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Article

Examining Coaches' Instructional Behavior in Response to Challenge and Threat Feedback

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Abstract: Coaches' experiences of stress are influenced by their perceptions of personal resources to meet situational demands. This study examined the impact of challenge and threat feedback on coaches' instructional behaviors using an experimental manipulation and behavior analysis. We used a single-case experimental design consistent with the principles of applied behavior analysis and conducted follow-up interviews. The Arizona State University Observation Instrument (ASUOI; Lacy & Darst, 1989) was employed to systematically observe coaches' instructional behaviors pre- and post- manipulation, which was delivered by random assignment of challenge or threat feedback to 10 novice coaches. A total of 1,084 instructional behaviors were recorded across both conditions. In the challenge condition, two coaches exhibited relatively large increases in instructional behavior, while three coaches showed small decreases. Coaches in the threat condition demonstrated greater within condition variance as two coaches showed relatively large increases in instructional behavior, two coaches showed large decreases, and one coach showed minimal change. Interview data highlighted the mediating roles of coaches' emotional responses, resource perceptions, and goal orientation in the challenge and threat appraisal process. Implications for practice include the use of reflection to promote coaches' resource perceptions and facilitate adaptive responses to stress.

Keywords: stress; cognitive appraisal; reflection; behavior analysis

Sports coaches encounter a range of stressors including interpersonal, organizational, and performance demands (Norris et al., 2017). Experiences of stress, resulting from the pressurized context in which coaches operate, can have a detrimental impact on coach behavior (Mageau & Vallerand, 2003). For example, coaches have reported negative effects of stress through changes in body language or tone of voice, and by becoming tense, agitated, moody, and less able to focus (Frey, 2007). One study revealed how coaches became “too directive” and “short with athletes” when they experienced stress (Olusoga et al., 2010, p. 281). Another study found that athletes detected coach stress through the coach’s behavior and reported a range of undesirable effects such as poor decision making, lack of awareness, inadequate technical advice, and an inability to motivate others (Thelwell et al., 2017). However, transactional stress theory (e.g., cognitive appraisal theory; Lazarus, 1999) indicates that stress is not always detrimental, but rather, how individuals appraise potentially stressful situations determines the adaptiveness of the stress response. To gain greater insight into coaches’ responses to stress, the current study examined coaches’ instructional behavior and appraisal processes in a pressurized context.

A contemporary stress theory specific to the sporting domain is the revised theory of challenge and threat states in athletes (TCTSA-R; Meijen et al., 2020). The TCTSA-R hypothesizes that athletes entering a stressful situation make appraisals of the performance conditions and their personal resources, which consequently determine their experience of stress as a challenge (beneficial for performance) or threat (debilitative for performance). Similarly, research suggests that coaches’ challenge and threat appraisals may influence their behavioral responses to stressful situations (Dixon et al., 2017). For example, a coach faces a season-defining game against a difficult opponent while being observed by the club’s management. Resource appraisals consist of perceptions of self-efficacy, control, and social support (Meijen et al., 2020). Therefore, if the coach experiences high perceptions of their teaching and management skills, confidence in their tactical preparation, and strong relationships with their athletes, they are likely to enter a challenge state. Conversely, if the coach experiences insufficient resources to meet situational demands, such as lower perceptions of their skills, doubt over their team’s preparedness, and strained relationships with athletes, a threat state is likely to ensue. Additionally, challenge states are characterized by an approach goal orientation (e.g., the coach views the performance situation as an opportunity to demonstrate their skills), whereas threat states are characterized by an avoidance goal orientation (e.g., the coach disengages from the task to avoid being viewed as incompetent; Jones et al., 2009).

An important element of the TCTSA-R is that initial challenge and threat states are not static but changeable; a notion that helps to explain the complex nature of coaches’ cognitive appraisals and their myriad emotional and behavioral responses (Dixon & Turner, 2018). For example, having perceived the game situation as one of high motivational relevance, the coach’s primary appraisal of goal congruence reflects the extent to which the conditions are favorable for success (e.g., recent form, availability of key players); high perceived goal congruence results in the coach entering a challenge state, while low perceived goal congruence results in the coach entering a threat state. However, following this initial appraisal, the reappraisal process outlined in Table 1 dictates the coaches’ behavioral responses through performance mechanisms such as decision-making and task engagement. Accordingly, the coach’s performance can be determined by one of four states: high challenge, low challenge, low threat, and high threat (Meijen et al., 2020). This contemporary four-part bifurcated theory has useful implications for studying coach behavior in stressful situations as a coach can enter a challenge state and not perform effectively or they can enter a threat state and still perform effectively. For example,

research has indicated that performers exhibiting a threat state can perform well if they hold high perceptions of self-efficacy concerning a pressurized task (Turner et al., 2013). Gaining a better understanding of coaches' appraisal processes is an important step towards devising strategies that promote effective behavioral responses in pressurized situations.

