

1 **An exploration of the relationship between educational background and the coaching**
2 **behaviours and practice activities of professional youth soccer coaches**

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15

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18

19 **Abstract:**

20 ***Background and Purpose***

21 Despite the proliferation in recent years of higher education establishments
22 offering tertiary-level study in the field of sports coaching, there is a lack of
23 research into the impact of such courses on coaching practice. The behaviours
24 employed and activities used by coaches during practice sessions is an area
25 where one might expect to see such impact, indeed certain studies have
26 tentatively noted the educational qualifications of coaches and suggested that
27 this may play a role in the application of behaviours more aligned with player-
28 learning. The purpose of this study was therefore to compare youth soccer
29 coaches with and without tertiary-level qualifications, examining their coaching
30 behaviours and practice activities.

31 ***Method***

32 The participants were ten male professional youth soccer coaches aged 24-55
33 with an average of 13 years coaching experience. Five of the coaches had
34 completed undergraduate degree courses related to sport coaching. All of the
35 coaches worked with players aged under 9 to under 18 in the youth academy of
36 an English professional soccer club. Systematic observation of coach behaviour
37 and practice activities was carried out using the Coach Analysis and
38 Intervention System (Cushion et al. 2012), while follow-up interviews were
39 used to elicit the coaches' perceptions of, and rationale for, their behaviour.

40 ***Findings***

41 The observation data showed that graduate coaches used significantly more
42 divergent questioning than non-graduate coaches, while the interview data
43 revealed a general trend for graduate coaches to show greater self-awareness of
44 behaviours and changes in behaviour between practice types. Graduate coaches
45 also provided more comprehensive rationales, for example, seeing silence as a
46 means of facilitating player decision making as well as for observation. In
47 contrast to previous research, sessions featured a higher proportion of playing
48 form than training form activities and at over twenty percent of session duration,

49 the 'other' practice state was a prominent feature of contact time with players.
50 While some coaches saw 'other' as wasted time, graduate coaches identified
51 this as an opportunity for group discussion and social interaction. The study
52 adds to existing data about coach behaviours and practice activities, providing
53 evidence that education background may indeed influence coaching practice.
54

55 **Keywords:** *coaching behaviour; practice activities; systematic observation; coach*
56 *education; tertiary education.*

57
58 **Introduction**

59 There has been a proliferation in the number of universities offering tertiary-level study in
60 sport coaching (Taylor and Garrett 2010), and despite claims that these courses have an
61 important role to play in raising standards of coaching (Turner and Nelson 2009), little is
62 known about their impact on graduate coaches' practice (Mallett, Rynne and Dickens 2013).
63 While such knowledge would provide supporting evidence of course impact (Mallett, Rynne
64 and Billett 2016), in coaching a background as a successful performer still has more
65 relevance, being valued by employers (Blackett, Evans and Piggott 2017), participants
66 (Cushion and Jones 2014) and coaches themselves (Mallett, Rynne and Billett 2016). It is not
67 surprising therefore, that research repeatedly illustrates that much of the knowledge acquired
68 by coaches is picked up through 'apprenticeships of observation' as athletes, and subsequent
69 experiential learning and mentoring as neophyte or assistant coaches (e.g., Cassidy and Rossi
70 2006; Cushion, Armour and Jones 2003; Erickson, Côté, & Fraser-Thomas 2007; Harvey et
71 al. 2013).

72 The use of systematic observation tools has consistently identified 'instruction' as the
73 most frequently used behaviour by coaches during practice (e.g. Cushion and Jones 2001;
74 Ford, Yates and Williams 2010; Kahan 1999; Millard 1996; Partington and Cushion, 2013;
75 Potrac, Jones, and Cushion 2007; O'Connor, Larkin and Williams 2017, 2018; *inter-alia*).

76 This body of work suggests that a deliberate behavioural strategy or ‘what coaches do’ is to
77 mix instruction and positive verbalisations, along with periods of silence. Indeed, in some
78 circumstances, research has identified a ‘traditional’ approach to coaching that is highly
79 directive, autocratic and prescriptive (e.g., Harvey, Cushion, & Massa-Gonzalez 2010; Potrac
80 and Cassidy 2006; Williams and Hodges 2005), with the most recent work suggesting
81 coaches still ‘over-coach, with high amounts of instruction and stop-start activity’
82 (O’Connor, Larkin and Williams 2017, 658). That said, the evidence also suggests that
83 coaching behaviour is ‘very situation specific and dependent on the interaction of a myriad of
84 influencing contextual variables’ (Jones 1997, 30). Mediating factors include, for example,
85 the gender of coach and athlete (e.g. Lacy and Goldston 1990; Millard 1996), the age of the
86 athlete (e.g. Seagrave and Ciancio 1990; Smith and Smoll 1993; Partington, Cushion and
87 Harvey 2014), the type of sport (e.g. Harvey et al. 2013; Claxton 1988; Wandzilak et al.
88 1988), competition score line (e.g., Calpe-Gómez, Guzmán and Grijalbo 2013), whether the
89 athlete is characterised by high or low expectations (e.g. Wilson, Cushion, and Stephens
90 2006; Solomon et al. 1998), the skill level of the athlete (e.g. Lacy and Darst 1985; Markland
91 and Martinek 1988), and the aims of the coaching session (e.g. Krane, Eklund, and
92 McDermott 1991). Other factors, such as the coach’s level in the coaching structure (e.g.
93 Solomon et al. 1998; Solomon et al. 1996), the stage in the season (e.g. Lacy and Darst 1985;
94 Potrac, Jones, and Armour 2002), the coach’s philosophy (Cushion and Jones 2001), and
95 whether it is practice or a competitive match (Smith and Cushion 2006; Partington and
96 Cushion 2012; Trudel, Côté and Bernard 1996) can impact on coach behaviour in a particular
97 context.

98 Importantly, coaching practice intertwined with contextual variables has an historical
99 and traditional thread where coaches’ experiences are powerful, long lasting, and have a
100 continual influence over pedagogical perspectives, practices, beliefs and behaviours

101 (Cushion, Armour and Jones 2003; Potrac, Jones and Cushion 2007). Therefore, we need to
102 probe more deeply and examine the outcome of coach socialisation experiences, and despite
103 considering a myriad of variables no research has examined specifically the relationships
104 between coaches' educational experience and background and coaching behaviour.
105 Educational background has begun to be highlighted as important and influential on coaches'
106 practice with coaches' educational background suggested as the factor resulting in coaching
107 behaviours more closely aligned with player learning (e.g., Partington, Cushion and Harvey
108 2014; Potrac 2001; Potrac, Jones and Cushion 2007; Smith and Cushion 2006). For example,
109 studies have proposed coaches' educational background as the link to coaches' use of silence
110 as a deliberate coaching behaviour to allow observation and player decision making to take
111 place (Potrac 2001; Potrac, Jones and Cushion 2007; Smith and Cushion 2006). These studies
112 portray higher levels of silence in both training and competition settings in contrast to the
113 explicitly instructional approach portrayed in other research (e.g. Cushion and Jones 2001;
114 Ford, Yates and Williams 2010; Partington and Cushion 2012, 2013). Noting that the
115 majority of these coaches held tertiary-level qualifications, it was suggested that this
116 educational background may result in an '...ability to "intellectualise" the coaching
117 process...' (Smith and Cushion 2006, 364). Such findings give some support to the
118 suggestion that tertiary education can aid in the development of critical thinking skills for
119 coaches (Mallett et al. 2009; Rynne and Mallett, 2014). Furthermore, Partington, Cushion and
120 Harvey (2014) suggested that educational background (qualified teacher status) resulted in
121 coaches who displayed a different attitude towards instruction, recognising the value of
122 delaying instruction to allow players to engage in self-reflection. In general, these studies
123 suggest a relationship between coach behaviour and educational background worthy of
124 further investigation.

