Title

Training Load Monitoring in Elite English Soccer: A Comparison of Practices and Perceptions Between Coaches and Practitioners

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Author

Matthew Weston[1]

[1]Department of Psychology, Sport and Exercise, School of Social Sciences, Humanities and Law, Teesside University, Middlesbrough, UK.

Corresponding Author:

Dr Matthew Weston

m.weston@tees.ac.uk

00441642384430

0000-0002-9531-3004

@MWeston73

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Abstract

Purpose: To survey practices and perceptions of training load monitoring among soccer coaches and practitioners.

Methods: A questionnaire assessed factors influencing training planning, training load practices, and training load feedback and usefulness. The questionnaire was distributed via email and as an online version (Bristol Online Survey Tool) to relevant staff working within elite English Soccer.

Results: Respondents represented two groups; those involved with player tactical (coach, n=94) or physical (practitioner, n=88) preparation. Coaches worked predominantly with younger players at lower standing clubs while practitioners worked with older players at higher standard clubs. With exception for the influence of current match schedule in training planning, there was coach-practitioner agreement for all training planning questions. There was agreement on some purposes for training load monitoring (maximise fitness, evaluate training) but not others (enhance fitness, reduce injury). For load monitoring methods, the greatest proportion of coach answers was for coach perception (22%); whereas the greatest proportion of practitioner responses was for GPS (22%). Largely, load reports were perceived positively and 84.1% of respondents felt training load monitoring was beneficial to their club.

Conclusion: This survey shows coaches and practitioners perceive training load monitoring as worthwhile, with differences in practices and perceptions likely reflecting club infrastructure.

Keywords: Soccer; Training monitoring; Training prescription; Coaching; Sports Science

Introduction

Soccer players require technical, tactical, mental and physical skills to succeed (Helgerud et al. 2001; Stølen et al. 2005), with competition preparation optimised when these requirements are all integrated into training (Reilly 2005). Technical and tactical sessions are frequently the priority in the training plan (Morgans et al. 2014) as such differences between players and teams ultimately dictate the match result. Therefore, the training loads experienced by players are often the consequence of coach-planned training, and not the main goal (Arcos et al. 2017).

Training loads can be categorised into internal and external loads; external load is the specific training prescribed by the coaches with internal training load being the individual physiological and psychophysiological response to the external load (Malone et al., 2015). The monitoring of training load helps to understand how players are adapting to, and recovering from training (Arcos et al. 2017; Bourdon et al. 2017). While individualisation is frequently ignored in soccer as training prescription is often focused on the group (Morgans et al. 2014), training load monitoring shows promise for understanding associations with fitness changes (Castagna et al. 2011; Akubat et al. 2012; Arcos et al. 2015) and injury risk (Malone et al. 2017a; Malone et al. 2017b) and also helps evaluate microcycle planning to ensure players are 'match ready' (Wrigley et al. 2012; Malone et al. 2015; Thorpe et al. 2016; Arcos et al. 2017). Therefore, many clubs now employ fitness and sports science personnel (termed 'practitioners') to collect/ interpret large volumes of training load statistics and provide daily feedback to coaches on player load and status (Akenhead & Nassis 2016). Presently however, coaches can perceive load monitoring strategies with skepticism (Burgess 2017) and 37% of practitioners recently surveyed rated coach buy-in as a substantial barrier to effective load monitoring (Akenhead & Nassis 2016).

Poor coach buy-in may be a consequence of the low priority coaches give to science, suggesting a reliance on non-scientific sources of information (e.g., other coaches) (Stoszkowski & Collins 2016). This process shows coaches could possess procedural (doing) sports science knowledge, yet lack the underpinning declarative knowledge (why) necessary for critical understanding (Stoszkowski & Collins 2016). For example, if coaches see little benefit in the input of practitioners over and above their existing knowledge and experience, then low buy-in could result. In the context of training load monitoring, this represents a barrier for practitioners as the coach very often determines a large part of the training load (Akenhead & Nassis 2016).

To overcome low coach buy-in, practitioners should show an understanding of the coaches' view of sport science and its place in the overall process and also be cognisant that their primary role is to support the coach (Akenhead & Nassis 2016). Further, the ability to effectively communicate training load data is paramount – data should be competently analysed and translated into clear, practical messages (Coutts 2016). However, this approach is not universally adopted (Akenhead & Nassis 2016), suggesting that load monitoring feedback could be a barrier to implementation.

