

Performance-related states in strength and conditioning training: Coaches' perceptions, contextual demands and applied regulation

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ABSTRACT

This article investigated strength and conditioning coaches' (SCCs) perceptions of performance-related state experience in training and how these states are regulated within applied practice. Drawing upon the Individual Zones of Optimal Functioning (IZOF) and Performance-Related Biopsychosocial States (PBS) frameworks, two studies were conducted. Study 1 examined SCCs' perceptions of optimal states for performance and associated psychosocial strategies using a 68-item online survey completed by 91 SCCs. Building on these findings, Study 2 utilised three focus groups with 10 SCCs to explore interpretations of athletes' state experience and its influence on coaching decision-making. Across both studies, SCCs perceived successful training performances as characterised by high intensities of functional modalities and low dysfunctional states, consistent with nomothetic IZOF profiles. However, findings extended existing theory by identifying contextual sub-layers within strength and conditioning, whereby distinct training modalities within sessions were perceived to require differentiated optimal state profiles. SCCs further described athlete states as dynamic and identified patterns of change due to physical exertion, perceived success or failure, and social interaction. Regulation of state experience was embedded within the "craft" of coaching and described as intuitive, relational and context dependent. This research advances IZOF theory by contextualising performance-related states within strength and conditioning training. Further research is required to evaluate the effectiveness of psychosocial coaching strategies on performance-related states and physical outcomes to inform evidence-based professional practice.

1. Introduction

Athletes often utilise psychological strategies to regulate their own psychobiosocial state (PBS) (Lane et al. 2012, 2016) and these states may also be influenced by others, including coaches (Friesen et al. 2013). Research emphasizes the importance of psychosocial coaching behaviours and characteristics within effective strength and conditioning (S&C) coaching (Szedlak et al. 2015; Szedlak et al., 2019). Psychological coaching competencies have been considered as the knowledge and understanding of athletes' behaviours, motivations and emotions, and how S&C Coaches (SCCs) can use this to enhance engagement, relationships and outcomes (Callary et al. 2023). Findings suggest that experienced and expert SCCs can intuitively identify what is most important, and implement a range of coaching strategies, suited to the individual and situational demands (Collins et al., 2021; Downes & Collins, 2021; LaPlaca & Schempp, 2020). While SCCs are expected to

have some psychological competency and this may be enhanced with experience, there has been limited research to understand SCCs perceptions of psychological states and their importance for performance within this context.

Till et al. (2017) suggested that SCCs also require an understanding of select psychological techniques, and the ability to integrate these within practice to enhance athlete performance (Radcliffe et al., 2015; 18; Feit et al. 2025). Previous research has reported the application of arousal regulation, "psyching up" or "hustle" strategies in S&C as methods to activate or relax an athletes' affective state to facilitate performance (Massey et al. 2002; Mellalieu & Shearer, 2012; Radcliffe, Comfort and Fawcett 15:18; Tod et al. 2015; Statler & Dubois, 2016; Gillham & Doscher, 2019). Arousal regulation strategies such as intensifying verbal statements, impassioned speeches, music and social facilitation have been suggested to enhance skill execution, muscular strength and endurance, and power performance (Tod et al. 2015).

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Although substantial support exists for psychological strategies enhancing muscular performance, [Tod et al. \(2015\)](#) state that, there is no clear understanding for why or how this occurs. Therefore, to enhance SCC's effective use of psychological strategies within the S&C environment, it is crucial to further investigate the possible underpinning mechanisms of performance-related affective states.

The Individual Zone of Optimal Functioning (IZOF) model has been proposed as a framework for understanding performance-related state experiences within S&C environments ([Gillham & Doscher, 2019](#); [Statler & Dubois, 2016](#)). IZOF conceptualises performance states as individualised, context-specific experiences consisting of psychological, biological and social components that may influence performance functionality ([Hanin, 2007](#); [Robazza, 2006](#); [Robazza & Ruiz, 2018](#); [Ruiz et al., 2016](#); [Ruiz et al., 2017](#); [Ruiz & Robazza, 2020](#)). Within this framework, performance-related states are interpreted according to both hedonic valence (pleasant vs. unpleasant) and performance functionality (functional vs. dysfunctional) ([Ruiz & Robazza, 2020](#)). Performance-related state experiences are suggested to consist of eight PBS forms: emotion, cognitive, motivational, volitional, bodily-somatic, motor-behavioural, operational, and communicative ([Hanin, 2010](#); [Hanin & Ekkekakis, 2014](#), pp. 107–128; [Ruiz et al. 2016](#)). Previous IZOF and PBS research across a variety of sporting contexts, including S&C, has primarily retrospectively investigated athletes' experiences during successful and unsuccessful performances ([Ruiz et al., 2017](#)). Findings generally suggest that successful performances are associated with a nomothetic profile, characterised by high intensities of positive functional states and low intensities of negative dysfunctional states ([Cooper et al. 2021](#); [Hanin, 2000](#); [Robazza et al., 2004](#); [Robazza et al. 2008](#); [Ruiz et al., 2017](#)).

Within coaching literature, [Mueller et al. \(2018\)](#) investigated tennis coaches' perceptions of athletes' performance-related states from an IZOF perspective. Researchers conducted semi-structured interviews with three high-level coach-athlete dyads to investigate awareness of players' emotional experiences, methods of players' expression and how coaches and athletes work together to regulate state experience. They identified that tennis coaches observed bodily, motor-behavioural and operational components of a performance state and utilised this information to adapt their responses to the players' needs through coaching strategies, such as positive reinforcement and performance-related feedback. Within S&C, research has investigated SCC's reflections on experience, decision making processes and use of psychosocial behaviours ([Callary et al. 2023](#); [Downes & Collins, 2021](#); [Szedlak et al., 2019](#); [Szedlak et al. 2015](#); [Szedlak et al., 2021](#)). However, research into SCC's experiences and perspectives of IZOF and athletes' performance-related states during training is limited. It is therefore unclear how SCCs perceive an athlete's state or how this knowledge informs their decision making and use of coaching strategies during training.

[Gillham and Doscher \(2019\)](#) proposed utilising IZOF framework to understand athletes' performance-related state experiences and inform S&C coaching actions and behaviours to facilitate performance. In the context of S&C, performance can be understood as the execution of training tasks intended to develop sport-specific physical qualities (e.g., strength, power and muscular endurance), where success is often reflected in the quality, intensity, and consistency of movement execution, effort, and engagement within training sessions ([Stewart et al., 2022](#); [Weldon et al. 2022](#)). S&C therefore presents a distinct performance context, characterised by specific training practices, environments and coach-athlete dynamics, in which athletes are required to repeatedly express and regulate effort, motivation, physical and technical output under varying demands ([Radcliffe et al., 2018](#); [Downes & Collins, 2021](#)). [Gearity et al. \(2020\)](#) proposed that every aspect of applied S&C practice is inherently a social interaction. Consequently, psychosocial knowledge and competencies, including emotions, leadership, motivation, and power dynamics are considered essential to coaches' effectiveness with athletes. [Szedlak et al. \(2019\)](#) further suggested that psychosocial competencies may influence athletes' motivation, confidence,

enjoyment, gratitude, extra effort, and self-regulation. It could therefore be considered that ineffective or limited psychosocial competencies in SCCs may negatively influence athlete engagement, quality of task execution, and responses to training demands, potentially contributing to suboptimal training adaptations and performance outcomes. Despite growing recognition of the psychosocial demands of S&C practice, existing education and accreditation pathways have historically prioritised biophysical and technical knowledge, with comparatively limited emphasis placed on developing coaches' understanding of athlete psychological states and interpersonal processes ([Downes & Collins, 2021](#); [Gearity et al. 2020](#)).

