European Journal of Human Movement

OPEN ACCESS

Original Research

Technical and Internal Load Responses in 3-A-Side Full-Court Basketball Games: The Effects of Coaches' Verbal Feedback

Elif Mengi[1,*], B. Utku Alemdaroglu[1] and A. Gokce Erturan[1]

1 Pamukkale University, Turkey.

* Correspondence: (EM): elifmengi35@gmail.com

Received: 13/04/2023; Accepted: 26/06/2023; Published: 30/06/2023

Abstract: The aim of the current study was to examine the acute effects of three different feedback conditions (positive feedback, negative feedback and no feedback) on heart rate, lactic acid, rate of perceived exertion responses and frequencies of technical actions on basketball players during 3-a-side full-court games. Twelve young basketball players (Mean age: 16.5 ± 1.5 years; height: 181± 5.9 cm; body mass: 71.4 ± 7 kg; training experience: 5.4 ± 2.1 years) voluntarily participated to the study. The players underwent anthropometric measurements followed by the Yo-Yo intermittent recovery test level 1. Then, players performed 3-a-side full-court games under three different conditions with positive verbal feedback, negative verbal feedback and no feedback randomly at 2-day intervals. Repeated measures ANOVAs were used to assess differences among responses to 3-a-side full-court games in terms of heart rate, lactic acid, rate of perceived exertion responses and the number of technical actions performed. No significant differences were found between the three feedback conditions nevertheless lactic acid results showed clinical significance in the negative feedback group (5.4±1.7) compared to the group without feedback (6.5±1.8). The findings of this study reveal that positive, negative verbal feedback given by the coach or no feedback does not have an acute effect on basketball players' game performance and internal load responses.

Keywords: Heart rate, lactate acid, rate of perceived exertion, small sided games, game-based training.

1. Introduction

Although many studies have examined the demands of basketball, fewer have been conducted on young male basketball players (Abdelkrim, El Fazaa, & El Ati, 2007; Abdelkrim et al., 2010; Hulka, Cuberek, & Belka, 2013; Vázquez-Guerrero et al., 2019). According to results of these studies, the distance covered by young males basketball players during matches range between 4000 m and 7500 m; this distance can be divided into high, moderate and low-intensity and recovery (respectively, 12 %, 11%, 14% and 63%) (Abdelkrim et al., 2010; Hulka et al., 2013). In terms of internal loads of the game, the average heart rate (HR) has been reported to be 85-91% of HRpeak and lactic acid (La-) responses of the players are 6.5 mmol. L (Abdelkrim et al., 2007; Hulka et al., 2013).

In the light of these results, it is clear that basketball players are required to have well-developed aerobic and anaerobic capacities. For this reason, coaches need to accurately determine the internal load (HR, blood lactate, and rating of perceived exertion) and external load (distance covered in different speed zones) resulting from matches and training. Moreover, technical skills and decision-making ability are very important for basketball players and they should perform these abilities under high levels of pressure and fatigue (Atlı, Köklü, Alemdaroğlu, & Koçak, 2013). A large number of studies have shown that game-based training elicits appropriate exercise intensity for the development of aerobic endurance. Thus, running-based and game-based training have been used interchangeably in team sports (Brandes & Elvers, 2017; Rampinini et al., 2007; Selmi et al., 2017; Weakley et al., 2019). Previous studies have also shown that game-based training in basketball elicits similar physiological responses to those seen in actual basketball games (Atlı et al., 2013; Carlo, Impellizzeri, Chaouachi, Nidhal, & Manzi, 2011; Conte, Favero, Niederhausen, Capranica, & Tessitore, 2017; Klusemann, Pyne, Foster, & Drinkwater, 2012; McCormick et al., 2012; Schelling & Torres, 2016). In addition, Delextrat and Martinez (2014) reported that in-season game-based training can have similar improvements in aerobic capacity as high-intensity running-based training for junior basketball players. While the aerobic capacity of players improved similarly in both training types, there was a greater increase in technical skills during game-based basketball training.

However it should be remembered that the physiological, physical and technical demands of game-based basketball training can be affected by factors such as the number of players (Carlo et al., 2011; Conte et al., 2017; Klusemann et al., 2012; McCormick et al., 2012; Schelling & Torres, 2016; Vaquera et al., 2018), rules employed (Conte, Favero, Niederhausen, Capranica, & Tessitore, 2015) and court size (Atlı et al., 2013; Klusemann et al., 2012). The other important variable is direct supervision and coaching can effect player training intensity and performance in game-based training (Coutts, Murphy, & Dascombe, 2004; Mazzetti et al., 2000).

