



Feedback and learning in tennis: Conceptualisation, classification, and practical implications

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ABSTRACT

This article defines the concept of feedback, proposes a classification of the different types of feedback, and explores the application of extrinsic feedback by tennis coaches. Furthermore, the influence of feedback on the learning and performance of tennis players is analysed. Finally, a series of practical implications that coaches can consider evaluating the feedback they provide to their players and to make the teaching-learning-evaluation process more effective in their training sessions are presented.

Key words: knowledge of results, knowledge of performance, communication, teaching.

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INTRODUCTION

When a new player takes up tennis and wants to learn the basics, or when an experienced player wants to improve their performance, it takes time for an improvement to occur. One possible way to facilitate improvement may be to try different strategies gradually through trial-and-error learning. Another way may be to get feedback from external sources, such as a coach or video footage (Lauber and Keller, 2014).

According to Ruiz Pérez (2001), the concept of feedback was first formulated by Nyquist in 1932 and is defined according to Sage (1977), in Oña (1999) as "the information that an individual receives as a result of a response". From the point of view of motor learning, Pieron (1999) defined feedback as the "information provided to the learner in order to help him/her to repeat the appropriate motor behaviours, eliminate the incorrect ones and achieve the desired results".

According to these definitions, feedback is associated with the information provided by the teacher, peers, or audio-visual systems. However, we must think of the learner and his or her ability to learn by himself or herself. Therefore, feedback can be classified into two subcategories: firstly, internal, intrinsic, inherent, and sensory feedback, which would be, according to Batalla (2000) "the information that an individual obtains about his or her own execution of an action". This is fundamental for movement control and involves a complex cognitive process. Secondly, we find the supplementary or augmented feedback that refers to additional information (quantitative or qualitative) from an external source.

Depending on the situation, supplementary feedback can be provided in two different ways: as knowledge of results or as knowledge of performance. In the first case, the information provided refers to the achievement or non-achievement of



the external target, while in the second case, the information provided refers to the execution of the movement pattern (Oña, 1999).

In addition, another concept that we cannot overlook is that of feedforward, understood by Cano et al. (2017) as "the sensory representation of the action or movement that the learner intends to perform and that is sent in advance to prepare a part of the system to receive the feedback".

In summary, we can define feedback as "the set of internal and external information aimed at improvement in order to readjust and stabilise motor responses".

Although, as we have just seen, feedback can be classified into two types, depending on who provides the information:

intrinsic and extrinsic or augmented, in this article we will focus on the second type, since, as coaches, it will be the one that is particularly relevant in our tennis lessons. Therefore, the objectives of this article will be 1) to classify the different types of feedback and their characteristics, 2) to analyse the influence of feedback on the learning and performance of tennis players and 3) to expose practical implications for tennis lessons, based on the information exposed.

TYPES AND CHARACTERISTICS OF FEEDBACK

To establish as broad and precise a classification as possible, a synthesis of various proposals has been made (Pérez, 2001; Oña, 1999; Gutiérrez, 2008; Cano et al. 2017; Haibach et al. 2011). Thus, Table 1 presents a classification of the different types of feedback.

Table 1
Types and characteristics of feedback.

Ranking	Type	Definition	Example
Depending on the moment	Concurrent or simultaneous	Information is provided during the action	"Take back the racket now".
	Terminal or immediate	Information is provided at the end of the action	"On this forehand, you should have taken the racket back earlier".
	Postponed or delayed	When a time interval is allowed to elapse between the action and the provision of information	"On the forehands you hit yesterday, you should have taken back your racket earlier."
Depending on the manner of reporting	Non-verbal	The way of transmission is not oral	The coach demonstrates a slice backhand.
	Verbal	The way of transmission is oral	The coach explains the execution of a slice backhand
According to the degree of specificity of what is being reported	Analytical	Refers to specific aspects of the action	"Note the position of the wrist when hitting".
	Global	A generic estimate of the action is made	"That stroke is very fluid."
Depending on the target audience	Individual	Single player	"Pepe, move faster!".
	Group	To a group of players	"Guys, move faster!".
According to frequency	Separated	Refers only to the last action	"I really liked this last shot".
	Accumulated	It refers to an accumulation of actions	"I really liked the last series of shots".
Depending on the intention	Descriptive	Provides exteroceptive information on how the action has been performed	"You've hit the ball between the shoulders and the hips".
	Evaluative	Assesses the student's performance	"You've hit it very well."
	Comparative	It draws an analogy between one action and another.	"This shot was better than the last one".
	Explanatory	It constitutes a cause-effect correlation.	"When you hit the ball at that height you have more control".
	Prescriptive	Affirms how to perform the action correctly	"Try to hit between the shoulders and the hips".
	Affective	Motivates the student to continue practising	"You're improving a lot, thanks to your attitude".
	Interrogative	The player is asked about the action	"How high do you think you hit the ball?"