Whilst IZOF has been investigated within a variety of sporting contexts, [Jackman et al. \(2025\)](#) recommended that further studies are warranted to understand the perspectives of coaches (such as sport coaches and SCCs), sport psychology practitioners, parents, and other key social agents. The present study does not seek to evaluate the accuracy of SCCs' interpretations of athlete psychological states, but rather to examine how these perceptions are constructed and applied in practice, and how they influence coaching decision-making within applied S&C environments. Therefore, the aim of this article was to investigate SCC's perceptions of athletes' performance-related experiences and regulation of coaching strategies within training through a sequential mixed-methods design. Study 1 explored SCCs' broad understanding of state experience in S&C and PBS during successful and unsuccessful performances. Subsequently, Study 2 qualitatively examined how SCCs interpreted and operationalised these perceptions within the coaching process and the application of coaching strategies in practice.

2. Study 1

2.1. Methods

2.1.1. Participants

This study utilised a cross-sectional design to explore and describe IZOF within the context of S&C, providing a foundation for future theoretical development. Non-probability, purposive group characteristics sampling was utilised to identify and recruit respondent SCCs. To be included within the study participants must have actively coached S&C within the last 2 years, supporting athletes that regularly participate in competitive sport. Participants ([Table 1](#)) consisted of active SCCs ($n = 91$; mean age ($\pm$ SD) = 33.9 ± 7.8 years [range = 21, 62]), with the majority demonstrating 6+ years' experience ($n = 64$, 70.4%) coaching male ($n = 90.1$, 90.1%) and female ($n = 58$, 63.7%) athletes typically aged between 16 and 20 ($n = 65$, 71.4%) and 21–25 years old ($n = 71$, 78.0%). Participants reported currently holding SC accreditations ($n = 80$, 88%), postgraduate or higher degrees ($n = 69$, 75.8%) and other related qualifications (USA Weightlifting, $n = 4$; CSCCa Strength and Conditioning Coach, $n = 2$; EXOS Performance Specialist, $n = 2$; CASES Sport and Exercise Scientist Accreditation, $n = 1$; British Weightlifting, $n = 1$; NASM Certified Personal Trainer, $n = 1$; and IART Clinical Fitness, $n = 1$). Participants also reported coaching with athletes at college/university ($n = 40$, 44.0%), national ($n = 43$, 47.3%), international ($n = 39$, 42.9%) professional ($n = 45$, 49.5%) or other levels (Olympic, $n = 1$; Semi-professional, $n = 1$; and Academy, $n = 1$) with the majority of athletes being based in the United Kingdom ($n = 52$, 54.2%) and competing in a range of team and individual sports.

2.1.2. Data collection

2.1.2.1. Pilot. A survey was specifically designed for the present study that sought to investigate practitioner's views of affective performance states within S&C training, relevant S&C coaching contexts and possible implications on professional practice. To ensure validity, clarity and comprehensibility, in line with established approaches within coach perception research ([Stoszkowski & Collins, 2016](#)), an online survey was

Table 1
Demographic details of Study 1 participants.

	No. of participants (%)		No. of participants (%)		No. of participants (%)
<i>Sex</i>					
Male	86 (94.5)	Female	5 (5.5)		
<i>Strength and conditioning and/or higher education qualifications</i>					
UKSCA	34 (37.4)	NSCA	37 (40.7)	ASCA	9 (9.9)
Undergraduate degree	58 (63.7)	Postgraduate degree	60 (65.9)	Doctorate	9 (9.9)
Other	10 (11.0)	No current qualification held	1 (1.1)		
<i>Number of years' experience</i>					
0–2 years	5 (5.5)	3–5 years	22 (24.2)	6–9 years	21 (23.1)
10 years or more	43 (47.3)				
<i>Sex of athletes predominately coached</i>					
Male	82 (90.1)	Female	58 (63.7)		
<i>Age groups of athletes predominately coached</i>					
<10 years	3 (3.3)	11–15 years	20 (22.0)	16–20 years	65 (71.4)
21–25 years	71 (78.0)	26–30 years	43 (47.3)	>30 years	26 (28.6)
<i>Level of competition of athletes predominately coached</i>					
Amateur	21 (23.1)	Professional	45 (49.5)	High School	21 (23.1)
College/University	40 (44.0)	Regional/County	22 (24.2)	National	43 (47.3)
International	39 (42.9)	Other	3 (3.3)		
<i>Country where athletes are predominately based</i>					
UK	52 (54.2)	USA	15 (15.6)	Canada	10 (10.4)
Australia	6 (6.3)	Ireland	3 (3.1)	China	1 (1.0)
Denmark	1 (1.0)	Finland	1 (1.0)	Germany	1 (1.0)
Hong Kong	1 (1.0)	Hungary	1 (1.0)	Italy	1 (1.0)
Portugal	1 (1.0)	Qatar	1 (1.0)	Spain	1 (1.0)
<i>Sport/s athletes predominately compete in</i>					
Football (soccer)	33 (13.5)	Athletics (Track and field)	20 (8.2)	Rugby Union	20 (8.2)
Combat sports	16 (6.6)	Basketball	15 (6.1)	Racquet sports	15 (6.1)
Cricket	9 (3.7)	Cycling	8 (3.3)	Swimming	8 (3.3)
Volleyball	8 (3.3)	Field Hockey	7 (2.9)	Rowing	7 (2.9)
Snow sports	7 (2.9)	American Football	6 (2.5)	Baseball	6 (2.5)
Ice Hockey	6 (2.5)	Netball	5 (2.0)	Sailing	4 (1.6)
Weightlifting/Powerlifting	4 (1.6)	Canoe and Kayak	3 (1.2)	Golf	3 (1.2)
Australian-Rules Football	2 (0.8)	Extreme Sports	2 (0.8)	Gymnastics	2 (0.8)
Archery	1 (0.4)	Curling	1 (0.4)	Equestrian	1 (0.4)
Fencing	1 (0.4)	Gaelic Football	1 (0.4)	Lacrosse	1 (0.4)
Motorsport	1 (0.4)	Rugby League	1 (0.4)	Shooting	1 (0.4)
Surfing	1 (0.4)	Table Tennis	1 (0.4)	Triathlon	1 (0.4)
Ultimate Frisbee	1 (0.4)	Water polo	1 (0.4)		
<i>Para-sports</i>					
Snowsports	3 (1.2)	Athletics (Track and field)	2 (0.8)	Swimming	2 (0.8)
Canoe and Kayak	1 (0.4)	Curling	1 (0.4)	Goalball	1 (0.4)
Triathlon	1 (0.4)	Wheelchair Basketball	1 (0.4)	Wheelchair Fencing	1 (0.4)
Wheelchair Rugby	1 (0.4)				

Note: Participants could select all options that applied. Forty-nine participants reported coaching more than one sport.

developed specifically for this study and evaluated prior to data collection through a pilot study. The pilot study was conducted by a panel of accredited SCCs ($n = 6$) that have actively coached S&C within the last two years. The survey took between 8 and 15 min to complete, and participant feedback resulted in rewording of four items to improve clarity and no items were removed or added for face and content validity.

2.1.2.2. Instrument. The final version of the online survey consisted of three sections and a total of 68 items. The first section consists of 12 items to provide eligibility and consent to participate, demographic information and experience within S&C. The second section consisted of 54 items that seek to understand SCCs perspectives on the implications of PBS within training. 11 items addressed SCC's perspectives on the impact of psychological states on athletic performance, professional practice, and the application of future research. Within these items, participants were asked how much they agreed or disagreed with a series of statements. For example “an optimal mental state exists which an athlete will perform at their best within an S&C session”, “an athlete requires different mental states to perform optimally in different forms of training e.g. strength, power, muscular endurance” and “as a coach, you can observe/intuit an athlete's mental state during a session”. Responses to these items consisted of a rating on a 7-point likert-scale (anchored by 1- strongly disagree and 7- strongly agree). One multiple

choice item was included to outline SCCs use of psychological strategies to manage PBS during practice. This item asked participants to identify any methods they utilised to enhance an athletes' performance from a series of options based upon previous research (Radcliffe et al., 2015) such as music, feedback, and verbal persuasion, as well as the option to provide other relevant strategies they utilise. The final section comprised of two optional items that invited participants to provide their name and contact details if they would be willing to participant in a further focus-group based study.

