COACH BEHAVIOUR

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Summary
There are different coaching styles that are appropriate with different types of athletes. The factors that influence coaching style include the type of sport, gender, age and level of the athletes. Coaches also use different styles between training sessions and competitive matches. Different behaviour analysis systems have been proposed, including the Arizona State University Observation Instrument (ASUOI), which can be used with a single variable or two variables. Using a limited number of variables and combining behaviour classes can improve reliability. However, some coaches may want more detailed information when reflecting on their behaviour. Therefore, other more complex systems use as many as seven variables (Harries-Jenkins and Hughes, 1995). There is a trade-off between reliability and detail of coach behaviour analysis systems. In scientific research, simpler instruments such as the ASUOI have been used due to the levels of reliability achieved. The more complex systems are preferred in coach education and reflective practice.

Introduction
‘Coaching process’ is an all-embracing term incorporating planning, delivery and management (Lyle, 2002). Successful coaching depends on the knowledge of the coach, the ‘coachability’ of the athletes, the ability of the coach in planning and designing training schedules, and decision making of the coach, as well as the behaviour of the coach during instructional sessions and competition. This chapter covers coach behaviour and how it is analysed in scientific research as well as within reflective practice by coaches. This will cover observational analysis methods and their application to the study of coach behaviour. Some systems record instructional behaviours of coaches (Lacy and Darst, 1984), while others analyse athletes’ time performing different tasks (Smith et al., 2005), as well as coach–athlete interactions (Hastie, 1999). There are limitations to observational methods and some aspects of coaching delivery should be investigated using other methods. For example, Strean (1998) suggested using interpretive interviews to allow a more substantial understanding, while Culver and Trudel (2006) used semi-structured interviews.

The rationale for analysing coaching behaviour is similar to that of teaching style. An understanding of successful coaching styles can be beneficial to aspiring coaches, and evaluation of coach behaviour can identify areas for improvement. Research in education is much more
developed than research in coaching. Therefore, research in teaching behaviour has been a foundation for research in coach behaviour. More (2008) described the historical development of observational analysis in teaching and coaching. The purpose of this chapter is to provide an up-to-date review of analysis of coach behaviour and suggest areas for future research efforts.

Performance analysis can be used within coach development programmes to assist coaches to develop appropriate coaching styles. Those aspects of coaching that can be directly observed can be recorded and analysed in detail. These aspects are behaviour during instructional sessions and behaviour during competition. The coach can reflect on their performance the same way as players can reflect on their performances, using a combination of quantitative, qualitative and video information.

**Coaching styles**

Coaching delivery involves a range of behaviours, activities, interactions and processes (Lyle, 2002). Lyle (2002) stated that there are four main styles of coaching demonstrated during delivery: authoritarian, autocratic, democratic and person-centred. Sherman et al. (2000) found that athletes from male, female and mixed sports preferred to participate in a democratic rather than authoritarian environment, receiving positive feedback, training and instruction. However, there is no one coaching style that will lead to success in all coaching environments and effective coaching requires flexible behaviour to adapt to different situations (Cratty, 1983). The use of these four broad behaviours varies from coach to coach. The style of coaching can be characterised by the vocabulary being used by a coach (Lyle, 2002) and even varies between sessions delivered by the same coach (Donnelly and O’Donoghue, 2008; Bowley et al., 2012). This is similar to the range of behaviour styles used in teaching (Mosston and Ashworth, 2002).

Coaching style is influenced by a number of factors, including individual coach philosophy (Abraham and Collins, 1998; Jones et al., 2002), the type of sport (Massey et al., 2002) as well as the gender (Lacy and Goldston, 1990; Millard, 1996), age group (Lacy and Darst, 1985; Miller, 1992) and level of athlete (Erle, 1981; Serpa et al., 1991; Jones et al., 1995). Coaching behaviour differs between training sessions and competition (Chaumeton and Duda, 1988; Wandzilak et al., 1988). Typically there will be a greater use of silent monitoring during competition than during training. Trudel et al. (1996) found that ice hockey coaches spent 51 per cent of matches observing without any interaction with the players and that there was little instruction given during competition.

