

## THE ROLE OF COGNITIVE FLEXIBILITY IN THE REALM OF SPORTS

**EISHA RAHMAN\*, AKBAR HUSAIN**

Department of Psychology, Aligarh Muslim University, Aligarh, INDIA.

\*Email: eisharhmn@gmail.com

**How to cite this article:** Rahman, E., & Husain, A. (March 2022). The role of cognitive flexibility in the realm of sports. Journal of Physical Education Research, Volume 9, Issue I, 08-12.

**Received:** February 12, 2022

**Accepted:** March 28, 2022

### ABSTRACT

*The realm of sports psychology has produced an extensive body of research related to psychological correlates of athletic prosperity. In this pursuit, scholars from around the globe have been probing the nuances of psychological phenomena to enhance the performance, health, and wellness of athletes. This follows from the fact that psychological techniques and concepts serve as a remarkable base for enhancing the athlete's functioning, adherence, and flourishing. Since every athlete intends to enhance their performance, they must ensure the factors underlying performance elevation, i.e., physical, emotional, mental, cognitive, social, and spiritual. Thus, the present study aims to explore the role of one such factor, i.e., cognitive flexibility. This ensues from the fact that the athletic realm is filled with uncertainties, thereby entailing adaptive functioning to meet changing demands. Therefore, cognitive flexibility, the adaptive ability to enable individuals to carry out complex tasks, find novel solutions, and meet changing demands, is well worth exploring. It is especially vital in sports as athletes constantly withstand a variety of stressors, anxiety, and pressure when performing. In addition, the fluctuations in internal and external demands and experiences make cognitive flexibility a critical factor in ensuring focus on performance-relevant cues during training and competition. Therefore, the researchers have probed the role of cognitive flexibility in enhancing athletes' performance. More explicitly, the role of cognitive flexibility has been explored in the context of attention to relevant cues, creativity and decision making, divergent thinking, and stress coping.*

**Keywords:** Cognitive flexibility, athlete, performance enhancement, adaptive ability.

### 1. INTRODUCTION

The realm of sports psychology is loaded with an extensive body of literature related to psychological correlates of athletic prosperity (Raglin, 2001; Mann, Grana, Indelicato, O'Neill, & George, 2007; Elbe & Wikman, 2017). Therefore, scholars worldwide have been probing the nuances of psychological phenomena to enhance athletes' performance, health, and wellness. They have been looking into the holistic factors underlying performance elevation, i.e., physical (Kellmann, 2002; Reinboth & Duda, 2004; Walsh, 2018), emotional (Costarelli & Stamou, 2009), mental (Keilani, Hasenöhrl, Gartner, Krall, Fürnhammer, Cenik, & Crevenna, 2016; Küttel & Larsen, 2020; Facer-Childs, Hoffman, Tran, Drummond, & Rajaratnam, 2021), cognitive (Masley, Roetzheim, & Gualtieri, 2009; Tingaz, 2020), social (Te Wierike, Sluis, Akker-Scheek, Elferink-Gemser, & Visscher, 2013), and spiritual (Meyer & Watson, 2014). These studies spotlight the role of psychology and related concepts in athlete life. Thus, the present study is an endeavor in this direction to highlight the role of one such factor, i.e., cognitive flexibility.

Since the realm of sports is infused with the uncertainty of outcomes (Baimbridge, 1998), the athletes and spectators must therefore be prepared to adapt to the changing