To identify SCC's perspectives on the functionality and intensity of PBS, the 14-Item Psychobiosocial State Scale (PBS-S) multimodal measure of state experience was utilised (Ruiz, Robazza, Tolvanen, & Hanin, 2019). The scale consists of 14 rows of 52 descriptors assessing six modalities of a performance state (i.e., emotional, cognitive, volitional, bodily-somatic, motor-behavioural, and operational) with a row of synonyms for each item. Each modality is assessed based upon the functionality for performance, i.e., functional (+) or dysfunctional (–). As a result the following items are assessed: functional pleasant states (P+); dysfunctional anxiety (Anx-); functional (Ang+) and dysfunctional anger (Ang-); functional (BS+) and dysfunctional bodily-somatic (BS-); functional (C+) and dysfunctional cognitive (C-); functional (MB+) and dysfunctional motor-behavioural (MB-); functional (O+) and dysfunctional operational (O-); and functional (V+) and dysfunctional volitional (V-). Participants were first asked to consider whether the

impact of the performance state is helpful or harmful and then to rate the magnitude of the anticipated impact via a 7-point Likert scale (anchored by +3 very helpful to -3 very harmful, with "0" indicating no effect). 14 items assessed the anticipated impact of each modality on performance during S&C. Participants then rated the intensity of each modality during a "best ever performance" (BEP) and a "worst ever performance" (WEP) (Cooper et al. 2021; Hanin, 2000; Woodcock et al. 2012) on a 5-point Likert scale (anchored by 0 nothing at all to 4 very much). 28 items asked SCCs to reflect on their experience and rate the observed intensity of athlete's PBS during a BEP and WEP during training. Within S&C a BEP could consist of setting a new personal best, performing well technically even in difficult exercises or they were powerful and energised (Cooper et al. 2021). Whereas a WEP could consist of athletes fatiguing quickly and feeling weak or tired, they were discouraged and demotivated, underperforming compared to expectations or they struggled to technically perform exercises (Cooper et al. 2021). Ruiz, Robazza, Tolvanen, Haapanen, and Duda (2019) presented composite reliability (CR) scores for the 14-item PBS-S scale, reporting that two-factor models were above 0.70 for states intensity (functional, CR = 0.738; dysfunctional, CR = 0.810) and perceived impact ratings (functional, CR = 0.782; dysfunctional, CR = 0.770) indicating good construct reliability. Cronbach's α coefficients were above 0.70 for states intensity (functional α = 0.742, dysfunctional α = 0.810) and perceived impact (functional α = 0.780, dysfunctional α = 0.767) showing adequate internal consistency.

2.1.2.3. Procedure. The online survey, administered through JISC Online Surveys v2 (Bristol, UK), was initially circulated via online social network posts that "tagged" S&C organisations, professionals, and gatekeepers (i.e., individuals with access to SCCs) requesting the participation of SCCs. In addition, the online survey was also distributed by email or direct message via social media (e.g., Twitter and LinkedIn). Recruitment and data collection took place over a 16-week period between April and August 2021.

2.1.3. Data analysis

Scheel et al. (2021) proposed that psychology-based research should aim to form concepts, establish causal relationships, and identify boundary conditions before attempting to test a hypothesis. As a result, descriptive statistics were calculated to characterise the sample with

respect to the items captured, reporting the frequency of responses for each item as number of responses (No.) and percentage of total responses (%). To describe the magnitude of difference between PBS-S profiles of BEP and WEP, a sample effect size was calculated with 95% Confidence Intervals (95% CI), as a Z to r conversion following a Wilcoxon signed-rank test. Effect size is presented as an r value between -1 and 1, with a value of -1 identifying a very large negative effect, 0 being no effect, and 1 identifying a very large positive effect.

2.2. Results

Responses to items 2 & 4, outlined in Table 2., indicated that SCCs strongly agree/agree that an athlete's mental state can impact their performance and an optimal mental state is unique to an individual. SCCs also agree in items 3 and 5, that within S&C an optimal mental state exists that will help an athlete perform at their best and athletes require different mental states to perform in different forms of training. Furthermore, items 6-8 agree/somewhat agree that SCCs can observe or intuit an athlete's mental state during a session, an athlete's state changes during an S&C session, and that as a coach you can manage or adjust an athlete's mental state during a session. Responses to items 9 and 11 also outlined that SCCs agree, further research investigating athlete's mental states during strength and conditioning and the ability to monitor and manage athlete's mental states would be beneficial for professional practice.

Responses, outlined in Table 3., report that the most frequently utilised strategies during coaching practice were positive feedback

Table 3
Frequency of SCCs reported use of psychological strategies during practice.

	No. (%)		No. (%)
Music	81 (89.0)	Energising statements	56 (61.5)
Motivational speeches	23 (25.3)	Verbal persuasion	59 (64.8)
Goal setting	79 (86.8)	Technical Cueing	82 (90.1)
Focusing athlete attention	74 (81.3)	Visualisation/imagery	46 (50.5)
Pre-performance routines	39 (42.9)	Positive feedback	87 (95.6)
Negative feedback	28 (30.8)	Other	13 (14.3)
None	0 (0)		

Note: Participants could select all options that applied.

Table 2

Frequency of SCC's reported perspectives on implications of IZOF in S&C as number of responses (No.) and percentage of total responses (%).

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1. Improvements in an athlete's SC performance leads to improvement in their sports performance	0 (0.0)	0 (0.0)	3 (3.3)	5 (5.5)	33 (36.3)	30 (33.0)	20 (22.0)
2. An athlete's mental state has an impact on their performance within an SC session	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.1)	35 (38.5)	55 (60.4)
3. An optimal mental state exists which an athlete will perform at their best within an SC session	0 (0.0)	0 (0.0)	3 (3.3)	8 (8.8)	16 (17.6)	44 (48.4)	20 (22.0)
4. An optimal mental state is unique to each individual	0 (0)	1 (1.1)	0 (0.0)	2 (2.2)	7 (7.7)	37 (40.7)	44 (48.4)
5. An athlete requires different mental states to perform optimally in different forms of training e.g. strength, power, muscular endurance	1 (1.1)	6 (6.6)	3 (3.3)	6 (6.6)	20 (22.0)	30 (33.0)	25 (27.5)
6. As a coach, you can observe/intuit an athlete's mental state during a session	0 (0)	0 (0)	2 (2.2)	3 (3.3)	29 (31.9)	40 (44.0)	17 (18.7)
7. An athlete's mental state changes during their participation in an SC session	0 (0)	0 (0)	3 (3.3)	6 (6.6)	41 (45.1)	29 (31.9)	12 (13.2)
8. As a coach, you can manage or adjust an athlete's mental state or level of activation during a session	1 (1.1)	0 (0)	(3.3)	6 (6.6)	38 (41.8)	31 (34.1)	12 (13.2)
9. A method of evaluating an athlete's mental state prior to/during performance would be beneficial for professional practice	1 (1.1)	0 (0)	3 (3.3)	15 (16.5)	27 (29.7)	32 (35.2)	13 (14.3)
10. Formal/informal coach education to be able to monitor and manage athlete's mental states prior to/during performance would be beneficial for professional practice	1 (1.1)	0 (0)	1 (1.1)	5 (5.6)	25 (27.8)	34 (37.8)	24 (26.7)
11. Further research investigating athlete's mental states during strength and conditioning training would be beneficial for professional practice	1 (1.1)	0 (0)	2(2.2)	4(4.4)	14 (15.4)	38 (41.8)	32 (35.2)

(95.6%), technical cueing (90.1%) and music (89.0%). All SCCs reported using at least one strategy in practice.

SCCs reported the perceived impact on performance of each modality of PBS-S. Responses, outlined in Fig. 1., suggest SCCs perceive C+ and O+ to be very helpful/helpful for performance and V+, MB+, P+, BS+ and A+ as helpful. SCCs also perceive V-, MB-, C-, O- and BS- as very

harmful/harmful for performance, and Anx- and A-as harmful. SCCs also explored the relationship between intensity of feeling state and performance. Analysis (Fig. 2.), revealed very large positive effects, ranging between $r = 0.76$ and $r = 0.84$ (95% CI: 0.70, 0.89) for all functional modalities and very large negative effects, ranging between $r = -0.76$ and $r = -0.88$ (95% CI: $-0.70, -0.92$) for all dysfunctional modalities.