The practices and perspectives of training load monitoring among practitioners represent a valued addition to the literature, yet perspectives from both sides are clearly needed. Therefore, this study's aim was to extend the work of Akenhead and Nassis (2016) by comparing training load monitoring practices and perceptions of practitioners and coaches working in elite English soccer. English soccer imposes unique challenges for coaches and practitioners due to high match-play frequency (Enright et al. 2017) and extensive Academy player information tracking via the Elite Player Performance Plan; a long-term strategy with

the aim of developing more and better home-grown players (www.premierleague.com/youth/EPPP). As such, coaches and practitioners working within elite English soccer represent an ideal population for the gathering of information on training load monitoring.

Methods

Survey Design and Distribution

A cross-sectional survey of staff working within elite English soccer was conducted from November 2016 to March 2017. The School of Social Sciences, Humanities and Law at Teesside University ethics committee approved the study, which conformed to the Declaration of Helsinki. This survey built on many of the training load themes previously surveyed (Akenhead & Nassis 2016), with the relevance of many themes contained in this survey (load monitoring procedures, role of load monitoring, data visualization and reports) subsequently verified in a recent training load consensus report (Bourdon et al. 2017).

The initial survey was designed to capture: 1) current club practices of training load monitoring (8 questions); 2) training planning (7 questions); 3) training load monitoring feedback (7 questions). Questions were multiple choice or Likert scale, of which all scales were unipolar. Each Likert Scale contained four to seven points and was fully labelled, with response labels as per Wade (2006), as such scales are more reliable and valid than partially labelled scales (Krosnick & Presser 2010). Response labels chosen represented constructs relevant to this survey (e.g., responsibility, agreement, frequency etc.) and each construct was defined precisely with equal intervals along the continuum of interest (Krosnick & Presser 2010). The survey was reviewed for content validity (Stoszkowski & Collins, 2016) via group discussion with four coaches and one practitioner working with an English Premier

League club. This process resulted in several modifications - three questions removed, two questions combined into one, two new questions added, the wording of several questions amended to enhance readability, and question order modified for coherent presentation of survey themes. Once changes were made, the survey was recirculated for approval. The finalised survey contained 20 questions covering three main themes: 1) training planning (questions 1-6); 2) club training load practices (questions 7-12); 3) training load monitoring: feedback and usefulness (questions 13-20). The question formats used within each of the three survey themes are presented in Table 1.

Establishing Cronbach's alpha adds validity and accuracy to the interpretation of questionnaire data and should be calculated for each concept rather than for the entire test or scale (Tavakol & Dennick 2011). As such, retrospective analysis of the responses assessing similar constructs (adjustment [questions 5-6]; reports [14-16]; monitoring [18-19]) yielded alpha's rated 'good', ranging from 0.82 (95% Confidence Interval 0.75 to 0.86) to 0.90 (0.86 to 0.92).

[Table 1 near here]

Voluntary informed consent was provided on the first survey page and no information regarding participant age, gender or club was requested. At the start of the survey, training load was defined as "*All physical activity undertaken by the players. This includes physical training sessions, skill-based training sessions, combined training sessions and matches*." Demographic data requested are listed below.

- Job title
- Years worked in elite English soccer
- Age category of players worked with (Senior, Professional Development Phase [<18 y or <23 y], Youth Development Phase [<13 y to <16y], Foundation Phase [<9 y to <12 y], and Pre-Academy [< 9 y]). Multiple choice as respondents could work with different age categories.

- What league their club played in (Premier League [top tier], Championship [second tier], League One [third tier], League Two [fourth tier], Other [non-league]; Academy: Category One [top tier], Category Two [second tier], Category Three [third tier], Category Four [fourth tier]). Multiple choice as respondents could work with different age categories.

The survey was developed as a word document and distributed via email from The English Football Association (FA) Education, Technical Directorate to known club contacts. The email contained information regarding the survey purpose and intended outcomes. Club contacts were asked to distribute the survey around their club at senior and academy levels, specifically asking coaches and sports scientists/ fitness coaches to complete. The survey was also made available online using the Bristol Online Survey Tool (BOS). A weblink to the survey was generated and shared on Twitter by The FA Physical Performance Education Lead and the study's author. The survey took approximately ten minutes to complete.

