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**Developing Self-Regulatory Skills and Reflective Practice in Professional English Soccer
Academy Goalkeepers Using Think Aloud: A Pilot Study**

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Abstract

1 Think aloud (TA) has previously been used as a tool that facilitates the development of self-
2 regulatory and reflective practice skills in coaches and golfers (Birch et al., 2022). This pilot
3 study aimed to further explore the use of TA as a tool to facilitate self-regulatory and
4 reflective practice skills by expanding the scope of this research into soccer goalkeepers. Two
5 academy goalkeepers at a professional English soccer club used TA during three separate
6 training sessions over three weeks, listened back to their TA audio and then took part in semi-
7 structured interviews to discuss their experiences of TA. A template analysis, involving the
8 adoption of both inductive and deductive lenses, was undertaken, with Zimmerman and
9 Campillo's (2003) phases and subphases of self-regulation used as a guiding framework. The
10 findings were organised into three themes: forethought phase, performance phase and self-
11 reflective phase. Findings supported the use of TA as a tool to develop both self-regulatory
12 and reflective skills in academy goalkeepers (e.g., enhanced reflective practice, increased
13 self-monitoring). Coaching and support staff may wish to use these preliminary findings and
14 consider the usefulness of embedding TA into their practices as one method for encouraging
15 athletes to reflect on their thought processes supporting them to become independent and
16 active participants in their learning process.

17 **Key words:** Applied sport psychology; Metacognitions; Self-monitoring, Goal setting
18

19 Self-regulation or self-regulated learning refers to learning that is a result of an individual's
20 self-generated thoughts, actions and behaviours that are directed towards the attainment of
21 their learning goals (Zimmerman, 2000). Self-regulatory skills, such as goal setting, self-
22 monitoring and self-evaluation, have been shown to improve an individual's self-regulatory
23 capabilities (e.g., self-efficacy; Guerin et al., 2010) and self-regulatory resources, such as
24 enhanced motivation and learning towards goal attainment (Zimmerman, 2002). Zimmerman
25 (2000) suggested that self-regulated learners self-generate thoughts, behaviours and feelings
26 that are oriented towards goal attainment, which in turn aids problem-solving processes and
27 can lead to more effective learning. Durand-Bush et al. (2023) described self-regulation
28 competencies (e.g., self-awareness, emotional control, attentional control) as key mental
29 performance competencies within their Gold Medal Profile for Sport Psychology (GMP-SP),
30 highlighting the role of self-regulation as a key contributing factor towards individuals
31 achieving optimal performance. Similarly, when an athlete is in a state of mis-regulation or
32 under-regulation (e.g., an athlete may struggle to manage their emotions or thoughts in
33 response to a stimuli), this has been associated with performance errors (Collins & Durand-
34 Bush, 2014).

35 Social learning psychologists proposed that self-regulatory processes can be divided
36 into three cyclical phases (Zimmerman, 2002). Zimmerman and Campillo's (2003) phases
37 and subphases of self-regulation describe these three cyclical phases, firstly, the forethought
38 phase refers to how the learner approaches a task and comprises of two forethought phase
39 processes: task analysis (e.g., goal setting) and self-motivation (e.g., self-efficacy beliefs).
40 Secondly, the performance phase occurs during a task and contains two major processes: self-
41 control (e.g., self-instruction, imagery) and self-observation (e.g., self-recording, self-
42 experimentation). Finally, the self-reflection phase occurs after each performance bout and is
43 concerned with deliberate efforts to alter performance and involves two major processes: self-

44 judgement (e.g., casual attribution) and self-reaction (e.g., self-satisfaction). The cyclical
45 nature of this framework proposes that self-reflections from previous performances impact
46 forethought processes of subsequent performances. For example, an athlete who has high
47 levels of self-satisfaction when reflecting on a performance may experience increased
48 efficacy beliefs and intrinsic interest (forethought phase) in future tasks.

49 Reflection has been described as a sub-facet of metacognition, which has previously
50 been defined as “the awareness of, and knowledge about one’s own thinking and consists of
51 planning, self-monitoring, evaluation and reflection” (Jonker et al., 2010, p. 902). Researcher
52 have explored how elite athletes reflect (Threlfall, 2014) and how this can influence learning
53 (Hauw, 2009; Richards et al., 2009). Reflection has been described in differing ways but
54 typically relates to how individuals look back on an experience and are able to appraise what
55 they have learnt to then take forward into future experiences (Jonker et al., 2012). Research
56 has shown that critical reflection is effective in promoting learning from experience within
57 complex and ambiguous situations. In the context of sport, this is achieved by athletes
58 generating thoughts from actions that may enrich, support, and challenge their understanding
59 (Starbuck, 2009). In Jonker et al’s. (2012) longitudinal study exploring reflection in the
60 development of expertise, it was reported that athletes who made the transition from junior
61 national to senior international level had higher reflection scores than athletes who did not
62 reach international status, demonstrating the importance of reflective skills in elite-junior
63 athletes.

