluated their own pre- and post-workshop findings on verbal instruction delivery methods in an educational environment that encouraged them to discuss and appraise the information with the SAS and other coaches (Cope et al. 2021; 2022; De Marco, Mancini, and West 1997; Krane, Eklund, and McDermott 1991; Raya-Castellano et al. 2021). We suggest that the educational process of guiding coaches to evaluate their own repertoire of coaching practice (Cushion 2010; Cushion, Harvey et al. 2012b) to scientific findings on verbal instruction led them to discover methods and strategies for modifying coaching behaviour in the post-workshop sessions. This pedagogical approach was important as coaches are often unaware of their own behaviours (Cope et al. 2021) and thus when engaged in a 'learner-centred' environment (Araya, Bennie, and O'Connor 2015), with data and learning materials they changed behaviour, which may also have increased self-awareness via a process of reflective practice (Cope et al. 2022; Kidman 1997).

To conclude, data from our case study indicated that soccer coaches predominantly used instructions that were delivered whilst players performed motor skills, and that these instructions were focused on the internal aspects of movement execution. Whilst these instructional methods are not optimal for skill acquisition, we successfully shaped coach behaviour (the increased use of external focused instructions) by implementing a coproduced evidence-based educational workshop that was 'learner-centred' to optimise coach development (Araya, Bennie, and O'Connor 2015). This outcome replicated our previous work (Andrew et al. 2021) where we also shaped coach behaviour around practice activities via a similar educational workshop. The fact that our pedagogical method has worked across two small scale studies leads to the question of 'scalability'. Scalability is important for transferring the mechanics of an intervention from a research setting to a larger-scale practical implementation stage based on its feasibility, effectiveness, and cost-effectiveness (Milat et al. 2013). The latter areas require further design and methodological evaluation, along with the implementation of validated measures that quantify any potential associated changes in coaches' meta-cognition, beliefs, and confidence following behaviour change (De Leeuw et al. 2015). Our coach-education methodology has the potential to be scaled, but importantly its impact should lead to significant improvements in skill acquisition in academy players that practice and learn in evidence-based environments.

Acknowledgements

The authors would like to acknowledge the coaches for taking the time to undertake the study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to restrictions (e.g. their containing information that could compromise the privacy of research participants).

ORCID

Matthew Andrew http://orcid.org/0000-0003-2007-910X
Paul R. Ford http://orcid.org/0000-0003-1673-3455
Allistair P. McRobert http://orcid.org/0000-0002-0964-7199
Nathan C. Foster http://orcid.org/0000-0001-5243-4159
Spencer J. Hayes http://orcid.org/0000-0002-8976-9232

References

Al-Abood, S. A., K. Davids, and S. J. Bennett. 2001. "Specificity of Task Constraints and Effects of Visual Demonstrations and Verbal Instructions in Directing Learners' Search During Skill Acquisition." *Journal of Motor Behavior* 33 (3): 295–305. https://doi.org/10.1080/00222890109601915.

Andrew, M., P. R. Ford, M. T. Miller, A. P. McRobert, N. C. Foster, G. Seerden, M. L. Littlewood, and S. J. Hayes. 2021. "Bridging the Gap Between Science and Application: The Use of Cocreation Educational Workshops in Professional Youth Soccer." *International Sport Coaching Journal* 9 (1): 82–99. https://doi.org/10.1123/iscj.2020-0054.

Araya, J., A. Bennie, and D. O'Connor. 2015. "Understanding Performance Coach Development: Perceptions About a Postgraduate Coach Education Program." *International Sport Coaching Journal* 2 (1): 3–14. https://doi.org/10.1123/iscj.2013-0036.

Bilodeau, E. A., I. M. Bilodeau, and D. A. Schumsky. 1959. "Some Effects of Introducing and Withdrawing Knowledge of Results Early and Late in Practice." *Journal of Experimental Psychology* 58 (2): 142–144. https://doi.org/10.1037/h0040262.

Brewer, C. J., and R. L. Jones. 2002. "A Five-Stage Process for Establishing Contextually Valid Systematic Observation Instruments: The Case of Rugby Union." *The Sport Psychologist* 16 (2): 138–159. https://doi.org/10.1123/tsp.16.2.138.

Chua, L. K., J. Jimenez-Diaz, R. Lewthwaite, T. Kim, and G. Wulf. 2021. "Superiority of External Attentional Focus for Motor Performance and Learning: Systematic Reviews and Meta-Analyses." *Psychological Bulletin* 147 (6): 618–645. https://doi.org/10.1037/bul0000335.

