Time perception and enjoyment of professional soccer players in different training sessions: implications for assessment of session-RPE and training load

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Time perception and enjoyment of professional soccer players in different training sessions: implications for assessment of session-RPE and training load.

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Declaration

The study conception and design were done in full collaboration with all authors. All authors critically revised the work. All authors read and approved the final manuscript. The authors declare that the results of the study are presented clearly, honestly, and without fabrication, falsification, or inappropriate data manipulation. authors received no specific funding for this work.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest Statement: The authors do not have any conflict of interest.

Abstract

The purpose of this study was to investigate whether the perception of time and enjoyment levels among professional soccer players varied according to type of training undertaken and whether this influenced the training load (TL) assessment method of session-RPE. Sixteen male professional soccer players participated in this study. A diverse range of seven training events was sampled, comprising passive sessions (e.g. long and short video analysis sessions; VA1 & VA2), sport specific game play (SSG), physical tactical sessions (TAC), individual skills training (IST) and cardiovascular training sessions (long and short; CV1 & CV2). Sessions varied in duration. Subjects estimated duration, enjoyment and perceived exertion. The activities rated as most enjoyable (all physical training sessions with the exception of CV1 & CV2) were also the sessions considered to last shortest, or time perceived as running fastest ($P<0.01$). Long duration video analysis (VA2) and high intensity cardiovascular training (without a ball) (CV2) were rated least enjoyable ($P<0.01$) and were the sessions where time estimates were longer than chronological time, indicating time perceived as running slow ($P<0.01$). Differences in subjective and chronological estimates of session-RPE substantially impacted TL estimates across the five physically active sessions ($P<0.01$). The outcomes of this study indicate that systematic and task specific variations in time perception and enjoyment exist among professional soccer players. This could be impactful for training design, optimizing the training experience and also for reliably assessing TL.

Key words: Time, enjoyment, soccer, football, exercise, exertion.

1. INTRODUCTION

High level performance in sports, such as professional soccer, requires diverse training methods and techniques, all of which are time consuming in different ways. These activities involve both active and passive components, all of which require considerable mental attention and physical application (9,17,29). Such a diverse range of tasks include passive activities such as data/video analyses of past performances, strategic awareness of tactical formations, and physically active tasks such as skills practice, tactical match play preparations, match simulations and dedicated cardiovascular, strength and anaerobic training (12). Therefore, the demands of training are complex, methods are diverse and the requirements of being professional players are extensive (1,27,36). This is particularly the case as the modern game requires fast decision-making, rapid problem solving and the execution of precise skills in highly stressful situations often in the presence of substantial physical fatigue (13,14).

To be successful, players must be able to cope with the physical and mental demands of training and regularly produce high level game performances over the course of a competitive season (12). Therefore, it is important to analyze factors that influence how players respond to training, and the different training modalities they are expected to undertake, particularly so when coaches must consider which players to select from the squad for matches over a busy season (28). From a coaching perspective, it is also clearly important to positively engage athletes in the training regimen to gain the best outcomes from them and also to develop effective relationships with coaches and teammates (36). Therefore, examining the level of engagement, enjoyment and sense of how players perceive the passing of time is of key practical importance to the optimization of the training programme.

Training quantification is linked with the concept of Training Load (TL) (8,9), and has been previously used in the context of football (1,13,22,27,35). The TL concept was initially introduced by Banister et al. (1975) and this method suggested that a training session can be quantified as training impulse (TRIMP). This was used as a metric means to model changes in performance resulting from alterations in athletes' fatigue and/or fitness status using a methodology derived from the multiplication of training intensity and session duration (2). Morton et al., (1990) (30) subsequently introduced a non-linear weighting scheme to correct bias induced by low training intensity and long duration training sessions from Banister's model. This practical means of quantifying training was also explored by other researchers (18,20,26,27) focusing on different aspects of how exercise intensity was measured and weighted. For example, alternatives were provided for exercise intensity measurements (i.e. heart rate or rating of perceived exertion) and weighting schemes used (i.e. nonlinear, zone-based or individualized methods). Nonetheless, until recently the core foundation of TRIMPs (i.e. multiplication of exercise intensity and duration) have not been challenged (24,33).