64 In light of the aforementioned research, Dixon et al. (2013) called for alternative
65 approaches that aid, encourage, and facilitate development of reflection-in-action within
66 athletes and coaches. The think aloud (TA) method has been used as an alternative to
67 methods that require the participant (e.g., athlete, exerciser, coach) to think and reflect

68 retrospectively following performance of a task (e.g., via reflective diaries or journals). TA
69 was originally proposed by Ericsson and Simon (1980; 1993) as a method for generating
70 information about thought processes mediating task performances and involves participants
71 verbally thinking aloud during task performance (reporting concurrently while performing) or
72 verbally recalling thoughts immediately after completing of a task (immediate retrospective
73 reporting; Eccles & Aarsal, 2017). For example, Whitehead et al. (2016) encouraged rugby
74 league coaches to think aloud as a technique to facilitate reflection-in-action and delayed
75 reflection-on-action (e.g., by listening back to their recordings). Results suggested that in-
76 action reflections shifted from descriptive to deeper-levelled reflections and coaches felt they
77 had developed increased awareness, enhanced communication, and developed pedagogically
78 as a result. Similarly, Stephenson et al. (2020) conducted a case study into the use of TA with
79 a football coach and the results indicated subjective improvements in self-awareness,
80 pedagogy, and communication skills.

81 Ericsson and Simon (1993) proposed a verbalisation framework to encourage the use
82 of their TA method. Level 1 verbalisation involves the vocalisation of inner speech, whereby
83 participants simply verbalise their inner thoughts during task performance. Level 2
84 verbalisation involves the verbal encoding and vocalisation of an internal representation that
85 is not originally in verbal code. These verbalisations should reflect stimuli within the
86 participants' attentional focus such as vocalisation of scents or visual stimuli. Level 1 and 2
87 verbalisations offer a representation of information held in the short-term memory (STM) and
88 that is involved in the mediation of task performance (Ericsson and Simon, 1993). In contrast
89 to this, Level 3 verbalisation involves the individual explaining their thought processes and as
90 such, requires retrieval of information from long-term memory (LTM) and therefore deviates
91 from the TA method as proposed by Ericsson and Simon (1993).

92 A recent mapping review of TA research within sport and exercise psychology has
93 highlighted the varied and flexible nature of the TA method (McGreary et al., 2024). The
94 researchers demonstrated how TA has been used to investigate a broad spectrum of topics
95 within sport and exercise psychology, for example, stressors and coping (Nicholls & Polman,
96 2008; Welsh et al., 2018; McGreary et al., 2020), attentional focus (Whitehead et al., 2018,
97 2019) and the development of expertise (Runswick et al., 2018). Similarly, TA has been used
98 across a wide variety and sports and activities, such as cricket (McGreary et al., 2020), golf
99 (Oliver et al., 2021), cycling (Whitehead et al., 2018), tennis (Swettenham et al., 2018), soccer
100 (Roca et al., 2021) and wall-sitting postural tasks (Gunn & Taylor, 2021).

101 More recently, researchers have explored the use of TA as a tool for promoting
102 reflection and self-regulatory skills (e.g., such as increased emotional control). For example,
103 Moffat et al. (2021) used TA alongside attribution retraining for junior tennis players, with
104 results suggesting TA helped to improve the athletes' emotional control and attribution
105 capabilities. Swettenham and Whitehead (2021) explored the perceptions of soccer coaches on
106 their use of TA as a reflective tool embedded into their coaches' practice. Coaches reported TA
107 supported their professional knowledge, interpersonal knowledge, and intrapersonal
108 knowledge. Finally, Birch et al. (2022) investigated TA as a tool to facilitate self-regulation in
109 golfers, whom they interviewed immediately after using TA and again after a six-to-eight-week
110 reflection period. Golfers reported increased levels of self-awareness, with results suggesting
111 TA facilitated self-judgement by increasing the golfers' awareness of the consequences of their
112 thoughts and actions. Such findings have demonstrated the suitability of using TA as a tool to
113 promote self-regulation and reflection in both coaches and athletes.

114 While attempting to record cognitions during task performance can pose significant
115 practical challenges and may be difficult to achieve in some contexts (Eccles et al., 2006;
116 Jackman et al., 2022), these studies demonstrate the benefit of the TA method in some sport

117 and exercise settings. Likewise, there is limited research exploring self-regulation, reflective
118 practice of athletes and how this may promote learning (Andersen et al., 2015). Studies that
119 have explored this using TA (e.g., Whitehead et al., 2016; Stephenson et al., 2020; Swettenham
120 & Whitehead, 2022) have focussed on coaches, not athletes, similarly, it is important to note
121 that these studies encouraged level 3 verbalisations, which is not in alignment with the TA
122 method proposed by Ericsson and Simon (1980; 1993).

123 In with the recommendations of McGreary et al. (2024) who suggested future TA
124 research should further understand the role of TA as an applied tool, this pilot study aims to
125 further extend previous research by investigating the role of TA as a facilitator of reflective
126 practice and self-regulatory skills (e.g., emotional control, attentional control) in soccer
127 goalkeepers. Positionally, the role of a soccer goalkeeper is unique and as the last line of
128 defence, they are under constant pressure with the knowledge that one mistake or lapse of
129 concentration will likely result in a goal for the opposing team (de Castro et al., 2021).
130 Therefore, this pilot study aims to expand the scope of previous research by investigating the
131 use of TA as proposed by Ericsson and Simon (i.e., level 1 and 2 verbalisations; 1980; 1993)
132 as a tool to develop self-regulatory skills and facilitate reflective practice in academy level
133 goalkeepers over a three-week training period.