In sports-specific games, a similar environment is created in which the movement patterns used during the competition are applied. For this reason, the application of movement profiles, which are frequently used in competitions, during these games ensures that the requirements of that sport branch are fulfilled and that the desired performance level is reached in technical terms (Owen, 2004; Rampinini et al., 2007). The advantages of sport-specific training over traditional training can be summarized as follows; if the trainings are well transferred to the competition environment of the athlete and reflect the physiological structure and specific movement profiles of the sports branch, higher training adaptations can be created (McArdle et al., 1996). Game-specific training also likely that athletes will have higher motivational responses to sport-specific training than traditional training methods or interval training approaches (Stone & Kilding, 2009). Considering all these advantages, researchers have designed many sport-specific methods to improve aerobic endurance and examined their effectiveness (Hoff et al., 2002; Gabbett, 2006).

One potentially important variable that has been investigated in very few studies is the effect of coaches' feedback on performance in game-based training. Rampinini et al. (2007) and Selmi et al. (2017)

investigated this effect in small sided football games (SSG), reporting that internal load responses (La- , HR, RPE) were higher when the coaches provided feedback. However, other studies, also on soccer players, have indicated that feedback did not have a significant impact on external and internal training load responses (Brandes & Elvers, 2017; Weakley et al., 2019). The one of the reasonable explanations of this conflict results could be type of coach feedback that is one variable that could effect responses of players in game-based training.

It is important to recognize that giving feedback effectively and accurately is complex. According to Vallerand and Reid (1988), positive feedback often expresses appreciation and praise for both technical and behavioral performance characteristics. Words of encouragement like "Your flexibility is very good" can be an example. Negative feedback, on the other hand, tries to correct any shortcomings in the relevant areas, which relates to the individual's poor performance (Vallerand & Reid, 1988). Negative feedback offers constructive criticism of the subject (Vallerand, 1984). Phrases like "Your performance is quite low, try to do better" can be an example.

The impact of feedback on physiological parameters was investigated in a few research. However, it was found that neither the handling of feedback nor the utilization of the approach (Rampini, 2007) were described in depth (Brandes, 2017; Sanchez et al., 2018). Despite the fact that it has been suggested by numerous researches because it effects performance (Sampaio et al., 2009; Klusemann et al., 2012; Halouani et al., 2017), little information was provided on the feedback's quality. In order to understand how the athletes' performance is influenced, it is crucial to understand the coach's feedback's content.

Thus, knowing the effects of type of feedback on these performance aspects might then help coaches balance internal and external responses of these games according to their goals (Brandes & Elvers, 2017; Weakley et al., 2019). However, despite a growing interest in basketball-specific training, to our knowledge previous research in basketball has failed to consider the influence of type of feedback on internal load and technical actions. Thus, the aim of the study was to examine the acute effects of the type of verbal coach's feedback on internal responses and number of technical actions basketball players during full-court 3-a-side games.

2. Materials and Methods

Subjects — Twelve male high school basketball players (average age 16.5 ± 1.5 years; height 181 ± 5.9 cm; body mass 71.4 ± 7 kg; training experience: 5.4 ± 2.1 years; maximum HR: 202.6 ± 7.8 beat.min-1) voluntarily participated in this study. All the players were members of the same U17 basketball team, which at the time trained for two hours five days per week. All participants were included in all feedback groups. Written informed consent was obtained from all the players and parent or legal guardian. All the players were informed of the research procedures, requirements, benefits, and risks with the written consent forms. This study was approved by the local Research Ethics Committee and was consistent with the institutional ethical requirements for human experimentation in accordance with the Helsinki Declaration.

Procedure — For a month before to the starting of the research, the coach received feedback education four days per week for two hours each day. What may be used as positive and negative feedback expressions in a basketball context, avoiding from utilizing body language, gestures, or mimics while providing feedback, and providing all

feedback with the same tone of voice are among the topics covered in this education program. Along with it, the coach decided and recorded each individual verbal feedback that might be made to the players individually or to the team as a whole during the games.

First, Yo-Yo intermittent recovery test level-1 was applied to determine the maximum HR of basketball players (Atlı et al., 2013) than played 3-a-side full-court games in random order. Yo-Yo intermittent recovery test level-1 and full-court games were organized with at least 2-day intervals in the end of the first part of the season for two weeks. The coach was asked to give some sort of feedback for each action or no feedback.