Data Reduction and Analysis

In accordance with Akenhead and Nassis (2016), the term practitioner was used to describe respondents whose job role was either sports scientist, fitness coach, or strength and conditioning coach. Therefore, respondents represented two discreet categories; 1) those involved in the tactical preparation of players (coach), and 2) those involved in the physical preparation of players (practitioner).

Following survey closure (31/03/2017), data were exported directly into SPSS (v.23, Armonk, NY: IBM Corp) using the BOS analyse function. Data from multiple-choice questions, including demographic questions of age category and club, were converted into a proportion of the total number of responses per question, both for coaches and practitioners. Between-group differences (coach-practitioner) in the proportion of responses were calculated, with uncertainty for this difference expressed as a 95% confidence interval (95%

CI), calculated using the Wilson procedure (Newcombe 1998). To obtain a magnitude based inference (Hopkins et al. 2009) for the between-group differences, a proportion ratio was calculated and assessed against the following magnitude scale: 1.00, 1.11, 1.43, 2.0, 3.3 and 10 for trivial, small, moderate, large, very large and extremely large, respectively, and their inverses 0.9, 0.7, 0.5, 0.3 and 0.1 (Hopkins 2010).

Likert scale data were treated as numeric variables (Hopkins 2010) and analysed with parametric statistics. Parametric statistics can be used with Likert scale data of small sample sizes, unequal variances, and with non-normal distributions, with no fear of coming to the wrong conclusion (Norman 2010). Therefore, coach-practitioner differences in Likert scale responses were assessed using an independent t-test with unequal variances. As all scales were fully labelled, a clear meaningful between-group difference in response was one full point on the scale. This one-point threshold, along with the t-test p value, mean difference and degrees of freedom were imputed into a custom-made spreadsheet (Hopkins 2007) to assess for a clear difference (yes/no) in response. No difference was recorded when the CI overlapped both the positive and negative thresholds by ≥5% (Hopkins et al. 2009). Likert scale responses are presented as the response label associated with the mean response expressed as an integer (Hopkins 2010) and also as the mean ± SD response and 95% CI, presented to two significant digits, with the latter used for statistical inference. In-line with the study's aim, all inferential analyses were confined to response differences between coach and practitioner.

Results

Respondents

Overall, 182 respondents completed the survey (coaches: n=94, 9.7 ± 7.0 years' experience; practitioners: n=88, 6.5 ± 5.3 years). Of the 88 practitioners, 49 were sports scientists, 19 fitness coaches, and 20 strength and conditioning coaches. Despite survey respondents representing all age ranges, there were moderate to extremely large differences in the proportion of age categories worked with by coaches and practitioners (Table 2). The majority of practitioners worked with Senior (32%) or Professional Development Phase (33%) players; whereas only 3% of coaches worked with senior players. Further, there were small to very large differences in the club standard respondents worked with. The majority of practitioners worked with Premier League and Championship clubs (77%), yet coaches' clubs were more evenly distributed across leagues. For those respondents who also worked in club Academies, there were small to large differences in the Academy categories as practitioners worked predominantly in Category One clubs (64%) while coaches worked across Categories One, Two and Three.

[Table 2 near here]

Training planning

Coaches and practitioners perceived coaches were *mostly responsible* and sports scientists/ fitness coaches *somewhat responsible* (Table 3) for planning training. The influence of current match schedule when planning training was rated differently between coaches (*somewhat influential*) and practitioners (*very influential*). There were no other clear between-group differences.

[Table 3 near here]

250 ***Club training load practices***

251 Regarding the purpose of monitoring training load, there were small differences in the
252 proportion of coach and practitioner responses for 'enhance fitness' (proportion ratio 0.73),
253 'reduce injury' (1.14), and 'showcase technology' (0.83), albeit with very low response
254 numbers for the latter answer (Figure 1a). All other between-group differences were trivial.

255 [Figure 1 near here]

256 For load monitoring methods, the difference between coach and practitioner in the proportion
257 of responses was extremely large for blood lactates (0.2), large for coach perception (2.14),
258 moderate for medical staff perception (1.71), ratings of perceived exertion (RPE) (0.64), and
259 heart rates (0.67), and small for sport scientist/ fitness coach perception (1.27), manager
260 perception (0.89), and global positioning systems (GPS) (0.76) (Figure 1b). The frequency
261 that training load data was collected was rated differently (1.3 points; 95% confidence
262 interval 1.0 to 1.6 points) by coaches (*sometimes*) and practitioners (*every session*). There
263 were between-group differences for who decides to monitor training load (trivial to
264 moderate), who is responsible for the analysis and interpretation of training load data (small
265 to large), and who the training load information is produced for (trivial to moderate) (Table
266 4).

