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Chapter 10 – **Think Aloud as a reflection in and on action tool.**

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Abstract

Traditional methods of reflection involve retrospectively looking back at an event and questioning practice. However, this process of only 'looking back' could lead to potential memory decay and memory bias, where memories are distorted by critical moments or how an individual may feel at the end of an event. Although retrospective reflections are extremely important, as it allows for an individual to process thoughts and feelings that occur after an event, in situ reflections seemed to have been overlooked. Therefore, this chapter presents a novel method of reflection-in-action, where a practitioner verbalises and records their thoughts and reflections (where possible) during the event or activity. This method is called Think Aloud (TA), and has been used to promote reflection-in-action in disciplines such as sports coaching and wider 'educare' professions such as nursing and medicine. This chapter will outline the utility of TA for practitioners within sport science, but also provide a history of how it has been used and provide practical recommendations for those wanting to add an extra level of reflection of their practice.

Introduction

Traditionally, reflection based methods focus on 'looking back' at an event or experience and questioning both that of the positive and negative as well as areas for subsequent development. Within the discipline of sports coach education, some have argued that the field has suffered from focusing on a type of reflection which links retrospection and review to projection and which differs very little from the concept of performance evaluation. The view of projection refers to sports coaches considering 'so what am I going to do next time?' without really considering potential implications of their proposed actions (Cropley et al., 2015; Dixon, et al., 2013). Furthermore, what is most commonplace about these methods is that they occur sometime after the event, episode, or experience. This timeframe leads to a potential memory gap between what occurs during practice and how the experience is remembered. In addition, what is also less known is how reflection-in-action or indeed 'in situ' occurs or can occur and what tools can be used to promote this. One such method is known as Think Aloud (TA) (Whitehead et al., 2016ba), this involves a person verbalising their thoughts (where possible) and reflecting on these thoughts as they occur 'within' an experience, event or performance. For example, take a soccer coach, using TA would involve the sports coach wearing a clip microphone and Dictaphone, and they would verbalise their current thoughts, reasons or rationales for these thoughts and immediate reflections. For example, "OK they're [who] not communicating at all. I wanna know why. Is there something I can do to help them communicate or not?" (Stephenson et al., 2020, pg. 16).

The TA method has been demonstrated as having utility across various disciplines (e.g., nursing, (Banning, 2008; sport coaching, Whitehead et al., 2016a; police training, Pais, & Felgueiras,

2016).Therefore, this chapter aims to provide readers from the sport and exercises sciences with an understanding for why reflection-in-action or 'in-situ' needs to be considered to prevent the memory gap that occurs during reflection-on-action. The chapter will also consider why reflection-in-action is often neglected and offer some practical recommendations for practitioners working across the sport and exercise science and allied disciplines, in their quest to develop as reflective practitioners.

Why we should consider reflecting 'in situ'

When reflecting it is vital that practitioners consider 'what' they are reflecting on and 'why' they are reflecting on that particular event, behaviour, episode, thought etc. More importantly, how do practitioners know that what they are reflecting on is a true representation of the event or the experience as it occurred? Human memory is not perfect, and as humans we may choose to lose or keep certain memories. There has been a wealth of research that has explored the differences as to how practitioners or humans in general experience an event and how we remember an event. According to Kahneman and Riis (2005), "Experiences are fleeting [whereas] memories are what we get to keep from our experience" (p. 286). Therefore, how we remember an event can be vastly different from how we experienced it.

This phenomenon is known as the memory-experience gap and is defined as a discrepancy between the average of experienced emotions and the overall evaluation of the experience, which is usually more intense than the averaged emotions. The gap has been demonstrated in people's ratings of various experiences, ranging from vacations (Kemp, et al., 2008; Wirtz et al., 2003) to episodes of pain (Broderick, et al., 2006; Stone, et al., 2005). This example may also be common in sport, whereby by a soccer coaches' team may be playing well, but then concede a goal in the very last minute. The final emotions felt at the end of the game therefore may supersede the *average* emotions and experiences occurring during the game and result in a memory-experience gap. In turn this may impact on how she or he may reflect and report back to their players.

Again, outside of the sports domain early research by Kahneman, et al., (1993) found that retrospective evaluations were strongly associated with the worst pain experienced during a given event. These memories were also strongly associated with the pain experienced at the end of the event, which has been named the peak end rule (Kahneman, et al., 1993). This rule has been studied extensively with that of pain, a negative subjective experience, both in experimental settings (Kahneman et al., 1993) and in the context of medical procedures such as colonoscopy (Redelmeier et al., 2003) and lithotripsy (Redelmeier & Kahneman, 1996). What is also evident from this research is that the memory experience gaps were more pronounced from the unpleasant emotions, in that people remember being angrier, sadder and more tense overall than they report during their actual experience (Miron-Shatz, et al., 2009). A potential reasoning for this type of 'remembering' is that if these memories/emotions convey a sense of danger or distress, which emphasizes them in memory, this could serve as a warning function for future behavior (Miron-Shatz, et al., 2009).