circumstances. Thus, the notion of cognitive flexibility comes into play, whereby athletes can meet the changing demands. This executive function of cognitive flexibility (Jacques & Zelazo, 2005) enables individuals to use cognitive processing strategies in the face of uncertain and unexpected environmental situations (Cañas, Quesada, Antolí, & Fajardo, 2003). More explicitly, it helps them pursue complex tasks and envisage novel and adaptable solutions to meet changing demands (Ionescu, 2012). Its role further extends to the accomplishment of personal goals (Martin & Anderson, 1998) and adherence to training and endurance regimes. Furthermore, cognitive flexibility helps individuals counter the repercussions of stress (Koesten, Schrod, & Ford, 2009), which is a crucial factor influencing the performance of athletes (Huijgen, Leemhuis, Kok, Verburgh, Oosterlaan, Elferink-Gemser, & Visscher, 2015; Santos, Ufring, Stahl, Lockie, Alvar, Mann, & Dawes, 2020). Therefore, exploring the role of cognitive flexibility in the realm of sports is imperative. Also, this executive function being an ability that can be acquired with experience makes it even more special, for athletes can leverage the boons of this ability by cultivating it with due efforts. Hence, the present study aims to explore the role of cognitive flexibility in the realm of sports, i.e., in the lives of athletes.

## **2. COGNITIVE FLEXIBILITY**

Cognitive flexibility refers to the ability to shift perspective or approach in the pursuit of adaptation to environmental changes (Johnco, Wuthrich, & Rapee, 2014). It is the ability to produce diverse ideas, generate response alternatives, and regulate behaviors to manage situational demand. It entails the ability to simultaneously think about multiple things and modify thinking according to the changes in demands or expectations. According to Brown and Tait (2014), cognitive flexibility reflects a change in cognitive state in response to the perceived intrinsic environmental contingencies (bodily demands) or extrinsic environmental contingencies (such as finding a solution to escape or combat a threatening scenario or stimulus). Dajani and Uddin (2015) propound that cognitive flexibility is the readiness with which one can selectively switch between mental processes to beget suitable behavioral responses.

According to researchers, this complex construct comprises several aspects of executive functioning that enable one to generate ideas and alternative perspectives in the face of challenges. Furthermore, it engenders habitual response inhibition in favor of adaptive strategies to counter the challenges.

Martin and Rubin (1995) suggested that individuals aware of situational factors and ready to acknowledge the need to make behavioral changes are cognitively superior and more flexible than those who follow a narrow and rigid approach to difficulty resolution. Since the task at hand (game in progress) is subject to changes in environmental conditions, people need to make behavioral adjustments to follow through with the task/game evolution. This adjustment and adaptation entail restructuring knowledge to ensure appropriate response generation. Thus, researchers from around the globe have been probing the role of cognitive flexibility in the pursuit of enhancing athletic performance.

## **3. COGNITIVE FLEXIBILITY AND ATHLETIC PERFORMANCE**

Though body proportions, skills training, strength, flexibility, and endurance are key factors influencing athletic performance, they only contribute to physical excellence. In solidarity, they are insufficient for ensuring athletic excellence. For instance, emotional changes are part and parcel of life, and therefore, athletes are no exception. They also undergo emotional upheavals; consequently, their performance gets affected (Tavacioğlu, 1999). In addition, athletes are expected to have the ability to cope, regulate their cognitions, emotions, and

bodily reactions, and focus on performance even during stressful encounters (Gardner & Moore, 2004). Thus, athletic performance enhancement entails the exploration of factors beyond physical nuances.

Since cognitively flexible individuals can more effectively interpret new situations and be ready to make necessary changes to response patterns, they often excel in their endeavors. Thus, athletes with high cognitive flexibility can pick on environmental cues and make quick and appropriate decisions; thereby, their performance is enhanced. This is further supported by Memmert, Baker, and Bertsch (2010), who propounded that the ability to focus attention efficiently is an essential factor for an athlete's success. This ensues from the fact that individuals need to be attentive to the displayed information and goal-directed cues to devise suitable strategies based on the availed knowledge (Cañas, Fajardo, & Salmeron, 2006). Castiello and Umlta (1992) suggested that athletes can enhance their ability to focus attention on a target by engaging in spontaneous repetition during practice. Athletes who can quickly adapt to changes in the visual field can better direct their attention.