125 According to current conceptions of coach learning formal education combines with

126 non-formal courses and ongoing experience in contexts with differing socio-cultural
127 constraints (Stodter and Cushion 2014). However, formal learning is typically understood as
128 governing-body coaching awards and the impact of other types of education (e.g. tertiary
129 level study) has yet to be explored. So, despite a number of studies which report on coaches'
130 perceptions of formal coach certification programmes (e.g. Chesterfield, Potrac and Jones
131 2010; Nelson, Cushion and Potrac 2013) to our knowledge only one study has explicitly
132 linked education to changes in coach behaviour (Stodter and Cushion 2014). Moreover,
133 despite research into the development of certain skills through tertiary education (e.g.
134 reflection, Knowles et al. 2001; Knowles et al. 2006) and coaches' perceptions of its utility
135 (Mallett, Rynne and Billet 2016), there is currently no evidence that tertiary education
136 courses impact coaching practice (Mallett, Rynne and Dickens 2013) or coaches' practice
137 behaviours.

138 Systematically identifying the behaviour of coaches using descriptive-analytical
139 systems has been a significant area of research for over 30 years (Cushion et al. 2012).
140 Relatively objective behavioural data are important as coaches have been shown to have
141 limited awareness of what behaviours they use, and how often they use them (cf. Harvey, et
142 al. 2013; Partington and Cushion 2013; Partington et al. 2015; Partington, Cushion and
143 Harvey 2014) – coaches are notoriously poor at describing their own behaviour – with
144 athletes' ratings correlating more strongly with observed behaviours than the coaches' own
145 self-ratings (e.g. Partington and Cushion 2013; Smith and Smoll 2007). It is of course
146 recognised that, as Cushion et al. (2012) argue, coaching behaviours *per se* do not stand alone
147 as predictors of effective coaching (Dodge and Hastie 1993) nor do they 'embrace the
148 entirety of the coaching process' (Lyle 1999, 14). Indeed, mixed methodologies are
149 increasingly employed combining systematic observation with interpretive interviewing
150 revealing the rationales underpinning coaches' behaviour and identifying contextual variables

151 influencing practice (Cope, Partington and Harvey 2017; Cushion et al. 2012; Hall, Gray and
152 Sproule 2016; Potrac, Jones and Cushion 2007). Such an approach provides information
153 about ‘what coaches do’ and also important insight into ‘why’ and ‘how’.

154 Given the intuitive link, and some initial correlation, between tertiary-level education
155 and coaching behaviours more aligned with player learning (Cushion, Ford and Williams
156 2012; Smith and Cushion 2006) a decade on research has not addressed the question posed by
157 Smith and Cushion (2006), who asked whether practical experience alone drives coaches’
158 behaviour, or how and to what extent is educational background a determining factor?
159 Therefore, the purpose of this study was to examine youth soccer coaches coaching
160 behaviour and compare coaches with and without tertiary-level qualifications. The aim was to
161 go some way to providing data showing any indication of differences in coach behaviour and
162 practice activities when considered by educational background. As a result, such an analysis
163 would help highlight coaches’ understanding of, and rationale for, their behaviours, and the
164 influences that inform their action in the coaching environment. The significance of such
165 work lies in providing knowledge that is arguably vital in coaching contexts (e.g. professional
166 youth soccer academies) which claim to be focused on ‘learning’ and ‘development’, and yet
167 where evidence currently shows a disparity between coaches’ practice (i.e. their behaviours
168 and activities) and that promoted by skill acquisition theory (Cushion, Ford and Williams
169 2012; Partington and Cushion 2013; O’Connor, Larkin and Williams 2017, 2018).

170

171 **Method**

172 As the research was bounded by a specific time frame, and by a particular case, data were
173 collected using a case study methodology (cf. Cushion, 2018). Berg (2007) defines a case
174 study as ‘a method involving systematically gathering enough information about a person,
175 social setting, event, or group to permit the researcher to effectively understand how the

176 subject operates or functions' (p. 283). In this case, the aim was to gather information on the
177 Academy coach's behaviour and its relationship to their educational background, to 'uncover
178 the manifest interaction of significant factors characteristic of this' (Berg, 2007, p. 284).
179 Importantly, the aim was not to generalise per se, but to generate context dependent
180 knowledge, with the aim that readers might elicit case knowledge that offers authenticity and
181 transferability (Grünbaum, 2007) and recognise where the 'case' aligns with their own
182 biographies and experiences.

183

184 *Participants and Setting*

185 The participants in the study were ten male professional youth soccer coaches aged between
186 24-55 (M =38.4 years, SD = 12.05) with an average of 13 years coaching experience (SD =
187 6.38), with 7.5 years (SD = 5.46) spent in an Academy or Centre of Excellence¹. Participants
188 were selected through criterion-based purposive sampling (Sparkes & Smith, 2014) – coaches
189 were asked to take part based on their position as soccer coaches within the Academy of a
190 professional soccer club; in addition to this, five coaches were also required to have a degree.
191 The graduate coaches (n=5) had completed undergraduate courses related to coaching (e.g.
192 Applied Sport Science and Coaching), additionally, three had gone on to complete
193 postgraduate degrees related to coaching or education ('Dave', 'Mark' and Andy') and two
194 were qualified teachers ('Dave' and 'Dean') (see Table 1).

195 Eight of the coaches held the Union of European Football Associations (UEFA) 'B'
196 Coaching Licence, with the remaining two having the UEFA 'A' Licence, these same two
197 had also played professionally in the second highest division of English football. All of the
198 coaches had completed specific governing body coaching qualification designed for coaches
199 of young players (Youth Modules).

¹ Academies (previously known as Centres of Excellence) are the place where professional soccer clubs in England develop their youth players to prepare them for the professional game.

200

201 ****Table 1 near here****

202

203 The setting was the Youth Academy of a League Two club (the fourth division of
204 professional soccer in England) in the North-East of England. The Academy had attained
205 Category Three status under the Elite Player Performance Plan (EPPP) (Premier League
206 2011), a recently introduced set of rules and regulations which govern professional club's
207 youth development programmes.²

208 The players coached were under 9 to under 16 at the club and undertook between 4.5-
209 6 hours of practice time and one match per week; while players coached aged under 17 and
210 under 18 undertook 12-15 hours of practice and one match. The purpose of the Academy was
211 to develop players, enabling their progression through the age groups to earn full-time
212 professional contracts. Whilst the Academy had a curriculum for coaches to follow, particular
213 practice activities and coaching behaviours were not specified.

214

215 *Systematic observation*

216 Coaching behaviours and practice activities were coded using the Coach Analysis and
217 Intervention System (CAIS) (Cushion et al. 2012) (see Table 2). In terms of secondary detail,
218 timing (pre-, concurrent, post-) of instruction, type of question (divergent, convergent) and
219 nature of silence (on-task, off-task) were included due to their relationship to key coaching
220 behaviours (Cushion, Ford and Williams 2012; Partington, Cushion and Harvey 2014). With
221 regard to practice activities, 'training form' was defined as any activity without a game
222 related focus (e.g. physiological, technical and skill based activities); 'playing form' was
223 defined as those activities with a game related focus (e.g. phases of play, conditioned and

² There are four categories of academy (Category One having the most stringent criteria), differences between them include facilities, staffing levels and player contact time.

224 small-sided games); the ‘other’ category was time spent on transitions between activities,
225 water breaks, or when the coach was organising/addressing the players (Cushion et al. 2012).

226

227 ****Table 2 near here****

228

229 *Interpretive interview*

230 Although the use of systematic observation provided descriptive data of the coaches’
231 behaviour and practice activities during sessions, it did not give any insight into the rationale
232 that informed those behaviours (Cushion et al. 2012). Therefore, interviews were used to
233 explore the coaches’ perceptions of the ‘attitudes, opinions, beliefs and values’ (Potrac, Jones
234 and Armour 2002, 186) that underpinned their actions, to understand the impact of
235 educational background on coaches’ practice.