134 **Methods**

135 **Philosophical Position**

136 A qualitative approach was adopted to understand the participants experiences of using TA as
137 a tool to facilitate the development of self-regulatory skills and reflective practice in soccer
138 goalkeepers. Thus the study was guided by a postpositivist paradigm, as self-regulatory
139 phenomena, such as emotional control, goal setting and attentional control are psychological
140 characteristics that exist with the mind and suggested to influence an individual's behaviour

141 (McGannon & Mauws, 2000). Therefore, this study aligns to a realist ontology that assumes a
142 reality exists, however this is independent from the conceptions that researchers may have of
143 it (Sayer, 2000). We combined this with a constructivist epistemology, which assumes
144 knowledge is theory laden and fallible (Wiltshire, 2018). As researchers, we believe that there
145 can be some level of shared knowledge and truth, e.g., explained by a model or theory (i.e.,
146 Zimmerman's, 2000 theory of self-regulation), however, we also acknowledge that there are
147 subjective differences and nuances and that there may be various perspectives of truth (Guba,
148 1990; Fischer, 1998).

149 **Participants**

150 Participants were two male, academy level goalkeepers at a professional English
151 soccer club academy and were aged 17 and 18. Participants were recruited based on a
152 convenience sampling method whereby participants were initially approached due to being
153 known by a member of the research team (Smith & Sparkes, 2016). Goalkeeper 1 (G1) had
154 10 years of academy level soccer experience and goalkeeper 2 (G2) had seven years of
155 academy level soccer experience and they would be classified as semi-elite according to
156 Swann et al's. (2015) elite athlete classification system. Participants were contacted by
157 telephone, acquired through the club after agreement was made with the head of the academy.
158 Ethical approval was granted from a United Kingdom (UK) based institution (approval
159 number 22/SPS/019) and informed consent was obtained prior to the start of the study.

160 **Materials**

161 A Sony Dictaphone was used to capture the goalkeepers' verbalisations of their
162 thoughts in action during training sessions. A clip microphone attached to the Dictaphone
163 was then fitted to the collar of the player. To allow for recordings to be made during sessions
164 safely, a FreeTrain running vest phone holder was used facing backwards to protect both the

165 equipment and the participants. To ensure clarity of sound, the clip mic was attached to the
166 side of the goalkeeper's neck on the collar. To keep the mic best attached, the excess wire
167 was tucked into the pocket of the vest. The Dictaphone was kept in the pocket of the vest,
168 which was secured by Velcro. The introduction meeting and post interviews were conducted
169 on Zoom, with the interview recordings being taken by an iPhone XS using the voice memo
170 application.

171 **Procedure**

172 Participants were instructed on how to TA engage in level 2 TA based on adapted
173 instructions developed by Birch and Whitehead (2020), which involved participants listening
174 to example voice recordings of individuals (athletes) engaging in level 1 and level 2
175 verbalisations. In line with the recommendations of Birch and Whitehead (2020), participants
176 were trained in the use of TA, which involved a series of traditional TA training exercises
177 (counting dots, arithmetic exercise, anagram problem solving task, Ericsson and Simon,
178 1980). Additionally, participants were given time whilst training to wear the recording device
179 and practice TA. Participants were then afforded the opportunity to ask any further questions
180 about TA. Participants were deemed competent once they had no more questions and the
181 second author felt the participant was confident in verbalising their thoughts in line with level
182 1 and 2 instructions.

183 The participants engaged in TA during one scheduled training session per week to
184 achieve high ecological validity, for three weeks (three sessions in total). Each TA session
185 started with goalkeeper-specific drills and was followed by group work with the outfield
186 players (e.g., small sided games) and lasted for an average of approximately 65 minutes,
187 including periods of silence, resulting in 395 minutes, of TA verbalisations. Participants were
188 instructed by the second author to "Please think aloud and say out loud anything that comes

189 to your mind during training” (encouraging level 2 verbalisations). Participants were also
190 reminded that they were not required to explain their thoughts to avoid participants engaging
191 in level 3 verbalisations and thus deviating from Ericsson and Simon’s (1993) TA method.
192 The researcher stood next to the participants goal and there was no communication between
193 the researcher and participants besides reminding the participant to “please continue to think
194 aloud” following periods of perceived silence (i.e., it appeared to the researcher the
195 participant had stopped TA).

196 Similar to the methodology adopted by Birch et al. (2022), semi-structured follow-up
197 interviews were conducted as a method to explore the participants perspectives and
198 experiences of TA as a tool to develop self-regulatory skills and aid reflective practice. In
199 total, each participant was interviewed three times, with each interview scheduled to take
200 place later the same day as the TA session. Following each TA session (i.e., the scheduled
201 training sessions were participants engaged in TA), participants were sent their recordings
202 and asked to listen back to their training session TA recordings and reflect on their
203 experience. Each interview was conducted via Zoom and with the aim of obtaining rich data
204 and further understanding the participants’ personal insights into using TA (Newton &
205 Burgess, 2008). The interview guide was informed by previous similar research such as
206 Whitehead et al. (2016) and Birch et al. (2022), with some questions being repeated
207 throughout each interview and other questions being specific to a certain week. For example,
208 some questions that were repeated include “describe your experience of engaging in TA this
209 week” and “what were the benefits of using TA during training”. Whereas an example of a
210 specific question from the final interview would be “Reflecting on your experience of TA, is
211 there anything you would have done differently” and “Without using TA, do you feel you
212 would have been able to recall that situation?”. As interviews were semi-structured, this
213 allowed for the flexibility of impromptu probing questions (e.g., can you explain what you

214 mean by X) during each interview. Interviews ranged from 30 min 11 s to 36 min 14 s in
215 duration with a total of 199 min 47 s of interview collected.