Table 1. Four States of Challenge and Threat (Meijen et al., 2020).

State	Goal congruence	Resource appraisal	Performance consequences
High challenge	Conditions are favorable for success.	Sufficient resources to meet demands.	More likely to experience helpful performance mechanisms.
Low challenge	Conditions are favorable for success.	Insufficient resources to meet demands.	Less likely to experience helpful performance mechanisms.
High threat	Conditions are not favorable for success.	Insufficient resources to meet demands.	Likely to experience unhelpful performance mechanisms.
Low threat	Conditions are not favorable for success.	Sufficient resources to meet demands.	Less likely to experience unhelpful performance mechanisms.

In the TCTSA-R it is posited that a high challenge state is associated with superior performance, and a high threat state is related to inferior performance (Meijen et al., 2020). Recent reviews confirm that performance advantages of challenge states are largely consistent across cognitive and behavioral tasks (Behnke & Kaczmarek, 2018; Hase et al., 2019). Indeed, challenge and threat states influence not only physical performance but also effort, attention, and cognitive function (Jones et al., 2009). However, although evidence reveals that challenge and threat states influence athletic performance, research concerning how cognitive appraisals impact sports coaches is sparse. Given that sports coaches must manage a range of demands and have become increasingly recognized as performers in their own right (Olusoga & Thelwell, 2017), the TCTSA-R provides a useful explanatory framework to study coaches' appraisal processes.

Recent studies offer insight into the role of cognitive appraisals when examining coaches' responses to stress. One study found that elite level coaches experienced a challenge appraisal by approaching stressors with enthusiasm and confidence, focusing on the potential to be gained from the stressor, whereas threat appraisals were characterized by goal-related threats and potential damage to wellbeing (Didymus, 2017). In one of the few studies to focus on coach behavior, a cross-sectional investigation of professional coaches indicated that threat appraisal was positively associated with autocratic behavior, and negatively related to positive feedback, whereas challenge appraisal was positively related to social support (Dixon et al., 2017). A further study revealed how negative appraisals impacted coaches' behavior through changes to facial expressions and demeanor, by distancing themselves from others, and a tendency to use more autocratic behavior and fewer instructional techniques (Dixon & Turner, 2018). Thus, consistent with research on athletic performance (Behnke & Kaczmarek, 2018; Hase et al., 2019; Meijen et al., 2020), initial studies into reveal how coaches' challenge and threat appraisals might influence a range of emotional, cognitive, and behavioral responses.

Having established that coaches encounter an array of stressors (Norris et al., 2017), it is necessary to examine their expressed responses (Thelwell et al., 2017). A recent review called for more objective, experimental research on cognitive appraisals, which have received scarce attention in the coaching literature (Olsen et al., 2020). Indeed, most studies into coach stress have adopted qualitative or cross-sectional designs (Norris et al., 2017).

Moreover, given that cognitive appraisals can be conscious or unconscious and may fluctuate as demands and resources are continuously appraised (Jones et al., 2009), these processes may be difficult to verbalize. Therefore, experimental methods that manipulate stress and observe the behavioral consequences of challenge and threat (e.g., Turner et al., 2014) offer more objective indicators of coaches' responses. The current study sought to extend previous research by observing coaches' behavior in response to challenge and threat feedback in a pressurized situation.

The present study aimed to examine the impact of challenge and threat feedback on coaches' instructional behaviors using an experimental manipulation and behavior analysis. This design addresses the limitations of previous research through a more applied focus on coaches' instructional behavior. Research indicates that successful coaches use instruction more than any other coaching behavior, providing athletes with technical and tactical information to make improvements in their performance (Becker & Wrisberg, 2008; Gallimore & Tharp, 2004). Moreover, instructional behaviors are important in developing athlete satisfaction and confidence (Andrew, 2009; Høigaard et al., 2015). We adopted a single-case experimental design (SCED), utilizing applied behavioral analysis to examine novice coaches' instructional behavior pre- and post- challenge or threat manipulation. By adopting this design in a naturalistic setting, we aimed to establish a level of ecological validity that is lacking in extant research. Indeed, studies that analyze coaching behaviors and interventions in the context of real-life goals and constraints can enhance the transfer of coaching research to practice, a widely acknowledged issue in the field (Lyle, 2018).

A sample of novice coaches were given either challenge or threat feedback as this demographic was expected to be highly sensitive to the manipulation. Novice coaches have less knowledge about their skills, and their behaviors are shaped considerably by contextual factors (Benish et al., 2021). For example, compared to experienced individuals, novices' self-efficacy is more influenced by verbal persuasion and the availability of resources (Tschannen-Moran & Hoy, 2007). As self-efficacy is largely based on past performance success (Bandura, 1997), novices will have a less robust sense of self-efficacy compared to those with a larger bank of experiences (Klassen & Durksen, 2014). Moreover, given that resource appraisals involve perceptions of knowledge and skills, experienced coaches with higher resource perceptions may have perceived the situation as non-evaluative (Blascovich & Mendes, 2000).