267 [Table 4 near here]

268 ***Training load monitoring: feedback and usefulness***

269 The majority of training load reports were verbal (coaches, 29%; practitioners 35%) or
270 written and graphical (coaches, 48%; practitioners 44%). There were clear between-group
271 differences for the frequency of training load report production, the timely manner in which
272 reports were produced and whether their club had the expertise and equipment to properly
273 monitor training loads, but no clear difference in the response to the way the reports were
274 communicated (Table 5). Clear differences existed between coach and practitioner answers to

whether training load monitoring is used 'positively' (proportion ratio 0.89) or 'negatively' (3.94), but the difference for 'both' was trivial (1.07). There were differences in the proportion of coach and practitioners who rated training load monitoring as being beneficial (small, 0.77) or not beneficial (extremely large, 10.89) to their clubs training practices (Figure 2b). Overall, 84.1% of respondents perceived training load monitoring as beneficial to their club.

[Table 5 near here]

[Figure 2 near here]

Discussion

This survey furthers our knowledge of training load monitoring and provides for the first-time coach perceptions of this common practice. Despite previously reported concerns with coach buy-in (Akenhead & Nassis 2016) and skepticism (Burgess 2017) for training load monitoring, there was largely agreement between coach and practitioners on factors influencing training planning, reasons for load monitoring, the practicality of data reports, and the usefulness of training load monitoring.

Training planning

Coaches were *mostly responsible* for planning training, with sports scientists/ fitness coaches *somewhat responsible* (Question [Q] 1) - a responsibility agreed upon. This finding supports the notion that training load is largely determined by the coach (Akenhead & Nassis, 2016), which is not surprising given that the main focus of soccer training is the technical and tactical preparation of players. Indeed, the major role of coaches is to help players acquire the skills necessary to perform successfully in competition (Ford et al. 2010). For the practitioner to add value to a training plan that is mostly devised by coaches, previous guidance for practitioners to align their practices, where ethically possible, to support the

direction of the coach (Akenhead and Nassis, 2016) would appear sensible. Coaches and practitioners agreed that scientific knowledge (Q2) and experience of the practical environment (Q3) are needed to plan a training week, suggesting an understanding of necessity for each other's roles.

Current match schedule, previous training, time of season, player fitness and players own feelings were perceived to be *somewhat* to *very influential* for planning training (Q4), which is consistent with findings that previous and upcoming games are the factors considered most when adjusting training load (Akenhead & Nassis 2016). For example, to apportion the load required for competition, training is planned around the weekly match schedule with load being reduced in proximity to matches (Wrigley et al. 2012; Malone et al. 2015). While speculative, that practitioners rated current match schedule more influential than coaches could reflect a deeper understanding of the physiological demands of soccer matchplay and in turn the implications for fatigue and recovery. Despite the recent good work examining players' perception of recovery (Thorpe et al. 2016) and the sensitivity of subjective measures for monitoring athlete well-being (Saw et al. 2015), it was surprising that the players own feelings were rated only *somewhat influential* when planning training. This may be a consequence of despite elite soccer players own feelings showing promise as an assessment of fatigue status (Thorpe et al. 2016), work is still required to investigate the relationships between these measures with global anchors such as performance, injury, and illness (Thorpe et al. 2017).

Most of what is currently known about load monitoring is from personal experiences or remains unpublished (Halson, 2014). In the current survey, data showed that individual (Q5)

and team (Q6) training sessions were adjusted more often than not due to prior training loads, thus showing training load monitoring is, to an extent, influencing practice.

