INCORPORATING DEVELOPMENTAL PSYCHOLOGY TO ENHANCE HIGH SCHOOL STRENGTH TRAINING

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The high school strength setting offers unique potential for long-term development—not only of the athlete, but also of the human. External environmental factors matter, of course. Peer relationships, for example, play a major role in the transmission and retention of lessons (28). Researchers in the field have noted that life skills developed through sport depend on environments that support such development and note that of all the external variables, coaches might be the most influential (7,20). For coaches who embrace this opportunity, their professional understanding should go beyond strength and conditioning training and incorporate an understanding of psychological principles that are pertinent during adolescence.

High school sports contain various components that align with high retention and engagement for students. The athletics setting includes factors that activate an array of brain regions that have been positively correlated with memory and engagement, such as novelty (40), goal-directed behavior (17), powerful social influences (23), exercise-induced neural enhancement (48), and thoughtful mentors and coaches (32). The weight room contains all those components, with a few important additions. Training for sport offers a similar atmosphere over a longer timeline, assuming a nine-month offseason for a three-month sport season. During an offseason training effort, the motivation of an upcoming season is still present, but the environment is relieved of the performance pressures that are commonly experienced by in-season athletes at both youth and advanced athletes (41,47). Research has highlighted the impact of psychological stress on muscular recovery from resistance training, as well as other concerns (44). In ideal circumstances, the weight room can create a supportive, growth-based experience that accounts for developmentally-appropriate social and character enhancement under the guidance of a dedicated coach.

The psychological development of young athletes is a factor not only in athletic performance, but also in long-term mental health and well-being. Models of youth sport have evolved in a way that appears to overemphasize achievement, often at the expense of the athlete's long-term development. This narrow focus, which can encourage early specialization and outcome-focused competition, has been linked to various psychological challenges that can undermine athletic and personal growth. Research indicates that early specialization, where athletes concentrate on a single sport at a young age, can lead to physical overtraining injuries, unnecessary psychological strain, and reduced enjoyment (47). Additionally, early specialization can contribute to issues such as burnout (5,23,39), anxiety, and depression (21,26). The pressures of youth sports, including intense training regimens, competitive performance demands, and early exposure to the win-at-all-costs mentality, can interfere with normal developmental processes, leading to emotional distress and decreased motivation (36,41). Declining sport participation during late childhood or early adolescence is often attributed to high stress, overburdened schedules, and lack of enjoyment (15,33).

In recent years, the growing recognition of mental health challenges among adolescent athletes has prompted calls for a shift toward more comprehensive models of athlete development. Athletes who burnout are at a higher risk of mental health difficulties, including depression and anxiety, and these issues can persist into adulthood (18). Moreover, the developmental experiences of adolescence have a lasting impact on future outcomes, including career satisfaction and mental health in later life (21,25).

The adolescent experience in sport is a complex intersection of personal identity, social relationships, and mental health. By promoting skills beyond sport-specific performance, such as resilience, emotional regulation, and self-awareness, coaches can better equip athletes to manage the psychological demands of their athletic careers and their lives beyond sport (9). In the wake of this understanding, long-term athlete development (LTAD) approaches have become increasingly common (2). The United States Olympic and Paralympic Committee (USOPC) leads the way with its Athlete Development Model (ADM), which inspired ADM frameworks from the national governing bodies of individual sports like USA Hockey, USA Wrestling, and USA Triathlon (45). The National Strength and Conditioning Association (NSCA) has a thoughtful approach to this work, as explained in a 2016 position statement that includes psychosocial components of health, growth mindset, and self-determination (27). These models are valuable and they can significantly benefit from incorporating foundational knowledge in developmental psychology and associated approaches to healthy development. Equipped with that understanding, coaches can develop not only physical and tactical skills, but also health and well-being, factors that last long after the athlete's career has ended.

It is a common opinion that sports teach life lessons. While life lessons are possible, positive outcomes are not guaranteed. Empowering coaches to support athletes in navigating their sporting careers and the complex emotional challenges of adolescence can lead to more resilient and well-rounded individuals who are better prepared for life both in and out of sport. This article aims to equip coaches with an increased understanding of developmental psychology, as well as provide a few strategies that might be helpful in those efforts.