The frequency of feedback was approximately once every 10 seconds under both negative and positive feedback conditions. Both negative and positive feedbacks were given to players in the same tone of voice by the same coach. Positive feedback involves statements about the strengths of one's performance, emphasizing positive aspects and effort. Encouraging expressions such as "bravo, good job, good shot, well done, keep going like this" were used in positive feedback games (Koka & Hein, 2003). Negative feedback is defined as constructive statements that draw attention to the weak points of a player's performance; the aim is not to humiliate players but to analyze poor performance in an open-minded and interactive way (Carpentier & Mageau, 2013; Koka & Hein, 2003). The statements preferred by the coach for games under the negative feedback condition were "Bad choice, slow tempo, wrong shot choice, bad defense" etc.

Before the data was collected, the coach was given guidance by an expert on how to deliver each type of feedback during 3-a-side full-court games twice a week for a month, a total duration of eight hours. Additionally, all 3-a-side full-court games were recorded using a digital camera (Sony digital 4K, Tokyo, Japan, 50 Hz) with the coach using a wearable microphone (Sennheiser, Wennebostel & Germany) so that his feedback was also recorded. Tests and games were performed between six and eight pm to minimize the effects of circadian rhythms. In the recovery periods between each bout, players were only allowed to drink water.

The experimental groups' training schedules were set up sequentially, no basketball player from any group was allowed in the gym during non-training hours, and the experimental groups were not permitted to see one another's workouts. This protocol was preferred in order to keep the basketball players from recognizing the various forms of coaching feedback. Positive or negative feedback was not given to the athletes in the regular training routines for basketball players; just the knowledge of results or the techniques were addressed.

3-A-Side Full-Court Games - 3-a-side full-court games were played on 28m x 15m court sizes (length x width) after a 20-minute standard dynamic warm-up. Each game consisted of four periods lasting three minutes with three minutes of passive recovery time between bouts. There were no substitutions in the games. The games are completed with the same players. The games were not stopped for fouls and no free throws were called, but players were warned instead. The ball was returned to play as quickly as possible after any stoppage and out of bounds by the coaches without stopping the clock. Players were asked to play a man-to-man defense system to standardize the tactical-technical strategies, which could affect internal loads and frequency of technical actions (Köklü et al., 2017).

Technical Actions - After the games, technical procedures were analyzed using video camera recordings. The camera (Sony digital 4K, Tokyo, Japan, 50 Hz) was placed in the corner of the court to record the entire court and was raised to about seven m. The videos were watched repeatedly, paused and manually coded. Technical actions (shots, steals, passes, turnovers, rebounds and assists) were determined and the frequency of each action was calculated. The coding system has been tested for reliability and consistency between and within encoders. For the intermediate reliability procedure, the primary investigator served as the gold standard for the intended interpretation and use of the coding system. Two women and one man encoded the same 10-minute video segments of the encoder. Then, each of the data of the other encoder was compared with the gold standard coding of that segment.

This process continued until all encoders reached a minimum 75% agreement with the gold standard for two different video segments. The minimum agreement standard is set at 75% for both intercoder and intracoder reliability. The agreement represented consistency in six coding decisions: (a) shots, (b) passes, (c) rebounds, (d) turnovers (e) steals and (f) assists. For the intra-rater reliability procedure, the three encoders encoded a 10-minute video segment and re-encoded the same segment a week later. The data obtained from the first coding and delayed recoding were compared with the percentage of agreement. Disputes were noted and resolved. As with inter-rater analysis, coders had to reach at least 75% code re-coding agreement. Re-tests of inter-rater reliability were completed approximately two months after coding training was completed and the minimum standard was reached across the entire segment (Turnnidge & Côté, 2019).

Heart rate monitoring - HR was recorded and stored at 5-second intervals during full-court bouts via short-range radio telemetry (Polar Team Sport System, Polar Electro Oy, Finland) throughout the games and transferred to computer and filtered. The mean HR for each full-court game was calculated by taking the means for the four bouts (HRgame).

Blood sampling - Blood lactate samples (0.7 μL) were taken from ear lobe in the last bout of each game using the Lactate Plus (L, Nova Biomedical, USA). The results were obtained in 13 s. Strips of this device did not require calibration codes or specific calibration strips. This device has displayed good reliability and accuracy when compared to a laboratory-based analyzer (Tanner, Fuller, & Ross, 2010).