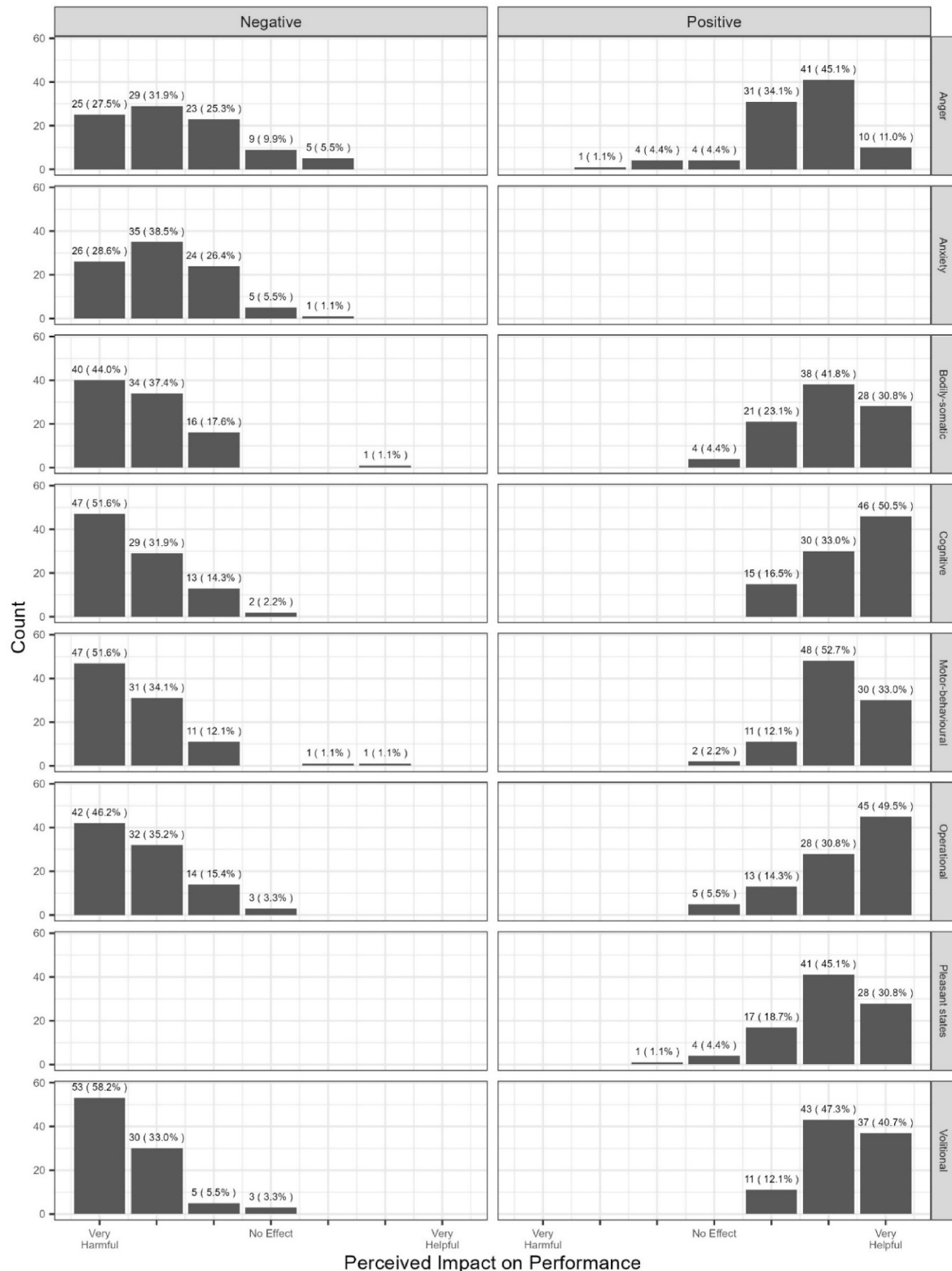


Fig. 1. Frequency of SCCs reported perceived impact of PBS modality and performance as number of responses (N) and percentage of total responses (%).

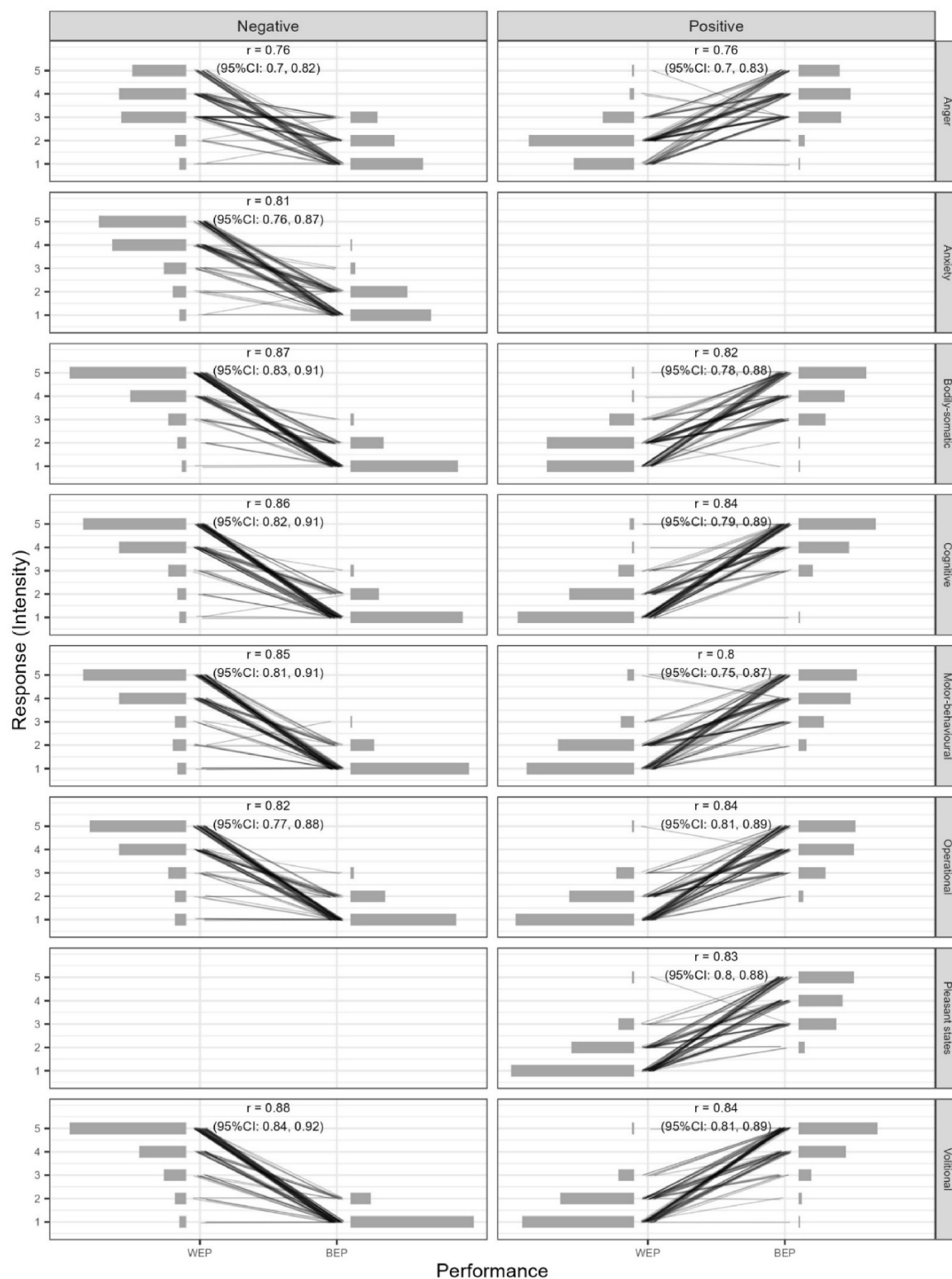


Fig. 2. Comparison of SCCs reported PBS modality intensities between BEP and WEP* * best ever performance = BEP; worst ever performance = WEP; functional pleasant states = P+; dysfunctional anxiety = Anx-; functional anger = Ang+; dysfunctional anger = Ang-; functional bodily-somatic = BS+; dysfunctional bodily-somatic = BS-; functional cognitive = C+; dysfunctional cognitive = C-; functional motor-behavioural = MB+; dysfunctional motor-behavioural = MB-; functional operational = O+; dysfunctional operational = O-; functional volitional = V+; dysfunctional volitional = V-.