The role of exercise duration in TL methods has been questioned recently (24,25,33,37), noting that this variable has consistently been expressed purely in absolute chronological frames and as an independent multiplier. For example, Weaving and colleagues (2020) proposed exercise duration as the main contributor to the variance in TL observed in professional rugby players (37). Renfree et al., (2022) further suggested that the current multiplication between intensity and duration may not take into account the non-linear nature of training stress (33). In cycling and running, exercise duration was suggested to play a key role for the large discrepancies observed between TL metrics and the training effects resulted from training sessions of various intensities and durations (24,25). Indeed, a study that was conducted by our group in cycling found that time is perceived differently, particularly during maximal exercise (15). That study

demonstrated that aerobic and anaerobic exercises at higher perceived exertion distort the perception of time (subjective time), giving the sense that time has slowed down, resulting in an under-estimation of measured time elapsed (chronological time). The perceived slowing of time was theorized to originate from exercisers focus on the feelings of fatigue associated with exercise (e.g. an associative state), an effect which is thought to be (relatively) lessened by the enjoyment of the activity (15). The effect of time appearing to slow down during exercise has recently been reproduced using a robust methodology. Yet, it was also shown to be an outcome not further compounded by the presence of other competitors (16). These studies collectively may suggest that the role of exercise duration in the context of TL may not be as straightforward as it is currently used in popular TL metrics.

The concept of time perception has never been systematically examined in the context of TL, where acute training sessions with different characteristics are compared. Therefore, the aim of the present study was to test the following hypotheses:

1. Time perception and ratings of enjoyment will differ significantly between different types of football training sessions.
2. The duration of exercise, when measured in fixed chronological time frames versus subjective time frames, will have a significant impact on training load (TL) metrics.

2. METHODS

2.1 Experimental Approach to the Problem

The experiment was an observation study of a squad of professional male first team soccer players (n=16) drawn as a convenience sample from the same squad. As a convenience sample,

the sample size of n=16 was fixed but was in excess of our previous work which was n=12 (15-16). Four further players participated in elements of the week but were excluded from the experiment due to non-completion of the full tasks across the week. The squad was in the second week of pre-season training and players and coaches were known to each other. The content of the training differed from the previous week, was progressive and aligned with preparations for the season ahead, commencing five weeks later. The focus of the pre-season was to concentrate on fitness training, tactical preparations, and playing friendly matches to build up match fitness and integrate new players into the squad. Following familiarization, all subjects were sampled in response to seven different training sessions undertaken over the course of the same week to ascertain their perception of time, their enjoyment levels, their perceived exertion and their heart rate responses.

Familiarization comprised of retrospectively estimating time spent (s), enjoyment rating (0-10 scale), and rating of perceived exertion (RPE) (0-10 scale) on two selected activities undertaken earlier on the same day: a 15-min, 30s (930s) passive management briefing session and an 8-min, 10s (490s) group warm up of light jogging.

The sessions comprising this study were scheduled parts of the overall training for the week but were not in its entirety. Sessions were selected for inclusion in the study due to their diversity and ease of management with all subjects engaged at the same time. The players were aware of the schedule of training on each day but were not informed of each session's planned or actual duration and clocks nor timing devices were visible to the subjects during sessions.

2.2. Subjects

Sixteen adult males (27.1 ±4.6 years, 76.4 ±3.8 kg) were recruited to participate in the study. All subjects were healthy, full-time professional soccer players drawn from the same first team squad of an English Football League (EFL) club. Written informed consent was obtained from the subjects prior to participation in this study. The study was approved by the ethical committee of the local university in accordance with the Declaration of Helsinki.