**Coach behaviour analysis systems**

**Early instruments**

The study of coach behaviour has developed from more established research into teaching styles within educational contexts (More, 2008). One of the first instruments used to analyse instructional behaviour was the Flanders Interaction Analysis System (FIAS), which was designed to analyse verbal behaviours of teachers (Flanders, 1960). Three different aspects of teacher–pupil communication are analysed using FIAS: teacher talk, pupil talk and silence/confusion. Modified versions of FIAS were developed for use in physical education and may be considered more relevant to coaching (Dougherty, 1970; Cheffers, 1972). Prior to the development of systematic observational techniques for coaching, coaching effectiveness was measured indirectly using self-report forms (Kahan, 1999). Early observation instruments for coaching typically
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used tick box forms to record instances of behavioural categories (Abraham and Collins, 1998). Tharp and Gallimore (1976) developed the Coaching Behaviour Recording Form (CBRF) to observe coaching behaviours. Their case study of a basketball coach found that half of all behaviours were instructional and that there was a 2:1 ratio for the use of scolding/re-instruction to praise.

The Coaching Behaviour Assessment System (CBAS) was developed by Smith et al. (1978) to examine youth baseball coaches’ behaviours. The CBAS analysed 12 behavioural categories, which were divided into reactive and spontaneous behaviours. Reactive behaviours were recognised as immediate responses to player or team mistakes or effort, while spontaneous behaviours did not respond to observation of preceding events.

The Arizona State University Observation Instrument

Lacy and Darst (1984, 1985, 1989) developed the Arizona State University Observation Instrument (ASUOI), which is comprised of two variables: behaviour type and use of an athlete’s first name by the coach. Behaviour type is a categorical variable of 14 named behaviours:

- Pre-instruction
- Concurrent instruction
- Post-instruction
- Questioning
- Positive modelling
- Negative modelling
- Hustle
- Praise
- Scold
- Management
- Humour
- Talking to assistant
- Silent monitoring
- Uncodable.

The use of the first name of an athlete is a dichotomous variable that is used as a modifier of the recorded behaviour. The ASUOI has been the most popular instrument used in scientific research into coach behaviour, with research spanning from 1984 to the publication of the current handbook (Lacy and Darst, 1984; Harry and O’Donoghue, 2012). The ASUOI is a recognised standard for the analysis of coach behaviour and has been used to analyse the behaviour of strength and conditioning coaches (Massey et al., 2002), coach behaviour during ice-hockey games (Trudel et al., 1996) and the behaviour of coaches of youth soccer squads (Cushion and Jones, 2001; Smith and Cushion, 2006). Both manual and computerised versions of the method have been used, with recent research implementing the ASUOI using the Focus X2 package (Elite Sports Analysis, Fife, UK). The Focus X2 implementation of the ASUOI has been used in the analysis of netball coaching (Donnelly and O’Donoghue, 2008; Harry and O’Donoghue, 2012), youth soccer coaching (Bowley et al., 2012) and physical education teaching (Paisey and O’Donoghue, 2008). The use of such interactive video analysis packages improves reliability as video recordings of coach behaviour can be analysed diligently, pausing where necessary and replaying video sequences to help choose the behaviour name that best fits the observed instance. There are other systems that are similar to the ASUOI, such as the Revised Coaching...
Behaviour Recording Form, which uses 12 behavioural categories (Côté et al., 1995; Durand-Bush, 1996; Bloom et al., 1999).

Computerised Coaching Analysis System

The CCAS (Computerised Coaching Analysis System) has been used for the analysis of coaching behaviour (Franks et al., 1988) and has provided a quantitative breakdown of coach behaviour (Harries-Jenkins and Hughes, 1995). CCAS uses seven variables to characterise coach behaviour:

- Behaviour (verbal commentary, demonstration or reconstruction)
- Audience (individual, team or group)
- Content (skill related or non-skill related)
- Aspect of player behaviour (effort, organisation, behaviour or other)
- Type (positive, negative or neutral)
- Appropriateness (appropriate or inappropriate)
- Style (interrogative, evaluative, descriptive, affective and prescriptive).