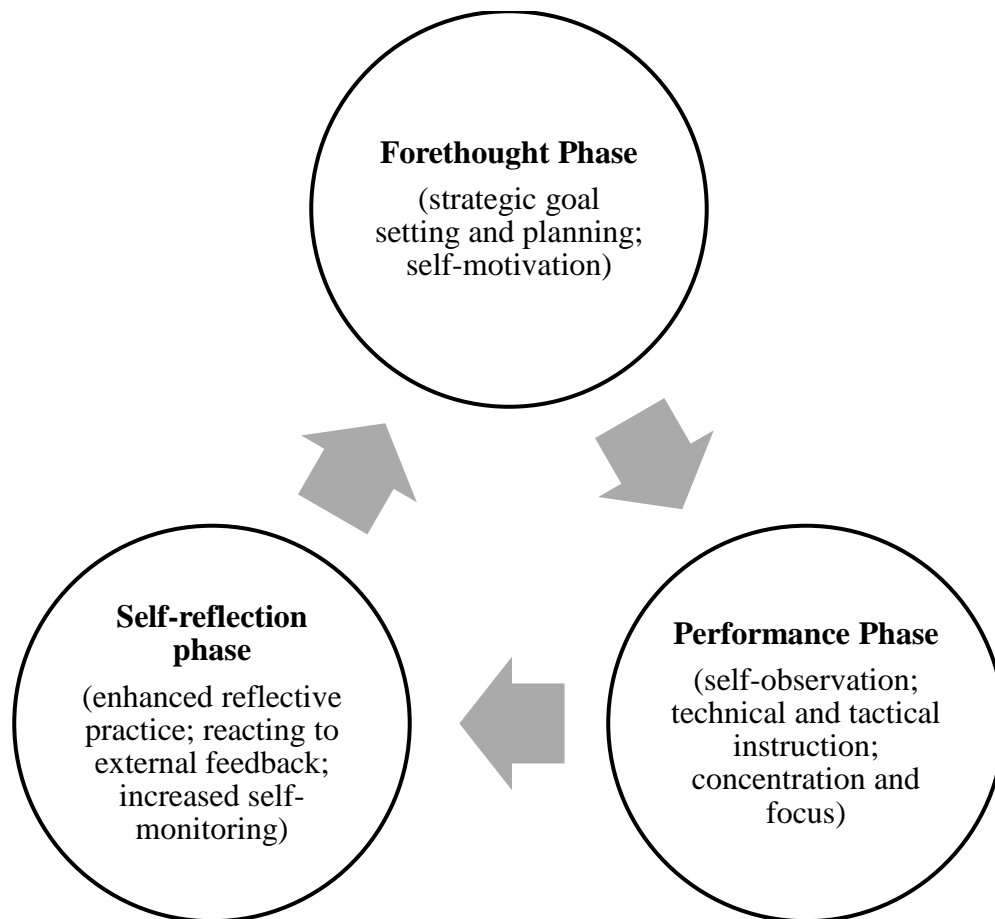
216 **Data Analysis and Rigour**

217 All audio files collected from both TA sessions and interviews were transcribed
218 verbatim and both data sets were analysed as one. To ensure anonymity, participant names
219 were replaced with participant numbers and any names mentioned were replaced with
220 pseudonyms. Data were imported into NVivo 10 and a template analysis was used to analyse
221 the data (King, 2012; King and Brooks, 2016). This was approach was chosen due to its
222 suitability as a ‘middle-ground’ in terms of inductive and deductive analysis and tentative use
223 of a priori themes (Braun and Clarke, 2022) and the applied and exploratory nature of the
224 current pilot study (Brooks et al., 2015; Schneider et al., 2023). The data were analysed using
225 inductive and deductive methods of analysis and was guided by the research questions and
226 three phases of self-regulation as proposed by Zimmerman and Campillo’s (2003)
227 framework. Analysis were conducted independently by the first and second authors, who
228 prior, to the analysis ensured familiarity with the content by reading and re-reading the
229 transcripts. Following this, authors inductively analysed the data, generating initial codes in a
230 systematic fashion by going through the TA data from the first week and then the resulting
231 interview to keep in the chronological sequence the data were collected in. Once initial codes
232 had been inductively generated, the first author deductively introduced a priori themes,
233 guided by the three phases outlined in Zimmerman’s and Campillo (2003), with the new data
234 being applied to the existing theoretical framework. The third author acted as a critical friend
235 throughout this process, by providing at both the inductive and deductive stages of analysis.
236 For example, by offering feedback on where a piece of new data may best fit within the
237 existing theoretical framework, this ensured the authors engaged in a process of continual
238 critical dialogue and strengthened the plausibility and defensibility of the results (Smith and

239 McGannon, 2018). Thick description and use of participant quotes were also provided as an
240 additional quality check procedure within the results section (King & Brooks, 2016).

