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Artificial Intelligence Approaches to Psychological Processes, Group Dynamics, and Leadership in Team Sports

Takım Sporlarında Psikolojik Süreçler, Grup Dinamiği Ve Liderlik Üzerine Yapay Zekâ Yaklaşımları

Zekai Çakır[1], Fatih Çatıkkaş[2]

[*1]Faculty of Sport Sciences, Bayburt University, Bayburt, Türkiye, zekaicakir@gmail.com / Orcid: 0000-0002-7719-1031

[*2]Faculty of Sport Sciences, Manisa Celal Bayar University, Manisa, Türkiye, fatihcatikkas@gmail.com / Orcid: 0000-0003-4105-2029

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Özet

Spor, yalnızca fiziksel performansın ön planda olduğu bir faaliyet alanı olmaktan çıkmış; psikolojik süreçler, grup dinamikleri, liderlik tarzları ve teknolojik yeniliklerle bütünleşmiş çok boyutlu bir yapı hâline gelmiştir. Özellikle takım sporlarında başarı, teknik kapasite ve fiziksel yeterlilikten öte; iletişim, iş birliği, güven, rol paylaşımı, motivasyon ve liderlik gibi psikososyal faktörlerin bir araya gelmesiyle şekillenmektedir. Son yıllarda yapay zekâ (YZ) ve makine öğrenmesi (MÖ) temelli yaklaşımlar, spor bilimlerinde performans analizlerinin yanı sıra grup dinamiği ve liderlik mekanizmalarının anlaşılmasına da önemli katkılar sunmaktadır. Çakır, Ceyhan, Gönen ve Erbaş (2023) YZ'nin spor alanında veri temelli karar alma süreçlerinde paradigma değişimi yarattığını; Ceyhan ve Çakır (2021) ile Çakır, Gönen ve Ceyhan (2022) ise dijital ortamların grup davranışları ve sosyo-psikolojik etkileşimleri dönüştürdüğünü ortaya koymaktadır. Hareket sensörleri, giyilebilir teknolojiler, sosyal ağ analizi, doğal dil işleme ve yüz/ses analizi gibi yöntemlerle elde edilen büyük veriler, takım içi etkileşimler, liderlik tarzlarının etkinliği ve psikolojik süreçlerin nesnel biçimde incelenmesine olanak sağlamaktadır (Gudmundsson, Horton & Holm, 2017; Lee & Kang, 2024). Bu bağlamda YZ, motivasyon, stres yönetimi, uyum ve grup bağlılığı gibi görünmez fakat kritik süreçlerin analizinde önemli bir araç hâline gelmiştir. Bununla birlikte, yapay zekânın sunduğu nesnel veri analizleri spor psikolojisi araştırmalarına yeni bir paradigma kazandırsa da, insan merkezli liderliğin yerini alamayacağı vurgulanmaktadır. Spor özünde insan ilişkilerine dayalı olduğundan, etik duyarlılık, empati ve koçlukta "insan dokunuşu" önemini korumaktadır. Bu nedenle YZ'nin, takım sporlarında liderlik ve grup dinamiğini destekleyici, güçlendirici bir araç olarak değerlendirilmesi gerekmektedir.

Anahtar Kelimeler: Takım Sporları, Grup Dinamiği, Liderlik, Psikolojik Süreçler, Yapay Zekâ

Abstract

Sports have evolved beyond being a domain centered solely on physical performance, emerging instead as a multidimensional field where psychological processes, group dynamics, leadership styles, and technological innovations intersect. In team sports in particular, success cannot be explained merely by technical capacity or physical fitness; rather, it is shaped by a combination of psychosocial factors such as communication, cooperation, trust, role distribution, motivation, and leadership. In recent years, artificial intelligence (AI) and machine learning (ML) approaches have provided valuable contributions not only to performance analysis but also to the understanding of group dynamics and leadership mechanisms within sport sciences. Çakır, Ceyhan, Gönen, and Erbaş (2023) emphasize that AI has initiated a paradigm shift in data-driven decision-making, while Ceyhan and Çakır (2021) and Çakır, Gönen, and Ceyhan (2022) highlight the transformative role of digital environments in reshaping group behavior and socio-psychological interactions. The integration of large-scale data derived from motion sensors, wearable technologies, social network analysis, natural language processing, and facial/voice recognition enables objective and multidimensional assessments of intra-team interactions, leadership effectiveness, and psychological processes (Gudmundsson, Horton, & Holm, 2017; Lee & Kang, 2024). In this regard, AI serves as a critical tool for analyzing often-invisible yet decisive processes such as motivation, stress management, cohesion, and group adaptation. Nevertheless, while AI introduces a new paradigm by enhancing objectivity and scalability in sport psychology research, it cannot fully replace human-centered leadership. As sport is inherently grounded in human relationships, ethical sensitivity, empathy, and the "human touch" in coaching remain indispensable. Therefore, AI should be regarded not as a substitute but as a supportive instrument that strengthens leadership and group dynamics in team sports.