INFLUENCE OF FEEDBACK ON LEARNING AND PERFORMANCE OF TENNIS PLAYERS.

Feedback serves as a hinge between teaching and learning, being an important variable for learning to take place. Some classical authors claim that feedback is essential and that it is the main characteristic of efficient teaching (Mosston & Assworth, 2008). Furthermore, some studies have concluded that simple repetition does not ensure motor learning and that the suppression of feedback can lead to a degradation of performance (Simonet, 1986). For Haibach et al. (2017) feedback is the most important route to motor learning, except of course, practice itself.

Regarding the objectives pursued when using feedback, Ruiz Pérez (2001) states that the three main objectives are:

- Inform the learner about what he/she is doing and how he/she is doing it.
- To motivate the learner by providing sufficient encouragement to keep practising until the precise objective is achieved.
- Reinforce or strengthen the response that the subject makes, which means getting closer to the desired value.

In addition to these 3 main effects, according to this author, others can be added such as correcting errors, favouring self-observation, saving time and effort, orienting attention towards what is relevant and developing strategies.

Other authors qualify these objectives by stating that the main objective is to improve response through error correction and that the rest of the objectives, such as motivation, strategy development, etc., are collateral objectives (Oña, 1999).

In the specific case of learning in tennis players, there are several studies that have analysed the relationship between the feedback provided to players and their learning or performance. Most studies have focused on the acquisition of skills, evaluating how different types of feedback affect the improvement of strokes.

Regarding the serve, some research has found that providing immediate increased feedback on speed (e.g., by indicating the values obtained through a radar) can support the learning process to serve faster in elite players (Moran et al., 2012; Keller et al., 2021). Furthermore, it was also indicated that increased service speed was not associated with lower accuracy (Keller et al., 2021).

The effect of increased feedback has also been observed in the forehand stroke with beginning players. In this case, players who received analytical feedback from the coach showed improvements in accuracy and execution after the training process. However, another group of players who only performed self-talk, without coach intervention, improved in the same way (Cutton and Landin, 2007).

Augmented feedback has also been shown to be positive in volley learning. Hebert and Landin (1994) found that players who received augmented feedback from the coach improved both accuracy and execution of volleys.

PRACTICAL IMPLICATIONS FOR TENNIS LESSONS.

Following the classification proposed above and based on the information presented in this article and other studies, we are going to present the main aspects that tennis coaches should consider regarding the feedback given to players in their tennis lessons.

Depending on the moment

It is recommended that feedback is provided between 10 and 25 seconds after the execution because, if it is given concurrently, it would interfere with the rest of the stimuli that the players must attend to, and if it is given immediately, it would interfere with the intrinsic feedback. Therefore, it is preferable to leave sometime between the execution of the action and the provision of feedback by the coach so that the players can evaluate the action themselves (Ruiz Pérez, 1994; Reid et al., 2006; Haibach et al., 2017; Cano et al., 2017).

Depending on the way of delivery

Regarding the use of verbal and non-verbal feedback, both types of feedback are complementary, and coaches should be aware of the different situations and personalities of players to confirm which type of feedback is more effective. In general, it is recommended that both types of feedback are combined, and that verbal feedback is not abused. In this regard, Reid et al. (2006), indicate that too much feedback leads to increased dependence on the coach and limits the player's ability to process and evaluate information independently.

According to the degree of specificity of what is being reported

Generally, it has been observed that feedback is most useful when it is simpler, refers to a single characteristic of the skill and focuses on the most relevant aspects of the action. However, it is important to consider the type of action and the level of the players. In the early stages of beginning players, more global feedback and the use of analogies can be provided, however, as the level of the player increases and the actions become more complex, it is recommended that feedback is more precise or analytical.

