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The psychology behind sports performance

Edited by
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The psychology behind sports performance

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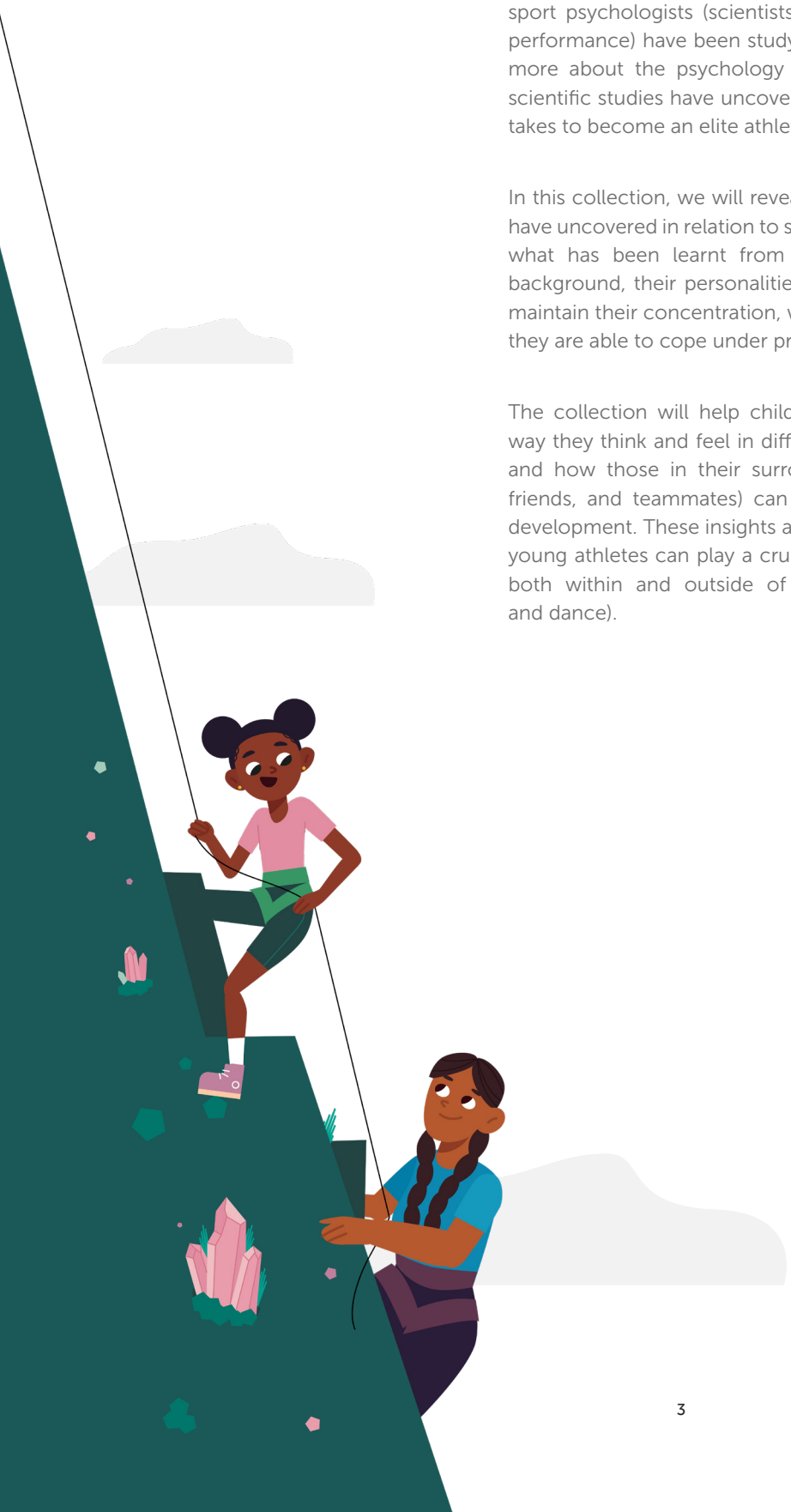
About this collection

Have you ever watched sport on TV and wondered how athletes like LeBron James, Serena Williams, Lionel Messi, Simone Biles, and Virat Kohli are able to perform so well in front of thousands of people? Just the thought of it is enough to make most people throw up and pass out! For over 100 years, sport psychologists (scientists interested in how the brain influences sport performance) have been studying athletes and teams in order to understand more about the psychology behind successful sport performance. These scientific studies have uncovered some fascinating insights regarding what it takes to become an elite athlete and perform at the highest level.

In this collection, we will reveal some of the secrets that sport psychologists have uncovered in relation to sport performance. Specifically, we will highlight what has been learnt from research which has explored elite athletes' background, their personalities, what motivates them, how they are able to maintain their concentration, where they get their confidence from, and how they are able to cope under pressure.

The collection will help children and young athletes understand how the way they think and feel in different situations influences their performances, and how those in their surrounding environment (e.g., coaches, parents, friends, and teammates) can influence their performances and long-term development. These insights are not only exciting, they start to highlight how young athletes can play a crucial role in enhancing their own performances both within and outside of sport (e.g., school, music, performing arts, and dance).



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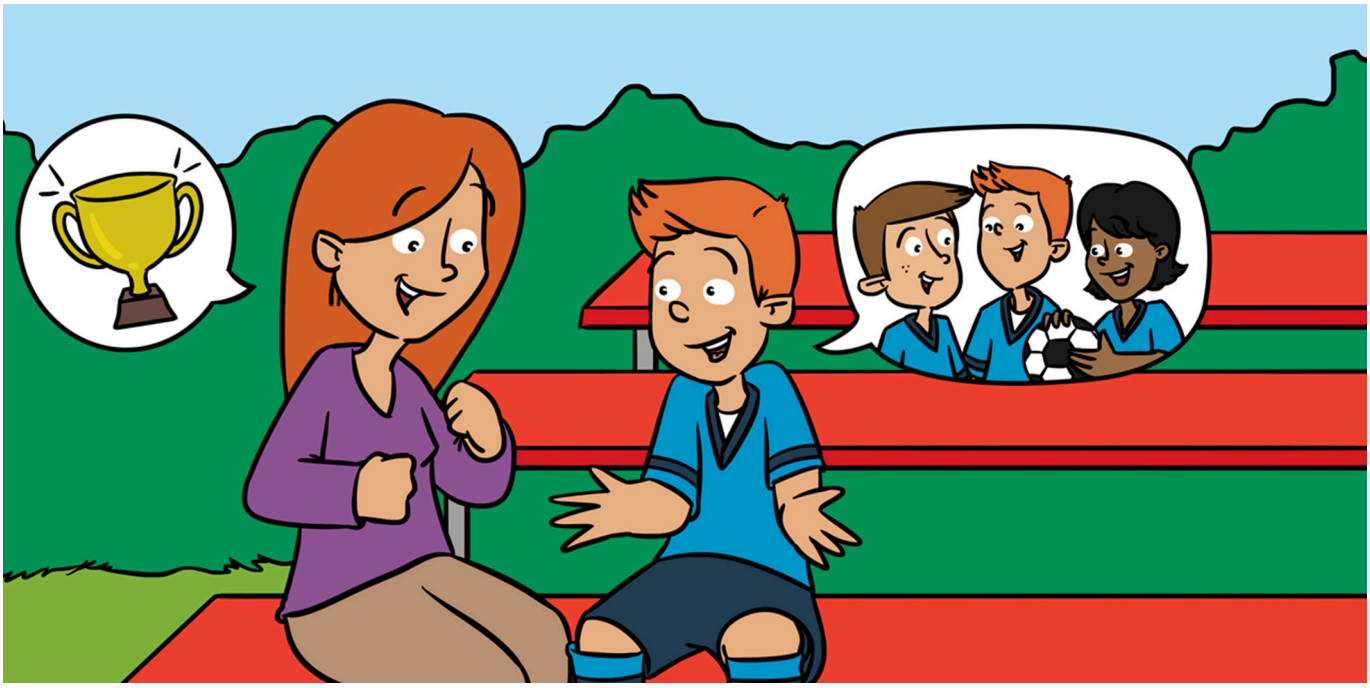

PARENTS WANT KIDS TO SUCCEED IN SPORTS, AND COMMUNICATION IS KEY

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YOUNG REVIEWERS:

JOSEPHINE
AGE: 8

SAHEJ
AGE: 14

SHAUN
AGE: 13

Parents of young athletes want their children to develop physically, grow as people, build relationships, and enjoy playing sports. Parents' goals also change over time, based on how much their children like sports, how well they do, and the sports setting. In short, research shows that parents' goals for their children change as the children themselves change. However, parents may not be the best at guessing what their children's goals are. In fact, researchers have learned that parents often do not cheer for the things their children actually want. So, it is important that, as children grow up and have new goals (for example, "I used to just want to have fun with my friends, but now I really want to win!"), they communicate often with their parents about what they want to accomplish in sports. This will help parents support them and cheer for them while they pursue their goals!

YOUTH SPORTS PARENTS

Lots of children play sports in America, and you might be one of them. Maybe you played in the past and do not anymore. Think back to when you first started playing a sport. Who got you involved? For most children, it was probably a parent [1]. Parents are often very involved in their children's sports. They normally sign them up for sports and make sure they get to and from their practices and games. They also stay to watch. Most parents praise, instruct, and offer feedback on their children's sports performance because they want to see them do well [2]. Sometimes it can be frustrating for parents because they do not understand what their children's sports goals are and they may set different goals than their children. Researchers have started to explore why parents communicate the way they do on the sidelines of their children's sports, and how communication from parents might affect children while they are playing [3]. Remember, youth sports are about the youth. A parent's role is to make sure children have fun and achieve their goals!

OUTCOME GOALS

Goals in which parents strive to manage the outcomes they or their children will experience in sports.

IDENTITY GOALS

Goals in which parents strive to manage others' impressions of them and/or their children in sports.

RELATIONAL GOALS

Goals in which parents strive to reflect and promote the type of relationship they have, or wish to have, with their children in sports.

Researchers have tried to understand parents' communication by looking at the multiple goals that parents have for their children in sports. Parents try to balance multiple goals while their children participate [4], and maybe you have experienced some or all of these goals. First, **outcome goals** are things your parent wants you to accomplish. Outcome goals can include wanting you to play better (by shouting tips and instructions) or trying to help you feel confident (by shouting support and encouragement). **Identity goals** are a second type of goals. Your parents want you to look like you are doing well when you are playing, so sometimes they might say things to make you look successful (by shouting that you are running the wrong way or telling you to pass the ball to the open player). They also want to look good as parents, so they often try to be respectful or sound smart when they are cheering for you and your teammates. **Relational goals** are the third type of goals. Sports are a great place to make friends and meet new people—for both you and your parents. So, at your practices and games, parents often try to communicate in ways that create friendships with your coaches and teammates, and with other parents [5].

The words parents use to achieve these three goals are the main things you hear while you are practicing or playing. Parents can shout at you as you play, and what your parents say and how they say it can have a big impact on your experience, as well as the experiences of your teammates, other parents, officials, and coaches. So, it is very important to tell your parents what you want to get out of sports! They might think you have different goals than you do, so tell them what you want them to say or not to say. As researchers have learned more about the connection between goals and communication, they have tried to help parents communicate in ways their children like. In this study, we tried to learn more about the

goals parents have for their children in sports, and how those goals shape their communication.

OUR RESEARCH

CASE STUDY

A type of research in which the focus is on a particular person, group, or situation over a period of time.

To learn how parents communicate with their children in sports, we performed a **case study** of four parents who had children participating in sports for the first time. In case study research, we want to learn a lot about a few people rather than a little bit about many people [5]. The parents we studied were between 30 and 43 years old. Three of the children were 5 years old and one was six at the beginning of the study. For all of them, it was their first season of sports! We chose parents of athletes at the beginning of their athletic careers because we wanted to know how the parents would adjust to their new roles in youth sports. We studied the parents for 15 months. We recorded interviews with the parents, in which we included questions like "Tell me about your decision to have Alex play sports this season," and "What did you hope he would learn by playing sports?" We had parents write in diaries about their experiences, thoughts, and emotions during their children's practices and games. Finally, we recorded the words parents said on the sidelines at their children's sports, to learn about their communication styles.

After collecting this information, we studied it carefully. We typed the interviews onto a computer and then read the interviews and diaries to see what parents hoped their children would get from sports, what the parents themselves wanted the children to get, and how parents felt when their children were practicing and competing. When we listened to the recordings of the parents on the sidelines, we sorted their behaviors into categories based on whether the parents were telling their children they were doing well, coaching from the sidelines, being negative or rude, or some combination of those things. Finally, we looked at the written words and the recorded words to see if parents' goals matched how they communicated on the sidelines.

WHAT WE LEARNED

We found 43 individual goals that parents had for their children in sports, which we separated into the outcome, identity, and relational categories. Most goals were outcome related, followed by identity and relational goals (Figure 1A). Within each of these categories there were subtypes of goals. We found four types of outcome goals:

- Avoid bad sports outcomes
- Get better as an athlete
- Grow as a person
- Enjoy sports

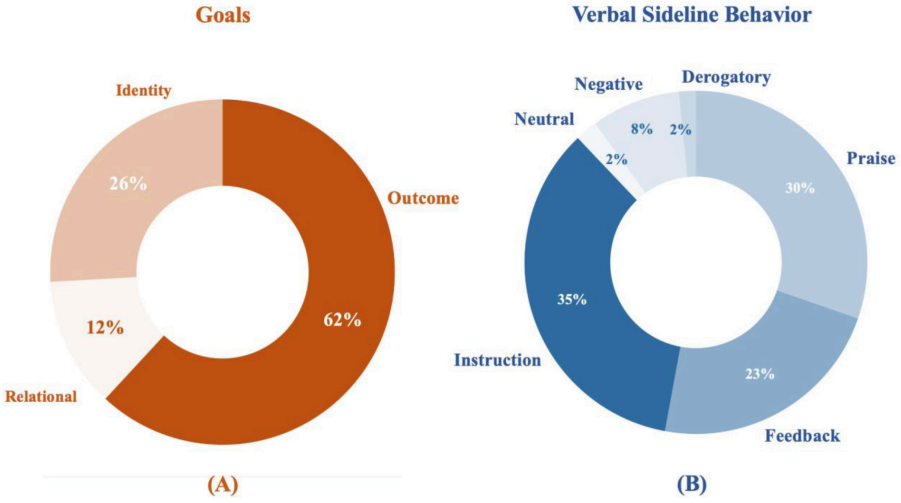

Figure 1

(A) We studied parents' responses to our interview questions. We determined the percentages of outcome, identity, and relational goals they held for their children in sports. **(B)** We studied parents' verbal sideline behaviors by recording them at their children's practices and competitions. We determined that the percentages of parents' instruction, praise, and feedback were high, whereas the percentages of parents' neutral, negative, and derogatory behavior were low.

We found two types of identity goals:

- Look like a good parent
- Make child look good to others

We found two types of relational goals:

- Make family relationships better
- Become friends with others

Most of these goals were shared by multiple parents, but each parent was also different in how important the goals were and how much the goals shaped their communication.

By analyzing parents' verbal sideline behavior (Figure 1B), we found that parents' goals often conflicted with each other. For example, parents' outcome goals often shaped their communication on the sidelines but, fortunately, their identity goals seemed to limit negative and rude comments. This conflict helped parents speak in ways that made them and their children look and feel better. For example, parents often said things like "You are going in the wrong direction!" but they chose to say it quietly, so coaches, parents, and their children could not hear. This illustrates one of the conflicts parents had—even though they wanted their children to do well, they also wanted their children to have fun and be viewed positively by others. Parents often try to communicate in ways that allow their children to enjoy playing sports—but not always! We learned that sometimes parents wait to make negative or rude comments until they are not around other people (like on the car ride home or at the dinner table). This taught us that parents struggle with balancing the goals they have for their

children's participation in sports and this conflict can show up in the ways they talk to their children before, during, and after practices and competitions.

We also saw that sometimes parents communicate based on goals that they are not directly thinking about, but that are present in the back of their minds. These goals for their children can include things like playing better than teammates or competitors, or playing well-enough to get a scholarship. We learned that parents sometimes feel badly for having these types of goals, perhaps because they feel guilty for putting pressure on their children. They might also understand that their own goals may be different than their children's goals. We also saw that parents change their goals based on what happens to their children in sports. For example, one parent's goals for their child changed when the parent realized the child was not one of the best players on the team. This parent went from wanting their child to be a great player to wanting the child to grow as a person.

We concluded that parents want their children to have fun and learn lessons in sports, and that they adjust their goals over time based on their children's experiences.

CONCLUSION

The most important thing to learn from our study is that parents want their children to learn various sports and skills and have fun playing. It is important to know that parents adjust their goals over time based on their children's successes and failures and the sports environment. Our overall message for young athletes is that you and your parents should communicate about what you want to accomplish in sports. We encourage you to share your athletic goals with your parents, to help them understand what you want to get out of playing sports [6]. When you do that, your parents can support you in the best way, from helping you have fun with neighborhood friends on a weekend to supporting your dreams to compete as a professional!

ORIGINAL SOURCE ARTICLE

Dorsch, T. E., Smith, A. L., Wilson, S. R., and McDonough, M. H. 2015. Parent goals and verbal sideline behavior in organized youth sport. *Sport Exerc. Performa. Psychol.* 4:19–35. doi: 10.1037/spy0000025

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CONFLICT OF INTEREST: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

YOUNG REVIEWERS

JOSEPHINE, AGE: 8
Josephine is a kindergarten student in Utah and likes to play sports when she is not in school. She ski races, mountain climbs, dances, swims, and plays, soccer, basketball, hockey, and flag football. In her spare time she likes to read books to her little brother and travel the world. She has been to 29 American states and 16 countries abroad. At home she is known for her eclectic wardrobe and wry sense of humor. This is her first scientific contribution!

SAHEJ, AGE: 14

Hello All! My name is Sahej! I am a freshman in high school and I am hoping to become an architect when I am older. I enjoy singing, dancing, swimming, and playing golf. I love to explore new things and hobbies. In school, my favorite subject is math and I love joining clubs in which I can take part of a leadership role or have the chance to speak in front of a large audience.

SHAUN, AGE: 13

I have played many sports for a long period of my life and I still do. I like to play video games, hang out with friends, and draw. A lot of my achievements in life is because of my parents pushing me to achieve great things. I also play the piano and a saxophone.

AUTHORS

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HOW COACHES, PARENTS, AND PEERS INFLUENCE MOTIVATION IN SPORT

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YOUNG REVIEWER:

CHRISTO-PHER

AGE: 16

When you practice and compete in sport, there are other people involved who support you in some way: coaches, parents, friends, and opponents. These people can influence how you feel about playing sport, through their actions, reactions, emotional expressions, and language. Our motivation in sport is not as simple as "more-v-less," but rather we experience a whole range of motivating/demotivating factors at the same time. Some motivators seem to feel natural and come from within us, while others seem to come from outside ourselves—like prizes, punishments, and peer pressure. We can be motivated toward an activity ("I want to do that!"), or away from it ("I do not want to do that!"). We can define success and failure in various ways, too. For example, we can compare ourselves to others ("Did I win?" "How did I rank?"), or we can strive for learning and improvement ("I finally did it, it worked!"). The motivational climate in sport refers to the way people around you influence these aspects of motivation.

INTRODUCTION

Imagine you join two sports teams at the start of a season because you really enjoy both sports and you are good at them. Your parents or guardians are supportive and there is plenty of time to fit in training and competitions around school and family time. It seems perfect. Over the first few months, however, you start to feel very differently about the two sports, and you start thinking about quitting one of them.

What has gone wrong? Perhaps you were not as good as you thought? Or perhaps the two motivational climates are different. In this article, we will explore what a motivational climate is, how motivational climates affect us, and how to get the most from our sports experiences. After reading this article, you may be able to recognize and choose a sports team, group, or class that best suits you. You may also be able to adapt yourself to specific settings and teams, which could improve your experience. We hope that what you learn will help you to enjoy sport more, so that you can receive all the health and happiness benefits that sport can bring.

WHAT IS A MOTIVATIONAL CLIMATE IN SPORT?

EXTRINSIC MOTIVATION

When the forces driving our behavior feel like they come from external sources, such as prizes, trophies, punishments, or criticism.

INTRINSIC MOTIVATION

When doing an activity feels naturally rewarding, then the motivation seems to be "built in" to the task: it is "intrinsic."

Motivation usually refers to why we do what we do [1]. Whenever we engage in any activity, the reasons we do it represent our motivation. Those reasons could be good or bad, many or few. They can feel like they come from outside ourselves, like rewards or punishments—this is called an **extrinsic motivation**. Or our reasons can feel like they come from inside ourselves, such as enjoyment, curiosity or a sense of achievement: this called **intrinsic motivation** [2]. There can even be options in between, like "I feel I ought to." In that case, we have accepted some external rules, and we apply them without needing to be reminded. Over time, our reasons can change as we get better, have setbacks, or overcome challenges. This means that our motivation can change quickly.

MOTIVATIONAL CLIMATE

The sum total of other people's influences on our motivation as experienced by the recipient. In sport these other people usually include coaches, other athletes, parents, and indeed clubs/organizations.

In any situation where humans gather and work together—including sport—we can influence each other's motivation. For example, someone may set rules, someone may pick the teams, and someone may get more excited about winning than about simply being around friends. The other people involved will see how the rules are set, how teams are picked, and what is valued, and these things may affect their own motivation. The sum total of those influences—from coaches, other athletes, parents, organizations, and more—is called the **motivational climate** (Figure 1) [3].

To study motivational influences on a sport team, researchers typically ask athletes what they notice and think about the motivational climate. These thoughts can be unique to each person. For example, some athletes really enjoy a highly competitive setting, but others may

Figure 1

The messages that athletes hear within a sports context can affect their motivation. For example, the messages in orange may feel pressurizing, and even demotivating, whereas the messages in green may feel much more motivating to the athlete. In this article we discuss how feedback focusing on improvement, and supporting an athlete to make their own choices both lead to better motivation. We will also discuss how enforcing external expectations and fear-of-failure may harm athlete motivation.

dislike it. Although the motivational climate is part of the external environment, it can actually nurture and foster the feeling that an athlete's motivation comes from within [2]. Coaches and teachers can work together and engage with athletes to discover what those athletes want from sport, and then make sure training and competitions supports those things.

UNDERSTANDING MOTIVATIONAL CLIMATE

Motivational climate is important in certain types of situation. For example, an **achievement context** is a situation in which some of your abilities are tested, compared, developed, or improved [4]. If you are not competing against others or testing and evaluating yourself, you may not be in an achievement context. So watching TV, talking to friends, or doing chores at home may not count as achievement contexts, so the motivational climate is not as important. But sport and school are two settings in which evaluation and comparison often happen.

Within an achievement context, we can focus on what gives a person a sense of achievement within that task or activity. A person with a focus on **mastery** will gain satisfaction from improving at, and eventually mastering, a skill. For these people, just exerting the effort to improve is often satisfying. Alternatively, a person with a focus on **performance** will gain satisfaction from positive comparisons with others, for example winning or achieving a high rank. These people may also feel satisfaction when they perform at the same level as a competitor but exert less effort to do so.

ACHIEVEMENT CONTEXT

Any setting or activity where performance on tasks is frequently evaluated/tested. Examples may include sport and school.

MASTERY FOCUS

When someone in an achievement context defines success on a task as either becoming effective in generating desired results ("mastery") or improving at the task, this is a "mastery" focus.

PERFORMANCE FOCUS

When someone in an achievement context defines success through comparison: being the best, winning-vs-losing, or through competitive rankings (e.g., best-to-worst, high-vs-low).

While these two types of focus can be thought of as personality traits (for example, "I am just a very competitive person!"), they can also relate to the motivational climate. The motivational climate of a sport can be about effort, improvement, and mastery, or alternatively about winning. Of course, the day-to-day activities of any sport team will likely involve both mastery and performance. When we do our research with sport teams, we find that athletes can experience a range of these characteristics. They can be competitive and improvement-focused; they can be heavily competitive; they can be heavily improvement-focused; or they can be neither heavily competitive nor improvement-focused.

HOW DOES MOTIVATIONAL CLIMATE AFFECT ATHLETES?