Keywords: Team Sports, Group Dynamics, Leadership, Psychological Processes, Artificial Intelligence

Giriş

Physical education and sport represent an educational domain that extends beyond mere physical development, contributing to the multidimensional growth of the individual through psychological, social, and cognitive dimensions. Arıcı (2006) highlights the psychological foundations of sport, emphasising its role in fostering self-confidence, motivation, attention, and coping mechanisms for stress. Similarly, Balcıoğlu, Yıldırım, and Sevim (2005) draw attention to the multidisciplinary structure of sport sciences, noting that physical education intersects with fields such as physiology, biomechanics, and training science. In this respect, it enhances motor skills and promotes social adaptation and cognitive capacity. Thus, sport transcends being a domain where physical performance is foregrounded; it evolves into a multidimensional social structure in which psychological processes, group dynamics, leadership mechanisms, and technological innovations are deeply intertwined. Over the past two decades, the global sports industry has demonstrated remarkable growth, exceeding 1 trillion USD in economic magnitude and engaging billions of spectators worldwide (Matthews et al., 2012; Le et al., 2017). This economic expansion does not remain confined to income and employment but also underscores sport's significant impact on identity formation, social integration, education, and health. Within this broad framework, team sports stand out as an arena in which individual abilities merge with collective processes and where psychological and social dynamics are most vividly observed.

Unlike individual disciplines, team sports render it impossible to account for success solely through technical capacity or physical competence. Instead, success emerges from converging multiple psychosocial factors, including communication, cooperation, trust, role allocation, motivation, and leadership styles among players (Carron, Bray & Eys, 2002). Accordingly, team sports offer a rich research context for examining group dynamics, psychological processes, and leadership mechanisms. A team's success is shaped not only by the players' physical preparation but also by adopting common goals, preserving morale under pressure, and strategically adapting to changing circumstances. Leadership, in particular, emerges as a critical element that builds team culture, manages conflicts, and strengthens resilience within competitive environments.

In recent years, advancements in computer science have increasingly facilitated the integration of artificial intelligence (AI) and machine learning (ML) into sports. Developments in AI have transformed sports science by enhancing not only performance analysis but also the understanding of psychological processes, group dynamics, and leadership mechanisms. Indeed, Çakır, Ceyhan, Gönen, and Erbaş (2023) argue that AI constitutes a paradigm shift in education and sport, empowering data-driven decision-making processes. This transformation extends to studying psychological processes such as motivation and commitment within team sports. Ceyhan and Çakır (2021) demonstrate that individuals' psychological experiences in digital environments decisively influence group behaviours and social interaction patterns, suggesting that athletes' roles within teams can be assessed more objectively through AI-based analyses. Similarly, Çakır, Gönen, and Ceyhan (2022) identify that metaverse awareness reshapes socio-psychological interactions among sport sciences students, highlighting the utility of digital environments for examining group dynamics and leadership processes. Moreover, Çakır (2022) reveals the influence of e-bullying and e-victimisation on intra-group relations, underscoring the determining role of digital interactions in shaping social roles and conflicts. These findings collectively illustrate that AI-driven analyses can contribute to performance evaluation and deeper insights into group dynamics, leadership styles, and psychological adjustment in team sports.

The proliferation of motion sensors, wearable technologies, video-tracking systems, and biometric measurements has enabled the collection of vast data sets, thereby allowing multidimensional analyses of physical performance and behavioural processes (Gudmundsson, Horton & Holm, 2017).