2.3. Discussion

The aim of this study was to investigate SCC's perceptions of PBS during successful and unsuccessful performances. Findings are congruent with previous research suggesting that SCCs perceive athletes' emotions and motivation to influence performance and subsequently utilise psychological strategies within professional practice (Feit et al. 2025; Lane et al. 2012; Radcliffe et al., 2018; Szedlak et al. 2015; Till et al. 2017). SCCs reported that within S&C, they believe an optimal state exists which can be highly individualised for each athlete. These findings may further support for the theoretical link and suitability of IZOF as a potential theoretical model to interpret performance-related experiences (Ruiz et al., 2017; Ruiz et al. 2016; Statler & Dubois, 2016; Gillham & Doscher, 2019). SCC's interpretations of IZOF and PBS were aligned with previous research suggesting that successful performances are associated with a nomothetic profile of high intensities of positive functional states and low intensities of negative dysfunctional states (Cooper et al. 2021; Hanin, 2000; Middleton et al., 2017; Robazza et al., 2004; Robazza et al. 2008; Ruiz et al., 2017).

With regards to different forms of physical training, such as muscular strength, power and endurance, SCCs reported that they may require different optimal feeling states. It could be considered that different forms of physical training may present as potentially unique performance sub-contexts within the primary context of S&C. Within the IZOF framework, these various sub-contexts could be interpreted as requiring differing form, content and intensity of feeling state, to mobilise athlete resources to successfully overcome the demands of the task. SCCs also reported that an athletes' state may change during an S&C session. Emotion-performance relationships are assumed to be bi-directional, suggesting that pre-event states can influence performance and ongoing performance influences mid- and post-event states (Robazza & Ruiz, 2018). An athlete's affective state is suggested to be a feeling experienced in response to events in the athlete's environment or mind at a specific moment in time (Lazarus, 2000; Ekkekakis & Zenko, 2016; Middleton et al., 2017). Previous research within other generic theoretical models of affect, such as the circumplex model, state experience in the form of valence and activation have been investigated before, during and after resistance-based activity (Evmenenko & Teixeira, 2022). However, within IZOF and PBS research, neither contextual sub-layers (such as stages of a competition or different forms of training) or within-performance changes in state experience have been investigated.

SCCs demonstrated less agreement in their ability to observe, interpret and manage athletes' states during training and expressed that additional research and coach education within the topic would be beneficial for professional practice. This is in alignment with findings by Tod et al. (2015) and Collins et al. (2021) that suggest SCCs should improve their understanding of why and how they use psychosocial strategies, to potentially enhance their impact on an athletes' physical performance. Consequently, further investigation is required to better understand how SCCs observe, interpret, and act upon athletes' performance-related state experiences within S&C environments. To address this gap, Study 2 adopted an in-depth qualitative approach to advance understanding of how performance-related state experiences are interpreted and operationalised within S&C practice, thereby extending IZOF and PBS inquiry into the applied coaching process.

3. Study 2

3.1. Methods

3.1.1. Participants

A single category design was utilised to investigate perceptions of IZOF and PBS within S&C training. 57 participants from Study 1 provided their contact details for follow up, with 7 participants subsequently agreeing to participate in Study 2. For a focus group

methodology, a single category design typically includes 4-10 participants split across 3 or 4 focus groups (Krueger & Casey, 2014; Smith & Sparkes, 2017). As a result, purposive sampling was used to recruit a further 3 participants that have actively provided S&C coaching within the last two years to athletes that regularly participate in competitive sport. In total, the sample consisted of 10 active, male SCCs (Table 4) (mean age ($\pm$ SD) = 32.8 $\pm$ 9.4 years [range = 24, 54]), with 3-10+ years' experience coaching male (n = 8, 80%) and female (n = 9, 90%) athletes typically aged between 16 and 20 (n = 10, 100%) and 21-25 years old (n = 9, 90%). Participants reported currently holding SC accreditations (n = 7, 70%), undergraduate (n = 9, 90%) or postgraduate degrees (n = 6, 60%). Participants also reported predominately coaching athletes at international (n = 7, 70%), national (n = 7, 70%), regional/county (n = 6, 60%), college/university (n = 5, 50%) or professional (n = 5, 50%) level within the United Kingdom (n = 10, 100%) and competing in a range of team and individual sports.

3.1.2. Procedure

Focus groups were arranged based on the availability of participants aiming between 2 and 6 participants per group. This group size is suggested to allow for an in-depth exploration of phenomena while ensuring each participant is included and given the opportunity to share their insights (Bell et al. 2022; Knight & Harwood, 2009). Focus groups were undertaken online and both audio and video recorded using Microsoft Teams to ensure an accurate record of the data. At the start of each focus group, participants were provided with a verbal explanation of the study. Participants were informed that any named athletes, SCCs or sport coaches, locations, sports clubs or organisations would be replaced with generic codes to ensure confidentiality and anonymity. It was made clear there were no right or wrong perceptions or experiences, and that the researcher was interested in everyone's experiences, knowledge, and thoughts whether positive, negative, or neutral (Bell et al. 2022). A definition of state experience was also provided to ensure participants understood the term within questioning.

3.1.3. Data collection

Three focus groups were conducted consisting of 3 or 4 participants and the researcher acted as a moderator, posed questions, and probed for responses (mean ($\pm$ SD) duration = 82.9 $\pm$ 8.2 min, range 74.2 – 90.6 min). A focus-group guide (see Table 5.) was developed based on suggestions by Krueger and Casey (2014) with broad initial questions, becoming more specific over the course of the focus group with four main target questions for discussion. The moderator ensured all participants were given the opportunity to contribute to each question. Two transition questions and four key questions specifically aimed to understand participants' perceptions of: observing athletes' PBS; context of performance-related states between individuals, training types and within training sessions; and strategies used to manage performance states during professional practice. Probing questions aimed encourage to all participants to contribute, to expand upon their responses and to engage in conversation, as well as the use of pauses to allow time for participants to consider their thoughts (Krueger & Casey, 2014).

3.1.4. Data analysis

Following the completion of all focus groups, data was initially transcribed by Microsoft Teams, the researcher then reviewed each recording and edited the transcription until the content was clearly represented. Anonymity was ensured by replacing participant names with specific codes (COACH A – J) and any mentioned sports team/club, organization, location, athlete or coach with generic codes (TEAM, ORGANIZATION, LOCATION, ATHLETE, COACH). Transcriptions were then subjected to inductive content analysis to identify patterns, themes or interrelationships within SCC's responses without preconceived analytical categories (Patton, 2015). SCCs answers to each question were treated as standalone meaning units unless they contained two or more key points in which case they were split accordingly (Nelson et al.,

Table 4

Demographic details of Study 2 participants.

	No. of participants (%)		No. of participants (%)		No. of participants (%)
Sex					
Male	10 (100)	Female	0 (0)		
Strength and conditioning and/or higher education qualifications					
UKSCA	5 (50)	NSCA	2 (20)	ASCA	0 (0)
Undergraduate degree	9 (90)	Postgraduate degree	6 (60)	Doctorate	0 (0)
Other	0 (0)	No current qualification held	0 (0)		
Number of years' experience					
0-2 years	0 (0)	3-5 years	3 (30)	6-9 years	3 (30)
10 years or more	4 (40)				
Sex of athletes predominately coached					
Male	8 (80)	Female	9 (90)		
Age groups of athletes predominately coached					
<10 years	2 (20)	11-15 years	4 (40)	16-20 years	10 (100)
21-25 years	9 (90)	26-30 years	4 (40)	>30 years	1 (10)
Level of competition of athletes predominately coached					
Amateur	4 (40)	Professional	5 (50)	High School	1 (10)
College/University	5 (50)	Regional/County	6 (60)	National	7 (70)
International	7 (70)	Other	0 (0)		
Country where athletes are predominately based					
UK	10 (100)				
Sport/s athletes predominately compete in					
Racquet sports	6	Athletics (Track and field)	4	Cricket	4
Rugby Union	4	Football (soccer)	3	Basketball	2
Cycling	2	Field Hockey	2	Lacrosse	2
Swimming	2	Curling	1	Extreme Sports	1
Fencing	1	Golf	1	Gymnastics	1
Netball	1	Rowing	1	Rugby League	1
Sailing	1	Snow sports	1	Table Tennis	1
Triathlon	1	Ultimate Frisbee	1		
Para-sports					
Curling	1	Snowsports	1	Triathlon	1
Wheelchair Basketball	1				

Note: Participants could select all options that applied. Eight participants reported coaching more than one sport.