If we reconnect to what motivation is—the why behind human behavior—then we recall that the motivational climate can influence our motivation in sport. This helps us to see why motivational climate is important. If our motivational whys are positive, numerous, and intrinsic, we are more likely to have a good experience, so we may come back for more! If our motivational whys are too negative, too few, or heavily extrinsic, we can quickly find we are not enjoying ourselves and may want to quit the sport.

Research backs up these ideas [5]. Athletes who perceive a mastery climate generally experience better results, including confidence in their abilities, better performance, higher intrinsic motivation, more pleasant emotions, better problem-solving strategies, and more "fair play." Athletes who perceive a performance climate more frequently experience extrinsic motivation, a lack of motivation, more unpleasant emotions, unhelpful problem-solving strategies like avoidance and complaining, and they will often cheat more or use negative tactics like trying to injure an opponent [6].

Based on those findings, it seems like helping athletes to better enjoy their sports should be as simple as creating a mastery climate! But the problem for scientists working in this area is that it can be quite difficult to dependably change coach, parent, or teammate behaviors in a way that helps everyone perceive a mastery climate [7]. All athletes bring different experiences and ideas with them to their sports. Recently, scientists have also started to look at other aspects of the motivational climate. For example, can a motivational climate make us feel connected to friends and valued or accepted? Can it help us to feel cared for and safe? How important are these things to your motivation? The question that first inspired me to become a researcher was whether a motivational climate can help athletes to seek desirable things (e.g., "I want to do this! It makes me feel happy!") instead of simply avoiding undesirable ones (e.g., "I do

not want that to happen. It would make me sad"). This is called the **approach-avoidance distinction**.

APPROACH-AVOIDANCE DISTINCTION

Motivation can also be understood as a difference between seeking-out desirable/pleasant experiences vs. avoiding unpleasant experiences. This distinction has existed in psychology for many decades.

This approach-avoidance distinction is a very common theme throughout psychology—not just sports psychology. Can you picture the difference between an athlete or team that is playing to win (an approach mentality), vs. playing not to lose (an avoidance mentality)? The tactics and behaviors of these two groups could be very different, and they might even experience different levels of fun or stress. Asking these questions led me to realize that coaches, parents, teammates, and others influence our motivation in many ways—from tiny words of support to a large investment of time and effort into helping athletes enjoy their sports. What I found overall was that influencing motivation in sport can be very complicated... but that is ok [8]! We actually do have methods that allow us to understand how motivation is influenced in sport, even if it is "messy."

HOW TO GET THE MOST FROM YOUR EXPERIENCE IN SPORTS

So, to go back to our initial example, what might be causing you to no longer enjoy one of your sports and want to quit? Is the team focused on developing skills when you really just want to win every game? Or are they too focused on winning when you just want to improve your skills? In either case, remember that it is what you perceive about the climate that actually affects how you feel and how you perform.

So, you may choose to reconnect to why you are playing, and what you want to get from it. Then you might choose to focus on examples of when the things that you value are supported by others. Remember that, in the long term, improving every day and winning tend to be closely linked. While research has taught us which coaching behaviors tend to create more positive experiences [9], it is important to remember that a lot of the power lies with you. You can choose to arrive at healthier *whys*, in any motivational climate, even if people around you are choosing the unhealthier ones.

Finally, consider that the second you enter a motivational climate, you are helping to create that climate—you can choose to emphasize learning and improvement over winning at all costs. You can steer the atmosphere toward nice vs. nasty, and choose to feel empowered vs. bossed around. So, now that you know about motivational climate, how will you try to influence the one you find yourself in the next time you play a sport?

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YOUNG REVIEWER

CHRISTOPHER, AGE: 16

I am a high school freshman student in Edmonton, Canada. I enjoy playing guitar, singing, and playing drums. Skiing and ice-hockey are my favorite sports! I like Science and I like to conduct various experiments. I am also a big fan of Star Wars!

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IT TAKES TWO: THE IMPORTANCE OF THE COACH-ATHLETE RELATIONSHIP

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YOUNG REVIEWERS

TOTS & TEENS

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Have you wondered why coaches are often the first people athletes turn to, both when they are performing poorly and when they are winning? It is because the coach-athlete relationship is the most important relationship developed in sport. Athletes spend more time with their coaches than with any other people in their lives generally. They look up to their coaches and rely on them for technical, tactical, and personal advice. Gold medal-winning Olympic athletes like Wayde van Niekerk, Simone Biles, Michael Phelps, Laura Muir, and LeBron James have said that their coaches are the reason for their success. In this article, we will discuss what makes a successful coach-athlete relationship, describe the impact of the coach-athlete relationship on an athlete's success, and provide tips that you and your coaches can use to develop a good working partnership.

WHY IS THE CONNECTION BETWEEN COACHES AND ATHLETES IMPORTANT?

RELATIONSHIP

Relationship is a social situation involving the connection between two people

Forming meaningful **relationships** with others is an important part of our lives. We develop many important relationships—with our friends, families, teachers, and romantic partners. In sport, athletes also form several important relationships—with their peers, managers, and trainers. Have you ever wondered why coaches are the first people athletes turn to when they are performing poorly or when they are winning? It is because the relationships that athletes develop with their coaches are key to the athletes' success and satisfaction. Coaches are the people that athletes spend most of their time with. They rely on their coaches for their expertise, guidance, and their judgement about selection for competitions, team and matches. Coaches play other important roles too: they can be mentors and motivators, and they can provide a shoulder to cry on. For example, Usain Bolt, eight-time Olympic gold medallist, admitted that "there is times when you want to doubt yourself, but coach is always there to say, 'Do not worry, I know what I can do to make you run faster, and what you need to do to go faster"' [1]. The connection between a coach and an athlete can influence a large part of an athlete's life. That is why coaches and athletes must focus on developing a relationship that is effective (liking, caring for, and respecting each other) and successful (helping each other to win/be successful).

IS THERE ONLY ONE TYPE OF COACH-ATHLETE RELATIONSHIP?

There are four main types of relationships between coaches and athletes that we see in sport [2]. The first is a coach-athlete relationship that is effective and successful—this is the ideal relationship, one that all coaches and athletes strive to develop. These relationships not only experience success but the coaches and athletes also develop deep, mutual care and respect for each other. A wonderful example of this type of relationship is the one between Michael Phelps and his coach Bob Bowman [2]. Bowman began coaching Phelps when Phelps was 11. Bowman supported Phelps to become the most successful Olympian of all time, with 28 Olympic medals (23 of which were gold medals)! Phelps also said that his coach knew him better than anybody, apart from his mother! Bowman commented that he was more than a coach to Phelps; he was also a friend, a counselor, and a confidant. Can you think of any other examples of this type of coach-athlete relationship in sport?

The second type of coach-athlete relationship is an effective but unsuccessful one. In this relationship, coaches and athlete build good quality relationships. These strong ties allow coaches to influence athletes and help the development of athletes' psychological, emotional, and social skills, as well as their physical, technical, and

tactical skills. Examples of this type of relationship can be found in youth sport, where the focus is on being "the best you can be," enjoying the sport, and having fun—without worrying about winning. If you have played sport before, or are playing sport now, you may have experienced this kind of relationship.

SUCCESSFUL RELATIONSHIP

Successful relationship is the extent to which the coach-athlete partnership is successful in terms of performance.

The third type of relationship is an ineffective but **successful relationship**. These relationships may experience sport success, but the coach and the athlete do not get on. In such cases, coaches and athletes can either try to fix the relationship or they can break up. A classic example is the relationship between Sir Alex Ferguson and David Beckham [2]. There is no doubt that this partnership was hugely successful. They also liked and cared about each other in the beginning, and Beckham often called Ferguson a father figure. Although they continued to be successful, the personal relationship between the two soured in 2003. As a result, Beckham left Ferguson and Manchester United.

The final type of coach-athlete relationship is one that is unsuccessful and ineffective. This is the most undesirable coach-athlete relationship, as it does not have any benefits for coaches or athletes. We do not usually see many examples of these relationships, as the costs of staying in such relationships outweigh the benefits, so they often break up.

THE 3+1 C MODEL OF THE COACH-ATHLETE RELATIONSHIP

Stop for a moment and think about your own experiences—what makes a good coach-athlete relationship? How would you describe a good-quality, effective, functional, rewarding, and satisfying coach-athlete relationship?

3+1 C MODEL

The 3+1C is a framework that describes the key relationship ingredients for a successful coach-athlete partnership.

The most studied framework of the coach-athlete relationship is called the **3+1 C model** (Figure 1). In this model, the coach-athlete relationship is defined as a situation made up of athletes' and coaches' feelings, thoughts, and behaviors [2]. The "feelings" element of this model is defined as closeness, which reflects the strength of the emotional bond between coach and athlete. For example, the extent to which the coach and athlete like, trust, and respect each other. The "thoughts" element is defined by commitment. For example, the intention of coach and athlete to work together in the short- and long-term. The "behaviors" aspect of this relationship is called complementarity, which is the extent to which coach and athlete are comfortable in each other's presence and adopt a friendly (rather than hostile) attitude. Complementarity also taps into the coaches' and athletes' unique roles in the relationship. For example, the coach is expected to lead and direct the athlete, while the athlete executes the coach's instructions.

Figure 1

The ingredients of a successful coach-athlete relationship. Research suggests that athletes who have high levels of 3+1 Cs are more likely to perform better, feel more motivated to train and compete, have better relationships with teammates, and have more belief in themselves and in their team's potential.

This model was originally called the 3Cs model because it consisted of closeness, commitment, and complementarity. However, based on developments in our research, it was revised to include co-orientation as an additional component. Co-orientation reflects the degree to which coaches and athletes have similar perceptions. These perceptions can range from their thoughts about their relationship to expectations about training and competition. Every given athlete and their coach develop mutual similarity and understanding that denotes their very unique common ground. Research shows that coaches and athletes who report high levels of the 3+1 Cs have better working relationships. It is important to note that that the coach-athlete relationship does not stay the same—it is always evolving. As coach and athlete spend time together, experience successes, and face challenges, the quality and the nature of the relationship will change and fluctuate.

WHAT HAS RESEARCH SHOWN?

Research conducted over the last 20 years has shown how the coach-athlete relationship is linked to athletes' success [3–5]. The research suggests that athletes who have better partnerships with their coaches (such as high levels of 3+1 Cs) report more positive outcomes. These athletes are more likely to perform better, they feel more motivated to train and compete, and they have better relationships with their teammates. Further, they report greater levels of vitality, as well as greater belief in themselves and in the potential of their teams. Athletes who report poorer-quality relationships (such as low levels of 3+1 Cs) report fewer favorable outcomes. They are likely to perform poorly, they feel less motivated to train and compete, and they are more likely to feel overwhelmed and stressed.

HOW TO DEVELOP EFFECTIVE, SUCCESSFUL COACH-ATHLETE RELATIONSHIPS

If you are an athlete, after reading this you probably realize that you cannot become successful alone! To be a successful athlete, you will need a coach who is prepared to connect with you, to support and guide you through the ups and downs of **competitive sport**. Table 1 gives some tips on how to develop a good coach-athlete partnership with benefits for both you and your coach [3].

COMPETITIVE SPORT

Competitive sport where participation in sport is focused on competing and training to achieve improvements and performance success.

Table 1

Tips for coaches and athletes to develop **effective**, successful coach-athlete partnerships.

EFFECTIVE RELATIONSHIP

Effective relationship is the extent to which the coach-athlete partnership meets the personal and emotional needs of each other (or one another).

Relationship characteristic	Tip 1	Tip 2	Tip 3
Developing closeness	Take time to provide praise, encouragement, support, and constructive feedback to each other during training, competition, and non-sport-related contexts.	Engage in small talk: remember each others' birthdays, show interest in activities that take place outside of sport.	Engage in teambuilding and social activities that involve others (athletes, assistant coaches, parents).
Developing commitment	Ensure that you do not miss any competitions and trainings and be on time. Be mentally and physically ready for training (for example, by being the first to arrive and last to leave).	Be prepared to give up your time to your coach/athlete (for example, stay longer on the sport field to practice, receive/give instruction or feedback, and schedule/attend extra sessions).	Listen and learn from each other and set together individual (and team) goals
Developing complementarity	Establish clear team rules and expectations (like a code of conduct that coaches and athletes know and understand, as well as the consequences if rules or codes are not followed).	Ensure that both coaches and athletes provide input and actively participate in the training sessions.	Achieve a balance between order and freedom—provide a clear training or competition structure.
Developing co-orientation	Ensure the goals are agreed upon by coaches and athletes, are undestood by all and are in line with everyone's capabilities, expectations, hopes, and aspirations.	Be curious, ask questions and actively listen to each other's responses.	Be sensitive and understanding of each others' needs; try to understand each others' views and perspectives.

Table 1

Overall, this article has outlined the importance of the coach-athlete relationship, the different types of relationships that can exist between an athlete and their coach, and the specific components of the relationship (i.e., closeness, commitment, complementarity, and co-ordination) that have been examined within the research. We hope that by reading this article you have a better understanding of what makes the coach-athlete relationship "click" as well as taking away some helpful tips for how you can contribute to building a successful and effective sporting partnership.

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YOUNG REVIEWERS

TOTS & TEENS, AGES: 10–12

We are a small but mighty class of curious, multilingual learners. We are studying living things, life processes, natural habitats and environmental damage caused by humans in our second language, English! Some of us love science, there is even a budding scientist amongst us, but some of us are not so keen. We are hoping you can show us just how amazing science can really be.

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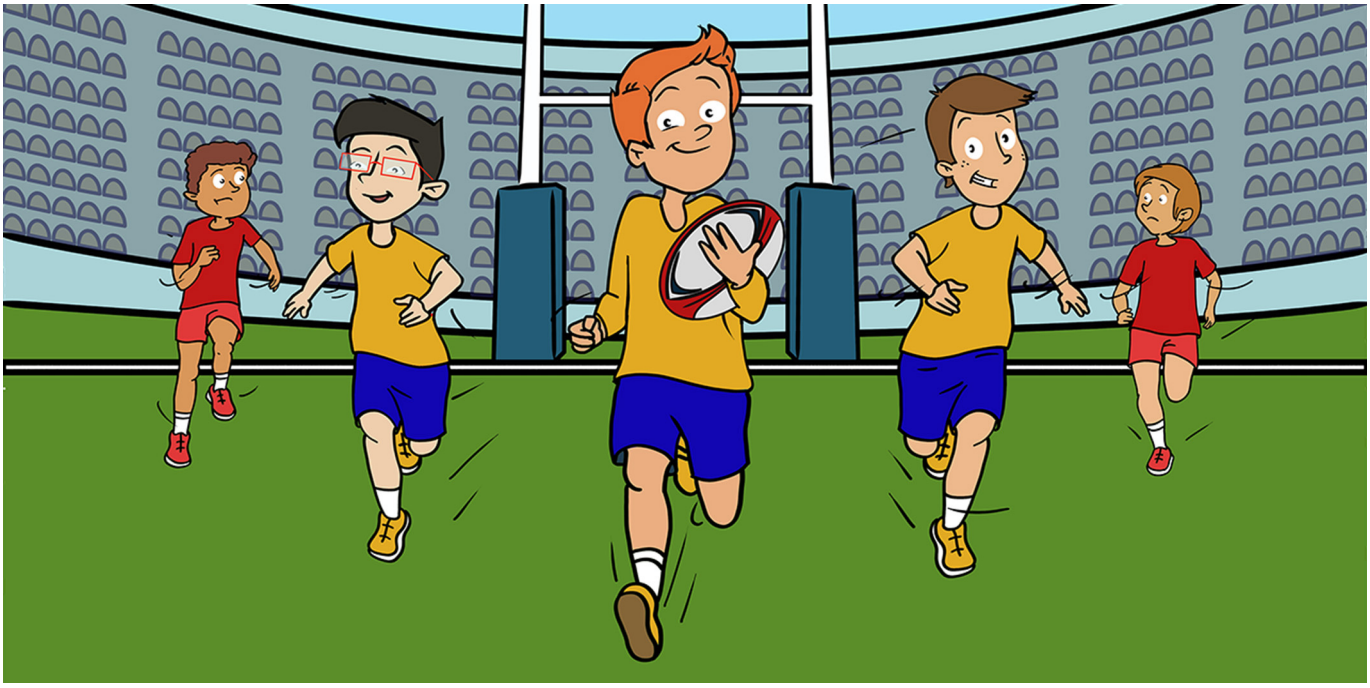

THREE WAYS THAT PEERS MATTER IN YOUTH SPORT

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YOUNG REVIEWER:

DAVID

AGE: 13

There are many features of youth sport that can make it exciting and motivating or, alternatively, make it dull, stressful, or otherwise uninviting. Among those features are the participants themselves. When young athletes sign up for a sport, opt to stay with a particular team, invest time and energy into practicing, or consider their competitive successes and failures, their peers (those of similar age, standing, and power) often play a part. Teammates are probably the most important peers in shaping youth sport choices and experiences, but other peers at school and elsewhere can also influence young athletes. In this article, we describe three ways that peers matter in youth sport. We argue that the quality of young athletes' sport experiences is tied to specific friendships, broader acceptance by peers, and how athletes compare themselves to their peers. These aspects of peer relationships play important roles in shaping athlete motivation and performance.

INTRODUCTION: PEERS AND THE QUALITY OF YOUTH SPORT EXPERIENCES

Most young people play a sport at some point in their childhood, with many trying a range of sports and staying involved with sports over several years. Organized sports usually take place in community settings, private clubs, or in schools. There are also informal opportunities in neighborhoods, parks, schoolyards, and other places where young people gather with minimal adult supervision. Across these settings, young people participate for a variety of reasons, including the opportunity to be with **peers** and make friends. It is important to consider peers when seeking to understand the quality of youth sport experiences.

PEERS

Individuals of about the same age, such as schoolmates, teammates, or others with roughly equal standing and power.

Often, sport scientists and others focus exclusively on how an athlete performs in sport, but ultimately the quality of a sport experience is more than just personal bests, winning, and losing. Quality sport experiences bring enjoyment, the opportunity to learn physical and life skills, and the chance to test oneself and perform. Sport experiences also bring various opportunities to be social. Peers can contribute to a good-quality sport experience. Therefore, the study of peers in sport can help us better understand how to create sport experiences that are attractive and fulfilling. When we use the term peers, we are often referring to people of about the same age, such as schoolmates, teammates, or others with roughly equal standing and power [1]. There are other ways to think of peers—for example, all orange belts in a karate dojo might be considered peers because of their shared level of accomplishment. In this case, both youth and adults could be considered part of a peer group. However, when studying children or adolescents in sport, we typically view peers to mean those of about the same age or grade who share sport and non-sport experiences in common.

How might peers influence sport experiences? Consider Olivia, who is thinking about joining the track and field team at her middle school. She has two good friends in her neighborhood, Leslie and Maya, with whom she plays outside, rides the bus to school, and otherwise spends time. Leslie and Maya are joining the team, and are encouraging Olivia to join too. Olivia has tried a variety of sports but has not stuck with them. In basketball, she felt excluded because she had a late start in the sport compared to her teammates. She had difficulty breaking into the social circle of the team. In field hockey, she got along well with her teammates, but viewed herself as less skilled than the others. She sometimes felt embarrassed about her play, especially when peers not on her team were spectating, and she received limited playing time. She tried swimming, but the way practices were structured left little time to interact with friends—she wanted more than just a focus on performance. Yet, despite these past experiences, she likes the idea of joining track and field. She can be with Leslie and Maya, there are no cuts from the team (low pressure), lots of others participate, everyone

Figure 1

Three Ways that Peers Matter in Youth Sport. Friendships with specific peers, general acceptance by the peer group, and how athletes compare themselves to (reference) peers are uniquely related to the quality of youth sport experiences.

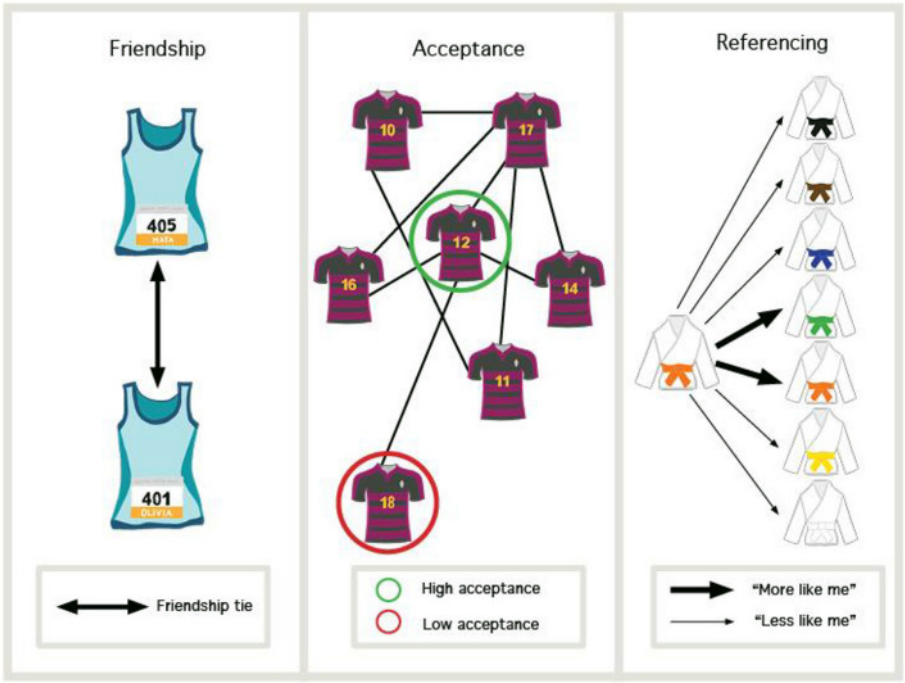

Figure 1

gets the chance to compete, and the team is recognized at the spring school assembly.

Olivia's experiences and current decision-making are influenced strongly by her peers. In the sections below, we discuss three ways that peers matter in youth sport (Figure 1). Studying this topic can help us make sport more engaging and meaningful to young people. This is especially important information for adults, because they are often in charge of sport experiences, but are not a part of the peer-to-peer interactions.

FRIENDSHIPS: ONE-ON-ONE PEER RELATIONSHIPS

FRIENDSHIPS

Close relationships that develop on a one-on-one level.

The opportunity to be with friends motivates young people to participate in sport. So, friendships are one important way that peers matter in sport [1]. **Friendships** are close relationships that develop on a one-on-one level. When a young athlete participates in a sport with a friend or several friends, there is great potential for the sport to be fun and personally meaningful. Also, by participating in sport together, friends have an opportunity to get to know one another better and to have shared experiences. Friendships can enhance sport experiences and sport experiences can enhance friendships.

Interviews and surveys of youth sport participants ages 8–16 years have highlighted both positive and negative features of sport friendships and defined six key features of sport friendship quality

Figure 2

Six Core Features of Sport Friendship. When sport friends are supportive, loyal, have things in common, enjoy being together, and manage conflict effectively, the stage is set for a good-quality sport experience.

Figure 2

[2, 3] (Figure 2). High-quality sport friendships are supportive and encouraging, loyal and close, involve having things in common, are highly enjoyable, experience occasional conflicts, and effectively resolve any conflicts that arise. Research shows that the more highly young athletes rate their sport friendships in these ways, the more likely they are to enjoy their participation, believe that they are competent at sport, and feel good about themselves. Athletes who rate their sport friendships more highly are also more motivated to participate because they *want to*, instead of feeling that they *have to*—which is a healthier form of motivation [1, 4].

ACCEPTANCE BY PEERS

PEER ACCEPTANCE

The degree to which one is accepted by or popular within a group of peers.

Young people generally want to be accepted by others their age. Those who are accepted feel meaningfully connected to others, while those with low acceptance may feel isolated. Through involvement in sport, athletes might try to achieve a sense of **peer acceptance** and belonging among teammates, or try to gain acceptance or popularity with other classmates and peers. Said another way, young athletes' interest in sport participation is tied to social goals as well as competitive goals [5]. Research shows that young people believe that being good at sport is a way to be popular with peers [1]. Also, when young people achieve a sense of acceptance or belonging in sport, there are benefits to their motivation and well-being [1, 4]. Feeling accepted can encourage continued involvement in sport and also benefit a young athlete's social development. On the other hand, sport involvement is not as motivating or beneficial when a young participant is not accepted by teammates or is on a team with a lot of conflict.