Challenge and threat research (e.g., Dixon & Turner, 2018; Turner et al., 2013) suggests that challenge feedback would facilitate higher resource perceptions, greater task engagement, and an approach goal orientation. Conversely, threat feedback induces lower resource perceptions, decreased task engagement, and an avoidance goal orientation. Therefore, it was hypothesized that challenge feedback would lead to increases in the frequency of instructional behaviour, whereas threat feedback would lead to decreases in the frequency of instructional behaviour.

Methods

Participants

The sample consisted of 10 upper-division undergraduate students at a U.S. university, two females and eight males ($M = 23.20$ years, $SD = 3.71$), with an average of 2.40 ($SD = 1.78$) years of coaching experience. Students were final year kinesiology majors, earning a minor in athletic coaching. Participants were purposively recruited from a 'directed coaching experience' course that required students to deliver a 50-minute assessed coaching session and complete a coaching internship. Students were required to pass this assessment to

graduate with the coaching minor. Participants had completed six units of study on coaching-related courses and were actively coaching at a competitive level at a club, high school, or college. Sports coached included baseball, basketball, football, gymnastics, soccer, and volleyball.

Design

Consistent with the principles of applied behavior analysis (Cooper et al., 2007), we employed a single-case AB design to compare coach behavior before (A) and after (B) the manipulation. SCEDs control for several threats to internal validity and facilitate the analysis of a relationship between manipulation of the independent variable (challenge or threat feedback) and change in the dependent variable (instructional behavior) (Horner et al., 2005). A recent meta-analysis supported SCEDs as an appropriate method to distinguish idiosyncratic effects in response to behavioral interventions (Barker et al., 2020). When studying coach stress, single-subject research designs may be more appropriate than large between-group designs (Olusoga & Thelwell, 2017). In support, studies of small samples enable precise measurement, effective experimental control, and quantitatively exact theory (Smith & Little, 2018). By analyzing the actual responses of fewer participants, SCEDs enable thorough investigation of each participant by accounting for individual variability, rather than averaging responses in larger designs which can obscure important functional relations (Normand, 2016). Moreover, SCEDs are appropriate for contexts characterized by large variability in individual performance (Hall & Getchell, 2014), such as sports coaching, where individuals act according to their perceptions of specific contexts (Cassidy et al., 2009).

Procedure

Behavior Analysis

Previous studies have utilized verbal instructions to manipulate challenge and threat states through resource appraisals (e.g., Turner et al., 2014). In the current study, coaches were randomly assigned challenge or threat instructions in the form of verbal feedback designed to manipulate resource appraisals in line with the TCTSA-R (Meijen et al., 2020). Challenge feedback aimed to promote self-efficacy and control over the outcome. Threat instructions aimed to demote self-efficacy and emphasized a lack of control over the outcome (appendix A.). To augment the manipulation, false performance feedback (Feinberg & Aiello, 2010) was provided regarding the athletes' engagement and performance improvement within the session. Instructions were provided verbally by the course instructor to each participant during a short break after their baseline session. These instructions ensured the intervention was consistent across participants, thus maintaining procedural reliability, a key indicator for determining quality in SCED's (Barker et al., 2020).

Ethical approval was granted through the Institutional Review Board at San Francisco State University. Informed consent and video release agreements were obtained. Although the assessment was a course requirement, participants could opt out of the data collection process. All students enrolled in the course chose to participate. Consistent with SCEDs, participants acted as their own controls to establish baseline levels (Hall & Getchell, 2014) by coaching for an initial 25-minutes. The course instructor administered the manipulation by providing feedback to the coach through challenge or threat instructions. Participants then coached the same skill for a second 25-minute period, after which, they were immediately debriefed on the nature of the study and received genuine feedback on their coaching performance. Only the baseline was assessed as part of the course requirements, so the manipulation did not impact the participants' grade.

However, participants were informed that the entire session would be assessed at 40% of the course grade. This design feature was important because the challenge and threat process is initiated in motivated performance situations, which are defined as goal-relevant and task engaging (Blascovich & Mendes, 2000). Moreover, the demands of being observed, video recorded, and assessed have been identified by coaches as stressful and threatening (Didymus, 2017; Dixon et al., 2017). The study procedures are outlined in figure 1.

To maintain ecological validity, it was important to ensure that coaches' behavioral responses were observed in a naturalistic setting, therefore, we avoided manipulation checks during the sessions. While previous research has evaluated challenge and threat states through measures such as cardiovascular reactivity and questionnaires (e.g., Turner et al., 2014), these measures may have created an unnatural coaching environment, consequently limiting the applicability of the findings. As an alternative, interviews were conducted three to five days after each participants' session to study the coaches' experiences of the manipulation.