THE IMPORTANCE OF INCLUDING DEVELOPMENTAL PSYCHOLOGY IN A HIGH SCHOOL SETTING

The scope of a coach includes performance psychology; every conversation regarding motivation, work ethic, teamwork, or navigating performance anxiety can be examined through psychology. A field of research has burgeoned in recent years that focuses on the potential of lessons learned in the athletic

experience to transfer into other areas of life (20,28). Coaches aiming at life lessons have an additional opportunity to recognize that they are influencing young people during a certain stage of development. Understanding an athlete's developmental stage offers enhanced potential for the coach to meet the athlete where they are and effectively prepare them for what is to come. While it would be outside the scope of the coach to be an expert in the field of developmental psychology, it seems increasingly important that they at least be aware of it. This article includes research-based theory and practical strategies to engage with athletes in a particularly important developmental stage.

One entry point to a deeper understanding of developmental psychology is through the work of Erik Erikson. Erikson's theories have profoundly influenced the fields of psychology and education by providing a framework for understanding personal growth and the development of identity throughout life. In 1950, Erikson wrote *Childhood and Society*, wherein he outlined the eight stages of psychosocial development (16). His work continues to be a cornerstone of the field, influencing theory and practice for over 70 years.

While this article focuses on adolescents, it is helpful to note that high school athletes have been through, and will go through, stages of development from infancy to late adulthood, each one marked by a central conflict. The stages begin with trust versus mistrust (0 – 1 year), autonomy versus shame and doubt (1 – 3 years), initiative versus guilt (3 – 6 years), industry versus inferiority (6 – 12 years), identity versus role confusion (12 – 18 years, high school), intimacy versus isolation (18 – 40 years), generativity versus stagnation (40 – 65 years), and integrity versus despair (65+ years). Though there is wiggle room at the boundaries of the stages, they continue to be a primary guide in the world of developmental psychology, as successful resolution of the conflict leads to healthy psychological development, while failure may result in difficulties that can affect future stages (35).

The majority of an athlete's developmental journey aligns with Erikson's fifth stage, identity versus role confusion which spans ages 12 – 18 (Figure 1) (35). During this stage, adolescents are heavily influenced by peer groups while navigating various social roles and resolving what Erikson famously termed the "identity crisis" (16). For young athletes, this stage can coincide with the increasing significance of athletic participation, wherein sport becomes a central part of their emerging identity. In this context, the coach serves as both a mentor and a key architect of team culture, playing a critical role in shaping the athlete's personal and athletic development. The coach's influence extends beyond the immediate sporting domain, shaping the trajectory of a young person's future within and beyond the context of sport. Coaches hold the potential to profoundly impact the formation of identity during this pivotal developmental stage.

