

## More Than Just Games and Play: Youth Sport as a Means to an End

Sheila Ohlsson Walker, CFA, Ph.D.



Since the beginning of time, regular physical activity – for us human beings and all of our mammalian cousins – has been a central ingredient in the recipe for optimizing mental wellness, physical health, and getting the most bang-for-the-buck from our brains – with an overarching purpose of survival<sup>1-5</sup>. It’s a straightforward evolutionary equation. The biochemical fuel required to optimize the health and functionality of our integrated mind-body system is produced when we exercise both our minds and bodies – in some way, shape or form – every day<sup>6-8</sup>.

Living our best possible lives across the developmental continuum necessitates a central focus on the early years. And here’s why. Prenatal, childhood and adolescent development (defined more recently to extend through age 24) are known “critical” and “sensitive” periods in brain development – marked by peak neurobiological malleability<sup>9-12</sup>. Neural connections peak in early childhood, as the brain discerns what’s necessary for survival (“myelination” speeds these up) and what’s not (“neural pruning” clears these out) – a process that persists at a vastly slower pace across life as new data replaces that which is obsolete<sup>13, 14</sup>.

The potential return on investment (ROI) is greatest during these years. Embedding preventative health behavior, life skills and mindsets that pay individual, multi-generational and societal-level dividends is most seamlessly achieved during childhood and adolescence – when neural plasticity is highest<sup>10, 11, 15-20</sup>. A strong start means better health (behavioral, mental, physical), greater educational attainment, enhanced economic productivity, and other key metrics of thriving<sup>21-24</sup>. Early investment also lowers odds of the most tragic loss of all – when a talented, gifted young person’s *nature is nurtured in the wrong direction – falling through our social safety net only to be caught in our criminal justice system*. This is an incalculable loss to the individual, their family, our society, and our world<sup>25, 26</sup>.

No matter how intractable the challenges, young people can and *do beat the odds* – also *changing the odds for generations to come*. The common thread woven through these inspiring and colorful human tapestries is a trusted, respected, caring adult – one who *meets them where they are, loves them for who they are*, and infuses a sense of *identity* and *value* into their epigenome – helping them *believe* a 2.0 story.

Ecology shapes biology – 24/7 and 365-days-a-year – and our brains, informed by our powerful inner voices, actively rewire around these stories – enhancing the odds that a far-fetched plot line manifests in real life. What’s real in the mind is real in the brain and body – and **BELIEF is a SUPERPOWER** like none other!

Science tells us that transformative change can happen at any age or stage – but childhood and adolescence hold the potential home-run ROI. In the proverbial “village” it takes to support positive holistic development, *especially in today’s day and age*, sport is an underutilized context. Here’s what we can do.

By creating engaging (FUN!) experiences with sport (read: “physical activity”) when neuroplasticity is at its peak, and the developing brain is the most malleable and open to automating (myelinating) *physical literacy* and *transferrable life skills* into long-term habit, intrinsic motivation can carry the developmental ball. Sport is built into the school day (PE class and intermural / intramural play), and during free time, athletics in some form is the *top choice* for the majority – an experience that *feels more like a “pull” than a “push”*<sup>27, 28</sup>.

The “secret sauce” for athlete engagement – 100% of the time – is a great coach and a high-quality coach ⇔ athlete relationship<sup>29, 30</sup>. A relational energy space marked by safety, trust, consistency, caring and mutual respect is Factor #1 in programs that promote Positive Youth Development (The PYD Big 3)<sup>31</sup>. Factor #2: Engagement in activities that build important life skills, and #3: Having real-world, practical opportunities to use these skills as participants and leaders in valued community activities. Factor number three – called “transferrable skills” in the scientific literature – is where the rubber hits the road for sport PYD (SPYD)<sup>32-34</sup>.

Achieving SPYD #3 starts with SPYD#1. Positive coach ↔ athlete relationships are akin to a “psychological magic carpet”, instilling the tangible sense of *identity* and *agency* a young person needs to re-write their story<sup>29, 30, 35, 36</sup>. “Developmental relationships” are priceless assets for young people – particularly our vulnerable youth who need it most – providing bi-directional, health-promoting fuel (oxytocin: the love hormone + serotonin: feel-good neurotransmitter + dopamine: excitement and novelty) for all<sup>29, 37-42</sup>. Moreover, as we operate in dynamic systems of relationships (isolation = health risk of 15 cigarettes/day) where emotions are contagious, the “ripple effect” of upward spiral biochemistry “pays-it-forward” too<sup>43-47</sup>.