236 The semi-structured approach included questions about biographic and demographic
237 information, perceived behaviours and practice types, before considering the CAIS behaviour
238 categories and the observational data (Partington, Cushion and Harvey 2014). The coaches’
239 perceptions of the impact on their practice of education, coaching courses, coaching
240 background and playing experiences were also explored.

241

242 *Procedures*

243 *Systematic observation and reliability*

244 Following University ethics approval, a total of 39 practice sessions were filmed, providing
245 3154 minutes of footage. In order to ensure an adequate picture of coaching practice, it is
246 recommended that at least three sessions are observed (Brewer and Jones 2002; Cope,
247 Partington and Harvey 2017). Therefore, following previous empirical research (e.g. Claxton
248 1988; Ford, Yates and Williams 2010; Lacy and Darst 1985), each coach was observed a
249 minimum of three times ($M = 3.9$, $SD = 0.74$). To establish reliability, inter- and intra-

250 observer testing was carried out (Cope, Partington and Harvey 2017; Van Der Mars 1989).
251 Due to the complexity of the observation instrument, eighty percent was set as the level of
252 agreement (Cushion et al. 2012). Inter-observer reliability for coaching behaviours was
253 81.9%, while intra-observer reliability was 83.5%. For practice states, inter-observer
254 reliability was 95.8%, and intra-observer reliability was 96.1%. All of these figures therefore
255 exceeded the accepted level of eighty percent agreement (Cushion et al. 2012).

256

257 *Interpretive interviews*

258 The interviews were conducted after the systematic observations and behaviour data coding
259 had been completed. The protocol for the interviews followed that established by previous
260 research (e.g. Partington, Cushion and Harvey 2014). Firstly, without having sight of their
261 behaviour data, coaches were asked about their coaching behaviours (i.e. what behaviours do
262 you use and why?); they were then shown the CAIS definitions and could elaborate on their
263 previous answers if they felt it necessary (i.e. if they saw a behaviour in the observation
264 instrument that they had not considered); lastly, they were presented with their behaviour
265 data and asked for their views (i.e. what are your views on the results of the observations?).
266 Coaches' answers were probed to elicit greater detail or clarification where necessary
267 (Sparkes and Smith 2014). Duration of the interviews ranged from fifty-six to seventy-six
268 minutes (mean duration 66 min.) and the recordings were subsequently transcribed verbatim.

269

270 *Data analysis*

271 *Systematic observation*

272 Data were analysed descriptively and for the comparative analysis, significance was set at
273 $P < 0.05$ unless otherwise stated. For overall coaching behaviours, independent t-tests were
274 conducted to compare the overall totals and RPM of discrete behaviours for the graduate and

275 non-graduate coaches. A one-way repeated measures ANOVA was undertaken to determine
276 if significant differences were evident in the proportion of sessions spent in training, playing
277 and other practice states by coaches from the graduate and non-graduate group. Mauchly's
278 Test of Sphericity was significant ($p < 0.05$), so Greenhouse-Geisser corrections were used. To
279 analyse the use of behaviours in the three different practice states (training, playing and
280 other), a repeated measures ANOVA was used for the percentage and RPM of each discrete
281 behaviour. Any identified interaction effects between practice state and coach status were
282 followed up with independent t-tests, this was in order to locate the practice state in which
283 significant differences were present. Mixed-model ANOVAs were used to compare
284 convergent and divergent questioning, and the timing of instruction behaviours (pre-,
285 concurrent, post-). To follow up on the comparison of question types, a paired samples t-test
286 was used, while a one-way ANOVA was applied to the timing of instruction.

287

288 *Interpretive interviews*

289 The interview data were analysed using abductive analysis, which involved moving back and
290 forth between deduction and induction (Morgan 2007). Firstly, the interview data were read
291 and re-read for familiarisation before initial open coding was completed line-by-line at a
292 descriptive level (Taylor 2014). This process of descriptive coding involved the addition of
293 codes to text segments in the transcripts to organise data and facilitate its retrieval (Patton
294 2002). Deductive analysis then took place, with preliminary structure for themes and sub-
295 categories provided by the behaviours from the observation instrument. Remaining data not
296 categorised in the deductive analysis were then inductively analysed to identify other themes,
297 this was done by grouping the initial descriptive codes into major themes before re-grouping
298 into relevant sub-categories (Patton 2002). Exemplar quotes from the transcripts were
299 provided to illustrate the sub-categories within each theme (Sparkes 1998).

300

301 **Results**

302

303 *Systematic observation*

304 In total, 3154 minutes of practice time was analysed showing 20,025 recorded behaviours.

305 Uncodable behaviours accounted for 0.3% of total behaviours.

306

307 *Overall coaching behaviours*

308

309 ****Table 3 near here****

310 Table 3 shows the behaviour totals and RPM for graduate and non-graduate coaches. Direct

311 management was the most frequent behaviour for both graduate ($26.2 \pm 4.55\%$) and non-

312 graduate ($25.6 \pm 5.51\%$) coaches. Silence on-task was the next most frequent at $17.6 \pm 3.56\%$

313 for graduate coaches and $14.3 \pm 4.09\%$ for non-graduates.

314

315 Overall, non-graduate coaches used significantly more of the following behaviours than

316 graduate coaches: specific negative feedback ($1.86 \pm 0.37\%$ vs $0.76 \pm 0.43\%$), $t(8) = -4.34$,

317 $P < 0.01$; general negative feedback ($0.62 \pm 0.41\%$ vs $0.08 \pm 0.08\%$), $t(4.325) = -2.85$,

318 $P = 0.04$; and post-instruction ($1.8 \pm 0.53\%$ vs $1.1 \pm 0.27\%$), $t(8) = -2.61$, $P = 0.03$. They also

319 used those three behaviours at a significantly greater rate per minute (RPM) than graduate

320 coaches: specific negative feedback (0.13 ± 0.04 vs 0.04 ± 0.03), $t(8) = 3.82$, $P < 0.01$; general

321 negative feedback (0.04 ± 0.03 vs 0.004 ± 0.005), $t(4.276) = 2.83$, $P = 0.04$; and post-

322 instruction (0.13 ± 0.04 vs 0.06 ± 0.02), $t(8) = 3.17$, $P = 0.01$.

323 Graduate coaches used significantly more divergent questioning ($6.44 \pm 3.57\%$) than
324 non-graduates ($1.84 \pm 1.88\%$), $t(8) = 2.55$, $P=0.03$. Furthermore, this was at a significantly
325 higher RPM (0.36 ± 0.17) than non-graduates (0.11 ± 0.97), $t(8) = 2.79$, $P=0.02$.

326

327 No interaction effect of coach graduate status on balance of pre-, concurrent and post-
328 instruction was found. When examining differences in the secondary detail of timing of
329 instruction, the follow up one-way ANOVA was significant [$f(2,27) = 83.23$, $P<0.01$].
330 Results of the post-hoc Tukey revealed that concurrent instruction ($9.95 \pm 2.79\%$) was
331 significantly higher than pre- ($1.72 \pm 0.59\%$) and post- ($1.45 \pm 0.54\%$) ($P<0.01$) for all
332 coaches.

333 Looking at the secondary detail of the questioning behaviour, a mixed model
334 ANOVA showed a significant main effect [$f(1,16) = 49.337$, $P<0.001$]. An interaction effect
335 was also present for coach graduate status [$f(1,16) = 5.426$, $P<0.05$]. For the post-hoc
336 analysis Bonferroni's adjustment was made to reduce the likelihood of type-1 errors,
337 therefore significance was accepted as $p<0.025$ ($P<0.05/2$). Non-graduate coaches asked
338 significantly more convergent ($9.32 \pm 5.78\%$) than divergent ($1.84 \pm 1.89\%$) questions
339 ($P=0.01$). However, for graduate coaches there was no significant difference between
340 convergent ($8.98 \pm 2.02\%$) and divergent ($6.44 \pm 3.57\%$) questioning.

