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Cognitive and Emotional Factors Influencing Performance in Elite 100-Meter Sprinting

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Abstract

Background: Elite 100-meter sprinting is a highly demanding sport requiring not only peak physical capabilities but also exceptional cognitive and emotional functioning. **Aim:** This review synthesises current knowledge on the cognitive and emotional factors influencing sprint performance. **Method:** The review emphasises key factors such as reaction time, attention control, neural coordination, anxiety management, motivation, and emotional regulation. **Results:** The interaction between cognitive and emotional domains is explored, along with environmental influences and psychological intervention strategies. **Conclusion:** Identified gaps highlight the need for integrative, personalised approaches and ethical considerations in emerging technological applications. A holistic understanding of these psychological components is essential for optimising training and competition outcomes in elite sprinting.

Keywords: Elite sprinting, cognitive factors, emotional regulation, reaction time, motivation, anxiety management, psychological interventions, flow state.

1. Introduction

The 100-meter sprint epitomises explosive athletic performance, demanding unparalleled physical speed, power, and neuromuscular coordination. Traditionally, research has focused predominantly on physiological determinants such as muscle strength, power output, and biomechanics. However, recent studies increasingly emphasise the critical role of psychological factors in shaping sprint performance. Cognitive components—including rapid reaction time, attentional focus, and neural coordination—are essential for optimising the explosive start and maintaining technique throughout the race (Baek, 2019; Ille et al., 2013). Simultaneously, emotional factors such as competitive anxiety, motivation, and confidence substantially influence an athlete's ability to perform under pressure.

Given the split-second nature of sprinting events, integrating the cognitive and emotional domains is especially relevant, as mental processes often determine victory or defeat (Dale et al., 2023; Hicks et al., 2026). Reaction time depends not only on sensory-motor processing speed but is modulated by arousal and stress levels (Hackley, 2009; Ulrich & Mattes, 1996). Attention control strategies enable athletes to maintain focus amidst distractions, while emotional regulation facilitates entry into flow states that enhance automaticity and reduce performance-inhibiting anxiety (Baltzell & Summers, 2017; Lardon & Fitzgerald, 2013; Nideffer, 2021). Despite

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these insights, the literature remains fragmented, with few comprehensive reviews that address the interplay between cognitive and emotional factors in elite sprinting. Furthermore, environmental and contextual influences—including competition settings and socio-cultural factors—add complexity to psychological readiness (Dwi Pramesti et al., 2022; Gehlot, 2025). Emerging technologies such as biofeedback and AI-driven analytics offer promising avenues for personalised psychological interventions but raise ethical concerns regarding privacy and consent (Banerjee & Saima, 2020; Ojo, 2024). This review synthesises current knowledge on cognitive and emotional factors affecting elite 100-meter sprint performance, identifies research gaps, and proposes future directions to enhance psychological support strategies.