In application to the context of reflection and what we, as sport and exercise science practitioners reflect on, this creates the following questions What do we reflect on….is it the experience or the memory? How does the 'peak end rule' effect what we reflect on? In other words, are our reflections-on-action just reflections on our memories and how we felt at the end of that particular experience? If this is the case, what might we be missing out on during the process of retrospective reflection-on-action?

Miron-Shatz, et al., (2009) explain the memory-experience gap within their research. Female participants were asked to rate their day overall in a retrospectively evaluative frame of mind. The participants recalled more unpleasant and pleasant emotions than they reported feeling during the individual episodes. Interestingly, there was found to be a larger discrepancy for the unpleasant emotions than pleasant. This suggests that separate processes are used for committing positive and negative events to memory. Indeed it is thought that when unpleasant emotions are involved, caution is favored over accuracy and could then have an effect on how reflections of these experiences occur and may not be fully representative of what was occurring during the in-situ event.

These differences between data captured during performance (using TA) and retrospective interviews have also been found within the sport literature. Tenenbaum and Elran (2003) examined the congruence between actual and retrospective reports for pre and post emotional states that were collected 1 hour before the event, 30 mins after the event and 72 hours after the event. The results revealed that thoughts and feelings that were openly expressed after 72 hours were not fully congruent with thoughts and feelings reported in real time. Further, Whitehead et al. (2015) used TA to capture the concurrent thoughts in participants during golf performance and then conducted interviews with these participants immediately after performance, 24 hours, and 48 hours after performance. Whitehead et al. (2015) did not measure specific emotional responses, as in Miron-Shatz et al. (2009) study, however when a comparison of the data was conducted there appeared to be large discrepancies between what was verbalized during performance, using the TA method and what was reported at the post performance interview, with only a 40% similarity between this data reported. Although not significantly different, there were more verbalizations reported that related to emotions during the post-performance interviews (up to 24 hours), which could relate the memory-experience gap in that these emotions may have been remembered more vividly in comparison to how they were experienced during the actual performance.

Collectively the above research provides evidence that retrospective memories of thoughts and feelings may be vastly different from the thoughts and feelings which happen during specific days, events, and experiences. Therefore, it is important to consider how reflection happens to capture these thoughts, feelings as close to the experience as possible in order to generate reflections that are based on real time experiences, rather than memories.

Think Aloud as a method for reflecting on the experience

Think Aloud as a method of reflection could offer an alternative approach to reflection on the experience as it occurs. TA involves a person wearing a recording device (usually a clip microphone attached to a Dictaphone) and they would verbalise their thoughts out loud during the completion of a task. The TA protocol was originally designed as a data collection tool (Ericsson and Simon, 1993) to understand cognition in participants whilst performing tasks such as chess (Gobert & Charness, 2006), scrabble (Tuffiash et al., 2007), and algebra (Cook, 2006). Further, TA is now widely used in occupational contexts, including in medical practice (Ericsson, 2004, 2007), whereby doctors, nurses, surgeons are required to verbalise their decision-making processes in-action (Banning, 2008). Over the last 20 years, sport psychology researchers have used TA with athletes to examine expert-novice differences (Whitehead et al., 2015), the impact of stress on thought processes in practice and competition (Whitehead et al., 2016b), how judges make decisions in gymnastics (Lee et al., 2018), and coping responses (e.g., Swettenham et al., 2018; McGreary et al., 2020; Whitehead &

Jackman, 2021). In this respect therefore, TA was and is not designed to promote reflection per se and it has been argued that verbalising thought processes using Level 2 verbalisation should not promote reactivity or a 'thinking about thinking' during performance of a task (Fox et al,. 2011). Level 2 verbalisation refers to verbalization that involves the verbal encoding and vocalization of an internal representation that is not originally in verbal code. For example, verbal encoding and vocalization of scents, visual stimuli, or movement. With this level of verbalization, only the information that is in the participant's focus is to be verbalized. Level 3 verbalization requires the individual to explain his or her thoughts, ideas, hypotheses, or motives (Ericsson and Simon,1993). Level 3 verbalisation may trigger an individual to become more aware of these thoughts, also known as reactivity (Double and Birney, 2019). This promotes meta cognition or 'thinking about thinking', which in turn could facilitate a process of reflection-in-action or in situ. In addition, by recording these verbalisations as they occur an individual can use these recordings to record real time thoughts, feelings and reflections as they are occurring during the experience. Which in turn has to potential to offer a tool for reflection both in situ on on-action.