Rating of perceived exertion (RPE) - RPE is a very commonly used for team sports; previous studies have showed that this method is a reliable, inexpensive and very simple way to determine internal load responses (Impellizzeri, Rampinini, Coutts, Sassi, & Marcora, 2004). In the current study, the same researcher asked to players how hard (1 rest and 10 maximum effort) their workout was; each athlete's s-RPE was collected after the last bout of each game. Each player was confidentially interviewed and not allowed to see the values given by other players. The CR-10 scale by Foster (Foster et al., 2001) was used in regular training for two weeks to familiarized players with it before the experimental design started.

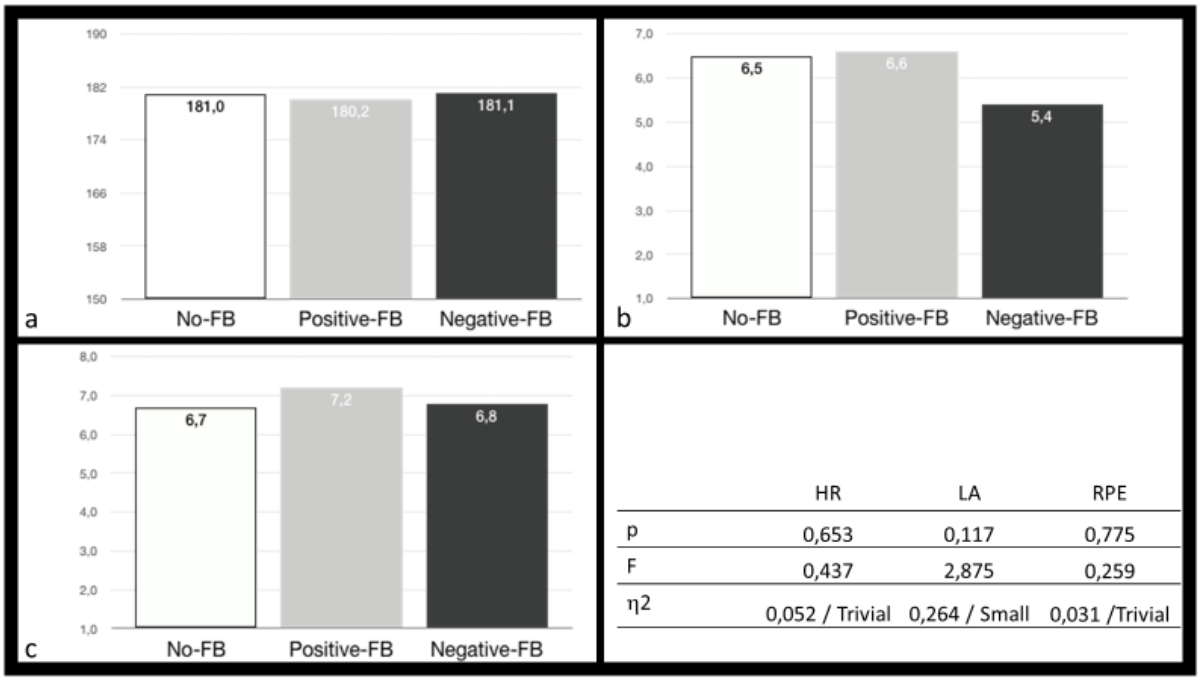
Statistical Analysis — The data are reported as means, standard deviations and 95% confidence intervals (95%CI). Before using parametric tests, the assumption of normality was verified using the Shapiro-Wilk test. A one-way repeated-measures analysis of variance was performed on each dependent variable, including HR, RPE, La-

and the number of technical actions. A Bonferroni Post Hoc test was applied to make a pairwise comparison between the different levels of within player factors (partial) η2, where 0.09, 0.1, 0.3, and 0.5 represent trivial, small, medium, and large effect size, respectively. The level of statistical significance was set at $p < 0.05$.

3. Results

Figure 1 shows the average HR, La- and RPE responses of the players during full-court 3-a-side games for the three different feedback conditions. There were no significant differences between the conditions in terms of any of the internal load measurements. When looking at the effect size values, the differences were found between the three conditions were trivial for HR, RPE and small for La-. Internal load responses were higher in the positive feedback condition than in the other conditions in exception HR.

Average frequencies of the different technical actions performed under the three conditions are shown in Figure 2. Similarly, no significant differences were found between the three different feedback conditions in terms of any of the technical actions. In terms of effect size, minor effects were found for shots in the no-feedback condition and minor effects for rebounds and assists in the positive feedback condition, while insignificant affects were found for turnovers, steals, and passes.



