OPEN FORUM
INNOVATIONS IN RESEARCH METHODOLOGY

Visualization vs. imagery in mental training

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Manuscript Preparation
E Funds Collection

Paweł Piepiora [ABCDE], **Kazimierz Witkowski** [DE]

Faculty of Physical Education and Sports, Wroclaw University of Health and Sport Sciences, Wroclaw, Poland

Received: 21 October 2022; **Accepted:** 30 November 2022; **Published online:** 16 January 2023

AoBID: 15881

Abstract

This article first introduces the trend of cognitive psychology and its influence on the discipline of sport science (in Poland: physical culture sciences), resulting in the emergence of the field of mental preparation. Then the difference between the most popular mental exercises of visualization and imagery has been outlined. In applied sports psychology, visualization and imagery refer to different goals of mental training and these terms cannot be used interchangeably. The final section mentions the support of visualization by augmented reality (AR). This trend is particularly evident among the younger generation of athletes.

Keywords: cognitive psychology • mental preparation • sports • sports competition • sports psychology

Conflict of interest: Authors have declared that no competing interest exists

Ethical approval: Not required

Provenance & peer review: Not commissioned; externally peer reviewed

Source of support: Departmental sources

Author's address: Paweł Piepiora, Faculty of Physical Education and Sports, Wroclaw University of Health and Sport Sciences, I. J. Paderewskiego 35 street, Multipurpose Sports Hall room 75, 51-612 Wroclaw, Poland; e-mail: pawel.piepiora@awf.wroc.pl

Cognitive psychology – *noun* the branch of psychology that deals with unobservable mental processes [13].

Sports psychology – *noun* the scientific study of the mental state of sportspeople, looking at issues such as motivation, concentration, stress and self-confidence [13].

Tactics – *plural noun* the art of finding and implementing means to achieve immediate or short-term aims [13].

Technique – *noun* a way of performing an action [13].

INTRODUCTION

In the second half of the 20th century, the dominant paradigm of psychological trends was behavioural psychology and learning psychology. With their help, many psychological phenomena were explained, but only those that could be observed. Everything that happens between stimulus and response was considered irrelevant to observable behaviour [1]. When these trends reached a dead end, importance began to be attached to processes involving reasoning, language, memory and imagination. From this perspective, the cognitive revolution redirected research to individual mental processes. This led to the emergence of an entirely new sub-discipline of psychology: cognitive psychology, which studies cognitive processes and structures, as well as the general principles of the mind [2]. The premise that all humans are capable of generating cognitive impulses has been taken as the basis of cognitive psychology. That is, thoughts and ideas of the mind about things we know or that occur around us. However, the same phenomenon will not occur if we do not know something or do not realize that an object or concept exists. Therefore, the premise of cognitive psychology is to study human behaviour focused on unobservable, mental aspects. These are aspects located somewhere between the stimulus and the observable response to that stimulus. Hence, cognitive psychology verifies the ideas formed in the patient's mind. How do they affect his/her emotional and behavioural response? How do these ideas affect a person's well-being and what can he/she do about it?

Nowadays, cognitive psychology is used as a therapeutic mechanism [3]. In most cases, the way to solve the case is through observation of how these cognitive elements or thoughts affect the patient's behaviour. In most cases, the patient's cognitive sphere fully determines his/her behaviour [4]. Therapy focuses on identifying specific thoughts, beliefs, and mental patterns. The specialist works with the person using a form of debate involving questions. The person in question must identify and challenge his own beliefs. Then he or she will be ready to reformulate them from attitudes and create new cognitive elements based on them. The person should then be guided in such a way that these cognitions and thoughts become more in line with objectively understood reality. The second variant of the modern use of cognitive psychology is mental training or psychological skills training [5]. The premise is that the mental qualities of a human being are not fixed. They change with biological development and human experience. Therefore, they can be trained, just like muscles [6].

Visualization vs. Imagery

Until the mid-twentieth century, sport training included only physical preparation in the areas of motor skills, technique and tactics. With the cognitive revolution, a fourth area - mental preparation - was also introduced into sport [7]. In physical culture sciences, it has been accepted that effective use of athletes' skills in crucial moments of sports competition is always determined by psychological skills, and the greatest reserves of effective performance under pressure lie in the mental sphere of athletes [8]. Hence the legitimacy of using mental training in sports and assigning it equal value to physical training, according to the principle that physical and mental training must be equal in the pursuit of sports mastery.

The main cognitive mental exercises include visualization and imagery. These two formulations of mental training based on multisensorial influence are not synonymous. Visualization is a thought process related to multisensory experience, during which an athlete simulates a movement without or with external manifestations. In this case, the multisensory sequence is strictly goal-oriented. Imagery, on the other hand, is a thought process associated with multisensory experience, during which the athlete creates visions without their external manifestations. In this case, the sequence of multisensory experience is closely related to the sphere of desires. Therefore, whilst preparing an athlete for sports competition, visualization should be used, which will relate to the sequencing of tactical assumptions and the course of the start. And imagery can be used in mental training units on relaxation, which will relate to future success and overall well-being.