PEER REFERENCING

A third way that peers matter in sport is that they can be a source of information about how good athletes are at sport and about which attitudes and behaviors are valued. Said another way, peers often serve

PEER REFERENCING

A mental process where individuals compare themselves to others with respect to skills, attitudes, and values.

as a point of reference for one another. **Peer referencing** is a common mental process that enables us to gauge our abilities and how we fit into a social situation. In sport, peer referencing relies heavily on peer comparisons, particularly in later childhood [4]. Athletes develop an interest in how they compare with others, and this can motivate or discourage them depending on their conclusions. For example, young athletes might compare themselves to others in the karate dojo and aspire to move to the next belt level. Alternatively, they might feel discouraged by not being as accomplished as others or believe that their progress is slow compared to others.

PEER-CREATED MOTIVATIONAL CLIMATE

How a peer group defines and reinforces what is considered successful. Some groups emphasize performance outcomes and others emphasize effort and improvement.

The way comparisons motivate or discourage young athletes depends on what is rewarded and considered "success" in sport. This is referred to as the **peer-created motivational climate** [6]. Peers may create a sport climate that strongly emphasizes outcompeting teammates and judges who is the "best." Alternatively, peers might create a sport climate that reinforces putting in strong effort, developing skills, and striving for improvement. Less skilled athletes can struggle with their motivation when their peers are too much like the first group. However, a less skilled athlete in a climate that promotes effort and improvement can remain strongly motivated.

PUTTING IT ALL TOGETHER

The three ways peers matter in sport—friendships, acceptance, and peer referencing—are not independent of one another. Peer referencing occurs in situations that contain friends and teammates, who may be accepting or not. For example, David's soccer teammates may not warmly accept him and they may be overly competitive with one another, yet his long-time best friend is on the team. Having such a good friend on the team may make David's participation enjoyable and motivating in spite of his challenges with other teammates. Research supports that challenges with peers in sport can be overcome when some peer factors are positive; however, an athlete will be *most* motivated when *all* peer factors are going well [7]. That is, when an athlete has quality friendships in sport, is well accepted by teammates, views oneself as comparing well to others, and is comfortable with the peer-created motivational climate, the athlete will probably have positive experiences in sport. Of course, peer relationships, motivation, and other experiences in sport are connected in complex ways. Future research is needed to more clearly understand when and how peers are most impactful, for good or bad, in youth sport.

To ensure that Olivia, David, and other young athletes have positive experiences with their peers in sport, there are a few things that adults and athletes themselves can do [8]. For example, it is important to allow time during practice and other team gatherings for athletes to be social and develop their friendships. Similarly, it is important for young people to have time to enjoy playing sports informally, without

too much supervision from adults. When focus is placed exclusively on organized sport and high performance and not on the broader interests and needs of young people, athletes can struggle with their motivation. Also, coaches can encourage teammates to emphasize effort, improvement, and teamwork over competing with one another. Reinforcing these qualities often results in improvements in skills and performance, while keeping a positive environment. Finally, because peers can have conflicts or will sometimes exclude one another, it is important for coaches to learn how to constructively manage conflicts and how to make sure that everyone on the team is feels included. This can ensure that every member of the team feels valued and has a quality youth sport experience.

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YOUNG REVIEWER

DAVID, AGE: 13

I am an upcoming 9th Grade Student, awarded a full scholarship to Regis High School, a prestigious secondary school for gifted young men in New York City. I have been awarded multiple prizes in science, math, and STEM in my secondary school. I enjoy coding, reading, videogames, and technology. I love swimming and playing soccer. Also, I love theater and musicals. I have a dual citizenship from Mexico and the United States. In the future, I would love to study Biomedical Engineering.

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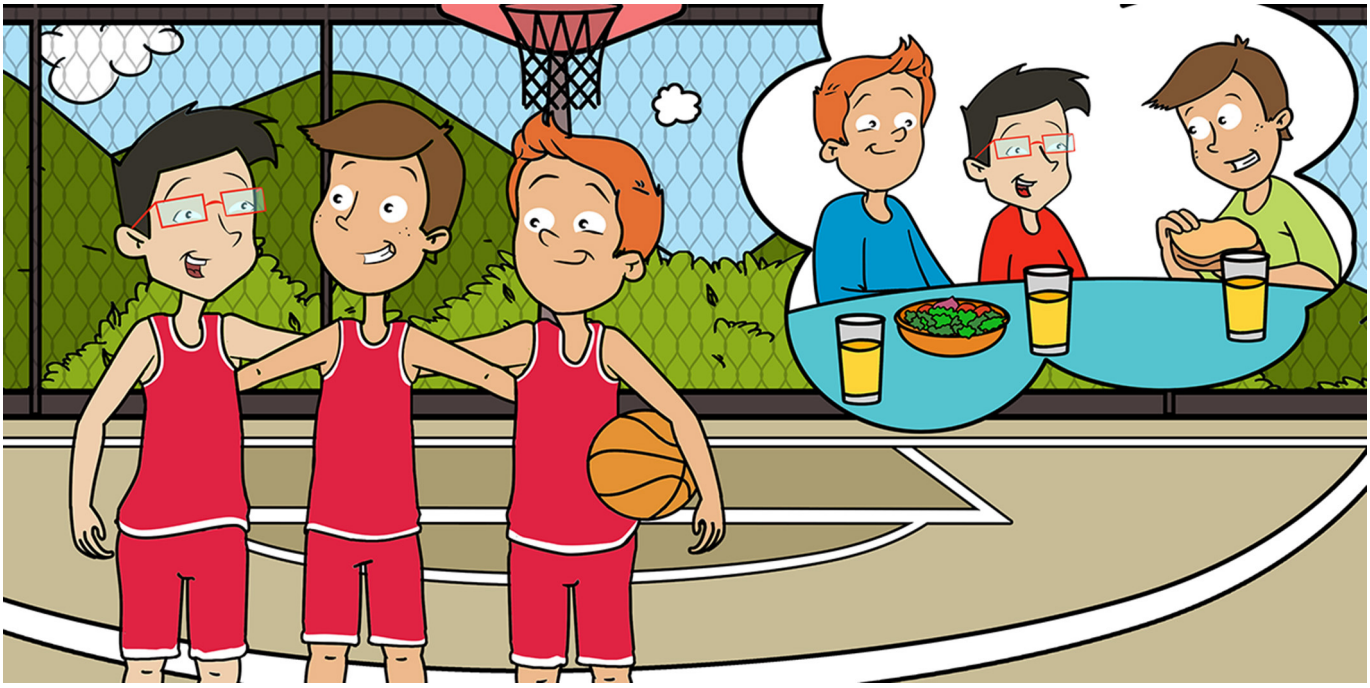

GROUP COHESION: THE GLUE THAT HELPS TEAMS STICK TOGETHER

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YOUNG REVIEWERS:

LIAM
AGE: 10

OLIVER
AGE: 12

PALOMA
AGE: 10

Playing together with other people can be an extremely fun aspect of taking part in sports. It can also be challenging when some people are not team players. This article focuses on the topic of group cohesion, which we describe as the glue that helps teammates to stick together. We might also define cohesion as the amount of unity or harmony in a team. Sport teams can be cohesive in terms of how well they play together during practices and games (i.e., task cohesion) as well as how well they get along away from their sport (i.e., social cohesion). Both types of cohesion are important because they lead to better individual and team performance, and athletes are more likely to be happy with playing on the team and to continue taking part. We suggest simple strategies that you and your coaches can use to help your team become more cohesive over time.

WHAT IS GROUP COHESION?

Many popular sport accomplishments have been celebrated because a group of individuals was able to work together to overcome major obstacles. Playing together with other people can be an extremely fun and rewarding aspect of taking part in sport. That special feeling of harmony in a team is called **cohesion**, and it helps teams succeed. For example, cohesion was a major factor in the success of the underdog Icelandic men's football/soccer team at the Euro 2016 championships. As their manager explained, "If you have been around this team, you see it is fantastic how everybody has a part to play, everybody is friends, everybody is willing to work with each other. That is a mentality you need for a small country to achieve things. You can not do it with individuals. We are a family."[1] Also, USA women's basketball coach Dawn Staley reinforced the importance of having the time to bring players together to successfully unite the group. In her words, "This program gives us an opportunity to keep a core group of players together and to build chemistry and cohesion."[2]

Cohesion is not something you can touch and it is also not something you can do. Rather, it is a set of beliefs that team members hold about the group and their membership in it. Researchers propose that athletes hold two sets of beliefs related to cohesion [1]. First, athletes have beliefs about the degree to which their teammates are unified. This is called **group integration**, and it could be thought of as the glue that helps teammates stick together. Athletes also have beliefs about how much each athlete wants to be a part of the team. This is called **attraction to the group**, and you could envision this as a magnet that initially draws each member in and keeps members interested in what the team is doing.

Furthermore, there are two contexts that draw people in (the magnet) and motivate them to work together (the glue). First, sport teams can be cohesive during practices and games. How well a team plays together is called **task cohesion**. Second, athletes may interact with one another away from the sport environment, and they may develop relationships and friendships. The way athletes get along outside of sport is called **social cohesion**. The two beliefs (group integration and attraction to the group) and the two contexts for cohesion (task and social) interact to create four dimensions of cohesion by which researchers can examine sport teams (Figure 1).

WHY IS COHESION IMPORTANT?

Many researchers have attempted to understand how athletes think about group cohesion. To do so, they can give questionnaires to the athletes. Other researchers have tried to estimate the level of group cohesion by examining members' interactions via social media, or through observing and documenting team behaviors. Regardless of

COHESION

The unity and harmony within a team.

GROUP INTEGRATION

Group integration beliefs about the degree to which teammates are unified.

ATTRACTIONS TO THE GROUP

Attraction to the group beliefs about how much each athlete wants to be a part of the team.

TASK COHESION

How united team members are during practices and games.

SOCIAL COHESION

How united team members are outside of practices and games, such that they develop friendships and relationships.

[1] Lawrence A. A 2016 football moment to remember: Iceland light up Euro 2016 [internet]. The Guardian; 2016 Dec 29 [cited 2021 Mar 1]. Available from: https://www.theguardian.com/football/2016/dec/29/2016-football-moment-to-remember-iceland-euro-2016

[2] Steenkeste C. USA Basketball team to play exhibition games against top women's college teams [internet]. Sports Illustrated; 2019 July 27 [cited 2021 Mar 1]. Available from: https://www.si.com/wnba/2019/07/27/sue-bird-diana-taurasi-team-usa-basketball-college-exhibiton-games-tokyo-olympics

Figure 1

Athletes can have beliefs about their own attractions to the group and their group's integration, and these beliefs are held for both task and social contexts. These factors interact to create four dimensions of cohesion [1].

Figure 1

which research method is used, there is evidence that cohesion is associated with improved individual and team performance, and with continued participation in sport. Team cohesion and performance have a circular relationship. In other words, higher levels of task and social cohesion contribute to better performances, but better team performances also lead to increased feelings of task and social cohesion [2]. Interestingly, cohesion is not just important for team sports—it is also important for individual sports, like cross-country running [2]. Athletes in individual sports spend a lot of time together, train with the same coaches, and share the same training space and equipment. This requires them to get along as much as (or more than) team-sport athletes [2, 3].

People who feel like they are part of a group, who are close with group members, and who are attracted to the group's task and social activities will have a stronger desire to remain with the group and may show longer commitment to a group or a sport. If a group is cohesive and a person enjoys being a member, the likelihood of experiencing positive emotions increases [3]. Finally, cohesion can also reduce attendance issues, such lateness or missing practices and games, and it can encourage greater effort [3].

Although cohesion enhances the group experience, it can sometimes create negative consequences. On one hand, high levels of social cohesion can sometimes cause group members to have difficulty focusing or committing to performance-related goals [3]. This may happen because group members who really like each other may spend more time socializing than focusing on the task at hand [3]. Additionally, communication problems within a team might arise when friends avoid having tough, sport-related conversations with one another, possibly because they do not want to hurt someone's feelings [3]. Some team members can also become isolated outside of the main group, or feel pressure to fit in, if they are new to the team or if they see themselves as different [3]. On the other hand, teams with very high levels of task cohesion can become overly focused on achieving their goals, which may make social relationships very tense. Players may not experience as much personal enjoyment, or they may feel excessive pressure to perform [3].

Even though cohesion can have negative consequences in certain situations, the performance benefits and happiness generated by cohesion outweigh any potential disadvantages that may arise [3].

PUTTING THE "TEAM" INTO TEAM BUILDING ACTIVITIES!

Now that we know what cohesion is and why it is important, the next step is to learn how to help teams become more cohesive. In sport, coaches, sport psychologists, and athletes use team-building activities to help teams become cohesive [3]. Team-building activities take many forms and can include games played with teammates, puzzles the team must solve together, or activities that involve sharing feelings or ideas with teammates [4]. All team-building activities involve working with teammates to build the skills needed to create united sport groups [3]. We will describe three easy-to-use team-building activities to help build group cohesion.

The first team-building activity is called the birthday balance beam [4]. In this challenge, all athletes stand on a small balance beam and work together to avoid falling off, as they move around each other to line up from oldest to youngest. This may just seem like a fun game to do with your teammates, but it also builds cohesion. To move around the balance beam and end up in the right order without anyone falling off, teammates need to listen, talk to each other, and work together to win. These are all skills that athletes can transfer to sport to build a united team [4].

Group goal setting is a second team-building activity. When a team works together to create goals for the season that everyone agrees on, they get excited to complete those goals [3]. There are several steps to setting team goals. First, a team chooses their long-term

(season) goals, for example to win a championship. Then, as a team, athletes plan shorter-term goals by which, step-by-step, they can achieve their long-term goal. Shorter-term goals help a team track its success and gain confidence along the way! For example, in basketball, a short-term goal could include all team members shooting 50 extra free throws at the end of practice. Teams should put their goals on a poster in their locker room or other common area, where the goals can be seen frequently. Once a week, the team should come together to talk about their progress, what is going well, and where they could improve. This activity helps athletes practice sharing ideas and reaching agreement regarding goals. These skills are important for cohesion because teammates can use them to work as a unit [3].

A third team-building activity is to develop a distinct team identity. Some teams have special team gear or create routines that are unique to them. This may be as simple as working together to create a special and creative cheer for the team. A team cheer should be fun, exciting, and use words that are important to the team. For example, in the team huddle before a game in the 2013 National Basketball Association finals, the Miami Heat chanted, "nothing's difficult, everything's a challenge, through adversity, to the stars!"[3] (Video). Having a team cheer to say before or after practices and games is a great way to practice teamwork, and it gets everyone excited to play. A fun and special cheer also makes a team unique from other teams; the cheer is something that all teammates can share and that helps all athletes feel like a part of the team [3].

[3] Passe Dec. NBA Wired - Miami Heat hype-huddle: "We Fight"

CONCLUSION

Overall, participating in a cohesive sport team is a very rewarding experience. Also, being united around the goals of the group (task cohesion) and developing positive bonds and friendships (social cohesion) can have important consequences for the team. It is worthwhile to try to develop these bonds, and team building activities are a fun way to build cohesion. These activities get athletes working together and thinking together, all the while making them excited to play as a team. An important point to remember with team-building activities is that practice makes perfect! The more teams value and practice working together, the more cohesive—and successful—they become [4].

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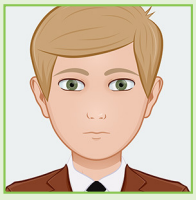
YOUNG REVIEWERS

LIAM, AGE: 10
I am in fifth grade and I like animals. My favorite animal is the lion. When I grow up I want to be a biologist. I also like stuffed animals.



OLIVER, AGE: 12
I am in the 7th grade. My favorite subject is science and I want to be an astronaut. I have run at least a mile a day for the past year. I love downhill skiing.

PALOMA, AGE: 10
I love science. I love asking questions and having them answered. I like knowing how things work and why things happen. Just today I was asking my mom about why we dream and why the rainbows are curved instead of a complete circle or

a triangle. I also like doing experiments. From 1st to 3rd grade I had a really good science teacher and we did so many experiments. Some of them involved Bunsen burners which were so fun.

AUTHORS

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Mark Eys (Ph.D.) is a Professor in the Departments of Kinesiology/Physical Education and Psychology at Wilfrid Laurier University (Canada), a Laurier Research Chair in Group Dynamics and Physical Activity, and a former Canada Research Chair. His current research interests include role commitment in sport, cohesion, and the application of group dynamics across contexts (sport, exercise, organizations). He is a co-author of the book *Group Dynamics in Sport*, and is a co-editor of *Group Dynamics in Exercise and Sport Psychology* and *The Power of Groups in Youth Sport*. *meys@wlu.ca

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Travis Crickard is a first-year doctoral student in the Department of Kinesiology and Physical Education at Wilfrid Laurier University. From St. John's, Newfoundland, Travis completed his B.Sc. at the State University of New York at Potsdam and his M.A. at the University of Ottawa, where he explored the learning experiences of high-performance ice hockey head coaches who played goaltender. Crickard's current research interests include coaching, coach learning, and how coach communication styles influence athlete and team outcomes. Travis has coached in the Canadian Hockey League, with the Canadian National U17 men's hockey team, and in New Zealand.

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"TOGETHER, WE CAN DO THIS": THE BEST SPORT TEAMS ARE GREATER THAN THE SUM OF THEIR PARTS

Matt Slater [1*] ***and Jamie Barker*** [2]

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YOUNG REVIEWERS

THE SCHOOL FOR SCIENCE AND MATH AT VANDERBILT

AGES: 14–15

Once upon a time, it was believed that the sport team with the best individual star players would be most likely to win all the trophies. Then one day, athletes, coaches, and sport fans, together with scientists (including sport psychologists), noticed that this did not always happen—so people began to doubt the idea. This was a concern because, for coaches to create great sport teams that can reach their potentials, the key ingredients for team success must be understood. Over time, there has been a shift from looking at the talent of individual star players to looking at teamwork. In this article, you will discover how the feeling of connection and relationship between players—their sense of *togetherness*—is the key ingredient in sport-team success. You will also learn some ideas for how to develop togetherness.

"Just look at what we can do when we work together."

Marcus Rashford

For a long time, professional sport teams brought the best individual players, in the hope that this would make the team successful. Eventually, athletes, coaches, and sport fans, together with researchers, noticed that individual talent alone was not enough. It became clear that the sport team with the best individual players did not always win the championship. Some athletes enjoyed being part of their teams but, unfortunately, some did not. This was a concern because sport psychologists wanted to create great sport teams that could reach their full potential. To create such teams requires an understanding of the key ingredients for sport-team success. Then, this knowledge must be put into practice to develop great sport teams.

A SHIFT FROM INDIVIDUAL STAR PLAYERS TO THE TEAM

The shift from a focus on individual star players to the team as a whole led researchers to discover a crucial concept for team success—**togetherness**. Togetherness reflects the strength of connections between players on a team and the extent to which individuals identify as part of a group. Togetherness is about much more than being listed on the same team sheet. Could it be the case that it is not the team with the most star players, but the team that feels the strongest connections with each other that is the most successful?

TOGETHERNESS

A strong sense of shared belonging and connection within a sport team 3Rs—An intervention to develop togetherness.

IN-GROUP

A group that we are part (e.g., our sport team).

OUT-GROUP

Other relevant groups within a specific context (e.g., other sports that are our competitors).

Dividing individuals into groups can quickly promote a group identity, even when there is no logical reason to put people on one team or the other. We observe this phenomenon on sport teams and in the behavior of sport fans. For example, fans are more likely to start conversations with other fans of the same team, even when they do not know them. Our group is known as the **in-group**, and this group will have features and values that make it unique [1]. Our competitors are known as **out-groups**, and they have different values to us.

Most people have a range of group identities and may have many in-groups, even within sport (for example a school team and a local team).

When in-groups form, the values of our in-group become boundaries within which we think and behave. We draw in and encourage our teammates. We favor our own group, believing our group is better than others (Figure 1). Researchers have also found that when athletes think and play for their teams instead of for themselves, they put in more effort, encourage teammates more, and believe more in themselves

and their teams [2]. Therefore, coaches should develop a unique group identity in which everyone feels a strong sense of togetherness (Figure 2).

Figure 1

Togetherness thinking ("us" and "we") vs. individual thinking ("I" and "me").

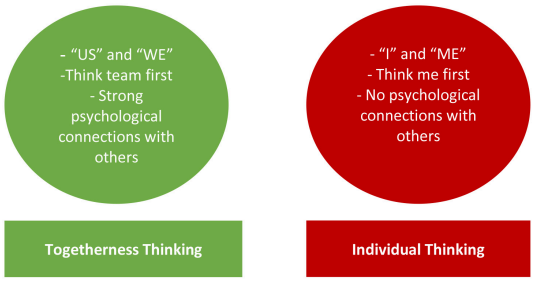

Figure 1

Figure 2

The positive and negative outcomes of teams with high vs. low togetherness and the factors that influence levels of togetherness.

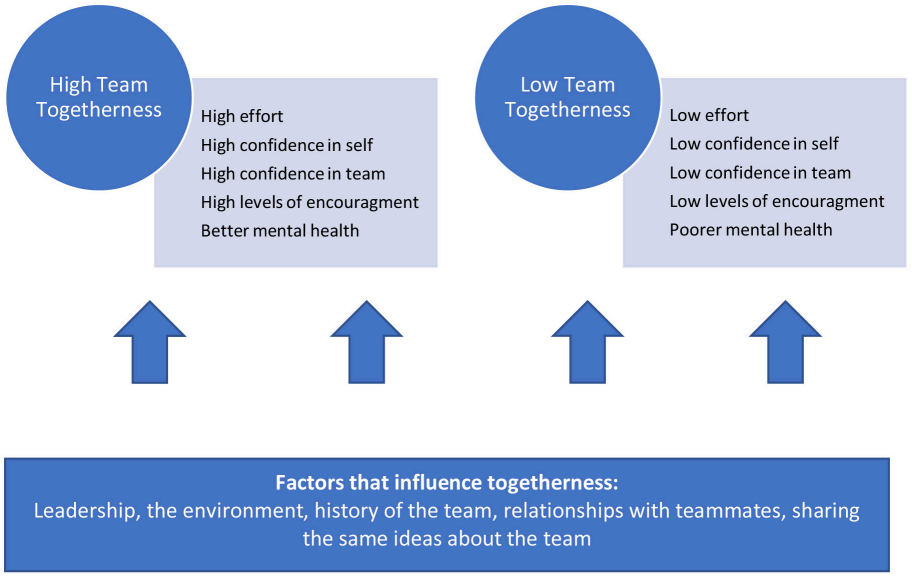

Figure 2

WHY IS TOGETHERNESS SO IMPORTANT?

One of the lessons learned by sports psychology researchers is that a strong feeling of togetherness within a sport team is the starting point for team success. When athletes feel connected to their teammates, they put in effort for, and on behalf of, their teams. This happens because an athlete's life as part of their sport team is a piece of their self-concept. In other words, the success or failure of the athlete's team is personal. It therefore makes sense that, when there is strong togetherness, athletes act for the team and behave in the team's best interest. This is the case even if the team's best interest is not necessarily the athlete's best interest. As former U.S. President John F. Kennedy once said, "Ask not what your country can do for you—ask what you can do for your country."

LEADERS PLAY A KEY ROLE IN CREATING TOGETHERNESS

"This is the struggle every leader faces. How to get members of the team who are driven by the quest for individual glory to give themselves wholeheartedly to the group effort."

Phil Jackson

Phil Jackson is a successful basketball coach, and this quote proposes that coaches should encourage their athletes to think about their sport teams first. Sometimes this may mean sitting on the bench so that a particular teammate can play, if it gives the team a better chance of winning. Sport psychologists thought that coaches might play an important role in developing togetherness in sport teams.

Coaches and leaders have been studied for a long time. It was once believed that the best coaches were born, not made. This was a problem because some people were born with the right ingredients (such as personality traits like being outgoing), but some were not. But some people who were born with the right ingredients were *not* successful leaders, and some people who were *not* born with the right ingredients *were* successful leaders. Thus, researchers learned there must be more to successful leadership than personality traits. They investigated a range of coaches and captains and found that the best leaders were not born that way. As well as being the key ingredient for the success of sport teams, togetherness was found to be important for the success of leaders, too.