341

342 ***Practice activities***

343 A one-way ANOVA revealed a significant main effect for practice state [$f(1,13,9.00) =$
344 20.80 , $p=0.001$]. There was no significant interaction effect between coach graduate status
345 and practice states [$f(1,13,9.00) = 0.47$, $p=0.859$]. Pairwise comparisons from the post-hoc
346 analysis revealed significantly higher percentage of time spent in playing ($M = 56.87$, $SE =$
347 4.28) than training ($M = 21.04$, $SE = 4.47$) and other ($M = 22.10$, $SE = 1.27$) practice states

348 for all coaches combined ($p < 0.01$). Only one coach used more training form than playing
349 form ('Mike', U18, non-graduate).

350

351 *Coaching behaviours in different practice states*

352 Practice state did have a significant impact on several behaviours, with regard to differences
353 between training and playing states: mean percentage of positive and negative modelling,
354 specific negative feedback, and pre-instruction were all significantly higher in training than in
355 playing form activities; while silence (on-task) and silence (total) were significantly higher in
356 playing than in training form. Arguably the most notable findings amongst the practice state
357 data are related to questioning and silence behaviours.

358

359 A repeated measures ANOVA for divergent questioning showed a significant main effect for
360 practice state [$f(2,16) = 15.097, p < 0.001$]. Subsequently, pairwise comparisons situated
361 significantly higher percentages in the 'other' practice state ($M = 7.71, SE = 1.26$) than in
362 training ($M = 2.06, SE = 0.43$) and playing ($M = 4.04, SE = 1.45$) states.

363 ****Figure 1 near here****

364

365 Despite the absence of an interaction effect between coach graduate status and practice type
366 for divergent questioning, noting the previously mentioned significant difference between
367 overall levels of divergent questioning for graduate and non-graduate coaches. Figure 1
368 shows the trend for graduate coaches to ask more divergent questions in all practice states.

369

370 A repeated measures ANOVA for silence (on task) demonstrated a significant main effect for
371 practice type [$f(2,16) = 96.374, P < 0.001$]. Pairwise comparisons showed significant
372 differences between training ($M = 15.12, SE = 1.3$), playing ($M = 20.91, SE = 1.80$), and
373 other ($M = 0.71, SE = 0.20$) states ($P < 0.01$). Whilst no interaction effect was present for

374 coach graduate status, there was a greater contrast in levels of this behaviour between training
375 and playing activities for coaches with degrees (training = $15.7 \pm 4.95\%$ vs playing = $23.1 \pm$
376 3.6%) than coaches without ($14.5 \pm 3.2\%$ vs $18.7 \pm 7.2\%$).

377

378 *Interview data*

379 After initial line-by-line coding of the interview transcripts at a descriptive level, deductive
380 analysis using behaviour and practice state categories from the observation instrument, along
381 with particular topics from the semi-structured interview guide (e.g. what behaviours do you
382 use and why?), provided preliminary structure for themes and sub-categories. Furthermore,
383 inductive analysis allowed the identification of other themes, resulting in the final structure
384 shown in Table 4. Tables 5 to 8 provide examples from the raw data for each sub-category.

385

386 *****Table 4 near here*****

387 *****Table 5 near here*****

388 *****Table 6 near here*****

389 *****Table 7 near here*****

390 *****Table 8 near here*****

391 **Discussion**

392 *Overall behaviours*

393 *Questioning*

394 Questioning has been identified as a coaching behaviour with the potential to influence
395 athlete learning positively (Chambers and Vickers 2006). Both the graduate (15.4%) and non-
396 graduate group (11.1%) used more questioning than those in Partington and Cushion (2013)
397 (7.8%) and Partington, Cushion and Harvey (2014) (7.2%), though like the coaches in these
398 studies, both groups here asked more convergent than divergent questions. However, while

399 convergent questioning was significantly higher than divergent for the non-graduate group
400 (9.3% vs 1.8%), for the graduate group (9.0% vs 6.4%) this was not the case. This contrast
401 was also illustrated in the finding that graduate coaches asked significantly more divergent
402 questions. This could be considered important in this context, as it is divergent questions that
403 have the potential to develop decision-making and problem-solving capabilities (Harvey and
404 Light 2015; McNeil et al. 2008), an important aspect of performance for elite players
405 (Williams and Ford 2013).

406 Both groups suggested that questioning was used as a way of checking understanding,
407 which clearly matches Siedentop's (1991, 233) description of convergent questioning as
408 '...analysis and integration of previously learned material'.

409

410 I'm probably questioning them...in relation to their knowledge to
411 find out if they know. (Rich, U9/10, non-graduate)

412

413 However, the higher incidence of convergent questioning for the non-graduate coaches,
414 coupled with their rationale for the use of questioning, suggested a desire to maintain control
415 and exercise informational power over the players (Raven 1993), echoing the findings of
416 previous studies in similar contexts (e.g. Cope et al. 2016; Potrac, Jones and Armour 2002).
417 By asking convergent questions, the coaches not only initiated interactions, but decided what
418 knowledge was important and valued during those interactions (Wright and Forrest 2007):

419

420 Alan (U15/16, non-graduate): Did we get transitions?

421 Players (all): Yeah.

422 Alan: did the two teams that were together more or less keep

423 about 60% possession would you say?

424 Players (all): Yeah.

425 Alan: Yeah and that's always our aim isn't it? 60% possession

426 is about what we're after so that's decent. Did we get goals?

427 Players (all): Yeah.

428 Alan: Did we break quickly?

429 Players (all): Yeah.

430 Alan: Did we switch?

431 Players (all): Yeah.

432 Alan: Did we keep composure?

433 Players (all): Yeah.

434 Alan: Did we secure possession?

435 Players (all): Yeah.

436 Alan: Yeah well done.

437

438 In this way the coach remained the dominant voice and in no danger of being perceived as

439 lacking in knowledge (Cope et al. 2016; Potrac, Jones and Armour 2002). The exchange

440 above also shows that despite questioning often being advocated as 'player centred', players

441 here were treated as a homogenous group, with limited consideration of their individual

442 differences (cf. Cope et al. 2016).

443

444 ...to be fair they [players] come up with the right answers.

445 They know it. (Alan, U15/16, non-graduate)

446

447 This attitude towards questioning also implied an epistemological view of knowledge as

448 being separate from the knower, existing initially in the mind of the coach before

449 transmission to players (Potrac and Cassidy 2006). A particular view about the nature of
450 knowledge in soccer is also suggested. This type of questioning and high levels of direction,
451 reflected a belief from the non-graduates that there is a 'right way' of doing something
452 (Cushion 2013) in soccer, that there are certain things that must be learned if players are to
453 become professionals (Cushion and Jones 2006).

454

455 ...perhaps I need to keep the questions more open...but I
456 suppose the demands on the environment that they're in now
457 and where they're at...I'm probably thinking, they've gotta
458 start to know this now...

459 (Mike, U18, non-graduate)

460

461 Going even further, the non-graduate coaches appeared to start to recognise their questioning
462 as a form of instruction:

463

464 My question would be very specific really to get what I want
465 from them. Really I may as well tell 'em hadn't I? (Alan,
466 U15/16, non-graduate)

467

468 This contrasted sharply with the views of coaches in the graduate group, for whom
469 questioning was a means of stimulating higher order thinking and constructing new
470 knowledge (Chow et al. 2009; Kidman and Lombardo 2010; McNeill et al. 2008).