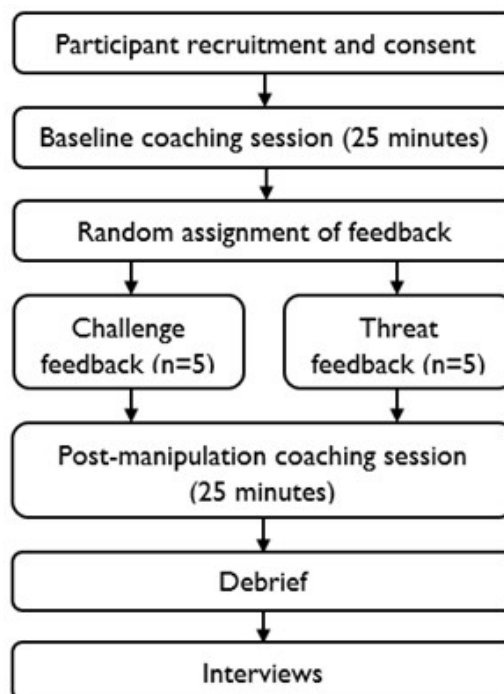


Figure 1. Data collection procedures.

Interviews

Consistent with the idiographic nature of the study, interviews were used to obtain information on the cognitive processes underlying coaches' behavior, enabling the examination of experiential and situational factors (Smith & Cushion, 2006). A semi-structured interview guide generated important information while also providing flexibility for the participants to describe their thoughts and feelings (Sparkes & Smith, 2014). The first author, who is trained in qualitative methods, conducted each interview in-person. Questions focused on participants' experiences of the procedures (e.g., "how did you feel during the assessment?") and responses to the manipulation (e.g., "what were you thinking having heard the feedback?"). Interviews lasted 35-50 minutes.

Interviews were analyzed thematically (Braun et al., 2019) to examine the processes underlying the coaches' behaviors. Firstly, a familiarization stage consisted of reading textual

data, noting any interesting items. At this stage, the first and third authors sought to establish trustworthiness by documenting theoretical and reflective thoughts regarding potential codes and themes (Nowell et al., 2017). Secondly, codes were generated by attaching labels to organize similar data. Thirdly, codes were reviewed, and initial themes were generated through researcher triangulation and diagramming (Nowell et al., 2017). Specifically, discussions between the first, second, and third authors prompted the exploration of alternate interpretations of the data (Smith & McGannon, 2018). Next, clear definitions were devised to capture the scope of each theme. The analysis was then reported by identifying the themes generated for each coach with supporting data extracts.

Data analysis was both inductive and deductive as codes generated in the initial stages were later categorized into themes relating to the TCTSA-R (Meijen et al., 2020). This approach ensured meaningful coherence through a logical connection of concepts throughout the study (Tracy & Hinrichs, 2017), which was especially pertinent given the multiple methods of data collection. The triangulation of behavior analysis and interviews sought not to validate the different data sets but to generate a more complete understanding of coaches' responses to challenge and threat feedback. Thick descriptions of the qualitative data are provided to promote transparency and transferability of findings by enabling the reader to draw their own conclusions (Smith & Sparkes, 2020).

Experimental Controls

Several steps were taken to control for confounding variables. Firstly, to reduce the likelihood of participants displaying 'desirable behaviors' the assessment criteria for the session did not include specific behaviors (e.g., feedback, demonstration). Rather, participants were assessed on more general concepts (e.g., providing learning opportunities, organization of practices). Similarly, there was no mention of specific behaviors in the challenge and threat instructions. Secondly, to prevent cross contamination, participants were asked not to divulge the content of the feedback. Thirdly, to ensure consistency across the coaching sessions, participants were required to deliver 'technical' coaching practices and teach a specific skill throughout their assessment. Lastly, coaches chose a skill they were familiar with as an individual's perception of their knowledge and skills relevant to situational performance is a key determinant of the appraisal process (Blascovich & Mendes, 2000). Moreover, collecting data in a naturalistic context meant that any effects were observed on ecologically valid tasks (Barker et al., 2011).

Instrument

Coach behavior was analyzed using the Arizona State University Observation Instrument (ASUOI; Lacy & Darst, 1989). The ASUOI is a recognized standard for the analysis of coach behavior and demonstrates greater reliability than similar instruments (O'Donoghue & Mayes, 2013). The ASUOI contains 13 behavioral categories grouped into three types of behaviors: instructional (pre-instruction, concurrent instruction, post-instruction, questioning, physical assistance, positive modelling, and negative modelling), non-instructional (hustle, praise, scold, management, other) and dual codes (use of first name). Instructional behaviors consist of information carrying statements concerning skills and strategies that are central to effective coaching. Although pre-defined categories of behavior do not capture the full complexity and nuance of what coaches do, the ASUOI is one of the most reliable and widely used instruments available (Hall & Gray, 2016). Thus, the ASUOI offered clear comparisons between baseline and post-manipulation instructional behaviors as we visually inspected tabulated data for each participant to determine whether changes occurred (Turner et al., 2020). Visual analysis was appropriate in the current study

as it is widely accessible and encourages a minimum transformation of the data (Ferron & Foster-Johnson, 1998).

