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Perception and Action in Sports: is there Room for Auditory Information?

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Introduction

In the literature concerning the role of perception in sport, the number of studies investigating the visual domain is way greater than the number of those investigating the auditory domain. However, in recent years there is a growing interest toward the contribution of auditory information in sport (see also the special issue edited by Murgia & Galmonte [1]). For instance, it has been demonstrated that athletes are able to discriminate the sound they produce while performing specific sport movements from the sound produced by other athletes performing the same movements [2,3]. This observation is further supported by the neurophysiological evidence that there are different patterns of brain activation when athletes listen to sport sounds deriving from themselves or from other athletes [4]. Moreover, it has been repeatedly demonstrated that an appropriate use of auditory information can promote significant performance improvements in various sports [5]. These improvements can derive either by shaping the execution of the movement on the basis of a model (e.g., Agostini, Righi, Galmonte, & Bruno [6]), or by adjusting the movement on the basis of an augmented feedback (e.g., Schaffert, Mattes, & Effenberg [7]); in both cases, athletes have to interpret auditory information as related to the self. However, to effectively perform in sport it is not sufficient to focus exclusively on your own movements, but also on those of the other people around you – teammates, opponents, referees – in order to react appropriately.

Notwithstanding the obvious fact that also the movements of the others produce sound, only a couple of studies investigated its influence on sport performances. One of these studies is that of Takeuchi [8], in which experienced tennis players were deprived of auditory information. Results highlighted that, compared to the normal condition, auditory deprivation significantly hindered performances in terms of points obtained; in particular, this worsening was mainly due to the decrease of correctly received and returned serves. Another study which investigated the response to sounds not related to the self is that of Brown, Kenwell, Maraj and Collins [9]. These authors started from the observation of Julin and Dapena [10] that at the 1996 Olympic Games, the reaction time of sprinters appeared to progressively increase from lane 1 to lane 8. To experimentally test the hypothesis that this effect was due to the phenomena of sound propagation and decay of the gunshot that served as "go" signal*, Brown and colleagues manipulated its loudness. The results revealed that an increase of the gunshot loudness promoted a significant decrease of the reaction time of sprinters. Recently, two studies further contributed to this area of research, focusing on auditory information produced by opponents. In particular, Camponogara, Rodger, Craig and Cesari [11] highlighted that basketball players are able to anticipate the action intentions of an attacker through the sound he produces while moving towards them. Moreover, Sors and colleagues [12] observed that, to discriminate the power of soccer penalty kicks and volleyball smashes, early auditory information provides more relevant perceptual cues than the respective visual information: indeed, when the former was present, athletes were faster in making the discriminations, and for smashes they were also more accurate.

Considering the novelty of the approach used for the latter experiments as well as the potential relevance of the results observed, in our opinion there is much room for future research on auditory information in sports. In particular, as concerns basic research, it would be interesting to investigate whether other kinds of information can be conveyed through sound produced by one's own and by opponents' movement. Moreover, it would be important to understand whether the observations made in one sport can be generalized to other sports having similar characteristics (e.g., whether the relevance of early auditory information observed in soccer and volleyball for shot power perception is analogous in other sports). Importantly, future investigations should use experimental tasks that closely resemble field situations. This suggestion is given in order to build a bridge between basic and applied research, so that the observations deriving from the former could provide information that are actually useful – and immediately usable – for the latter. Specifically, the main aim of applied research in this field is developing and testing the effectiveness of perceptual-motor training, which could promote significant improvements in athletes' performances. In this regards, the research challenge is to demonstrate that athletes can somehow use auditory information to modify their own motor behaviour and benefit from it. This would provide practitioner psychologists with innovative tools to enhance perceptual-motor skills of their clients.

*Nowadays, to avoid such a lane bias, in all major competitions starters use an electronic gunshot delivering a beep via loudspeakers placed behind each starting block.

References

1. Murgia M, Galmonte A. The role of sound in motor perception and execution. Open Psychol J. 2015; 8: 171-173.
2. Kennel C, Pizzera A, Hohmann T, Schubotz R I, Murgia M, et al. The perception of natural and modulated movement sounds. Perception. 2014; 43: 796-804.
3. Murgia M, Hohmann T, Galmonte A, Raab M, Agostini T. Recognising one's own motor actions through sound: The role of temporal factors. Perception. 2012; 41: 976-987.
4. Justen C, Herbert C, Werner, Raab M. Self vs. other: Neural correlates underlying agent identification based on unimodal auditory information as revealed by electro tomography (sLORETA). Neuroscience. 2014; 259: 25-34.
5. Sors F, Murgia M, Santoro I, Agostini T. Audio-Based

Interventions in Sport. The Open Psychology Journal. 2015; 8: 212-219.

6. Agostini T, Righi G, Galmonte A, Bruno P. The relevance of auditory information in optimizing hammer throwers performance. In: PB Pascolo, editor. Biomechanics and sports. Vienna: Springer. 2204; 67-74.
7. Schaffert N, Mattes K, Effenberg A O. An investigation of online acoustic information for elite rowers in on-water training conditions. Journal of Human Sport and Exercise. 2011; 6: 392-405.
8. Takeuchi T. Auditory information in playing tennis. Perceptual and Motor Skills. 1993; 76, 1323-1328.
9. Brown A M, Kenwell ZR, Maraj B K, Collins DF. Go signal intensity influences the sprint start. Medicine and Science in Sports and Exercise. 2008; 40: 1142-1148.
10. Julin A L, Dapena J. Sprinters at the 1996 Olympic Games in Atlanta did not hear the starter's gun through the loudspeakers on the starting blocks. New Studies in Athletics. 2003; 18: 23-28.
11. Camponogara I, Rodger M, Craig C, Cesari P. Expert players accurately detect an opponent's movement intentions through sound alone. Journal of Experimental Psychology: Human Perception and Performance. 2017; 43: 348-359.
12. Sors F, Murgia M, Santoro I, Prpic V, Galmonte A, et al. The contribution of early auditory and visual information to the discrimination of shot power in ball sports. Psychology of Sport and Exercise. 2017; 31: 44-51.