The pre-eminence of creativity is time and again proffered by coaches and experts. In the realm of sports, athletes require uniqueness and creativity in order to ensure that their moves remain unpredictable and they can leverage the opportunities. However, harnessing creative thinking is often difficult (Memmert et al., 2010). It entails flexible decision-making in complex game situations (Memmert & Roth, 2007). Thus, researchers proffer the need to cultivate cognitive flexibility. Since cognitive flexibility allows one to respond creatively (Kreutzer & Bowers, 2016), cognitively flexible athletes have a greater chance to outperform their opponents in the face of competition. Moreover, researchers suggest that widening the range of environmental variability can enhance athletes' creative thinking and coping ability (Abernethy, Baker, & Côté, 2005; Memmert et al., 2010).

Stress, i.e., the body's response to changing stimuli or stressors, is another factor that greatly and gravely impacts athletic performance. In moderation, stress is a dose of motivation; however, if the level of stress exceeds our coping ability and starts to hinder us, it calls for immediate address (Selye, 1973). In the face of distress, athletes usually resort to different coping mechanisms or perhaps employ escapism (Nagano, Kato, & Fukuda, 2004). According to Hüttermann, Memmert, Simons, and Bock (2013), cognitive flexibility is a constructive coping mechanism that allows an attentional shift from one notion to another. Han, Park, Kee, Na, Na, and Zaichkowsky (2011) also found that athletic performance gets enhanced due to the modulation of stress and anxiety by cognitive flexibility.

Research suggests that individuals high in cognitive flexibility can effectively manage life stressors (Koesten et al., 2009). This implication ensues from the fact that individuals high in cognitive flexibility are imbued with a remarkable ability to generate alternatives and shift response trajectories to meet situational demands. Moreover, psychological inflexibility is associated with higher symptoms of distress, including anxiety and depression (Ruiz, 2010).

Sports settings involve many contextual differences compared with everyday settings. Thus, cognitive flexibility helps athletes meet the need of situational demand by reducing experiential avoidance and facilitating focus on task-relevant cues (Gardner & Moore, 2004). This further increases the probability of improving performance (Josefsson, Ivarsson, Gustafsson, Stenling, Lindwall, Tornberg, & Böröy, 2019). Also, cognitive flexibility allows switching the thinking process to become more adaptable to the situation at hand. This ability to adapt to new, changing or unplanned events allows the athlete to experience an enhanced quality of life, curtailed distress, and performance elevation. Moreover, it allows one to solve problems creatively, adapt to curveballs, and act appropriately in sundry domains; individuals are able to see from a different perspective.

#### 4. CONCLUSION

Life is filled with situations where one needs to consider differing perspectives. This uncertainty is even more dominant in the lives of athletes, for they have to deal with the demands and pressure of the sports and ensure that they perform their best. The pressure ensuing from the situations at hand and their ongoing life circumstances make it even more imperative that they harness cognitive flexibility to ascertain that they can modify behaviors irrespective of the challenges. Besides sports being a competitive field where the success of one leads to the loss of others, athletes need to be ready to accept the game's outcome. In this pursuit, cognitive flexibility allows the athletes to accept the outcome and plan for future endeavors in accordance with situational demands.

Moreover, the role of cognitive flexibility in implementing cognitive restructuring serves as a critical factor in the rehabilitation of injured athletes. Also, practicing cognitive flexibility can create new neural pathways in the brain and improve cognitive flexibility skills and divergent thinking. Therefore, coaches must be made aware of the importance of cognitive flexibility to determine the level and develop the abilities further. Athletes must foster cognitive flexibility and expose themselves to new situations and diverse contexts. In addition, they must practice thought redirecting and anticipate competitors' movements to develop strategic awareness and enable themselves to make quick and effective decisions. Moreover, they must see the game field from a wide range, gain insights from others' experiences, and try to understand and envisage.

