Thinking Aloud. A qualitative analysis of stressors and coping responses in cricket bowlers during a competitive match.

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Abstract

Stressors and coping in cricket bowlers have yet to be explicitly examined. The present study aimed to investigate stressors and coping verbalisations of cricket bowlers during a competitive match using a Think Aloud (TA) method. TA provides access to a participant's immediate short-term memory and overcomes limitations associated with retrospective methods such as recall bias and memory decay. Six semi-elite club level cricket bowlers were selected to verbalise their thoughts during a bowling spell in a real-life competitive match using TA. Verbalisations were recorded using an audio device and transcripts were thematically analysed to generate relevant stressors and coping themes. Findings indicated stressors and coping strategies varied throughout cricket bowling performance. Results also highlighted how stressors and coping responses represent a dynamic and recursive process and do not occur in isolation of one of another. Stressors were made up of organizational and competitive stressors and coping responses were coded using Lazarus and Folkman's (1984) classification of problem-focussed coping and emotion-focussed coping strategies. The findings from this study have extended previous literature by further understanding the stressors and coping responses of cricket bowlers by adopting a novel method of data collection, within an ecologically valid environment of real-life cricket competition. Applied implications and future research suggestions are discussed accordingly within the concluding remarks.

KEYWORDS: *Cognitions, Competition, Concurrent Verbalisations, Think Aloud, Thought Processes*

Introduction

Identifying and sourcing various stressors experienced by athletes has been of interest to researchers and practitioners alike (e.g., Nicholls & Polman, 2007a). This is primarily due to the potential negative impact of stressors on athlete well-being and performance (Rice et al., 2016; Swettenham et al., 2018). Lazarus' (1991a; Lazarus & Folkman,1984) transactional model of stress and coping (TMSC) and his cognitive-motivational-relational theory (CMR) of emotions (see Lazarus, 1991b, 1999, 2000) have been used extensively to underpin examinations of stressors and coping in sport. Specifically, Lazarus argues that stress is a dynamic and recursive transaction between environmental demands and personal resources, which comprises primary and secondary appraisals. The primary appraisal involves assessing the impact an event may have on an individual's physical and psychological well-being and the implications the incident may have towards an individual's personal goals, values, and beliefs. If something of significance is at stake, this is defined as a 'stressful encounter', and subsequently there are three main meanings, known as 'transactional alternatives'. These transactional alternatives include an individual appraising an event as either harm/loss, threat, or challenge. After making an initial primary appraisal, individuals will make a secondary appraisal whereby the individual considers his/her perceived coping resources concerning the specific demands of the situation. These cognitive-evaluative reactions are theorised to influence coping and emotional responses to a demand, and ultimately impact sporting performance (Lazarus, 2000).

According to Lazarus and Folkman (1984), coping has been defined as *"constantly changing cognitive and behavioural efforts to manage specific external and internal demands appraised as taxing or exceeding the resources of the person*" (p.141). Whereas, stressors can be defined as *"environmental demands (i.e. stimuli) encountered by an individual"* (Fletcher et al., 2006, p. 9), coping responses can be categorised into three broad themes (Nicholls &

Polman, 2007a). Emotion-focused coping strategies aim to regulate emotional arousal and distress. Problem-focused coping strategies aim to alleviate stress by reducing or eliminating the stressor. Avoidance coping strategies, further introduced by Endler and Parker (1990), involve behavioural and cognitive efforts to disengage from a stressful situation. This coping classification system was adopted within the present study due to the saliency of its use in previous similar research. While there are limitations with Lazarus and Folkman's (1984) model in that problem- and emotion-focused strategies represent a broad coping classification, and some coping strategies may be classified under both (Coyne & Gottlieb, 1996; Nicholls et al., 2016), by adopting sub-themes in the analysis and representation of coping responses these limitations can be minimised.

Research using the TMSC as a guiding framework has generally examined the stressors and sources of strain encountered by performers (e.g., Mellalieu et al., 2009; Arnold et al., 2013), the appraisals and subsequent coping responses to stressors (e.g., Dugdale, Eklund, & Gordon, 2002, Holt & Hogg, 2002; Didymus & Fletcher, 2012), and the emotional responses evoked from appraisals (e.g., Uphill & Jones, 2007). A systematic review investigating stressors and coping within a variety of sports such as table tennis, swimming, golf, wresting and many more highlighted the TMSC was supported in 46 out of 64 studies (72%), while also suggesting a significant interaction between the stressors experienced by an athlete and the type of coping response adopted (Nicholls & Polman, 2007a).

Cricket is an open-skilled, dynamic sport, and while it is a team-based sport, it contains many individual battles within the context of a game (e.g., batsmen versus bowler). The dynamic nature of cricket should naturally present many stressful situations and as such, offer rich data. Previous research exploring stressors and coping in cricket (e.g., Thelwell et al., 2007) have focused on stressors and coping of cricket batsmen. Thelwell et al. (2007) retrospectively interviewed nine professional cricket batsmen to identify sources of stress and

associated coping strategies utilised. Results revealed that cricket batsmen experienced various stressors, such as perceptions of self (self-induced pressure, emotional instability, insecurity), match specific issues (game situation worries, importance of game, conditions of play), and external influences (personal life, financial pressures). Also, the primary coping responses identified were cognitive strategies relating to psychological skills such as self-talk and imagery. Similarly, Neil et al. (2016) examined the stress and emotion process of male cricketers over a series of competitive performances using reflective diaries and follow-up semi-structured interviews. Their results highlighted how, for cricket athletes, the perceptions of control and self-confidence were salient variables for influencing emotive and behavioural outcomes when experiencing stressors.

