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10 Examining the relationships between challenge and threat cognitive appraisals and coaching  
11 behaviours in football coaches

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1 Examining the relationships between challenge and threat cognitive appraisals and coaching  
2 behaviours in football coaches.

### 3 **Abstract**

4 Previous research demonstrates that sports coaching is a stressful activity. This article  
5 investigates coaches' challenge and threat cognitive appraisals of stressful situations and  
6 their impact on coaching behaviour, using Blascovich and Mendes' (2000) biopsychosocial  
7 model as a theoretical framework. A cross-sectional correlational design was utilised to  
8 examine the relationships between irrational beliefs (*Shortened general attitude and belief*  
9 *scale*), challenge and threat appraisals (*Appraisal of life events scale*), and coaching  
10 behaviours (*Leadership scale for sports*) of 105 professional football academy coaches.  
11 Findings reveal significant positive associations between challenge appraisals and social  
12 support, and between threat appraisals and autocratic behaviour, and a significant negative  
13 association between threat appraisals and positive feedback. Results also show that higher  
14 irrational beliefs are associated with greater threat, and lesser challenge cognitive appraisals.  
15 However, no associations were revealed between irrational beliefs and challenge cognitive  
16 appraisals. Additionally, findings demonstrate a positive relationship between age and  
17 training and instruction. Results suggest that practitioners should help coaches to appraise  
18 stressful situations as a challenge to promote positive coaching behaviours.

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21 **Keywords:** Challenge and threat, coaching, stress

## 1    **Introduction**

2    Coaching is considered to be a stressful occupation (Gould, Guinan, Greenleaf, & Chung,  
3    2002). Research has identified 182 distinct stressors amongst elite coaches (Thelwell,  
4    Weston, Greenlees, & Hutchings, 2008), with one investigation revealing a wide range of  
5    stressors related to conflict, pressure, isolation, athlete concerns, the competition  
6    environment, and competition preparation (Olusoga, Butt, Hays, & Maynard, 2009).  
7    Coaching stress could even result in coaches dropping out of the profession (Frey, 2007).  
8    Indeed, one investigation revealed moderate to high levels of burnout amongst 261  
9    collegiate tennis coaches (Kelley, Eklund, & Ritter-Taylor, 1999). The notion that sports  
10   coaches are subject to a vast array of stressors which can damage performance and  
11   psychological well-being warrants further exploration.

12            Extant research details the potential antecedents of coaching stress. For example,  
13   Thelwell et al. (2008) revealed that coaching stress emanates from performance aspects  
14   (divided into coaches' own performance and that of their athletes) and organisational  
15   (environmental, leadership, personal and team) factors. However, research examining how  
16   stress can influence coaching behaviour is sparse. Some evidence indicates that stress can  
17   deplete coaches' psychological resources, restricting their ability to attune to their athletes'  
18   thoughts and feelings, damaging the coach-athlete relationship (Mageau & Vallerand, 2003).  
19   Moreover, research illustrates that coaches who are highly stressed by competition rate  
20   themselves as significantly less warm-hearted than their low-stressed colleagues (Kellmann  
21   & Kallus, 1994). Similarly, coaches reporting high-levels of stress experience more burnout  
22   and a need to distance themselves from others (Kelley et al., 1999). One coach in Frey's  
23   (2007) study revealed that when she experiences stress, her unapproachable manner could  
24   cause her athletes to avoid her and refrain from discussing any issues. Therefore, coaches'

1 stress can impact athletes, leading to detriments in coach satisfaction and performance  
2 accomplishments (Jowett & Cockerill, 2003).