Club training load practices

Coaches and practitioners agreed that a primary purpose of training load monitoring (Q7) was to 'maximise performance'; thereby showing declarative knowledge among coaches (Stoszkowski & Collins 2016). The higher proportion of practitioner answers for 'enhance fitness' may reflect more extensive knowledge of the dose-response relationship between training loads and fitness changes (e.g., Castagna et al. 2011; Akubat et al. 2012; Arcos et al. 2015) and practitioners seeing their role relating mostly to player physical preparation. Whereas, the higher proportion of coach answers for 'reduce injury' may reflect the importance of player availability on team performance (Hägglund et al. 2013), which is the responsibility of the coach (Ford et al. 2010). Improving performance and injury prevention have also previously been rated highly as objectives for training load monitoring (Akenhead & Nassis, 2016). The showcasing of expertise and equipment as a purpose for load monitoring were both rated encouragingly low (~1%).

There were substantial differences between coaches and practitioners for training load monitoring practices (Q9). The most frequent methods utilised by practitioners were GPS, RPE, and heart rates. The use of these methods in soccer has helped quantify: external training load in the context of periodisation across the training week (Malone et al. 2015; Thorpe et al. 2016); a link between high-speed running and injury risk (Malone et al. 2017b); and dose-response relations between internal load and fitness changes (Castagna et al. 2011; Akubat et al. 2012). Therefore, it appears the methods chosen by practitioners are indeed useful measures for quantifying load monitoring purpose (e.g., enhance fitness, reduce

349 injury). The most frequent coach methods were coach and sports scientist/ fitness coach
350 perception, and GPS. Along with coaches reporting a greater proportion of responses for
351 perception as a method of training load monitoring, they also reported a lower frequency of
352 training load data collection when compared to practitioners (Q10). These findings may be
353 explained by the coaches working more with younger players and at lower standard clubs
354 (Table 2) given that competition standard and resources influence training load monitoring
355 issues like practicality and staffing (Bourdon et al. 2017). Indeed, insufficient human
356 resources can be a substantial barrier to effective load monitoring practices (Akenhead &
357 Nassis, 2016). If a link between club resources and load monitoring procedures exists, it may
358 also explain the differences in training load procedures (Q8, Q11, Q12). As perception was a
359 popular method of training load monitoring among coaches, it is logical that coaches
360 perceived responsibility for analysis and interpretation to be distributed across staff; however,
361 practitioners perceived responsibility to predominantly be with themselves. Further, coaches
362 reported that the decision to monitor training load was also relatively well distributed across
363 all staff, yet practitioners reported the decision was largely made by themselves. As
364 practitioners are less responsible than coaches for planning training, they could perceive
365 themselves as having greater responsibility in supporting the coach-planned training by
366 providing training-related information on player physical status; thereby, showing awareness
367 that their primary role is supporting the coach (Akenhead and Nassis, 2016). Whether
368 perception was used as a means of training load monitoring is due to validity or the only
369 available method because of poor resources, would require further investigation.
370
371 ***Training load monitoring: feedback and usefulness***
372 Despite between-group differences in the perception of whether load monitoring was used
373 either ‘positively’ or ‘negatively’ (Q13), there was agreement that monitoring was used both

374 ‘positively’ and ‘negatively’. A more detailed understanding of these positive and negative
375 concepts regarding training load monitoring is, however, warranted and would be possible
376 through a different methodological approach (i.e., qualitative).
377
378 Huge amounts of training data are monitored daily, which can cause a complicated decision-
379 making matrix - the more complicated the matrix, the harder it is for practitioners to make
380 informed decisions (Lazarus et al. 2017). Therefore, turning training data into relevant
381 information for players and coaches represents a daunting challenge for sports scientists
382 (Vanrenterghem et al. 2017). So, to ensure effective uptake of training load data it is crucial
383 that those who produce training load reports have delivery flexibility (Robertson et al. 2017)
384 and the ability to visualize data in a meaningful way to help inform and influence the
385 coaching process (Bourdon et al. 2017). Report clarity and timing are therefore vital and from
386 the respondents surveyed here it appears that communication of training load reports may not
387 be a substantial barrier. For example, despite between-group differences in frequency (Q14)
388 and timeliness (Q15) of reports, but not for report communication (Q16), coaches and
389 practitioners generally felt reports were regularly produced (e.g., *sometimes* to *often*) and
390 agreed to an extent that production was timely (e.g., *somewhat agree* to *agree*). The lesser
391 frequency of training load data collection reported by the coaches (Q10) could explain the
392 lower coach frequency and timeliness of report production. Training load reports were a
393 combination of verbal, written and graphical (Q17), thereby illustrating delivery flexibility
394 and presentation (Robertson et al. 2017). While data obtained through the monitoring of
395 training can be used to enhance training content and subsequently improve performance, any
396 improvement is partly dependent on the effective analysis and feedback to coaches and
397 players (Morgans et al. 2014). As such, practitioners are encouraged to establish
398 parsimonious systems that are both cost- and time-effective (Coutts, 2014).