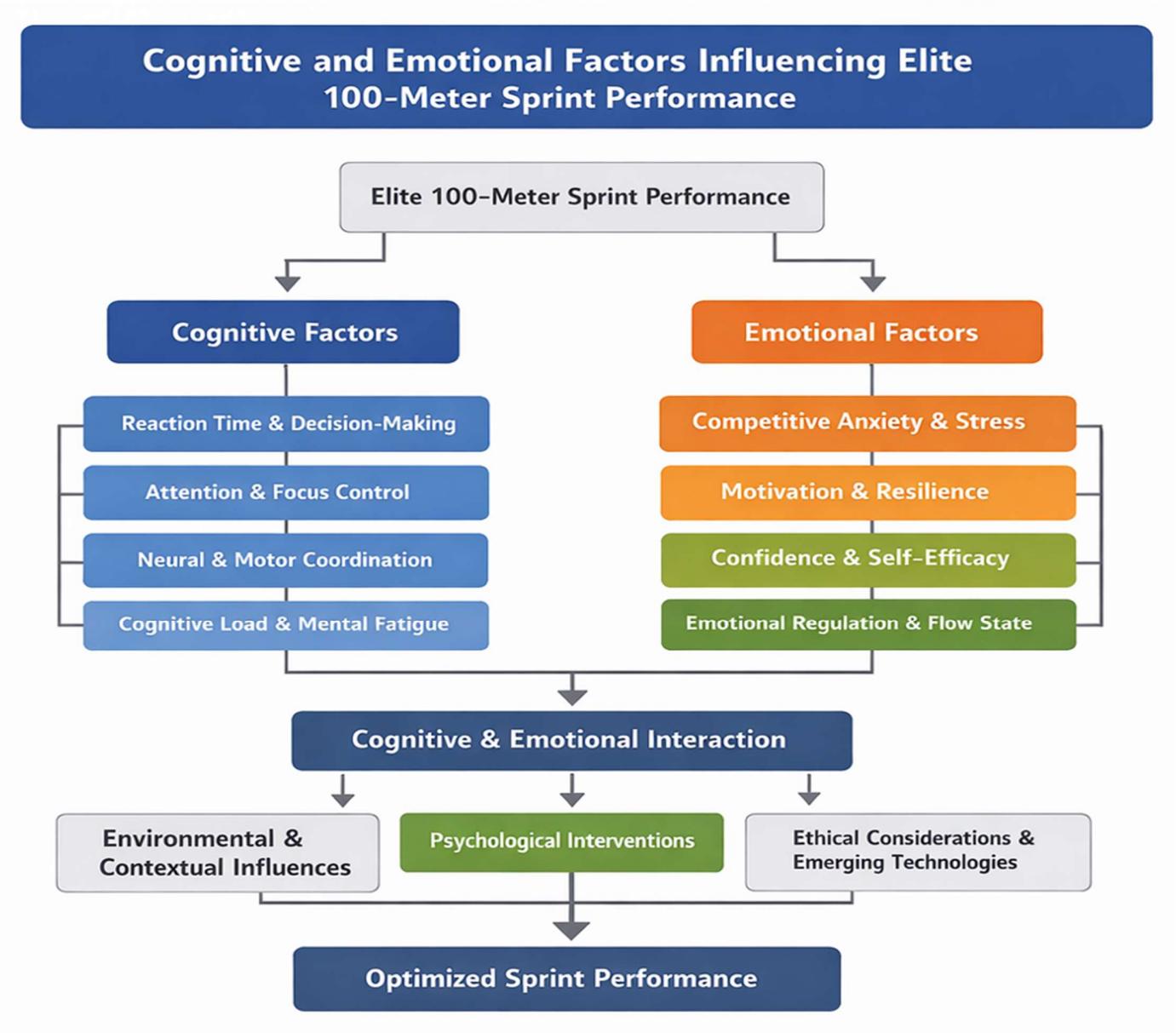

Figure 1. Psychological Drivers of Elite 100-Meter Sprint Performance

2. Cognitive Factors Affecting Sprint Performance

2.1. Reaction Time and Decision-Making

Anxiety commonly precedes competition and exerts complex effects on sprint execution. Moderate anxiety enhances arousal and readiness, while excessive anxiety leads to errors such as false starts or muscle tension. Psychological coping strategies include relaxation techniques, diaphragmatic breathing, and cognitive-behavioural interventions that modulate physiological stress responses (Hopper et al., 2019; Ma et al., 2017). Pre-race routines and mental rehearsal aid athletes in regulating anxiety, balancing activation to optimise performance (Gorman, 2014; Whelan et al., 1990).

3.2. Motivation and Emotional Resilience

Motivation drives the sustained effort required for elite sprint training and competition. Both intrinsic motivators (e.g., personal goals, passion) and extrinsic motivators (e.g., rewards, recognition) influence performance trajectories (Alkasasbeh & Akroush, 2025; Q Tablizo et al., 2018). Emotional Resilience—the capacity to rebound from setbacks like injuries or poor performances—is critical for maintaining motivation over time (Barbarin, 2025; Cooper et al., 2013). Psychological frameworks emphasise the development of a growth mindset, goal-setting, and social support as key resilience factors (Amir & Standen, 2019; Khan, 2025).