Despite this body of work furthering our understanding of stressors and coping in cricket, an inherent limitation of this research is that it has primarily adopted methods of data collection whereby participants have been asked to recall experiences retrospectively. Studies that have required participants to recall experiences retrospectively may lose vital information through memory decay (Ericsson & Simon, 1993; Nicholls & Polman, 2008). There is also the limitation of participant recall bias (Bahrick et al. 1996), whereby participants recall of events are often influenced by the outcome of that event, either because of success or failure. A potential explanation for these methods may be due to it being difficult for an athlete to actively recall and reflect on their stressors, appraisals, and coping in-action. The present study therefore aims to extend this work by exploring stressors and coping responses as they occur during a competitive match. The present study also aims to expand on previous stressor and coping research in cricket by exploring the perspective of the cricket bowler. The results from the present study may offer a different perspective to previous cricket-based research by capturing the stressors and coping verbalisations of cricket bowlers as they occur in the moment

during a competitive match. As a result, it is plausible that the present study may offer new insights relating to stressors and coping.

Although capturing in-event cognitions poses significant practical challenges to the researcher, the Think Aloud (TA) method may offer a fruitful means of overcoming the limitations associated with retrospective recall. According to Ericsson and Simon (1993), the TA method may provide researchers with a valid means of capturing in-event cognitions. Specifically, TA instructs participants to give verbal expression to their thoughts while performing a task. Ericsson and Simon (1993) proposed three levels of verbalisation. Level 1 verbalisation is simply the vocalisation of inner speech where the individual does not need to try to communicate his or her thoughts and are required only to verbalise task-relevant information. Level 2 verbalisation involves the verbal encoding and vocalisation of an internal representation that is not originally in verbal code (e.g., verbal encoding and vocalisation of scents, visual stimuli, or movement) — for example, verbalising any thoughts during the performance of a task. With this level of verbalisation, participants vocalise information that is in their focus. Level 3 verbalisation requires the individual to explain his or her thoughts, ideas, hypotheses, or motives. For example, explaining why a cricketer selects a specific shot. However, this level of verbalisation has been criticised for disrupting the natural cognitive flow and potentially also disrupting performance (Ericsson & Simon, 1993; Fox et al., 2011).Notwithstanding, research by Whitehead et al. (2015a) and Fox et al. (2011) found that the generation of level 3 verbalisations, such as explanations, does not in general negatively impact the performance of a task, and in fact may have a positive effect on performance accuracy. This is something that has also been highlighted by Double and Birney (2019), which they specify as positive reactivity, where verbalising and explaining cognitions increase positive behaviours within performance.

Recently, literature has attempted to collect data from athletes in action using TA. For example, Swettenham et al. (2018) used TA to capture in-event stressors and coping strategies in tennis players. This study demonstrated how stressors and coping altered depending on the condition of the activity (practise and competition) and across gender, contradicting previous stress and coping (e.g. Roth & Cohen, 1986) although, more research is required before accurate conclusions can be drawn. Similarly, researchers have used TA to gather data in a variety of sporting settings. For example, examining stressors and coping in a variety of sports such as golf (Nicholls & Polman, 2008; Calmeiro et al., 2010; Kaiseler, 2012) and snooker (Welsh et al., 2018).

Welsh et al. (2018) highlighted how the thought processes of elite snooker players change during performance, particularly during highly dynamical situation-specific moments. Welsh et al. also highlighted that super-elite and elite professional snooker players engaged in extensive problem-focused coping strategies, which advanced the current literature. The level 3 TA method also allowed for the participants to describe, demonstrate and explain their use of behavioural strategies (e.g. walking round a table to clear their thoughts). Swettenham et al. (2018) highlighted how gender differences occur only for the type of stress appraised, not the coping response with tennis players. By adopting a TA method, they were able to offer context-specific findings within tennis. Alternatively, Whitehead et al. (2018) highlighted critical differences in the thought processes of trained and untrained cyclists, in particular, the use of cognitive strategies to manage stressors. More recently, McGreary et al. (2020) adopted a TA method whilst exploring stressors and coping in cricket batsmen during challenge and threat states. Their results extended on previous cricket research (e.g. Thelwell et al., 2007) by highlighting when in a threat state, batsmen verbalise significantly more external, performance and pressure stressors. This study also further highlights the suitability of adopting TA method within cricket, albeit with batsmen rather than bowlers.

Overall, findings from previous TA research (Nicholls & Polman, 2008; Kaiseler et al., 2012; Swettenham et al., 2018, Welsh et al., 2018) investigating stressors and coping identified a multitude of stressors, and associated coping responses, which supports the contentions of Lazarus' TMSC (1991a; Lazarus & Folkman, 1984.) while also extending on previous stress and coping research that had adopted retrospective data collection methods. The results of previous TA research serve to support our existing understanding of stressors and coping while also advancing the literature base by offering context-specific findings in naturalistic settings. Indeed, Swettenham et al. (2018) argued taking caution when drawing conclusions based on retrospective studies given that the data gleaned could be contaminated by more recent events and experiences. The potential contamination of data by more recent information highlights the need to reduce the amount of time between the athlete experiencing stressors and recalling the event.

Despite this, a limitation of previous studies adopting TA is that Calmeiro et al. (2010) and Swettenham et al. (2018) are the only known studies to have examined stressors and coping in a competitive environment. This lack of research limits our understanding of using TA in competitive situations. Therefore, more research is needed in different sports to allow researchers to better understand the stressors and coping responses of athletes during competitive performance. Another limitation of TA research exploring cognitions in sport is that the majority have "quantitized" (cf. Sandelowski et al., 2009) verbalised TA data in accordance with a priori coding schemes for the purpose of conducting inferential statistics. For example, Arsal et al. (2016) and Whitehead et al. (2016) compared cognitions frequencies in skilled versus less skilled performers. Likewise, McGreary et al. (2020) compared the frequency of TA verbalisations of cricket batsman during challenge and threat states. Despite the extensive use of quantifying cognitions, there are some pertinent limitations with such data, noticeably the perception that the frequency of qualitative themes does not always liken to the

importance of that information (Braun & Clarke, 2006). Given the concerns of codifying qualitative data in previous TA research, this provides a strong basis for the exploration of such data in greater depth within further research. Here the present study aims to explore using an interpretivist epistemology and TA approach the stressors and coping strategies of cricket bowlers during competition. As a result, the present study will further enhance our knowledge as it allows the researchers to access previously unobtained information from cricket bowlers. Likewise, the present study may serve to support previous research adopting TA and advance the current literature base surrounding stressors and coping.