241 **Results**

242 This pilot study aimed to examine the use of TA as a tool to develop self-regulatory
243 and reflective skills within academy-level soccer goalkeepers. Using Zimmerman and
244 Campillo's (2003) Phases and Subprocesses of Self-regulation as a guiding framework, the
245 results are presented across three main themes. Namely: forethought phase, performance phase
246 and self-reflection phase, (see figure 1). Participants are referred to as G1 (goalkeeper 1), and
247 G2 (goalkeeper 2) throughout the results and W1 (week 1), W2 (week 2), and W3 (week 3)
248 refer to the weeks in which participants engaged in TA and were interviewed. Goalkeepers
249 reported positive effects on performance and developed key metacognitive skills (goal setting
250 and planning, self-observation), identifying areas of strength and improvement, which allowed
251 them to develop action plans targeting their development.



252
253

254 Figure 1. Cycle diagram displaying themes and sub-themes across TA and interview data and
255 processes goalkeepers went through.

256 **Forethought Phase**

257 The forethought phase was underpinned by data from both TA and subsequent
258 interviews. Specifically, this theme related to strategic goal setting and planning whereby
259 participants were setting task specific goals and identifying strategies to achieve these goals.
260 Secondly, within the sub theme self-motivation, participants verbalised motivational
261 strategies and motivation towards improvement as a result of engaging in TA and reflecting
262 on their verbalisations.

263 ***Goal setting and planning***

264 Goal setting and planning related to participants setting goals and identifying
265 strategies to facilitate improvement. This was evidenced in both TA verbalisations and
266 interviews. During TA, participants verbalised smaller objectives to achieve within a session
267 or within a skill, for example, “and then work on my body position I were slow to receive
268 because I'm receiving pretty straight on,” (G1, W1, TA) and “Stuff I need to work on. Set
269 position, handling, focus on body going forwards, bringing my hands towards the ball, good
270 shape and catching the ball. Nice” (G2 W2 TA,). This finding provides evidence of how TA
271 can be used by participants to help make their goals more explicit and plans towards technical
272 elements of performance. Likewise, data from subsequent interviews highlighted how
273 participants reflected on previous performance (i.e., reflecting on TA data from previous
274 training sessions) using these reflections to identify areas to improve.

275 I needed to improve on my first touch, and I was telling myself that. I remember one
276 instance where I took a touch and it kinda went wide behind me. And then that meant I
277 panicked, or whatever. And then, as well as hitting the ball trying to hit the ball too hard
278 instead of just like, remember Matt [coach] telling me to like, feel into it. So that's, that's
279 what I took from that (G1 1st interview).

280 This finding offers support to the usefulness of TA as a tool to develop self-regulatory skills,
281 as in this example, the participant described using TA to facilitate reflecting on their
282 performance during a training session and setting new goals to aid their development in the
283 future. Participants reflected on their verbalisations and used these as a base to later reflect on
284 and identify areas of further development.

285 *Self-motivation*

286 This theme related to the motivational strategies employed by participants to achieve
287 the goals they had set. Participants verbalised motivational self-talk and instructional self-talk

288 statements during performance. For example, “I’ve changed my position, so I was level with
289 it to receive the ball, so I was then able to put the ball out in front of me to play” (G1 W2 TA)
290 and “That save there it was a good save, yeah think I need to hold my hand there felt a bit
291 flicky, but a good set, my touch was very good and my handling, another good touch” (G1
292 W3 TA). Participants also described the impact of listening back to their TA recordings on
293 their attitudes towards their learning and improvement. For example,

294 I've enjoyed looking back on sessions that hadn't been (video) recorded, and still having
295 something to look back on and improve on for next time. So, like, from week two to week
296 three, how can I improve my talking here? Or what's Matt [coach] said for me to improve?
297 So, I just like looking back, especially and also think about what I'm doing (G2 3rd
298 interview).

299 In this example, participants described being intrinsically driven to identify areas for
300 improvements based on their verbalisations as they progressed through the weeks and then
301 using these verbalisations to look for areas to improve.

302 **Performance Phase**

303 The performance phase was underpinned by both TA and interview data and relates to
304 verbalisations during performance (i.e., during training sessions). The performance phase
305 theme consisted of three sub-themes. Firstly, for self-observation, participants demonstrated
306 increased awareness of their thought processes during performance. Secondly, technical, and
307 tactical instruction whereby participants verbalised and reflected on technical and tactical
308 aspects of performance. Finally, concentration and focus, which reflects participants
309 describing TA as a tool to increase their increase and focus during performance.

310 *Self-observation*

311 Self-observation describes how the participants demonstrated awareness of
312 their thought processes, strengths, and areas for improvement within their
313 performances. For example, G1 verbalises positive aspects of his performance, while
314 also reflecting-in-action, demonstrating increased levels of self-awareness:

315 Think my distribution was good, the timing on my crosses was very good, what I need
316 to work on is I need to work on my angle, so when they are heading down the by-line I
317 need to think about positioning. (G1, W3 TA)

318 Similarly, G2 demonstrated increased levels of self-awareness, by recognising an area for
319 improvement and justifying how it would lead to performance enhancement:

320 I'm getting too attached to my near post so next time do not get attached to my near
321 post so stay more in line with the centre of the goal, gives me a better chance of saving
322 either side of me and not just at my near. (G2, W3 TA)