Reliability

The observers (authors two and three) completed a training manual designed for researchers using the ASUOI (Solomon & Reece, 1995). The observers then analyzed a recorded coaching session together. After each distinct action, the video was paused, and the observers independently coded the behavior according to the ASUOI definitions. If they agreed on the coding category, data were entered. If they did not agree, the segment was viewed again. This consensus-building technique was used to determine the coding of all coach behaviors (Becker & Wrisberg, 2008). The observers then independently coded a second coaching session. Reliability tests revealed an agreement of 80.6%, which did not meet the 85% agreement criterion (van der Mars, 1989). Thus, an additional phase required the observers to independently code a third session by identifying specific time-stamped behaviors. Following further consensus-building, a final recorded session was independently analyzed, yielding an agreement of 96%. Each observer was randomly assigned five recorded sessions and was blind to the feedback given.

Results

Behavior Analysis

Across the 10 sessions, a total of 1,084 instructional behaviors were recorded. The frequency of baseline instructional behaviors ranged from 20-93. Visual inspection of single-case behavioral analyses revealed individual changes in coaches' instructional behavior following both challenge and threat feedback. In the challenge condition, two coaches increased their instructional behavior following the feedback, while three coaches decreased their instructional behavior (Figure 2). In the threat condition, three coaches increased their instructional behavior following the feedback, while two coaches decreased their instructional behavior (Figure 3).

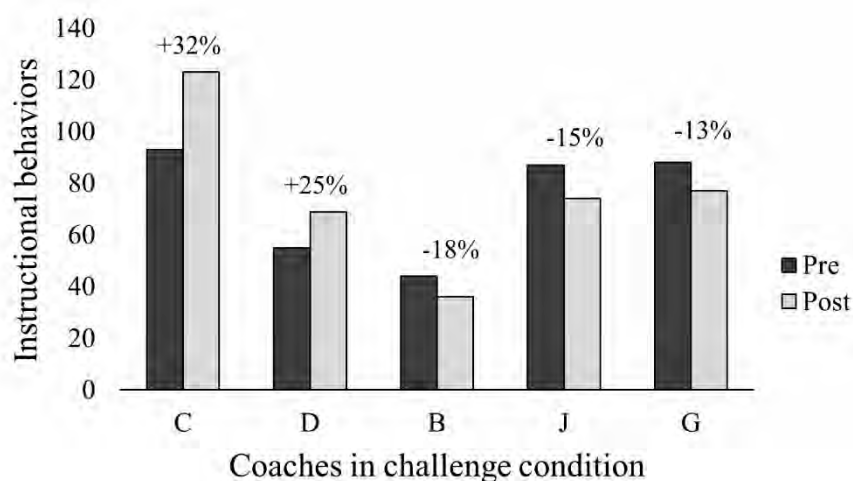


Figure 2. Changes in instructional behavior pre- and post- challenge feedback. Individual coaches represented by letters.

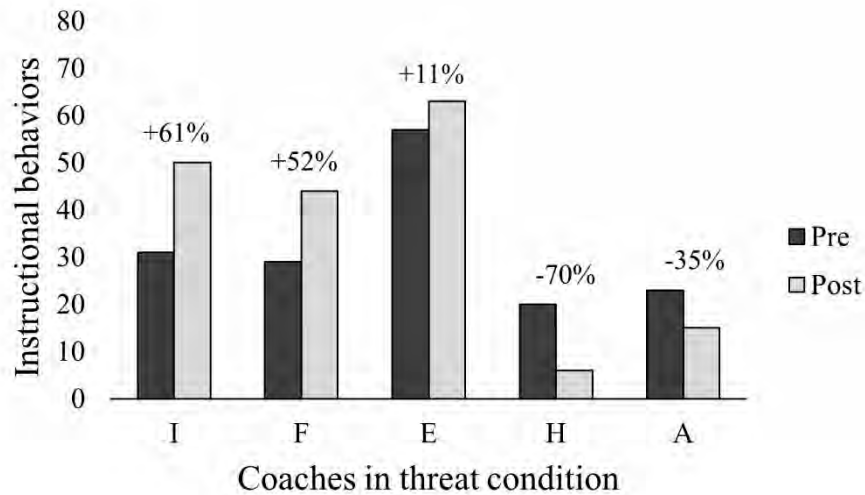


Figure 3. Changes in instructional behavior pre- and post- threat feedback. Individual coaches represented by letters.