471

472 I try and use questioning...because I want them to reflect on
473 the situations they experience...I think at this level we need to

474 challenge and stretch their thinking... (Mark, U11, graduate)

475

476 Evidenced in the significantly higher levels of divergent questioning, while four out of five
477 coaches in the graduate group said they used questioning to challenge the players and extend
478 learning, only one coach from the non-graduate group mentioned this. This justification for
479 using questioning coupled with supporting behavioural data has not been reported in previous
480 studies of coaches in similar contexts (e.g. Partington and Cushion 2013; Partington, Cushion
481 and Harvey 2014).

482

483 *Silence*

484 Silence on-task was the second most frequent individual behaviour category for graduate
485 (17.6%) and non-graduate (14.3%) coaches. This was higher than Cushion and Jones (2001)
486 (10.5%), Partington and Cushion (2013) (6.5%) and the range reported for coaches of
487 different age groups by Partington, Cushion and Harvey (2014) (3.7-8.4%), but lower than
488 the range for three different age groups (18-34%) in Ford, Yates and Williams (2010). The
489 prominent use of silence by the coaches in the present study may reflect the fact that unlike
490 those in Partington, Cushion and Harvey (2014), it was described as a deliberate coaching
491 strategy - though again differences were apparent between the graduate and non-graduate
492 coaches.

493

494 Coaches from both groups justified silence as being used for observation (Miller 1992):

495

496 Interviewer: ...what's the purpose of you being silent in your
497 sessions?

498 Dave: To observe. To make sure when you do go in, you coach

499 something that's real as opposed to...it just being based on
500 what you want to do." (Dave, U11, graduate)

501
502 ...when I'm silent I'm watching...their actions, whether
503 they've got to grips with and doing things that I want to see...
504 and just watching for any opportunity to step in and highlight
505 anything I feel [a] need to... (Mike, U18, non-graduate)

506
507 In the context of previous research (Partington and Cushion 2013; Partington, Cushion and
508 Harvey 2014), the fact that coaches gave a reason for their silence could be seen as positive.
509 However, further to this, four out of the five graduate coaches also saw silence as a means of
510 facilitating player learning.

511
512 ...to let them make their decisions so I'm not telling or trying
513 not to tell them the answers. (Dean, U13, graduate)

514
515 This justification echoes that given by the graduate coaches in Smith and Cushion (2006)
516 study. Also, Partington, Cushion and Harvey (2014) noted that coaches with teaching
517 qualifications discussed giving a chance for players to learn by doing suggesting that
518 graduate coaches implemented a 'more "hands-off" and less prescriptive' (Cushion, Ford and
519 Williams 2012, 1638) approach.

520
521 Notably, silence was viewed negatively by the non-graduate coaches as it related to a
522 perceived loss of control, reflecting a desire to remain at the 'centre' of the session, taking
523 responsibility for decisions (cf. Potrac, Jones and Armour 2002).

524

525 I feel if I'm coaching a session and I sit back and observe for
526 even two minutes...I personally feel the session's getting
527 away from me...I feel like I've lost control of the session. So
528 silence for me as a coach, I'm not saying it's right or wrong,
529 but for me it's uncomfortable.

530 (Sean, U14, non-graduate)

531

532 *Instruction and Management*

533 In place of silence, instruction and management were a means to maintain control of the
534 session, indeed direct management was the most frequent behaviour for both graduate
535 (26.2%) and non-graduate (25.6%) coaches. Aside from disseminating the organisation of
536 practices, management often involved keeping score, counting passes towards a target
537 numbers, and indicating whose restart it was (Cushion et al. 2012). Several coaches (2/5
538 graduates, 4/5 non-graduates) saw this, along with concurrent instruction, as a means of
539 raising or maintaining the intensity of the session. Skill acquisition theory suggests that this
540 directive approach, whilst not conducive to long-term learning, would result in short-term
541 performance improvements (Williams and Hodges 2005). Accordingly, instructional
542 behaviour is reinforced and reproduced, as the coaches see immediate benefits and the
543 players become increasingly socialised into playing a passive role (Potrac, Jones and Cushion
544 2007).

545

546 Non-graduates referenced previous experience as players or coaches as the source of such
547 behaviours, rather than evidence-based theory (Cushion, Ford and Williams 2012):

548

549 It is a method of keeping a high tempo. And probably it's true
550 to the way I've been brought through.

551 (Alan, U15/16, non-graduate)

552

553 It would be because every coach I've played under did it
554 themselves. (Sean, U14, non-graduate)

555

556 This appears to be evidence of the uncritical reproduction of previous experiences, where
557 perceptions about effective practice and the coaching role are formed as players and
558 implemented on becoming a coach (Jones, Armour and Potrac 2004; Townsend and Cushion
559 2015).

560

561 *Practice activities*

562 Along with high levels of instructional behaviours, previous research has shown a prevalence
563 of 'training form' activities, a traditional approach to practice characterised by the use of
564 isolated technique or skill work (Ford, Yates and Williams 2010; Partington and Cushion
565 2013; Partington, Cushion and Harvey 2014). However, evidence from the present study
566 showed coaches used more playing form (56%) than training form (22%) activities. The
567 'other' practice state (22%), made up the remaining session time. There were no significant
568 differences found between the graduate and non-graduate coaches on this.

569

570 Playing form activities were used due to their similarity to competition, a justification
571 supported by scientific theory on skill acquisition, which suggests that long-term learning is
572 facilitated by variable, random practice, such as that created by small-sided games (Ford and
573 Williams 2013; Schmidt and Lee 2005; Williams and Hodges 2005). Given that a key

574 concern of coaching in these elite developmental contexts is to prepare players for careers in
575 professional soccer, it follows that practice activities should result in "...retained improved
576 performance in match-play" (Ford and Whelan, 2016, 112).

577

578 I'd rather see the small sided game... the main reason
579 would be to develop their game understanding and for
580 players to be comfortable, opposed rather than
581 unopposed... in a game a lot of things happen, a lot of
582 things are around you, opponents, team mates, decisions
583 influence a lot of what you're doing, on and off the ball.

584 (John, U9/10, graduate)

585

586 The balance in favour of playing form activities suggests that at least part of the theory-
587 practice gap recently identified in the literature (Cushion, Ford and Williams 2012; Ford,
588 Yates and Williams 2010) did not appear to be present in these groups of coaches. However,
589 in providing a rationale for the use of training form activities, reasons tended to contradict
590 scientific theory. Training form was largely seen as something for developing technique,
591 which for short term performance may be accurate, but the idea that these improvements
592 would transfer into games was misguided (Cushion, Ford and Williams 2012).

593

594 Basically the repetitional thing is basically being able to pass
595 from A to B, doing it over and over and over and over and
596 over again, trying to reduce the mistakes, hoping that when
597 they go into a small sided game, or a small possession game
598 that they become better at it...I'm a great believer [in that],

599 I've always done it... (Mike, U18, non-graduate)

600

601 There is an indication here, that rather than an explanation based around skill acquisition
602 theory, the use of drill-type activities is justified as an approach learned and reinforced
603 through experience, in much the same way as explicit instruction (Ford, Yates and Williams
604 2010; Potrac, Jones and Cushion 2007).

605 At twenty-two percent of session duration, time spent in the 'other' practice state was
606 comparable with findings on three team coaches in other sports (16-24%, Harvey et al. 2013).
607 This clearly comprised a significant part of training sessions, which several coaches looked
608 upon as wasted time. However, there were coaches, all graduates, who saw the potential for
609 learning to take place in this 'other' state:

610

611 If it was just drinking and not doing something that's related
612 to the training, probably needs to come down but if it's related
613 to their group discussions and choosing formations and
614 discussing the topic then that number probably wouldn't be as
615 bad...(Dean, U13, graduates)

616

617 The coaching behaviours employed during time spent in the 'other' state can provide some
618 indication of the nature of interactions therein.