Previous research investigating cricket has tended to primarily focus on the batsmen (e.g., Thelwell et al., 2007; Turner et al., 2013). Therefore, there is a need to better understand the context-specific stressors and coping of cricket bowlers due to the unique demands they experience during a match. For example, a fielder (teammate) making an error results in the loss of a potential wicket or extra runs being scored. Similarly, cricket is primarily a batman's sport, often with hundreds of runs scored with a maximum of ten wickets taken by the bowling side. This often requires bowlers to demonstrate a variety of psychological skills such as mental focus and dealing with setbacks (Phillips et al., 2014). Likewise, exploring stressors and associated coping in ecologically valid settings, such as a competitive match, offers scope for potential new findings. Furthermore, a large portion of stressors and coping research has been dedicated to studying individual and closed-skill sports (Thelwell et al., 2007). By furthering our understanding of the stressors and coping strategies of cricket bowlers during competition, practitioners and coaches alike can gain greater insight into these real time thoughts. Therefore, the present study aims to investigate the stressors and associated coping strategies of cricket bowlers during competitive performance, using a real-time, concurrent method of TA. Specifically, the researchers hope to understand what specific stressors and coping responses

occur within the ecological setting of real-world competition, within the sport of cricket and within the context of bowling.

Method

Ontological and Epistemological Assumptions

Similar to Welsh et al. (2018), the authors followed a relativist ontology and a subjectivist epistemology, in particular, conceptual relativism. The researchers viewed the data from the perspective of the six participants and attempted to make sense of their stressors and coping but relativized this in relation to categorical frameworks. This position adopts the beliefs that multiple realities coexist among individuals, and the role of the researcher is to understand the meanings, purposes and intentions individuals associate with actions and interactions (Corbin, 2009). Previous TA research has traditionally positioned itself as following a realist ontology and post-positivist epistemology. However, adopting alternative philosophical positions agrees with Eccles and Arsal (2017). Notwithstanding, it is essential to recognise that results from this position are different but no better or worse than other positions.

Participants

Participants were six male high-level club cricket athletes (age range from 18 to 30 years, $M = 24.00$, $SD = 3.52$). All participants played for respective first teams and competed in an English Cricket Board (ECB) Premier League, the highest level of amateur cricket in England and Wales. All participants had been competing in their first team regularly and experience ranged from two to ten years of senior playing experience. In relation to Swann, Moran and Piggot (2014), these participants would therefore be classed as performing at a semi-elite level. All participants had played a minimum of one competitive match per week during their season. Four participants were simply first-team club cricketers, one participant had played minor-counties cricket and one participant was a professional cricketer contracted to play for an amateur club side. Club cricket in England often observes professional cricketers

play regularly in the amateur leagues, normally when recovering from injury or for younger players to gain experience. Participants were two spin-bowlers, two fast-bowlers, and two swing bowlers. Six participants were chosen as it was agreed between the research team that this number represented the three main bowling types and would provide a satisfactory level of data to promote further comprehension and understanding of the research question (Patton, 2002). To qualify for the study, participants had to have played at least one first-team game within the season the data was collected; this was to ensure a satisfactory standard of ability and experience across participants. Participants were recruited through various clubs known to the lead researcher. Access was granted by gatekeepers at these clubs to attend training sessions to discuss the proposed research. Participant information sheets were handed out during training sessions with contact information provided for the lead researcher, for potential participants to ask questions. All participants in the study provided written consent before data collection. Institutional ethical approval was granted before data collection.

Procedure

Using Ericsson and Simon's (1993) guidelines for conducting level 2 verbalisations, participants practised how to verbalise their stressors and coping competently. Level 2 verbalisations provides access to information from an individual's short-term memory (STM; Eccles, 2012), and participants are not required to further expand on their verbalisations, nor are they expected to provide explanations for their motives. Due to the dynamic nature of the task (bowling) and the context in which the participants were required to verbalise (competitive league fixture), level 2 verbalisations was deemed appropriate.

Using Ericsson and Kirk's (2001) adapted warms up tasks, participants were required to verbalise their thoughts while completing several TA training tasks, including a math problem, an anagram task, and a naming/free association task. The math problem involved working through a multiplication task (e.g., 19 multiplied by 6), the anagram problem involved

working through a word scrambling task, and the naming problem involved identifying an associated group of words. Participants were instructed to 'please think-aloud anything that comes into your head, do not try and explain these thoughts.' Participants were encouraged to ask questions to clarify what was required and completed these exercises until the lead researcher deemed them to have fully grasped the TA process. Based on recent recommendations by Birch and Whitehead (2019), following TA training, participants were encouraged to engage in TA while practising bowling. Participants were instructed to say out loud all of their thoughts (e.g., thoughts related to performance, opposition, teammates etc) before and after the execution of the cricket delivery. Specifically, participants were asked to "please Think Aloud by trying to say out loud anything that comes into your head throughout the trial. You do not need to try and explain your thoughts and you should speak as often as you feel comfortable in doing so". TA training took place during a training session for the participants' club to minimise interference for the participant. To reduce the potential of interference with skill execution, participants were not instructed to verbalise their thoughts during bowling execution (Schmidt & Wrisberg, 2000). It was emphasised to participants that they were engaging in Level 2 verbalisations, and as such, they were not required to explain their thoughts, but instead were required to say what they were thinking (Ericsson & Simon, 1993). The training provided participants with an opportunity to practise their bowling action with the recording device attached. In addition to practising TA while performing, participants were offered the chance to voice any concerns they had regarding TA. Before practising, some participants had expressed anxiety towards the recording device interfering with their bowling action. However, following this session participants reported no concerns regarding the recording device while bowling. Participants could practise TA and bowling for as long as they felt necessary, this was to ensure participants would provide quality data when required to TA during a competitive match. Training lasted from 30-40 minutes and ended when the

participant clearly articulated that they fully understood the TA process. The lead researcher then determined whether they were competent in TA.