Cope, E., C. J. Cushion, S. Harvey, and M. Partington. 2021. "Investigating the Impact of a Freirean Informed Coach Education Programme." *Physical Education and Sport Pedagogy* 26 (1): 65–78. https://doi.org/10.1080/17408989.2020.1800619.

Cope, E., C. J. Cushion, S. Harvey, and M. Partington. 2022. "Re-visiting Systematic Observation: A Pedagogical Tool to Support Coach Learning and Development." *Frontiers in Sports and Active Living* 310: 962690.

Cushion, C. J. 2010. "Coach Behavior." In *Sports Coaching Professionalization and Practice*, edited by J. Lyle, and C. J. Cushion, 43–62. London, UK: Elsevier.

Cushion, C., P. R. Ford, and A. M. Williams. 2012a. "Coach Behaviours and Practice Structures in Youth Soccer: Implications for Talent Development." *Journal of Sports Sciences* 30 (15): 1631–1641. https://doi.org/10.1080/02640414.2012.721930.

Cushion, C., S. Harvey, B. Muir, and L. Nelson. 2012b. "Developing the Coach Analysis and Intervention System (CAIS): Establishing Validity and Reliability of a Computerised Systematic Observation Instrument." *Journal of Sports Sciences* 30 (2): 201–216. https://doi.org/10.1080/02640414.2011.635310.

Cushion, C. J., and R. L. Jones. 2001. "A Systematic Observation of Professional Top-Level Youth Soccer Coaches." *Journal of Sport Behaviour* 24: 354–376.

Darst, P. W., D. Zakrajsek, and V. H. Mancini. 1989. *Analyzing Physical Education and Sport Instruction*. Champaign, IL: Human Kinetics.

De Leeuw, A., P. Valois, I. Ajzen, and P. Schmidt. 2015. "Using the Theory of Planned Behavior to Identify Key Beliefs Underlying Pro-environmental Behavior in High-School Students: Implications for Educational Interventions." *Journal of Environmental Psychology* 42: 128–138. https://doi.org/10.1016/j.jenvp.2015.03.005.