323 The findings from the TA data were also further supported by the interview data, for
324 example,

325 Yeah, I like it because let's say if I did something bad, I'd just be thinking about, I'd
326 just be in my head. But when we speak out loud, it becomes a bit more clear. And you
327 can like, think about it more whatever you are thinking in your head. If you say
328 something out loud, then it sort of goes in more, like take note and say like I got too
329 near to my near post. If I say I say that out loud then next time, I will remember to be
330 more in line with the ball. That is makes it more like it makes me take note a bit more if
331 I say it out loud. Which is insane with like good stuff in that like saying what you did
332 well. (G2, 3rd Interview)

333 In this example, and in accordance with the forethought phase of self-regulated learning, G2
334 describes how engaging in the process of TA allowed him to become more aware of his

335 thought processes and that the process of thinking aloud enhanced the encoding of the
336 information that was being verbalised, which later facilitated memory recall (i.e.,
337 remembering what he needed to do better, because he had said it out loud earlier). This
338 increased awareness of thought processes then resulted in control strategies aimed at
339 transferring those thoughts into actions for the future (i.e., via setting learning goals and
340 strategic planning to achieve the learners' task).

341 *Technical and tactical instruction*

342 This theme represents the technical and tactical instructions that participants
343 verbalised and their perceived development in this area as a result of reflecting using TA. G2
344 articulates how when reflecting on their TA data they had observed themselves verbalising
345 tactical information related to their positional play (referred to as depth) during each of the
346 training sessions:

347 I think on the shooting part the main part was the depth in the goal because I think so
348 many keepers get that wrong...like the key part of that is your depth and the goal was I did
349 not really think about it too much when he (the coach) wasn't here It was one of the first
350 things he said to me. (G2, 2nd Interview)

351 For example, G2 verbalises during a training session “tight, just getting in line for shot now
352 to cross to deal with a cross”. TA data from G1 also highlights how they verbalised similar
353 tactical aspects “I think I have done pretty well there I have recognised that my depth out my
354 goal is something to concentrate on” (G1, W3 TA). By verbalising their thought processes
355 participants were able to capture these technical and tactical adjustments that often reflected
356 specific areas the goalkeepers were working on. Participants were then able to listen back to
357 their verbalisations (TA data), which helped to reinforce some of the coaching points they

358 received from their coaches. For example. G2 described the benefit of having access to the
359 TA data:

360 I think it reinforced my coaching messages, that is gonna help me. And obviously, there
361 is no like clear way of knowing but I also I do know that the more I hear like the
362 advice, and stuff, the more likely it is going to get into my mind. I am not sure that I
363 would have done that, like pulled off into a better support position, if I had not have
364 listened to it back. (G2, 3rd interview).

365 There were similar findings from a technical aspect, with participants verbalising technical
366 aspects of performance and upon reviewing these verbalisations (TA data), demonstrating
367 progress. G1 explains below:

368 Yeah, I think it's helped with a lot of improvements I made in my technique, like
369 simplifying the catch, I think still is, still is something that I need to improve on but the
370 fact that I was able to acknowledge that during Think Aloud is something that is good to
371 take on (G1, 3rd interview).

372 When linking to the performance phase of the self-regulation cycle, it is suggested by the
373 participants interview data that they felt **using TA** was able to facilitate control strategies such
374 as self-instruction and becoming more self-aware during performance.

375 ***Concentration and focus***

376 Participants reported how they experienced improved levels of concentration and
377 focus as a result of engaging in TA. Within the performance phase, a focus of attention is a
378 key component, and G2 described that thinking aloud had a positive effect on their
379 concentration levels during performance:

380 It helps your concentration, if you are always thinking, like, when I was younger, I'd be
381 thinking about my tea or something or anything other than football (soccer) when the
382 balls at the other end. I'm not thinking about where my back four is whatever. But like
383 now, focus on the back (referring to players) for what they're doing, what the team's
384 doing, speaking to yourself and speaking to them. It (TA) keeps you so much more
385 engaged (G2, 2nd interview).

386 For G1 he stated how TA allows him to remain concentrated, particularly at times when there
387 is less activity (i.e., when the ball is away from his goal). “Just keeping yourself involved in
388 the game, especially as a goalkeeper, because you're basically just on your own, so it's like,
389 it's a good way to keep yourself concentrating” (G1, 3rd interview). Participants also reported
390 how TA was helpful in remaining focussed when they were resting, as during goalkeeper
391 training, while one goalkeeper is training, the other is normally resting and observing. For
392 example: “yeah so on this one just focus on like what he (G1) is doing well, so I can copy off
393 him right here and then do what you need to do better” (G2, W2 TA). Here the verbalisations
394 also aligned to identifying areas development within their own performance.

395 **Self-Reflection Phase**

396 This theme describes the processes by which participants used TA to aid the
397 development of reflective skills and was comprised of two sub-themes. Namely, enhanced
398 reflective practice and reacting to external feedback.