Interviews

Thematic analysis of qualitative data yielded four main themes that underpinned the coaches' behavioral responses: positive emotion, resource perceptions, negative emotion, and goal orientation. Themes and codes are attributed to coaches in Table 2, with coaches represented by letters corresponding to Figures 2 and 3.

Table 2. Thematic analysis of qualitative data by condition.

Theme	Code	Challenge condition					Threat condition				
		C	D	B	J	G	I	F	E	H	A
Positive emotion	Enjoyment	x		x	x	x					
	Energy			x	x						
Resource perceptions	Knowledge	x	x	x		x	x	x	x		
	Self-efficacy	x	x	x		x					
Negative emotion	Anxiety						x		x	x	x
	Confusion						x	x	x		x
Goal orientation	Approach	x	x	x			x	x	x		
	Avoidance									x	x

Positive Emotion

Most of the coaches in the challenge condition reported feeling more joyful or energetic following the manipulation, while none of the coaches in the threat condition reported positive emotions. These findings were expected as instructions that promote perceptions of resources can lead to challenge states (Turner et al., 2014), and consequently, participants are more likely to experience positive emotions (Meijen et al., 2020). Although positive emotional responses were largely consistent across coaches in the challenge condition, qualitative data suggested that positive emotion did not have a substantial nor consistent

impact on coaches' instructional behavior. Nonetheless, coaches described how their behavioral responses were subtly influenced by positive emotion following the challenge feedback.

I felt great after [the feedback]. It meant a lot to me just because I've done a lot of coaching and thought it really did reflect. I don't think it impacted my coaching directly, I think it just made me feel better about it in general that I was doing it right from the start and that everything I was doing was good [pause] but yeah, it definitely brought up my personal behavior a little bit. (Coach C - challenge)

My levels of excitement probably went up slightly... So, if it affected me, it's not to a point where you can see it in my face, but you know, in terms of intrinsic motivation. (Coach J - challenge)

Resource Perceptions

Most participants in the challenge condition reported experiences of increased self-efficacy following the manipulation, whereas none of the coaches in the threat condition described experiences of heightened self-efficacy. These findings were expected as evaluative feedback influences individuals' experiences of self-efficacy, while maintaining a sense of efficacy is difficult when significant others express doubt about one's capabilities (Bandura, 1997). However, several participants across both conditions described how they reflected on their coaching experience and knowledge to meet the demands of the assessment.

Because of that confidence, I was able to focus more on giving feedback and having them learn, more than me getting graded on what was going on. So, my behavior, because I was more confident, I was able to be happier, I was able to enjoy [the session] more. (Coach B - challenge)

Just past experience teaching here... Like all semester, classes that we had to create the lessons and stuff like that. So, from those experiences, I was like 'you know what, I can do this. I've done this before and it's okay, like, I got this.' (Coach I - threat)

Negative Emotion

Participants in the threat condition reported experiences of anxiety, which included descriptions of nervousness and panic. Coaches in the threat condition also described feelings of confusion and indecision in the second half of their session. None of the coaches in the challenge condition reported experiences of negative emotion in response to the manipulation. These findings were consistent with theory and research as threat states are typically associated with negative emotions (Jones et al., 2009), and novices are likely to experience increased stress following negative feedback (Klassen & Durksen, 2014).

I was definitely a lot more stressed, I felt that I just had to slow things down a bit... I was definitely on edge after the feedback. I would say that I tried to have a little bit more control, I thought of things that could engage them more. (Coach E - threat)

It's like my version of like tunnel vision... I think in that moment for the next two to three minutes, I'm thinking about it, you can probably see a really blank expression on

my face. Like I'm here staring off into space. I have no idea what's in front of me because I'm in my mind right now. (Coach F - threat)

Goal Orientation

Coaches in both conditions described how they adopted an approach goal orientation by focusing on the opportunity to perform effectively in the assessment. These findings were expected for coaches in the challenge condition as individuals focused on approach goals are more likely to strive for competence and view demanding events as a challenge (Jones et al., 2009). Interestingly, several coaches in the threat condition described an approach focus through enhanced attentiveness, whereas two participants in the threat condition reported an avoidance focus that coincided with their disengagement from coaching. Thus, coaches experienced different goal orientations despite receiving the same feedback.