Think Aloud within a clinical setting

Similar to the origins of reflective practice, the roots of Think Aloud as a method to facilitate reflection can be found within clinical and 'educare' settings, which have since been adapted into sport. This adaptation into the sporting domain will be covered in the next section. However, this section will first outline how TA has been used within clinical decision making and associated medical training.

Fonteyn and Ritter (2008) argue that clinical reasoning can be defined as the cognitive processes and strategies used to understand the significance of patient data, as well as to identify and diagnose patient problems. The ability to make effective clinical decisions is important to achieve positive patient outcomes in today's health care and necessitates the effective use of clinical reasoning, and especially so for complex care situations. The clinical reasoning process is dependent on critical thinking approach and is influenced by attitudes and philosophical perspectives (McCarthy, 2003).

Hoffman, et al., (2009), using compared clinical decision making in expert and novice nurses working in an Intensive/Critical Care Unit, using TA. Nurses were asked to concurrently verbalise their thoughts processes as they carried out care during the first 2 hours of each shift. Hoffman et al., (2009) were able to identify how experts collected nearly twice as many cues as than novices. For example, experts collected cues around electrolyte measures, chest movement, muscle strength and many other cues that were not collected by novices. In addition, the expert nurses were able to cluster these cues together to identify patient status when making decisions. Finally, the experts were more efficient and proactive in collecting relevant cues and anticipatory problem that may help them identify patient problems.

Forseberg, et al. (2014), used TA to study clinical reasoning with experienced nurses and their interactions with virtual patients. Through use of a computer-based simulation of real-life clinical scenarios, the authors were able to identify three categories that were important to the clinical reasoning and decision making of these experienced paediatric nurses. These three categories were 'hypothesis oriented', 'high specific competence', and 'experience'. Through analysis of the TA verbalisations via a content analysis, data showed that these nurses followed patterns among the signs, symptoms, physical examinations, laboratory tests to create a hypothesis during this clinical reasoning. In addition, the previous experience was evident through TA, as these nurses verbalised how previous and similar cases has helped them in their deductive reasoning when forming these hypotheses.

TA has been used in domains such as nursing (Banning, 2008), medicine (Borleffs et al., 2003) and physiotherapy (Atkinson & Nixon-Cave, 2011) to develop clinical reasoning and decision making within these settings. TA has been identified as a unique method to augment reflection-in-action for either the learner or the mentor in any given situation. This has been demonstrated by Borleffs et al. (2003) who developed an approach to clinical reasoning, called clinical reasoning theatre (CRT), which involves student doctors observing a doctor with his or her patient, whilst thinking aloud. The students are able to listen and observe the doctor's clinical reasoning skills, and to understand why he or she asks particular questions. On the flip side, having a novice clinician or practitioner TA during a clinical encounter can facilitate the meta-cognitive process (Banning, 2008; Atkinson & Nixon-Cave, 2011), which in turn may aid self-reflection and discovery of ineffective thought processes.

Similarly, Banning (2008) adopted this method as an educational tool to develop and assess clinical reasoning in undergraduate nursing students. Within nursing, when engaging in metacognitive processing, individuals will use both inductive and deductive logic to simultaneously assemble and evaluate patient information and supportive evidence before making judgements about nursing care (Higgs et al., 2001; Simmons et al., 2003). Banning (2008) adopted the 'TA' seminar (Lee & Ryan-Wegner, 1997), whereby student nurses were encouraged to verbalise their thoughts as they problem solve a case study or interpret a statement. It is proposed that the process of thinking aloud allows the nurse to ''verbalise their thought processes and rationale for the types of questions that they ask during a history or physical examination for the diagnostic hypotheses that they consider,'' (Lee & Ryan-Wenger, 1997, p. 102). This use of a TA approach within these environments develops skills in problem-solving, heuristics, verbalised reasoning and in the case of medical settings, enhances the experience of using and applying both clinical reasoning strategies.

The sport and exercise science domains offer similar environments and settings whereby practitioners are within a training process and learning to reflect on their craft as they move through stages of formal education and applied practice development. This development of metacognition skills (Banning, 2008) and making thoughts visible (Atkinson & Nixon-Cave, 2011) are key to developing that of sport and exercise practitioner expertise, therefore, the next section will provide details of how sport has 'borrowed' from allied fields of medicine and 'educare' professions.