Despite between-group differences, coaches and practitioners showed a level of agreement (e.g., *somewhat agree* to *agree*) that their clubs had expertise (Q18) and equipment needed (Q19) to properly monitor training loads and also whether load monitoring was beneficial (Q20). Here, the between-group difference could again be indicative of the issues surrounding club infrastructure and resources discussed previously. Overall, the vast majority of survey respondents (84.1%), working across the range of playing ages and standards, perceived training load monitoring to be beneficial to their club.

Survey response

While higher survey response rates tend toward findings with greater validity (Baruch & Holtom 2008), response rate alone is not a good proxy for survey validity (Morton et al. 2012). Nonetheless, reconciling the current respondent rate with previous surveys provides context for this survey's response level. Respondent number here was 182, which is higher than previous sports science survey's evaluating perspectives on warm-up strategies (19 respondents) (Towlson et al. 2013), training load monitoring (41) (Akenhead & Nassis 2016), extra time (46) (Harper et al. 2016), injury risk and prevention (139) (Zech & Wellmann, 2017), but lower than a survey on overreaching (242) (Williams et al 2017), and β-alanine supplementation (570) (Kelly et al., 2016). Further, the present study's response level helps to minimise the threat to external validity that is posed by non-response bias (Sedgwick, 2014) which was evident by the systematic difference in the age categories and club standard that respondents worked with. Limiting the survey to one response per team ensures findings are not influenced by multiple responses from the same team (Harper et al. 2015), yet in the present study more than one response from the same club was possible given the large number of squads within each elite club (e.g., from <9 y up to senior). Therefore, the potential for clustering of responses is acknowledged, although this would apply to practices

more than perceptions. Finally, the low response for coaches working with senior players shows their perceptions to training load monitoring are not yet understood. This represents a much-needed area for future research, as does a more detailed understanding of coach backgrounds given that coaching practice is heavily influenced by tradition, emulation and historical precedence rather than through critical consideration of the latest research (Stoszkowski & Collins, 2016).

Conclusion

This is the first study comparing training load practices and perceptions between coaches and practitioners. There was a level of agreement on factors influencing training planning, load monitoring purpose, the communication of training load reports and the overall usefulness of load monitoring. As such, this survey provides the clearest support to date for the usefulness of training load monitoring in soccer. Substantial differences in player age and club standard that respondents worked with suggest the observed differences in load monitoring practices, perceptions, and feedback likely reflect club infrastructure and resources.

Practical Implications

Coaches and practitioners working within elite English soccer generally support the usefulness of training load monitoring procedures. If club resources limit the use of technology, education on the use of inexpensive, reliable and practical measures, such as RPE or differential RPE (Weston et al., 2015), could help to ensure effective training load monitoring at all levels of elite soccer. To improve the management of training load information it is recommended that coaches and practitioners breakdown discipline boundaries and work closely together to ensure practices are indeed player focused.

449 **Disclosure statement**

450 No potential conflict of interest is reported by the author.

451

452 **Figure Legends**

453 Figure 1. The purpose (a) and method (b) of monitoring training load. Coaches answers are
454 presented in the black columns and practitioners answers in the light grey columns.

455 Figure 2. How training load monitoring is used (a) and is it beneficial to club's training
456 practices (b). Coaches answers are presented in the black columns and practitioners answers
457 in the light grey columns.

458

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Table 1. Survey structure broken down by theme, along with the number and type of questions contained within each theme

Section	Focus	No. of Questions	Question type
1	Training planning	6	Likert scale (x6)
2	Club training load practices	6	Multiple choice (x5) Likert scale (x1)
3	Training load monitoring: feedback and usefulness	8	Likert scale (x5) Multiple choice (x3)

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Table 2. Proportion of player age categories and league clubs worked with by the survey respondents. Also included are the difference between the proportions (with 95% confidence interval [CI]), ratio of the proportion difference and qualitative inference for the ratio