2.3. Procedures:

Subjects completed seven different types of training in our sample of the week's activities. These were the sessions experimenters were given access to across the week while other training was purely for coaches and players. Session 1 was of video analysis (short) (VA1). This was a passive training session, comprising a management presentation, analyzing prior team performances and identifying tactical issues (Duration: 19min, 37s; 1177s) (Day 1, morning). The second session was of cardiovascular training (low intensity) (CV1). This was a group, self-paced training session completed around the exterior of the football pitches with no verbal reinforcement or encouragement. This session did not contain ball work (20min, 15s; 1215s) (Day 1, morning). Session three was of individual skills training (IST). This was a training session that was performed individually, within a group setting with subjects working on basic ball skills, facilitated by three supervising coaching staff. Activities focused on ball control, precision heading, advanced ball juggling skills and general individual techniques. (30min, 11s; 1811s) (Day 2, morning). Session four was a further and longer video analysis session (VA2). As with VA1, this was a passive training session, comprising a management and analyst presentation, examining prior team performances, but now also including opponents tactical play and identifying tactical issues, solutions and contained elements of question and answer (50min, 10s; 3010s) (Day 2, midday). Session five was a second

cardiovascular training (high intensity) (CV2). This was a competitive group running activity with verbal encouragement and guidance provided by coaching staff. This session did not contain ball work (12min, 2s; 722s) (Day 3, morning). Session six was of small-sided games (SSG). This was a training session that comprised two parallel 4 vs 4 small-sided games. Two short breaks were provided during the session and coaches used those opportunities to change personnel amongst the parallel games/teams (35min, 11s; 2111s) (Day 4, morning). The final session (session seven) was tactical formation training (TAC). The training squad was split into groups of different sizes during this session, although all subjects were engaged in tactical activities throughout the sampled duration. The activities included free kicks, corners, team positional play, roles and responsibilities both as attacking and defensive units. The session included periods of both active and passive participation under instruction from coaches (40min, 6s; 2406s) (Day 5, morning).

Subjects were asked to retrospectively estimate time elapsed in seconds (s). Assessments of RPE were completed at the conclusion of each activity and all-time perception estimates were completed by subjects at the end of the same day in which the sessions were undertaken for consistency. Subjects were shown a chronological time series to aid their time retrospective time estimates covering a two-hour period. The time series was specified in seconds apart from at 3000s and 6000s to further assist with anchoring estimates in nomenclature more familiar to the participants. All subjects were advised that each session's duration was timed by stopwatch and that they should attempt to estimate its duration in seconds. They were further advised sessions timings were not rounded up and so all estimates should be as precise as possible, using the scale provided for guidance.

A Visual Analogue Scale (VAS) was used to assess the rating of session enjoyment after the completion of all training sessions. The athletes had to answer to the following statement: "Use this scale to indicate your enjoyment for this training session." The scale scores varied from 1: No pleasant at all to 10: Extremely pleasant.

TL was calculated from the TRIMP formula based on RPE to derive the session-RPE outcome (sRPE) (20). The sRPE was collected immediately after the cessation of all training sessions (except the two video analysis sessions which were passive activities) via using the CR-10 Borg scale (7,11). The RPE scores were then multiplied by training duration in absolute chronological frames ($sRPE_c$), subjective time ($sRPE_s$). TL metrics were also normalized by dividing the scores achieved for different metrics by the subjective time for each training session ($sRPE_n$) (Figure 1). RPE-based methods used training duration in seconds and not minutes. This novel method was implemented to enable statistical comparisons between TL metrics.

FIGURE 1 ABOUT HERE

Heart-rate data were recorded during all activities by Polar heart rate chest belts (S610i, Polar, Kempele, Finland).

2.5. Statistical Analyses

Data are shown as mean (±SD). Prior to analysis, all data was checked for parametric assumptions. Data were normalized for comparison and the subjective time of each session was compared to the chronological time using one sample t-tests. The RPE was used to compute

sRPE (time x RPE), and sRPEc and SRPEs were compared using paired t-test analysis. A difference score (in seconds) between subjective and chronological time for each participant was then calculated for each trial. Correlation coefficients between the difference score and enjoyment, RPE, HR were calculated using a repeated observation approach (5) for exercise trials (CV1, IST, CV2 SSG, TAC). The same approach was used for the non-exercise video analysis trials (VA1, VA2). The level of significance in this study was set at $p<0.05$.