Within this context, AI-based methods are employed across a broad spectrum: from mapping intra-team communication networks via social network analysis, to monitoring athletes' stress levels through sentiment analysis algorithms; from forecasting the effectiveness of leadership styles via computational modelling, to informing strategic decision-making processes with data-driven insights (Lee & Kang, 2024).

These innovations transcend the boundaries of traditional sport psychology research. Given the limited generalizability of self-report surveys and small-scale observational studies, AI's capacity to detect latent patterns in large, heterogeneous data sets introduces objectivity and scalability into research on sport psychology and leadership. Consequently, the analysis extends beyond performance metrics to encompass critical yet often invisible processes such as team cohesion, motivation, stress management, and intra-group interactions.

This study aims to elucidate the role of AI-based approaches in examining psychological processes, group dynamics, and leadership mechanisms within team sports. The study seeks to provide a conceptual framework for future research by conducting an in-depth analysis of existing literature. In doing so, it positions itself at the intersection of sport sciences, psychology, and artificial intelligence, with the dual objective of contributing to theoretical discourse and practical applications while paving new pathways toward sustainable success.

GROUP DYNAMICS AND TEAM SPORTS

The Concept of Group Dynamics

Group dynamics refers to the study of interactions, roles, norms, and relationships among individuals within a group. The concept was first introduced by Kurt Lewin, who sought to explain how groups are formed, develop, and function (Lewin, 1947). According to Lewin, a group is not merely a collection of individuals but a system characterised by interdependence among its members. This perspective underscores that the behaviours of group members are shaped not solely by individual dispositions but by the structure of the group and its interactions.

Group dynamics encompass leadership, communication, role distribution, norms, and group cohesion (Forsyth, 2018). These dynamics play a decisive role in a group's efficiency, the quality of interpersonal relationships, and its capacity to achieve collective goals. In the Turkish literature, group dynamics is described as a concept that encompasses patterns of interaction among group members, mechanisms for conflict resolution, and the processes through which groups attain common objectives (Eren, 2014).

Group Dynamics in Team Sports

Team sports represent one of the most concrete contexts in which group dynamics can be observed. Teams are composed of individuals who come together to achieve specific goals, and the quality of communication, cooperation, and role allocation among members directly influences team performance and overall success (Carron, Bray & Eys, 2002). Group dynamics are therefore critical in fostering trust, cohesion, shared purpose, and coordination among team members, all essential for collective achievement.

How Does Group Dynamics Emerge in Sports Teams?

Group dynamics is an interdisciplinary concept that examines the structure, functioning, and interactions among members within a group. Sports teams represent one of the most evident social systems where group dynamics can be observed. Team performance is determined by individual abilities and intra-group processes (Friesen, 2012). Three fundamental elements within the group formation process become particularly salient: group norms, roles, and communication structures. Norms represent the behavioural standards accepted by group members, whereas roles define the group's distribution of tasks and responsibilities (Beal et al., 2003). These elements regulate members' expectations, thereby enhancing team cohesion and efficiency.

1. Group Formation: Norms, Roles, and Communication Structures

Group formation refers to individuals coming together and organizing around a shared objective. Several fundamental elements must be established for a group to function effectively and achieve productive outcomes. Group norms, roles, and communication structures are the most critical (Forsyth, 2019).

Group Norms

Group norms are the accepted, shared, and expected standards of behaviour within a group. Such norms may take both written forms (e.g., rules, regulations) and unwritten forms (e.g., traditions, expectations) (Beal et al., 2003). In sports teams, norms encompass various practices, from training discipline and pre-match rituals to respect for teammates and obedience to the coach. Norms are crucial in fostering team cohesion (Shaw, 1981).

Roles

Roles refer to the tasks, responsibilities, and behavioural patterns team members assume. They can be categorized as formal or informal. For instance, in sports teams, formal roles include goalkeeper, defender, forward, or libero, while informal roles may include leader, motivator, or mediator. The roles assumed by athletes significantly shape group dynamics (Beauchamp & Eys, 2014).