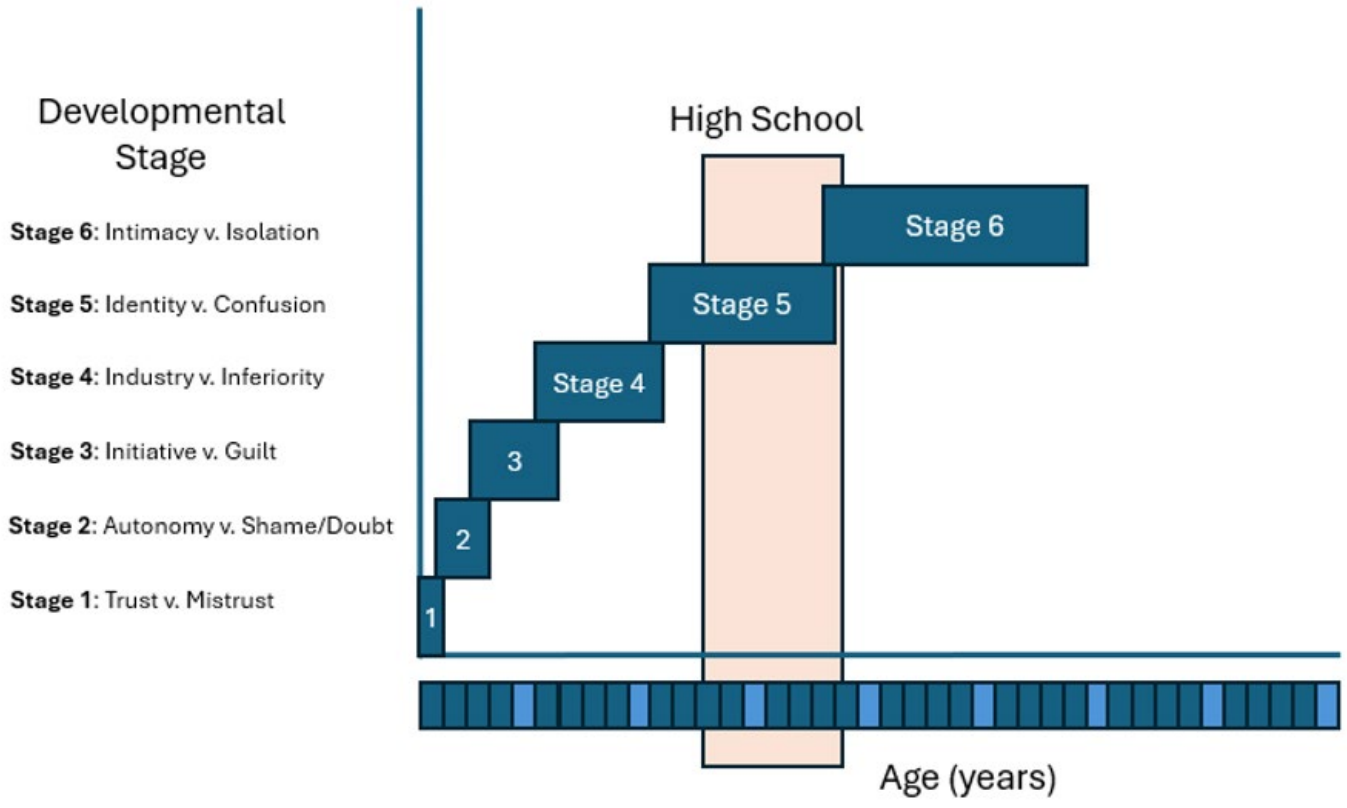

FIGURE 1. ALIGNING THE HIGH SCHOOL ATHLETICS OPPORTUNITY WITH ERICKSON'S STAGES OF DEVELOPMENT

While this article focuses primarily on Erikson's Stage 5, it is important to acknowledge the overlapping influence of the preceding Stage 4, industry versus inferiority (Figure 1). At the intersection of these two stages, young athletes build or, in some cases, diminish their skills and self-confidence. During Stage 4, the core psychological task involves developing a sense of competence. Without appropriate support or opportunities to succeed, a child may transition into Stage 5 carrying feelings of inadequacy or inferiority. Understanding this offers unique insight for a coach who might confuse an athlete's reluctance or hesitation with lack of interest or effort. Awareness and understanding are essential. If left unresolved, this sense of inadequacy can become embedded in their identity, potentially persisting well into adulthood and requiring significant time and effort to unravel (46).

This raises an important question: what does lifelong wellness and fulfillment look like for young athletes? What does a coach mean when they refer to "life lessons?" While athletic achievement may contribute to success and well-being for some, it is critical to consider the broader factors that contribute to lifelong fulfillment beyond sport. At the end of one's time as an athlete, they enter Erikson's Stage 6, intimacy versus isolation, which spans from approximately 18 – 40 years old. Friendships and relationships during this stage will be influenced by the preceding stages. Suppose a sports experience left them with a sense of inferiority (Stage 4) that became entwined in their sense of identity (Stage 5). In that case, they will carry those burdens into the relationships and professional settings of "real life" after sport. If one is poorly equipped to enter Stage 6, they can be left with stagnation, depression, and difficulty with relationships (29,38). Erikson's research suggests that the stages within which high school coaches interact with students will play a powerful role in the next few decades of their life.

If a high school coach wants to optimize the potential of the weight room as a learning environment, they might start by prioritizing the person over the person's role as an athlete. They would then be able to incorporate successful strategies to improve performance, team culture, and the holistic growth of the participants.