3. RESULTS

TABLE 1 ABOUT HERE

The outcomes of subjective time estimations ranged from 79.7% to 116.7% of chronological time (Table 1). The largest deviation from chronological time in short (time runs fast) and long (time runs slow) estimations occurred for the IST session (79.7%; time ran fast, -334 ±359s, 95% CI -142 to -525s) and was slowest for the CV2 (116.7%; time ran slow, 121 ± 133s, 95% CI 50 to 192s) (Figure 2). These outcomes were independent of duration, where VA2 was the longest session (115.2%; time ran slow, 456s ±378s, 95% CI 257s to 655s) (Figure 2). From the 7 sessions, 3 appeared to run fast (IST, SSG, TAC; $P<0.01$), 2 sessions were not different to chronological time (VA1, CV1) and 2 appeared to run slow (VA2 and CV2; $P<0.01$) for the 16 subjects (Figure 3a). There was a trend for VA1 to be perceived fast (-41s ±83s, 95% CI -85 to 3s, $P=0.07$). All sessions that included physical activity with the football (IST, SSG, TAC) appeared to run fast.

FIGURE 2 ABOUT HERE

Enjoyability ratings of the different training sessions followed a similar pattern to that of those perceived to have run fast (enjoyable) or slow (less enjoyable) (Table 1) (Figure 3A). The three sessions with the football were regarded as the most enjoyable (all P<0.01). The least enjoyable session was CV2.

FIGURES 3A and 3B ABOUT HERE

RPEs showed significant differences with lower estimates of TL for IST (-689 ± 666 au, 95% CI -324 to -1054 au, P<0.01), SSG (-822 ±1086au, 95% CI -249 to -1395 au, P<0.01), TAC (-725 ±939 au, 95% CI -225 to -1225 au, P<0.01) compared with RPEc. There was no significant difference between RPEs and RPEc for CV1 and a higher estimation of load for RPEs compared to RPEc in CV2 (967 ±1103 au, 95% CI 384 to 1550 au, P<0.01) (Figure 3b).
The assessment of TL for the five physical active sessions differed by 1140au across session-RPE_S and session-RPE_c approaches. Time estimates were consistently shorter (time passing quickly) in the sessions with the football (IST, SSG, TAC; P<0.01) and were longer in the non-ball physically active sessions CV1 and CV2, significantly so for CV2 (P<0.01) (Figure 4).

FIGURE 4 ABOUT HERE

There were significant negative correlations between the difference in time (subjective time minus chronological time) and enjoyment for the non-exercising trials (VA1, VA2) (r=-0.88, p<0.001) and the exercising trials (CV1, IST, CV2 SSG, TAC) (r=-0.46, p<0.01), indicating subjective time was lower when compared to chronological time in trials scored as more enjoyable.

4. DISCUSSION

The main finding of this study was that there were significant and systematic differences in the perception of time among the professional soccer cohort in response to different types of training sessions. Retrospective estimation of time elapsed also indicated that time appeared shorter (i.e. ran faster) in sessions the players found more enjoyable (IST, SSG, TAC) ($P<0.01$) and these were all events that included physical activity with a football. This observation carries implications for the construction of optimal training sessions for athletes which individual differences in attention capacity could be meaningful (29). Coaches often require performers to absorb extensive tactical information, to undertake complex tasks and to execute these with precision (36). Therefore, the duration, intensity and nature of training sessions are crucial aspects when optimal performances are of concern.

Our previous studies of time perception in sport have shown significant instances of time distortion during exercise (15,16) in recreationally active populations. However, this is the first time a study has demonstrated this effect in professional performers in response to both exercising and non-exercising conditions. Professional athletes are clearly dedicated and motivated to perform their chosen sport, yet to our knowledge, no studies have systematically evaluated how athletes consider the passing of time across a diverse range of activities which might be more or less stimulating to them (6). The training sessions sampled in our study included skilled performances and show that time is significantly related to the enjoyment of the task ($P<0.01$). Time distortion is a known phenomenon (10,19), as is the concept of time perceived to be passing quickly in enjoyable activities (3,21) and thus this is consistent in the training of soccer players who reported their highest enjoyment ratings in activities most akin to participating in the game for which they train. Correlations indicate that the sessions