Table 5

Focus group guide.

Phase	Question
Opening	1 If you could tell us your first name, where you are joining the call from and what sport/s you work with?
Introduction	2 What comes to mind when you think of an athlete's mental readiness to perform during a strength and conditioning session? 3 How do you feel about subjective markers/measures of performance, such as an athlete's self-rating, within strength and conditioning training compared to objective measures?
Transition	"State experience" is defined as a mind-body state, in a given moment, such as thoughts, feelings, actions or internal processes in relation to performance. 4 What does an athlete's state look like during a best performance? 5 What does an athlete's state look like during a worst performance?
Key	6 How might a performance state differ between athletes? 7 How might a performance state differ for different types of training? 8 How might an athletes "state" change during a training session? 9 When, how and why would you choose to use a coaching strategy to manage your athlete?
Ending	10 Following this discussion, what other thoughts or considerations do you have about performance states in strength and conditioning? 11 What would you be most interested in understanding through further research?

2013). The inductive content analysis followed a three-stage process, conducted by the researcher (Nelson et al., 2013; Stoszowski & Collins, 2016). First, meaning units were generated, analysed and labelled. Second, meaning units that shared similar concepts or comparable information were grouped into initial lower-order themes. Third, in a similar process of grouping according to content, lower-order themes were then compared to form higher order themes. The researcher formed themes through the comparison of relevant explanatory theoretical and discipline-specific knowledge, assumptions and experience.

To ensure research quality and rigour, the remaining research team assumed roles of 'critical friends' and provided a critical dialogue to challenge and advance the construction, naming and interpretation of higher and lower-order themes (Smith & McGannon, 2018).

3.2. Results and discussion

The aim of study 2 was to investigate SCC's perceptions of athletes' performance-related experiences, their influence on the coaching process and the regulation of coaching strategies. Content analysis identified three higher order themes, outlined in Table 6. (for full detail see Supplementary File A).

Table 6

Higher and lower order themes identified regarding SCCs' views and regulation of performance-related states within professional practice.

Higher-order themes	Lower-order themes
Considerations in preparation for S&C delivery	Demand for athlete performance Context of the session in relation to other influences Athlete resources required to achieve session demands Interpretation and value of subjective assessment of athlete performance
Understanding of state experience in S&C	Importance in professional practice State experience in relation to performance outcomes Individualised nature of assessment Patterns of change within a session
Decision-making process and application of coaching strategies	Professional judgement Learning through trial and error Strategy selection Influence of coaching environment

3.2.1. Considerations in preparation for S&C delivery

SCCs highlighted the need to understand the context of training in relation to other influences, such as the individual or team's sport specific training schedule, life or education demands, or the performance landscape i.e., impact of results on sponsors or performance rankings. For instance, Coach D commented: "We are a small cog in a big wheel for that athlete" and Coach H adding: "I think it's really easy to think 'OK, they're an athlete' whatever environment we're in. The athletes', at the end of the day, are human beings and they've got other life stuff going on that can really impact them". SCCs also described communication with athletes as beneficial for interpreting their perceived psychological readiness to perform and their self-referenced perceptions of exertion and performance, both during and post session, alongside objective measures. SCCs have been suggested to shape their practical strategies based upon theoretical and applied knowledge, including of their athlete and the context in which they operate (Till et al. 2017). SCC's communication has been highlighted as a core psychological competency in particular opening channels of communication and the ability to listen, understand, interpret athlete signals and respond in ways intended to influence behaviour (Callary et al. 2023). Coach C explained the perceived complexity of gaining and interpreting athlete readiness and the importance of communication:

I suppose what we're trying to do, is measure the immeasurable because you can measure a jump height but what we find with the daily monitoring there's some players would just turn off to that process. If you're measuring a jump height, how did you know that's a full 100% effort? So you see a jump height coming down, but they might just be sick of doing their jumps in the morning ... How would you measure the psychological readiness? I think you do that little and often, rather than at the end of the session, and so how was that session? and how was that lift? How were those reps?.. that constant communication.

Within the IZOF framework, state experience is suggested to influence performance within a specific context, which has typically been described as a sport-specific practice or a competition (Robazza & Ruiz, 2018; Ruiz & Robazza, 2020). It could be proposed that various forms of training may require differing performance states due to their contextual variables and associated outputs. Within S&C, for example, this could be initially conceptualised alongside desired physical demands or adaptations, such as producing maximal force at low speeds (strength), maximal force at high speeds (power) and ability to perform a high number of repetitions (muscular endurance) (McGuigan, 2016; Tod et al. 2015). As explained by Coach E, the mobilisation of athlete resources and perceived activation levels, can differ with training modality, session duration or physical load.

For a speed session it wants to be small, condensed doses. I'm not talking about the reps and sets and those things, but in terms of working within a very, very short, condensed period of time. You know, a very, very short distance. We want that mindset within a single repetition to be focused on going from A to B or A to Z or wherever it may be. Within a conditioning session, for example, we want that to be sustained throughout, we want it to be level. We don't want peaks and troughs, we don't want big ripples, we want smaller ripples. It's being aware where to hit them in terms of you raising the volume or raise that intensity and raising the temperature of the room and being understanding of where that needs to be hit and the exact time.

Coach B elaborated further and considered that an athlete's feeling states and activation levels may also be required to change dramatically within a training session, for example between learning a complex movement and a maximal effort bout of exercise.

You don't need every session to be the best or for them to be at their best. Sometimes it's just like we're going to have to get through this

session and just tick the boxes ... But you also have to know how to get them to perform when it really counts. Maybe it's just for a few sets in a session, let's say for a 1RM, or for a whole session when they really need to make gains.

This outlines a possible need for SCCs to determine critical moments within a session, such as when best performance may be perceived as required from the athlete. Outside of these critical moments SCCs described operating within a bandwidth, where consistency and avoidance of negative feeling states is prioritised over expectations of optimal performance.

3.2.2. Understanding of state experience in S&C

SCCs emphasized the perceived importance of working effectively with athletes in training by being aware of, interpreting and responding to their feeling state. This is consistent with a growing body of research that consistently refers to core components of coaching expertise within S&C being psychosocial in nature (Szedlak et al. 2015; Radcliffe et al., 2015; 18; Till et al. 2017; Szedlak et al., 2019; LaPlaca & Schempp, 2020; Feit et al. 2025). Psychosocial coaching competencies have been suggested to include knowledge and understanding of athletes' behaviours, motivations and emotions, and the skills to interpret, work with and change these to drive better engagement, relationships and outcomes (Callary et al. 2023). Coach J explained:

As coaches (SCCs) we need to work with athletes. To make sure we're guiding them or supporting them to get to the place that they need to be to perform at their best of their ability and I think that's part of our skill and the craft of coaching and then hopefully if you can do that effectively, then the athletes will keep coming back, if that makes sense? So regardless of state they are in, they'll keep coming back because they know that you have support them in the right way for them.