STRATEGIES FOR INCORPORATION

The adolescent years are particularly formative, which positions the high school coach to be highly impactful. A thoughtful coach will remember that the environment they create will shape the experience of their athletes. One of the most impactful components of this process is the language used by the coach. The coach's role includes helping young people make sense of their experiences. For example, if a powerlifting coach in a post-meet breakdown blames "bad" calls by the judges as the reason his team lost a competition, then that narrative will be planted in the malleable minds of the athletes. The athletes' self-talk might reflect the notion that the judge was the reason for losing. This will fuel subsequent discussions in the locker room or on the drive home. With this externally facing locus of control, the athletes have decreased agency in future outcomes (6). Instead, coaches can recognize their impact and develop personalized, context-specific strategies to support the development of their athletes.

The coach should focus on individual improvement and self-reflection, rather than social comparison. Comparison is inherent to competitive sport. While comparison can motivate, it can also degrade one's self-concept and individual wellness (1,24). This is especially resonant in high school-aged athletes. As they begin the construction of a personal identity, a strictly comparison-based environment can lead to fixed identities, such as "I am not strong" or "I am not talented" when compared to stronger or more talented athletes. Strength training offers an opportunity to reframe the comparative instinct by limiting performance comparison to previous versions of oneself. This can be accomplished with progress check-ins regarding top sets or best times. For example, the coach might highlight that an athlete has increased their top set by 10 lb, noting that their diligent effort has led to quantifiable improvement. Highlighting training and exercise progress has been linked to increases in self-efficacy (37). Focusing on improvement and the process by which one improves has the potential to foster the celebrated "growth mindset," wherein researchers identify the impact in students who believe their intelligence can be developed (12,13). Equipping adolescents with a sense of agency in this way can be a staple of the training experience.

It is important to frame experiences for transfer. Session introductions and breakdowns offer an opportunity to frame the strength training experience for deep understanding. Often, these moments are used to explain technique, help athletes realize the intention of prescribed movements, and provide motivation. There is additional opportunity to explain how skills learned in the weight room can transfer into other areas of life. These strategies align with previous recommendations by Gould and Carson, who note that framing an experience for transfer should include recognition of the value of the skill, confidence in its ability to transfer, and comprehension of transfer (20). An athlete attempting a max effort back squat must call upon more than just physical ability. The transition phase of the squat is the most challenging part (34). At the bottom of a squat, the athlete could give up under the strain and drop to the safety rails of the rack; however, the athletes who attempt to drive back up despite the challenge, will have demonstrated a worthwhile quality. The coach could ask them to name the quality they enlisted; perhaps it is grit, commitment, or resilience. Next, the coach could ask athletes to imagine another situation wherein the same quality might be helpful. Students might need "commitment" to study through finals or they might need "resilience" to overcome personal challenges. Similar to visualization strategies to improve sports performance, naming the capacity and imagining its future has the potential to activate pre-motor networks in the brain, possibly increasing the likelihood of its later usage (42). Framing these and similar experiences for transfer can be a major benefit to high school athletes.

Through this process, instill awareness, understanding, and intentional use of self-talk. Self-talk is a component of performance enhancement that continues to gain traction through both research and practice. A recent review of "pysching-up" techniques for maximal force production revealed that self-talk was one of the most effective strategies. Motivational self-talk (MST) and physical, environment, task, timing, learning, emotion, and perspective (PETTLEP) methods produced some of the most effective results from the entire literature review (2). Additional studies demonstrate the role of self-talk in resilience and emotional wellness and, in alignment with the central theme at this stage of development, self-identity (19,31). This indicates an opportunity for a coach to tap into a strategy for performance improvement (tuning in to and deliberately cultivating self-talk) and support adolescents in navigating more complex and psychologically valuable ideas, such as the development of personal identity. To do so, the coach should be aware of the language they use around their young athletes. As in the powerlifting coach example, the leader has the power to implant or condition the language of those in their charge (11). Developing a toolkit of self-talk strategies and modeling language that contributes to the effective use of self-talk is important as one constructs self-identity.