Building relationships isn’t easy for everyone, nor is an understanding of child and adolescent development automatically built-in to our brains as we age. However, for our young athletes to thrive, we must innovate our system to develop a new kind of coach – one who approaches the teaching experience as a whole child educator – which inherently requires basic insight into how children grow and learn<sup>48, 49</sup>.

For this vision to unfold in real life, we must create a high-quality, developmentally grounded, sustainable, meaningful and measurable system of coach education across the U.S. – in partnership with a high-quality team invested in the long-term goal of ***youth sport as a means to an end***<sup>49-58</sup>.

## A NEW SPORT STORY, A NEW END GAME & A NEW SYSTEM

COVID-19 tore through the world of sport like a raging, humbling, perspective-altering forest fire. In one fell swoop, the indiscriminate global pandemic dismantled leagues, tournaments, and recreational play alike – activities we once took for granted. Participation rates flatlined for all athletes, of all ages, at all skill levels, in all geographic areas - except for sports like tennis and golf with built-in social distancing protocol.

*Times of great challenge present great opportunity. And COVID has done just this for youth sport.*

After blazing fires, even ones that eviscerate everything in their path, new growth sprouts up – sooner or later – through the earth’s charred crust. Perhaps the vibrant, healthy, bright green chutes bursting from the soil into the sunlight *are a metaphor for what’s possible* in youth sport culture today.

Across many economic sectors, COVID had the effect of accelerating slow-moving change, forcing a re-think and re-do relative to systems that were not serving the very constituencies for which they were designed. It’s time to re-write a sport story that clearly needs a new edition – one in which the final chapter holds a new, innovative, sustainable high-quality system that serves our young athletes as it should.

This requires telling a new scientifically grounded, developmentally framed, humanistic, comprehensive narrative about what youth sport is – and what it is not. If the 1.0 story is about winning at all costs, having access because you live in the right zip code, or ignoring harmful developmental consequences of early sport specialization to pursue a low-odds college scholarship – *the 2.0 story is just the opposite*<sup>59-61</sup>.

The new narrative, fueled by fresh energy and grounded in the science of learning and development, is one of *whole child development through the vehicle of sport*, comprised of separate-but-integrated asset-based themes known to matter more than grades or IQ over the life course.<sup>32, 34, 62-82</sup> They include:

- Wellness and preventative health behavior (emotional-mental-physical)
- Building healthy brains (wire healthy habits when neurobiology is stickiest)
- The 6 C’s of Positive Youth Development (character, confidence, competence, caring, connection and community)
- Social-emotional learning (relationship building and emotion regulation)
- Process-oriented, collaborative, growth mindsets that built grit and collective efficacy
- Self-care/wellness (coaches need “own oxygen masks on first” to maximize capacity/impact)

Coaches who approach sport through the lens of an educator, trained to cultivate relationships that can bolster opportunity for each of our children – regardless of race, ethnicity, culture, gender, gender identity, sexual orientation and religion – can help shape life trajectories our youth choose and deserve<sup>83</sup>.

## MENTAL AND PHYSICAL HEALTH

A good life – one that is active, engaging and purposeful – starts with sound behavioral, mental and physical health. Atop health scaffolds education – inarguably the most effective way to disrupt multi-generational cycles of poverty and adversity. However, “*You can’t educate a child who isn’t healthy, and you can’t keep a child healthy who isn’t educated*” (former U.S. Surgeon General, Dr. Jocelyn Elders), bringing us full circle, reinforcing *public education* – particularly for our marginalized youth – *as a public health issue*.

***If we don’t have our health, we don’t have anything!***

Science conveys a clear story that physical and mental health are, at a molecular level, two sides of the same coin. The very same inflammatory markers and neurotransmitters that confer risk for chronic disease (obesity, cardiovascular disease, Type-2 Diabetes) also influence mental illness (depression, anxiety, and other psychiatric disorders), which increases the odds of high-risk behavior<sup>6, 7 84</sup>. Without the right support at the right time, this combination can become an insidious, irrecoverable downward spiral.