Communication Structures

Communication structures refer to the systems that determine the flow of information and interaction among group members. The more open and effective the exchange of information within a group, the higher the cooperation and coordination (Wheelan, 1999). In sports teams, communication structures are shaped by leadership style (e.g., democratic or autocratic), coach–player relationships, team meetings, and feedback mechanisms. Effective communication fosters trust among team members, enables problems to be expressed openly, and facilitates collaboration (Yukl et al., 2019).

Communication is not limited to verbal exchanges; it also occurs through non-verbal means such as body language, written messages, eye contact, and gestures. These forms of non-verbal communication are particularly critical in in-game decision-making and, consequently, in sustaining team dynamics (Carron et al., 1998).

Tuckman's Stages of Group Development

Bruce Tuckman (1965) conceptualised group development as a process unfolding across five stages. This model has been widely applied to understand the evolution of sports teams:

- Forming: Team members come together, become acquainted, and learn about shared objectives. Uncertainty and formal patterns of communication typically dominate this stage.
- Storming: Intra-group conflicts emerge, often concerning role allocation, leadership, or tactical disagreements among players.
- Norming: Conflicts are resolved, group norms become established, and team cohesion strengthens.
- Performing: The team operates at a high efficiency level, focusing collectively on achieving its objectives.
- Adjourning: The process concludes with the season's end or the team's disbanding (Tuckman & Jensen, 1977).

This model provides valuable guidance for coaches in managing the developmental trajectory of teams, and for instance, recognising that natural conflicts during the storming phase can shape effective intervention strategies (Weinberg & Gould, 2023).

Group Cohesion

Group cohesion is a dynamic process that binds members around shared goals and strengthens intra-group bonds (Carron, Brawley & Widmeyer, 1998). Within the field of sport psychology, cohesion is typically examined through two dimensions: task cohesion and social cohesion.

Task Cohesion

Task cohesion refers to the degree to which group members work together to achieve common objectives (Carron & Eys, 1998). In team sports, this concept encompasses tactical coordination, strategic cooperation, and collective goal orientation. For example, the synchronisation displayed by a basketball team in both offensive and defensive organisation exemplifies task cohesion (Filho et al., 2014). Empirical evidence consistently demonstrates a direct link between task cohesion and team performance (McEwan & Beauchamp, 2014).

Social Cohesion

Social cohesion, by contrast, concerns the quality of interpersonal relationships and the strength of social bonds among team members (Dion, 2000). It reflects friendship, mutual respect, and social interaction within the team. For instance, athletes spending time together outside of training or providing one another with emotional support indicates high social cohesion (Beal et al., 2003). However, unlike task cohesion, the influence of social cohesion on performance is more indirect. Excessive social bonding may even hinder performance under certain circumstances (Mullen & Cooper, 1994).

Team Cohesion and Performance

Group cohesion, encompassing task and social dimensions, represents a critical variable within team dynamics. For optimal performance, it is essential to cultivate a balanced development of both task and social cohesion (Mathieu et al., 2015). High task cohesion enables teams to focus on strategic objectives and enhances collective efficiency (Bandura, 1997). Conversely, social cohesion supports members' motivation and resilience, strengthening the team's psychological endurance, particularly under demanding competitive conditions (Hodge et al., 2013).

Leadership in Sport (Coaching Styles)

Leadership is defined as the process of influencing and guiding group members toward the achievement of collective objectives. In this respect, leadership styles constitute a critical determinant of team performance and group dynamics. Within sporting contexts, leadership styles are commonly categorised into three primary types: autocratic, democratic, and laissez-faire (Chelladurai & Saleh, 1980). However, contemporary sport increasingly recognises the significance of transformational leadership and Jowett's coach–athlete relationship model as frameworks for effective leadership practice.

Autocratic Leadership

In autocratic leadership, the leader excludes group members from the decision-making process, unilaterally makes decisions and expects compliance from team members. This centralised style can be effective in situations that demand rapid decision-making; however, long-term, it may undermine athletes' motivation (Chelladurai, 2007). Research indicates this style can be effective in high-stress scenarios, such as critical moments during competition (Horn, 2008).

Democratic Leadership

Democratic leadership involves incorporating athletes into the decision-making process, establishing reciprocal, two-way communication between the leader and team members. Over time, this style fosters greater cohesion and athlete satisfaction (Yukelson, 1997). Meta-analytic findings further reveal that democratic leadership strengthens athletes' self-efficacy beliefs (Chelladurai & Saleh, 1980; Rowold, 2006).