regarded as the least enjoyable appear to be those where time estimates over estimated duration, resulting in a sense that the sessions were overly long in duration. These sessions included the extended video analysis session (VA2) and the high intensity cardiovascular training session (CV2). The responses to the VA2 session support common psychological research in which attention can be considered more focused for shorter durations (31) and it seems likely key coaching messages and detailed review could benefit from shorter, more focused sessions. For session CV2, the observation that time appears to drag is consistent with Edwards & McCormick (2017) and Edwards et al (2024) who found this effect in high intensity exercise (15,16). It is also noteworthy, that the least enjoyable sessions and the ones that were overestimated in terms of duration are also those that did not include practical involvement of ball work.

Another key finding from the study is how TL reflects the different nature of football training sessions. For example, CV_2 was the training session with the highest RPE (7.7 ± 1) and lowest chronological duration (722 seconds). On the other hand, SSG training session found to result in an almost double $sRPE_c$ score compared to CV_2. SSG reported a lower RPE (6.1 ± 1) compared to CV_2, however a significantly higher exercise duration (1967.5 ± 170.3). This is in line with other studies that reported an underestimation of TL metrics when reflecting short and intense training sessions (24,25,37). In running, a 25-minute sub-maximal training session (6/10 CR-10 scale) resulted in a 1.5 x times higher sRPE score compared to a 10-minutes maximal session (10/10 CR-10 scale). When sRPEc was normalized by subjective time ($sRPE_n$), a different pattern of response was observed (Figure 1). That was an attempt to partially remove the influence of duration and evaluate intensity separately. Our findings may suggest that football coaches and practitioners should be cautious when using training duration

295 when comparing football training sessions that are different in nature. Indeed, others have also
296 suggested the need to calculate intensity and duration together, as well as separately (25,32,37).
297
298 To our knowledge, this is the first time that exercise duration outside of fixed chronological
299 frames is suggested for sRPE (20). As shown in Figure 4, $sRPE_c$ and $sRPE_s$ found to be different
300 for all training sessions, except CV_1 ($P<0.01$). The comparisons between longer and less intense
301 training sessions (i.e. SSG) and short, near maximal training sessions (i.e. CV_2), showed a
302 similar pattern of $sRPE_s$ compared to $sRPE_c$. Nonetheless, our data provided interesting insights
303 when $sRPE_c$ and $sRPE_s$ were compared across different training sessions. For example, for IST,
304 SSG and TAC training sessions, $sRPE_c$ was found to be significantly higher compared to $sRPE_s$
305 ($P<0.01$). Interestingly, these were the training sessions where subjects had the ball on their
306 feet during exercise and were classified as more enjoyable. It seems likely that such activities
307 could serve as a useful mechanism of creating a moderately dissociative state that lessens
308 cognitive awareness of physical discomfort and distorts time from seemingly overlong, to
309 running short (16). Further work in this area would be beneficial to the optimal balance of
310 training activities and maximizing TL.
311
312 In contrast, the CV_2 training session was found to be the least enjoyable and reported
313 significantly greater $sRPE_s$ scores compared to $sRPE_c$. Collectively, our findings indicate that
314 as exercise intensity increases, the enjoyment often decreases and therefore the perception of
315 time decreases (i.e. time is perceived slower), although this may be complicated by the presence
316 of additional stimulations such as sport-specific activities in the case of soccer players where
317 ball work is included. The pattern that arise from our data between time perception, enjoyment
318 and TL may provide some useful insights for coaches and practitioners. For example,

practitioners may want to further explore the concept of time perception, enjoyment and other TL metrics for various training intensities and durations.