619

620 *Change in behaviour by practice state*

621 Both convergent and divergent questioning comprised a significantly higher percentage of
622 behaviours in the 'other' practice state, than in training or playing activities. As previously
623 stated, some graduate coaches seemed to recognise the potential for learning in 'other', while

624 non-graduate coaches tended to see this state as wasted time.

625

626 ...we also used that time to use...peer assessment, plenty of

627 group discussions and so on. (Mark, U11, graduate)

628

629 Although it was found that only one out of three coaches in Harvey et al. (2013) utilised such

630 periods to engage in discussions, it was suggested that ‘far from being time off task...it could

631 be argued that such a state incorporated some crucial facets of coaching’ (25).

632 Indeed, for graduate coaches, convergent (16.2%) and divergent (10.8%) questioning

633 was second only to management (25.9%) in their frequency in the ‘other’ state. Whilst this

634 should not be seen as a recommendation that more time be spent in this state, it does appear

635 to indicate that in this case graduate coaches made more effective use of this time. They did

636 this by consciously incorporating behaviours which are associated with player learning

637 (McNeill et al. 2008; Metzler 2011).

638 Silence on task was significantly higher in playing (20.9%) than training form

639 (15.1%). As an example, ‘Andy’ predicted this, he showed less concurrent instruction (10.3%

640 vs 24.9%) and more silence (18.9% vs 10.5%) in playing than training form.

641

642 I think they change in that perhaps, I’m on top of the

643 players a bit more in the technical side because I’ll try to

644 walk around to give individual feedback or group feedback

645 and then in the game...I’m very consciously aware of

646 trying to ensure that in the game, you’ve just got to let them

647 have a go. So I try to use more silence in the game than

648 there would be perhaps, in the technical or skills practice.

649 (Andy, U14, graduate)

650

651 This self-awareness was not evident in all of the coaches, and non-graduate coaches tended to
652 be less accurate in their perceptions, as shown in the prediction and subsequent reaction
653 below:

654

655 In playing state I would have a lot more driving the session,
656 a lot more instruction. It would definitely differ.

657

658 This is really interesting. I'm silent in the playing state a
659 lot more than in the training state. That's blown me away.
660 So I'm a lot more vocal in the training state. (Sean, U14,
661 non-graduate)

662

663 As hinted at by these excerpts, there was also a trend towards reduced instruction in playing
664 form activities, although this was non-significant. These findings support the idea that
665 playing form activities may result in less prescriptive behaviours, though like the coaches in
666 previous studies, the non-graduate group were largely unable to predict or explain the change
667 (Partington and Cushion 2013).

668

669 *Influence on behaviour*

670 Whilst it was not the aim of this study to explore coaches' educational experiences in depth,
671 the interviews did provide some indication of the ways in which tertiary level education had
672 influenced the practice of the graduate coaches. It appeared that university challenged
673 coaches' conceptions of the coaching role:

674

675 ... when I started coaching, I was very much a coach that just
676 copied someone I had as a coach, and when I was in the
677 system [as a player] the methods were completely different. It
678 was command all the time...it was very authoritative. So,
679 when I went to university, my lecturer taught me about the
680 importance of giving the players ownership, asking higher
681 order open questions to promote their thinking and also about
682 guided discovery and whole-part-whole. (Mark, U11,
683 graduate)

684

685 Graduate coaches described the examples provided by lecturing staff as a stimulus for their
686 own practice. However, rather than uncritically reproducing their approach, they developed
687 ideas and skills through collaboration with both course staff and other students (Turner and
688 Nelson 2009).

689

690 ...certainly with the lecturers and a good cohort [of students],
691 you didn't just pinch something, it was more pinch something
692 and add something, expand on it rather than just nicking an
693 idea for an ideas sake. (John, U9/10, graduate)

694

695 So, by questioning the dominant conception of coaching as coach-centred and explicitly
696 directive and providing an environment where knowledge and skills were developed,
697 practiced, and critically discussed, tertiary education seemed to have resulted in graduate
698 coaches with an altered view of 'how' to coach and coherent rationales for why they do so.

699 This contrasted sharply with the coaches' attitudes towards soccer-specific coaching courses,
700 which were seen to be about the acquisition of specific knowledge (Jones 2007) and the
701 reproduction of an authoritarian coach-centred practice (Chesterfield, Potrac and Jones 2010).

702

703 I think a lot of it was language. Being able to say the specific
704 things that you want to put across. (Gary, U14/15, non-
705 graduate)

706

707 It was directing the games and being loud and making sure
708 people stood still, and controlling what happened. (Rich,
709 U9/10, non-graduate)

710

711 It appears that the focus on 'what' to coach, along with strict definitions of 'how' to coach,
712 has led to non-graduates who are less able to explain and justify their coaching behaviours.
713 Without the input of the university course, it appeared that for these coaches the influence of
714 previous experience from playing and coaching was pervasive, as their practice remained
715 implicit and unquestioned (Cushion, Ford and Williams 2012; Cushion and Jones 2006). All
716 of the coaches mentioned previous coaches, several of whom had influenced them in both
717 positive and negative ways.

718

719 When I went to the club full time, I really didn't understand
720 what it was or what was needed for apprentices to make it as
721 pros. So I copied the behaviour of the other coaches and I
722 copied their methods... There was a very strict discipline and
723 sometimes berating culture. I was thinking is that the way, is

724 that what I should be doing?...bearing in mind I was coming in,
725 not as an ex-pro, so I had to earn respect fairly quickly and so I
726 did copy certain behaviours and behaved in a certain way and
727 spent a lot of time, probably not being the person I was.

728 (Alan, U15/16, non-graduate)

729

730 This matches the 'heavily authoritarian' (Cushion and Jones 2006, 148) behaviour observed
731 during an ethnography of a similar context at another professional club, with Alan's
732 justification here of needing to 'earn respect' a clear reiteration of earlier research findings
733 (Potrac, Jones and Armour 2002).

734

735 **Conclusions**

736 Systematic observation revealed significant differences in coaching behaviour between
737 graduate and non-graduate coaches. Arguably most notable of these was the finding that
738 graduate coaches asked significantly more divergent questions than non-graduates. This
739 behaviour has been identified as having the potential to facilitate higher order, critical
740 thinking and decision-making skills (McNeill et al. 2008; Siedentop 1991), yet incidence of
741 divergent questioning in such contexts had previously been found to be infrequent in
742 comparison to explicit instructional behaviours (Partington and Cushion 2013; Partington,
743 Cushion and Harvey 2014). Tertiary level study was reported to have helped the graduate
744 coaches challenge the traditional conception of coaching as directive and coach-centred,
745 resulting in a practice more closely aligned with current conceptions of player learning.

746 In addition to this important difference in behaviour, insights from the interpretive
747 interviews showed evidence of a difference in coaches' levels of self-awareness. Existing
748 research had suggested that coaches are poor at describing their behaviours (Harvey et al.

749 2013; Partington and Cushion 2013; Partington et al. 2015; Partington, Cushion and Harvey
750 2014). In the present study, it was clear that coaches were able to identify key aspects of their
751 practice, however, evidence indicated that graduate coaches were more accurate at predicting
752 their most frequent behaviours. This also meant that when providing a rationale for their
753 actions, the justifications of graduate coaches centred on facilitation of player learning which
754 largely matched their actual practice, rather than an idealised version (Cushion 2010).

755 With regard to practice activities, in contrast to previous research (Ford, Yates and
756 Williams 2010; Partington and Cushion 2013; Partington, Cushion and Harvey 2014),
757 sessions featured a higher proportion of playing form than training form activities.
758 Furthermore, at over twenty percent of session time, the ‘other’ practice state was a
759 prominent part of contact time with the players in this context. For some coaches, this was an
760 unconsidered part of practice (Harvey et al. 2013) and seen as wasted time, however,
761 graduate coaches identified this as an opportunity for group discussion and social interaction.
762 Observation data supported this showing significantly higher percentages of questioning in
763 ‘other’ when compared with training and playing form.