It can be helpful to create future visions based on character and approach, rather than exclusive focus on outcomes. The appeal of a starting position, an all-star caliber season, or a championship trophy can be a strong motivator. Start there, but do not end there. Encourage athletes to focus not only on the trophy that might appear after the culmination of their efforts, but on the efforts themselves. The development of an internal locus of control, similar to "personal agency," and characterized by the belief that the source of outcomes is within oneself, has been linked not only to preferential performance outcomes, but to improved self-control and health outcomes (3). The alternative, an external locus of control, creates a heavy reliance on situations and outcomes, wherein external variables are potentially endless (6). This external focus can decrease one's sense of agency. In the context of Erikson's stages, decreased agency can begin a path where inadequacy and inferiority become part of an adolescent's personal identity (16,35). For best outcomes, coaches can ask adolescents to imagine not only the strong, high-performing athlete they hope to be once the season rolls around, but also the resilient, high-character person who might excel in those future moments. Creating a future vision that goes beyond physical performance is essential.

Encourage reciprocal teaching and healthy peer-to-peer accountability. Empower young athletes to provide healthy feedback for one another. By holding each other accountable to technique, high effort, and other standards of the weight room, they learn to communicate around a shared purpose. Reciprocal teaching, which is a process of collaborative dialogue, has been shown to improve comprehension, develop metacognitive skills, encourage participation, enhance social skills, and build confidence (30). Coaching athletes through this process is as valuable as any other coaching application. How to give and receive feedback is a fundamental life skill. In a communal sports environment, social skills are developed alongside a social community (5,14). This might be a guiding factor for the entire training environment, as the study of life lessons through sport continually points to peer impact as a vital component (28). Among varied benefits, healthy peer interaction creates a positive pathway to Stage 6 of development (intimacy versus isolation), wherein communication, in the form of relationship development, is a central theme.

It is important to note that these ethically driven, long-term focused efforts are not the enemy of performance; rather, they can support high performance and improve outcomes in a sustainable way. In a 2022 article from the United States Olympic and Paralympic Committee Coaching Magazine, the author profiled a powerlifting team through the COVID-19 pandemic and following years (10). During that time, wrought with fear and uncertainty, coaches focused on capacities, such as commitment, optimism, and growth mindset. There was no way of knowing how long the pandemic would last or when the team would be able to compete again. They pressed on, focused on internal capacities, trained remotely, and controlled whatever was under their control. They had no comparison, no villainization of opponents, and limited attention on possible outcomes. The results were impressive. In the years following the pandemic, that team won three Illinois State Championships, four Natural Athlete Strength Association High School Nationals Championships, and four USA Weightlifting national competitions. In 2022, USA Weightlifting dubbed them "the strongest school in America." All of this occurred while they focused more on character, community, and healthy development than trophies. It could have been a coincidence, of course; however, if the trophies never appeared, everyone involved would have agreed that the experience was well worth it. Those athletes, trophies in hand or not, had become empowered.

MOVING FORWARD

Coaches can maximize the likelihood of positive outcomes in this powerful space by creating a vision for the sort of person they would like the athlete to become. They should lean into learning about developmental psychology, sport psychology, and the greater conversation of the human condition. They should normalize the incorporation of stage-appropriate strategies. They should have patience and foresight. Coaches should have the intention to teach life lessons through sport and in the weight room.

REFERENCES

1. Arigo, D, Bercovitz, I, Lapitan, E, and Gular, S. Social comparison and mental health. *Current Treatment Options in Psychiatry* 11: 17-33, 2024.

2. Balyi, I, Way, R, and Higgs, C. *Long-Term Athlete Development*. Schaumburg, IL: Sheridan Books; 2013.

3. Botha, F, and Dahmann, SC. Locus of control, self-control, and health outcomes. SSM *Population Health* 25: 101566, 2024.

4. Brancato, K. Burnout in youth sports. Good Athlete Project. *Beyond Strength – Journal of Psychology and Sport*, 2024.

5. Brown, BB, and Larson, J. Peer relationships in adolescence. In: Lerner RM, Steinberg L, editors. *Handbook of Adolescent Psychology*. (2nd ed.) John Wiley & Sons, Inc.; 2009.

6. Caliendo, M, Cobb-Clark, DA, Silva-Goncalves, J, and Uhlendorff, A. Locus of control and the preference for agency. *European Economic Review* 165: 104737, 2024.