LEADERS PUTTING THE TEAM FIRST

One research study used a survey to ask the athletes how often their coach displayed team-focussed behaviors, such as making decisions for the best interest of the team rather than making decisions for their own self-promotion [3]. The survey asked how connected the athletes felt with their teams, as well as how confident and supported they felt before their competitions. The athletes were more confident and felt more supported when they perceived their coach to be creating togetherness. Also, those athletes who felt their coach led with togetherness at the start of the season reported greater levels of confidence at the end of the season. In other words, one of the reasons why athletes believed themselves to be successful at the end of the season was due to their coaches displaying leadership that brought their teams together earlier in the season. As Jurgen Klopp states, leadership that puts the sport team first is the best approach:

> "Have empathy and give real support to the people around you, then everyone can act. That is what leadership is,

have strong people around you with a better knowledge in different departments than yourself."

Researchers began to look at other ways athletes may benefit when coaches work to develop togetherness. People used to believe that the amount of stress an athlete felt was determined by that athlete's personality. But athletes and sport psychologists eventually realized that other factors, such as the coach and the amount of teamwork in the sports environment, impacted athletes' responses to stress. To test this idea in the lab, researchers measured psychological and cardiovascular (heart and lung) responses to stress in athletes who had either high or low levels of connection with a leader. They found that, when there was a low connection between coaches and athletes, the athletes did not manage stress as well. In other words, a lack of teamwork between coaches and athletes led to a negative stress response in the athletes. Also, participants in one experiment performed 37% better on a concentration-related task when they had a strong connection with the leader. This is important because, in competition, athletes are often required to perform under pressure. This research taught us that togetherness between coaches and athletes can help athletes respond better to stress [4].

HOW TO DEVELOP TOGETHERNESS

How can coaches bring athletes together so that they are connected and feel a strong sense of belonging? One way to achieve this is through the 3Rs intervention. The 3Rs focus on three stages of enhancing togetherness: reflecting, representing, and realizing. In the reflecting stage, each team member completes an identity map—that demonstrates the network of groups that they are part of—and shares previously unknown stories with other teammates, to promote understanding of each other. In the representing stage, the team agrees on a shared set of values that embodies what is unique about the team. For example, maybe the team has a vision to be supportive to each other, or to be innovative and creative in the way they play their sport. Finally, in the realizing phase, the team achieves or at least makes progress toward their shared vision, while organizing events that help the team to live out their values.

Researchers have found that the 3Rs are beneficial for promoting a stronger sense of togetherness, along with increased effort both during and away from formal training. The influence of the 3Rs on sport *performance* is not as well-understood. There are few studies in this area, and none of them investigated performance in terms of goals scored or any other measurable indicator of success.

SUMMARY

In this article, we reviewed the theories and research evidence supporting the idea that the best sport teams and leaders are created based on togetherness. The 3Rs are one method that can be used to create togetherness in sport teams. It is togetherness—not the number of star athletes on a team—that makes a sport team greater than the sum of its parts!

AUTHOR'S NOTE

Many famous athletes and coaches talk about the importance of teamwork. Yet there is often a focus on the sport teams with the individual star players, or the ones with the best talent when we discuss who will be successful. This article brings to life the importance of teamwork and leadership for sport teams. We focus on the latest science of teamwork and leadership. We share how thinking in sport psychology has transformed from a focus on individual star players to a time now where togetherness has been discovered in contemporary research as the key ingredient to sport team success. As well as the latest science of teamwork and leadership, we talk about the original theory that helps us to explain how and why togetherness is so important for team performance. Here, we draw on the role of coaches and explore their role in creating togetherness, as well as the impact leaders can have on athletes' health more generally. As Marcus Rashford put it so well: "Just look at what we can do when we work together."

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YOUNG REVIEWERS

THE SCHOOL FOR SCIENCE AND MATH AT VANDERBILT, AGES: 14–15

We are a class of students from all over Nashville, who come together once per week at Vanderbilt to learn more about science, technology, engineering, and mathematics. We conduct experiments in our classroom and in labs on campus!

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TEAMWORK MAKES THE DREAM WORK: HOW TO BE A GREAT TEAMMATE

Kaitlin L. Crawford and Desmond McEwan*

Department for Health, University of Bath, Bath, United Kingdom

YOUNG REVIEWER:

STELLA

AGE: 11

Teams are groups of people who work together to achieve a common goal. Maybe you play on a sports team, perform in school plays, or work on a group project for a class. These are all examples of teams. You may have heard your coach or teacher talk about the importance of teamwork and being a good teammate. Teamwork is what teams do to maximize their chances of achieving their goals, like winning a basketball game, putting on a stellar school play, or obtaining a high mark on a group assignment. Sometimes it can be difficult for people to come together and work effectively as a team. In this article, we talk about what teamwork is and how teams can improve the way they work together before, during, and after games. We also explain how teammates can support one another when faced with obstacles and conflict.

At some point in our lives, most of us will be a part of a team. Maybe we will join a sports team, be cast in a school play, or be assigned a group project to complete. You may have heard your teachers, parents, and coaches talk about the importance of teamwork and how

working together as a group can help teams achieve their goals [1]. But what exactly is teamwork? Teamwork behaviors are the things that team members do as a group to meet team goals, like winning a basketball game or completing a group assignment [2]. In this article, we will describe how the members of a basketball team can use teamwork before they play a game, while they are playing, and even after a match, to improve the way they play as a group (Figure 1). While we will be using a basketball team as the main example throughout this article, everything we discuss can apply to *any* type of team, in any sport or other activity.

HOW CAN TEAMS WORK TOGETHER BEFORE COMPETITION?

PREPARATION

Getting ready for an upcoming competition by practicing skills or plays, or simply talking with your coaches and teammates about what you want to work on.

The first part of teamwork that we must consider is **preparation**. This is when team members figure out what they want to achieve during the season or even in the next game. It can be very helpful for teams to take some time to plan how they want to play as a team [2, 3]. A basketball team might decide to set some team goals before a game. One goal might be to improve their skills, such as passing, shooting, or rebounding. The team might also set the goal of being supportive toward teammates during the game. To meet these goals, it is important that the team talks about *how* they plan to achieve each goal [2, 3]. For example, if the goal is to improve skills like dribbling or shooting, the team may decide to set aside time during each practice to work on those specific skills. If the team's goal is to be supportive to teammates, the team may choose to talk about how a supportive

Figure 1

Teamwork can happen before, during, and after a game—as well as all season long!

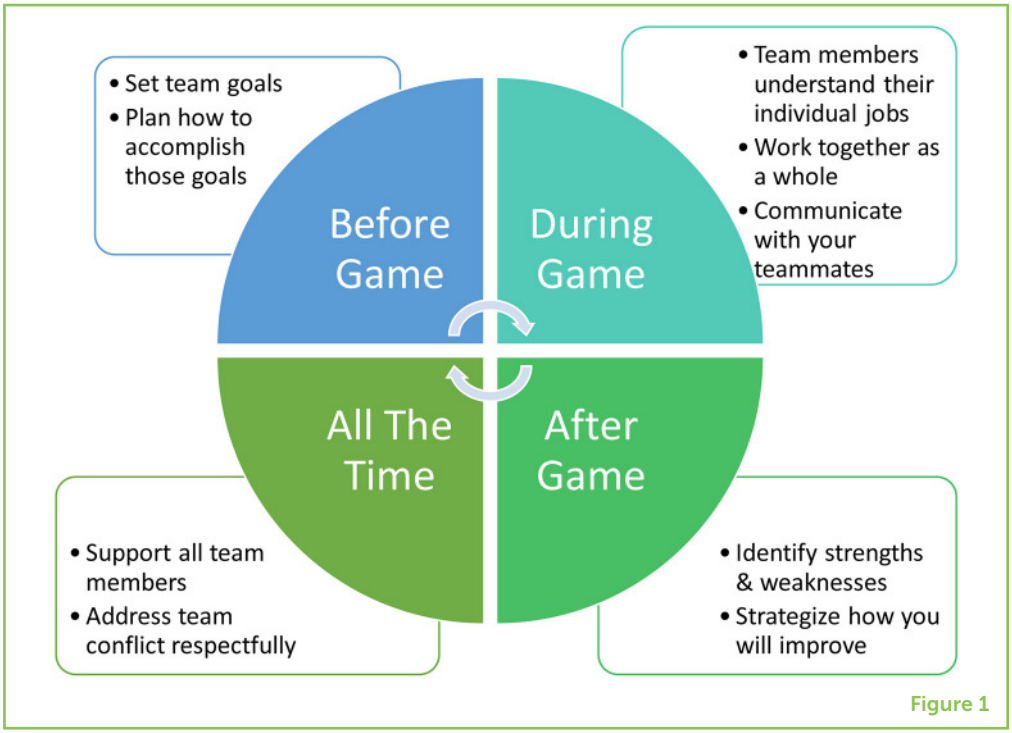

Figure 1

teammate acts, both on and off the court. The team may make it their goal to cheer on their teammates, to give each teammate a high five, or to provide some encouragement to a teammate who may be struggling with a skill. Similarly, we might use preparation with our families when we are planning a trip or a hosting a party. It might be helpful for all family members to discuss what they will do to help prepare for an event, like packing the suitcases before a trip or preparing the food for the party guests. If everyone identifies a way that they can help, then things will likely go more smoothly.

Think for yourself: What are three things your team can do to prepare for an upcoming game, performance, or assignment, to meet your goals?

COORDINATION

Working together to all be in the right spot at the right time; involves being in sync or timing your movements with those of other teammates.

COOPERATION

Working together with teammates to achieve a common goal; involves trusting that everyone will do what they are supposed to do and play the best they can.

COMMUNICATION

Sharing information and ideas with our teammates and coaches; can be expressed out loud or through body language.

GAME DAY: TEAMWORK DURING COMPETITION

The second part of teamwork is focused on what happens *during* a game. For the basketball team to play at their best, they must consider the 3 Cs: coordination, cooperation, and communication [2, 3]. **Coordination** allows each team member to know what his or her role is on the court. For example, when the team is trying to score a basket, each team member needs to be in the right spot at the right time, so that everyone's movements are timed properly [2]. Next, it is important for a team practice **cooperation**, by having all members perform their individual roles to their full potential, while also keeping an eye out for teammates [2, 3]. When a basketball team is on defense, the players on the court not only need to focus on who they are guarding, but they also need to be ready to help a teammate who needs back up. The last of the 3 Cs is **communication**, which means what we say to our teammates during play. Talking with teammates is important because it helps everyone stay on the same page—particularly since things can change so quickly during a game. Communication helps teams adjust or change things up on the fly [2, 3]. Outside of sport, we can use communication to talk to our families, friends, and loved ones about how we are feeling or how our day went. Communication allows our teammates and loved ones to stay up-to-date on our lives as well as to understand when we might be feeling down and in need of cheering up.

Think for yourself: How could you use communication, coordination, or cooperation with your friends, family, classmates, or teammates, to improve teamwork?

IMPROVING TEAMWORK POST-GAME

The final phase of teamwork focuses on how we can improve teamwork after the game is over. During a game, things happen quickly and sometimes we do not have time to make big changes or discuss

how we performed as a team until *after* the game. A team can do two things to improve their teamwork after the game is over: **evaluate** or discuss as a group what the team did well and what needs to be improved, and decide how the team will make any **adjustments** or changes to the way they play [2, 3].

EVALUATE

Talking about the parts of practices or games that were good and the parts that might need improvement.

ADJUSTMENTS

Small or big changes that a team can make to play together better.

It is not only important to *identify* your team's strengths and weaknesses but also to discuss how your team can *maintain* their strengths while also *improving* their weaker aspects. Perhaps your basketball team did an excellent job defending your opponent during the game, but only made half of their free throws. With this information in mind, it is key to make the necessary adjustments as a group. To help the team score a higher percentage of free-throw shots during a game, maybe the team needs to spend more time in practice, breaking down free-throw shooting technique; or perhaps the team can create drills to help players make their free-throw shots under pressure.

Think for yourself: Think back to a game or situation in which your team did not perform at their best. Name one thing your team could improve on and suggest one way that the team could improve that aspect before the next game.

STICKING TOGETHER THROUGHOUT THE SEASON

Working together as a team is not always easy! Each team member is different and unique. We all have different strengths, weaknesses, personalities, and past experiences. Often, individual team members and the group as a whole encounter obstacles during a season. Therefore, it is important that every team is prepared to respond to obstacles and support its members when problems arise. Even though you or one of your teammates may be dealing with a personal problem that is separate from the team, it could still have an effect on how the team performs [4]. Supportive teams and teammates always find both big and small ways to help team members who need it. Support might be as simple as offering words of encouragement to a teammate who is struggling or talking to a trusted adult (parent, teacher, or coach) about a problem you or one of your teammates are dealing with.

In any team, it is possible that conflict between teammates will arise. Not only is conflict normal, but it can also be a positive learning opportunity for teams. Teams, families, and friendship groups can prepare for potential conflicts between members by having strategies to help manage those situations. Strategies that help individuals express themselves and communicate their concerns can limit the amount of damage that a disagreement or issue can cause a team, family, or friendship group [5].

Think for yourself: Imagine one of your teammates or friends is feeling nervous before a big game or other challenge. What could you, as a teammate or friend, do to help that person?

FINAL THOUGHTS ON TEAMWORK

We will all find ourselves on a team on the field, court, classroom, or stage at some point in our lives. How we interact with our teammates massively impacts not only the way we perform but also how much fun we have with our teams [1, 2]. We hope you have learned some tools to help you and your teammates work together before, during, and after a game or other event. Being a good teammate is not solely about helping your team *win*, but also about supporting your team members and helping each other be the best we can be. As they say, teamwork makes the dream work.

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YOUNG REVIEWER

STELLA, AGE: 11

Hi, I am Stella! I enjoy dancing, playing tennis, watching Star Wars, singing/acting (and especially making jokes, that crack me up!), and I also really like reading Percy Jackson. When I am at school, I really enjoy doing STEM projects with my friends and working in a team, one of my favorite projects is Spike LEGO! I live near the beach in Sydney, with my mum, dad, and sister, and we like to go for walks along the coast. Peace out!

AUTHORS

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Kaitlin L. Crawford is a first year Ph.D. student at the University of Bath in Bath, England. She is originally from North Vancouver British Columbia, Canada. Kaitlin grew up playing lots of different sports including field hockey, basketball, figure skating, soccer, track and field, and her favorite, volleyball (both indoor and beach). Before she went to university, Kaitlin also performed in many school plays and was an active member of her school student council. She believes that dogs, like her best friend Thad the Bulldog (see photo), are often cooler than people and that Cap'n Crunch is the best breakfast cereal!

DESMOND MCEWAN

Dr. Desmond McEwan is a chartered psychologist and assistant professor at the University of Bath. Originally from western Canada, he now resides in Bath, England. He is interested in learning how teams can work most effectively together and achieve their goals. When he is not working, he is typically spending time with his wife (Alicia) and dog (Ella), watching sports (especially Formula 1 and ice hockey), and eating far too many chocolate chip cookies! *d.a.mcewan@bath.ac.uk

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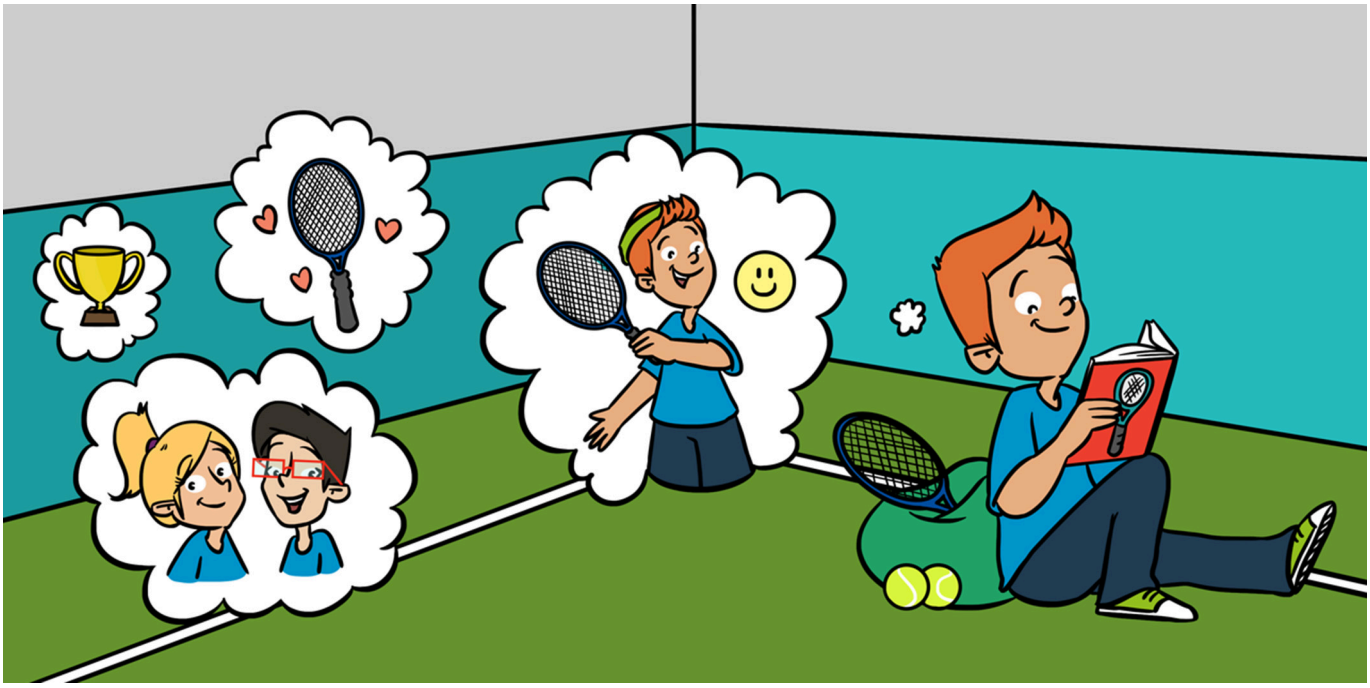

WHAT MOTIVATES YOUNG ATHLETES TO PLAY SPORT?

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YOUNG REVIEWERS:

COOPER
AGE: 14

NIKHIL
AGE: 15

Motivation is a key factor in young people choosing to play sport outside of school. For example, when playing sport, you could be concerned with getting better at skills, or you might be more focused on being better than other athletes. Moreover, you could choose to take part in sport because you enjoy it, or you could participate because your parents say so. In this article, we explain these two ways of looking at motivation—one that is all about the goals you strive for, and the other that is all about your reasons for taking part. Sport scientists have used these approaches frequently to understand motivation in youth sport and to promote more rewarding experiences. To stay in youth sport longer, it is better if you want to improve yourself rather than to out-do others, and better if you want to be involved rather than feeling forced to participate.

Motivation is a wonderful thing. It gives you energy and makes you want to do specific activities, like playing organized sport. Millions of young people all over the world engage in competitive sport from

an early age, and many continue throughout their teenage years. For some people, sport is a wonderful experience that helps them develop as athletes and as people. For others, their time in sport is short-lived, as they discover it is not what they want or because they feel they are not good enough. So, what influences whether sport is rewarding? In this article, you will read about key features of motivation that help to answer this question. The first section deals with your **achievement goals**, and the second looks at your **motivational regulations**, or reasons for taking part.

ACHIEVEMENT GOALS

What you aim to do (desire) to feel successful.

MOTIVATIONAL REGULATIONS

Reasons for doing something that show higher or lower quality motivation.

GOALS IN SPORT—WHAT ARE YOU TRYING TO ACHIEVE?

Why do some young people participate in sport and excel, while others give up? One answer comes from achievement goal theory [1]. This theory gets its name because there are two different, but sometimes complementary, ways of striving to be good at sport, which are called achievement goals. A goal is something you try to do or aim for, and relates to how you view your own ability. For example, in sport, you might have the goal of wanting to improve your skills—maybe you want to beat your personal record or develop your technique. This is called having a **mastery goal**; you are trying to learn and develop yourself in sport to feel successful. On the other hand, you might have the goal of wanting to be better than everyone else—you want to win or do things faster or more easily than your teammates or competitors. This is called having a **performance goal**; you are trying to show that you are better than others and that is what makes you feel successful in your sport.

MASTERY GOAL

A desire to get better without comparing yourself to anyone else.

PERFORMANCE GOAL

A desire to be better than others.

Why are these two goals important for understanding whether young athletes stay in sport or quit? Well, these two ways of viewing your ability have very different consequences. When you have a mastery goal, you are focusing on improving your own skills, learning new things, and developing in your sport. You are more likely to enjoy your sport and want to participate. You will feel happy, proud of your efforts, and satisfied with your performance. These feelings make you to want to keep going. However, when you have a performance goal, you may be worried about the competition because you do not know if you will be the best or win at your sport. As the group of people that you compare yourself with often changes (because better players join your team, you move up in age group, or other players simply improve faster than you), you can never be sure that you will be among the best. Consequently, you will be less likely to satisfy your goals and more likely to drop out.

Interestingly, young athletes show preferences for either mastery or performance goals, but some will adopt both at various times and in different situations. These athletes often stay longer in sport because they have more than one way of viewing their abilities

and experiencing success. Nevertheless, most young athletes who remain in sport effectively employ mastery goals that are based on self-improvement. They are more interested in the processes of sport performance (techniques and tactics) and less in the outcomes of competition. That is, they constantly want to improve at and master the various elements and demands of their sport, and they will practice and train enthusiastically. The aspect of enjoyment leads to our second way of understanding motivation in youth sport.

MOTIVATIONAL REGULATIONS IN SPORT—WHY ARE YOU TAKING PART?

An alternative way to understand motivation in youth sport is to examine your reasons for taking part. The theory we are going to look at this time is called self-determination theory [2]. This theory involves the idea of motivational regulations, or more simply, your reasons for involvement in sport. These are the answers you give when asked, "why do you play your sport?" Do you participate freely, because you choose to, or because something or someone else has forced you to be involved? Let us look at these reasons in a bit more detail. They are really important because they reflect the quality of your motivation in sport.

INTRINSIC MOTIVATION

The highest quality of motivation, involving enjoyment and fun.

What does it mean to have a high quality of motivation in sport? Many of you will say that you love sport, it is great fun, and you really enjoy everything about it. This shows **intrinsic motivation** and is the most positive form of motivation because you want to play sport for its own sake, and you freely choose to play. At the other extreme, it is possible that you do not want to be there, and you cannot see the point of it at all. Although this absence of motivation is more likely to be seen in school physical education settings, it can be present in youth sport if, for example, you are forced to join a sport team by your parents. You might feel you have little ability, or feel you have no friends in sport. These are clearly not good reasons for sticking with sport!

EXTRINSIC MOTIVATION

Lower quality motivation than intrinsic motivation, not based on the activity itself.

In between these two extremes are several other types of motivation, all of which can be described as **extrinsic motivation**. Types of extrinsic motivation differ in the degree of freedom that you feel playing sport. More freedom equals higher-quality motivation because you want, rather than feel forced, to participate. For example, you might want to play sport because it improves your fitness or allows you to make friends. These are more positive reasons for taking part. Less positively, you might play to please your friends and parents and avoid their disappointment if you drop out. Even worse, you could play sport to avoid punishment from your parents or just to win trophies and other rewards. So, some forms of extrinsic motivation are more desirable than others. The important point is that the more intrinsic your motivation is, or the more it reflects positive extrinsic reasons, the more rewarding sport will be. Without these reasons for playing,

you will probably feel like you do not want to be there, and you will possibly show no motivation whatsoever (Figure 1)!