	Coach % (no.)	Practitioner % (no.)	Difference between proportions (%); 95% CI	Proportion ratio	Qualitative inference
[a] Proportion (%) of player age categories worked with:					
Senior	3 (4)	32 (49)	30; 22 to 38	0.1	Extremely large
Professional Development Phase	17 (26)	33 (50)	16; 6 to 25	0.5	Moderate
Youth Development Phase	36 (53)	19 (28)	17; 7 to 27	1.9	Moderate
Foundation Phase	30 (45)	15 (22)	16; 6 to 25	2.1	Large
Pre-Academy	14 (21)	1 (2)	13; 7 to 19	10.7	Extremely large
[b] Proportion (%) of League clubs worked with:					
Premier League	36 (31)	58 (42)	23; 7 to 37	0.61	Moderate
Championship	22 (19)	19 (14)	2; -11 to 15	1.12	Small
League One	16 (14)	11 (8)	5; -6 to 16	1.45	Moderate
League Two	23 (20)	6 (4)	17; 7 to 28	4.13	Very large
Other	3 (3)	6 (4)	2; -5 to 10	0.62	Moderate
[c] Proportion (%) of Academy clubs worked with:					
Academy Category One	36 (30)	64 (36)	28; 11 to 43	0.56	Moderate
Academy Category Two	29 (24)	23 (13)	6; -10 to 20	1.25	Small
Academy Category Three	31 (26)	11 (6)	21; 7 to 33	2.93	Large
Academy Category Four	4 (3)	2 (1)	2; -6 to 8	2.02	Large

[a]300 total responses, with 149 by coaches and 151 by practitioners
[b]159 total responses, with 87 by coaches and 72 by practitioners
[c]139 total responses, with 83 by coaches and 56 by practitioners

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Table 3. Mean (±SD) coach and practitioner response to the Likert scale planning training questions (Q1-6), along with the mean difference, 95% confidence interval (CI) for the difference and whether the difference was clear

	Coach answer (mean ± SD)	Practitioner answer (mean ± SD)	A clear between-group difference of at least one point on the Likert Scale (Mean difference; 95% CI)
[A] Who is responsible for planning training?			
Coaches	**Mostly responsible** (3.4 ± 0.6)	**Mostly responsible** (3.1 ± 0.6)	**No** (-0.4; -0.5 to -0.2)
Sports Scientists/ Fitness Coaches	**Somewhat responsible** (2.3 ± 0.8)	**Somewhat responsible** (2.4 ± 0.7)	**No** (0.1; -0.2 to 0.3)
[B] Knowledge of the scientific process of training in needed to plan a training week	**Somewhat agree** (5.2 ± 1.2)	**Agree** (6.0 ± 1.0)	**No** (0.7; 0.4 to 1.0)
[B] Experience of the practical training environment is needed to plan a training week	**Agree** (5.7 ± 1.1)	**Agree** (6.2 ± 1.0)	**No** (0.5; 0.1 to 0.8)
[C] When planning training, what is the influence of:			
Current Match Schedule	**Somewhat influential** (3.2 ± 1.2)	**Very influential** (4.4 ± 0.7)	**Yes** (1.2; 0.9 to 1.5)
Previous Training	**Somewhat influential** (3.5 ± 1.0)	**Very influential** (3.7 ± 0.9)	**No** (0.2; 0.0 to 0.5)
Time of Season	**Somewhat influential** (2.9 ± 1.1)	**Somewhat influential** (3.1 ± 1.0)	**No** (0.2; -0.1 to 0.5)
Player Fitness	**Somewhat influential** (3.3 ± 1.0)	**Somewhat influential** (3.4 ± 1.0)	**No** (0.1; -0.2 to 0.4)
Players Own Feelings	**Somewhat influential** (3.1 ± 0.9)	**Somewhat influential** (2.8 ± 0.9)	**No** (-0.3; -0.5 to 0.0)
[D] How frequently are individual player training sessions adjusted due to prior training load information	**Sometimes** (3.3 ± 1.1)	**Often** (3.6 ± 0.7)	**No** (0.3; 0.1 to 0.6)
[D] How frequently are the teams' training sessions adjusted due to prior training load information	**Sometimes** (3.1 ± 1.2)	**Sometimes** (3.5 ± 0.8)	**No** (0.4; 0.1 to 0.7)