3.3. Confidence and Self-Efficacy

Self-confidence, shaped by past successes and constructive coaching feedback, directly impacts sprint performance. High self-efficacy enhances focus, reduces anxiety, and promotes competitive risk-taking. Cognitive restructuring and positive self-talk bolster confidence by reframing negative thoughts and reinforcing self-belief (Gauthier et al., 1983; Takdir et al., 2025). Coaches play a pivotal role in nurturing athlete confidence through tailored feedback and encouragement (Forlenza et al., 2018; Nicholls, 2017).

3.4. Emotional Regulation and Flow State

Emotional regulation facilitates entry into the flow state—a psychological condition of complete immersion and optimal performance. Mechanisms include awareness of emotional triggers, adaptive coping, and mindfulness practices (Bieleke & Wolff, 2024; N. E. Brick et al., 2020). Flow states in sprinting are associated with enhanced automaticity, reduced conscious interference, and peak physical output. Understanding flow triggers and maintenance informs psychological training aimed at sustaining high-level competition performance (N. Brick et al., 2019; Stavrou et al., 2007).

4. Interaction Between Cognitive and Emotional Factors

Cognitive and emotional domains in sprinting are deeply interconnected. Emotional states, such as anxiety or confidence, modulate cognitive processes, including attention allocation and decision-making speed. Conversely, cognitive control mechanisms contribute to emotional regulation, enabling athletes to manage stress and maintain composure (Kleine et al., 1988; Lopes, 2024). This bidirectional relationship suggests

integrated psychological training addressing both cognitive and emotional skills can yield synergistic performance improvements (Leblanc et al., 2019; Velez Sancarranco, 2026).

5. Environmental and Contextual Influences

The competition environment significantly affects cognitive-emotional states. Factors such as competing at home versus away, audience presence, and ambient conditions influence stress levels and attentional focus (Swain, 1990; Swain et al., 1990). Cultural and socio-economic contexts further shape psychological readiness by affecting access to resources, coaching, and support systems. Developing context-sensitive psychological interventions accounting for individual athlete circumstances is essential (Schinke & Moore, 2011; Storm & Larsen, 2020).

6. Psychological Support and Intervention Strategies

Sport psychologists and coaches collaborate to develop cognitive and emotional skills through evidence-based interventions. Techniques include mental skills training, biofeedback, and cognitive-behavioural therapy tailored to sprinting demands. Technological advancements, such as AI-driven analytics and wearable biofeedback devices, enable real-time monitoring of mental states, facilitating personalised interventions (Ajendla et al., 2025; Bates, 2025). These tools support objective assessment and adaptive training protocols to optimise psychological readiness.

7. Identified Gaps and Future Research Directions

Despite progress, gaps remain in comprehensively understanding cognitive-emotional dynamics in sprinting. Integrative studies combining cognitive neuroscience and sport psychology are needed to elucidate underlying mechanisms (Costello et al., 2021; Di Bella et al., 2023). Personalised psychological interventions tailored to individual neurocognitive profiles represent a promising frontier (Allott et al., 2025; Thompson-Hollands et al., 2014). Ethical considerations surrounding technology-assisted psychological monitoring—including privacy, informed consent, and data security—require systematic exploration to guide responsible application (Thorat & Ambali, 2024; Torous & Roberts, 2017).

8. Conclusion

Elite 100-meter sprinting performance depends on a complex interplay of cognitive and emotional factors alongside physical attributes. Reaction time, attention control, neural coordination, anxiety management, motivation, confidence, and emotional regulation collectively influence outcomes. The dynamic interaction between these domains underscores the necessity of holistic psychological training integrated with physical preparation. Future research and applied practice should prioritise personalised, ethically sound interventions leveraging emerging technologies to enhance mental readiness and optimise elite sprint performance.