3 Past research has considered stress as a unidirectional construct where high stress is  
4 deleterious, and low stress beneficial. However, stress can be perceived positively and used  
5 constructively by coaches. Frey (2007) found that coaches could actually respond to stress  
6 positively through enhanced focus and motivation. Stress theory has recognised the  
7 multidimensional nature of stress, considering stress to be transactional and largely  
8 dependent on individual perception. Lazarus and Folkman's (1984) model of psychological  
9 stress suggests that individuals are constantly evaluating the events they encounter, and that  
10 these evaluations involve primary and secondary cognitive appraisals. Primary appraisals  
11 are needed for the identification and evaluation of the event. Irrational beliefs, particularly  
12 beliefs that reflect demands (e.g., "I must succeed"), are considered an important part of  
13 primary appraisal (Hyland, Shevlin, Adamson, & Boduszek, 2014). Irrational beliefs are  
14 rigid, extreme, and illogical beliefs that are associated with greater stress and anxiety (e.g.,  
15 Turner, 2016), thought to be organised like evaluative schemas (e.g., DiGiuseppe, 1996).  
16 Therefore, irrational beliefs about performance may distort the primary appraisal process  
17 (David, 2003; David, Lynn, & Ellis, 2010). Secondary appraisals are seen as the assessment  
18 of resources used to cope with the perceived situation. Therefore, if insufficient resources  
19 are perceived in a given situation, a maladaptive stress response (threat) is elicited. In  
20 contrast, if sufficient resources are perceived, an adaptive stress response (challenge) is  
21 elicited. In more contemporary challenge and threat theory, Blascovich and Mendes' (2000)  
22 biopsychosocial model (BPS) considers challenge as an adaptive approach to a motivated  
23 situation (e.g., personally relevant situation such as a competition or interview), whereas  
24 threat is described as a maladaptive approach to a motivated situation.

25

1           In challenge and threat theory, the cognitive appraisal process is the central mediator  
2 of challenge and threat, and the BPS model distinguishes both demand and resource  
3 appraisals as part of this process. The demand appraisals consist of perception of danger,  
4 uncertainty and required effort. For example, the coach's team may be losing to a less  
5 regarded opponent (danger to self-esteem), the coach is unsure how this may impact their  
6 job security (uncertainty), and they believe it will take significant resources to succeed  
7 (effort). The resource appraisals relate to how the individual copes with the demands and  
8 include skills, knowledge, and dispositional factors (e.g., self-esteem, sense of control,  
9 personality traits). For example, a coach is more likely to experience challenge if they recall  
10 previous games in which they have won from a losing position (skill and experiences), have  
11 confidence in their tactical understanding (knowledge), and they generally see stressors as a  
12 challenge. Challenge and threat theory provides a more accurate way to examine coaching  
13 stress, allowing stress to be assessed as a multidimensional construct, rather than a  
14 unidirectional construct, in line with contemporary theory and research (Jones, Meijen,  
15 McCarthy, & Sheffield, 2009).

16           The present study contributes to the extant research in a number of ways. First, this  
17 study explores the relationships between challenge and threat, and coaching behaviour, as  
18 little past research has investigated the behavioural consequences of challenge and threat.  
19 Theory suggests that threat is associated with avoidance goals, which orient the individual  
20 away from undesired situations (Blascovich, 2014). One study showed that during a social  
21 interaction task, threat resulted in greater freezing, avoidance posture, and less smiling  
22 (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). Research in sport also indicates that  
23 challenge is related to superior performance compared to threat (e.g., Moore, Vine, Wilson,  
24 & Freeman, 2012; Turner, Jones, Sheffield, & Cross, 2012), but no research has examined a  
25 coach sample. In addition, while some studies have examined the role of irrational beliefs in

1 cognitive appraisal (e.g., David, Schnur, & Belliou, 2002), research has not explored the  
2 associations between irrational beliefs, and challenge and threat, with sport literature yet to  
3 consider irrational beliefs alongside challenge and threat cognitive appraisals.

4 Literature indicates that coaching is a stressful activity which can negatively affect  
5 coaches' behaviour and relationships with their athletes. However, whilst research findings  
6 have identified the causal components of coach stress, there is a dearth of research  
7 examining the multidimensional nature of stress, and the notion that stress can be both  
8 adaptive and maladaptive (Fletcher & Scott, 2010). The primary aim of the present study  
9 was to examine the relationships between challenge and threat cognitive appraisals and  
10 coaching behaviour in relation to a particularly stressful recent coaching event. The  
11 secondary aim was to examine the influence of irrational beliefs on coaches' challenge and  
12 threat cognitive appraisals.