	HR	LA	RPE
p	0,653	0,117	0,775
F	0,437	2,875	0,259
η2	0,052 / Trivial	0,264 / Small	0,031 /Trivial

Figure 1. Comparison of Internal load responses (a) Heart Rate (%) (b) Blood Lactate (mmolL^{1}) (c) Rate of Perceived Exertion (AU). FB: feedback

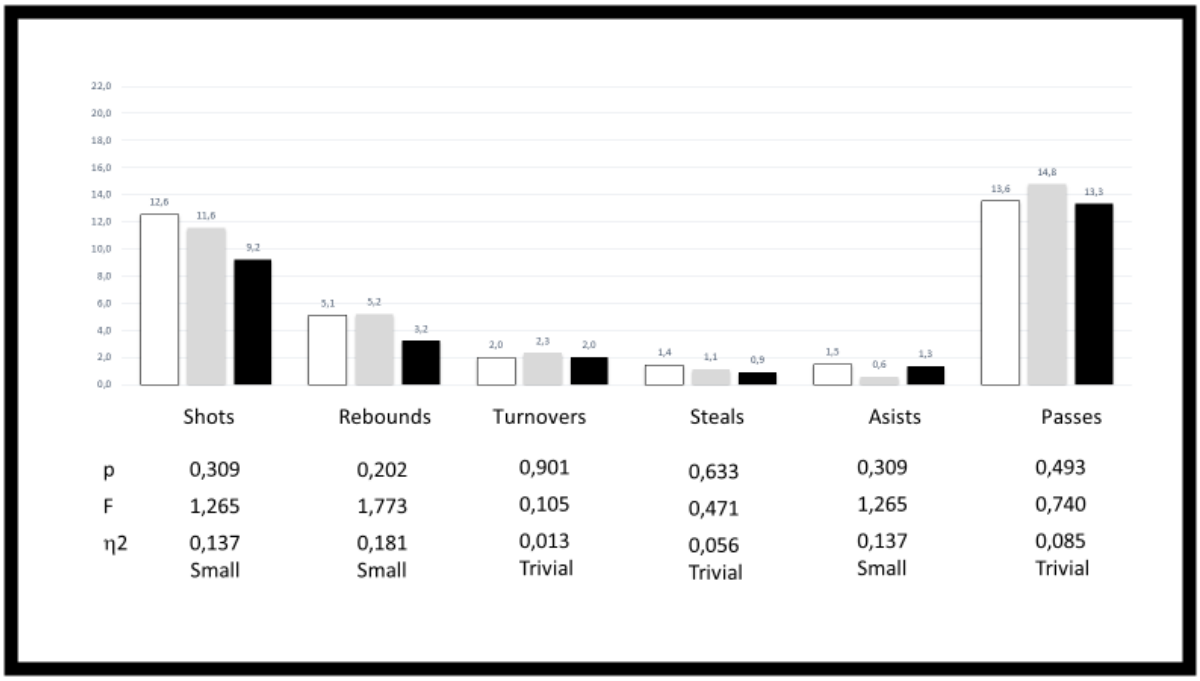


Figure 2. Comparison of technical actions. FB: feedback

4. Discussion & conclusions

The present study aimed to compare the effects of different types of verbal feedback on HR, RPE and La responses and on the frequencies of various technical actions among young basketball players during full-court 3-a-side games. According to the results of the study, there were no significant differences either in terms of internal load responses or in the number of technical actions scores of the players under the different conditions of positive feedback, negative feedback and no feedback. In terms of effect sizes, trivial and small effects were determined in terms of internal load responses for HR, RPE and La- respectively. Small effects were found on shots, rebounds and assists performed and trivial effects on the numbers of turnovers, steals and passes. Consequently, our findings suggest that giving or opting out of verbal positive or negative feedback in 3-on-3 full-court games does not significantly change the players' internal load responses or the frequencies of various technical movements. Consequence for technical actions can be a factor to be considered regarding the position of the players, such as being a starter or substitute, as in the study of Delextrat and Martinez (2014).

The type of verbal coach feedback did not make a difference between the LA responses in the study, but different results were obtained in the literature. Whether the feedback is used by the coaches during sports-specific games and the way it is given can affect the LA responses that can be reached in the athlete. Knowing these LA responses is very important in terms of calculating the internal load to be created in the athlete during training or determining the next training volume. Training intensity, optimally determined according to the requirements of the sports structure, can create a supportive power in reaching the desired physiological and physical adaptations (Riebe et al., 2017). Reported blood-lactate concentrations during games were in the range of those reported in competitive basketball (Abdelkrim et al., 2009). Although blood-lactate concentration is generally considered a reflection of anaerobic metabolism during exercise, the relationships during intermittent exercise are

questionable (Krustrup et al., 2006). As a result, changes in blood-lactate concentration caused by game-specific training should be carefully evaluated until further studies are conducted (Krustrup et al., 2006).