399 *Enhanced reflective practice*

400 The goalkeepers reported on how their reflective practice had developed throughout
401 the TA process, as they became more proficient in TA. For example, the verbalisations made
402 in week 1 were considerably less detailed than in week 3, with many verbalisations, brief
403 utterances, even during periods of training when the participants were not performing a skill

404 “Thinking about shape. Short” (G2, W1, TA), “That’s poor” (G2, W1, TA), whereas more
405 detailed utterances included “what I did well was noticing where the pressure is coming from,
406 I want to finish noticing where the pressure is coming from” (G1, W1, TA). In comparison,
407 by week 2, participants were verbalising more fluently, with less broken speech, for example:

408 We just got the ball so just thinking about our shape, balls on the right side, our shape
409 looks pretty good, back in now, turn out turn out, cause Jays got the ball show for it,
410 yes, showing for the ball, didn’t choose to play but I was there for the option, come out,
411 yes Jay yes, it lovely, just pulled off to show start position, seen Princes run executed
412 well. (G2, W2 TA).

413 By verbalising more during TA sessions, participants were better able to understand their
414 motivations and thought processes when reflecting back on the TA data, **which** in turn aided
415 their comfortability in TA. Interview data also further supported this finding, for example,

416 I think it's been really good (TA), you know, since week one. And it’s got a lot better. And
417 I've been able to use it more effectively. Because obviously, in week one, you know, I'm a
418 lot more uncomfortable with it on and like it's weird speaking to yourself but then by like,
419 week three, it became a lot more normal. I was able to be more comfortable with it on. If I
420 listen back to it, it makes me get a lot more out of it, because of how much better I was
421 with it (TA) (G2 3rd interview).

422 This greater level of depth then offered participants insight into their cognitions during
423 performance, allowing the participant to make more nuanced inferences about their
424 cognitions. Ultimately, this allowed for more critical reflections to be made, such as
425 recognising areas of development and then, in line with earlier themes and consistent with the
426 phases of self-regulated learning, subsequent actions to be planned.

427 ***Reacting to external feedback***

428 This theme related to how the participants reflected upon and reacted to feedback
429 from an external source (primarily their goalkeeping coach). Participants used their TA
430 verbalisations to reflect on training sessions with a particular emphasis on coach feedback.
431 Likewise, during the TA process, there was evidence of participants engaging in reflection-
432 in-action in response to coach feedback. For example:

433 Stepped across now, tight, drive with it, yeah, I was narrowing the angle, but he (coach)
434 says I got too low too quick. So next time focus on keeping my height a bit more, then
435 getting low when he comes really close. (G2, W2 TA)

436 Further G2 reflects on feedback from the coach:

437 Just what he (coach) was saying was from an angle was getting too attached to my near
438 post so next time do not get attached to my near post so stay more in line with the
439 centre of the goal, gives me a better chance of saving either side of me and not just at
440 my near. (G2, W3 TA)

441 This finding was further reinforced through interpretations of the interview data.
442 Participants highlighted how they would review their verbalisations from training to listen
443 back and reflect on both coaching feedback and their verbal responses. Participants then
444 seemingly used these verbalisations to identify areas of further development and set
445 appropriate goals.

446 Yeah, I think you'd remember more points that you need to improve because I feel like
447 sometimes you get told them to improve and then they just leave you with it. And then but
448 say it you realise it yourself; you can go back to the recordings and basically create a big
449 list of things that you need to work on (G1, 2nd interview).

450 This process then demonstrates cyclical nature of the self-regulatory process, whereby the
451 reflections participants make inform the goal-setting process for further learning to take place
452 (as part of the forethought phase).

Discussion

453

454 The aim of this pilot study was to expand previous research that has explored the use
455 of TA as a tool to develop self-regulatory skills and facilitate reflective practice in
456 populations such as coaches and athletes. Specifically, this study explored whether TA
457 promotes self-regulation and aids reflection in academy level goalkeepers. Underpinned by
458 Zimmerman and Campillo's (2003) phases and subprocesses of self-regulation, results
459 support the use of TA as a tool for developing reflective practice in goalkeepers and
460 promoting self-regulated learning.

461 A notable finding from the present study was participants reported that engaging in
462 TA enhanced their reflective practice, suggesting that as they progressed through the weeks,
463 their verbalisations became more detailed and allowed for them to identify both their
464 strengths and areas of improvement. Faull and Cropley (2009) identified how reflecting on
465 areas of improvement can lead to more independence in problem solving and thus self-
466 regulated learning. However, research suggested when reflecting, individuals can have a
467 tendency towards focussing on negatives (Rozin & Royzman, 2001). The findings from this
468 study demonstrate that TA can be used as a tool to also identify and reflect on positive
469 aspects of performance (as well as areas for improvement), which in the context of elite sport
470 has been shown to combat the tendency to attend to negatives (Ludlam et al., 2016), and can
471 increase an individual's performance (Peláez et al., 2019). In line with Zimmerman's (2000)
472 self-regulated theory, reflecting on positives may lead to improved self-motivation beliefs
473 (e.g., enhanced self-efficacy) and reflecting on areas for improvement can lead to setting
474 goals and strategic planning for their development.

475 Another pertinent finding suggested participants experienced increased levels of self-
476 awareness, reporting increased levels of self-observation, more technical and tactical

477 instructions and improved concentration and focus. This finding extends the work of Birch et
478 al. (2022) who also reported increased levels of self-awareness in golfers, with golfers
479 becoming more aware of how their behaviour influences performance as a result of the
480 reflective process. The construct of being a self-aware learner proposes that athletes rather
481 than being a passive receiver of knowledge, take responsibly for their own development
482 (Holland et al., 2010). In becoming responsible, learners identify a change in behaviour
483 through reflective practice (e.g., recognising improvements in focus or increased technical
484 instruction; Gilbert & Cote, 2013). This finding also extends the work of Stephenson et al.
485 (2020) who reported that reflective practice in coaches as an effective tool for promoting self-
486 awareness.