13 Based on theory (Blascovich, 2014) and past research (e.g., Mendes et al., 2007) it  
14 was hypothesised that challenge cognitive appraisals would be positively related to positive  
15 coaching behaviours, and negatively related to negative coaching behaviours. In parallel, it  
16 was hypothesised that threat cognitive appraisals would be negatively related to positive  
17 coaching behaviours, and positively related to negative coaching behaviours. Finally, based  
18 on irrational beliefs research (Hyland et al., 2014) and theory (DiGiuseppe, 1996), it was  
19 hypothesised that higher irrational beliefs would be associated with greater threat, and lesser  
20 challenge.

## 21 **Method**

### 22 *Participants*

23 Participants were 105 soccer coaches with an age range of 19 to 66 years ( $M_{age} = 33.19$ ,  $SD$   
24  $= 10.27$ ). To ensure an appropriate level of coaching knowledge and experience, all coaches  
25 held a minimum level of qualification of the Football Association (FA) level 2 award in

1 football coaching (The Football Association, 2016), and coached at the academy level in the  
2 United Kingdom (UK). Academies are youth development programmes associated to elite  
3 professional clubs for players between nine and 18 years (Cushion & Jones, 2006).  
4 Participants were recruited at training events organised by the national governing body and  
5 via email communications to academy managers and directors of coaching at UK football  
6 academies. Institutional ethical approval was obtained and all participants completed  
7 informed consent before data collection.

#### 8 *Measures*

9 *Shortened general attitude and belief scale (SGABS).* The SGABS (Lindner, Kirkby,  
10 Wertheim, & Birch, 1999) comprises of 26 items forming two main subscales; total  
11 irrationality (22 items) and rationality (4 items). Participants were asked to indicate the  
12 extent that they agreed with each of the 26 statements on a 5-point scale ranging from 1  
13 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicative of stronger beliefs.  
14 The SGABS has shown high test-retest reliability ( $r = .91$ ; Lindner et al., 1999), and  
15 acceptable construct, concurrent, convergent, and discriminate validity (MacInnes, 2003).  
16 The SGABS was selected due to its previous use in sport settings (e.g., Turner & Barker,  
17 2013). Given the focus of the current study on irrational beliefs, only the total irrational  
18 beliefs subscale was used. Cronbach's  $\alpha$  for total irrational beliefs in the current sample was  
19  $\alpha = .94$ .

20 *Appraisal of life events scale (ALE-scale).* The ALE-scale (Ferguson, Matthews & Cox,  
21 1999), comprises 16 adjectives which participants were asked to rate in relation to their  
22 perceptions of their most stressful coaching experience (which the participants described in  
23 qualitative form) within the last month on a six-point Likert scale from 0 (*not at all*) to 5  
24 (*very much so*). Mean scores of the sums of specific items were used to determine challenge



1 and threat. Cronbach's  $\alpha$  for the ALE-scale in the current sample were  $\alpha = .85$  for  
2 challenge, and  $\alpha = .85$  for threat.