Mayes and O’Donoghue (2006) implemented CCAS in the Focus X2 system, allowing interactive quantitative and video feedback to be provided. More (2008) also used Focus X2 to implement an interactive video analysis system for coach behaviour. More’s system used four variables:

- Focus (instruction, feedback on correct performance and feedback on incorrect performance)
- Timing (during performance, post-performance or stopped/freeze)
- Delivery (whether or not demonstration was used)
- Emphasis (key factors or non-key factors).

The Coach Analysis Instrument (CAI) is part of the CCAS (Johnson and Franks, 1991) and produces detailed quantitative information about coach behaviour profile, allowing reflection on the content of practice sessions and the performance needs of the athletes. Partridge and Franks (1996) made recommendations for improvement of the CAI and consequently it was updated to the CAI II system.

Split-screen systems

Brown and O’Donoghue (2008) used the Dartfish package (Dartfish, Fribourg, Switzerland) to develop a split-screen analysis system for coach behaviour. A 60-minute netball coaching session was filmed using two cameras, with one focussing on the coach and the other recording a wider view of coach and athlete behaviour. The coach wore a microphone and radio transmitter (Sennheiser electronic GmbH & Co. KG, Hannover, Germany) so that the coach’s voice was recorded clearly, even though the cameras were located on a balcony overlooking the coaching session. The two video recordings were integrated within Dartfish using the split-screen facility so that the two views were presented side by side. The 60-minute split-screen video used a single sound source, which was the coach’s voice as picked up by the remote microphone. This video was tagged using a coach behaviour system developed in Dartfish.

The coach was able to look at tables that cross-tabulated different pairs of variables, consider frequencies and look at video sequences of events of interest. The coach provided feedback on
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the information produced and how it could be helpful to her reflective practice. The coach did not find the quantitative information to be useful because there were no norms for coach behaviour to compare it to. The approach could be enhanced if the coach tagged her own behaviour because she would recall what she was thinking during the periods of silent monitoring that preceded periods of intervention and communication. This knowledge of the coach’s thoughts would help interpretation of communication events. The benefit of the split-screen view was that the coach was able to see her own body language while also being able to see athlete behaviour before, during and after coach instructions.

The system made the coach aware of subtle aspects of body language. Where coach evaluation is assisted by a mentor, the ability to review and discuss video sequences was considered beneficial. While the quantitative information was not seen as directly important to reflective practice, the importance of having a tagged video allowing interactive and efficient viewing of relevant video sequences was recognised.

Brown and O’Donoghue (2008) reported that filming the session, analysing the video and producing the results and video products took 12 hours of computer time, including five hours where the operator was actively using the Dartfish system and two hours where the operator used a video editing package to complete the highlights video. Such effort needs to be justified and the system is probably best used periodically rather than on a weekly basis.

Qualitative and mixed methods

In areas of sports science where observational techniques are used, the methods are not limited to quantitative data and analysis. The analysis of coach behaviour can also be analysed using qualitative observational analysis (Smith et al., 1983; Morgan et al., 2005) and mixed method approaches (Potrac et al., 2007a, 2007b). In some mixed methods research, the ASUOI can be used to analyse coach behaviour showing ‘what’ the coach did, while qualitative observation can be used to analyse ‘why’ the coach used the given style of coaching. For example, Paisey and O’Donoghue (2008) supported the ASUOI with detailed field notes made during qualitative observation of videos of physical education teaching. These field notes considered teacher behaviour, pupil behaviour and the interaction between the teacher and pupils. Donnelly and O’Donoghue (2008) used qualitative methods in a different way to support the ASUOI. They presented quantitative results to an experienced coach and then conducted an interview with the coach to seek explanations for the behaviour observed. Potrac et al. (2007b) also used qualitative research to assess coaches’ interpretation of their role, their priorities and the philosophy underpinning their practice.

Reliability and validity

There is a trade-off between the level of detail of an observational system and the reliability with which the system can be operated. The ASUOI uses two variables and CCAS uses seven variables. This can make the ASUOI more reliable than CCAS when they are implemented using similar apparatus (manual forms or computerised systems). The reliability of the ASUOI varies from study to study and depends on the way in which the instrument is implemented, the definition of the behaviours and the experience and training of the observers. One investigation reported agreement on 85 per cent of the recorded behaviour instances (Siedentop, 1991), while others found lower levels of reliability. Paisey and O’Donoghue (2008) reported kappa values of 0.628 for behaviour type and 0.422 for use of the first name, which are interpreted as good and moderate strengths of agreement, respectively. Similarly, Donnelly and O’Donoghue
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(2008) reported kappa values of 0.720 for behaviour type and 0.498 for use of the first name, which are also interpreted as good and moderate strengths of agreement, respectively.