Suffice to say, *nurturing nature in a positive way, particularly during peak neural malleability – is vital* – and exercise is prescription-strength medicine that moves this process along. Physical activity promotes psychological well-being and ameliorates mild-to-moderate anxiety and depression – the two leading categories of mental unwellness in our youth today<sup>39, 78, 79, 85-92</sup>. Exercise is also the top solution for obesity, a health condition affecting 42.4% of U.S. adults and 18.5% of children age 2-19 – exponentially increasing the odds of chronic disease<sup>93-98</sup>. America is home to 4% of the global population and 18% of its body mass, with

90% of our \$17.6 trillion healthcare expenditures going toward chronic physical and mental illnesses – each which can be *partially or entirely prevented* with healthy lifestyle choices and behavior<sup>99,100</sup>.

We must invest early, when the ROI is highest, by cultivating intrinsic motivation for multi-sport participation and building “physically literate” young people who are likelier to stay active for life, are more resilient, and more apt to make healthy choices in other key areas like nutrition and sleep<sup>68-71, 101-106</sup>? The science of learning and development spells out the answer in no uncertain terms: Keep it SAFE, make it FUN – and do this when the brain is at peak plasticity for embedding habits that can last for life<sup>15, 56, 107-111</sup>.

## THE FUN FACTOR, AND WHY IT'S IMPORTANT

Scientific research shows that engagement (FUN!) is the #1 reason kids stick with sport over time – or any after-school activity, for that matter<sup>27,28</sup>. Out of 81 total responses that young athletes report as to why they play sport, winning is squarely in the middle of the pack at #40<sup>112</sup>.

The *FUN FACTOR* of full engagement stimulates “upward spiral” brain chemistry – affecting attention, motivation and learning, and improving recall even many years later – as emotions (the “felt” part of an experience) are the strongest neural wire to memory of them all<sup>113-116</sup>. Neurobiology aside, all the young athlete knows – *and what’s really important in the end* – is the *felt sense* of a positive experience, providing a subconscious motivational pull to stay engaged. The inner voice says: “*It will be **FUN**, let’s **GO!**”*

## YOUTH SPORT AND MULTI-MODAL LEARNING

Imagine that you’re studying for a challenging test. To prepare, you open your book and do a passive read through (one modality) of the exam material. But knowing new learning will be stickier if other senses are recruited to *learn the same material in a different way*, you go on to highlight pertinent information and

annotate in the margins, then draw a figure that conveys the *feel* of the material, then teach a group of imaginary peers, vocalizing key words. Finally - you take a walk, turning the content over in your mind!

Embedding new knowledge using different modalities (reading, writing, and speech), all amplified by brain-fueling exercise biochemistry (walking), creates connections to a new memory using several neural wires – rather than just one. “Multi-modal learning,” as it’s termed in *Mind, Brain, and Education Science*, fosters the kind of “deep learning” that lasts – 180 degrees from that which goes “poof” after the test<sup>117-119</sup>.

**Sport is the very definition of multi-modal learning**, with coaches as powerful educators in their personalized experiential classrooms – the courts, fields, arenas, and rinks across our country<sup>120, 121</sup>. **Focus Follows Fun**<sup>122</sup>, and when “Coaches of Character” create engaging context, and model the very attributes they hope their players will learn, it is evident why athletics is one of the oldest and best-known venues to teach skills, mindsets, and attitudes that foster positive long-term outcomes for young people<sup>48</sup>.

#### THE SCIENCE: BUILDING FLEXIBLE, ADAPTIVE, AND CREATIVE BRAINS

While childhood and adolescence are known “sensitive periods” that present an unparalleled open window for long-term habit formation, “emerging adulthood” (18-25 years) is a hot area of neuroscience – posited to hold similar neural plasticity to adolescence<sup>20, 107, 123, 124</sup>. Exquisite neurobiological malleability is a key theme in the sport story, as coaches can have profound impact during this chapter, for better and worse.

Learning happens everywhere – in and outside of the classroom – and education, broadly, is about preparing our youth for an unknown journey through school, career, and life<sup>125</sup>. And learning happens best when it’s not simply an intellectual idea but has real-world emotional significance<sup>82, 126, 127</sup>. Developing whole human beings with a sense of *identity, agency and purpose* – who can lean into solving intractable problems such as racial injustice, poverty, and discrimination – THAT is the long game for education<sup>34, 35, 128-131</sup>.

Emotionally skilled and knowledgeable coaches can capitalize on *teachable moments* in real-time, seizing opportunities that arise naturally through play and competition to speak openly and honestly about issues of character, equity, morality, social justice – and what it means to be one’s best self regardless of the “W” or “L”. The multi-modal learning context of sport is rich with opportunity for meaningful, emotionally salient conversations on hard topics – wiring young minds for curiosity rather than judgment – embedding flexibility to see shades-of-gray on issues that can calcify into polarizing black-and-white adult truths<sup>34, 130-132</sup>.