3 *Leadership Scale for Sports (LSS)*. The LSS (Chelladurai & Saleh, 1980) was employed to  
4 operationalise coaching behaviour through coaches' self-perception (Sullivan, Paquette,  
5 Holt, & Bloom, 2012). The LSS assesses the leadership behaviours of coaches, and  
6 comprises 40-items that are scored on a 5-point scale from 1 (*Never*) to 5 (*Always*). Each  
7 item was prefaced with the words 'As a coach, I ...' to orient the coaches towards  
8 completing the questions in relation to their own coaching. The LSS has five subscales  
9 (Chelladurai, 1980); training and instruction (coaching behaviours aimed at improving  
10 performance), democratic behaviour (allowing athletes to participate in decision-making  
11 processes), autocratic behaviour (coach makes decisions independently as an authority  
12 figure), social support (concern for the welfare of athletes, generating a positive group  
13 atmosphere), and positive feedback (behaviours that reinforce an athlete by recognising and  
14 rewarding good performance). Past research indicates that the LSS has adequate  
15 psychometric properties, with the results of analyses supporting the validity and reliability  
16 of the measure (cf. Chelladurai, 1993; Chelladurai & Riemer, 1998). Cronbach's  $\alpha$  for the  
17 LSS subscales in the current sample were  $\alpha = .79$  for training and instruction,  $\alpha = .83$  for  
18 democratic behaviour,  $\alpha = .66$  for autocratic behaviour,  $\alpha = .79$  for social support, and  $\alpha =$   
19  $.68$  for positive feedback. The relatively low  $\alpha$  for autocratic behaviour has also been found  
20 in past research (Walach-Biśta, 2013).

## 21 *Design*

22 The current study adopted a cross-sectional correlational design to examine the relationships  
23 between irrational beliefs, challenge and threat appraisals, and coaching behaviours.

## 24 *Procedure*

1 An online survey was developed using Qualtrics. The survey required participants to  
2 complete the three measures, which took 14.08 ( $SD = 9.85$ ) minutes to complete on average.  
3 Participants were informed that by completing the survey they would be entered into a prize  
4 draw to win £250.

#### 5 *Analytic Strategy*

6 Data were first examined for missing data. Little's MCAR test revealed that seven  
7 participants' irrational beliefs data and three participants' LSS data were missing at random,  
8  $\chi^2 = 56.85$ ,  $df = 44$ ,  $P > .05$ , and therefore expectation maximization (EM) was used to  
9 estimate the missing values, providing a complete data set for main analyses. Then data  
10 were screened for outliers and examined for normality to ensure data met the necessary  
11 assumptions for parametric testing within SPSS. Shapiro Wilks tests were performed and if  
12 the presence of significant ( $p < .05$ ) outliers were indicated then z scores for significant  
13 outliers were assessed. Data-points with z scores greater than two were windsorised (Smith,  
14 2011).

15 Main data analyses were completed in three stages. First, data were coded based on  
16 the qualitative responses to the open-ended element of the ALE scale. Specifically, in  
17 relation to the participant's most stressful experience within the last month, themes were  
18 constructed that reflected common experiences. Four themes emerged; interpersonal  
19 stressors ( $N = 32$ ), organisational stressors ( $N = 12$ ), performance stressors ( $N = 35$ ), and  
20 uncertainty ( $N = 21$ ). Examples of each theme can be found in Table 1.

21 Second, to assess the relationships between challenge, threat, irrational beliefs, and  
22 LSS subscales, bivariate correlation analyses were conducted. Third, to examine the  
23 relationships between challenge and threat appraisals, and LSS subscales, five separate  
24 hierarchical regression analyses were conducted. Multiple regression analyses were chosen  
25 as they allow for multiple predictors of each LSS subscale, including age, irrational beliefs,

1 and challenge and threat appraisal, offering a more sophisticated examination of  
2 relationships in the data. Past research indicates that coaching experience is related to  
3 greater coaching efficacy (Feltz, Chase, Moritz, & Sullivan, 1999) potentially because more  
4 experienced coaches offer more technical instruction (Jones, Housner, & Kornspan, 1997).  
5 Furthermore, past research suggests that irrational beliefs are important in the cognitive  
6 appraisal process that underpins challenge and threat states (e.g., David, 2003). Therefore, it  
7 was important to account for the effects of age, and irrational beliefs on the proportion of  
8 variance explained by challenge and threat appraisals. Therefore, each regression analysis  
9 included age entered at step 1, total irrational beliefs entered at step 2, and challenge and  
10 threat entered at step 3, predicting each of the five LSS subscales.