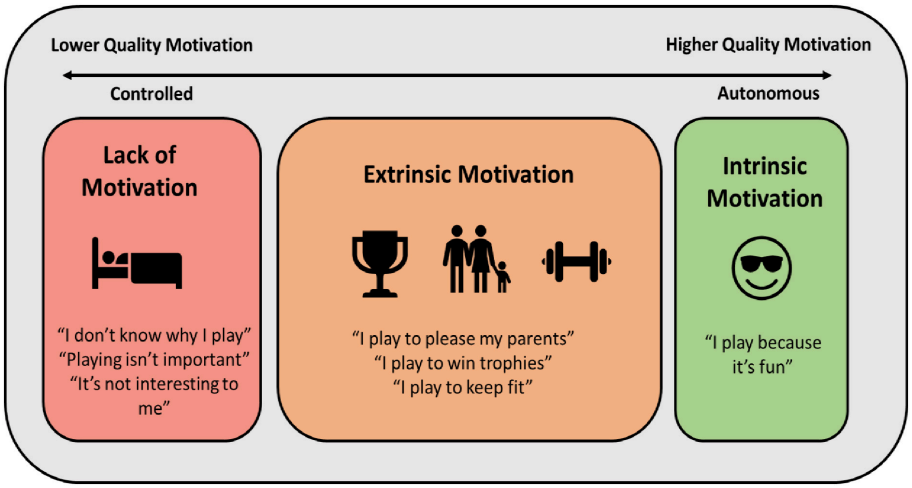

Figure 1

Reasons for playing sport can be more autonomous or more controlling. More feelings of autonomy and fewer feelings of being controlled lead to higher quality motivation. Not all extrinsic reasons are equally bad. Playing to keep fit, for example, is better than playing to win trophies.

AUTONOMOUS REASONS

A feeling that you do something by choice.

CONTROLLED REASONS

A feeling that you are forced to do something.

You will have many reasons for playing sport, and the balance between feeling like you want, should, or must participate will determine the quality of your sport experience. In reality, your involvement in sport is probably a result of both **autonomous** (freely chosen) and **controlled** (forced) reasons. To find sport more rewarding, you want the autonomous reasons to outweigh the controlled reasons. Whether that happens depends a great deal on the adults who support you. Coaches and parents can help you to develop better quality motivation in sport.

CONCLUSION

To sum up, we have shown you two ways of understanding your motivation in sport. These are not the only ways. The take-home message is that sport will be more positive if you try to use mastery goals to develop your skills, and if you experience a feeling of personal choice about being there. With motivation like this, it is more likely that you will only want to stop being involved in youth sport when you become too old to play!

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YOUNG REVIEWERS

COOPER, AGE: 14
Hi my name is Cooper. I love to play basketball and hang out with my friends. I am in grade 9 and my favorite subject is math. I also enjoy drawing and cooking.

NIKHIL, AGE: 15
Nikhil is interested in neuroscience and enjoys learning about the many intricacies of the brain. In his free time he enjoys origami, listening to music, playing the piano and spending time with his dog, and kip.

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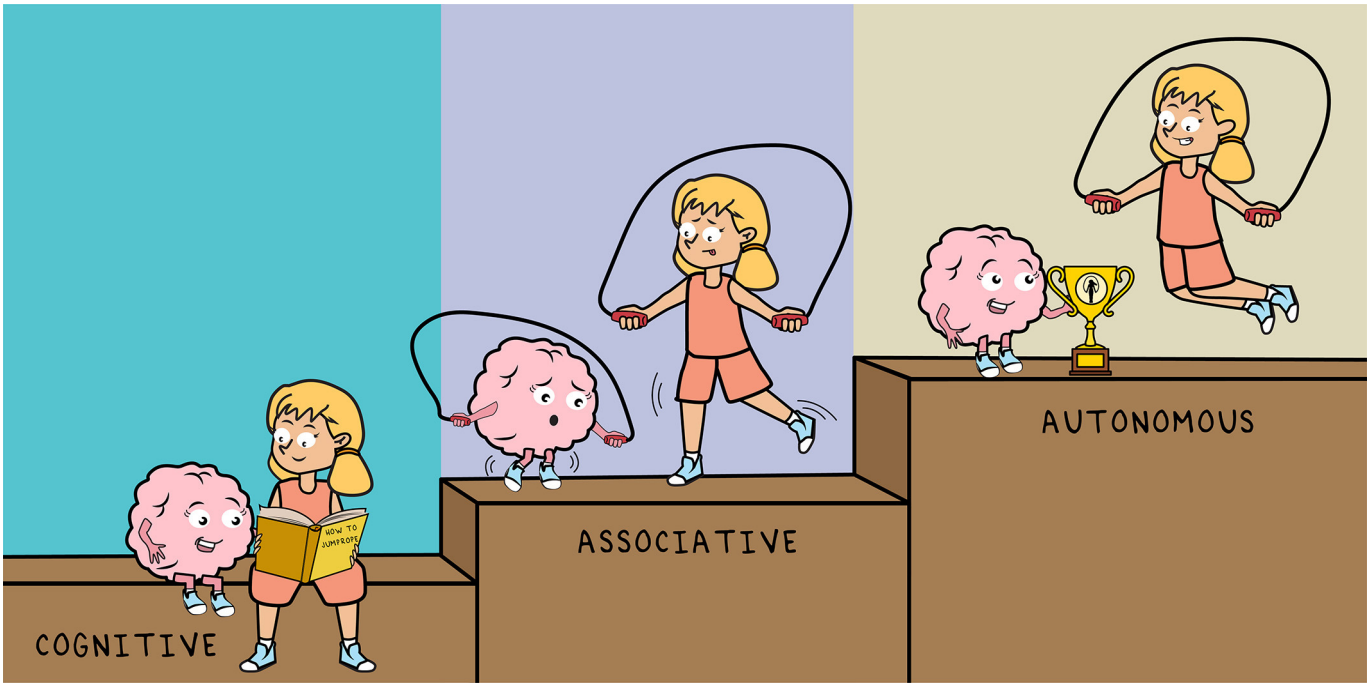

HOW DO WE LEARN SKILLED MOVEMENTS?

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YOUNG REVIEWER:

BASMA

AGE: 8

All athletes were novices at one point in their lives, even Olympic gold medalists and world champions. They committed years of practice to become competitive and even longer to become elite performers. This transformation from novice to expert requires motor learning, which is the process of acquiring and refining motor (movement) skills. Inspired by the observation that motor skills evolve from being effortful to effortless, psychologists have divided motor learning into three separate stages: the cognitive stage, in which we gather information about the actions needed to perform a skill; the associative stage, in which we refine our movements; and the autonomous stage, in which our movements become smooth and automatic. Here, we will explore how a fictional young athlete, Amy, progresses through these three stages and uses different parts of her brain to make the transition from novice to expert.

INTRODUCTION

How do you cross the street or pick up your heavy backpack? How do you get out of bed or open a car door? It is astonishing how we can move and coordinate so many different muscles at the same time

with so little effort. But not all movements are alike. There are large movements that involve the body's biggest muscles, like the bicep muscles that help you throw, or the quadricep muscles that help you walk. There are also smaller muscles to control the fingers, essential for fine and precise movements, such as those necessary for playing the piano or using a pencil.

How do we acquire new movements as well as fine-tune old ones? We do so through the process of learning and refining **motor skills**. Inspired by the observation that motor skills evolve from being effortful to effortless, Fitts and Posner proposed a model that divides motor learning into three stages: the cognitive stage, the associative stage, and the autonomous stage [1]. In the **cognitive stage**, we rely on cognition, or the processing of new information, to determine what steps are necessary to make a movement accurately. In the **associative stage**, our movements are refined by feedback from the environment (for example, how far a frisbee misses a goal) and feedback from our bodies (for example, whether the frisbee was thrown with proper technique and posture). In the **autonomous stage**, our movements become automatic and flawlessly executed, without really having to think about them. To illustrate these three stages of motor learning, let's examine how a fictional young athlete named Amy learned to play frisbee [2].

MOTOR SKILLS

The ability to make a specific movement, like kicking a ball or tying a shoelace.

COGNITIVE STAGE

The stage in which significant improvements in skill arise from instruction and demonstration.

ASSOCIATIVE STAGE

The stage in which movements are steadily refined through trial-and-error.

AUTONOMOUS STAGE

The stage in which movements become automatic and effortless

THE COGNITIVE STAGE

Amy's motor learning journey began with the cognitive stage, in which Amy spent a lot of time trying to understand how the game of frisbee works and what types of movements are required. She consulted books and instructional videos to figure out all the physical motions needed to throw the frisbee, trying to absorb all this new information as fast as she could. For instance, Amy realized that she needed to grip the frisbee with her index finger and thumb, curl her wrist toward her body, and release the frisbee while rotating her shoulder across her body.

Amy's first few tries were way off. The frisbee barely spun. Even on the next day, the frisbee spiraled out of control, flying straight into the bushes. Her frisbee throw lacked consistency, which is common in the cognitive stage. Despite her frustration, Amy continued to rehearse the sequence of movements required for a successful throw.

THE ASSOCIATIVE STAGE

After a few weeks of training, Amy became fluent in the basic frisbee throw. Her improvements were momentous, but her throw was far from perfect. Amy then entered the associative stage of motor learning. She transitioned from learning *what* movements to perform to fine-tuning *how* these movements should be performed. Through trial-and-error, Amy became more accurate by tightening her grip

and including a follow-through after her throw. Amy's movements became more consistent and refined in a steady manner, relying less on her knowledge of frisbee and more on her sensory feedback like **proprioception**, which is the awareness of where the body is in space.

PROPRIOCEPTION

The awareness of where the body is located in space; body awareness.

THE AUTONOMOUS STAGE

After years of continuous practice, Amy has become an expert, and is the captain of her frisbee team. Amy is now in the autonomous stage of motor learning, throwing a frisbee quickly and accurately across the entire field. Her movements have become effortless, automatic, and at times, even outside her awareness. Her learning, however, has started to plateau, with minimal improvement even with extended practice (Figure 1).

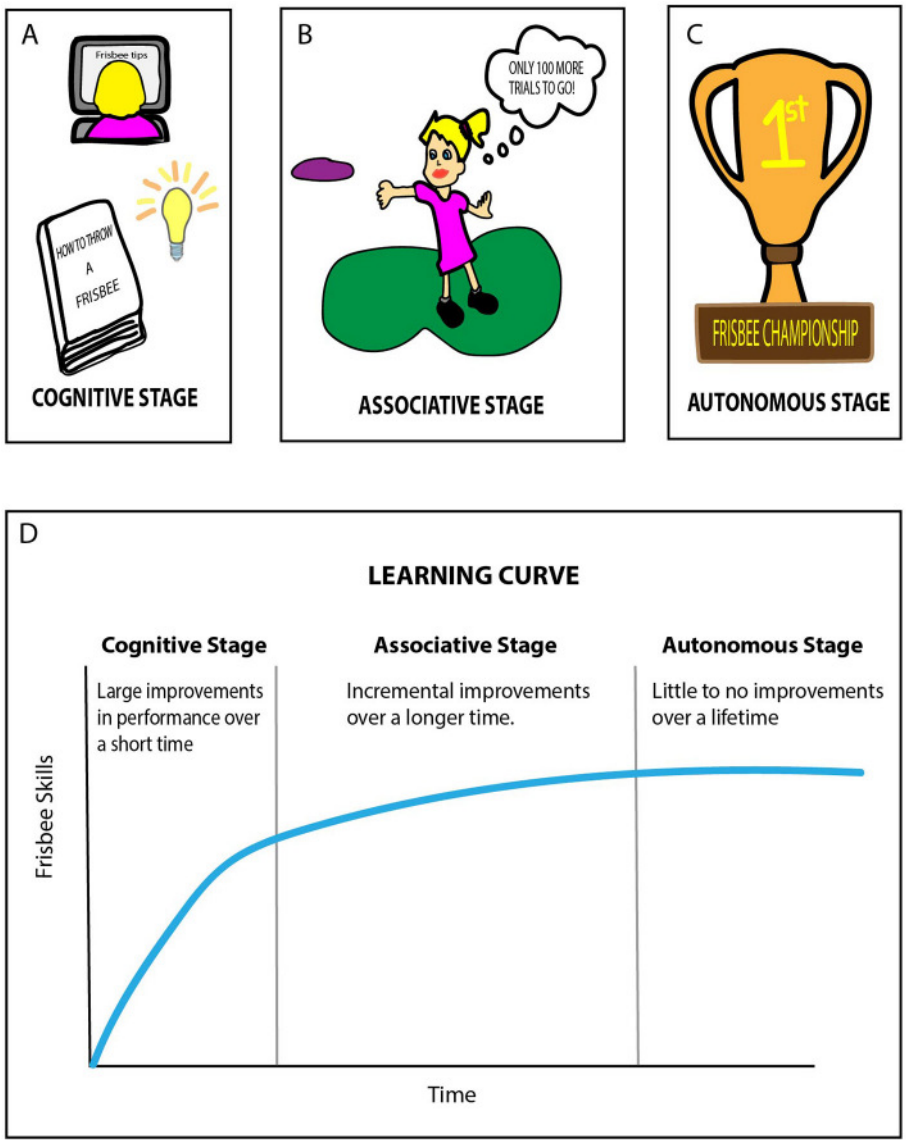

Figure 1

The stages of motor learning. **(A)** In the cognitive stage, Amy learns how to throw a frisbee from instructional manuals and videos. **(B)** In the associative stage, Amy continues to learn via trial-and-error over many months of practice. **(C)** In the autonomous stage, Amy's throw has become automatic and effortless, enabling her to win first place in the nation. **(D)** Amy's frisbee skills improve rapidly in the cognitive stage, gradually in the associative stage, and reach a plateau in the autonomous stage.

FORGETTING AND REMEMBERING

If Amy stops practicing for a long time, she might forget some of what she has learnt. However, skills that are well-practiced and automatic are forgotten more slowly than skills that are less engrained in memory. If Amy picks up a frisbee after not playing for a while, she may initially feel a sense of "rustiness" or clumsiness from forgetting these motor memories. However, she will be able to re-learn frisbee skills faster than when she learnt them for the first time. For instance, re-learning how to ride a bike after years of not biking will be much quicker than learning how to bike for the first time.

HIPPOCAMPUS

The region of the brain associated with forming and storing new memories.

CEREBELLUM

The region of the brain responsible for maintaining posture and integrating signals from the environment and body to make movements more accurate and efficient.

MOTOR CORTEX

The region of the brain that coordinates different muscles and specific sequences of movements.

THE ROLE OF THE BRAIN IN MOTOR LEARNING

The brain is divided into many regions, and these regions perform specialized functions that, together, allowed Amy to learn how to throw a frisbee (Figure 2). There are three brain regions that seem to be essential in motor learning: the hippocampus, cerebellum, and motor cortex [3]. The **hippocampus** is thought to store new memories and is crucial for remembering the necessary steps of a frisbee throw during the cognitive stage of learning. The **cerebellum** is thought to help refine the frisbee throw using visual feedback and proprioception, and it is especially important for learning via trial-and-error during the associative stage of learning. Finally, the **motor cortex** helps coordinate the direction and force of a frisbee throw, relaying information from the brain to the muscles in an automatic manner. As these brain regions (and many others) become more in sync, Amy's frisbee throw will become less effortful and more automatic in the final, autonomous stage of learning.

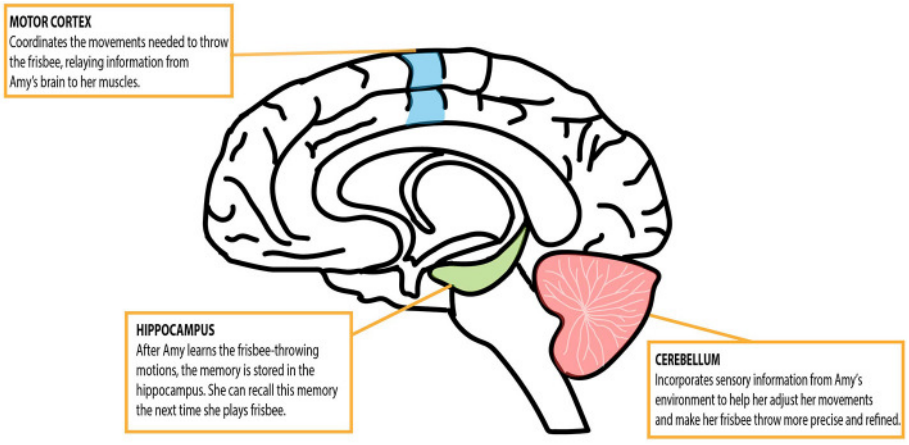

Figure 2

The role of the brain in motor learning. There are three main regions of the brain associated with motor learning. The hippocampus stores memories of the motor skill, the cerebellum helps adjust movements through trial-and-error, and the motor cortex coordinates the direction and force of movement. The figure represents a left side view of the brain.

CONCLUSION

Skilled movements, like throwing a frisbee, evolve through various stages of learning, and recruit many brain regions and muscle groups. Next time you pick up a new sport or skill, notice how you progress through the three stages of motor learning: the cognitive stage, in which major improvements in skill arise from instruction and demonstration; the associative stage, in which movements are gradually refined through trial-and-error; and the autonomous stage, in which movements, once effortful, become automatic and effortless. In conclusion, Fitts' and Posner's model has not only helped us to understand the basis of motor learning but has also made sports training for athletes and physical rehabilitation for patients so much more effective.

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YOUNG REVIEWER

BASMA, AGE: 8

I am an 8 years old girl. I grew up in Lebanon, In a very beautiful village. I love Science because I can understand how the brain works. I also love chocolate and painting.

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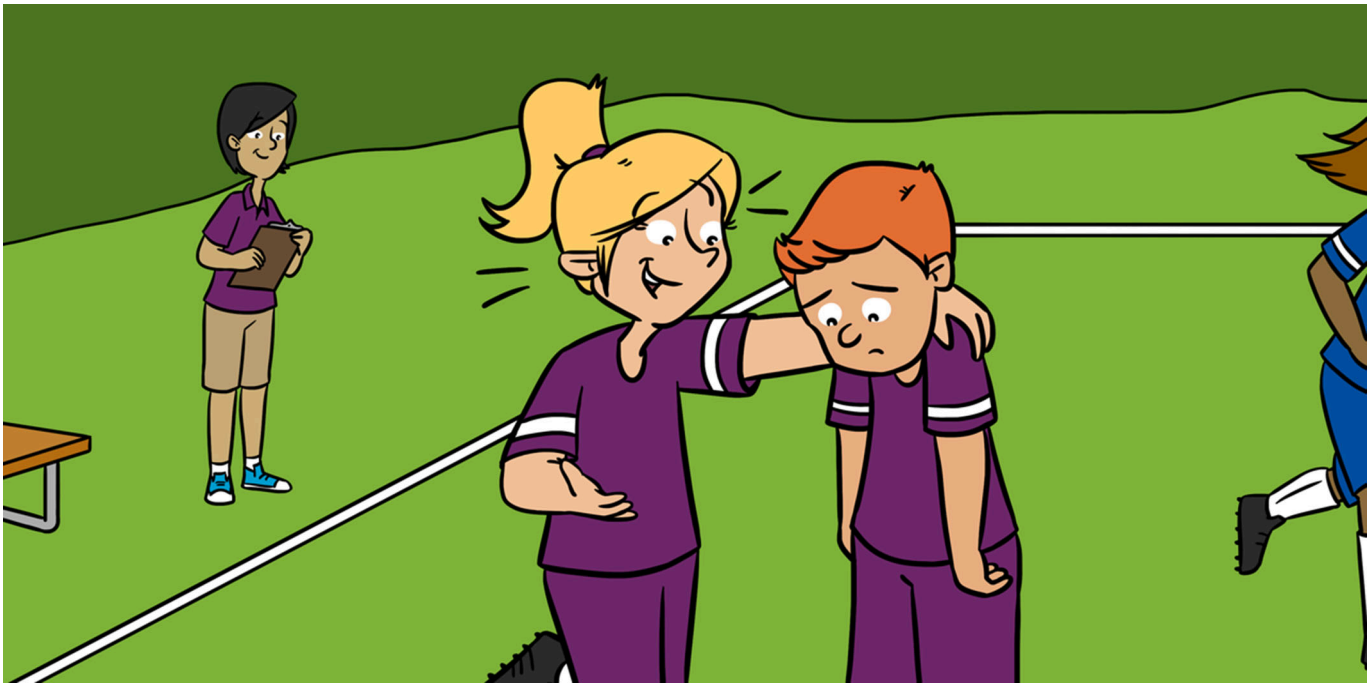

TO EXCEL IN SPORT, TAKE CARE OF YOUR 5CS!

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YOUNG REVIEWERS:

GRACE
AGE: 15

JACOB
AGE: 11

Youth sport offers an important opportunity for young people to develop their technical and physical skills. However, these are not the only important elements of performance. A young athlete's mental and social skills are vital for coping with some of the challenges that sport brings. In this article, we introduce you to the 5Cs—a new method used by coaches to help develop mental and social skills in their athletes. We describe the behaviors that we see in athletes who show high levels of the 5Cs: commitment, communication, concentration, control, and confidence. We discuss how recent research with youth football coaches has helped them to apply coaching strategies and techniques to aid the development of these important qualities in young athletes and their teammates.

THE 5CS

When coaches work with young athletes, it is not only the athletes' technical, physical, or tactical skills that the coaches are trying to develop. Every sport has its own unique set of mental demands, and these demands are different for team sports vs. individual sports.

In individual sports such as tennis, you go head-to-head with a single opponent and you are entirely responsible for every decision and tennis stroke that you make (about every 1.5 s!) You have to make hundreds of decisions in a match, but there is no coaching from the side lines, and no substitutes to help you out if you are underperforming. There are no draws or ties, no time limits in a match, and no personal best scores at the end. There is simply a winner and a loser. In team sports such as football, you must be equally as focused when you do not have possession of the ball as when you do—through looking for teammates and anticipating movements. You have the pressure of performing well and consistently to secure your place on the team. You are challenged to recover quickly after mistakes, and your support, encouragement, and leadership skills are tested, particularly if your teammates are not playing well and frustrating the team's chances of success.

All types of sport impose various mental and emotional pressures on young athletes because of the way each sport is structured and played. This means that mental and social skills are very important for young athletes to master. Sport psychologists have long been interested in helping athletes to improve their performance [1, 2]. Mental skills can help with the mental and emotional demands of a sport, and sport psychologists have come up with some of the most important mental skills and qualities that young athletes can develop and practice [3, 4]. In this article, we present the 5Cs as an emerging approach that coaches can take to help athletes develop the mental and social skills required for their sport [5]. We will define each C, discuss recent research, and give examples of the most important behaviors that young people can practice to develop their 5Cs.

THE 5CS ARE ESSENTIAL FOR SPORT

Young athletes and players can demonstrate a great variety of behaviors in sport—some of which are helpful to their performance and some of which are harmful. Imagine the coach of football team—let us call her Coach Jessica. She is watching a match and looking at the way her team is performing. Take a look at Figure 1 to see some of the words she uses to describe what sees in her players.

Coach Jessica sees many players demonstrating high levels of effort, determination, and persistence, but a few players seem to be giving up and not getting involved in the match. These players are also showing frustration and arguing with their teammates for making mistakes. One of the players encourages those uninvolved teammates to refocus and gives out instructions to support them. The uninvolved players switch back on and get their heads up. They start to get more involved and help out their teammates. Coach Jessica sees players competing with a higher energy and a more positive attitude, and the team starts to perform better.

Figure 1

Positive and negative behaviors and responses that Coach Jessica sees in her players during a football match.

Figure 1

Many of Coach Jessica's team members demonstrated several very positive mental skills, and some players showed better mental skills after being encouraged by one of their teammates. When we take a closer look at the positive and negative words in Figure 1, we begin to see that the players' behaviors can be grouped together. Take a look at the jigsaw puzzle in Figure 2.

Figure 2

The positive and negative behaviors and responses that players show can be grouped into the 5Cs: commitment, communication, concentration, control, and confidence.