Franks et al. (1988) found that different dimensions of behaviour had differing levels of reliability. Smith et al. (1977) found that trained observers could use a coach behaviour analysis system sufficiently reliably. Smith et al. (2005) used Gamebreaker (SportsTec, Warriewood, Australia) to analyse coach behaviour and focussed on the two out of five behavioural classes that they demonstrated could be observed reliably.

More complex systems give greater scope for disagreement between independent operators within reliability studies (Mayes and O’Donoghue, 2006). Consider the coach comment ‘why was this group the only group to complete the task without an error?’ This could be entered as negative feedback to the team or as positive feedback to a group. A further issue is that many of the named behaviours in coaching analysis systems are not independent. There will be many occasions where an observer could classify observed behaviour in more than one way. These kinds of situation were quite common and would limit the reliability of observation.

There are also challenges to the validity of analysis methods for coach behaviour. Fletcher (2006) suggested that the invasive nature of a video camera could affect the behaviours of the athletes and coaches. A further challenge to quantitative systems is that they may over-simplify coach behaviour. Gaining a balance between the need for objective reliable information about coach behaviour and the need to understand the complex nature of coach behaviour is a difficulty for researchers in the area. However, quantitative coach behaviour analysis systems can be used effectively in applied settings along with complementary qualitative techniques.

Application areas

Research

There are two main application areas of coach behaviour analysis: the first is developing scientific knowledge about coaching and the other is within coach education and development. These two application areas place different emphases on measurement issues, complexity of data and use of video information. In scientific research, the video footage of coach behaviour is used during data collection. The video is indexed with behaviours performed by the coach and these behaviours are used in subsequent analysis. There are examples of case study research reporting on the behaviour of an individual coach (Bloom et al., 1999), but it is more typical for scientific research to report on the average member of the sample of coaches who participated in the study (Cushion and Jones, 2001; Smith and Cushion, 2006). The results included in research papers are tabular or graphical summaries of quantitative data without supporting video sequences. For the study to be replicable, the behaviours need to be defined and the level of reliability must be measured and reported. Many scientific studies use the ASUOI, where there are only two dependent variables (behaviour and whether the first name of the athlete is used by the coach). This makes the research manageable in terms of stating hypotheses and reporting results, as well as improving the reliability of the observation method. Coach behaviour has been assessed in many sports, including basketball (Bloom et al., 1999), soccer (Miller, 1992; Potrac et al., 2007a, 2007b), tennis (Claxton, 1988) and weight training (Massey et al., 2002). Coach behaviour research has included case studies of individual coaches (Bloom et al., 1999; Tharp and Gallimore, 1976) and comparison of successful and unsuccessful coaches (Claxton, 1988), youth coaches (Smith et al., 1978; Lacy and Goldston, 1990; Miller, 1992) and elite-level coaches (Potrac et al., 2007a) as well as gender effects on coach behaviour (Miller, 1992).
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Analysis of coach behaviour has become an established area of research (Van der Mars, 1989; Kahan, 1999; Potrac et al., 2007a; Gilbert and Trudel, 2004; More, 2008). An important area of research is comparing the behaviours of successful and less successful coaches. Successful coaches use more questioning and post-instruction than their less successful counterparts (Lacy and Darst, 1984).

Earlier in this chapter, we identified various factors that influence the coaching style used, including the type of sport, level of the athletes, age group of the athletes and the type of session being conducted. Published results give an indication of the styles used in different scenarios. For example, in competition, there is a greater use of silent monitoring than there is during instructional sessions. This is obvious to many in coaching but the real contribution of coach behaviour analysis is the description of how much silent monitoring is used in each situation by successful coaches. Understanding that there is a greater use of silent monitoring in competition than during instructional sessions is not enough. Another research finding is that there is less post-instruction in physical education teaching than in coaching contexts (Paisey and O'Donoghue, 2008).