Before practising TA while performing a cricket bowling delivery, participants were fitted with the recording device, which incorporated a small microphone clipped onto the participant's shirt collar (lapel microphone) and a small recording device inserted inside the participant's trouser pocket. The participants were informed of how to set up the recording device and were told to start recording once they began their first over and to continue until they had finished their bowling spell. Participants were instructed that while bowling during a competitive match to TA for a minimum of 10 overs during a shared bowling spell (i.e., they would bowl five overs, and their partner would bowl for five overs). 10 overs gave ample time to verbalise thoughts both during bowling and between overs. A maximum of 15 overs are available to each bowler per match due to league rules. To ensure the data was as authentic as possible, participants were reminded not to act differently from how they would during a standard competitive match (i.e., to act as they normally would during any other competitive game). Recordings ranged from approximately 40 minutes to 70 minutes, which included moments of silence.

Data Analysis

A total of 343 minutes of TA audio was collected and transcribed verbatim. In order to maintain the anonymity of participants, participant numbers replaced names. Similarly, pseudonyms were used to replace names verbalised during bowling performance. An abductive thematic analysis (Timmermans & Tavory, 2012) was conducted to explore participant stressors and coping responses during bowling performance (Braun & Clarke, 2006). Thematic analysis was utilised as it allows for the examination of lived experiences across numerous participants (Clarke & Braun, 2013). The analysis followed an abductive process where the author prioritised the participant's think aloud verbalisations and his own interpretation of their

meaning of these and then brought in theory (at stage 4) to explain and critically analyse his own interpretation of the participant's verbalisations. the first author read all transcripts of TA (immersion in the data) in Nvivo 10 (step 1). Once complete, the first author developed a list of codes from the transcripts. At this stage, 94 initial codes that the first author perceived related to stressors and coping were reviewed and considered and discussed with the second author (step 2). This collaborative coding approach is supported by Saldana (2013) as it allows a 'dialogic exchange of ideas' that support interrogation and discussion from multiple perspectives. During stage 3, author one searched for themes that he identified as meaningful and relevant to the research question. Given that this study was focused on how stressor and coping data may be interpreted from Think Aloud verbalisation data, at this stage 13 stressor themes and the coping responses of planning, motivational self-talk, rationalising, planning, technical planning and tactical planning were generated from the data. At stage 4, Lazarus and Folkman's (1984) categories of coping were used as a vehicle to support the sense making of the data, and therefore, coding of emotion- and problem-focused coping was used to further make sense of the participants think aloud verbalisations. Therefore, the 'coping responses' were grouped into 'umbrella' coping themes of emotion-focused coping and problem-focused coping. Likewise, with the stressor related themes, the use of Arnold and Fletcher (2013) pre-existing organizational and competitive stressors were used to make sense of the data. In an attempt to be transparent, at this stage, the critical friend allowed for the discussions of an initial 13 stressor themes to be developed into 6. For example, the first author had created codes of 'behaviour of opponent' and 'batting style of opponent', later following discussions this theme was merged to form 'opponents' as it was agreed this better reflected the stressors verbalised. Another example is where the original themes 'teammate' and 'bowling partner' were then developed into the theme 'teammates'. It is important to note that this was a process of critical dialogue between authors, and rather than to agree or disagree to achieve consensus, the critical

friend encouraged reflexivity by challenging the first authors construction of knowledge (Cowan & Taylor, 2016). Therefore, at this stage, the two stressor umbrella themes were organisational stressors, with three sub themes and competitive stressors, with three sub themes. The two coping umbrella themes were emotion focused coping, with 2 subthemes and problem focused coping with two sub themes.

Once complete and consistent with the potential limitations of inter-rater reliability as highlighted by Smith and McGannon (2018), a different researcher acted as a critical friend to ensure data collection and analysis were plausible and defendable (step 5; Smith & McGannon, 2018). At this stage, definitions of the themes were discussed in detail between 3 of the authors. Following this refining and naming of themes, the findings were produced (step 6) and are presented in the results section (see Table 1).

A subjectivist epistemology is reflected in the multiple coping strategies that were presented by the differed voices of the participants represented in the findings. It is important to note that due to the nature of Level 2 verbalisations, participants only verbalised thoughts that were in their immediate STM. Therefore, an initial analysis of data revealed that appraisals of stress were not verbalised as participants were not instructed to verbalise appraisals. As appraisals are assessments of resources required to cope with the stressor (Lazarus & Folkman, 1984), this may require retrieval of information from the long-term memory (LTM), and during the performance of a task using Level 2 verbalisations, these assessments may not be occurring within the STM.

Quality Criteria

A relativist perspective informed the present studies approach to research quality. As the interpretation of this data is based on the interpretations of the authors who engaged in the data analysis. such, the present study should be judged on the characteristics outlined by papers such as Sparkes and Smith (2009), Smith and Caddick (2012) and Smith and Sparkes (2013).

Firstly, naturalistic generalizability, the ability of the present paper to promote to curiosity within the reader. Secondly, with the magnitude of data collection, analysis and the researcher's interpretations. Thirdly, credibility, which refers to the whether the findings are believable and whether there is transparency in the procedures used to collect and analyse data. Finally, rigour, refers to whether the present study appreciates the *"complex theoretical constructs, data and time in the field, sample(s), context(s) and data collection and analysis processes"* (Sparkes & Smith, 2013, p.197). In addressing these characteristics, the reader is called upon, particularly in relation to naturalistic generalizability whereby they are encouraged to discern within the results what is similar and different to their own situations (Sparkes and Smith, 2014). Similarly, adopting critical friends allowed for a reflexive dialogue whilst acting as a resource for challenging and developing defendable interpretations. Finally, the present study provides clarity on the details of the participants, the recruitment of participants, how data was collected and the length of each data collection (length of time participants were required to verbalise thoughts). Data collection and analytical methods are included, and these techniques were discussed within the research team and deemed appropriate to meet the present studies aims.