References

Ajendla, A., Patel, M., Olikkal, P., & Vinjamuri, R. K. (2025). *Mental Health Management Through Wearables and AI Innovation* (pp. 193–212). Igi Global. https://doi.org/10.4018/979-8-3373-0659-9.ch010

Alkasasbeh, W. J., & Akroush, S. H. (2025). Sports motivation: a narrative review of psychological approaches to enhance athletic performance. *Frontiers in Psychology*, *16*.https://doi.org/10.3389/fpsyg.2025.1645274

Allott, K., Bryce, S., Douglas, K., Stainton, A., Wood, S. J., & Bowie, C. R. (2025). Formulating Cognitive Functioning to Guide Personalised Treatment for People Diagnosed With Mental Disorders. *Acta Psychiatrica Scandinavica*. https://doi.org/10.1111/acps.13811

Amir, M. T., & Standen, P. (2019). Growth-focused Resilience: development and validation of a new scale. *Management Research Review*, *42*(6), 681–702. https://doi.org/10.1108/mrr-04-2018-0151

Baek, J. H. (2019). Effects of Attentional Focus on Reaction Time in Sprint. *International Journal of Human Movement Science*, *13*(03), 61–70. https://doi.org/10.23949/ijhms.2019.12.13.3.5

Baltzell, A., & Summers, J. (2017). *The Power of Concentration (Module 3)* (pp. 77–86). Springer. https://doi.org/10.1007/978-3-319-70410-4.9

Banerjee, D., & Saima, A. (2020). AI And Mental Health: Innovations, Challenges, And Opportunities. Red Unicorn. https://doi.org/10.25215/9358096373.05

Barbarin, O. A. (2025). *Emotional Resilience* (pp. 175–187). Oxford University Pressnew York. https://doi.org/10.1093/oso/9780197747490.003.0013

Bates, M. (2025). Toward Personalised Healing: AI-Supported Wearables in Mental Health Practice. *IEEE Pulse*, *16*(5), 17–21. https://doi.org/10.1109/mpuls.2025.3618429

Bieleke, M., & Wolff, W. (2024). *Special issue: The self-regulation of human performance*. Center for Open Science. https://doi.org/10.31234/osf.io/g6wr9

Brick, N. E., Venhorst, A., Robinson, D. T., & Macintyre, T. E. (2020). *Self-regulation and Emotion Regulation in Endurance Performance* (pp. 155–167). Routledge. https://doi.org/10.4324/9781003052012-17

Brick, N., Macintyre, T., & Schücker, L. (2019). *Attentional focus and cognitive strategies during endurance activity* (pp. 113–124). Routledge. https://doi.org/10.4324/9781315167312-9

Cooper, C. L., Flint-Taylor, J., & Pearn, M. (2013). *Introduction—Setting the Scene* (pp. 1–9). Palgrave Macmillan Uk. https://doi.org/10.1057/9781137367839.1

Costello, S. E., O'Neill, B. V., Howatson, G., Van Someren, K., & Haskell-Ramsay, C. F. (2021). Detrimental effects on executive function and mood following consecutive days of repeated high-intensity sprint interval exercise in trained male sports players. *Journal of Sports Sciences*, *40*(7), 783–796. https://doi.org/10.1080/02640414.2021.2015946

Dale, J., Muniz-Pumares, D., Cimadoro, G., Meijen, C., & Glaister, M. (2023). Sprint Cycling. *Journal of Psychophysiology*, *37*(4), 191–203. https://doi.org/10.1027/0269-8803/a000321

Di Bella, L., Doma, K., Sinclair, W. H., & Connor, J. D. (2023). The Acute Effect of Various Feedback Approaches on Sprint Performance, Motivation, and Affective Mood States in Highly Trained Female Athletes: A Randomised Crossover Trial. *International Journal of Sports Physiology and Performance*, *18*(3), 313–319. https://doi.org/10.1123/ijspp.2022-0320