7. Camiré, M, Forneris, T, Trudel, P, and Bernard, D. Strategies for helping coaches facilitate positive youth development through sport. *Journal of Sport Psychology in Action* 2(2): 92-99, 2011.

8. Cusimano, K, Freeman, P, Pawaar, J, and Moran, J. The effects of psyching-up on maximal force production: A systematic review. *Strength and Conditioning Journal* 46(4): 468-483, 2024.

9. Danish, SJ, Petitpas, AJ, and Hale, BD. Life development intervention for athletes: Life skills through sports. *Journal of Sport Exercise and Psychology* 15(1): 52-68, 1993.

10. Davis, JD. Leadership, growth, and national championships. *US Olympic and Paralympic Coach Magazine* 33(2): 18-23, 2022.

11. Davis, JD. Using the high order performance framework for effective leadership. *Journal of Character and Leadership Development* 10(3): 77-84, 2023.

12. Dweck, C. Mindsets: Developing talent through a growth mindset. *Olympic Coaching Magazine* 21(1): 4-7, 2009.

13. Dweck, C. Carol Dweck revisits the "growth mindset." *Education Week* 35(5): 20-24, 2015.

14. Eather, N, Wade, L, Pankowiak, A, and Eime, R. The impact of sports participation on mental health and social outcomes in adults: A systematic review and the "Mental Health through Sport" conceptual model. *Systematic Reviews* 12: 102, 2023.

15. Eime, RM, Young, JA, Harvey, JT, Charity, MJ, and Payne, WR. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing the development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity* 10(98): 1-14, 2013.

16. Erikson, EH. *Childhood and Society*. New York, NY: Norton; 1950.

17. Eryilmaz, H, Rodriguez-Thompson, A, and Tanner, AS. Neural determinants of human goal-directed vs. habitual action control and their relation to trait motivation. *Scientific Reports* 7: 6002, 2017.

18. Esopenko, C, Coury, JR, Pieroth, EM, Noble, JN, Trofa, DP, Bottiglieri, TS. The psychological burden of retirement from sport. *Current Sports Medicine Reports* 19(10): 430-437, 2020.

19. Geurts, B. Making sense of self talk. *Review of Philosophy and Psychology* 9(2): 271-285, 2018.

20. Gould, D, Carson, S. Life skills development through sport: Current status and future directions. *International Review of Sport and Exercise Psychology* 1(1): 58-78, 2008.

21. Gould, D, Tuffey, S, and Udry, E. Burnout in competitive junior tennis players: II. The role of competitive goals, perceived parental pressure, and motivational climate. *Sport Psychology* 10(4): 365-382, 1996.

22. Gump C. Now what? Life after sport. *Beyond Strength Journal* 1(1): 16-17, 2024.

23. Irani, F, Muotka, J, and Lyyra, P. Social influence in adolescence: Behavioral and neural responses to peer and expert opinion. *Social Neuroscience* 19(1): 25-36, 2024.

24. Jansen, M, Boda, Z, and Lorenz, G. Social comparison effects on academic self-concepts-Which peers matter most? *Journal of Applied Developmental Psychology* 58(8): 1541-1556, 2022.

25. Knights, S, Sherry, E, and Ruddock-Hudson, M. Investigating elite end-of-athletic-career transition: A systematic review. *Journal of Applied Sport Psychology* 28(3): 291-308, 2016.

26. Kreher, JB, and Schwartz, JB. Overtraining syndrome: A practical guide. *Sports Health* 4(2): 128-138, 2012.

27. Lloyd, RS, Cronin, JB, Faigenbaum, AD, Haff, GG, Howard, R, Kraemer, WJ, et al. National Strength and Conditioning Association position statement on long-term athletic development. *Journal of Strength and Conditioning Research* 30(6): 1491-1509, 2016.

28. Lower-Hoppe, LM, Anderson-Butcher, D, Newman, TJ, and Logan J. The influence of peers on life skill development and transfer in a sport-based positive youth development program. *Journal of Sports Development* 9(15): 1-12, 2021.

29. Malone, JC, Liu, SR, Vaillant, GE, Rentz, DM, and Waldinger, RJ. Midlife Eriksonian psychosocial development: Setting the stage for late-life cognitive and emotional health. *Developmental Psychology* 52(3): 496-508, 2016.