The same healthy emotional climates that help wire young brains for nuanced conversations on sophisticated issues – also set conditions for the deep learning that fosters holistic positive development. Coaches who intentionally develop safe and supportive cultures create conditions for lasting learning in wellness (poor health = shaky foundation for everything); emotional intelligence; character, confidence and competence; and stress management – all gifts that just keep on giving across life<sup>30, 73, 133, 134</sup>.

Developing characteristics that show up on the outside, starts with providing learning experiences that shape neural network connectivity and mind-body functionality on the inside<sup>107</sup>. We integrate new knowledge into old – forming a “constructive developmental web” – empowering humans to develop complex skills other mammals cannot<sup>135</sup>. There are specific ways build the kinds of minds that will thrive in the 21<sup>st</sup> century. Our educational system, in its current form, is simply not set up to do this<sup>136</sup>.

Youth sport, however, just may be. Here is some insight into how this might work.

## THE THREE MAJOR NETWORKS AND MEANING MAKING

Neuroscience research reveals three major networks in the brain. The **Executive Control Network** (ECN), ON when our attention is directed OUTWARD; the **Default Mode Network** (DMN), ON when our focus is directed INWARD – reflecting, creating and “connecting the dots”; and third, the **Salience Network**, which *toggles between our inside and outside worlds*, directing our attention to high-priority stimuli as needed<sup>107</sup>.



Our brains are their most *efficient and effective* when the Salience Network is *active* – frequently and organically *synergizing and streamlining crosstalk* between the ECN and the DMN. This cross-pollination gives the brain a larger and more sophisticated data set with which to *make meaning* of life events – perceptions and mental frames that have vital implications for health and human potential. Here’s how this works.

Any discrete experience, whether joyful or taxing, has its own biochemical signature (positive = “upward spiral” or negative = stress response) which infuses into the integrated mind-body system<sup>7, 19, 42, 113, 137</sup>. Our experience of “objective reality” – *and how we make meaning of it* – is a *complex neural construction process* happening in real-time, and similarly – *memory is a cognitive re-construction*, one that is unique to each of us<sup>138-141</sup>. Life can only be viewed through our own personalized “perceptual sunglasses” – with lenses tinted rose-colored-to-cloudy depending on how *nurture has been epigenetically shaped by nature* over time.

Because mindset and meaning-making shape perception, and because what’s *real in the mind is real in the body* at a molecular level, this means: a) our interpretation of *any event* can reinforce the *adaptive neural wiring of resilience or maladaptive wiring of despair*; b) perceptions have molecular-level implications for our health and well-being; c) as emotions are contagious, our wellness has implications for others too; and d) cultivating asset-based perceptual lenses early in life can equip our youth for success<sup>16, 138, 142</sup>.

Can sport build the patterns of connectivity and crosstalk endemic to flexible, relational and growth-oriented minds, ready to meet the unknown challenges of the 21<sup>st</sup> century? The answer is YES – but HOW is another question. Skill development, and how a brain wires up accordingly, differs both *between* “open-skill” (unpredictable, externally-paced) and “closed-skill” (predictable, self-paced) sports, and *within* categories too (e.g. team vs. individual, social dynamics, etc.) in ways scientists are only beginning to understand<sup>143-146</sup>.

With this said, myriad scientific and intuitive factors support the hypothesis that sport can help build minds that instinctively “skate to where the puck is going to be”, in the words of Wayne Gretzky. By providing

positive experiences that fortify *wellness skills, process-oriented learning, resilience, creative thinking, cognitive flexibility and self-regulation* – embedding “the power of the pause” to make good decisions on the fly – these skills build self-efficacy, transfer seamlessly to the workplace, and raise the bar for what’s next.

This is a vision for how sport can help build the healthy, flexible, and adaptive minds that will help our young people not only survive – *but thrive* – in the real world.

## SAFETY FIRST

It is vital to acknowledge that within the sport context the coach-athlete relationship must be cultivated as a sacred and *safe place*, which means **zero tolerance** for emotional, sexual or physical abuse<sup>147</sup>. Safety First is **essential** for young people to take the kinds of risks that allow them to leave their comfort zone, break through perceived limitations, and reach new heights they never dreamed of.