Dwi Pramesti, A., Hermahayu, H., & Faizah, R. (2022). Study of identifying factors for the developing measuring instrument on the psychological readiness of athletic athletes. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran*, *8*(3), 17–36. https://doi.org/10.29407/js_unpgri.v8i3.18807

Forlenza, S. T., Pierce, S., Vealey, R. S., & Mackersie, J. (2018). Coaching Behaviors That Enhance Confidence in Athletes and Teams. *International Sport Coaching Journal*, *5*(3), 205–212. https://doi.org/10.1123/iscj.2017-0040

Gauthier, J., Pellerin, D., & Renaud, P. (1983). The enhancement of self-esteem: A comparison of two cognitive strategies. *Cognitive Therapy and Research*, *7*(5), 389–398. https://doi.org/10.1007/bf01187167

Gehlot, Y. (2025). Pregame Mindset of Athletes: Psychological Readiness, Anxiety, and Instruction Following Across Individual and Team Sports. *International Journal of Humanities and Social Science*, *12*(6), 9–22. https://doi.org/10.14445/23942703/ijhss-v12i6p102

Gorman, A. (2014). *Pattern Recognition and Recall*. https://doi.org/10.4135/9781483332222.n211

Hackley, S. A. (2009). The speeding of voluntary reaction by a warning signal. *Psychophysiology*, *46*(2), 225–233. https://doi.org/10.1111/j.1469-8986.2008.00716.x

Hicks, D. S., Mcmillan, S., Schöllhorn, W., & Van Den Tillaar, R. (2026). Sprint Running Coordination: A Dynamical Systems Perspective. *Sports Medicine (Auckland, N.Z.)*. https://doi.org/10.1007/s40279-025-02380-6

Hopper, S. I., Murray, S. L., Ferrara, L. R., & Singleton, J. K. (2019). Effectiveness of diaphragmatic breathing for reducing physiological and psychological stress in adults: a quantitative systematic review. *JBI Database of Systematic Reviews and Implementation Reports*, *17*(9), 1855–1876. https://doi.org/10.11124/jbisrir-2017-003848

Ille, A., Selin, I., Do, M.-C., & Thon, B. (2013). Attentional focus effects on sprint start performance as a function of skill level. *Journal of Sports Sciences*, *31*(15), 1705–1712. https://doi.org/10.1080/02640414.2013.797097

Khan, S. F. (2025). Building Resilience: Strategies for Mental Strength and Holistic Growth. *Research Journal of Humanities and Social Sciences*, 133–135. https://doi.org/10.52711/2321-5828.2025.00023

Kleine, D., Sampedro[Ddot], R. M., & Melo[Ddot], S. L. (1988). Anxiety and performance in runners: Effects of stress and anxiety on physical performance. *Anxiety Research*, *1*(3), 235–246. https://doi.org/10.1080/08917778808248722

Lardon, M. T., & Fitzgerald, M. W. (2013). *Performance Enhancement and the Sports Psychiatrist*. 132–146. https://doi.org/10.1002/9781118404904.ch13

Leblanc, S., Uzun, B., Aydemir, A., & Mohiyeddini, C. (2019). Validation of an Emotion Regulation Training Program on Mental Well-Being. In *Psychological Reports* (Vol. 123, Issue 5, pp. 1518–1536). Sage. https://doi.org/10.1177/0033294119878399

Lopes, G. C. D. (2024). The Influence of psychology on sports performance: emotional and cognitive factors. *South Florida Journal of Development*, *5*(11), e4683. https://doi.org/10.46932/sfjdv5n11-038

Ma, X., Yue, Z.-Q., Gong, Z.-Q., Zhang, H., Duan, N.-Y., Shi, Y.-T., Wei, G.-X., & Li, Y.-F. (2017). The Effect of Diaphragmatic Breathing on Attention, Negative Affect and Stress in Healthy Adults. *Frontiers in Psychology*, *8*(756). https://doi.org/10.3389/fpsyg.2017.00874