Laissez-Faire Leadership

Laissez-faire leadership is characterised by the leader's minimal involvement in decision-making, leaving choices largely to the group or athletes themselves. This style grants athletes considerable autonomy, with minimal control or guidance from the leader. While it can be advantageous when working with highly motivated and experienced athletes, it often leads to performance deficiencies in groups requiring direction and structure (Chelladurai, 2007; Bass & Riggio, 2006). Among younger or less experienced athletes, the likelihood of adverse outcomes under this style is particularly pronounced (Côté & Gilbert, 2009).

Transformational Leadership

Transformational leadership is an approach whereby the leader mobilizes athletes' intrinsic motivation by articulating a compelling vision, providing inspiration, and emphasizing individualized support, thereby encouraging them to attain higher levels of performance (Bass, 1985). This leadership style is comprised of four key components:

- Idealized Influence: Establishing trust through exemplary behavior.
- Inspirational Motivation: Creating a shared vision and fostering team spirit.
- Intellectual Stimulation: Encouraging innovation and critical thinking.
- Individualized Consideration: Addressing the unique needs of each athlete (Rowold, 2006).

Jowett's Coach–Athlete Relationship Model

Jowett and Ntoumanis (2004) examined the coach–athlete relationship through the framework known as the *"3+1 Cs"*, which consists of four dimensions:

- Closeness: Mutual feelings of love, respect, and trust between coach and athlete.
- Commitment: Both parties' motivation to maintain and develop the relationship.
- Complementarity: The alignment of coach leadership with athletes' responsive behaviors.
- Co-orientation: The extent to which coach and athlete are aware of each other's perceptions of their relationship (Jowett, 2007).

The Impact of Coaching Behaviors on Athlete Psychology

Coaching behaviors and competencies exert a decisive influence not only on athletes' performance but also on their psychological well-being, affecting factors such as enjoyment of sport and potential dropout (Çik & Küçük, 2019). Within sport psychology, the coach's communication style, feedback methods, and leadership behaviors directly shape athletes' perceived support and performance anxiety (Horn, 2008).

Amorose and Horn (2000) demonstrated that supportive and autonomy-enhancing coaching approaches enhance athletes' intrinsic motivation. Similarly, Mageau and Vallerand (2003) found that autonomy-supportive coaching behaviors positively influence athletes' motivation. Conversely, authoritarian or controlling coaching styles have been shown to increase anxiety, diminish self-worth, and reduce motivation among athletes (Bartholomew et al., 2010).

Artificial Intelligence Approaches in the Analysis of Psychological Processes, Group Dynamics, and Leadership in Team Sports

Artificial intelligence (AI) technologies have evolved into powerful tools that extend beyond the analysis of physical performance in sport, enabling a deeper understanding of the multidimensional and dynamic nature of

human behavior. From individual psychological processes to intra-team interactions and leadership styles, AI-supported approaches are providing sport sciences with new perspectives. Within this framework, several key application areas of AI in sport can be highlighted.

The Role of Artificial Intelligence in the Analysis of Group Dynamics and Cohesion

Traditional methods of assessing group dynamics and team cohesion often rely on observational techniques and subjective evaluations. AI technologies, however, introduce objectivity and depth into these processes. Machine learning algorithms, in particular, play a revolutionary role in quantifying intra-team interactions, as well as visualizing patterns of information exchange and levels of social connectedness (Wäsche et al., 2017; Gudmundsson et al., 2018).

AI contributes to this domain through various methods:

Social Network Analysis: AI technologies can identify the frequency and structure of interactions among athletes. For instance, analyses based on passing networks or in-game audio recordings provide critical insights into a team's task cohesion (Clemente et al., 2017).

Natural Language Processing (NLP): In team sports, AI can analyze the emotional tone of athletes' communications with coaches and teammates, thereby offering a means of assessing social cohesion. Detecting positive and negative sentiment contributes to the development of effective conflict management strategies (Pérez-Rosas et al., 2018).