Without **Safety First**, unbuffered childhood adversity – which includes racism, discrimination and bullying – can initiate a powerful inflammatory chain reaction called “the toxic stress response” – which impairs the structure and function of the developing brain, damages the immune system in a way that *at least* doubles odds for 9 of the 10 leading causes of death in the U.S., and higher-yet odds for a range of mental illnesses, high-risk behavior, and learning and behavior problems in school (32x)<sup>25, 148-157</sup>.

If trauma is not offset by positive experience, and the toxic stress response is not neutralized by upward spiral biochemistry, the sympathetic nervous system can get locked in persistent overdrive – the neural shadows of post-traumatic stress disorder whispering “*Fight, Flight or Freeze*”<sup>42, 113, 158-161</sup>. *Moreover, because what’s real is in the mind is real at a molecular level in the body* – the invisible scars of childhood adversity can be deep and lasting – often impacting future generations too<sup>142, 162-167</sup>.

The good news is that coaches can be, *and in many cases are*, the high-quality developmental relationship a young person needs to reset. Part of the *social safety net* our youth need more than ever – particularly those at risk<sup>29</sup>. *Relational wounds require relational healing*, which happens when adults *nurture a young person's nature* in an adaptive, healing, and growth-oriented way<sup>38, 39, 47, 74, 168-170</sup>.

In real life, human development is messy, hard-to-measure and jagged – shaped by specific influences, on a specific individual, in specific ways, at specific times and places – as described in “The Specificity Principle”<sup>12, 171</sup>. Against this idiosyncratic developmental backdrop, all it takes is one moment of authentic, inspiring human connection to shift a life trajectory<sup>17, 35, 47, 171-175</sup>.

When *hope and belief are infused into the epigenome of a young person*, given the *optimistic story science tells about human malleability* – the light of hope is **ALWAYS** on the horizon<sup>30, 174, 176</sup>.

## THE LONG GAME: MOVING FROM SCIENCE TO ACTION

When we understand that science demonstrates, beyond a shadow of a doubt, that *the early years of life – into adolescence and early adulthood – are the most powerful for development*, we also understand the significant opportunity for youth sport to capitalize on this moment in time and change the narrative – and economic story of return on investment – on what engagement over time really means.

The central focus of “rebranding” youth sport at the *start* of life, is to **optimize health and development across life**. This will require unprecedented cross-disciplinary collaboration between education, medicine, public health, social services and advocacy to create a culture that honors sport as a means to an end. Bold, creative and thoughtful strategic initiatives will be required in order to:

- **Be SMART:** Develop Specific, Measurable, Actionable, Realistic and Time-bound strategic goals.
- **Focus on FUN!** Take the emphasis off of winning and losing, place it squarely on engagement.

- Change the Scorecard: Measure what matters. Health, the 6 C's of PYD, social-emotional learning.
- Develop a New Cross-Disciplinary Field in Higher Education: Conferences, symposia, communication.

To create the conditions for our youth to thrive through sport, making it an accessible and affordable human right for all across the United States, we must *prioritize fun over winning*; provide experiences that help athletes not only understand but also FEEL the larger-than-life role regular physical activity, healthy lifestyle habits, behaviors and mindsets can play across life; and educate the key adults in a child's life in a synergistic and accessible manner to get everyone on the same page – supporting their best interests.

## METAPHORICAL TROPHIES

When we have enough distance for philosophical reflection on life in the rearview mirror – the tall trophies and the hurtful disappointments, the wins and losses – the concrete measures of “success” and “failure” fade away. What takes on significance are the *metaphorical trophies* that live on inside of us. The triumphs related to our character – the way we showed up – in big life moments that revealed our integrity, humility, courage, empathy, and kindness – qualities remembered by those who love us most.

These are stories we've carefully authored and nurtured – the ones we believe about ourselves, who we are in the world – and what *was* and *is* possible for us – which include new narratives *we helped others see*, take in, and believe about themselves. **2.0 upgrades that changed their lives.** These trophies vastly outweigh the others in our hearts, minds, bodies and spirits – priceless gifts that no one can ever take away.

Leveraging *sport as a means towards this end*, at this precise moment in time, **would be the biggest win of all.** It is time that we as a community of athletes, parents, coaches, administrators, and policymakers commit to giving our young people the healthy, productive and meaningful lives they choose and deserve. THIS is our True North, and our call to action.

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