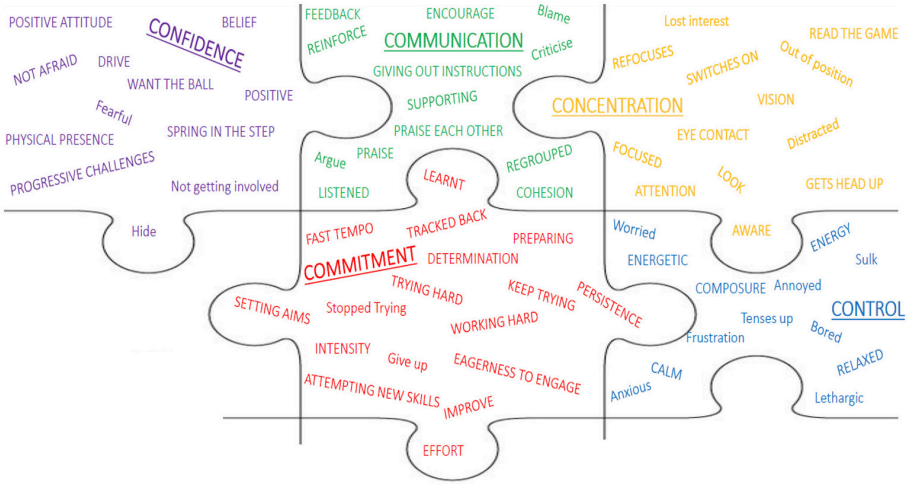

Figure 2

When you look at the jigsaw pieces, you can see five words beginning with C, in bold and underlined text. In capital letters, you can see the

positive behaviors associated with that C and, in lowercase letters, you can see the negative behaviors that represent the lack of that C.

Commitment

COMMITMENT

The quality or strength of your motivation to improve and persevere in the learning and performance of skills.

Commitment reflects the strength of your motivation to improve, persevere, and learn new skills. Commitment drives you forward and is demonstrated by athletes who show consistent effort from start to finish, high-quality preparation, and a desire for taking on new challenges. Athletes with great commitment focus on making improvements and learning from their mistakes. They take pride in how their efforts lead to progress, regardless of whether they win or lose.

Communication

COMMUNICATION

How well you send and receive information to and from others through behaviours such as encouragement, praise and acknowledging feedback.

Communication involves the social skills shown when building relationships with teammates, coaches, and parents. The quality of your communication skills are demonstrated in the ways that you send and receive information. Asking questions; sharing your thoughts; and giving encouragement, praise, and positive instructions are all ways of sending information to your teammates. Acknowledging a teammate or your coach with a thumbs up or a clap is a non-verbal way to send a positive message. Listening respectfully to a coach, accepting feedback, and taking advice or instructions from teammates are great ways of receiving information that can help your performance. Good communication is an essential social skill that acts like superglue for teamwork!

Concentration

CONCENTRATION

Your ability to consistently focus and refocus effectively on what is required for the task in hand.

Concentration is an athlete's ability to focus on the right thing at the right time. Athletes with great concentration stay focused on the key components of a task during many potential distractions that compete for their attention. If they lose focus, they are good at recognizing it quickly and often say a positive phrase to themselves or pick a key object (like the ball or a teammate) on which to refocus.

Control

CONTROL

Your ability to recognise, understand and manage thoughts and feelings so that you create an emotional state that helps your performance.

Sport inevitably brings feelings of nervousness because it is exciting and physical, and no one knows how the competition or match will end. With such uncertainty, a dose of nerves is completely normal, but it is important to stay in **control** of your feelings. Keeping calm, positive, and composed while also being alert and ready are some of the features of good emotional control. The ability to take care of your thoughts, feelings, and emotions is vital. Using slow, steady breathing techniques, listening to your favorite music, and showing positive, helpful reactions after making mistakes are some of the strategies that can make you a master of control.

Confidence

CONFIDENCE

The belief in your ability to perform well through making positive decisions and being fully present, assertive and engaged in your role.

Confidence is often what athletes experience and feel when their other 4Cs are going well. Because of their high commitment, communication, concentration, and control skills, an athlete with high confidence is likely to test out new skills, take calculated risks, show strong body language, and be a leader who supports others. These athletes will consistently fight to the end, regardless of whether they are winning or losing.

WHAT DOES RESEARCH TELL US ABOUT THE VALUE OF THE 5CS?

Sport psychologists believe that it is important for young athletes to practice their 5Cs just like they practice physical and technical skills [1, 2, 6]. However, not all sport clubs employ sport psychologists, so researchers have examined whether educating coaches about these concepts can help young people to master the 5Cs. In one study, researchers taught coaches about one C at a time and told them how they could help players to improve on that C [1]. Coaches were instructed to follow this procedure:

- The coach started the training session by asking players to talk about what behaviors and qualities they felt were important in terms of that C. The players provided examples of things they could demonstrate on the field.
- The coach then challenged the players to show some of these behaviors and work together on the field.
- When a player demonstrated an example of a C, such as positive encouragement to a teammate (communication), the coach praised the player and gave positive feedback.
- Players were encouraged to praise each other when they noticed a teammate demonstrating a particular C. For example, Jack said "that is such great determination, Chris, keep working hard" when Chris persevered (commitment) after making a mistake.
- The coach praised all the players when he saw them encouraging each other, which resulted in a positive and energized training environment.
- At the end of the session, the coach asked the players to share what they had learned, which C behaviors had been demonstrated well, and how they could improve next time.

The coaches practiced each individual C for 3 weeks before being taught the next C, until they had spent 15 weeks coaching all of the 5Cs. The players improved their levels of commitment, communication, concentration, control, and confidence in their practice sessions as the 15 weeks progressed [3], and the coaches reported greater confidence levels too, which made a difference in their players' mental and social skills.

In a second research study at a football academy, the parents of the players were also involved in offering perceptions of their children's 5Cs on the field, without knowing that, in secret, the coach was being educated on the 5Cs one at a time [2]. In this case, the players not only improved in their 5Cs over time, but parents also reported the same views on the progress of their children. Parents also noticed that their children were using some of the same skills at school. For example, one parent noted how their child had improved his English communication skills and was more confident at reading in public [4].

In both studies, coaches encouraged the players to support their teammates in showing 5Cs behaviors—both coaches and teammates have the power to support and influence young athletes. Although these initial results are promising, more research on the 5Cs is needed to verify the results and make sure this method is reliable. Future research should examine different sports and settings (for example, music or schoolwork). Research is currently in progress to determine how parents can reinforce the 5Cs in their young athletes, and several football academies in the UK are now using the 5Cs programme to create a positive and caring culture for players, coaches, parents, and other support staff [7].

CONCLUSION

Sport can place lots of demands on young people, but with the help of coaches, parents, and teammates, you can overcome these demands by developing positive mental and social behaviors. The 5Cs is an emerging approach that focuses attention on some of the most important qualities young people can show in sport, to help them have positive experiences [6]. Although results are promising, more research across different sports is needed to determine the wider benefits and effectiveness of the 5Cs approach.

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YOUNG REVIEWERS

GRACE, AGE: 15
I was born in Brisbane but moved to the Sunshine Coast when I was 2 years old. I am 15 years old and in grade 10. I am passionate about psychology and mental health and am looking to become a clinical psychologist when I am older. I love cats and have 3 at home. I also have a younger sister called Lilly. My hobbies include reading books, with my favorite genres being young adult and dystopian, as well as singing. I also like French and will be studying it in years 11 and 12.

JACOB, AGE: 11
Hi! My name is Jacob, I have interests in math, coding in Python and Scratch, Minecraft, Roblox, and science. I have a Youtube channel called Emerald Cheetah Plays that is about Minecraft. I like playing chess, four in a row, backgammon, Monopoly, and card games. I live in Toronto with my parents and little sister, Noya. I also know how to brew Kombucha and regularly do so with my dad. I look forward to gaining experience as a peer reviewer.

AUTHORS

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Chris Harwood, Ph.D., is a professor of sport psychology at Loughborough University in the UK. His research interests and expertise lie in the psychosocial aspects of youth sport and athlete development, with a particular focus on the influence of parents and coaches. He has particularly focused his research in the fields of achievement motivation, sport parenting, and the 5Cs approach to athlete development (www.the5Cs.co.uk). As a registered sport psychologist and practicing consultant, he has worked extensively with the Lawn Tennis Association, the Football Association, the International Tennis Federation, and several professional youth sporting clubs and academies. *C.G.Harwood@lboro.ac.uk

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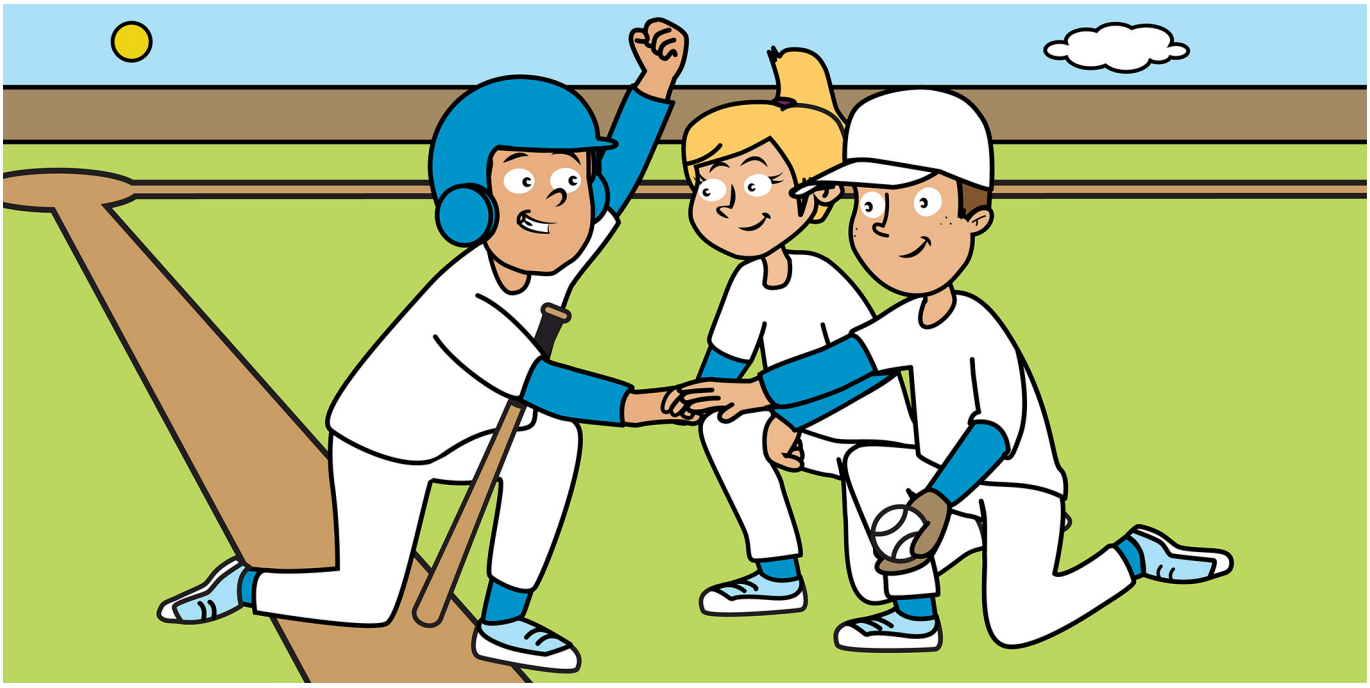

ALL ATHLETES CAN LEAD IN THEIR OWN WAY

Todd M. Loughead*, Mason B. Sheppard and Katherine E. Hirsch

Sport Psychology and Physical Activity Research Collaborative (SPPARC), University of Windsor, Windsor, ON, Canada

YOUNG REVIEWER:

BLAKE

AGE: 9

Did you know that not just coaches can be leaders on sport teams? Athletes are also an important source of leadership within teams. When you think of athletes performing leadership roles, you probably think of captains or assistant captains. While these are important sources of team leadership, athletes do not need to be captains or assistant captains to be leaders. In fact, all athletes can display leadership through their behaviors. Coaches can help athletes to be a part of team leadership. We provide some suggestions on how coaches can facilitate the development of leadership skills in their athletes. If athletes are not comfortable being team leaders, they can provide leadership by mentoring fellow teammates. There are many ways that athletes can provide leadership to their teams!

LEADERS ON A SPORT TEAM

When we think of leadership on sport teams, we often think of the coach as the team leader. There is good reason for this: coaches are responsible for selecting the athletes who will be on the team, planning practices, and choosing which athletes will play and when. It

is important to remember that every coach is different. Some coaches may be strong at teaching the technical aspects of their sports, while others are better at developing their players socially. It is unrealistic to expect coaches to meet all of their athletes' needs. Consequently, there is another source of leadership on sport teams—leadership that comes from the athletes. Our research has found that athletes are an important source of leadership within sports teams. We call this **athlete leadership**, and it happens when several athletes assume leadership roles within their team and influence teammates to achieve a common objective [1]. This definition highlights the fact that multiple athletes on a team can serve in leadership roles. As a result, athlete leadership is shared amongst a group of teammates.

ATHLETE LEADERSHIP

Influencing teammates toward a common goal.

ARE CAPTAINS AND ASSISTANT CAPTAINS THE ONLY LEADERS?

There are many athletes on a team who provide leadership. Teams have formal leaders and informal leaders. Formal leaders are athletes selected by their coach or teammates to be team leaders. These leadership roles commonly have titles, like captain or assistant captain. In addition to these formal leaders, teams also have informal leaders: teammates who gain status as leaders just by interacting positively with their teammates. Unlike formal leaders, informal leaders do not have official titles. Examples of informal leaders are athletes who encourage teammates to stay focused during a game, or athletes who have a lot of experience playing the sport. In our research, we found that teams are full of leaders, with every athlete being viewed as a leader by at least one teammate [2]. In fact, athletes can be viewed as leaders by their teammates even if those athletes do not think of themselves as formal or informal leaders. Based on this, any teammate can be a leader—including you!

HOW TO BE A LEADER

Team leadership is complex. No one athlete, or even a small group of athletes, on a team can meet the needs of every teammate. We believe that leadership is best viewed as a team property, meaning that the leadership behaviors that the team needs are shared by the entire group of teammates. Such shared leadership means that, at certain times or when certain situations present themselves, all athletes will fulfill a leadership role when it is necessary and, in other situations, they will step back to allow other teammates to lead.

Why is leadership shared amongst teammates? There are so many leadership behaviors that athletes use while leading their teams that it would be impossible for any one athlete to effectively display all these behaviors. Researchers asked athletes to rate how important it was for athletes to display 13 leadership behaviors [3]. The rating

used a 5-point scale, with 5 indicating that athletes strongly believed a behavior was important, and 1 indicating that athletes strongly believed that a behavior was not important. The results showed that 10 of the 13 leadership behaviors were rated close to 4 or above (3.91–4.87), indicating that, to be an effective team leader, it is important to display *many* of these leadership behaviors. Figure 1 contains a list of leadership behaviors that can help you show effective leadership on your team. Remember to practice the leadership behaviors that you are comfortable with. The idea is that you and your teammates together will cover all these leadership behaviors.

Figure 1

Ten leadership behaviors that athletes can display to show effective team leadership.

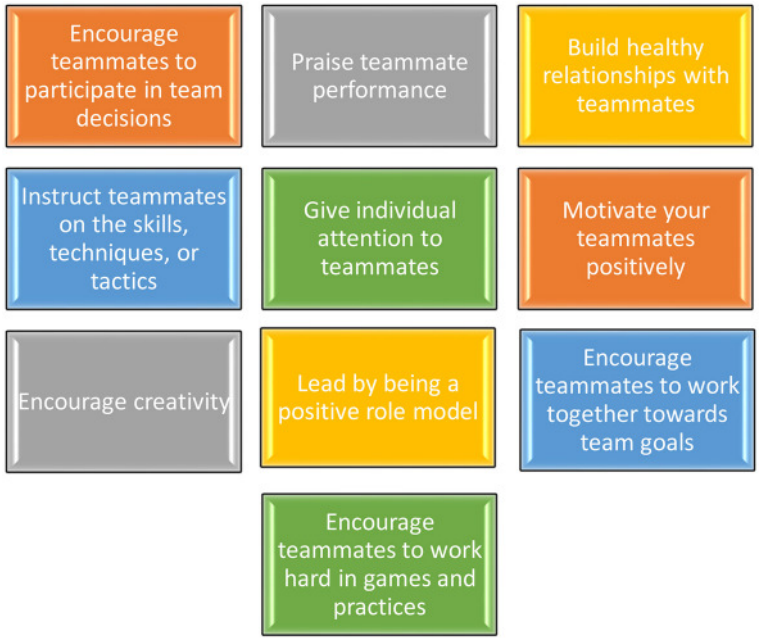

Figure 1

HOW CAN COACHES HELP ATHLETES BECOME LEADERS?

Coaches can help athletes become team leaders in various ways. Many teams have formal athlete leaders, such as captains or assistants, and coaches can help develop leaders by rotating players in these leadership roles. Throughout the season, different players are assigned the role of captain or assistant. This gives every player an opportunity to learn and practice leadership behaviors. Coaches could also assign other specific leadership duties, such as warm-up leader, dressing-room leader, and practice leader. Rotating these duties will also help spread the leadership experience amongst all teammates. Another way that coaches can help athletes to be team leaders is to provide them with leadership materials to read or watch at home. Afterwards, coaches and teammates could discuss what they learned from these materials and implement various leadership activities. These leadership activities could include team-building activities

and/or planning social team events. Overall, coaches can help athletes to be team leaders by providing many opportunities for all players to learn and practice leadership, which will help create a positive team environment.

CAN I LEAD IN OTHER WAYS?

If an athlete does not feel comfortable being a team leader, there are other ways to lead. For example, athletes can lead through **mentoring** [4]. Mentoring is a process by which an individual guides another person to support that person's development. There are many ways to mentor to a teammate. One way is by being a friend. It is important for athletes to have positive relationships with their teammates away from their sport. This can happen in social settings, in which teammates share hobbies or interests. For example, going to a restaurant, watching sporting events, or doing homework together promote **social engagement**. Athletes can also lead by acting as role models. Teammates may observe the characteristics of a role model athlete and try to model their own behaviors after that athlete. If an athlete follows his or her morals and values, teammates will try to be like that athlete on and off the field. Athletes can also lead by creating ways to communicate with teammates away from the sport. The use of social media, texting groups, and online video games are all ways to stay in touch with teammates. This can work for you, too. By being yourself and creating relationships away from your sport, your teammates will look to you as a leader, whether you know it or not.

MENTORING

To support and encourage a teammate in order to maximize their potential.

SOCIAL ENGAGEMENT

Participation or involvement in the activities of a group. For example, being actively involved in a sport team.

TAKE-HOME MESSAGE

All athletes can provide leadership to their sport teams. There are many ways that athletes can be leaders, so it is important to select leadership and/or mentoring behaviors that you are comfortable with. Remember, team leadership is a team effort! The key is to have a group of teammates performing leadership behaviors. When athletes help to lead their teams, there are numerous benefits that can positively impact team dynamics [5]. For example, athlete leadership improves team cohesion or team chemistry, which means the amount of unity or closeness that teams feel (Figure 2). Team cohesion or chemistry is important for the performance and satisfaction of sports teams. Using the leadership behaviors we described, all athletes should strive to make their teammates feel valued, get everybody to work together, be focused on team goals and objectives, and develop warm interpersonal relationships.

Figure 2

Teams with numerous athlete leaders have better team chemistry, which means that athletes feel more satisfied with their teams and are more able to perform at their best.

Figure 2

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YOUNG REVIEWER

BLAKE, AGE: 9

I like to play baseball and riding my dirtbike. I also like biking and my favorite baseball team is the San Francisco Giants.

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KATHERINE E. HIRSCH

Katherine E. Hirsch is a Ph.D., student studying sport and exercise psychology at the University of Windsor, Canada. She is a member of the Sport Psychology and Physical Activity Research Collaborative. Her research is largely focused on the role of athlete leaders in promoting positive group dynamics in team sports. Her research examines leader fairness and outcomes of fair treatment and unfair treatment, including cohesion and athlete satisfaction.

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TALENT DEVELOPMENT IN SPORT: HOW DO YOU MAKE IT TO THE TOP?

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YOUNG REVIEWERS:

LEILANI
AGE: 11

ZELYA
AGE: 8

Around the world, billions of children participate in sport, and many are identified as being talented. However, only a small number of these individuals go on to become elite athletes. In fact, you have more of a chance of being struck by lightning than becoming an elite athlete! So how do those who *do* become elite athletes make it happen? What enables a talented young athlete to become an international superstar? In this article, we will review key information about talent development and answer some important questions: How early should I start my sport? Should I focus on one sport or try lots? How important is "failing" in the journey to stardom? We will discuss various talent development pathways and why some may be better than others. We will also look at the factors that might influence an athlete's chances of success.

Have you ever wondered what would increase or decrease your chances of becoming an elite athlete? Well, the short answer is LOTS

of things! Some things you can control and change, others you cannot. Some factors have to do with you as a person and others have to do with the environment you grow up in. In this article, we are going to discuss a few of these things, to help you understand how elite athletes make it to the top.

WHEN WERE YOU BORN AND WHERE DO YOU LIVE?

Incredibly, one thing that can influence your chances of becoming a future champion is the month in which you were born! If you are one of the youngest on your team or in your competition year, then your teammates and competitors might be bigger and stronger than you because they were born before you and have had more time to grow. Lots of adults forget this and, when they pick teams or label children as talented, they often choose the bigger, stronger children, forgetting that those children might just be older. These children then get better coaching, train in better facilities, have more opportunities to develop their sporting skills, and become more confident. All of this means that these children are more likely to become elite athletes. If you are one of the youngest on your team, do not give up! Hanging in there can make you pretty tough, and scientists have shown that, if you do manage to keep going, chances are you will end up being really good. This is called "the rise of the **underdog**" [1]!

UNDERDOG

A competitor thought to have less chance of winning a fight or contest.

Not only does the month in which you were born influence your chances of becoming an elite athlete, but where your parents choose to live does, too! Children born in smaller cities and towns often have more chances to play many different, less-organized sports. There are fewer children competing for spaces on teams, meaning there are more chances for everyone to play and practice. Children born in bigger cities often have to compete for places on teams, and the teams usually compete in very structured programs run by high-quality coaches. This means young athletes in big cities often play in more structured, professional teams and programs. It might seem that having lots of competition and good coaches would help you become an elite athlete, but it does not always! Athletes from smaller cities who have more chances to play sport in fun, safe, less-structured programmes are more likely to be successful [2].

In fact, both the number of sports you play when you first start out and how much you practice are quite important in helping you become an elite athlete. Depending on where you live, you might have opportunities to play more than one sport, but sometimes it can be difficult to know whether to just practice one sport or try lots. Scientists have found that if you just do one sport from a young age, you might get bored with it as you get older and sometimes even get more injuries. Therefore, it is probably better to try lots of sports. Practicing various sports is likely to make you happier and help you to learn lots of skills that you can use across sports. Look out for Zlatan Ibrahimović

playing football. He does some amazing high kicks, which he learnt in taekwondo! Playing games just for fun can also make you better [3]! This may be playing a game of HORSE on the basketball court with your friends or kicking a ball around in the park. Once you have had a chance to play lots of sports and learn many skills, if you want to be really good you *do* need to put your energy and focus into practicing just one sport. This usually happens when you are about 14, but it varies depending on the sport you decide to focus on.

WHO ARE YOU AND WHAT DO YOU THINK ABOUT WINNING AND LOSING?

PERSONALITY

The way a person usually thinks, feels, and behaves from day-to-day.

OPTIMISTIC

Feeling and showing hope and confidence about the future.

Having certain **personality** characteristics can help you to develop into an elite athlete. Some of your personality is there from birth, influenced by your genes. However, some of your personality develops as you grow up because of your parents and the experiences you have. Scientists have shown that super-elite athletes (those who win lots of medals at the Olympics) have different personalities than athletes who win only a few medals or do not win any medals at all [4]. The best athletes are often very organized, **optimistic**, and hopeful! They also work really hard to get things right. Perhaps most importantly, super-elite athletes really want to win, but also want to perform well. They know they must work on developing their skills and abilities, not just at being better than others.

The way you think about winning and losing is an important part of your sporting experience and might affect whether you become an elite athlete. Most athletes do not just win and have lots of success. In fact, this is very uncommon! Most elite athletes experience a bumpy path to the top and often fail, lose, and feel disappointed along the way. Athletes may also experience difficult things outside of sport. Amazingly, some of the best athletes of all time have experienced some really big challenges growing up. These bumps and challenges can make athletes tougher and influence their personalities! In science, we call this a "rocky road" (Figure 1). Even Michael Jordan got cut from his high school basketball team! Imagine if he had stopped playing because of that! These bumps are so important that sometimes coaches may try to put some into training [5]. One example may be asking you to play in an older age group, which might be harder for you. When you experience these bumps—in real life or in practice—the support you get from your family and coaches will be really important!

NOBODY MAKES IT ON THEIR OWN!