Variability of coach behaviour has been recognised within and between coaches. There is no ‘ideal’ model of coaching (Kidman, 2001), suggesting coaching styles are situational to the team or athlete at a specific time. Such situations can be affected by both a coach’s and an athlete’s behaviour and there is a need for different approaches in different contexts (Cross, 1999). Research has revealed that there is greater variability in higher-level coaches’ behaviour than in the behaviour of their lower-level counterparts. This has been found in both netball (Donnelly and O’Donoghue, 2008) and soccer (Bowley et al., 2012) and may result from higher-level coaches being more reactive to situations, while lower-level coaches may apply a similar style in different situations.

Coach development and reflection

Pedagogic literature reveals that instructional behaviour can be modified through systematic analysis (Borg, 1972; Werner and Rink, 1989; Grant et al., 1990). In coach education applications, coaching behaviour data is analysed on an individual basis and video sequences are used extensively when reflecting on coaching performance. Reliability does not have to be as high as when used in scientific research because the information is not being generalised beyond the particular coach. Furthermore, any quantitative results are supported by the actual video sequences. This allows the coaches and their mentors to interactively use coach behaviour analysis systems to view behaviours where quantitative patterns highlight areas of interest. Any modification of behaviour will be based on an in-depth analysis of the video sequences, rather than on the quantitative results for a session. The relaxed reliability requirements allow multiple modifiers for behaviour to be used to enrich the analysis. These may include focus, timing, delivery and emphasis of comments (More, 2008) or the seven variables used in the CCAS (Franks et al., 1988). Methods of analysing instructional behaviour should still be objective, reliable and valid (Rink, 1993) but to a lesser extent perhaps than in scientific research.

Reflective practice by coaches should use video analysis of coaching behaviour (Farres, 2004). More and Franks (1996) used CAI along with audio and video recordings of coach behaviour and reflective logs within an intervention to help coach development. When such systems are used to provide feedback to coaches, the direct evidence to support recommendations made can be effective (More and Franks, 1996). The advantage of using video is that it assists the coach to recall events during coaching sessions they are reflecting on (Gilbert and Trudel, 2001).
Future work

There are three areas for future research that are proposed here: behaviour of successful coaches, the development of norms for coach behaviour and temporal analysis of coaching behaviour. There is previous research that has compared the behaviours of successful and unsuccessful coaches (Lacy and Darst, 1984). However, when one considers the nature of different sports and the variety of different age groups, gender and levels of athletes, it is clear that more research is needed in this area. These studies are time-consuming and need to be well planned. If the sample size for each coach group was 15 and the number of sessions observed to gain a typical behaviour pattern for each coach was 10 sessions of at least 60 minutes, then 150 hours of video footage would need to be analysed. This is clearly not advisable within an undergraduate degree project where the time commitment required would be excessive.

Norms are used in many areas of education and health and they permit values to be interpreted using the relevant population. The ASUOI is an established instrument such that norms should be developed for coach behaviour in different levels of different sports. When one considers the variety of different training sessions where different coaching styles may be required, the programme of research needed to provide norms for coaching behaviours based on all influencing factors is substantial.

It is surprising to the authors that there has been little research into temporal aspects of coach behaviour considering how long the ASUOI has been available to researchers and practitioners. The quantitative results presented in research to date have been static in nature: frequency profiles, percentage session times and mean durations of behaviour instances. Temporal analysis would give an indication of the orderings of events and cycles of behaviours that may occur during sessions. Uncovering such patterns may reveal interesting new knowledge about the behaviour of successful coaches. One study that has attempted such an analysis shows some temporal patterns in netball coaching (Harry and O’Donoghue, 2012). Much more research of this type is needed in other sports.

Concluding remarks

Performance analysis techniques can be applied to the behaviour of coaches just as they can be applied to the behaviour of players and teams. This chapter has surveyed the research that has been done on coach behaviour and the methods used. Analysis of coach behaviour can be applied in both scientific research and the reflective practice of coaches. In both types of work, the analysis can be enhanced when quantitative coaching behaviour information is combined with complementary qualitative research.

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