This field study poses some specific limitations. For example, the novelty of this study could have been compromised by the training sessions implemented. This data collection took place in a professional team environment and therefore, no manipulation of training sessions were performed. Training sessions were those devised and already planned by coaching staff and in future work it would be interesting to break activities down further to specific tasks within each type of session i.e. tactical work (TAC) session, where inevitably players took on a variety of roles. The intensities used for the training sessions also varied from 2.0 ±1 to 7.7 ±1 in the CR-10 RPE, while durations ranged from 722 up to 2406 seconds. Edwards and McCormick (2017) suggested that sensory time estimates are manipulated by exercise intensity. In this study, no maximal training sessions were implemented. Furthermore, the fitness level of the subjects in the study may have played a role towards the results found. We anticipate that subjects with lower fitness levels will perceive a greater time distortion and the effects of accumulative fatigue and session duration over extended would be meaningful to investigate in subsequent work (16). We encourage future researchers and practitioners to use various training intensities, durations assessed these among players with different fitness levels to further explore the applicability of $sRPE_s$.

The pattern observed in this study between time perception, enjoyment and TL metrics may be further investigated. We encourage researchers and practitioners to further explore this novel idea with other indicators of the acute training effects. In a recent framework (23), it was suggested that training is a complex phenomenon that will result changes in cognitive, subjective and biomechanical assessments. For example, the concept of acute performance

decrement may provide interesting insights between the novel idea presented in this study and the training effects as assessed by a football-specific performance assessment (24,25). Moreover, Saw et al., (2013) supported the importance of subjective measurements for monitoring the athletes training response (34). In this study, measurements of enjoyment were present alongside TL. Future researchers may want to investigate whether other subjective measures related to enjoyment, such as the POMS scale (4) can provide conceptually links between TL and time sensory abilities.

In summary, this study has shown that professional players experienced systematic time distortion across a diversity of training studies where time appeared to run faster in more enjoyable activities. TL as monitored by sRPE were significantly different across the sessions when compared using durations estimated by the performers vs. chronological time, supporting a consistent style of approach for the assessment of training load. It is recommended that the differential time between subjective and chronological time could become a useful index to further explore the impacts of training at an individual level, although further work is required to fully explore this phenomenon.

PRACTICAL APPLICATIONS

This study provides valuable insights for sports coaches and athletes by highlighting how time perception and enjoyment vary in different football training sessions. Our findings show that players perceive time to pass more quickly and enjoy training activities more when they include time with a ball or are game-related. Conversely, players found long video analysis sessions less enjoyable and preferred shorter, more focused reviews, which can help in designing

sessions that better capture their concentration. Additionally, players disliked cardiovascular training without the ball.

These insights can help coaches structure more effective and enjoyable training sessions. Incorporating more ball-related and game-related activities can enhance player engagement and enjoyment, potentially leading to improved performance and motivation. Shorter, sharper video reviews can maximize player focus and retention of key tactical information.

Furthermore, our study proposes a novel approach to training load (TL) monitoring. Instead of using training duration in fixed chronological frames, we suggest using subjective time as a multiplier within the popular Session RPE (sRPE) method. This approach does not intend to replace sRPE but encourages thinking of exercise duration in a weighted manner rather than as a fixed, independent factor. This adjustment may provide more accurate reflections of player experience and training load, aiding in better session planning and load management.

Overall, our findings offer practical strategies for enhancing training session design and monitoring, ultimately supporting improved athlete performance and well-being.

7. ACKNOWLEDGEMENTS

All authors have read, critically revised and approved the final manuscript. The results of the study are presented clearly, honestly, and without fabrication, falsification, or inappropriate data manipulation. The authors received no specific funding for this work. No specific grant supported this study. The authors do not have any conflict of interest. The authors have no professional relationships with companies or manufacturers who will benefit from the results of the present study. The results of the present study do not constitute endorsement of a product by the authors or the National Strength and Conditioning Association.