Nicholls, A. R. (2017). *Psychology in Sports Coaching*. Routledge. https://doi.org/10.4324/9781315203836

Nideffer, R. M. (2021). *Anxiety, Attention, and Performance in Sports: Theoretical and Practical Considerations* (pp. 117–136). Taylor Francis. https://doi.org/10.4324/9781315781594-10

Ojo, Y. (2024). *Ethical Considerations in Using AI for Mental Health Diagnosis and Treatment Planning: A Scoping Review*. 169–180. https://doi.org/10.52968/15065557

Q Tablizo, A., Biado, D., S Crispino, H., Avon Lee, M., & Kemboi, P. (2018). Touching the Finish Line: Predictors of Motivation Among Long Distance Elite Runners (Exploring Sports Psychology). *PEOPLE: International Journal of Social Sciences*, *4*(2), 416–427. https://doi.org/10.20319/pijss.2018.42.416427

Schinke, R., & Moore, Z. E. (2011). Culturally Informed Sport Psychology: Introduction to the Special Issue. *Journal of Clinical Sport Psychology*, *5*(4), 283–294. https://doi.org/10.1123/jcsp.5.4.283

Stavrou, N. A., Jackson, S. A., Zervas, Y., & Karteroliotis, K. (2007). Flow Experience and Athletes' Performance with Reference to the Orthogonal Model of Flow. *The Sport Psychologist*, *21*(4), 438–457. https://doi.org/10.1123/tsp.21.4.438

Storm, L. K., & Larsen, C. H. (2020). *Context-driven sport psychology* (pp. 73–83). Routledge. https://doi.org/10.4324/9781315187259-6

Swain, A. (1990). Interrelationships Among Multidimensional Competitive State Anxiety Components As A Function Of The Proximity Of Competition. *Perceptual and Motor Skills*, *71*(8), 1111. https://doi.org/10.2466/pms.71.8.1111-1114

Swain, A., Jones, G., & Cale, A. (1990). Interrelationships among Multidimensional Competitive State Anxiety Components as a Function of the Proximity of Competition. *Perceptual and Motor Skills*, *71*(Suppl 3), 1111–1114. https://doi.org/10.2466/pms.1990.71.3f.1111

Takdir, A. M., Darusman, M. R., & Devi, D. F. (2025). Transforming Negative Thoughts into Self-Confidence: The Impact of Cognitive Restructuring on Adolescents. *Journal of Psychological Perspective*, *7*(1), 19–28. https://doi.org/10.47679/jopp.719982025

Thompson-Hollands, J., Sauer-Zavala, S., & Barlow, D. H. (2014). CBT and the future of personalised treatment: a proposal. *Depression and Anxiety*, *31*(11), 909–911. https://doi.org/10.1002/da.22301

Thorat, V. M., & Ambali, M. P. (2024). *Ethical Considerations in Mental Health Data Collection and Analysis*. 429–448. https://doi.org/10.1002/9781394272266.ch20

Torous, J., & Roberts, L. W. (2017). The Ethical Use of Mobile Health Technology in Clinical Psychiatry. *Journal of Nervous & Mental Disease*, *205*(1), 4–8. https://doi.org/10.1097/nmd.0000000000000596

Ulrich, R., & Mattes, S. (1996). Does Immediate Arousal Enhance Response Force in Simple Reaction Time? *The Quarterly Journal of Experimental Psychology Section A*, *49*(4), 972–990. https://doi.org/10.1080/713755672

Velez Sancarranco, M. A. (2026). The Interaction Between Cognitive, Emotional, and Behavioral Processes. *Minerva*, *7*(19), 104–113. https://doi.org/10.47460/minerva.v7i19.276

Whelan, J. P., Epkins, C. C., & Meyers, A. W. (1990). Arousal interventions for athletic performance: Influence of mental preparation and competitive experience. *Anxiety Research*, *2*(4), 293–307. https://doi.org/10.1080/08917777900824873