De Marco, G. M. P., V. H. Mancini, and D. A. West. 1997. "Reflections on Change: A Qualitative and Quantitative Analysis of a Baseball Coach's Behavior." *Journal of Sport Behavior* 20 (2): 135–163.
Diekfuss, J. A., and L. D. Raisbeck. 2016. "Focus of Attention and Instructional Feedback from NCAA Division 1 Collegiate Coaches." *Journal of Motor Learning and Development* 4 (2): 262–273. https://doi.org/10.1123/jmld.2015-0026.
Eather, N., B. Jones, A. Miller, and P. J. Morgan. 2020. "Evaluating the Impact of a Coach Development Intervention for Improving Coaching Practices in Junior Soccer (Soccer): The "MASTER" Pilot Study." *Journal of Sports Sciences* 38 (11-12): 1441–1453. https://doi.org/10.1080/02640414.2019.1621002.
Field, A. 2017. *Discovering Statistics Using SPSS*. London, UK: Sage Publications.
Ford, P. R., I. Yates, and A. M. Williams. 2010. "An Analysis of Practice Activities and Instructional Behaviours Used by Youth Soccer Coaches During Practice: Exploring the Link Between Science and Application." *Journal of Sports Sciences* 28 (5): 483–495. https://doi.org/10.1080/02640410903582750.
Franks, M. I., N. Hodges, and K. More. 2001. "Analysis of Coaching Behaviour." *International Journal of Performance Analysis in Sport* 1 (1): 27–36. https://doi.org/10.1080/24748668.2001.11868246.
Gentile, A. M. 1972. "A Working Model of Skill Acquisition with Application to Teaching." *Quest (grand Rapids, Mich)* 17 (1): 3–23. https://doi.org/10.1080/00336297.1972.10519717.
Guss-West, C., and G. Wulf. 2016. "Attentional Focus in Classical Ballet: A Survey of Professional Dancers." *Journal of Dance Medicine & Science* 20 (1): 23–29. https://doi.org/10.12678/1089-313X.20.1.23.
Hall, E. T., S. Gray, and J. Sproule. 2016. "The Microstructure of Coaching Practice: Behaviours and Activities of an Elite Rugby Union Head Coach During Preparation and Competition." *Journal of Sports Sciences* 34 (10): 896–905. https://doi.org/10.1080/02640414.2015.1076571.
Handford, C., K. Davids, S. Bennett, and C. Button. 1997. "Skill Acquisition in Sport: Some Applications of an Evolving Practice Ecology." *Journal of Sports Sciences* 15 (6): 621–640. https://doi.org/10.1080/026404197367056.
Hayes, S. J., N. J. Hodges, R. Huys, and A. M. Williams. 2007. "End-Point Focus Manipulations to Determine What Information is Used During Observational Learning." *Acta Psychologica* 126 (2): 120–137. https://doi.org/10.1016/j.actpsy.2006.11.003.
Heale, R., and A. Twycross. 2018. "What is a Case Study?" *Evidence Based Nursing* 21 (1): 7–8. https://doi.org/10.1136/eb-2017-102845.
Hendry, D. T., P. R. Ford, A. M. Williams, and N. J. Hodges. 2015. "Five Evidence-Based Principles of Effective Practice and Instruction." In *Routledge Handbook of Sport Expertise*, edited by J. Baker, and D. Farrow, 414–429. London, UK: Routledge.
Hendry, D. T., and N. J. Hodges. 2018. "Early Majority Engagement Pathway Best Defines Transitions from Youth to Adult Elite Men's Soccer in the UK: A Three Time-Point Retrospective and Prospective Study." *Psychology of Sport and Exercise* 36: 81–89. https://doi.org/10.1016/j.psychsport.2018.01.009.
Hodges, N. J., and I. M. Franks. 2002. "Modelling Coaching Practice: The Role of Instruction and Demonstration." *Journal of Sports Sciences* 20 (10): 793–811. https://doi.org/10.1080/026404102320675648.
Hornig, M., F. Aust, and A. Güllich. 2016. "Practice and Play in the Development of German Top-Level Professional Soccer Players." *European Journal of Sport Science* 16 (1): 96–105. https://doi.org/10.1080/17461391.2014.982204.
Jones, B., N. Eather, A. Miller, and P. J. Morgan. 2023. "Evaluating the Impact of a Coach Development Intervention for Improving Coaching Practices and Player Outcomes in Football: The MASTER Coaching Randomised Control Trial." *Physical Education and Sport Pedagogy*, 1–18. p.962690. https://doi.org/10.1080/17408989.2022.2153817.
Kal, E. C., J. Van der Kamp, and H. Houdijk. 2013. "External Attentional Focus Enhances Movement Automatization: A Comprehensive Test of the Constrained Action Hypothesis." *Human Movement Science* 32 (4): 527–539. https://doi.org/10.1016/j.humov.2013.04.001.
Kidman, L. 1997. "A Self-Reflective Analysis Process for Coach Education." *Pedagogy in Practice* 3: 18–36.
Krane, V., R. Eklund, and M. McDermott. 1991. "Collaborative Action Research and Behavioral Coaching Intervention: A Case Study." *Applied Research in Coaching and Athletics Annual* 6: 119–148.
Lacy, A. C., and P. W. Darst. 1985. "Systematic Observation of Behaviors of Winning High School Head Football Coaches." *Journal of Teaching in Physical Education* 4 (4): 256–270. https://doi.org/10.1123/jtpe.4.4.256.
Lee, T. D., S. P. Swinnen, and D. J. Serrien. 1994. "Cognitive Effort and Motor Learning." *Quest (Grand Rapids, Mich)* 46 (3): 328–344. https://doi.org/10.1080/00336297.1994.10484130.
Mallett, C. J., P. Trudel, J. Lyle, and S. B. Rynne. 2009. "Formal vs. Informal Coach Education." *International Journal of Sports Science & Coaching* 4 (3): 325–364. https://doi.org/10.1260/174795409789623883.
McNevin, N. H., C. H. Shea, and G. Wulf. 2003. "Increasing the Distance of an External Focus of Attention Enhances Learning." *Psychological Research* 67: 22–29. https://doi.org/10.1007/s00426-002-0093-6.
Milat, A. J., L. King, A. E. Bauman, and S. Redman. 2013. "The Concept of Scalability: Increasing the Scale and Potential Adoption of Health Promotion Interventions into Policy and Practice." *Health Promotion International* 28 (3): 285–298. https://doi.org/10.1093/heapro/dar097.
Millard, L. 1996. "Differences in Coaching Behaviors of Male and Female High School Soccer Coaches." *Journal of Sport Behavior* 19 (1): 19–32.

Nicklas, A., R. Rein, B. Noël, and S. Klatt. 2022. "A Meta-Analysis on Immediate Effects of Attentional Focus on Motor Tasks Performance." *International Review of Sport and Exercise Psychology*, 1–36. https://doi.org/10.1080/1750984X.2022.2062678.