Even the most skilled and talented young athletes cannot succeed on their own. Help from family, especially parents and guardians, is extremely important [6]. Parents/guardians often act as a taxi service,

Figure 1

Becoming an elite athlete is often a rocky road. As shown, athletes will experience highs such as winning important competitions, achieving personal best times or performances, and representing their country. But it is not all positive, along the way athletes will also experience challenges such as injuries, missing out on selection or losing an important game. Coping with the highs and lows of sport are a key part of becoming an elite athlete.

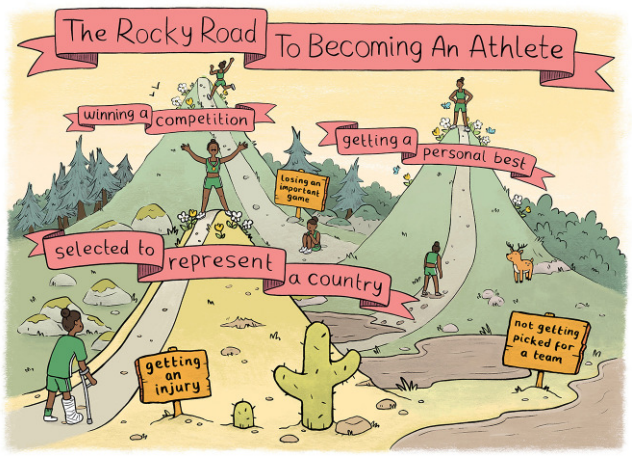

Figure 1

taking you to training and competitions; as chefs, cooking healthy, and **nutritious** foods; as banks, paying for equipment and coaching; and as your number-one cheerleader, saying lots of positive things and supporting you whether you perform well or badly. Support from parents/guardians is extra important if you are having a tough time or hit one of those bumps in the path—you might get injured, find it hard to learn a new skill, or not play as well as you want. Lots of athletes thank their parents after they win gold medals or break world records because they know they could not have done it without them.

NUTRITIOUS

Containing lots of the substances needed for life and growth.

Other people in your family might also impact your chances of making it to the top. If you live near other family members like grandparents, aunts, uncles, or older **siblings,** this can be useful because they can help with some of the tasks that parents/guardians usually have to do. This means parents are less likely to be stressed out and can provide you with the very best support. Having older siblings is especially helpful for increasing the chances of becoming an elite athlete [2]. Younger athletes often watch their older siblings and want to play sport more and work harder because their siblings are doing it. Sometimes having a sibling who plays the same sport can provide a ready-made practice partner, but also a competitor. When siblings are competitive, it can help young athletes perform better. Think about Venus and Serena Williams—they practiced together all the time as children and then became rivals on the world stage. Serena is younger than Venus but usually beats her—probably for all the reasons above!

SIBLINGS

A brother or sister.

CONCLUSION

Even if you are very skilled, born in the right place, and have the most supportive parents (see Figure 2), you still might not become an elite athlete. Luck is also an important part—in fact, whether you are born in a big city or a small town is luck! Some young athletes have better luck than others. For example, athletes might get bad injuries that stop

Figure 2

Talent development is influenced by many things. For instance, as shown in the figure, where you live and your opportunities to sample a lot of different sports can influence your opportunities to develop your sporting talents. Additionally, support of family members, coaches and teammates is also really important.

Figure 2

them from playing, which is really unlucky. Other athletes might have their very best games when an important person is watching, meaning they get selected for a special team—this is really lucky. Sadly, there is nothing we can do about luck. However, if you play lots of sports when you are young, have fun and enjoy being active, try your hardest, and do not worry about messing up or making mistakes, you are doing everything you can to increase your chances of success!

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YOUNG REVIEWERS

LEILANI, AGE: 11
I love to play soccer with my friends, and I am very good at it. But I also love to draw, like my mom. I liked the article, it was very cool, especially the part about the underdogs. They are just as special as those that win all the time. Because winning comes with a lot of practice, and that is a hard level to get to.

ZELYA, AGE: 8
I am good at gymnastics and soccer. I even got a ribbon in gymnastics. I am also good at math, I like numbers. I thought this article was very cool. My mom and dad are my cheerleaders. They are at every game making sure I do my best. They are my biggest fans and I love them very much.

AUTHORS

CAMILLA J. KNIGHT

Camilla J. Knight is a professor of sport psychology and youth sport. That means she gets to spend her time reading and teaching about sport and trying to find out how to make sport more enjoyable for children and their families. She is spent over a decade talking to parents, coaches, and young people to find out about their experiences in sport. As someone who grew up playing sport and still loves to be active and have adventures, she cannot think of a better way to spend her time! *c.j.knight@swansea.ac.uk

VICTORIA M. GOTTWALD

Vicky M. Gottwald is obsessed with basketball and, as a twin, has always been very competitive. She spent a lot of her playing career playing basketball for Wales before coaching with several of the Wales National Team Junior Squads. It has always been important to her to make her passions her job, and so she is also a researcher and teacher in skill acquisition. She is very interested in how athletes practice and best develop their skills.

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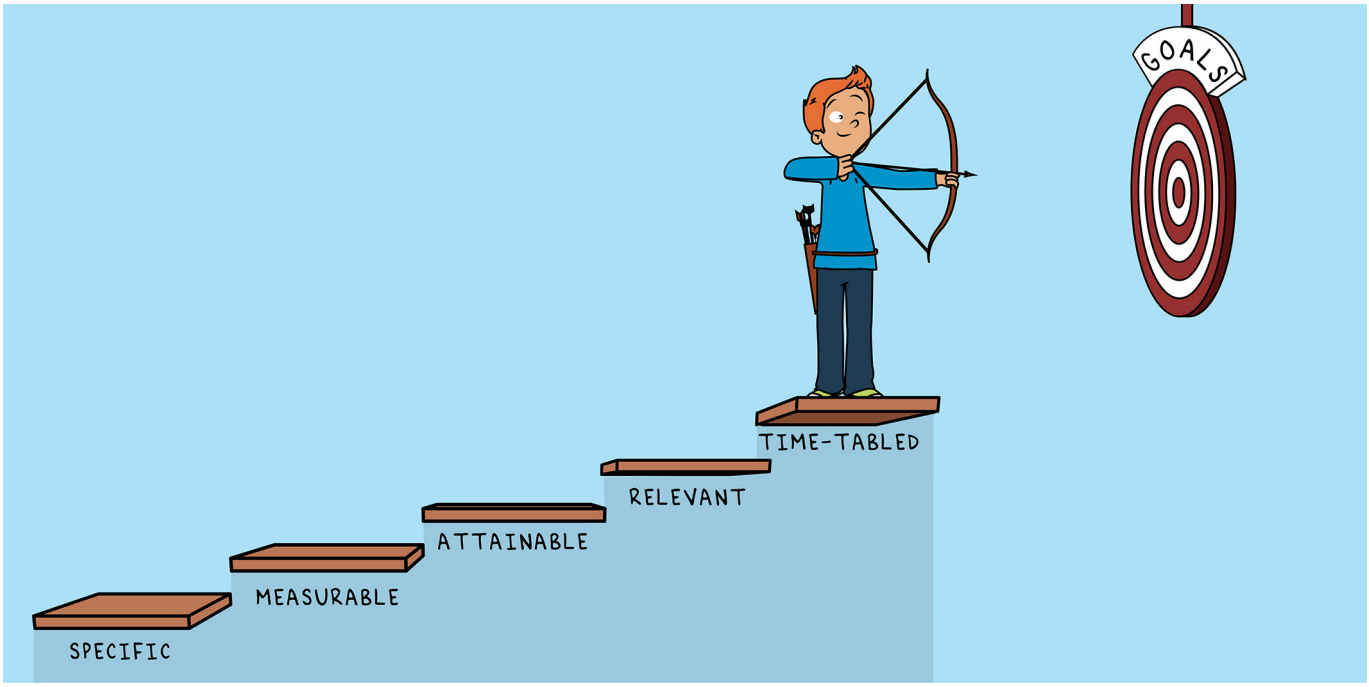

SET GOALS TO GET GOALS: SOWING SEEDS FOR SUCCESS IN SPORTS

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YOUNG REVIEWER:

NAMI

AGE: 12

Sports coaches encourage us to be active, alert, and to get things done quickly; they also advise us to relax, be patient, and do things slowly. With these changing instructions, we need a system to do things at our own pace. In sport psychology, we call this system goal setting. Goal setting means establishing a target that you want to achieve. When your goals are specific, achievable, and challenging, you feel motivated. Getting a glass of water from the kitchen might be specific and achievable but not challenging, whereas training for the nationals in 3 months' time might challenge you, but you might not know precisely how or when to train. In this article, we introduce a goal-setting system that can help you to set and achieve the goals that matter most to you.

GOAL SETTING

The development of an action plan that guides an individual toward a goal.

Goal setting is a process by which people set targets that will help them to achieve desired outcomes, such as winning a swimming competition or learning a new skill. You can imagine goal setting as a map that helps you decide which direction to travel to get to your destination. You are free to choose your own route, but

better choices will make the journey easier and allow you to travel with confidence.

Along the way, you may notice that the map does not always accurately describe the territory: some hills seem steeper than the map shows, and some distances take longer to travel. So, you may need to adjust your goals as you go. If you do not choose a direction to travel, then you can wander aimlessly—so it pays to be specific. It is important to know how long the journey will be so that you know how much food to bring. Also, if you are traveling to meet a friend, for instance, your friend would appreciate a time to meet. So, goal setting also requires a timetable and a clear plan [1].

SETTING "SMART" GOALS

We call the process that we have just described SMART goal setting. In this case, SMART is an acronym for the parts of the process. Whenever you set a goal, you can check it against the SMART criteria: **s**pecific, **m**easurable, **a**chievable, **r**ealistic, and **t**ime-tabled. Specific means that your goal states exactly what you wish to change and improve. Measurable means that you can easily see if you have made progress. Achievable means that your goal is possible to achieve. Realistic means that your goal is challenging but it is within your control to achieve it. Finally, time-tabled means that you set time boundaries around your goal. Goal setting is SMART when everything is flexible and adjusts to your individual needs, the goal being pursued, and your personal environment. If you wish to improve your forehand in tennis, then it does not matter whether you are a professional tennis player or child in a local tennis club; setting goals gives you a helpful target that you can translate into daily actions to follow. The SMART technique works for individuals with different personalities and cultural backgrounds [2]. SMART goal setting provides a formula for achieving the goals that are important to you, using the strengths you already have!

Goal setting is a game with two halves: the first half is to *set* a goal; the second half is to *achieve* it. In the game of goal setting, much of what happens in the second half depends upon the thinking and planning that occurs in the first half. To set goals, you often must think about the past as a guide to your future. Unfortunately, people can become prisoners of their stories, which can prevent them from achieving their goals. We might tell ourselves stories like, "It is impossible for me to succeed—I do not have the skills;" or, "Children who live where I live do not become professional athletes." We carry these stories with us through our lives, but they are often untrue. For example, you cannot be certain that becoming a professional athlete is not possible for you. You might be the one person from your community who becomes a professional athlete, but you would never realize this possibility unless you kept moving toward your goal each day. The mental endurance to keep progressing toward a goal is often what separates athletes who

succeed from athletes who do not. The SMART technique works for individuals with different personalities and cultural backgrounds [2]. It is a technique which gives a formula for getting the goals which are important to you, using the strengths you already have.

HOW TO SET GOALS

There are three common types of goals that we can set: outcome, performance, and process goals. **Outcome goals** focus on the results [3]. You might set a goal to win a competition or to get the number 1 rank in your sport, for example. It is important to remember that you are only partly in control of outcome goals because another person or team might simply perform better on the day of the competition. **Performance goals** have to do with improving your own ability, independent of the other competitors or team members. For example, in rugby, the kicker might wish to improve her conversions from 70 to 80%. The rugby kicker is in control of achieving this performance goal because it does not depend upon anyone else. **Process goals** are the basic practices we have to do in order to improve our overall capacity to play a sport. Coaches and athletes use process goals in practice to improve performance. For example, a golfer might focus on the top back portion of the ball when practicing putting. Out of these three types of goals, we should remember that only process goals are 100% in our control.

OUTCOME GOALS

Outcome goals focus on the end point or the desired end-result in the short or long-term.

PERFORMANCE GOALS

Performance goals are focused on trying to develop and achieve a better sporting ability.

PROCESS GOALS

Process goals are focused on the day-to-day behaviors one needs to engage in to improve their skills.

Writing down our outcome, performance, and process goals, maybe at the start of each week, is a purposeful way of striving for improvement. Maybe you have a coach who will help you set your weekly goals. For example, you might set a goal to train or practice on Monday, Wednesday, and Friday. Setting goals can help you focus your attention on the task at hand. The more you practice with the SMART technique, the better you will become at setting, refining and achieving your goals. Many athletes incorporate this healthy habit into their lives. As you work on your goal setting, keep some healthy guidelines in mind. First, your goals should be realistic but moderately difficult. You should feel like you are just out of your comfort zone. Second, choose your own goals. If you choose your goals yourself, you will feel more motivated and committed to them. Third, choose goals that can give you feedback about how well you are doing. For example, if your goal is to master a specific shot in, every time you play the shot gives you feedback on your progress. Fourth, focus on process and performance goals, not on outcome goals. This will help improve your ability as an athlete and spearhead your development. Last, be sure to set time aside to plan your goals beforehand and to periodically review them as you make progress.

Following a particular order of setting goals and achieving your goals using SMART goal-setting allows us to be consistent and improve. When you are setting goals, you need to look at the short-term,

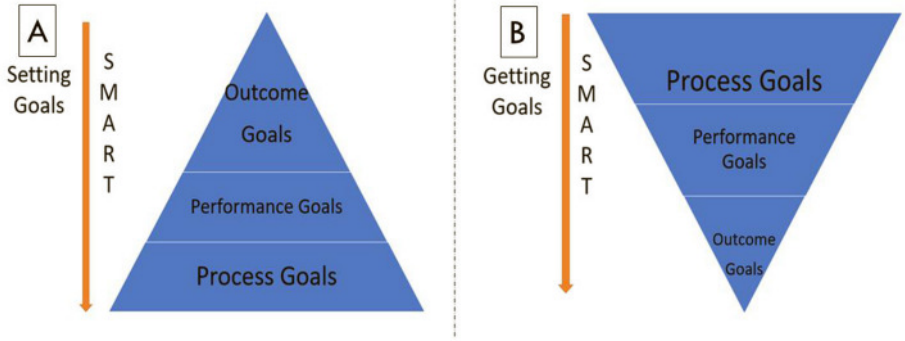

Figure 1

Figure 1

(A) When setting goals, it is a good idea to start with Outcome Goals, move to Performance Goals, and then finally to Process Goals. This is helpful because it gives you the destination and the path to take. **(B)** When working toward achieving goals, it is helpful to start with working only toward process goals. Achieving process goals automatically puts us on the path to achieve Performance goals, which allows us to eventually achieve our Outcome goals. Figure was designed by Sahen Gupta.

medium-term, or long-term future to decide on your Outcome goal i.e., your destination (e.g., being Junior Number 1 rank). Then you set the Performance goals which are needed to improve your own ability to cross certain milestones to get to your destination i.e., the road you follow (e.g., the tournaments you need to play and the skills you need to master). Lastly, you set your Process Goals which are crucial to building your daily practices and training to keep you on track and follow the road toward your destination (e.g., regular training, nutrition and good support) (see Figure 1A). When you are then getting goals, you start from the other way. You start with process goals which become your vehicle to achieve your performance goals to stay on the road. This eventually allows you to achieve your outcome goals and reach your destination (see Figure 1B). If you do not get your process goals (train regularly, get good support), it is difficult to achieve your performance goals (develop skills and play tournaments), which makes it difficult to achieve your outcome goal (of being Junior Number 1 rank).

THE ROAD MAY BE ROUGH...

When we set goals, we set ourselves up for a future that we hope is within our control. However, because sports are unpredictable, we must keep our minds in a healthy place to manage this uncertainty. Two helpful mechanisms are **self-compassion**. Self-compassion means not judging ourselves too harshly when things get difficult and instead engage in an understanding and acceptance inward. Self-compassion has enormous benefits for athletes, but unfortunately, not everyone believes this. Some people believe that self-compassion might decrease the drive for self-improvement that characterizes the best performers in any sport—they believe that self-compassion makes athletes lazy! But research suggests that people take more, not less, responsibility when they have self-compassion after a negative event [4]. For example, if you fail to win a tournament, being self-compassionate allows you to understand

SELF-COMPASSION

Being nice to ourselves when we are in pain or face personal shortcomings, rather than hurting ourselves with extra self-criticism.

the reasons why you lost, and positively motivate you to improve those areas.

Striving for perfection helps athletes to achieve excellence in any sport. Healthy perfectionism involves high personal standards—trying to be the best you can be. But perfectionism can have a downside, too. If you set unrealistic goals for yourself and are harshly self-critical when you do not meet them, this is not healthy or helpful for your performance or success. It is important for athletes to regularly ask themselves, "Has my striving for perfection gone too far in the wrong direction?" Balancing perfectionism with self-compassion is the healthiest strategy [5].

Remember, it is common to face difficulties while working toward your goals. For example, research has shown that even elite athletes who practice goal setting found it difficult during the COVID-19 pandemic [6]. From our work with elite athletes, we recommend the ICE strategy to help stick with your goals. "I" stands for identifying goals that mean a lot to you. "C" is for committing to chase your goals despite difficulties. "E" is for expanding your abilities, by learning from the successes and failures of the SMART goal-setting process.

CONCLUSION

In summary, we set goals to get goals! When you follow the SMART goal-setting formula, you increase your chances of achieving your goals. The mistakes you make along the way are the best way of remembering what you have learned [7]. We finish with a few lines from Ella Wheeler Wilcox's famous poem, "The Winds of Fate":

"One ship drives East and another drives West,
With the self-same winds that blow,
'Tis the set of the sails,
And not the gales,
Which tells us the way to go."

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YOUNG REVIEWER

NAMI, AGE: 12
I like playing sports, especially with my friends, because it is active and fun. I am curious about Chemistry practical/experiments since it is exciting. I spend most of my time doing sports, homework, reading, watching TV, or gaming.

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Sahen Gupta is a 22-year-old doctoral student in sport and exercise psychology at Glasgow Caledonian University. He specializes in resilience, positive environments, and youth sport environments. He has worked with athletes from cricket, football, tennis, and track & field, to name a few. Sahen started his scientific research at age 18, and he firmly believes in the importance of spreading scientific knowledge to everyone, especially pre-university students with scientific curiosity. He has published multiple peer-reviewed articles, edited books, and is currently writing two books. He is also the founder of Discovery Sport & Performance Lab. *sgupta2203@caledonian.ac.uk

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INSPIRED BY IMAGINATION: HOW IMAGERY CAN HELP YOU BE BETTER AT SPORT

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YOUNG REVIEWER:

SPANDANA
AGE: 13

Have you ever pictured yourself scoring the game-winning goal or staying calm at a crucial point in a match or performance? If you answered yes to either of these, then you have used a mental skill called imagery. Imagery is creating (or recreating) situations in your mind. Many top athletes in the world use imagery to help them perform at their best. In fact, just like any physical skill, such as running or a tennis serve, imagery improves with practice. In this article, we explain how imagery works, suggest what to image, and explain when and where you can use imagery to improve sport performance.

Imagery is more easily experienced than explained. To illustrate this point, let us go through a short exercise. Close your eyes and imagine eating a slice of watermelon. Stop reading and imagine it.

THINK ABOUT WHAT YOU SAW

Now, repeat this exercise, but this time, imagine holding the slice of watermelon in your hand. See the vibrant colors—the green rind, the

pink flesh, and the brown seeds. As you take a bite, taste the sweetness of the ripe watermelon, hear yourself slurp as you sink your teeth into the fruit, and feel the juice drip down your hand. Stop reading now and imagine it.

In almost every case, the second picture will have been more vivid because of the focus and effort you needed to use to create the image. Most of us can create a vivid experience (like eating a slice of watermelon on a warm day) when the instructions are detailed. This exercise is an example of imagery. **Imagery** is defined as creating or recreating an experience in your mind. It is more than just "seeing" the watermelon—it is tasting it, hearing the sounds as you eat it, and feeling it in your hand. The imagery of eating the watermelon may make you smile and wish for summer vacation.

IMAGERY

Creating or recreating an experience in your mind.

You may be wondering why you are reading about watermelon if this article is about sport! The watermelon exercise demonstrates your ability to create powerful images that you can not only visualize, but experience. Imagery can be used for more than just *recalling* a memory; it can be used to create *new* images, such as performing a new sport skill. In fact, researchers have found that kids as young as 7 years of age use imagery in sport to learn and develop new skills and strategies, manage their emotions, increase confidence, and improve performance [1]. When combined with physical practice, imagery improves performance more than practice alone.

HOW DOES IMAGERY WORK?

Imagery works by triggering the same parts of the brain that are activated when you actually perform the task. For example, when athletes imagine themselves taking a penalty shot in ice hockey, the areas of the brain that become active when they physically skate toward the net and release the puck will also be active when imagining the shot. This is referred to as **functional equivalence** [2] and it can lead to improved sport performance.

FUNCTIONAL EQUIVALENCE

When the parts of the brain that are activated while *performing* a task (like a penalty shot in ice hockey) are also activated when *imagining* the same task.

Following the guidelines of the PETTLEP model helps athletes achieve functional equivalence between imagery and actual performance [3]. There are seven key factors in the model: physical, environment, task, timing, learning, emotion, and perspective (Table 1). Although any imagery training is beneficial, following the key factors from PETTLEP while practicing your imagery three or more times per week is recommended.

IMAGERY HELPS WITH SKILL DEVELOPMENT

Young athletes can use imagery to help with skill development and skill execution. When a baseball player learns how to throw a baseball

Table 1

PETTLEP: 7 key factors when using imagery.

P	Physical	Imagery should be a physical experience. For example, when imaging, hold your tennis racquet, wear your goggles and swim cap, or feel your heartbeat as you near the last 100 m on the track.
E	Environment	The image should be as real or as close to the actual environment as possible. If possible, use imagery in the actual environment (for example, go to the top of the downhill ski race). If that is not possible, or you are unfamiliar with the competition venue, perhaps video footage or pictures will help.
T	Task	Depending on your skill level and your preferences, where you choose to focus your attention and therefore image may change. An Olympic sprinter may focus on staying low out of the blocks, whereas a high school sprinter may focus on a quick reaction to the starting pistol.
T	Timing	The timing of the image should be equal to that of your physical performance, if possible. For example, if a gymnastics routine takes 1 min to physically execute, so too should the imagery.
L	Learning	What you imagine may change as you continue to learn the skill. For example, the content of your image when you are first learning a penalty stroke in field hockey should be different from when you have mastered the skill.
E	Emotion	Images will be more effective if you attach meaning or emotion to them. If you imagine a personal best time, feel the excitement and the joy that is part of it.
P	Perspective	Consider using both perspectives, internal (imagining it through your own eyes) and external (seeing yourself performing as if watching on tv), when imaging.

Table 1

with correct technique, this is known as skill development. When a volleyball player does a serve as best as they can, this is referred to as skill execution. Research shows that if you imagine the proper execution of a skill, it will help with the *actual* execution of the same skill when you do it in real life. Also, athletes can perform a drill faster and with less mistakes when they use imagery compared to those who do not use imagery [4].

IMAGERY IMPROVES STRATEGY

When the coach tells the basketball team to play a full-court press, this is known as a sport strategy. Imagery can help athletes learn and perform strategies in many different sports. In fact, athletes who use imagery in sport have been found to make quicker decisions about which strategies to use and when to use them. Young athletes have indicated that using imagery helps them to anticipate what will happen next in game situations [1].

SELF-CONFIDENCE

Trusting your own skills and abilities, and believing that you can perform well in your sport.

SELF-EFFICACY

Your confidence in being successful at a specific task (such as the free throw). The confidence of an entire team in their joint success is known as collective efficacy.

IMAGERY BOOSTS CONFIDENCE

Researchers study two types of confidence in athletes: self-confidence and self-efficacy. If you believe that you are capable of performing successfully in your sport, you demonstrate **self-confidence**. **Self-efficacy** is similar to self-confidence, but it is specific to a task or situation. For example, a basketball player can have a high self-efficacy in shooting a free throw but can have a low self-efficacy in dribbling. If athletes imagine being confident, focused, and mentally tough in sport situations, they can gain more self-confidence and self-efficacy in their sports.