SCCs outlined possible observable cues during S&C performance including motor-behavioural, bodily-somatic, cognitive, motivation and communicative modalities. Coach G described: "I think if you going to paint an ideal picture, it would be someone who's very focused, driven, they're motivated". Similarly, Coach H also noted "if they come up bouncing through the walls and they're like, high fiving everyone, then you kind of know that they're potentially primed to go". Coach I further explained that: "In terms of the worst performances it is definitely the negative body language ... coming in with slopy shoulders and the way they communicate with other players or athletes". Within the IZOF and PBS framework, SCCs are therefore proposed to perceive and interpret athlete: motor coordination efficiency or inefficiency; ability or inability to focus on relevant stimuli and concentration on the task; levels of activation or deactivation; pursuing or avoiding a specific action or activity; effectively or ineffectively interacting with others; or effectiveness or ineffectiveness of task execution (Robazza & Ruiz, 2018). Similar findings have been reported within tennis coaches observing bodily, motor-behavioural and operational components of a performance state and adapting coaching strategies to respond to the players' needs (Mueller et al., 2018). Research also suggests that the use of psychological strategies in S&C could be based upon athlete's behavioural responses such as facial expressions, posture, gestures and verbal expressions (Szedlak et al. 2015; Till et al. 2017). Coach H also reflected on the complexity of perceiving athlete state: "I think there's so many variables that come into play, that it's really hard to pinpoint one exact thing".

Emotion-performance relationships are assumed to be bi-directional, suggesting that pre-event states can influence performance and ongoing performance influences mid- and post-event states (Robazza & Ruiz, 2018). Therefore, athletes' state could change during a session in response to physical activity, the various intensities and complexities of training modalities or perceptions of success or failure. Coach B explained that changes in athlete's state experience during a session are

a regular occurrence: “To say that it would stay the same would be the stranger thing to say”. This was reinforced by Coach D who stated: “I think you have to be open with every session that you walk into that things are gonna change and you need to be able to operate within that bandwidth and not be single minded”. SCCs considered possible patterns of change, including positive, negative, stable and fluctuating. Coach I stated:

Some people tend to be really stable and just grind it out every session. Some people can fluctuate either side. One day they might come in and struggle and it really depends on the session and the session content of what, how and where they go from there. And then other people are completely fluctuating all the way through.

Coach G reflected on potential triggers of change, such as engaging in physical activity and perceived successes or failures:

Yeah I definitely think (*athlete state*) can change in a variety of different ways. Like, there might be a warm up, they might not be up for the session at start of the day. Things have been going against them, but by the end of that session, blood started flowing, they might have started doing something they enjoy, or feeling good and then going into training in a much better mind state. If they lift a new weight that they never lifted before and get a PB that can be quite a big change in state that I've seen for someone, sort of a lot more happy with the session. Equally if they're kind of not getting an exercise, seen it where someone's been looking on top of the world having a great session, but they can't get what they need to do and it goes the other way and then the states change into the more of a negative mind frame and the rest of the session can kind of peel off into a bit of nothing.

Research within other theoretical frameworks, such as the circumplex model of affect have outlined affective responses of valence and activation during physical exercise (Evmenenko & Teixeira, 2022). Within the IZOF framework, the PBS-S was proposed to measure athletes' current feeling states before, during, and after performances (Ruiz, Robazza, Tolvanen, & Hanin, 2019). However, there is little to no research utilising the PBS-S to measure state experience and observe change between or during sessions, both within sport or S&C.

SCCs also considered the complexity and individualised nature of performance-related experiences between athletes of differing biological sex, experience, types of sport and individual “rhythms” of performance. Coach J stated:

I would say pretty different between each athlete. For football players, they'd be very generally like, the boys would be very brash about it and make sure everyone knows that they're in that state where they're feeling really good. For like track and field athlete, I'd suggest that they're more intrinsically driven and so they wouldn't be shouting about it. But yeah, as a coach, you'll be able to see it a bit more. And then maybe if you look at a female athlete and I think it would be quite spread across them, so few athletes might be similar to the boys and scream and shout about it and others would just kind of steadily get on with it.

This is in congruence with previous research outlining that SCCs may utilise different psychological strategies based upon athlete age, experience, competitive level and biological sex (Quartiroli et al., 2022). Coach H also described: “I think it takes time to get to know and that took a long time to really understand what your athletes are like”. These findings may support the utilisation of IZOF as an individualised approach to determine performance-related state experience and inform S&C coaching actions (Ruiz et al., 2017; Ruiz, Robazza, Tolvanen, & Hanin, 2019; Gillham & Doscher, 2019). Within IZOF framework, it is suggested that as training-related activities are repetitive, state experience is likely to develop into a stable pattern and athletes can develop emotional tendencies and preferences (Robazza & Ruiz, 2018). Previous research investigating both within- and between-athlete profiles across a

variety of sporting contexts, including S&C, have been associated with a nomothetic profile consisting of high intensities of positive functional states and low intensities of negative dysfunctional states (Ruiz et al., 2017; Cooper et al. 2021). However, previous research typically relied on retrospective data collection, within emotion-focused measures. As a result, data could be considered limited due to recall bias and a lack of comprehensive measures of PBS experience.

3.2.3. Decision-making process and application of coaching strategies

The “craft” of coaching and ability to intuitively adapt and implement coaching strategies perceived to support athlete performance is suggested to differentiate experienced and expert SCCs from inexperienced and novice SCCs (Grant and Dorgo 2014; LaPlaca & Schempp, 2020; Downes & Collins, 2021). SCCs described several factors that are considered in their decision-making process to determine if an intervention is necessary and when/how to apply a coaching strategy with the intention of influencing an athlete's feeling state. Factors could include their previous experience, coaching values and philosophies, knowledge of athlete, quality of the relationship, and the accumulation of athlete observations. Coach J explained:

I think, in terms of like positioning coaching strategies, I don't think a lot of coaches (SCCs) will have this little catalogue that they pull from in terms of the coaching strategy, depending on how that athlete walks through the door. Like there's been some really good work around coaching individuals and different types of people, characters, personalities which might enable it. But unfortunately, again, I think it's depending on the athlete and how much you know that athlete and how you work with them. It might then be not so much of a coaching strategy, but how you approach it as a person, as a human, how you approach that person and that then might then link into coaching cues or your coach intervention if you like and how you particularly work with that athlete. And again that would come back to whether you stick to the script or you tear up the script and do something totally different. And I think a lot of the time it's that coaching craft to do that, but do it working with the player, the performer, the athlete.

Coach B further elaborated that different coaching strategies may be perceived as beneficial for different participants:

Some people really need competition to like the motivate them to get the best out of them. Some people just need music on really loud and for me to say “come on, let's go for it” and some people like find that a little bit awkward and just want to just crack on. So yeah, I think it's understanding that every so often you'll get their baseline and then you'll do something and then you'll notice if their baseline goes up or goes down.

SCCs psychosocial knowledge is suggested to be primarily constructed through reflection on practical experience and gaining information from athletes, with little to no information gained from academic research. This differs to other forms of professional knowledge in S&C, such as programming and exercise selection, where academic research is a primary source of knowledge (Szedlak et al., 2019; Callary et al. 2024). This may be due to a limited focus on psychosocial content from accrediting bodies and a lack of peer-reviewed research that investigates the effectiveness of psychosocial coaching practices (Peterson, 2019; Szedlak et al., 2019). SCCs stated that the application of coaching strategies is described as an unconscious, intuitive and reactive process that relies on a trial-and-error approach with each athlete. Coach B described:

When we start to speak these things out, you actually put these things that we do unconsciously into like the fore and I have been starting to think consciously about what we do unconsciously or making these little decisions. You're looking at those micro thoughts that are going through your head and then all of a sudden you're making a decision

and doing it. Whether it's right or wrong, you can't say you have it all planned out. I would just love to say I've got a grand plan but I'm usually reacting. But yeah, I think the variables of what the problem is and the context of the person and in terms of strategies, getting to know the person well and being personable and making sure that they know that you care about them.

Coach H also describes some of the challenges and difficulties of developing through a trial-and-error approach:

I think what is just coming to my mind is a lot of trial and error really with athletes. I think a lot of times I'll drive home from work and I'll be like **** that didn't work. But then there's always ways of changing it ... you just find different ways of managing them. I think a lot of it is trial and error. And then you just kind of you niche it and niche it and niche it, but it's never going to be perfect. But I think you can find common ground and it comes back to observation just from watching and communicating with them is really important.