Think Aloud within sport coaching

Within sport coaching, Whitehead et al., (2016a) were the first to pilot the use of Think Aloud as a reflection method. In this inaugural paper TA was introduced to six rugby league coaches who attended a workshop through which they were educated and trained on the use of TA. Once coaches deemed themselves comfortable with using TA, they then used TA within their usual coaching environment. Coaches were then instructed to listen back to their TA audio and reflect on their in-situ TA verbalisations and reflections. Following this, coaches then attended a second workshop whereby they shared their reflections of engaging in TA. This study involved the process of reflection-in-action, on-action and shared reflection amongst the coaches with social validation interviews revealing that coaches felt the process of using TA had promoted their self-awareness, which in turn improved their communication with their athletes. Furthermore, coaches self-reported an improvement in the delivery of their sessions, where they were able to make changes more quickly during the session itself rather than waiting until after the session to reflect on this.

Developing this tool further within sports coaching, Stephenson et al. (2020) examined the experiences of one soccer coach as he engaged in four coaching session using TA. The coach (Dave) within this study also completed a reflective diary and engaged in a retrospective interview to

provide an overall narrative account of his experiences of using TA. Dave reported becoming more aware of his coaching and in turn, also reported an improvement in his communication with his player and the pedagogy and design of his sessions. Dave also, however, experienced feelings of apprehension and distraction and which offered further practical guidelines for coaches when considering the use of TA. Firstly, engaging in the process of using TA was deemed a new skill within itself requiring the coach to both attend to the athletes and the act of coaching the session in addition to stepping back and verbalising their thoughts and reflections as they are occurring. Within this study, it seemed that Coach Dave found it difficult at times to attend to *both* TA and his coaching session and thus it is important that coaches are trained appropriately, and are aware that TA itself is a learning process.

Swettenham and Whitehead (2021) introduced eight coaches from a Category One soccer Academy within the UK to TA. Following an introductory workshop, whereby coaches were able to engage in the process of TA, coaches were interviewed to glean an understanding into their perceptions of TA as a reflection tool. Data revealed that TA has the reported potential to develop three types of knowledge (professional, interpersonal, intrapersonal; Cote & Gilbert., 2009). More specifically the coaches reported developing an increase in self-awareness, becoming more aware of their biases and an overall improvement in their reflection (intrapersonal knowledge). Coaches also reported developing their communication with their athlete and also their relationships with their fellow coaches by sharing the TA audio (interpersonal knowledge) as a form of critical friend support. Finally, coaches were able to articulate how TA could help them with the session design and general coaching process (professional knowledge).

The common thread between these studies appears to be that of the perceived increase level of self-awareness generated through the process of TA. Thinking about own thinking during a coaching session, coaches are able to bring some potentially ignored thoughts to the forefront and also question these thoughts, actions and practices as they occur.

Think Aloud as a tool to use with reflection-on-action

Within most (if not all) examples provided within this chapter individuals will also engage in a process of reflection-on-action. Think Aloud can be used to support reflection-on-action or meta-reflections, whereby practitioners will engage with their TA audio to support further stages of and potentially deeper reflections. For example, within Whitehead et al., (2016a) all coaches engaged in a reflective practice workshop which involved open discussions about coaches use of TA within their practice and what they had learnt from the experience. More specifically, coaches were given a set of questions to consider (see figure 1 below). Coaches were then encouraged to consider how they would further engage in TA within their practice on what specifically they might focus on during their next coaching session to improve their practice. Coaches within this study reported the benefit of these workshops, one coach states, “It’s [TA] really made me think about myself, everything really in terms of the players and thinking about a game situation, thinking am I doing right to intervene with the players now should I just let them get on with it” (Whitehead et al., 2016a, pg. 275).