Results

Resulted indicated that stressors and coping occur as a dynamic and recursive process, whereby participants reported a variety of coping strategies in response to stressors. For example, *"Argh, too far down leg (stressor), sorry boys (emotion-focused coping), two balls left (stressor), let's keep it tight here, come on (problem-focused coping)".* Participants reported two primary stressors, which are presented as themes and sub-themes. These stressors were Organisational and Competitive stressors. Within these themes, sub-themes were also generated (pitch and equipment, teammates, opponents, bad bowls, misfortune, self-induced pressure), which evidence a higher level of complexity within these themes (see Table 1). Following the verbalisation of each stressor, participants also verbalised several coping

strategies. In line with Lazarus and Folkman (1984), these coping verbalisations were grouped into emotion-focused coping or problem-focussed coping. During the initial analysis process, no avoidance coping strategies were verbalised by participants, hence their omission from the results. However, Table 1 provides more detail in terms of specific verbalisations.

INSERT TABLE 1 HERE Table 1. 1

The section below presents each stressor and supporting quotes. Each stressor is accompanied by the verbalised coping response to evidence the dynamic and recursive process between stressors and coping when bowling in cricket.

Organisational Stressors

Organisational stressors refer to the demands associated with the environment and organization within which the athlete is operating (Fletcher et al., 2006). These raw data stressors were grouped into stressor themes: a) pitch and equipment, b) teammates and c) opponents. Both problem-focused coping and emotion-focussed coping were evident following verbalisations of this stressor. For example, planning in the form of adjusting bowling plans in response to stressors was one of the more pertinent strategies employed from a problem-focussed coping perspective. Emotion-focussed coping was used by some participants, where rationalising stressors were used in response to a stressor.

Pitch and Equipment

Stressors associated with match conditions referred primarily to the condition of the cricket ball. Problem-focussed coping strategies were used in the form of planning and emotion-focussed coping in the way of motivational self-talk. Participant 3 refers to the condition of the ball as being a potential stressor: *'Ball is hard and shiny, feels a bit greasy, argh ball feels a bit greasy (stressor), trying to bowl a good line just on off stump (problem-focused coping of planning)'* (P3). He attempts to manage the stressors by adjusting his bowling plan to yield a positive result. Similarly, participant 3 refers to the condition of the wicket (pitch) as being

another potential stressor: '*Ball is keeping quite low of the pitch (stressor) going to adjust to use it as my advantage (problem-focused coping, planning)'* (P3). Another example shows how a participant uses self-talk to cope with the stressors related to the condition of the ball; *'Ball is starting to fall apart a little bit now (stressor), Just got to keep doing what I am doing, be patient (emotion-focussed coping, motivational self-talk)'* (P2).

Teammates.

Stressors related to teammates mainly came in the form of teammates making mistakes, (e.g., dropping a catch) and relating to the bowling partner (e.g., how well their bowling partner was performing and how that influenced them). Interestingly, participants were less likely to report many coping strategies. This finding could be explained as they are not active agents in the stressor (i.e., the fielder making a mistake or the bowling partner, then there is little they can do to cope). An example of teammates being a stressor is evident in participant 6, 3 and 1 below:

> Good start from us though, nice and tight just need a couple of wickets, if it was up to me I would take my bowling partner off if he doesn't get any wickets this over, doesn't look right today, don't know what is up with him. Yeah, if I was the captain, wicket this over, or I'd take him off (stressor) (P6).

Similarly, participant 3 verbalises his teammate as a potential stressor, *'If Bill (pseudonym) doesn't get this last wicket this over, the roles will change, and it will be on me to get this last wicket (stressor)'* (P3). Although participant 6 and 3 don't verbalise immediate coping responses, participant 1 verbalises emotion-focused coping in response to their teammate, causing a stress response:

> Need my bowling partner to try and tighten it up to help me build a bit of pressure, feels like he is trying too hard to get the wicket (stressor), he just needs to relax and bowl tight deliveries (emotion-focussed coping, rationalisation) (P1).

Opponents

Opponents were stressors sourced from the team the participants were competition against; in the case of the present study, it was the batsmen as they were the direct opposition for the bowlers. The primary method for coping with opponent stressors was problem-focused coping strategies, with tactical and technical adjustment being the most salient coping strategies used by participants. However, emotion-focussed coping was also evident. Stressors relating to the behaviour of opponents tended to come in the form of how the batsmen were playing, whether they were playing aggressively or conservatively or if they were trying to score runs in a particular area. Emotion-focussed coping tended to be through rationalisation in response to a stressor, for example, *'OK so the batsman is playing aggressively (stressor), just hope that the ball will eventually find a fielders hand or that I will just sneak one through (Emotion-focussed coping, rationalisation)'* (P6).

Problem-focussed coping tended to come in the form of planning which involved either technical or tactical adjustment, for example, *'I noticed last over he was trying to drive my bowling partner (Stressor) so I am going to try and tempt him in for a drive and hopefully find the edge (problem-focussed coping, planning)'* (P5). This example highlights the ongoing process of coping with stressors as they occur in the moment, responding to stressors caused by the batsmen and attempting to cope with it and facilitate performance. Another example, *'Ahh batsmen is moving the screens, making me wait (stressor). Come on, get this straight; get a couple straight (problem-focussed coping, planning), and your confidence builds (emotion-focused coping motivation self-talk)'* (P2). The playing style of the opponent was also reported as a stressor, and this referred mostly to whether the batsmen were left or right-handed. Bowlers typically have a preference for who they want to bowl to, whether left or right-handed, and these stressors often prompted problem-focused coping strategies in the form of planning either technical or tactical adjustment. One participant states: *'Bowling to a left-hander now*

(stressor), going to try and put the ball across him (problem-focussed coping, tactical planning), it's his first ball going to see what he can do,' (problem-focused coping, tactical planning)' (P1). Having to change to bowl to a left-hander, resulted in this participant making a tactical adjustment to how he is was going to bowl. Participant 4 highlights how he makes both a technical and tactical adjustment to attempt to manage the stressor:

> Going to come around the wicket (problem-focused coping, tactical planning) to the left-hander, (stressor) maybe bring in LBW. (To a teammate) Think I'm going to come around to the left-hander? (stressor) Maybe bring someone out of covers and put him down as a wide fine leg or something? (problem-focussed coping, technical and tactical planning) (P4).