## 11 **Results**

### 12 *Associations between challenge, threat, irrational beliefs, and the LSS*

13 To assess the relationships between challenge, threat, irrational beliefs, and the LSS  
14 subscales, bivariate correlation analyses were conducted (Table 2). Pearson's correlation  
15 coefficients for challenge appraisal revealed small but significant positive associations with  
16 social support ( $r = .29, P < .01$ ), and positive feedback ( $r = .19, P < .05$ ). Pearson's  
17 correlation coefficients for threat appraisal revealed small but significant positive  
18 associations with total irrational beliefs ( $r = .36, P < .001$ ), and autocratic behaviour ( $r =$   
19  $.25, P = .01$ ).

### 20 *Challenge and threat appraisal to predict LSS*

21 Because correlation analyses revealed significant relationships for challenge, threat,  
22 irrational beliefs, and LSS subscales; total irrational beliefs were included in subsequent  
23 regression analyses to examine the relationships between challenge and threat, and LSS  
24 subscales. Therefore five hierarchical regression analyses were conducted, with age entered

1 at step 1, total irrational beliefs entered at step 2, and challenge and threat entered at step 3,  
 2 predicting each of the five LSS subscales.

3 For training and instruction, at step 1 age accounted for a significant proportion of  
 4 variance,  $R^2 = .09$ ,  $P < .01$ , but total irrational beliefs at step 2,  $R^2 = .03$ ,  $P > .05$ , and  
 5 challenge and threat at step 3,  $R^2 = .02$ ,  $P > .05$ , did not account for a significant proportion  
 6 of variance. Standardised coefficients revealed a significant positive association between  
 7 training and instruction, and age ( $\beta = .33$ ,  $P = .001$ ).

8 For democratic behaviour, at step 1 age did not account for a significant proportion  
 9 of variance,  $R^2 = .00$ ,  $P > .05$ , neither did total irrational beliefs at step 2,  $R^2 = .03$ ,  $P > .05$ ,  
 10 or challenge and threat at step 3,  $R^2 = .01$ ,  $P > .05$ .

11 For autocratic behaviour, at step 1 age did not account for a significant proportion of  
 12 variance,  $R^2 = .00$ ,  $P > .05$ , neither did total irrational beliefs at step 2,  $R^2 = .03$ ,  $P > .05$ . But  
 13 challenge and threat at step 3 did account for a significant proportion of variance,  $R^2 = .07$ ,  
 14  $P < .03$ . Standardised coefficients revealed a significant positive association between  
 15 autocratic behaviour and threat ( $\beta = .25$ ,  $P < .02$ ).

16 For social support, at step 1 age did not account for a significant proportion of  
 17 variance,  $R^2 = .01$ ,  $P > .05$ , neither did total irrational beliefs at step 2,  $R^2 = .02$ ,  $P > .05$ . But  
 18 challenge and threat at step 3 did account for a significant proportion of variance,  $R^2 = .07$ ,  
 19  $P < .04$ . Standardised coefficients revealed a significant positive association between social  
 20 support and challenge ( $\beta = .26$ ,  $P < .01$ ).

21 For positive feedback, at step 1 age did not account for a significant proportion of  
 22 variance,  $R^2 = .00$ ,  $P > .05$ , neither did total irrational beliefs at step 2,  $R^2 = .01$ ,  $P > .05$ . But  
 23 challenge and threat at step 3 did account for a significant proportion of variance,  $R^2 = .07$ ,  
 24  $P < .03$ . Standardised coefficients revealed a significant positive association between

1 positive feedback and challenge ( $\beta = .21, P < .05$ ), and significant negative association  
2 between positive feedback and threat ( $\beta = -.22, P < .04$ ).