I was much more relaxed before, almost a little lackadaisical. [The feedback] kind of woke me up, you know? I wasn't necessarily like stern or serious, but I was firmer, much more of a critic in their movements. (Coach F - threat)

I just started giving less and less feedback and instructions, I just kind of turned off once I got that feedback. I was showing negativity to the players, and then I was kind of giving up on the session. I felt like I stopped coaching at that point. (Coach A - threat)

Discussion

The current study was the first to use applied behavior analysis to examine the influence of challenge and threat manipulations on coach behavior. Single-case analyses revealed specific individual responses to the challenge or threat feedback in a naturalistic setting, with six of the ten novice coaches demonstrating at least a 25% change in the frequency of instructional behavior following the manipulation. Two of the five coaches in the challenge condition increased their instructional behaviour following manipulation. Two of the five coaches in the threat condition decreased their instructional behaviour following the manipulation. Therefore, the hypotheses that coaches would exhibit a greater frequency of instructional behaviours following the challenge feedback, whereas coaches in the threat condition would display fewer instructional behaviours were only partially supported. Interview data offer explanations of idiographic changes through themes of positive emotion, resource perceptions, negative emotion, and goal orientation. Findings from the behavior analysis and interviews contribute to knowledge of the mechanisms underlying coach behavior in pressurized situations, culminating in recommendations for promoting adaptive responses to stress.

One explanation for the increased instructional behavior demonstrated by two coaches in the challenge condition is that coaches experienced heightened perceptions of personal resources. Data revealed how these coaches reflected on their previous coaching experience and sport specific knowledge to perform effectively in the assessed coaching session. Additionally, four coaches in the challenge condition referred to experiences of heightened self-efficacy following the manipulation. As past performances are the most important source of efficacy information, self-efficacy typically increases when individuals repeatedly appraise their experiences as successes (Bandura, 1997). Reports of enhanced resource perceptions combined with the high goal congruence promoted by the challenge feedback suggest that coaches C and D experienced a high challenge state, characterized by an increase in useful performance mechanisms such as effective attentional skills (Meijen et al., 2020). Enhanced perceptions of personal resources could enable coaches to share more

resources with their athletes (e.g., through feedback and instruction) having managed the situational demands of the assessment (Dixon et al., 2017). Indeed, following the challenge feedback, these coaches revealed an approach focus to their session, as they reported greater engagement in teaching and interaction with less focus on external factors such as the evaluation of their practice. These responses corroborate previous research showing that coaches experienced challenge by approaching stressors with confidence while focusing on the potential to be gained from a stressor (Didymus, 2017). Current findings add to the knowledge base by demonstrating how coaches' reflection on their experience and knowledge might facilitate enhanced resource perceptions and subsequent useful behavioral responses in pressurized situations.

Despite reporting positive emotions, three coaches decreased their instructional behavior after the challenge feedback. These findings may be indicative of a low challenge state if the coaches perceived insufficient resources to meet the demands of the situation (e.g., lack of experience coaching adults), and were therefore less likely to experience useful performance mechanisms such as effort, attention, and cognitive function (Jones et al., 2009; Meijen et al., 2020). However, two of these coaches reported positive perceptions of cognitive resources despite a decline in instructional behavior. A discrepancy between the behavior analysis and self-report data could be explained by the notion that individuals may not have conscious awareness of their cognitive appraisals (Jones et al., 2009). Moreover, it is possible that challenge was expressed non-verbally. For example, individuals who evaluate a pressurized task as a challenge appear more dominant, confident, and composed (Brimmell et al., 2018). Current findings reveal that while challenge feedback consistently led to positive emotional responses, behavioral responses were individualistic and varied, thus reflecting the idiosyncratic and situational nature of stress appraisals (Blascovich & Mendes, 2000). Practitioners might help coaches to enhance their resource appraisals through challenge-oriented conversations that prompt coaches to reflect on their knowledge and experience of providing effective instruction.

Participants who received the threat feedback demonstrated greater within condition variance of behavioral responses compared to those in the challenge condition as three coaches exhibited increases in instructional behavior, whereas two coaches demonstrated large decreases. Coaches described how the anxiety and confusion experienced following the threat feedback resulted in a narrowed attentional focus and withdrawal from interactions. Furthermore, due to the perceived demands of the assessment, coaches prioritized managing the practice environment over improving athlete performance through instruction. These responses are consistent with cognitive appraisal theory as threat states are characterized by avoidance through closed body posture, general orientation away from the stimulus, and lower task engagement (Blascovich & Mendes, 2000; Jones et al., 2009). Indeed, by experiencing low goal congruence and low resource perceptions, a high threat state leads to anxiety and unhelpful performance mechanisms (Meijen et al., 2020). Current findings are also comparable to previous research that highlighted coaches' unhelpful behavioral responses to stress (Frey, 2007; Olusoga et al., 2010; Thelwell et al., 2017), such as the negative association between coaches' threat appraisals and the provision of positive feedback (Dixon et al., 2017). Current findings add to extant research by explicating the mechanisms of attentional narrowing and motivation to control the practice environment rather than provide instruction.