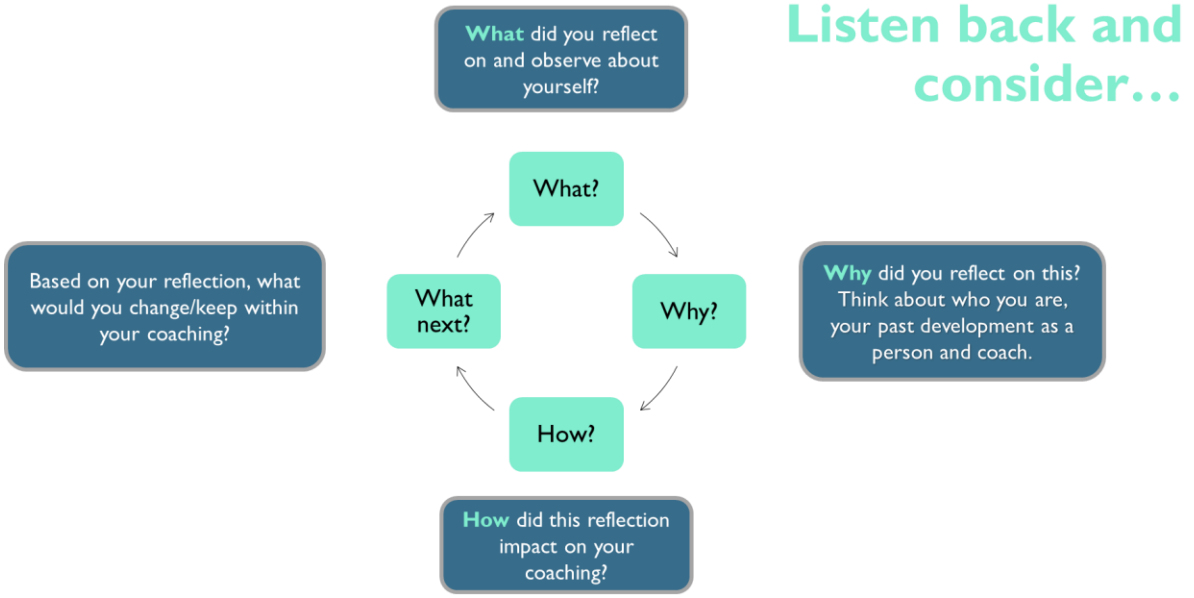

Figure 1. Questions asked to coaches following the use of TA in practice.

Similarly, student nurses engaging in a TA Seminar (Banning, 2008) weregiven opportunities to engage in reflection-on-action by discussing their TA audio and decision making with other students or fault members. The above example from Whitehead et al. (2016a) was inspired by this earlier work. Within Stephenson, et al. (2020) the coach within this study used a reflective diary to capture reflection on action from his coaching session but also to reflect on the processes of Thinking Aloud and how this impacted his role as a coach. It is therefore, important that TA is supported by reflection-on-action or retrospective methods of reflection to such as workshops, reflective diaries, reflective conversations with a critical friend.

Practical implications for practitioners considering the use of TA within their practice

1. **TA as a reflection method within practice does have potential limitations that practitioners should consider prior to engagement**. Engaging in the TA method requires individuals to engage in an activity that may feel slightly obscure and therefore cause feelings of self-consciousness. These feelings of self-consciousness may lead to distraction from the task at hand and in turn, negatively impact of performance of the task. For example, the coach within Stephenson et al., (2020) explicitly stated how TA did become a distraction and he became extremely focussed on his internal thoughts rather than the activity in front of him. Introducing a new task that required a person to engage in (TA) in addition to them attending to their task at hand may result in a slowing down of the task. An individual new to TA is potentially at the 'cognitive stage of learning' (Fitts & Posner, 1967) and adding in a new task such as Thinking Aloud could be difficult. It is therefore, extremely important for an individual new to TA to try it out for this first time in a safe setting, for example Whitehead et al., (2016a) took their participant coaches through a series of training exercises and allowed each coach to trial the use of TA in a workshop setting.

2. **When introducing practitioners to TA and encouraging them to use it for the first time, it is important that they do not think it's being used as surveillance.** As with traditional methods of reflection, especially within education and training settings, reflection can be

seen as a way to determine if an individual is 'thinking correctly' in line with that specific discipline or organisation (Cushion, 2018). Reflections could therefore be dishonest or moulded into what they think is required. To try and navigate this issue, allowing practitioners to use TA on their own and keep their recordings to themselves, even in the initial engagement in TA is an important consideration. However, it is important to note that within medical professions where practitioners e.g. nurses, are dealing with often life threatening situations situations is it important that reflections on reasoning and decision making is made visible (Banning, 2008).

3. **To date, there is no concrete or one way in which TA should and can be used as a reflection tool.** Across different disciplines, TA has been used to make clinical decision making and reasoning visible and aid medical practitioners in their reflections, but also, as shown through this chapter, to support sports coaches reflect during the coaching of practice and competitive environments When TA has been used to support reflection, there does involve a process of reflection-on-action, where TA audio is listened to, which creates a scaffolding approach to reflection. It is therefore, recommended that practitioners using TA to support reflection in-situ also listen back and engage in some form of reflection-on-action or a meta-reflection (reflecting on their reflections insitu).

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