Nosek, P., T. E. Brownlee, B. Drust, and M. Andrew. 2021. "Feedback of GPS Training Data Within Professional English Soccer: A Comparison of Decision Making and Perceptions Between Coaches, Players and Performance Staff." *Science and Medicine in Football* 5 (1): 35–47. https://doi.org/10.1080/24733938.2020.1770320.

O'Connor, D., P. Larkin, and A. M. Williams. 2018. "Observations of Youth Soccer Training: How Do Coaches Structure Training Sessions for Player Development?" *Journal of Sports Sciences* 36 (1): 39–47. https://doi.org/10.1080/02640414.2016.1277034.

Parr, J. V., G. Gallicchio, A. Canales-Johnson, L. Uiga, and G. Wood. 2023. "Cortical, Muscular, and Kinetic Activity Underpinning Attentional Focus Strategies During Visuomotor Control." *Psychophysiology* 60 (6): e14249. https://doi.org/10.1111/psyp.14249.

Partington, M., and C. Cushion. 2013. "An Investigation of the Practice Activities and Coaching Behaviors of Professional Top-Level Youth Soccer Coaches." *Scandinavian Journal of Medicine & Science in Sports* 23 (3): 374–382. https://doi.org/10.1111/j.1600-0838.2011.01383.x.

Partington, M., C. Cushion, and S. Harvey. 2014. "An Investigation of the Effect of Athletes' Age on the Coaching Behaviours of Professional Top-Level Youth Soccer Coaches." *Journal of Sports Sciences* 32 (5): 403–414. https://doi.org/10.1080/02640414.2013.835063.

Patton, M. Q. 2002. *Qualitative Research & Evaluation Methods*. London, UK: SAGE Publications.

Porter, J., W. Wu, and J. Partridge. 2010. "Focus of Attention and Verbal Instructions: Strategies of Elite Track and Field Coaches and Athletes." *Sport Science Review* 19 (3-4): 77. https://doi.org/10.2478/v10237-011-0018-7.

Potrac, P., R. L. Jones, and K. Armour. 2002. "'It's All About Getting Respect": The Coaching Behaviours of an Expert English Soccer Coach." *Sport, Education and Society* 7: 183–202. https://doi.org/10.1080/1357332022000018869.

Potrac, P., R. L. Jones, and C. J. Cushion. 2007. "Understanding Power and the Coach's Role in Professional English Soccer: A Preliminary Investigation of Coach Behaviour." *Soccer & Society* 8: 33–49. https://doi.org/10.1080/14660970600989509.

Powell, D., G. Wood, P. E. Kearney, and C. Payton. 2021. "Skill Acquisition Practices of Coaches on the British Para Swimming World Class Programme." *International Journal of Sports Science & Coaching* 16 (5): 1097–1110. https://doi.org/10.1177/17479541211026248.

Raya-Castellano, P. E., A. P. McRobert, D. Cárdenas, L. Fradua, and M. J. Reeves. 2022. "Exploring the 'Teachable Moments' of Questioning During Training: A Work-Based Coach Development Programme Affecting Behaviour Change." *Physical Education and Sport Pedagogy*, 1–19. https://doi.org/10.1080/17408989.2022.2083095.

Raya-Castellano, P. E., M. J. Reeves, L. Fradua-Uriondo, and A. P. McRobert. 2021. "Post-Match Video-Based Feedback: A Longitudinal Work-Based Coach Development Program Stimulating Changes in Coaches' Knowledge and Understanding." *International Journal of Sports Science & Coaching* 16 (6): 1259–1270. https://doi.org/10.1177/17479541211017276.

Relvas, H., M. Littlewood, M. Nesti, D. Gilbourne, and D. Richardson. 2010. "Organizational Structures and Working Practices in Elite European Professional Soccer Clubs: Understanding the Relationship Between Youth and Professional Domains." *European Sport Management Quarterly* 10 (2): 165–187. https://doi.org/10.1080/16184740903559891.

Salmoni, A. W., R. A. Schmidt, and C. B. Walter. 1984. "Knowledge of Results and Motor Learning: A Review and Critical Reappraisal." *Psychological Bulletin* 95 (3): 355–386. https://doi.org/10.1037/0033-2909.95.3.355.

Sawiuk, R., W. Taylor, and R. Groom. 2016. "Exploring Formalized Elite Coach Mentoring Programmes in the UK." *Sport, Education and Society* 23 (6): 619–631. https://doi.org/10.1080/13573322.2016.1248386.