Depending on the target audience

If we refer to feedback related to learning skills, it is recommended that feedback is individual and refers to the specific characteristics of the action and of each player. Group feedback can be useful in the initial stages of learning, with groups of players with the same level of competence. In these cases, for example, the main characteristics of a stroke or action can be explained together.

According to frequency

It seems most appropriate to provide cumulative feedback every 3 or 4 trials. In this way, the player can develop strategies for orienting attention and interpreting his or her results. However, it is important to consider the learning stage of the players and the complexity of the tasks. In this regard Wulf et al. (1998) indicate that with beginning players or during the learning of complex actions, coaches may have to provide feedback more frequently. However, as players increase their level of competence, feedback should be less frequent and intrinsic feedback should be prioritised (Reid et al., 2006).

Depending on the intention

Although in our work as tennis coaches, all types of feedback can be useful depending on the situation, the ones that will be particularly relevant for our students' learning will be explanatory and prescriptive feedback. Again, it will be important to consider the level of competence of the players. As players become more proficient and more autonomous, interrogative feedback can be a good resource to enable players to self-evaluate and propose their own motor solutions. In addition, this type of feedback can also be very useful in the early stages to encourage discovery learning.

CONCLUSIONS

The feedback provided by the coach is a transcendental variable in the teaching-learning process that takes place in tennis lessons. Therefore, it is important for coaches to reflect on the feedback they provide to players. In this article we have proposed a classification and some implications that coaches can consider improving their communication with players and make the teaching-learning-evaluation process more effective.

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REFERENCES

- Batalla, A. (2000). Motor skills. Barcelona: Inde.
- Cano, R., Martínez, R.M., & Miangolarra, J.C. (2017). Motor control and learning. Madrid: Panamericana.
- Cutton, D.M., & Landin, D. (2007). The effects of self-talk and augmented feedback on learning the tennis forehand. *Journal of applied sport psychology*, 19(3), 288-303. <https://doi.org/10.1080/10413200701328664>
- Gutiérrez, M. (2008). Learning and motor development. Andalucía: Fondo editorial.
- Haibach, P. S., Reid, G., & Collier, D. H. (2011). Motor learning and development. *Human Kinetics*.
- Hebert, E. P., & Landin, D. (1994). Effects of a learning model and augmented feedback on tennis skill acquisition. *Research Quarterly for Exercise and Sport*, 65(3), 250-257. <https://doi.org/10.1080/02701367.1994.10607626>
- Keller, M., Kuhn, Y. A., Lüthy, F., & Taube, W. (2021). How to serve faster in tennis: The influence of an altered focus of attention and augmented feedback on service speed in elite players. *The Journal of Strength & Conditioning Research*, 35(4), 1119-1126. <https://doi.org/10.1519/JSC.0000000000002899>
- Lauber, B., & Keller, M. (2014). Improving motor performance: Selected aspects of augmented feedback in exercise and health. *European Journal of Sport Science*, 14(1), 36-43. <https://doi.org/10.1080/17461391.2012.725104>
- Moran, K. A., Murphy, C., & Marshall, B. (2012). The need and benefit of augmented feedback on service speed in tennis. *Med Sci Sports Exerc*, 44(4), 754-60. <https://doi.org/10.1249/MSS.0b013e3182376a13>
- Mosston, M., & Assworth, S. (2008). Teaching physical education (First online edition). Spectrum Institute for Teaching and Learning.
- Oña, A. (1999). Control y aprendizaje motor. Madrid: Síntesis.
- Pierón, M. (1999). Para una enseñanza eficaz de la actividad físico-deportiva. Barcelona: Inde.
- Reid, M., Crespo, M., Lay, B., & Berry, J. (2007). Skill acquisition in tennis: Research and current practice. *Journal of Science and Medicine in Sport*, 10(1), 1-10. <https://doi.org/10.1016/j.jsams.2006.05.011>
- Ruiz Pérez, L.M. (2001). Development, motor behaviour and sport. Madrid: Síntesis.
- Simonet, P. (1986). Apprentissages moteurs. Processus et procédés d'acquisition. Paris: Vigot.
- Wulf, G., Shea, C. H., & Matschiner, S. (1998). Frequent feedback enhances complex motor skill learning. *Journal of Motor Behavior*, 30(2), 180-192. <https://doi.org/10.1080/00222899809601335>

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