Competitive Stressors

Performance outcome was a common stressor that was associated with bowling bad or unsuccessful balls; these stressors were the most salient stressors reported by participants and interestingly involved the most varied coping strategies. A wide variety of both problem-focussed and emotion-focused coping strategies were used to help cope with the stressors experienced.

Bowling Bad Balls

Stressors related to bowling bad balls were the most pertinent stressor reported by participants. The coping strategies used to manage stressors associated with bowling bad balls varied between problem- and emotion-focussed coping strategies. Positive reinforcement, rationalisation, self-talk, tactical adjustment, technical adjustment, and bowling plans were some of the more salient strategies employed by participants. Examples of participants coping with stressors related to bowling bad balls include:

> Second ball was too short; (stressor) need to get it up there a little bit. (problem-focussed coping, planning). Batsman missed out then, that was a bad ball (stressor) but good for me

because that will build a little bit of pressure. (emotion-focussed coping, rationalising) (P6).

Argh that's poor (stressor), too far down leg side again (stressors), s**t (emotion-focused coping) (P1). These excerpts provide an example of the process between stress and response, whereby perceived underperformance resulted in an adverse emotional reaction, which required a coping strategy to manage the stressor, in the form of rationalising the situation stating that pressure is building on the batsman.

Misfortune

When the outcome of performance was unsuccessful, participants also reported feelings of being 'unlucky.' Typically, participants reported using problem-focussed coping strategies, mostly tactical adjustment, and self-talk to cope with stressors, alongside emotion-focussed coping strategies, mostly rationalisation. An example to support this:

> F*****g hell just missed top of off stump. (stressor) Just going to bowl line and length to this batsman, he's the set batsmen just bowling it right in the blockhole. (problem-focussed coping, planning) Unlucky again (stressor), when you're on fire that's the type of wicket that gets caught. (emotion-focussed coping, rationalising) (P5).

A further example highlights how participants also used self-talk to cope, *'Please catch it, ahh unlucky again. (stressor) Another one dropped. (stressor) Last few balls, bowl well now come on. (problem-focussed coping, instructional self-talk)'* (P3).

Self-induced Pressure

Stressors stemming from self-induced pressure often were when a participant stated they 'needed' to perform well or 'needed to do an action,' thereby placing themselves in a stressful situation. These stressors often followed shortly after stressors related to bowling bad balls or experiencing misfortune. However, they were deemed as a separate stressor as participants reported coping strategies were in response to the self-induced pressure rather than

bowling a bad ball or misfortune per se. Coping strategies employed to manage self-induced pressure were primarily problem-focused, in the form of bowling plans of technical adjustment. For example:

> Need to tighten up again (stressor), back to the basics, bowling on a good length and line just on top of off stump. (problem-focussed coping, technical planning) (P1).

Further to this, participant 4 states, *'need to make sure I am back on it now (stressor), nice and straight (problem-focused coping, technical planning)'* (P4). Within this example, the participant verbalises two stressors concurrently, one as a result of bowling bad balls and the second due to self-induced pressure. The participant reported a problem-focused coping strategy, namely technical planning, to cope with both stressors.

Discussion

The present study aimed to use TA (level 2) verbalisations to examine stressors and associated coping strategies of cricket bowlers during competitive performance. Results extend previous research by examining stressors and coping responses of cricket bowlers using a novel method (TA) within an ecologically valid and competitive environment. Likewise, the results extend previous TA research, which has traditionally been underpinned by post-positivism and codified qualitative data by providing a more detailed analysis of TA verbalisations beyond that of frequencies. Participants reported two primary stressors, which were presented as both themes and sub-themes. These were organisational stressors and competitive stressors; sub-themes were also developed to highlight the complexity within these themes (for example, opponents, bowling bad balls). Furthermore, following the verbalisation of a stressor, participants verbalised several coping strategies. In keeping with Lazarus and Folkman (1984), the initial coping responses (e.g. rationalising, planning, technical adjustment) were grouped into emotion-focused coping or problem-focussed coping. As such, the initial codes formed sub-themes, addressing limitations of this coding classification system (Coyne & Gottlieb,

1996). The main findings from the present study highlighted that cricket bowlers during a competitive performance reported technical planning and tactical planning as problem-focused coping strategies. Similarly, participants reported rationalising as an emotion-focused coping strategy in response to match specific and performance-based stressors. Stressors and coping occurred as a dynamic and recursive process throughout the participant's performance during a real-life competitive game, supporting Lazarus's (1999) TMSC.

Firstly, our findings support and extend on previous work such as Nicholls and Polman (2007b). The present study identified similar stressors and coping responses to those reported in previous research; however, they were examined as they occurred during a competitive match using a novel method. Therefore, enhancing the confidence of findings in this area by applying them to an ecologically valid setting. Nicholls and Polman identified increased effort and concentration as the two most frequently reported problem-focused strategies by England age-group rugby players primarily in response to stressors related to mental and physical errors. The present study identified problem-focused coping strategies used by the participants were primarily technical and tactical planning. Typically, these coping strategies were employed following stressors related to bowling bad balls, opponents, and self-induced pressure. Therefore, participants employed tactical and technical adjustments to cope with a variety of stressors. These findings highlight how stressors and coping is a dynamic process that is dependent upon the environmental demands and personal coping resources. Likewise, the use of multiple coping strategies to manage a variety of stressors demonstrate how stressors and coping change to reflect the dynamic nature of competitive match play. For example, the 'battle' between batsmen and bowler, moments were the bowler may be performing well and when the batsmen may have the upper hand. Similarly, it highlights the uniqueness of coping strategies employed by athletes across different sports (e.g., cricket to rugby). Although, the differences in coping strategies between the present study and Nicholls and Polman (2007b)