HR has been used as one of the most common internal load parameters for controlling exercise intensity in the field. In parallel with our findings, Atlı et al. (2013) and Köklü et al. (2017) found similar HR responses on 3-a-side full-court games in female high school basketball players. The similarity in these results may be an indication that there is no effect of gender difference in 3-a-side full-court games in terms of HR responses. The HR responses found in our study were appropriate to improve endurance capacity of players similar with high intensity interval training since the previous research stated that HR values should reach 90% in training to improve of aerobic capacity (Buchheit & Laursen, 2013). In the current study, it was found that feedback did not affect the HR responses of the players. Therefore, the findings of this study are consistent with the those of Brandes and Elvers' (2017), who found that using verbal feedback had no impact on players' HR responses. However, some studies have reported that using verbal feedback increases HR responses during sport-specific games (Rampinini et al., 2007; Selmi et al., 2017). The possible explanation for these contradictory results could be about the usage of different types and frequencies of feedback in the previous studies. Rampini et al. (2017) and Selmi et al. (2017) used encouragement in their study but they report neither systematic information about type and frequency of feedback nor exactly which statements were used by coaches in providing feedback. Brandes and Elvers (2017) meanwhile, used two different types of feedback. The first one was called "strongly pushed feedback" and was given loudly and continuously for player's each action. The second type of feedback was "mild feedback" which was given every 20 seconds. The pushed feedback was provided more than mild feedback. In this study, exact feedbacks were used, which were given every 10 seconds. Although our results suggest that HR response might not be effected by different types of feedback, the HR responses of players reached appropriate level to improve endurance capacity of players.

RPE is a valid alternative to HR to monitor training intensity (Impellizzeri et al., 2004), since RPE has been shown to have a strong correlation with HR responses not only to regular basketball training (Manzi et al., 2010) but also to SSGs (David & Julen, 2015). It is recommended that RPE values reach 'hard' to 'very hard' (± 6) for efficient endurance training (Buchheit & Laursen, 2013). In the current study, RPE responses after each game were in these recommended zones showing that RPE values were high enough in these 3-a-side games to develop endurance performance. While no previous studies have reported RPE results for 3-a-side full-court games, similar findings have been reported in 2-a-side (Klusemann et al., 2012) and 4-a-side (Conte et al., 2015; Klusemann et al., 2012) full-court games.

No significant effects of feedback or lack of feedback on RPE responses were found in this study. These results do not support our hypothesis that negative feedback given by the coach would increase RPE responses. Brandes and Elvers (2017) reported that while no significant differences were found between SSGs played under their two different feedback conditions, possible increases in RPE responses were found in the 'pushed feedback' game. Selmi et al. (2017) and Rampinini et al. (2007) both reported

significant increases in RPE after SSGs played with feedback. Moreover, Selmi et al. (2017) found that games played with feedback produced greater physical enjoyment than those with no feedback. It is thought that the more players enjoy the game, the higher the RPE results. However, the type of feedback in these studies were not structured as it was in our study. Although feedback type has no effect on RPE results, classifying coach's feedback as positive and negative is the strength of this study and makes it valuable for the relevant literature. The results revealed that there was no significant difference between positive feedback, negative feedback and no feedback groups in terms of the study variables. Examining the acute, short-term, effect of feedback may have led to this finding.

Basketball training should meet the demands of a real game (Hulka et al., 2013) in terms of technical, internal and external load parameters. Game-based training gives coaches the opportunity to develop the aerobic capacity, technical skills and decision-making of players in the same training section. However, the frequencies of technical actions seen in this study group were lower than those in Atlı et al. (2013) and Klusemann et al. (2012). Nevertheless, number of technical actions performed in 3-a-side full-court games seems to be suitable for the young players to improve their basketball-specific skills. To our knowledge this is the first study which has sought to determine the effects of verbal feedback on technical actions in game-based training.