The Use of Artificial Intelligence in Evaluating Leadership and Coaching Styles

The real-time and dynamic assessment of coaching leadership styles is difficult to achieve through traditional methods. However, AI-supported behavioral analyses allow for objective evaluation. AI applies the following techniques in this context:

Facial Expression and Voice Analysis: The emotional tone of coaches' pre-game talks and their facial expressions can be measured. Deep learning models are capable of linking these data to performance outcomes, thereby identifying the most effective leadership behaviors (D'Mello & Kory, 2015).

Optimization of Decision-Making Processes: The impact of coaching leadership styles on team performance can be tested through game statistics and real-time tactical decisions, using simulation models. Reinforcement learning algorithms, for instance, can predict the long-term effects of different leadership strategies.

In addition, AI technologies can integrate with wearable devices (e.g., smart bracelets) to monitor athletes' stress levels and physiological responses (e.g., heart rate, galvanic skin response) during interactions with coaches (Kosinski et al., 2016). Compliance with coaching instructions can be evaluated through motion sensors and computer vision techniques (Memmert et al., 2017). Furthermore, analyses of athletes' language use in social media posts or post-training interviews can serve to monitor their psychological states, enabling early detection of athletes at risk of burnout (Chaspari et al., 2018).

Conclusion

Team sports embody a structural complexity that cannot be reduced solely to individual skill, physical fitness, or technical knowledge. By their very nature, they represent social systems in which interpersonal interactions are most vividly experienced. Consequently, success is far more than the aggregate of players' individual talents and performances. A team's achievements on the field are directly tied to the quality of its group dynamics—trust among players, the presence of effective communication channels, the fair distribution of roles and responsibilities, collective motivation toward shared goals, and the capacity for strategic adaptation. Viewed from this perspective, team sports are not merely arenas of physical display but dynamic social laboratories in which psychological processes and leadership mechanisms are intricately intertwined.

In recent years, the advancement of artificial intelligence (AI) technologies has introduced a paradigm shift in the methods used to examine this multidimensional structure of team sports. Traditional sport psychology research has typically relied on observation, self-report surveys, or small-scale sampling. By contrast, AI-based approaches allow for the analysis of much broader and more heterogeneous data sets. Through social network analysis, for example, the frequency of interactions among athletes and the structure of passing networks can be objectively mapped. Similarly, natural language processing (NLP) techniques enable sentiment analysis of athletes' and coaches' communications, thereby providing empirical measures of social cohesion. Furthermore, analyses of facial expressions and vocal tones reveal the immediate psychological impact of leadership styles and communication strategies, while biometric data obtained from wearable technologies (e.g., heart rate, stress levels, sleep patterns) facilitate early monitoring of athletes' psychological well-being. In this regard, AI has become not merely a performance-enhancing tool but also a critical support system for identifying motivational states, commitment, stress management, and risks of burnout among athletes.

Nevertheless, despite these opportunities, the inherently human-centered nature of sport must not be overlooked. Sporting environments are not reducible to datasets processed by algorithms; they are shaped equally by emotions, empathy, values, and ethical decision-making. For instance, the emotional support a coach provides, the empathy displayed during crises, or the human approach to conflict resolution within a team are qualities that no artificial system can fully replicate. As Mageau and Vallerand (2003) argue, leadership effectiveness in sport is not defined solely by strategic direction but also by the capacity to meet athletes' psychological needs, to support their autonomy, and to build relationships grounded in trust. In this sense, AI should be regarded as a tool and a complementary instrument in sport psychology and leadership research, not as a substitute for human-centered leadership.

In conclusion, AI-based technologies represent a significant paradigm shift in understanding both performance and psychological processes within team sports. However, this paradigm must be contextualized within the recognition that human relationships, ethical sensitivities, and emotional dimensions cannot be disregarded. The true strength of AI lies in its capacity to serve as a supportive mechanism for human-centered leadership and group dynamics, to enhance decision-making processes, and to render visible the otherwise invisible psychological processes at play. Harnessing technological advancements without neglecting the human dimension of sport represents the most balanced and sustainable pathway for both individual athlete development and collective team success.

References

Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. Journal of sport and exercise psychology, 22(1), 63-84.

Arıcı, H. (2006). *Beden Eğitimi ve Sporun Psikolojik Temelleri*. Nobel Yayınları.