### 3 **Discussion**

4 This was the first study to consider challenge and threat as part of coaching stress, and the  
5 first to examine the relationships between challenge and threat cognitive appraisals with  
6 self-reported coaching behaviours. Results from the regression analyses revealed small but  
7 positive associations between challenge appraisals and social support, and between threat  
8 appraisals and autocratic behaviour, and a negative association between threat appraisals and  
9 positive feedback. This may suggest that participants with a tendency to appraise a stressor  
10 as a challenge are more likely to offer social support to their athletes, while participants who  
11 tend to appraise stressors as a threat are more likely to be autocratic in their coaching  
12 behaviour and less likely to offer positive feedback. Although not all coaching behaviours  
13 were related to challenge and threat in this study, these results indicate partial support for the  
14 hypotheses that challenge would be associated with positive coaching behaviours, while  
15 threat would be associated with negative coaching behaviours. This may have implications  
16 on how coaches are educated, and the psychosocial skills required to deliver effective  
17 coaching in stressful situations. Clearly, it is advantageous for coaches to be able to appraise  
18 stressors as a challenge, and past research has successfully used instructional sets (Turner,  
19 Jones, Sheffield, Barker, & Coffee, 2014) and imagery (Williams & Cumming, 2012) to  
20 promote challenge. Therefore, practitioners should consider working with coaches on  
21 strategies that can elicit greater challenge appraisals.

22       The finding that greater challenge appraisal and lesser threat appraisal is associated  
23 with more positive coaching behaviours can be explained in two main ways. First, those  
24 who react to stressors with a challenge appraisal may have a greater capacity to offer  
25 support and feedback to others, because they feel they can cope with situational demands

1 themselves. The notion that effectively coping with stress may enhance the provision of  
2 social support is one that could stimulate future research, as much of the extant literature  
3 (e.g., Thoits, 1995) focuses on the receipt of social support and its buffering effects on  
4 stress. Second, it has been proposed that challenge is associated with more positive affect  
5 compared to threat (Blascovich & Mendes, 2000; Skinner & Brewer, 2002). Positive  
6 emotions can acutely broaden an individual's range of thoughts and actions (Fredrickson,  
7 2001), and may promote the building of future social relationships (Kjell & Thompson,  
8 2013). Therefore, coaches who appraise a stressor as a challenge may experience positive  
9 emotions that encourage behaviours that promote stronger relationships with their athletes,  
10 such as social support and positive feedback. Emotions were not measured in the current  
11 study therefore this contention should be followed up by further research. Research should  
12 also explore the provision of social support and how this is associated with a challenge state.

13         The finding that threat cognitive appraisals are positively related to autocratic  
14 behaviour also supported the hypotheses, and can be explained through existing coaching  
15 research. Autocratic behaviour is the extent to which a coach keeps apart from the athletes  
16 and stresses his or her authority in dealing with them (Chelladurai & Saleh, 1980). Research  
17 indicates that a coach is more likely to use autocratic behaviour when they are highly  
18 stressed and as a result feel the need to distance themselves from others (Kelley et al., 1999)  
19 and withdraw from interacting with their athletes (Frey, 2007). Interestingly, one study  
20 revealed that world class coaches may adopt controlling behaviours to 'mask' or hide their  
21 stress so athletes would remain unaffected by the coaches' stress (Olusoga, Butt, Maynard,  
22 & Hays 2010). The current study goes further than linking greater stress to autocratic  
23 behaviour by uncovering that threat is related to greater autocratic behaviour, whereas  
24 challenge is not. This offers a more complex picture of how coaching stress influences  
25 behaviour by assessing stress as a multidimensional construct. Considering the BPS model's

1 notion of demand appraisals versus resource appraisals, autocratic behaviour resulting from  
2 threat cognitive appraisals may be due to the depletion of a coach's psychological resources  
3 in stressful situations, damaging their capacity to attune to their athletes' thoughts and  
4 feelings (Mageau & Vallerand, 2003). Mageau and Vallerand (2003) postulate that  
5 controlling behaviours may occur when pressure to perform leads coaches to become  
6 outcome focused and ego-oriented, thus ignoring their athletes' inner experiences. The  
7 notion of using autocratic behaviour as a coping strategy rather than simply being a  
8 consequence of stress and performance pressure warrants further investigation.