764 Like Cushion and Jones (2001), generalisability of findings is limited by the difficulty
765 in such elite developmental contexts of controlling for variables which may impact on results.
766 Firstly, contextual factors with the potential to influence behaviour - within sessions these
767 often related to players, their attendance and movement between age groups (Morgan, Muir
768 and Abraham 2014). Secondly, in seeking to make a meaningful comparison of graduate and
769 non-graduate coaches, it was impossible to have perfectly comparable samples in terms of the
770 age groups coached. This may have influenced the behaviours used by the coaches, though
771 existing studies have reported contradictory findings relating to this (Ford, Yates and
772 Williams 2010; Partington, Cushion and Harvey 2014).

773 Overall, this study showed significant differences in behaviour between graduate and non-
774 graduate coaches, the fact that divergent questioning was one of these is worthy of note in
775 relation to this youth development context. While non-graduate coaches struggled to predict
776 and justify their behaviours, coaches in the graduate group generally provided more accurate
777 predictions and theoretically sound rationales for their actions. This included the use of
778 silence not just for observation, but to allow player decision making; and questioning not just
779 to check knowledge, but also to extend critical thinking and decision-making skills – highly
780 relevant to developing elite performers in soccer.

781

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1040 *Table 1 - Coaches' biography.*

Coach (pseudonym)	Age group coached	Coaching experience (total)	Coaching experience (Academy/ CoE)	Graduate	Coaching qual.	Playing experience
John	U9/10	8	4	Yes	UEFA B	Semi-professional
Dave	U11	13	10	Yes	UEFA B	Semi-professional
Mark	U11	11	7	Yes	UEFA B	Semi-professional
Dean	U12/13	15	7	Yes	UEFA B	Semi-professional
Andy	U14/15	14	10	Yes	UEFA B	Semi-professional
Rich	U9/10	20	2	No	UEFA B	Semi-professional
Sean	U14	2	2	No	UEFA A	Professional
Gary	U14/15	6	3	No	UEFA B	Semi-professional
Alan	U15/16	21	20	No	UEFA B	Semi-professional
Mike	U17/18	20	10	No	UEFA A	Professional

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Table 2 – CAIS behaviour definitions (Cushion et al. 2012)

Primary coaching behaviour	Description
<i>Positive modelling</i>	Skill demonstration – with or without verbal instruction that shows the performer the correct way to perform.
<i>Negative modeling</i>	Skill demonstration – with or without verbal instruction that shows the performer the incorrect way to perform.
<i>Specific feedback (positive or negative)</i>	Specific verbal statements (either positive or supportive OR negative or unsupportive) that specifically aim to provide information about the quality of performance.
<i>General feedback (positive or negative)</i>	General verbal statements OR non-verbal gestures (either positive or supportive OR negative or unsupportive (can be delivered concurrently or post).
<i>Corrective feedback</i>	Corrective statements that contain information that specifically aim to improve the player(s) performance at the next skill attempt.
<i>Instruction</i>	Verbal cues, reminders or prompts to instruct / direct skill or play related to player(s) performance.
<i>Humour</i>	Jokes or content designed to make players laugh or smile.
<i>Hustle</i>	Verbal statements or gestures linked to effort to activate or intensify previously directed behaviour.
<i>Praise</i>	Positive or supportive verbal statements or non-verbal gestures which demonstrate the coach's general satisfaction or pleasure to a player(s) that DO NOT specifically aim to improve the player(s) performance at the next skill attempt.
<i>Punishment</i>	Specific punishment following a mistake.
<i>Scold</i>	Negative or unsupportive verbal statements or non-verbal gestures demonstrating displeasure at a player(s) that DO NOT specifically aim to improve the player(s) performance at the next skill attempt.
<i>Uncodable</i>	Not clearly seen or heard, not belonging to any other category.
<i>Silence</i>	Coach is silent this can be on-or off-task. (See secondary questioning behaviours below for definitions of on-and off-task).
<i>Question</i>	Coach asks a question about skill, strategy, procedure or score, the status of a player's injury, about the welfare of a player, etc. (see secondary questioning behaviours below for specific examples).
<i>Response to question</i>	Coach responds to a question that may or may not be directly be related to practice.
<i>Management – Direct</i>	Management that is practice/match competition-related coach behaviour contributing directly to

1045		practice/match competition or explaining how to execute the skill, drill or game.
1046	Management – Indirect	Management that is practice-related coach behaviour, not contributing directly to practice/the match competition.
1047	Management – Criticisms	Management that demonstrates displeasure at the player(s) behaviour or match official's decisions.
	Confer with assistants	Coach confers with assistants to talk about, manage or reflect on anything concerned with the practice.
		Secondary detail of behaviour (timing)
	Timing	Description
	Pre	Information given before a performance episode.
	Concurrent	Information given during a performance episode.
	Post	Information given after a performance episode.
		Secondary detail of behaviour (questioning and silence)
	Questioning	Description
	Convergent	Limited number of correct answers/options – closed responses (i.e. often yes or no answer).
	Divergent	Multiple responses/options – open to various responses.
	Silence	Description
	Silence on-task	Coach monitors practices without reacting verbally or non-verbally.
	Silence off-task	Coach is not visibly engaged in the practice.

1048 *Table 3 - Total behaviours used by graduate and non-graduate coaches [total behaviours,*
 1049 *percentage of behaviours (mean), standard deviation (SD) and rate per minute (RPM)].*
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Behaviour	Graduate coaches				Non-graduate coaches			
	Total	%	SD	RPM	Total	%	SD	RPM
Pos. modelling	154	1.4	0.49	0.09	144	1.3	0.89	0.09
Neg. modelling	29	0.3	0.23	0.02	47	0.4	0.35	0.03
Spec. pos. feedback	435	4.6	1.89	0.26	402	4.0	1.88	0.29
Spec. neg. feedback	79	0.8 ^a	0.42	0.05 ^a	185	1.9 ^a	0.36	0.13 ^a
Gen. pos. feedback	644	6.6	2.27	0.38	1032	10.5	6.25	0.79
Gen. neg. feedback	9	0.1 ^a	0.09	0.00 ^a	62	0.6 ^a	0.42	0.04 ^a
Corrective feedback	168	1.5	0.93	0.09	152	1.4	1.16	0.10
Instruction (pre)	147	1.4 ^b	0.41	0.08	209	2.0 ^b	0.65	0.14
Instruction (conc.)	1057	9.6 ^b	3.80	0.59	1000	10.3 ^b	1.60	0.73
Instruction (post)	111	1.1 ^{a,b}	0.27	0.07 ^a	176	1.8 ^{a,b}	0.52	0.13 ^a
Instruction (total)	1312	12.1	4.09	0.73	1385	14.1	1.32	0.99
Humour	96	0.9	0.52	0.05	76	0.7	0.24	0.05
Hustle	103	0.9	0.51	0.06	157	1.6	0.93	0.12
Praise	24	0.2	0.15	0.01	56	0.6	0.33	0.04
Punishment	0	0.0	0.00	0.00	17	0.2	0.18	0.01
Scold	2	0.0	0.03	0.00	9	0.1	0.08	0.01
Uncodable	20	0.2	0.17	0.01	37	0.4	0.24	0.03
Silence (on task)	1781	17.6	3.56	1.03	1418	14.3	4.09	0.96
Silence (off task)	182	1.9	0.50	0.11	207	2.1	0.37	0.15
Silence (total)	1963	19.5	3.76	1.14	1624	16.4	4.00	1.11
Question – converg.	926	9.0	2.02	0.53	906	9.3 ^c	5.79	0.61
Question – diverg.	586	6.4 ^a	3.57	0.36 ^a	178	1.8 ^{a,c}	1.87	0.11 ^a
Question (total)	1510	15.4	4.46	0.88	1083	11.1	7.63	0.72
Response to quest.	351	3.5	0.85	0.20	282	3.1	2.22	0.21
Management – Dir.	2694	26.2	4.55	1.55	2520	25.6	5.51	1.77
Management – Ind.	182	1.8	0.24	0.11	158	1.7	0.91	0.12
Management – Crit.	27	0.3	0.13	0.01	42	0.4	0.48	0.03
Conf. with assistant	382	3.7	2.19	0.22	364	3.6	2.69	0.26
Total	10189	100		5.88	9836	100		6.93