Our study does have some limitations that should be addressed. An important limitation was the lack of measurement of external loads, which may have helped to understand how feedback influenced internal load responses. During the matches, internal training load responses were measured, but external training load responses could not be obtained. Understanding the external training load requires understanding the variables during these games, such as the distance traveled, the speed zones, and the acceleration-deceleration. This is especially the case for RPE responses of players, which may be the same under different external loads. Secondly, stress-related hormonal parameters that are important markers of psychological state (Selmi et al., 2017) were not assessed. The third limitation relates to the size of the court. Only 3-a-side full-court games were used in this study, but feedback could affect the responses of players in more anaerobic games such as 2-a-side or 1-a-side full-court games or more aerobic half-court and 4-a-side full-court games. The fourth limitation was related to the type of the feedback given by the coach. Although there are other classifications for feedback in the literature, the researchers chose to employ just one of them as positive and negative feedback in the methodological design of this study. Future studies may employ other categorization of the verbal feedback and test the effect of it on the player's performances. In addition, the sample size of the study should be considered as a limitation. A final aspect worth considering is that players every day training under their coaches' feedback and changing their routine could affect their performance. Examining the effects of coaches' verbal feedback on players' technical and internal load responses should be considered in the future.

As a conclusion, positive, negative verbal feedback given by the coach or no feedback does not have an acute effect on basketball players' game performance and internal load responses. Besides, 3-a-side full-court games can be an considered as an alternative to traditional running training. It

is recommended to be used instead of high intensity interval training in the development of anaerobic power and capacity by coaches. In addition, it is considered important to examine the long-term effects of these games in future studies and to determine the effects of verbal feedback on external load responses.

Conflicts of Interest: The authors declare no conflicts of interest.

References

Abdelkrim, N. Ben, El Fazaa, S., & El Ati, J. (2007). Time-motion analysis and physiological data of elite under-19-year-old basketball players during competition. British Journal of Sports Medicine, 41(2), 69–75.

Abdelkrim, N. Ben, Castagna, C., Jabri, I., Battikh, T., El Fazaa, S., & El Ati, J. (2010). Activity profile and physiological requirements of junior elite basketball players in relation to aerobic-anaerobic fitness. Journal of Strength and Conditioning Research, 24(9), 2330–2342.

Atlı, H., Köklü, Y., Alemdaroğlu, U., & Koçak, F. Ü. (2013). A comparison of heart rate response and frequencies of technical actions between half-court and full-court 3-a-side games in high school female basketball players. Journal of Strength and Conditioning Research, 27(2), 352–356.

Brandes, M., & Elvers, S. (2017). Elite Youth Soccer Players' Physiological Responses, Time-Motion Characteristics, and Game Performance in 4 vs. 4 Small-Sided Games. Journal of Strength and Conditioning Research, 31(10), 2652–2658.

Buchheit, M., & Laursen, P. B. (2013, May). High-intensity interval training, solutions to the programming puzzle: Part I: Cardiopulmonary emphasis. Sports Medicine, Vol. 43, pp. 313–338.

Carlo, C., Impellizzeri, F. M., Chaouachi, A., Nidhal, B. A., & Manzi, V. (2011). Physiological responses to ball-drills in regional level male basketball players. Journal of Sports Sciences, 29(12), 1329–1336.

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. Psychology of Sport and Exercise, 14(3), 423–435.

Conte, D., Favero, T. G., Niederhausen, M., Capranica, L., & Tessitore, A. (2015). Physiological and Technical Demands of No Dribble Game Drill in Young Basketball Players. Journal of Strength and Conditioning Research, 29(12), 3375–3379.

Conte, D., Favero, T., Niederhausen, M., Capranica, L., & Tessitore, A. (2017). Affect of Number of Players and Maturity on Ball-Drills Training Load in Youth Basketball. Sports, 5(1), 3.

Coutts, A. J., Murphy, A. J., & Dascombe, B. J. (2004). Affect of direct supervision of a strength coach on measures of muscular strength and power in young rugby league players. Journal of Strength and Conditioning Research, 18(2), 316–323.

David, C., & Julen, C. (2015). Training The Relationship Between Intensity Indicators in Small-Sided Soccer Games. Journal of Human Kinetics, 45, 119–128.

Delextrat, A., & Martinez, A. (2014). Small-sided game training improves aerobic capacity and technical skills in basketball players. International Journal of Sports Medicine, 35(5), 385–391.

Foster, C., Florhaug, J. A., Franklin, J., Gottschall, L., Hrovatin, L. A., Parker, S., … Dodge, C. (2001). A New Approach to Monitoring Exercise Training. In Journal of Strength and Conditioning Research (Vol. 15).

Gabbett, T. J. (2006). Skill-based conditioning games as an alternative to traditional conditioning for rugby league players. The Journal of Strength & Conditioning Research, 20(2), 306-315.

Hoff, J. Wisløff, U. Engen, L.C. Kemi, O.J. & Helgerud, J. (2002). Soccer specific aerobic endurance training. British Journal Sports Medicine, 36(3), 218-221.