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Table 1. Time perception, ratings and heart rate responses to seven types of soccer training sessions

	Subjective time (s)	Chronological time (s)	Perceived time difference	RPE	Enjoyment	HR
Video analysis (short) (VA1)	1136.3 ±83.0	1177	Same	N/A	5.3 ±2	58.4 ±8.0
Video analysis (long) (VA2)	3466.1 ±378.2**	3010**	Long	N/A	3.2 ±2	55.1 ±5.7
Individual skills training (IST)	1206.0 ±168.8**	1811**	Short	2.0 ±1	7.0 ±1	97.1 ±13.7
Small sided games (SSG)	1967.5 ±170.3**	2111**	Short	6.1 ±1	7.8 ±1	143.1 ±7.9
Cardiovascular (low) (CV1)	1236.2 ±71.5	1215	Same	4.8 ±1	4.8 ±1	128.8 ±13.7
Cardiovascular (high) (CV2)	842.6 ±132.9**	722**	Long	7.7 ±1	3.1 ±1	164.3 ±10.4
Tactical formation training (TAC)	2218.8 ±268.8*	2406*	Short	4.0 ±1	6.9 ±1	105.3 ±8.9

* = difference between subjective and chronological time (P<0.05), ** = difference between subjective and chronological time (P<0.01).

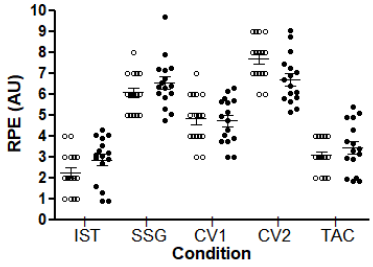


Figure 1. Comparison of session-RPE (light bars) and normalised session-RPE (dark bars) for the five physically active training sessions.

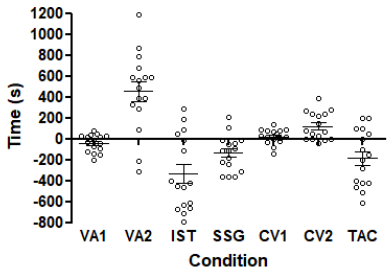
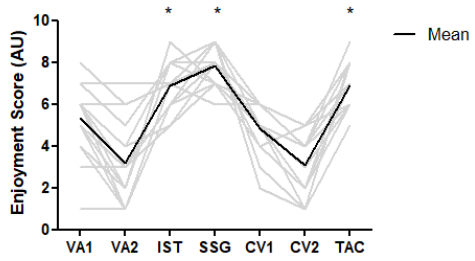


Figure 2. Perception of time estimates of each of the seven sessions, shown as their relative deviation from chronological time. VA1 = Video Analysis 1; VA2 = Video Analysis 2; IST = Individual Skills Training; SSG = Small-Sided Games; CV1 = Cardiovascular Training 1; CV2 = Cardiovascular Training 2; TAC = Tactical Formation Training.



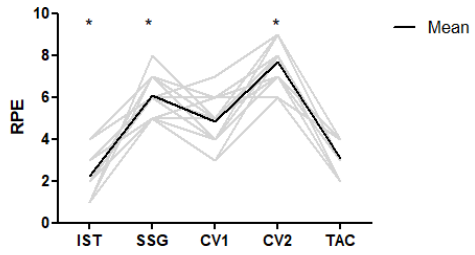


Figure 3a (enjoyment scores) and Figure 3b (ratings of perceived exertion) for each participant across the different training sessions. Figure 4a includes all seven sessions for enjoyment scores where Individual Skills Training (IST), Small-Sided Games (SSG) and Tactical Formation Training (TAC) were rated most enjoyable ($P<0.01$). These figures include the five active sessions for the ratings of perceived exertion (RPE), but excludes the two passive (non-exerting) video analysis sessions. SSG and CV2 were rated as most exerting ($P<0.01$) and IST as the least ($P<0.01$).

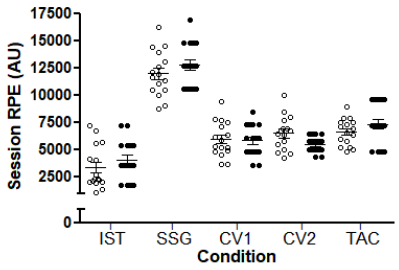


Figure 4. Comparison of Session RPE (session duration x time (s)) for both subjective (sRPEs) and chronological (sRPEs) time in response to the five training sessions involving physical activity. * = P<0.01. Arbitrary units derived from RPE multiplied by session duration (s), using both subjective time (sRPEs) and chronological time (sRPEs).