1051 *Note: ^a Significant difference between graduate and non-graduate group in independent t-*
 1052 *tests.*

1053 *^b Significant difference between concurrent instruction and pre-/post-instruction.*

1054 *^c Significant difference between convergent and divergent questioning.*

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1056 *Table 4 - Major themes and subcategories identified from the deductive and inductive*
 1057 *analyses.*
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Themes	Sub-categories
Use of specific behaviours	Questioning to check understanding and extend learning; silence for observation and to let them play; instruction to increase intensity.
Practice activities	Playing form for decision making; training form for technique; 'other' as wasted time; 'other' as learning.
Change in behaviour by practice type	Silence in playing form; evidence of self-awareness; lack of self-awareness
Influences on behaviour	Academic education; Soccer-specific qualifications; previous coaches.

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1061 *Table 5 - Sub-categories and raw data examples for the use of specific behaviours theme.*

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Theme	Sub-categories (no. of coaches from graduate group, no. of coaches from non- graduate group)	Raw data examples (coach, age-group, graduate-status)
Use of specific behaviours	Questioning to check understanding (4,3)	‘...understanding, to see whether they understand what we’re talking about and see whether they’re listening, there’s obviously some boys they switch off...’ (Mike, U18, non-graduate)
	Questioning to extend learning (4,1)	‘...if I see at that moment in time that individual is really confident, he understands what’s expected, then I’ll challenge him...ask him a high order question that will really promote his thinking.’ (Mark, U11, graduate)
	Silence for observation (4,4)	‘...observation for those two purposes: is it working? Who needs what?’ (Dave, U11, graduate)
	Silence to let them play (4,2)	‘...to let them make their decisions so I’m not telling or trying not to tell them the answers.’ (Dean, U13, graduate)
	Instruction to increase intensity (2,4)	‘There may be times, let’s say the first few minutes, I might use command to get the intensity up.’ (Mark, U11, graduate)

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1065 *Table 6 - Sub-categories and raw data examples for the practice activities theme.*

Theme	Sub-categories (no. of coaches from graduate group, no. of coaches from non- graduate group)	Raw data examples (coach, age-group, graduate-status)
Practice activities	Playing form because it is realistic to the game (4,2)	‘I don’t think you can have any other practices which are more like a game than small sided games, where they’re gonna be challenged by playing against another team.’ (Rich, U9/10, non-graduate)
	Training form for technique (3,2)	‘...you might take two or three players out that are really struggling with a particular technique and work on that...’ (Dean, U13, graduate)
	‘Other’ as wasted time (2,3)	‘...there’s a lot of contact time lost there.’ (Andy, U14, graduate)
	‘Other’ as learning (3,0)	‘In terms of going for a drink, having discussions, using methods to help with their social interaction. (Mark, U11, graduate)

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1068 *Table 7 - Sub-categories and raw data examples for the change in behaviour by practice type*
 1069 *theme.*

Theme	Sub-categories (no. of coaches from graduate group, no. of coaches from non- graduate group)	Raw data examples (coach, age-group, graduate-status)
Change in behaviour by practice type	Increased silence in playing form (3,2)	‘...the reason I’m guessing, I’m more silent in a playing state, would be observing what’s going on, the bigger picture. I’m not looking at an individual or skill, I’m not looking at one player at a time, I’m now, it might take me five, six, seven, eight seconds to scan the pitch to see patterns, to see shapes, to see habits of players, to see the movements they’re making and so on and so forth. So that I think, and it’s obviously a bigger area as well. So if I’m scanning a bigger area, it’s going to take longer.’ (Sean, U14, non-graduate)
	Evidence of self- awareness (4,2)	‘If I was to do a technical practice...it would be probably more command.’ (Mark, U11, graduate) ‘It appears in the game, as I said, I don’t provide as many instructions. But that was expected... Obviously in the games I’m not talking as much ... and that’s expected as well. In the training exercises I do talk a lot more. Coach a lot more.’ (Mark, U11, graduate)
	Lack of self- awareness (2,4)	‘...the big thing that stands out is the disparity between convergent and divergent questioning, which has completely surprised me.’ (Gary, U14/15, non-graduate)

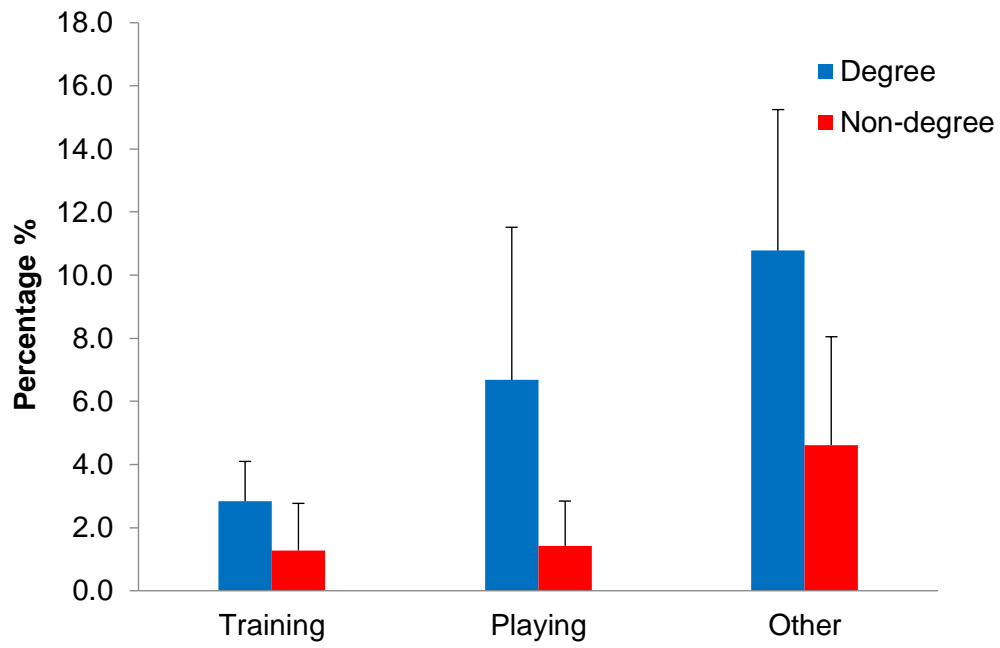
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1072 *Table 8 - Sub-categories and raw data examples for the influences on behaviour theme.*

Theme	Sub-categories (no. of coaches from graduate group, no. of coaches from non- graduate group)	Raw data examples (coach, age-group, graduate-status)
Influences on behaviour	Academic education (4,0)	‘When I started my degree, I learnt more about giving the players ownership. [Before that] I was very much a coach that just copied someone I had as a coach.’ (Mark, U11, graduate)
	Soccer-specific qualifications (5,5)	‘I think the Youth Module Three was the most important for me...making things specific to the player and the action review process of going in, giving the player a challenge or asking a question and then seeing whether he’s taken it on board.’ (John, U9/10, graduate)
	Previous coaches (4,5)	‘...there’s a few people yeah, [name of previous coach] was one that I really respected as a young coach, because of the way he demonstrated, he was a very good demonstrator of what he wanted...when he did it I used to think “wow”.’ (Mike, U18, non-graduate)

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Figure 1 - Divergent questioning percentage of total behaviours as a function of practice state.

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