could be attributed to the personal coping resources available to the athletes or the demands placed on the athletes when data was collected. Likewise, the difference in findings may be attributed to different data collection methods used. The present study used TA to collect data during a competitive match, whereas Nicholls and Polman (2007b) adopted a retrospective data collection method. As such, their data may have been limited by memory decay or recall bias and as such, vital information may have been lost. Thelwell et al. (2007) highlighted that for cricket batsmen, the use of self-talk was a prominent coping strategy, primarily as a cognitive general coping strategy in the form of positive and constructive reminders primarily in response to stressors relating to perceptions of self, current playing status, match specific issues and relationships with others. Within the present study, participants used instructional self-talk to manage competitive stressors, particularly in response to 'misfortune'. This finding could suggest that following misfortune (e.g., a teammate making an error or an unfavourable umpiring decision) participants engaged in a process of instructional self-talk to manage the stressors. Likewise, participants also used motivational self-talk for both organisational and competitive stressors, although it was not a prevalently reported coping strategy. The present study therefore extends on Thelwell et al.'s work by providing an examination of stressors and coping within an ecologically valid setting. The results therefore suggest that for both cricket batsmen and bowlers, psychological skills in the form of self-talk are a salient coping strategy.

Previous research such as Nicholls et al. (2005b) and Swettenham et al. (2018) identified technical adjustments and planning as frequent coping strategies for adolescent golfers and tennis players. However, a limitation of these studies is that high frequency does not always equate to importance. The present study adopting an alternative, qualitative approach further identified similarities in results to these papers, further supporting their findings. Results suggested the use of problem-focused coping strategies such as tactical planning or technical planning, primarily to cope with competitive stressors, for example,

bowling a poor delivery provide further support to the findings of previous research. The current studies result also extends this work, it was identified that emotion-focused coping strategies such as rationalising were prominent in response to both organisational stressors and competitive stressors. Specifically, emotion-focused coping was utilised in response to teammates, pitch and equipment, opponents, bowling bad balls, and misfortune. Swettenham et al. (2018) also identified that avoidance coping strategies were a salient coping response verbalised by tennis players during both practice and competition. The present study offers alternative findings here, with participants not verbalising any avoidance coping strategies. This finding could suggest avoidance coping responses are context specific (e.g. more likely to occur in some sports) or rather the demands of cricket bowling are such that avoidance coping responses are not applied (or at least not verbalised).

Welsh et al. (2018) highlighted how planning shots was a salient problem-focused coping strategy and how rationalising was a frequently cited emotion-focused coping strategy for elite-level snooker players. The present paper further develops this finding by extending the scope to where the knowledge applies, in this case, within the context of cricket bowlers. Similarly, the varied nature of stressors and coping provide an ecologically valid insight into competition, reflecting the dynamic nature of competitive sport. For example, periods of play when the bowler may be 'on top' followed by periods of play when they are not performing so well. This is represented within the data as moments when participants reported higher levels of stressors and less coping and moments when they reported higher levels of coping to seemingly fewer stressors. This finding offers some support to Lazarus's (1991a; Lazarus & Folkman, 1984) TMSC. By extending where these findings apply, practitioners and coaches can be more precise when supporting athletes in a variety of contexts. Whitehead et al. (2015b) reported that higher-skilled golfers actively sought solutions to problems through greater use

of deliberate planning. Therefore, the high use of tactical and technical planning by participants in the present study may be symptomatic of them not dwelling on mistakes or technical errors.

Similarly, this finding extends on previous work by Whitehead et al. (2015b), who found that when highly skilled golfers performed in a pressurised environment, they tended to reinvest and verbalise more about technical elements. It could therefore be suggested that athletes in the present study, after verbalising a stressor, tended to make technical and tactical verbalisations. This finding is in line with Masters' (1992) reinvestment theory whereby individuals focus on the internal technical aspects of their performance when under stressful conditions (e.g., induced by competition). Results from Thelwell et al. (2007) did not report a high level of technical adjustment in cricket batsmen when under stress, despite match specific stressors being reported. It could, therefore, be tentatively argued that athletes may have a lower tendency to reinvestment when doing so retrospectively, thus supporting the use of TA as a data collection method and as a way of capturing the cognitions of athletes.

It is also noteworthy that the reporting of stressors and coping strategies varied both within the individual and between individuals. For example, at times, participants may have reported an influx of stressors while verbalising few coping strategies. Likewise, they may have verbalised an increasing number of coping strategies without stating a higher number of stressors. Each stressor sub-theme was met with a variety of coping responses, both problem-focused and emotion-focused as was highlighted within Table 1. This finding has also been reported in previous research (e.g., Samson et al., 2015; Whitehead et al., 2017; Welsh et al., 2018). Within the context of cricket, this finding could be explained based on the dynamic nature of competitive match play. There may be times when the batsman is performing well and scoring runs. Likewise, the bowler may be performing poorly. The balance of play often switches, and as a result, the reporting of stressors and coping strategies may follow this trend. Alternatively, participants may be engaging in coping strategies that would not necessarily be

verbalised (e.g., breathing exercises). This finding supports Lazarus's (1991a; Lazarus & Folkman, 1984) TMSC as it provides evidence that stressors and coping is a dynamic and recursive process that changes throughout stages of the same performance as a result of changing environmental demands and available personal resources.

The present paper also extends previous TA research exploring stressors and coping both in cricket (e.g. McGreary et al. 2020) and other sports such as golf or tennis (e.g. Nicholls &Polman, 2008; Swettenham et al. 2018) by moving beyond quantifying qualitative data and examining factors such as frequency of citations. Here, the results provide a greater in-depth exploration of the stressor and coping process in an ecologically valid setting. Previous TA research typically collected data during performance of a task in either a training or experimental setting. However, this study has attempted to take a different approach to the data analysis of event performance stressors and coping by acknowledging that stressors and coping may occur differently for different people. This demonstrates how the participants in this study share common stressors and coping responses, although they demonstrate differences in when they verbalised them. Due to the dynamic and varying demands of bowling, a variety of stressors can be experienced and be equally met with coping strategies, as evidenced by the findings in this current study.