9         Results also show partial support for the hypotheses that higher irrational beliefs are  
10 associated with greater threat, and lesser challenge cognitive appraisals. Specifically,  
11 correlation analyses showed that irrational beliefs were positively associated with threat  
12 cognitive appraisals, but no associations were revealed between irrational beliefs and  
13 challenge cognitive appraisals. This may suggest that coaches who have higher irrational  
14 beliefs are more likely to appraise stressors as a threat, supporting the assertions of past  
15 research (David et al., 2002). Further research that does not adopt cross-sectional  
16 correlational methods is required, as cause and effect could not be established.

17         A finding that emerged from the data that was not hypothesised is the positive  
18 relationship between age and training and instruction, indicating that older coaches are more  
19 likely to provide training and instruction. Training and instruction has been described as one  
20 of the most important functions of a coach to improve performance by teaching athletes the  
21 skills, techniques and tactics of the sport (Chelladurai & Saleh, 1980). This finding may be  
22 attributed to age generally equating to greater experience, and consequently the acquisition  
23 of technical, tactical and pedagogical knowledge. Research shows that experienced coaches  
24 exhibit significantly more technical instruction than their inexperienced counterparts (Jones,  
25 Housner, & Kornspan, 1997), and instructional behaviours are predominant amongst expert

1 coaches (Cushion & Jones, 2001). Future research should focus specifically on age and  
2 experience in relation to stress and coaching behaviour using a larger sample.

3       The limitations of the current study present some opportunities for future research.  
4 First, much challenge and threat research uses cardiovascular (CV) reactivity markers to  
5 indicate challenge and threat (e.g., Turner et al., 2014), circumventing the inherent biases in  
6 self-report measures (e.g., Blascovich & Mendes, 2000). In addition, because cognitive  
7 appraisal can occur both consciously and unconsciously (Blascovich & Mendes, 2000), it is  
8 not clear to what extent participants can accurately introspect on their cognitive appraisals  
9 (Gawronski & Houwer, 2014). So future research may wish to include CV measures of  
10 challenge and threat and explore the relationships between CV reactivity and coaching  
11 behaviours. Second, participants were asked in the ALE scale to recall their most stressful  
12 experience within the last month. However, it is unknown how accurately participants can  
13 recall the details and severity of these stressful events, as memory retrieval can be impaired  
14 after an acute stressor (Kuhlmann, Piel, & Wolf, 2005). Third, caution should be applied  
15 when interpreting the results of self-report measures due to limitations such as response bias  
16 (van de Mortel, 2008). Caution should also be exercised due to the relatively small, although  
17 significant, proportion of variance accounted for by challenge and threat appraisals in  
18 autocratic behaviour, social support, and positive feedback (less than 10%). In addition, Beta  
19 coefficients also indicate small associations ( $\beta < .3$ ) between variables. However, this study  
20 attempts to predict coach behaviour, which is a complex endeavour, and therefore although  
21  $R^2$  values are small, important conclusions can still be drawn from the analyses. Lastly, it  
22 should be noted that the findings of this study are based on the completion of three measures  
23 taking approximately fourteen minutes to complete, which may not yield an in-depth  
24 understanding of how stressful situations impact coaching behaviour. Indeed, in addition to  
25 stress, there are numerous personal and contextual factors which impact coaches' behaviour



1 including their education, competitive experience as an athlete, and hours of coaching per  
2 week (Rodgers, Reade, & Hall, 2007). Therefore, future research could utilise laboratory  
3 methods to induce stress and observe the behavioural consequences of challenge and threat  
4 in coaches (e.g., Turner et al., 2012) to offer objective indicators of coaching behaviours.  
5 Further, cardiovascular indices of challenge and threat (cardiac output and total peripheral  
6 resistance; e.g., Turner et al., 2012) could be examined to address the shortcomings of self-  
7 report measures of challenge and threat. It is important to move beyond the cross-sectional  
8 approach adopted in the current study, which cannot determine cause and effect. Despite  
9 these limitations, this study provides fruitful avenues for future research exploring the  
10 behaviours of coaches in relation to their appraisals of stressful situations.