30. Mafarja, N, Mohamad, MM, Zulnaidi, H, and Fadzil, HM. Using of reciprocal teaching to enhance academic achievement: A systematic literature review. *Heliyon* 9(7): e18269, 2023.

31. Mosier, IT. Coaching yourself through: Exploring the relationship between positive self-talk and resilience. *Theses* 2803, 2020.

32. Nabi, G, Walmsley, A, Mir, M, and Osman, S. The impact of mentoring in higher education on student career development: A systematic review and research agenda. *Studies in Higher Education* 1-17, 2024.

33. National Federation of High School Associations. Participation in high school sports registers first decline in 30 years. Published September 5, 2019. Retrieved 2025 from https://www.nfhsnetwork.com.

34. Oliva, V, Novosad, A, Buzgo, G, and Vajda, M. The force-curve in squatting according to performance level. *Journal of Physical Education and Sport* 20(6): 3436-3444, 2020.

35. Orenstein, GA, and Lewis, L. Erikson's stages of psychosocial development. Updated November 7, 2022. In: *StatPearls* [Internet]. Treasure Island, FL: StatPearls Publishing; 2024.

36. O'Sullivan, J. The enemy of excellence in youth sports. January 2015. Changing the Game Project. Retrieved 2025 from https://www.changingthegameproject.com.

37. Pekmezi, D, Jennings, E, and Marcus, BH. Evaluating and enhancing self-efficacy for physical activity. *ACSM's Health and Fitness Journal* 13: 16-21, 2009.

38. Perry, TE, Ruggiano, N, Shtompel, N, and Hassevoort, L. Applying Erikson's wisdom to self-management practices of older adults: Findings from two field studies. *Research on Aging* 37(3): 253-274, 2015.

39. Raedeke, TD, and Smith, AL. Development and preliminary validation of an athlete burnout scale. *Journal of Sport and Exercise Psychology* 26(4): 507-522, 2001.

40. Ramirez Butavand, D, Hirsch I, Tomaiuolo M, Moncada, D, Viola, H, and Ballarini, F. Novelty improves the formation and persistence of memory in a naturalistic school scenario. *Frontiers in Psychology* 11: 48, 2020.

41. Rice, SM, Purcell, R, De Silva, S, Mawren, D, McGorry, PD, and Parker, AG. The mental health of elite athletes: A narrative systematic review. *Sports Medicine* 46(9): 1333-1353, 2016.

42. Ridderinkhof, KR, and Brass, M. How kinesthetic motor imagery works: A predictive-processing theory of visualization in sports and motor expertise. *Journal of Physiology Paris* 109(1-3): 53-63, 2015.

43. Scanlan, TK, and Lewthwaite, R. Social psychological aspects of competition for male youth sport participants: I. A test of the competition evaluation model. *Journal of Sports and Exercise Psychology* 8(1): 25-35, 1986.

44. Stults-Kolehmainen, MA, and Bartholomew, JB. Psychological stress impairs short-term muscular recovery from resistance exercise. *Medicine and Science in Sports Exercise* 44(11): 2220-2227, 2012.

45. U.S. Olympic & Paralympic Committee. American development model: Growing sport excellence in America. Updated 2023. Retrieved 2025 from https://assets.contentstack.io/v3/assets/blt9e58afd92a18a0fc/blt56504605fd45bfd4/66a3cf096a265b3d1e203ef4/ADM_Manual_-_Updated_(2).pdf.

46. Vogel-Scibilia, SE, McNulty, KC, Baxter, B, Miller, S, Dine, M, Frese, FJ. The recovery process utilizing Erikson's stages of human development. *Community Mental Health Journal* 45(6): 405-414, 2009.

47. Walton, CC, Purcell, R, Henderson, JL, Kim, J, Kerr, G, Frost, J, et al. Mental health among elite youth athletes: A narrative overview to advance research and practice. *Sports Health* 16(2): 166-176, 2024.

48. Zou, J, and Hao, S. Exercise-induced neuroplasticity: A new perspective on rehabilitation for chronic low back pain. *Frontiers in Molecular Neuroscience* 17: 1407445, 2024.

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