An unexpected finding was the large increase of instructional behavior exhibited by two coaches following the threat feedback. These responses might reflect a low threat state as coaches perceived sufficient resources to meet the demands of the situation and demonstrated adaptive responses through enhanced task engagement. Additionally, coaches

were likely to experience negative emotions but perceive them as facilitative (Meijen et al., 2020). For example, interview data revealed how coaches' experiences of anxiety coincided with increased attentiveness toward their athletes, with coaches subsequently offering more corrective feedback. Findings suggest coaches can perform effectively despite experiences of negative emotion, supporting research that revealed useful responses to stress such as increased motivation and focus (Frey, 2007; Olusoga et al., 2010). The current study contributes to literature on coaches' adaptive cognitive and behavioral responses to stress by highlighting the mediating roles of resource perceptions and approach goal orientation. Thus, coaches might prepare for experiences of threat by identifying performance cues to attend in pressurized situations, thereby encouraging greater task engagement.

The large variance of behavioral responses might also be explained through participants' dispositional appraisal style. For example, some coaches might have felt more comfortable entering their assessment due to recent positive coaching experiences (Jones et al., 2009). Given that coaches were facing a potentially stressful situation, it is possible that they entered a challenge or threat state at the start of the assessment, which subsequently mediated their response to the manipulation. Moreover, trait challenge can predict an individual's approach and response to motivated performance situations (Meijen et al., 2020). For example, Cumming et al. (2017) found that elite rowers were highly predisposed to challenge, becoming more challenged through events of increasing magnitude. Research also reveals that irrational beliefs are an important dispositional factor in the cognitive appraisal process (Chadha et al., 2019), and are associated with greater threat among sports coaches (Dixon et al., 2017). Future research might assess coaches' cognitive appraisals of stress before and during a motivated performance situation to determine whether dispositional variables influence coach behavior.

The behavior analysis and interview data revealed that challenge and threat feedback influenced coach behavior. These findings are of practical significance for coaches and sport psychology practitioners. Increases in instructional behavior typically coincided with participants' reflections on their coaching knowledge and experience, suggesting an enhanced awareness of their capability to perform in pressurized contexts. For example, coaches' beliefs about their skills and abilities, established through reflection on previous successful experiences, can promote self-efficacy (Dixon & Turner, 2018). Therefore, coaches' reflections on their experience and knowledge could be an important facet in determining how they respond in stressful situations. Indeed, reflection interventions can enhance coaches' self-awareness of the demands they face and lead to lasting behavior change (Hägglund et al., 2021). Findings in the current study suggest that reflection can be utilized to promote challenge states by enhancing coaches' resource perceptions.

Limitations of the current study offer directions for future research. Firstly, coach behavior was only observed in one session. Having one opportunity to complete the assessment was important to ensure participants experienced a pressurized and personally relevant situation. However, future studies might use multiple baselines typical of more complex SCEDs to establish greater stability of individual coach behavior. Future studies might also employ cross-over experimental designs to analyze differences between challenge and threat conditions using appropriate statistical tests. Secondly, behavior analysis tools like the ASUOI measure quantities of coach behavior without consideration of contextual factors or the effectiveness of specific behaviors. For a more nuanced perspective of coaches' stress responses, further research could examine athletes' perspectives and responses to coach behavior following challenge and threat manipulations. Additionally, coaches could view videos of their practice in challenge and threat conditions to prompt deeper reflection on the cognitive processes that underpin their behaviors (e.g.,

Carson, 2008). Thirdly, although the small sample size of 10 novice coaches is typical of single-case experimental designs, caution must be taken when applying the findings to other contexts. Thus, future research could recruit larger and more diverse coach populations, such as those working at the collegiate and elite level, to build collective evidence on coaches' cognitive appraisals and behavioral responses.

Conclusions

The current study makes a novel contribution as the first to examine coaches' behavioral responses to challenge and threat manipulations in a naturalistic setting and the first to analyze coaches' stress responses using the TCTSA-R as an explanatory framework. Behavioral responses were individualistic with challenge and threat feedback leading to varied changes in coaches' instructional behaviors. Challenge feedback enhanced coaches' positive emotions and self-efficacy, but behavioral responses were determined by resource perceptions such as experience and ability. Findings indicate that coaches can respond positively to threat feedback by becoming more focused on their athletes' performances, or negatively through a lack of engagement and withdrawal, reflecting the idiosyncratic and complex nature of cognitive appraisals. The findings support a central tenet of the TCTSA-R, as initial appraisals did not necessarily determine the coaches' behavior, and extend previous research by highlighting the role of reflection in enhancing resource perceptions that could subsequently promote challenge states and facilitate coach performance in pressurized situations.

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Appendix A

Table A1. Challenge and threat instructions.

Challenge	Threat
Because of the way you have coached in the last session the participants are engaged and have shown improved performance.	Because of the way you have coached in the last session the participants have lacked engagement and have not shown improved performance.
Your coaching performance has been above average in comparison to your peers and coaches of a similar level.	Your coaching performance has been below average in comparison to your peers and coaches of a similar level.
If your coaching leads the participants to continued improvements, your coaching performance will be judged as excellent.	The participants need to show continued improvements for your coaching performance to be judged as good.

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