Balcıoğlu, İ., Yıldırım, H., & Sevim, Y. (2005). *Beden Eğitimi ve Spor Bilimleri*. Gazi Kitabevi.

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. Personality and social psychology bulletin, 37(11), 1459-1473.

Bass, B. M. (1985). Leadership and performance beyond expectations.

Beal, D. J., Cohen, R. R., Burke, M. J., & McLendon, C. L. (2003). Cohesion and performance in groups: A meta-analytic clarification of construct relations. *Journal of Applied Psychology*, 88(6), 989–1004.

Beauchamp, M. R., & Eys, M. A. (2014). Group dynamics in exercise and sport psychology. Routledge.

Carron, A. V., Bray, S. R., & Eys, M. A. (2002). Team cohesion and team success in sport. *Journal of Sports Sciences, 20*(2), 119–126. https://doi.org/10.1080/026404102317200828

Carron, A. V., Hausenblas, H. A., & Eys, M. A. (1998). Group dynamics in sport.

Ceyhan, M. A., & Çakir, Z. (2021). Examination of Fear of Missing Out (FOMO) States of Students Who Study at the School of Physical Education and Sports in Terms of Some Variables. *Education Quarterly Reviews*, *4*(4), 419-427. https://doi.org/ 10.31014/aior.1993.04.04.404

Chaspari, T., Tsiartas, A., Stein, L. I., Cermak, S. A., & Narayanan, S. S. (2014). Sparse representation of electrodermal activity with knowledge-driven dictionaries. IEEE Transactions on Biomedical Engineering, 62(3), 960-971.

Chelladurai, P. (2007). Leadership in sports. Handbook of sport psychology, 111-135.

Chelladurai, P., & Saleh, S. D. (1980). Dimensions of leader behavior in sports: Development of a leadership scale. Journal of Sport and Exercise Psychology, 2(1), 34-45.

Côté, J., & Gilbert, W. (2009). An integrative definition of coaching effectiveness and expertise. International journal of sports science & coaching, 4(3), 307-323.

Çakır, Z. (2022). Spor lisesi öğrencilerinin e-zorbalık ve e-mağduriyet davranışlarına yönelik tutumlarının incelenmesi, International Journal of Eurasia Social Sciences (IJOESS), 13(48), 656-671. http://dx.doi.org/10.35826/ijoess.3169

Çakır, Z., Ceyhan, M. A., Gönen, M., Erbaş, Ü. (2023). Yapay Zeka Teknolojilerindeki Gelişmeler ile Eğitim ve Spor Bilimlerinde Paradigma Değişimi. Dede Korkut Spor Bilimleri Dergisi, 1(2), 56-71. https://dergipark.org.tr/tr/pub/dksbd/issue/82087/1399742

Çakır, Z., Gönen, M., & Ceyhan, M. A. (2022). Spor bilimleri fakültesi öğrencilerinin metaverse farkındalıklarının incelenmesi. *CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi*, *17*(2), 406-418. https://doi.org/10.33459/cbubesbd.1179009

Çik, B., & Küçük, V. (2019). Sporcular tarafından algılanan antrenör davranışlarının bazı değişkenlere göre incelenmesi. Eurasian Research in Sport Science, 4(1), 7-17. https://dergipark.org.tr/en/pub/eriss/issue/46550/584369

Dion, K. L. (2000). Group cohesion: From" field of forces" to multidimensional construct. *Group Dynamics: Theory, research, and practice*, *4*(1), 7.

D'mello, S. K., & Kory, J. (2015). A review and meta-analysis of multimodal affect detection systems. ACM computing surveys (CSUR), 47(3), 1-36.

Eren, E. (2014). *Örgütsel Davranış ve Yönetim Psikolojisi*. İstanbul: Beta Yayıncılık.

Filho, E., Dobersek, U., Gershgoren, L., Becker, B., & Tenenbaum, G. (2014). The cohesion–performance relationship in sport: A 10-year retrospective meta-analysis. *Sport Sciences for Health, 10*, 165-177.

Forsyth, D. R. (2019). Group dynamics. Cengage Learning.