#### 5. REFERENCES

- Abernethy, B., Baker, J., & Côté, J. (2005). Transfer of pattern recall skills may contribute to the development of sport expertise. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, 19(6), 705-718.
- Baimbridge, M. (1998). Outcome uncertainty in sporting competition: The Olympic Games 1896–1996. *Applied Economics Letters*, 5(3), 161-164.
- Brown, V. J., & Tait, D. S. (2014). Behavioral flexibility: Attentional shifting, rule switching and response reversal. *Encyclopedia of Psychopharmacology*, 1-7.
- Canas, J. J., Fajardo, I., & Salmeron, L. (2006). Cognitive flexibility. *International Encyclopedia of Ergonomics and Human Factors*, 1, 297-301.
- Canas, J., Quesada, J., Antolí, A., & Fajardo, I. (2003). Cognitive flexibility and adaptability to environmental changes in dynamic complex problem-solving tasks. *Ergonomics*, 46(5), 482-501.
- Castiello, U., & Umiltà, C. (1992). Splitting focal attention. *Journal of Experimental Psychology: Human Perception and Performance*, 18(3), 837.
- Costarelli, V., & Stamou, D. (2009). Emotional intelligence, body image and disordered eating attitudes in combat sport athletes. *Journal of Exercise Science & Fitness*, 7(2), 104-111.
- Dajani, D. R., & Uddin, L. Q. (2015). Demystifying cognitive flexibility: Implications for clinical and developmental neuroscience. *Trends in Neurosciences*, 38(9), 571-578.
- Elbe, A. M., & Wikman, J. M. (2017). Psychological factors in developing high performance athletes. In *Routledge handbook of talent identification and development in sport* (pp. 169-180). Routledge.
- Facer-Childs, E. R., Hoffman, D., Tran, J. N., Drummond, S. P., & Rajaratnam, S. M. (2021). Sleep and mental health in athletes during COVID-19 lockdown. *Sleep*, 44(5), zsaa261.
- Gardner, F. L., & Moore, Z. E. (2004). A mindfulness-acceptance-commitment-based approach to athletic performance enhancement: Theoretical considerations. *Behavior Therapy*, 35(4), 707-723.
- Han, D. H., Park, H. W., Kee, B. S., Na, C., Na, D. H. E., & Zaichkowsky, L. (2011). Performance enhancement with low stress and anxiety modulated by cognitive flexibility. *Psychiatry Investigation*, 8(3), 221.
- Huijgen, B. C., Leemhuis, S., Kok, N. M., Verburch, L., Oosterlaan, J., Elferink-Gemser, M. T., & Visscher, C. (2015). Cognitive functions in elite and sub-elite youth soccer players aged 13 to 17 years. *PloS One*, 10(12), e0144580.
- Hüttermann, S., Memmert, D., Simons, D. J., & Bock, O. (2013). Fixation strategy influences the ability to focus attention on two spatially separate objects. *PLoS One*, 8(6), e65673.
- Ionescu, T. (2012). Exploring the nature of cognitive flexibility. *New Ideas in Psychology*, 30(2), 190-200.
- Jacques, S., & Zelazo, P. D. (2005). On the possible roots of cognitive flexibility.