Schwab, S., R. Rein, and D. Memmert. 2018. "Kick it Like Ronaldo": A Cross-Sectional Study of Focus of Attention Effects During Learning of a Soccer Knuckle Ball Free Kick Technique." *German Journal of Exercise and Sport Research* 49 (1): 91–96. https://doi.org/10.1007/s12662-018-0558-4.

Shea, C. H., Q. Lai, C. Black, and J. H. Park. 2000. "Spacing Practice Sessions Across Days Benefits the Learning of Motor Skills." *Human Movement Science* 19 (5): 737–760. https://doi.org/10.1016/S0167-9457(00)00021-X.

Smith, B., O. Williams, L. Bone, and T. M. S. W. C. P. Collective. 2022. "Co-production: A Resource to Guide Co-producing Research in the Sport, Exercise, and Health Sciences." *Qualitative Research in Sport, Exercise and Health* 15 (2): 159–187.

Stodter, A., and C. J. Cushion. 2014. "Coacheś Learning and Education: A Case Study of Cultures in Conflict." *Sports Coaching Review* 3 (1): 63–79. https://doi.org/10.1080/21640629.2014.958306.

Stodter, A., and C. J. Cushion. 2016. "Effective Coach Learning and Processes of Coaches' Knowledge Development: What Works?" In *The Psychology of Effective Coaching and Management*, edited by P. A. Davis, 35–53. New York, NY: Nova Science Publishers.

Tabachnick, B. G., and L. S. Fidell. 2007. *Using Multivariate Statistics*. Boston, MA: Pearson/Allyn & Bacon.

van der Graaff, E., M. Hoozemans, M. Pasteuning, D. Veeger, and P. J. Beek. 2018. "Focus of Attention Instructions During Baseball Pitching Training." *International Journal of Sports Science & Coaching* 13 (3): 391–397. https://doi.org/10.1177/1747954117711095.

Vilar, L., P. T. Esteves, B. Travassos, P. Passos, C. Lago-Peñas, and K. Davids. 2014. "Varying Numbers of Players in Small-Sided Soccer Games Modifies Action Opportunities During Training." *International Journal of Sports Science & Coaching* 9 (5): 1007–1018. https://doi.org/10.1260/1747-9541.9.5.1007.

Vincent, W. J., and J. P. Weir. 2012. *Statistics in Kinesiology*. Champaign, IL: Human Kinetics.

Williams, A. M., and P. R. Ford. 2009. "Promoting a Skills-Based Agenda in Olympic Sports: The Role of Skill-Acquisition Specialists." *Journal of Sports Sciences* 27 (13): 1381–1392. https://doi.org/10.1080/02640410902874737.

Williams, A. M., P. R. Ford, and B. Drust. 2020. "Talent Identification and Development in Soccer Since the Millennium." *Journal of Sports Sciences* 38 (11-12): 1199–1210. https://doi.org/10.1080/02640414.2020.1766647.

Williams, A. M., and N. J. Hodges. 2005. "Practice, Instruction and Skill Acquisition in Soccer: Challenging Tradition." *Journal of Sports Sciences* 23 (6): 637–650. https://doi.org/10.1080/02640410400021328.

Williams, A. M., and N. J. Hodges. 2023. "Effective Practice and Instruction: A Skill Acquisition Framework for Excellence." *Journal of Sports Sciences* 41 (9): 833–849.

Williams, A. M., and T. Reilly. 2000. "Talent Identification and Development in Soccer." *Journal of Sports Sciences* 18 (9): 657–667. https://doi.org/10.1080/02640410050120041.

Wulf, G. 2007. *Attention and Motor Learning*. Champaign, IL: Human Kinetics.

Wulf, G. 2013. "Attentional Focus and Motor Learning: A Review of 15 Years." *International Review of Sport and Exercise Psychology* 6 (1): 77–104. https://doi.org/10.1080/1750984X.2012.723728.

Wulf, G., M. Höß, and W. Prinz. 1998. "Instructions for Motor Learning: Differential Effects of Internal Versus External Focus of Attention." *Journal of Motor Behavior* 30 (2): 169–179. https://doi.org/10.1080/00222899809601334.

Wulf, G., N. McNevin, and C. H. Shea. 2001. "The Automaticity of Complex Motor Skill Learning as a Function of Attentional Focus." *The Quarterly Journal of Experimental Psychology Section A* 54 (4): 1143–1154. https://doi.org/10.1080/713756012.

Yamada, M., L. Q. Higgins, and L. Raisbeck. 2022. "How External and Internal Focus are Used in the Field: A Review." *International Journal of Sports Science & Coaching* 17 (3): 647–654. https://doi.org/10.1177/17479541211068955.