A greater understanding of the stressors and coping strategies used by athletes could help facilitate the implementation of effective interventions by practitioners. Within the context of the present study, psychologists could focus their interventions on facilitating the development of the specific problem-focused (technical planning and tactical planning) and emotion-focused (rationalisation) coping strategies in cricket bowlers to manage competitive stressors, although this would be dependent upon examining the effectiveness of the coping strategies used in these studies. This may more effectively prepare athletes to manage the dynamic and changing stressors experienced during competitive performance, increasing the

likelihood of successful outcomes. Likewise, coaches could utilise such information to design sessions that recreate the stressors experienced in competitive situations to facilitate athlete development. For example, coaches could develop sessions based on pressure inurement training, whereby, athletes practice performing skills under pressure in order to deal with the stressors of competition. This typically involves creating a high challenge (e.g., increase demands of training) and high support environment (e.g., brief and debrief athletes; Fletcher & Sarkar, 2016).

Moreover, Nicholls and Polman (2008) highlighted the potential of TA for sports psychologist's assessments of clients, as they would be able to listen to the verbalisations made by their clients during performance of their sport, therefore, being less reliant on more conventional retrospective methods such as interviews or questionnaires. For example, a practitioner would be able to listen to their client's verbalisations following unsuccessful/successful skill execution, which could help to develop and guide interventions and ultimately improve performance. In this study participants verbalisations relating to stressors and coping were captured, which could be used by a practitioner to identify common stressors experienced by a client and identify further methods to help the client cope. Similarly, TA could present an opportunity for players to self-reflect on their thoughts during competitive performance. Whitehead et al. (2016) highlighted the suitability for TA to be used as a reflective tool in their study investigating rugby league coaches using TA.

Despite the proposed benefits of TA, it is vital to highlight the limitations of this approach. As highlighted by Nicholls and Polman (2008), although TA may be suitable for detecting acute stressors and discrete coping strategies, TA may not afford the assessment of ongoing or complex stressors. Moreover, athletes engaging in TA during a performance may only focus on performance-related stressors and ignore stressors that are related to broader life issues, which may be significant to them (Nicholls & Polman, 2008; Nicholls et al., 2009).

Stressor identification is particularly relevant to the present study as all stressors reported were related to performance with no mention of stressors related to broader life (Nicholls & Polman, 2008). Likewise, when using TA as a method for collecting cognitions during performance, it is limited to capturing the coping strategies that are employed during the performance and not any strategies that are applied prior to performance, as was identified by Thelwell et al. (2007) who noted cricket batsmen's use of a pre-performance routine as a salient coping strategy. These limitations may limit the validity of thoughts in relation to a task (Eccles & Arsal, 2017). In addition, although participants regularly engaged in verbalisations of their thoughts, it cannot be guaranteed that all thoughts were verbalised. Samson et al. (2015) posited that participants might not share specific thoughts for various reasons (e.g., social desirability), which may ultimately limit the amount of data gathered. Finally, it is important to add that during this study, no measures of coping effectiveness or performance were collected, therefore, future research should consider the coupling of coping responses and the link to performance outcomes.

This paper has attempted to provide a significant contribution to the current sport psychology literature, by providing an insight into the transactional nature of stressors and coping in cricket bowlers during competition, where there is an authentic sense of winning or losing. However, analysis of the data was a subjective interpretation of participants experiences from the authors. Therefore, future research should consider involving the participant in the data analysis process, such as member reflections (Smith & McGannon, 2018). Member reflections can be used to create 'a meticulous, robust and intellectually enriched understanding through generating additional insights and dialogue' (Smith & McGannon, 2018, p.117). While the present study highlighted critical differences in the transactions made by participants during a competitive performance, it did not investigate potential explanations for these differences. Therefore, the effects of factors such as age, experience, personality, and cultural influences

on an individual's coping ability remain seldom explored. Future research could explore these areas to further our understanding of the factors that influence an individual's ability to cope and manage stressors. Similarly, future research could examine psychological and physiological measures to determine the extent to which participants perceive the task as stressful. For example, participants could complete the Competitive State Anxiety Inventory-2R (Cox et al., 2003) pre-competition. Likewise, attaching heart rate monitors and collecting salivary cortisol samples (Coetzee, 2011) could also be used to measure stress levels. Greater attention in future research should also be given to understanding the roles of appraisals, emotions and coping effectiveness. Adopting a TA methodology may offer a potentially fruitful means of exploring these topics in competitive sport. Finally, a further potential future research direction could be investigating stressors and associated coping strategies of other sports using TA. While sports such as golf (Nicholls & Polman, 2008) and long-distance running (Samson et al., 2015) have been examined, there is potential to adopt TA to other sports, including archery, shooting, and motorsport events. Using TA as a method to assess in-event cognitions could provide a new perspective into the stressors and coping literature and provide a fruitful means for practitioners to work with athletes.

To conclude, the present study has highlighted how stressors and coping occur as a dynamic process, with stressors and coping strategies changing as the course of a competitive game develops. The present study was designed to provide a detailed insight into the stressors and associated coping strategies of cricket bowlers whilst they were performing in a competitive match and addressing limitations of previous research investigating stressors and coping (e.g., Thelwell et al., 2007) using retrospective methods of data collection (e.g., retrospective bias). Furthermore, the present study also aimed to extend on previous TA literature investigating stressors and coping (e.g., Nicholls & Polman, 2008; Welsh et al., 2018; Swettenham et al., 2018), by examining stressors and coping during an ecologically valid

competitive match and extending the scope of where knowledge can be applied. The study provides further support for TA as a method for collecting in-event stressors and coping data within an ecologically valid context. Overall, the present study has provided new insights into the stressors and coping strategies of cricket bowlers through a novel method of data collection (TA) which allowed for the exploration of stressors and coping strategies as they occurred in the moment, during a competitive game.

AUTHOR DECLARATION

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institutions concerning intellectual property.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He/she is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author.

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