- Johnco, C., Wuthrich, V. M., & Rapee, R. M. (2014). The influence of cognitive flexibility on treatment outcome and cognitive restructuring skill acquisition during cognitive behavioural treatment for anxiety and depression in older adults: Results of a pilot study. *Behaviour Research and Therapy*, 57, 55-64.
- Josefsson, T., Ivarsson, A., Gustafsson, H., Stenling, A., Lindwall, M., Tornberg, R., & Böröy, J. (2019). Effects of mindfulness-acceptance-commitment (MAC) on sport-specific dispositional mindfulness, emotion regulation, and self-rated athletic performance in a multiple-sport population: an RCT study. *Mindfulness*, 10(8), 1518-1529.
- Keilani, M., Hasenöhl, T., Gartner, I., Krall, C., Fühnhammer, J., Cenik, F., & Crevenna, R. (2016). Use of mental techniques for competition and recovery in professional athletes. *Wiener Klinische Wochenschrift*, 128(9), 315-319.
- Kellmann, M. (2002). Enhancing recovery: Preventing underperformance in athletes. *Human Kinetics*.
- Koesten, J., Schrödt, P., & Ford Debra, J. (2009). Cognitive flexibility as a mediator of family communication environments and young adults' well-being. *Health Communication*. 24(1), 82-94.
- Kreutzer, C. P., & Bowers, C. A. (2016). Making games for health engaging: The influence of cognitive skills. *Games for Health Journal*, 5(1), 21-26.
- Küttel, A., & Larsen, C. H. (2020). Risk and protective factors for mental health in elite athletes: A scoping review. *International Review of Sport and Exercise Psychology*, 13(1), 231-265.
- Lopes Dos Santos, M., Uftring, M., Stahl, C. A., Lockie, R. G., Alvar, B., Mann, J. B., & Dawes, J. J. (2020). Stress in academic and athletic performance in collegiate athletes: A narrative review of sources and monitoring strategies. *Frontiers in Sports and Active Living*, 2, 42.
- Mann, B. J., Grana, W. A., Indelicato, P. A., O'Neill, D. F., & George, S. Z. (2007). A survey of sports medicine physicians regarding psychological issues in patient-athletes. *The American Journal of Sports Medicine*, 35(12), 2140-2147.
- Martin, M. M., & Anderson, C. M. (1998). The cognitive flexibility scale: Three validity studies. *Communication Reports*, 11(1), 1-9.
- Martin, M. M., & Rubin, R. B. (1995). A new measure of cognitive flexibility. *Psychological Reports*, 76(2), 623-626.
- Masley, S., Roetzheim, R., & Gualtieri, T. (2009). Aerobic exercise enhances cognitive flexibility. *Journal of Clinical Psychology in Medical Settings*, 16(2), 186-193.
- Memmert, D., & Roth, K. (2007). The effects of non-specific and specific concepts on tactical creativity in team ball sports. *Journal of Sports Sciences*, 25(12), 1423-1432.
- Memmert, D., Baker, J., & Bertsch, C. (2010). Play and practice in the development of sport-specific creativity in team ball sports. *High Ability Studies*, 21(1), 3-18.
- Meyer, A. R., & Watson, N. J. (2014). Radical orthodoxy and the emergence of spiritual hero-athletes: Examining Lance Armstrong's "Illness" Narrative. *Journal of Disability & Religion*, 18(2), 157-172.
- Nagano, T., Kato, T., & Fukuda, T. (2004). Visual search strategies of soccer players in one-on-one defensive situations on the field. *Perceptual and Motor Skills*, 99(3), 968-974.
- Raglin, J. S. (2001). Psychological factors in sport performance. *Sports Medicine*, 31(12), 875-890.
- Reinboth, M., & Duda, J. L. (2004). The motivational climate, perceived ability, and athletes' psychological and physical well-being. *Sport Psychologist*, 18(3), 237-251.
- Ruiz, F. J. (2010). A review of Acceptance and Commitment Therapy (ACT) empirical evidence: Correlational, experimental psychopathology, component and outcome studies. *International Journal of Psychology and Psychological Therapy*, 10(1), 125-162.
- Selye, H. (1973). The Evolution of the Stress Concept: The originator of the concept traces its development from the discovery in 1936 of the alarm reaction to modern therapeutic applications of syntoxic and catatonic hormones. *American Scientist*, 61(6), 692-699.
- Tavacıoğlu, L. (1999). Sport psychology-cognitive evaluations. *Ankara: Bağırhan Yayınevi*.
- Te Wierike, S. C. M., van der Sluis, V. D. A., van den Akker-Scheek, I., Elferink-Gemser, M. T., & Visscher, C. (2013). Psychosocial factors influencing the recovery of athletes with anterior cruciate ligament injury: A systematic review. *Scandinavian Journal of Medicine & Science in Sports*, 23(5), 527-540.
- Tingaz, E. O. (2020). The mediating role of mindfulness in the relationship between the cognitive flexibility and irrational performance beliefs of university student-athletes. *Current Psychology*, 39(4), 1208-1214.
- Walsh, N. P. (2018). Recommendations to maintain immune health in athletes. *European Journal of Sport Science*, 18(6), 820-831.