Hulka, K., Cuberek, R., & Belka, J. (2013). Heart rate and time-motion analyses in top junior players during basketball matches. Acta Gymnica, 43(3), 27–35.

Impellizzeri, F. M., Rampinini, E., Coutts, A. J., Sassi, A., & Marcora, S. M. (2004). Use of RPE-based training load in soccer. Medicine and Science in Sports and Exercise, 36(6), 1042–1047.

Klusemann, M. J., Pyne, D. B., Foster, C., & Drinkwater, E. J. (2012). Optimising technical skills and physical loading in small-sided basketball games. Journal of Sports Sciences, 30(14), 1463–1471.

Koka, A., & Hein, V. (2003). Perceptions of teacher's feedback and learning environment as predictors of intrinsic motivation in physical education. Psychology of Sport and Exercise, 4(4), 333–346.

Köklü, Y., Alemdaroğlu, U., Aksoy, İ., & Gürmen, İ. (2017). Comparison of physiological responses and technical actions in full-court games in young basketball players. Science & Sports, 32(6), e215-e220.

Manzi, V., D'ottavio, S., Impellizzeri, F. M., Chaouachi, A., Chamari, K., & Castagna, C. (2010). Profile of weekly training load in elite male professional basketball players. Journal of Strength and Conditioning Research, 24(5), 1399–1406.

Mazzetti, S. A., Kraemer, W. J., Volek, J. S., Duncan, N. D., Ratamess, N. A., Gómez, A. L., … Fleck, S. J. (2000). The influence of direct supervision of resistance training on strength performance. Medicine and Science in Sports and Exercise, 32(6), 1175–1184.

McArdle, W.D., Katch, F.I. & V.L. Katch. (1996). Exercise Physiology: Energy Nutrition and Human Performance. (4th Ed). Williams & Wilkins, London.

McCormick, B. T., Hannon, J. C., Newton, M., Shultz, B., Miller, N., & Young, W. (2012). Comparison of Physical Activity in Small-Sided Basketball Games versus Full-Sided Games. International Journal of Sports Science & Coaching, 7(4), 689–697.

Owen, A., Twist, C., & Ford, P. (2004). Small-sided games: The physiological and technical effect of altering pitch size and player numbers. Insight, 7(2), 50-53.

Rampinini, E., Impellizzeri, F. M., Castagna, C., Abt, G., Chamari, K., Sassi, A., & Marcora, S. M. (2007). Factors influencing physiological responses to small-sided soccer games. Journal of Sports Sciences, 25(6), 659–666.

Schelling, X., & Torres, L. (2016). Accelerometer load profiles for basketball-specific drills in elite players. Journal of Sports Science and Medicine, 15(4), 585–591.

Selmi, O., Khalifa, W. Ben, Ouerghi, N., Amara, F., Zouaoui, M., & Bouassida, A. (2017). Affect of Verbal Coach Encouragement on Small Sided Games Intensity and Perceived Enjoyment in Youth Soccer Players. Journal of Athletic Enhancement, 06(03).

Stone, N. M., & Kilding, A. E. (2009). Aerobic conditioning for team sport athletes. Sports Medicine, 39, 615-642.

Tanner, R. K., Fuller, K. L., & Ross, M. L. R. (2010). Evaluation of three portable blood lactate analysers: Lactate Pro, Lactate Scout and Lactate Plus. European Journal of Applied Physiology, 109(3), 551–559.

Turnnidge, J., & Côté, J. (2019). Observing Coaches' Leadership Behaviours: the Development of the Coach Leadership Assessment System (CLAS). Measurement in Physical Education and Exercise Science, 23(3), 214–226.

Vaquera, A., Suárez-Iglesias, D., Guiu, X., Barroso, R., Thomas, G., & Renfree, A. (2018). Physiological responses to and athlete and coach perceptions of exertion during small-sided basketball games. Journal of Strength and Conditioning Research, 32(10), 2949–2953.

Vázquez-Guerrero, J., Jones, B., Fernández-Valdés, B., Moras, G., Reche, X., & Sampaio, J. (2019). Physical demands of elite basketball during an official U18 international tournament. Journal of Sports Sciences, 37(22), 2530–2537.

Weakley, J. J. S., Read, D. B., Fullagar, H. H. K., Ramirez-Lopez, C., Jones, B., Cummins, C., & Sampson, J. A. (2019). "How Am I Going, Coach?"—The Affect of Augmented Feedback During Small-Sided Games on Locomotor, Physiological, and Perceptual Responses. International Journal of Sports Physiology and Performance, 1–8.