Radcliffe et al. (2018) proposed that S&C presents a separate environment from sport-specific settings that may facilitate productive, athlete-centred training and can be conducive to provision of emotional support and psychological strategies due to one-to-one nature of delivery. SCCs also highlighted the perceived influence of the training environment in establishing and maintaining performance states, including creating an open and purposeful environment and mediating any harmful influence of interactions with others. Coach F describes:

Just always creating that consistent environment that is open to the athletes. So there's some days where their state is quite low and their state is quite high, It's OK, but if you have that environment where they can learn and be able to adapt and adjust, and as a coach, myself also being to adapt and adjust to the different states they have, then if it came about that one day their low, and one day then their high, as long as they adapt and they can kind of learn from there and it's an open environment.

From an IZOF perspective, Ruiz, Robazza, Tolvanen, Haapanen, and Duda (2019) investigated the interplay between motivational climates and the intensity and reported impact of athletes' emotions in team and individual sport training settings. Authors suggested that sport coaches need to promote a task involving motivational climate to support autonomous motivation and avoid feelings of dysfunctional anxiety and anger to enhance the athletes' adaptation to training in performance contexts.

Middleton et al. (2019) investigated the impact of social interaction on pre-performance PBS for swimming competitions, and noted interaction with friends, teammates and sport coaches as helpful or harmful for focus, confidence and motivation. Coach F commented on the impact of coach-athlete interactions within a group S&C session:

I might be give feedback to one athlete "Oh, really good job. Well done" on this lift or after this exercise and then the other person is thinking "I didn't get that same response". So I think as a coach you have to be mindful of the level of feedback you give to each individual athlete and make sure it's almost balanced to the individual but also balanced to the whole group. Because you don't know how they might perceive the way you're treating someone, they might think they are not being treated the same or getting the same sort of attention. So I think the way that we conduct ourselves is quite important in how an athlete's state of mind changes throughout the session

Coach D also describes the impact of their emotional state on the training environment:

I can be in a bad mood, but still execute what I need to get done just as effectively that day, depending on the task. But the effect that I have on you and others around me, you might not respond to it well

or you respond to it even better. And I think that's probably the bigger picture of what we need to manage.

Collectively, these findings suggest a potential influence of coach behaviour and interpersonal dynamics within S&C environments on athletes' PBS. However, little to no research has examined training environments, peer or coach interactions, or the use of coaching strategies on IZOF, PBS or athlete performance within S&C contexts. Further research is necessary to explore intra- and interpersonal dynamics, coaching strategies and environments within S&C, and their potential relationship with PBS and physical performance.

4. Summary

The aim of this article was to investigate SCC's perceptions of performance-related state experience within S&C and how these perceptions influence coaching practice. Across two studies, findings demonstrate that SCCs perceive athletes' psychological states as influential to physical performance, interpret these states as individualised and context-dependent, and report regulating their coaching behaviours accordingly. To our knowledge, this is the first research to examine SCC's perceptions through the theoretical lens of IZOF and PBS frameworks. The findings may extend the application of these frameworks beyond sport settings and highlight the perceived complexity of performance-related state experience within S&C environments and competencies within contemporary coaching practice.

Study 1 suggested that SCCs perceive successful performances as associated with a nomothetic profile of high intensities of positive functional states and low intensities of negative dysfunctional states, consistent with previous research in sporting and S&C contexts. Study 2 further outlined how SCCs interpret and operationalise performance-related states in practice. SCCs explained observing athletes' motor behaviour, communication patterns, activation levels, motivation and social interaction to infer readiness and perceived performance potential. A key theoretical contribution of the combined findings is the identification of contextual sub-layers within S&C across training modalities (e.g. strength, power, speed, endurance). SCCs described training modalities as potentially requiring different form, content and intensity of feeling state to meet performance demands. These findings may advance IZOF conceptually by suggesting that state experience could operate not only in training or competition, but also across sub-contextual layers within those environments.

SCCs also identified "critical moments" within sessions, such as maximal lifts, performance testing or a complex exercise, where optimal state mobilisation is perceived to be prioritised. Additionally, SCCs emphasized that athlete states are dynamic and subject to change before, during and after S&C sessions. Findings described perceived patterns of stability, positive or negative shifts, and continuous fluctuation in response to physical exertion or activation, perceived success or failure and social interactions. However, previous research within IZOF in S&C has largely been retrospective in nature, focused solely on affective modalities, and described a global BEP and WEP performance in S&C (e.g. Cooper et al. 2021). This presents a limitation in that previous research may not fully capture the complexity and temporal variability of state experience reflected in the present findings. Further research should therefore be conducted utilising multimodal state-like measures, such as PBS-S, to explore performance-related states across various training modalities and within-session state variability. In line with IZOF research within sporting contexts, further research could also explore the influence of motivational climate and social interaction on state experience within S&C (Middleton et al. 2019; Ruiz, Robazza, Tolvanen, & Hanin, 2019).

Despite these contributions, several limitations should be acknowledged when interpreting the present findings. First, Study 1 relied on SCCs' retrospective reflections of best and worst performances, which may be susceptible to recall bias and may not fully capture the dynamic

and fluctuating nature of performance-related state experience within sessions. It should also be noted that the use of self-report Likert-scale data in Study 1 may be susceptible to acquiescence bias and potential ceiling effects, which may have limited response variability and reduced the ability to differentiate between respondents' perceptions. Findings across both studies reflect SCCs' perceptions and interpretations of athlete states, rather than objective assessments of athletes' psychobiosocial states or direct measures of performance outcomes. Recruitment through professional networks and social media may also have resulted in a sample of SCCs who were particularly reflective, engaged, or interested in psychosocial aspects of coaching practice. Within Study 2, participant discussions may have been influenced by professional self-presentation and exposure to IZOF/PBS terminology, potentially encouraging theory-consistent interpretations of practice. Finally, while coach–athlete interactions were discussed extensively, the present study did not critically examine how power dynamics within S&C environments may influence athletes' expression of state experience or SCCs' interpretations of athlete behaviour.

A central finding of Study 2 was that the regulation of athlete states was described as embedded within the “craft” of coaching. Strategy selection was described as intuitive, reactive and grounded in accumulated experiential knowledge rather than systematically planned interventions. SCCs reported adapting the use of feedback, competition, music, communication style and environmental tone in response to perceived athlete state, often developed through trial-and-error processes. Furthermore, SCCs highlighted that effective state regulation was perceived to depend on trust, communication and understanding the athlete as an individual. As proposed within previous research and the current study's findings, SCCs appear to recognise the importance of psychosocial competencies to work effectively with athletes. However, while SCCs demonstrate conceptual alignment with IZOF and PBS principles, the application of state regulation strategies was described as largely intuitive, and experience driven.

Future research should utilise multimodal state-like measures, such as the PBS-S, to investigate performance-related states across different S&C modalities and within-session fluctuations in state experience. Further work should also examine how coaching strategies, motivational climate, social interaction and interpersonal dynamics influence PBS and subsequent physical performance outcomes within S&C contexts. Importantly, future studies should incorporate objective performance indicators alongside perceived state measures to better establish how SCC perceptions of athlete states and subsequent coaching interventions relate to actual performance changes. Such research would help move beyond descriptive accounts of SCC perceptions and support the development of evidence-informed psychosocial practice. Future research could also utilise in situ case-study or observational designs to capture real-time coach–athlete interactions, enabling analysis of both effective and ineffective coaching behaviours, including potential misinterpretations of athlete states and their impact on performance. This would support bridging the gap between theory, coach education and applied psychosocial competencies, advancing both research and contemporary S&C coaching practice.

CRediT authorship contribution statement

Jonathan J. Cooper: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft. **James Fisher:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – review & editing. **Emma Mosley:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – review & editing. **Russell Discombe:** Conceptualization, Investigation, Methodology, Supervision, Writing – review & editing. **James Wright:** Conceptualization, Investigation, Methodology, Supervision, Writing – review & editing. **Tom Doncom:** Formal analysis, Methodology, Validation, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.psychsport.2026.103236>.

Data availability

All data has been provided within article and supplementary material

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