487 Results also suggested that participants reacted and reflected to external sources,
488 primarily from their coach. Participants reacted to coach feedback during performance (e.g.,
489 coaches providing instructions from the side) and when listening back to their audio
490 recordings, reflecting on coaching instructions and feedback. This finding is in alignment
491 with the concept of co-regulation, which can be defined as the interaction with others that
492 temporarily supports self-regulation, which can ultimately facilitate the athlete to regulate
493 independently (Hadwin et al., 2011). This finding offers support to the work of Collins and
494 Durand-Bush (2014) who highlighted how coaches can co-regulate through strategies such as
495 preparatory strategies, performance strategies and self-regulation strategies to help their
496 athletes self-regulate. In this case, participants seemingly used their recordings to review
497 coach feedback as a method to develop self-regulatory skills, such as, reflecting on their
498 perceived strengths and areas of improvements coupled with the feedback from the coach.

499 **Applied Implications**

500 Based on the findings from this study, we offer some applied implications that may be
501 beneficial to practitioners working in this context, such as, sport and exercise psychologists,
502 strength and conditioning coaches and specialist coaches, including goalkeeper coaches.
503 Coaches and practitioners could encourage goalkeepers (and more broadly athletes in
504 general) to use TA to record successful events, potentially overcoming aspects of the
505 negativity-bias (Rozin & Royzman, 2001). If comfortable to do so, athletes could also share
506 their recordings with coaches and collaboratively reflect, this may offer the coach insight into
507 the thought processes of their athlete(s) while also fostering the coach-athlete relationship. As
508 has been demonstrated in previous research (e.g., Whitehead et al., 2016; Stephenson et al.,
509 2020; Swettenham & Whitehead, 2021) coaches could use TA to support their reflections, but
510 to extend on previous research, do so alongside athletes and engage in a collaborative
511 reflective process together as a tool to reflect on strategies used to develop self-regulatory
512 skills within athletes.

513 **Limitations and Future Directions**

514 This is the first attempt of a paper to explore the use of TA as a tool to promote self-
515 regulation and develop reflective practice skills in academy level goalkeepers and only the
516 second to explore this in an athlete population (after golfers in Birch et al., 2022).
517 Nonetheless, it is important to acknowledge the limitations of the present study and propose
518 suggestions for future research to further develop this area. We encourage readers to draw
519 their own conclusions from the study and assess the degree of resonance (Smith, 2018). We
520 also acknowledge that the study was confined to two participants, both of whom play in a
521 specific sport and position and was conducted over a short time period. Therefore, further
522 research is required to develop stronger conclusions about the utility of TA as tool to
523 facilitate self-regulatory skills and reflective practice. Likewise, this study only considered
524 the views and reflections of the goalkeepers and did not include the voice of the coach, and in

525 a goalkeeper's relationship with their coach, the coach plays a crucial role in their
526 development (Bowes & Jones, 2006). In accordance with the concept of co-regulation,
527 exploring this relationship between the coach and athlete may offer further insight into their
528 role in supporting self-regulation. Therefore, future research may wish to investigate this in
529 more depth. Another limitation is that participants were not guided or instructed to use a
530 guiding framework (e.g., Gibbs' reflective cycle; Gibbs, 1988) when reflecting on their TA
531 data, this decision was taken so as not to overload the participant with learning new skills
532 (e.g., how to TA and learning a reflective cycle). However, future research may wish to
533 consider this to support the reflective process in athletes and assess its impact on the
534 promotion of self-regulatory skills. Finally, akin to the limitation described in Birch et al.
535 (2022), athletes become more aware of their thought processes that can promote self-
536 regulated learning, however, by directing attention towards one's thoughts processes we can
537 temporarily impact performance (Nisbett & Wilson, 1977). While the evidence is
538 overwhelmingly supportive of using TA to capture data, researchers should be aware of the
539 perceived impact of this on performance and may wish to consider extending the TA training
540 period for participants to reduce this impact.

541 **Conclusion**

542 To conclude, this study has provided a useful insight into the effectiveness of using
543 TA as a tool to develop reflective practice and promote self-regulation in a specific athlete
544 population. The study has demonstrated how TA can be implemented as a novel reflective
545 tool for goalkeepers in an academy at a professional soccer club to enhance athletes'
546 reflective practice. The findings have built on previous research exploring the use of TA as a
547 tool to facilitate self-regulation in golfers (Birch et al., 2022) and as a reflective practice tool
548 in coaches (e.g., Whitehead et al., 2016; Stephenson et al., 2020; Swettenham & Whitehead,
549 2021). The findings from the present study also offer further support to Zimmerman's (2000)

550 self-regulated theory and Zimmerman and Campillo's (2003) Phases and Subprocesses of
551 Self-regulation by offering evidence to the cyclical nature of their framework. The themes
552 presented demonstrated how the participants reflected on their performance via TA
553 recordings, which influenced their next forethought phase (via goal setting and motivational
554 strategies), performance phase (via increased self-observation, technical and tactical
555 instruction) and self-reflection phase (via developed reflective practice and co-regulation).

556 **Disclosure Statement**

557 The authors report there are no competing interests to declare.

558

559

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