11 To conclude, this study is the first to demonstrate the relationship between coaches'  
12 cognitive appraisals of stressful situations, and coaching behaviour. Specifically, coaches  
13 reporting greater challenge and lesser threat appraisals reported more positive and less  
14 negative coaching behaviours. These findings suggest that it may be important to examine  
15 coaching stress as a multidimensional construct. Practitioners should work with coaches to  
16 promote challenge appraisal, and reduce irrational beliefs, in order to encourage more  
17 positive coaching behaviours. Future research should more robustly examine the findings of  
18 the current study using larger samples across a range of sports, using meditational and  
19 experimental methods, as well as using more objective markers of challenge and threat, and  
20 coaching behaviour.

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Reviewer comment	Page & line no.	Revision/response
<i>Abstract</i>		
What else could have ‘impact’ on coaching behaviour? Would other factors as well as ‘stressful activity’ contribute to a change in behaviour? Needs to be an understanding of other contextual and situational factors.	Page 14, lines 5-7	Other contextual and situational factors acknowledged. We feel this fits more appropriately into the discussion though.
You could include in the abstract some of theory you have used.	Page 1, lines 7-8	Theory included
<i>Introduction</i>		
Maybe more detail is needed on the different kinds of stress?	Page 2, lines 12-15	More detail added
A definition of what “irrational beliefs” is would be useful for the reader.	Page 3, lines 13-15	Definition included
Does this introduction need to finish with clear aims of the study.	Page 5, lines 7-10	Clear statement of aims precede hypotheses.
<i>Method</i>		
For the reader to have a clearer understanding on the coaches included in the study more detail regarding the context is needed.	Page 5, line 24 - page 6 line 1	More detail regarding the context is provided.
More demographic detail about the 105 soccer coaches: F.A. Youth Award qualified? Education? What domain did they coach in- participation, development or performance? Professional?	Page 5, line 24 - page 6 line 1	Participants coach in the development programmes of professional clubs.
You seem to have good access- how and why? Was this a funded project?	Page 6, lines 2-4	One of the authors provides support on national governing body coach education courses. The author did not have direct contact with participants but gained access to a network of coaches through the NGB.
You clearly define the five subscales, which is helpful. But, what is your rationale for using the Leadership Scale for Sports?	Page 6, line 24 - page 7, line 1	Rationale provided.
Would some of this information regarding who the participants are be more appropriate in the ‘Participants’ section. Again, a greater understanding of who the ‘heads of coaching’ and the ‘recruited coaches’ are is needed.	Page 5, lines 24-25 Page 6, lines 3-4	Information moved to ‘Participants’ section. More detail provided on the roles of the ‘heads of coaching’
I am not sure a survey with three measures that took 10 minutes can give you a detailed understanding of the impact of stressful situations on coaching behaviour.	Page 7, line 21	Our estimate of 10 minutes was based on pilot data. We actually have the stats for how long it took the participants to complete the questionnaire on average and have now reported these data in the procedures section.
<i>Discussion</i>		
The study using just “self-reported” coaching behaviours could be a negative seeing as we know coaches’ have poor self-awareness. Throughout the study there is a	Page 13, line 25 - page 14, lines 1-4	We have recognised the limitation of using self-report data collection methods which may result in response bias and also the limitations of using

lack of recognition for the limitations of the research methods. For example, what would be the limitations of “laboratory methods”?		three brief measures.
Not sure the future recommendation for research is linked to your above critique.	Page 14, lines 9-12	Our recommendations for future research are now more closely aligned with the limitations.

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Categories	Codes
Interpersonal stress (32)	Player selection (1) Player behaviour / attitude (15) Parents (6) Conflict with other coaches (1) Player fearing injury (1) Challenging group (7) Player emotions (1)
Organisational stress (12)	From management (1) Logistics (2) Financial (1) Colleague incompetence (1) Administration (2) Lack of support (3) Time pressure (2)
Performance pressure (35)	Player performance (3) Coach performance (8) Game strategy (1) Assessment / observation (13) Results (4) Level of competition (2) Player injury (2) Apprehension before game (1) Impact of personal issues (1)
Uncertainty (21)	Time pressures (4)