Thus, there is compatibility between visualization and imagery, on the one hand, and several differences, on the other. The compatibility is modality, that is, the use of all five senses: sight, hearing, touch, smell and taste. This translates into controlling the actual situation. The differences are in the creation of situations, characters

and perspectives. In visualization, there are only planned action scenarios. On the other hand, in imagery they can also be directed spontaneously. Visualization concerns the author of thought processes. And imageries can also refer to other model athletes. Imageries exist only in an internal or external perspective [9]. On the other hand, in visualization there are additionally three forms: kinesthetic,, internal kinesthetic and external kinesthetic [10]. The internal perspective refers to an activity that happens from the point of view of the person who actually performs it. The external perspective, on the other hand, involves imagining oneself outside the body and observing one's actions from the outside. In addition, the kinesthetic form in visualization involves recreating physical sensations caused by specific actions. Going further, the internal kinesthetic form involves visualizing oneself doing activities as in an internal perspective with simultaneous physical sensations dispensed by the body. And the external kinesthetic form is visualization from the outside with simultaneous physical sensations.

Accordingly, visualization is a mental technique that involves recalling positive sensory experiences: mental images, associating them with emotions or creatively building images of a new desired reality. Through visualization, we are able to induce arousal of the body as if a particular movement were actually being performed. It is a cognitive process because it is based on a psychomotor mechanism. Visualization requires the activity of the brain structures involved in the physical execution of the movement, while blocking the actual execution of the movement. The effects of visualization are palpable and noticeable when the actual mental exercises are preceded by relaxation.

What's next?

In the 21st century, augmented reality (AR) is among the main forms of human interaction with computer systems. It is defined as a means of visualization, manipulation and interaction of humans with computers and with complex data [11]. Its data specificity is characterized by intensity, understood as the ability to draw the viewer's special attention to selected objects. Interactivity, that is, the interaction of the user with the system through the interface, is also important. It is worth noting that immersion here marks the degree of absorption of the user's attention due to the three-dimensionality of the stimuli. In addition, all the information should be provided in a clear, descriptive, and rational manner, which is manifested by illustrative. And intuitiveness translates into ease of interpreting information [12]. It should be noted that AR is defined as real environments enriched with some virtual elements, for example: in references to sports competition, real elements (potential opponents and venue) can be enriched with estimated audience and spatial layout of the competition venue. Therefore, AR is fully justified for upgrading visualization among athletes. For this purpose, specific scenarios should be implemented and then subjected to verification conducted with the participation of athletes, their coaches and psychologists, physiologists and biomechanics specialists. It will be important to determine whether the application of such solutions will improve the results of specific athletes. What matters here is the individuality of each person. For some, AR can significantly aid visualization, for others it can significantly interfere with previous visualization performance. It is noted that the use of technological innovations in visualization is closer to younger generations of athletes. On the contrary, older generations of athletes prefer to support visualization through traditional methods of breathing techniques and meditation.

REFERENCES

1. Aronson E, Aronson J. Człowiek istota społeczna. Warszawa: Wydawnictwo Naukowe PWN; 2020 [in Polish]
2. Strela J, Doliński D. Psychologia. Podręcznik akademicki. Vol. 1-2. Gdańsk: Gdańskie Wydawnictwo Psychologiczne; 2010 [in Polish]
3. Szczepańska-Gieracha J, Cieślik B, Serweta A et al. Virtual Therapeutic Garden: A Promising Method Supporting the Treatment of Depressive Symptoms in Late-Life: A Randomized Pilot Study. J Clin Med 2021; 10: 1942
4. Kalina RM. Language and methods of innovative agonology as a guide in interdisciplinary research on interpersonal relationships and people with the environment – from micro to macro scale. Arch Budo 2020; 16: 271-280
5. Galloway J. Mental Training for Runners: How to Stay Motivated. Maidenhead: Meyer and Meyer Sport; 2011
6. Prokopczyk A, Wochyński Z. Influence of a special training process on the psychomotor skills of cadet pilots – Pilot study. Front Psychol 2022; 13: 1019495
7. Blecharz J, Siekańska M. (2009). Praktyczna psychologia sportu: wykorzystanie koncepcji psychologicznych w sporcie. Kraków: Akademia Wychowania Fizycznego; 2009 [in Polish]
8. Piepiora P, Piepiora Z, Bagińska J. Personality and Sport Experience of 20–29-Year-Old Polish

Male Professional Athletes. Front Psychol 2022; 13: 854804

9. Hardy L, Callow N. Efficacy of external and internal visual imagery perspectives for the enhancement of performance on tasks in which form is important. J Sport Exercise Psy 1999; 21(2): 95-112
10. Karageorghis CI, Terry PC. Inside Sport Psychology. Champaign: Human Kinetics; 2011
11. Militello LG, Sushereba CE, Ramachandran S. Handbook of Augmented Reality Training Design Principles. UK: Cambridge University Press; 2023
12. Cieśliński WB, Sobecki J, Piepiora PA et al. Application of the Augmented Reality in prototyping the educational simulator in sport – the example of judo. J Phys Conf Ser 2016; 710(1): 012016
13. Dictionary of Sport and Exercise Science. Over 5,000 Terms Clearly Defined. London: A & B Black; 2006

Cite this article as: Piepiora P, Witkowski K. Visualization vs. imagery in mental training. Arch Budo Sci Martial Art Extreme Sport 2023; 19: 1-4