Likert Scales
[A]: 1, not at all responsible; 2, somewhat responsible; 3, mostly responsible; 4, completely responsible
[B]: 1, strongly disagree; 2, disagree; 3, somewhat disagree; 4, neither agree or disagree; 5, somewhat agree; 6, agree; 7, strongly agree
[C]: 1, not at all influential; 2, slightly influential; 3, somewhat influential; 4, very influential; 5, extremely influential
[D]: 1, never; 2, rarely; 3, sometimes; 4, often; 5, a great deal

Table 4. Mean (±SD) coach and practitioner response to the multiple-choice training load club procedures questions (Q8,11,12), along with the mean difference in the proportion, 95% confidence interval (CI) for the difference and qualitative inference for the ratio

	Coaches % (no.)	Practitioner % (no.)	Difference between proportions (%); 95% CI	Proportion ratio	Qualitative inference
[a] Who decides to monitor training load?					
Manager	10 (22)	17 (33)	7; 1 to 14	0.57	Moderate
Lead Coaches	23 (53)	12 (23)	11; 4 to 18	1.96	Moderate
Coaches	15 (35)	8 (16)	7; 1 to 13	1.87	Moderate
Medical Staff	21 (48)	21 (42)	1; -7 to 8	0.97	Trivial
Sports Science/ Fitness Coach	32 (73)	42 (83)	11; 1 to 20	0.75	Small
[b] Who is responsible for analysis/ interpretation of training load data?					
Manager	3 (5)	3 (3)	1; -5 to 5	1.24	Small
Lead Coaches	15 (24)	5 (6)	10; 3 to 17	2.97	Large
Coaches	15 (24)	6 (7)	9; 2 to 17	2.54	Large
Medical Staff	17 (26)	10 (12)	6; -2 to 14	1.61	Moderate
Sports Science/ Fitness Coach	49 (76)	76 (87)	27; 15 to 37	0.65	Moderate
[b] Who is the training load information produced for?					
Manager	9 (26)	16 (60)	7; 2 to 12	0.57	Moderate
Lead Coaches	21 (60)	15 (59)	5; 0 to 11	1.35	Small
Coaches	19 (54)	17 (64)	2; -4 to 8	1.12	Small
Medical Staff	17 (50)	17 (65)	0; -5 to 6	1.02	Trivial
Sports Science/ Fitness Coach	24 (69)	21 (79)	3; -3 to 10	1.16	Small
Players	11 (31)	15 (57)	4; -1 to 9	0.72	Small

[a]428 total responses for this multiple-choice question, with 231 by coaches and 197 by practitioners
[b]270 total responses for this multiple-choice question, with 155 by coaches and 115 by practitioners
[c]674 total responses for this multiple-choice question, with 290 by coaches and 384 by practitioners

Table 5. Mean (±SD) coach and practitioner response to the Likert Scale training load feedback questions (Q14-16,18,19), along with the mean difference, 95% confidence interval (CI) for the difference and whether the difference was clear			
	Coach response (mean ± SD)	Practitioner response (mean ± SD)	A clear between-group difference of at least one point on the Likert Scale (Mean difference; 95% CI)
[D] How frequently are training load reports produced	**Sometimes** (3.3 ± 1.2)	**Often** (4.5 ± 0.9)	**Yes** (1.1; 0.9 to 1.5)
[B] Training load reports are produced in a timely manner	**Somewhat agree** (4.8 ± 1.7)	**Agree** (6.0 ± 1.2)	**Yes** (1.1; 0.7 to 1.6)
[B] Training load reports are communicated in a clear and practical manner	**Somewhat agree** (4.8 ± 1.6)	**Agree** (5.6 ± 1.2)	**No** (0.8; 0.4 to 1.2)
[B] Your club has the expertise needed to properly monitor training loads	**Somewhat agree** (5.0 ± 1.7)	**Agree** (6.0 ± 1.2)	**Yes** (1.1; 0.7 to 1.6)
[B] Your club has the equipment needed to properly monitor training loads	**Somewhat agree** (4.5 ± 1.9)	**Agree** (6.0 ± 1.3)	**Yes** (1.4; 0.9 to 1.9)
Likert Scales [D]: 1, never; 2, rarely; 3, sometimes; 4, often; 5, a great deal [B]: 1, strongly disagree; 2, disagree; 3, somewhat disagree; 4, neither agree or disagree; 5, somewhat agree; 6, agree; 7, strongly agree			