Friesen, A. (2012). Group dynamics in sport (4th ed.). Journal of Sports Sciences, 30(10), 1073. https://doi.org/10.1080/02640414.2012.685617

Gudmundsson, J., Horton, M., & Holm, S. (2017). Computational methods for analyzing and modeling team sports. *ACM Computing Surveys*, *50*(4), 1–34. https://doi.org/10.1145/3117801

Hodge, K., Henry, G., & Smith, W. (2014). A case study of excellence in elite sport: Motivational climate in a world champion team. The Sport Psychologist, 28(1), 60-74.

Horn, T. S. (2008). Coaching effectiveness in the sport domain.

Jowett, S. (2007). Interdependence analysis and the 3+1 Cs in the coach-athlete relationship. In S. Jowett & D. Lavallee (Eds.), *Social psychology in sport* (pp. 15–27). Champaign, IL: Human Kinetics.

Kosinski, M., Wang, Y., Lakkaraju, H., & Leskovec, J. (2016). Mining big data to extract patterns and predict real-life outcomes. Psychological methods, 21(4), 493.

Le, H., Yue, Y., Carr, P., & Lucey, P. (2017). Data-driven ghosting using deep imitation learning. *Proceedings of the MIT Sloan Sports Analytics Conference*.

Lee, H., & Kang, S. (2024). Artificial intelligence applications in team sports: A systematic review. *Frontiers in Sports and Active Living, 6,* 145621. https://doi.org/10.3389/fspor.2024.145621

Lee, S., & Kang, M. (2024). A Data-Driven Approach to Predicting Recreational Activity Participation Using Machine Learning. *Research Quarterly for Exercise and Sport*, *95*(4), 873-885.

Lewin, K. (1947). Frontiers in group dynamics: Concept, method and reality in social science; social equilibria and social change. Human relations, 1(1), 5-41

Mageau, G. A., & Vallerand, R. J. (2003). The coach–athlete relationship: A motivational model. Journal of sports science, 21(11), 883-904.

Matthews, P., Ramchurn, S. D., & Jennings, N. R. (2012). Human-agent collaboration for disaster response. *Autonomous Agents and Multi-Agent Systems, 25*(1), 1–40. https://doi.org/10.1007/s10458-012-9207-2

McEwan, D., & Beauchamp, M. R. (2014). Teamwork in sport: A theoretical and integrative review. *International review of sport and exercise psychology*, *7*(1), 229-250.

Memmert, D., Lemmink, K. A., & Sampaio, J. (2017). Current approaches to tactical performance analyses in soccer using position data. Sports medicine, 47(1), 1-10.

Mullen, B., & Copper, C. (1994). The relation between group cohesiveness and performance: An integration. *Psychological bulletin*, *115*(2), 210.

Price, M. S., & Weiss, M. R. (2013). Relationships among coach leadership, peer leadership, and adolescent athletes' psychosocial and team outcomes: A test of transformational leadership theory. *Journal of Applied Sport Psychology, 25*(2), 265–279. https://doi.org/10.1080/10413200.2012.725703

Rowold, J. (2006). Transformational and transactional leadership in martial arts. Journal of applied sport psychology, 18(4), 312-325.

Shaw, M. E. (1981). Group dynamics: The psychology of small group behavior. McGraw-Hill.

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological Bulletin*, 63(6), 384–399.

Tuckman, B. W., & Jensen, M. A. C. (1977). Stages of small-group development revisited. *Group & Organization Studies*, 2(4), 419–427.

Wäsche, H., Dickson, G., Woll, A., & Brandes, U. (2017). Social network analysis in sport research: an emerging paradigm. European Journal for Sport and Society, 14(2), 138-165. https://doi.org/10.1080/16138171.2017.1318198

Weinberg, R. S., & Gould, D. (2023). *Foundations of sport and exercise psychology*. Human kinetics.

Wheelan, S. A. (1999). *Creating effective teams: A guide for members and leaders*. Sage.

Yukelson, D. (1997). Principles of effective team building interventions in sport: A direct services approach at Penn State University. *Journal of applied sport psychology*, *9*(1), 73-96. https://doi.org/10.1080/10413209708415385

Yukl, G., Mahsud, R., Prussia, G., & Hassan, S. (2019). Effectiveness of broad and specific leadership behaviors. *Personnel Review*, *48*(3), 774-783.