Imagery is not only beneficial for individual athletes—it can also help build the confidence of an entire team. This is known as collective efficacy and it happens when each player on the team believes that, together, they can be successful. A youth girls' soccer team improved their collective efficacy in both training and competition by using imagery for 10 min each day over 13 weeks [5].

IMAGERY HELPS TO MANAGE NERVES

Have you ever felt nervous before a game? If so, you may have noticed your clammy hands, or felt your heart beating quickly. This is called competitive anxiety, and it can be harmful to your sport performance if it is not managed properly. Do not worry if you do not know what to do—imagery can help! If you imagine being calm and relaxed in your sport, this can help lower your anxiety and stress related to competition and performance.

WHERE AND WHEN SHOULD I USE IMAGERY?

One of the great things about imagery is that it can be used anywhere! Imagery can be used before, during, and after both practice and competition. For example, you may choose to use imagery before practice, to help yourself mentally prepare, or after a game, to help yourself reflect on areas you want to improve. You may decide that the best time to use imagery is right before going to sleep at night. Although imagery use is important during the sport season, it is equally important to use in the off-season. Think about where and when imagery may work best for you!

WHAT SHOULD I IMAGE?

When using imagery, it is important to create or recreate the content of the image as realistically as possible. Think of "content" as all the details you can include in your image to help make it more vivid—remember the watermelon exercise. For example, use as many different senses

INTERNAL VISUAL IMAGERY

Imagining through your own eyes.

EXTERNAL VISUAL IMAGERY

Seeing yourself from someone else's point of view, as if you were a spectator or watching yourself on TV.

as possible to help make your images come to life. This could include imagining the *smell* of the freshly cut grass on the soccer pitch or the *sound* of the referee's whistle. It may include the *feeling* in your leg muscles as you perform a corner kick, or the *touch* of your teammate's hand as they high-five you. Also, keep your images positive. Think of times when you have done well or create images of goals you want to achieve. Finally, your images may be from either an internal or external perspective. That is, you could be seeing your image from your own eyes (**internal visual imagery**), or watching yourself as if you were on TV (**external visual imagery**). Both perspectives are great, and you are encouraged to use the one that works best for you.

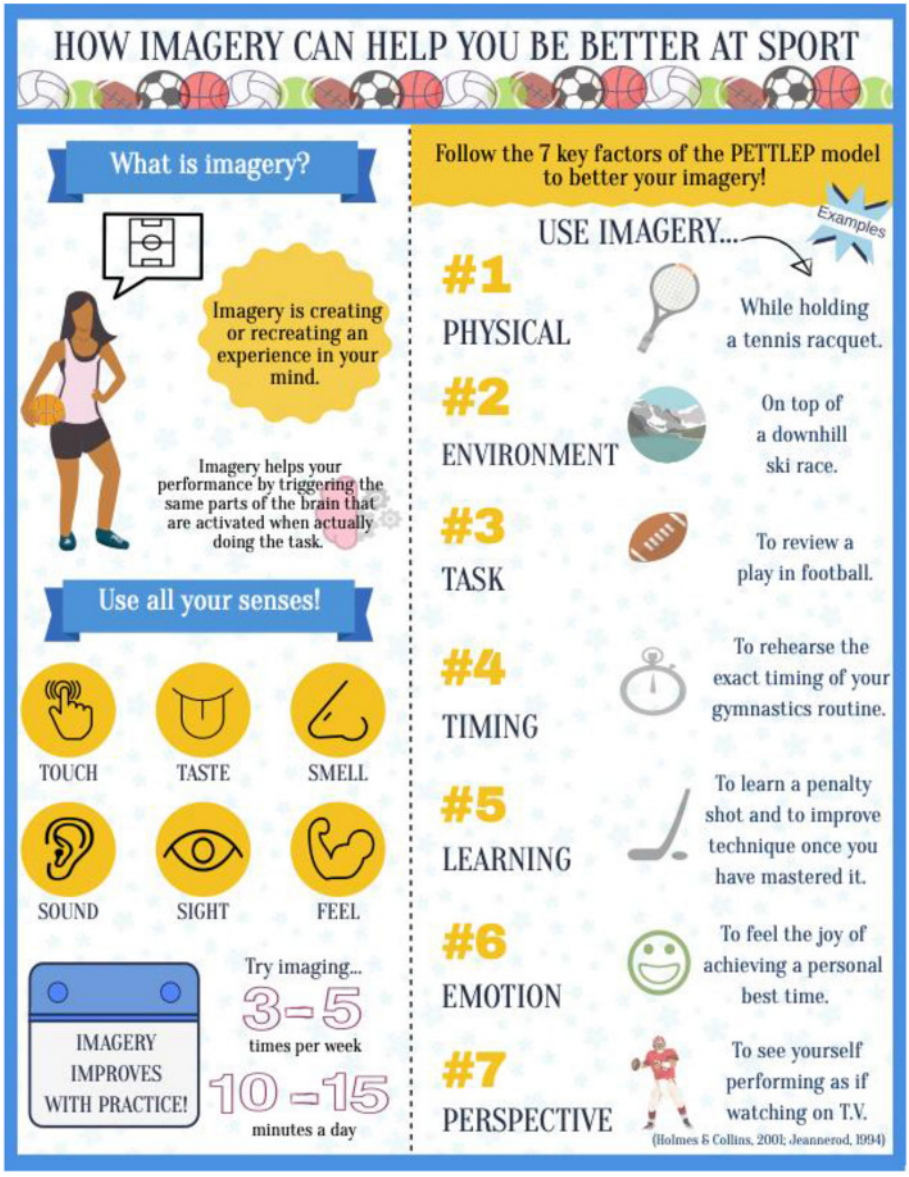

Figure 1

A summary of how imagery works and how you can use it to help yourself improve at sport.

HOW DO I PRACTICE MY IMAGERY?

VIVIDNESS

The clarity and detail of images that you create.

CONTROLLABILITY

The ability to change or control your imagery.

To help you practice your imagery, you are encouraged to improve the vividness and controllability of your images. **Vividness** refers to how *clear* your image is, while **controllability** is your ability to *change or control* your images. Try this to help improve the vividness and controllability of your images: Imagine you are in your bedroom. What color is your bedding? How clearly can you see this color? Is it clear and easy to see, or cloudy and difficult to see? Now, can you imagine your bedding as a different color? How easy or hard is it to imagine this new color?

If this is challenging that is okay—keep practicing and over time you will improve! Take a look at Figure 1 for a summary of how to use imagery in sport.

CONCLUSION

Imagery is a powerful mental skill athletes use to improve performance. We are all capable of using imagery and we know that imagery improves with practice. While imagery may be easy for some athletes, others may take some time to develop their ability to image. We recommend using imagery at least 3–5 times a week for 10–15 mins a day. The more you image, the better your imagery will become! When you use imagery for sport, make it as real as possible and decide what you want the outcome to be. Imagery can be done anywhere at any time. You do not need a pitch, pool, or arena to imagine. Practicing imagery as part of your routine will help you become a better and more complete athlete.

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YOUNG REVIEWER

SPANDANA, AGE: 13

Hello, my name is Spandana! I like to read sci-fi and play volleyball. I find science interesting and love to learn about psychology and space. Some of my hobbies are drawing, listening to music, and playing my guitar.

AUTHORS

KRISTA J. MUNROE-CHANDLER

Dr. Krista Munroe-Chandler is recognized for her work in the psychology of performance. She is a full professor in the Faculty of Human Kinetics at the University of Windsor, Canada. Her research interests include imagery use in sport and exercise as well as the application of sport psychology interventions. She runs the UWorkItOut UWin program- an exercise program for university students with mental health concerns, and is the Principal Investigator on a federally funded research project aimed at developing and implementing an online Psychological Skills Training program for athletes with a disability. She works with athletes (both able bodied and athletes with a disability) and performers of all ages and levels helping them achieve their personal performance goals. *chandler@uwindsor.ca

IRENE L. MUIR

Irene L. Muir is a Ph.D. Candidate in the Faculty of Human Kinetics at the University of Windsor, Canada. Studying the area of sport and exercise psychology, her research interests include the use of imagery in dance, the effect of physical activity on mental health (i.e., depression, anxiety, and well-being), and body image in sport. Using behavior change strategies, she works with university students to increase their exercise involvement. Additionally, she implements mental skills training with youth athletes and dancers to enhance their performance and personal development.

FRANK O. ELY

Frank Ely is a Ph.D. Candidate in the Faculty of Human Kinetics at the University of Windsor specializing in sport and performance psychology. Frank's passion for research lies in helping athletes and coaches both access information on mental or psychological skills and apply strategies to effectively implement these skills into practice and competition. In addition to research, Frank works with athletes and coaches to help them optimize their performance through psychological skills training, leadership education, and team-building activities. Frank has worked with youth, recreational, NCAA, and USPORTS athletes across a variety of sports.

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SELF-TALK: CHATS THAT ATHLETES HAVE WITH THEMSELVES

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YOUNG REVIEWERS:

KAI-NING
AGE: 8

MARIA
AGE: 12

Talking to ourselves is a unique human characteristic, and it makes a big difference to our performance, especially in sports. Sports psychology researchers have examined self-talk and found that athletes often use it to express what they are experiencing mentally and emotionally. This brings athletes' attention to anything negative that they are thinking or feeling. Once they are aware of these things, athletes can try to talk themselves out of negative thinking to improve their performance. Because this is quite difficult, sports psychologists have developed training for athletes, to help them talk to themselves more effectively. Moreover, sport psychologists have developed techniques in which athletes repeat cue words that help them learn faster, control their emotions, or increase their motivation. Overall, research has shown that self-talk is important for self-control, that it can be improved, and, in the form of cue words, self-talk can enhance attention, motivation, and performance.

SELF-TALK MAKES US HUMAN

One behavior that makes certain athletes better than others is also a behavior that is uniquely human. While there are several things that make humans different from other animals, one is that we talk to ourselves! We call this **self-talk**, and it has been studied very intensively in sports psychology because it is essential for helping athletes perform at their best. Sports psychologists define self-talk as words or sentences said to yourself, either aloud or in a voice that can only be heard in your head [1].

Self-talk can be classified into several types [2]. **Spontaneous self-talk** is an echo of who we are and how we feel. Sometimes we just happen to say things to ourselves like, "Why am I so forgetful?" or "I am so angry!" to reflect aspects of our personalities or the emotions we feel. In contrast, **goal-directed self-talk** is not spontaneous—it is a mental tool we can use to solve problems and improve our performance. We quite consciously say things like "breathe calmly" to be less nervous in difficult situations. All this self-talk is natural, and everyone does it! Sports psychologists sometimes also ask athletes to repeat cue words or phrases, like "Knees bent" or "I can do it," to improve the athletes' performance. This **self-cueing** is not a reflection of our thoughts, like spontaneous or goal-directed self-talk are, but it has been shown to influence both our thinking and our motivation.

SELF-TALK

Words or sentences addressed to the self, said either aloud or silently.

SPONTANEOUS SELF-TALK

Self-talk that occurs unintentionally and through which we express thoughts and emotions such as hopes ("I hope I win!") or fears ("Am I going to make a fool of myself?").

GOAL-DIRECTED SELF-TALK

Self-talk used as a tool to problem-solve ("Stop looking at the fans and you will calm down.") or improve performance ("Move quickly to get into position to hit the ball!").

SELF-CUEING

A process of developing cue words to enhance motivation ("You can do it!") or provide instruction ("Focus on the ball!").

SPONTANEOUS SELF-TALK: IF YOU SAY SO, THEN YOU KNOW SO

Through self-talk, we get to know who we are, what we think, and how we feel. If I ask you why you like or dislike sailing, it is very unlikely that you could form an opinion without talking. You may talk to others to form your opinion, but you may also talk to yourself. Athletes often talk to themselves when they are alone while practicing their sports or because they do not want to share their thoughts and feelings with others. This natural self-talk usually describes the athlete's physical or mental state ("I am so tired.") or their thoughts and feelings about things ("I prefer playing in the evenings rather than mornings.") (Figure 1A).

Although athletes do not use spontaneous self-talk purposefully, it can be helpful because it allows them to become aware of who they are and how they feel. Once they are aware, they can identify mental challenges and attempt to solve them. For example, a young athlete might feel too tired to go to practice after school. This feeling grows within the athlete until it bursts out in the form of a self-statement such as, "I really do not feel like training today!" Self-talk like this makes us aware of our mental challenges, and it can help athletes to increase their motivation through a process called **self-control**.

SELF-CONTROL

Is the ability to regulate one's emotions, thoughts, and behavior in the face of temptations and impulses.

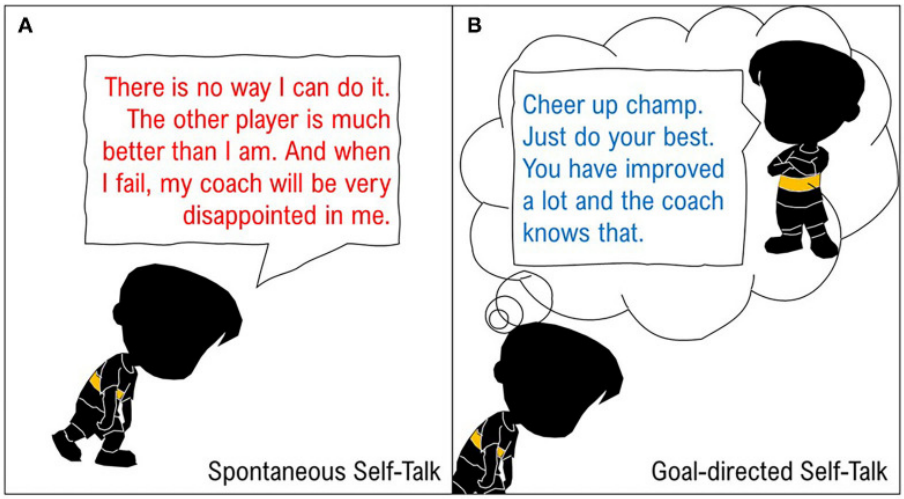

Figure 1

(A) Spontaneous self-talk reflects our current thoughts and feelings. Jordan feels a little down, and his spontaneous self-talk acts like a mirror, to reflect his feelings and thoughts. **(B)** Goal-directed self-talk is like our "inner coach." Jordan's goal-directed self-talk aims to strengthen his self-confidence and reduce his self-doubts.

GOAL-DIRECTED SELF-TALK: THE TEAM WITHIN

Sometimes we also talk to ourselves to change how we feel or to help us improve our performance. This goal-directed self-talk is intentional and purposeful, so it is different from the spontaneous self-talk that describes who we are and how we feel (Figure 1B). In a way, we all have our own inner team: one part of the mind is a psychologist, helping us cope with emotions, while another part is a coach or teacher, helping us learn new things. The voices of our inner psychologists, teachers, or coaches try to motivate us, calm our nerves, cheer us up, show us where we went wrong, and help us find better solutions for the future.

However, it is important that we give ourselves good advice and guidance—our inner voices are not always correct. Sometimes we do not listen to our spontaneous self-talk or we incorrectly identify the underlying problem. The inner voice can also give bad advice, like when an athlete tells herself that she "has to win." It would be much wiser to say that she should "try her hardest." At times, the inner voice keeps trying to instruct and guide even though it would be better if it just kept quiet for a while. Therefore, many athletes need to learn how to talk to themselves properly using goal-directed self-talk, so that they can use this skill when advice from coaches or others is not available.

LEARNING TO TALK WITH YOURSELF

Over the course of our lives, we learn how to talk to others. We do not talk to our friends the same way we talk to our teachers, and we change our way of talking when others are happy or sad. However, most of us are not specifically taught how to talk to ourselves [3]. Therefore, sports psychologists have designed educational self-talk techniques

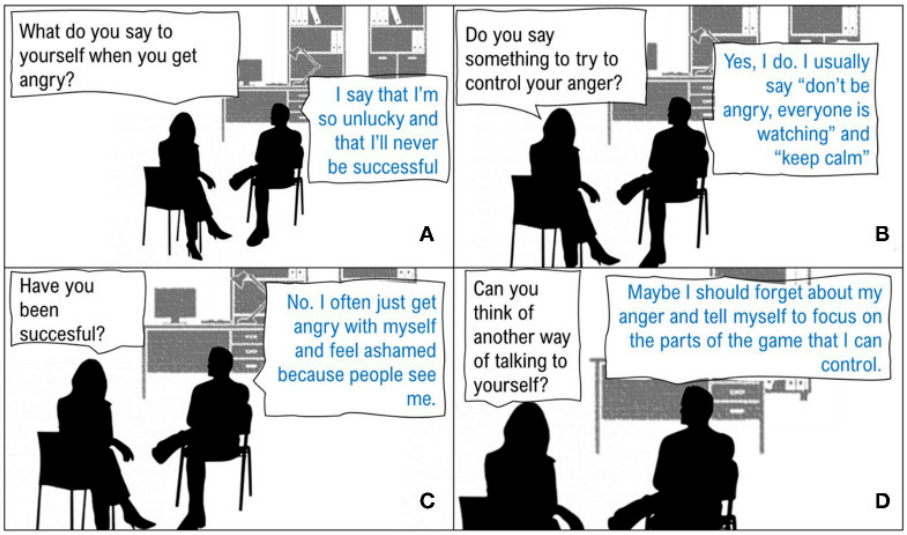

Figure 2

Figure 2

An example of a self-talk technique for teaching athletes to talk to themselves in healthier ways. **(A)** Mike, an athlete, meets with Ann, a sports psychologist, to discuss his self-talk. They decide to talk about Mike's anger. **(B)** Ann asks Mike whether he uses goal-directed self-talk to control his anger. **(C)** Mike realizes that his self-talk is not really helping him. **(D)** Ann coaches Mike to try an alternative style of self-talk to deal with his anger.

to show athletes how to communicate effectively with themselves [4]. In these techniques, athletes first learn to listen to their spontaneous self-talk. Listening to ourselves reveals how we are doing and what our specific mental or emotional challenges are in that moment. Second, athletes learn *when* they should talk to themselves, *how* they should talk to themselves, and *what* they should say to themselves.

Sports psychologists ask athletes to remember what they have told themselves in the past to overcome a challenge. For instance, a professional footballer recognized that he got angry when he performed poorly. He told himself, "Great players always win and they never get angry." Once athletes remember what they used to tell themselves, they are asked to explore other ways to talk to themselves. The footballer was asked what he would say to his little sister if she had the same problem. He said that he would tell his sister, "You cannot always win, and it is normal to be angry sometimes." Then the sports psychologist advised him to use this approach on himself. He eventually stopped asking himself to always be perfect and he accepted his anger as a part of his ambition. This self-acceptance helped him to overcome his anger and he became an even greater player. Techniques like these can help athletes change their self-talk and become better psychologists, teachers, and coaches for themselves (Figure 2).

SELF-CUEING, A WAY TO LEARN AND GET PSYCHED

Although the self-talk techniques described in the previous section can have a great long-lasting impact on athletes, they have one shortcoming: they need time to work. Sometimes, athletes face urgent problems that need immediate solutions, and there is another self-talk technique that can help. Athletes can use short self-talk cues as they

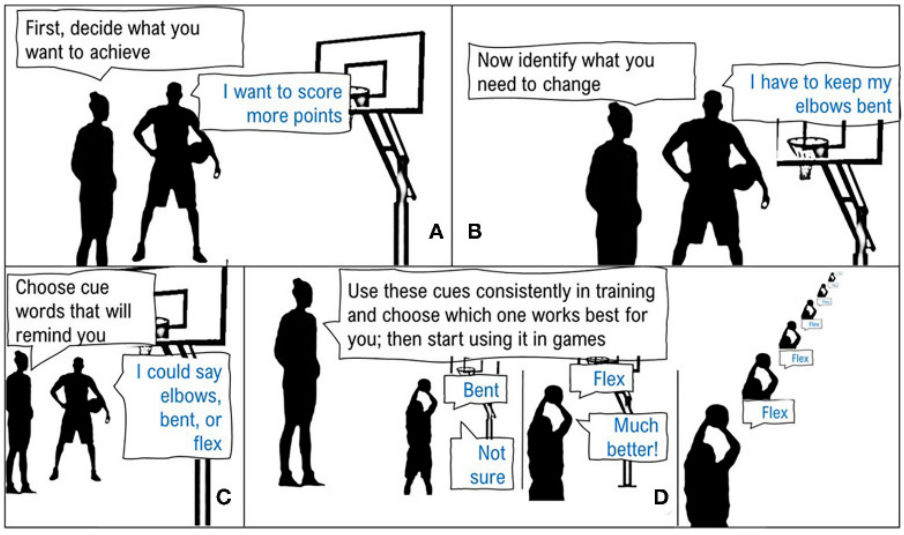

Figure 3

An example of a self-cueing technique in which cue words are chosen and practiced to help learning and improve performance. **(A,B)** John, a basketball player, and Jane, a sports psychologist, use a self-cuing technique during training. They first analyze what John needs to accomplish and what he can do to achieve his goal. **(C,D)** John chooses some cue words, decides which one works best, and practices it for a long time.

try to improve their performance [5]. Imagine you wish to learn the forehand stroke in tennis. Because it is important to always look at the ball and hit it from below, a self-talk script could instruct you to say "ball" when the ball leaves your coach's racquet and "up" when you hit the ball with your racquet. Science has proven that learning happens faster with this kind of instructional self-cueing.

Another self-cuing technique focuses on self-talk scripts designed to enhance motivation, deal with emotions, and boost confidence. Imagine you must execute a critical basketball free-throw in front of the entire school; imagine being nervous and feeling lots of pressure. A self-talk script could instruct you to say, "You are the best!" while you step up to the line and, "Relax!" moments before you take the shot. Such motivational self-talk scripts can improve performance in stressful situations. All self-cuing techniques may have immediate effects, although it is wise to practice with cue words in training before using them in competitive settings. You might get cue words wrong at first, but with practice, self-talk scripts can help you achieve your sports goals (Figure 3).

CONCLUSION

Elite athletes rely on their natural self-talk to understand themselves and to handle their mental and emotional challenges. That is why many sports psychologists and coaches educate athletes to talk to themselves in healthier ways. In addition, athletes use self-cueing to enhance their performance. However, self-talk is not something that only athletes do—all humans do it. Who we are is shaped by our self-talk. Self-talk helps us to get to know ourselves and to reshape ourselves to become the people we want to be. Learning about healthy

self-talk can help us achieve excellent performance in many different aspects of our lives, including school, work, and of course sports!

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YOUNG REVIEWERS

KAI-NING, AGE: 8

I recently finished lower elementary and will be starting grade 4 this fall (2021). I enjoy learning new things and like to take on different challenges. My favorite subject is math and I also like spelling, especially some of the tricky words! In my free time, I love reading, particularly about mysteries. Inventing different toys or tools that have practical uses is another hobby of mine. Even though I live in Canada, I visit my grandparents and extended family in Taiwan whenever I can!

MARIA, AGE: 12

Hi my name is Maria. I am 12 year old, and I love neuroscience. My favorite subject is Science. In my free time I love to read do research and dance. I want to learn more about the brain so I can become a neurologist and help people when I grow up.

AUTHORS

ALEXANDER T. LATINJAK

I am an associate professor at the University of Suffolk in England. I played tennis as a kid, which led me to move from Germany, where I grew up, to Spain. I studied psychology and did my doctorate at the Universitat Autònoma de Barcelona. After working at EUSES School of Health and Sports Sciences in Catalonia for seven years, I moved to Ipswich to teach sports psychology, do self-talk research, and practice sports psychology with athletes from many different sports. What I love most about sports psychology is that we study how people can use their brains to their advantage. *a.latinjak@uos.ac.uk

ANTONIS HATZIGEORGIADIS

I am a professor at the University of Thessaly in Greece. I became interested in sports psychology because of my own problems in sports and in self-talk in particular: I missed a penalty kick in the semi-finals of the national school championship, and it haunted me for a long time! I studied for a few years in the UK and then moved back to Greece to pursue a career at the University of Thessaly because I love research and want to help young people to develop.

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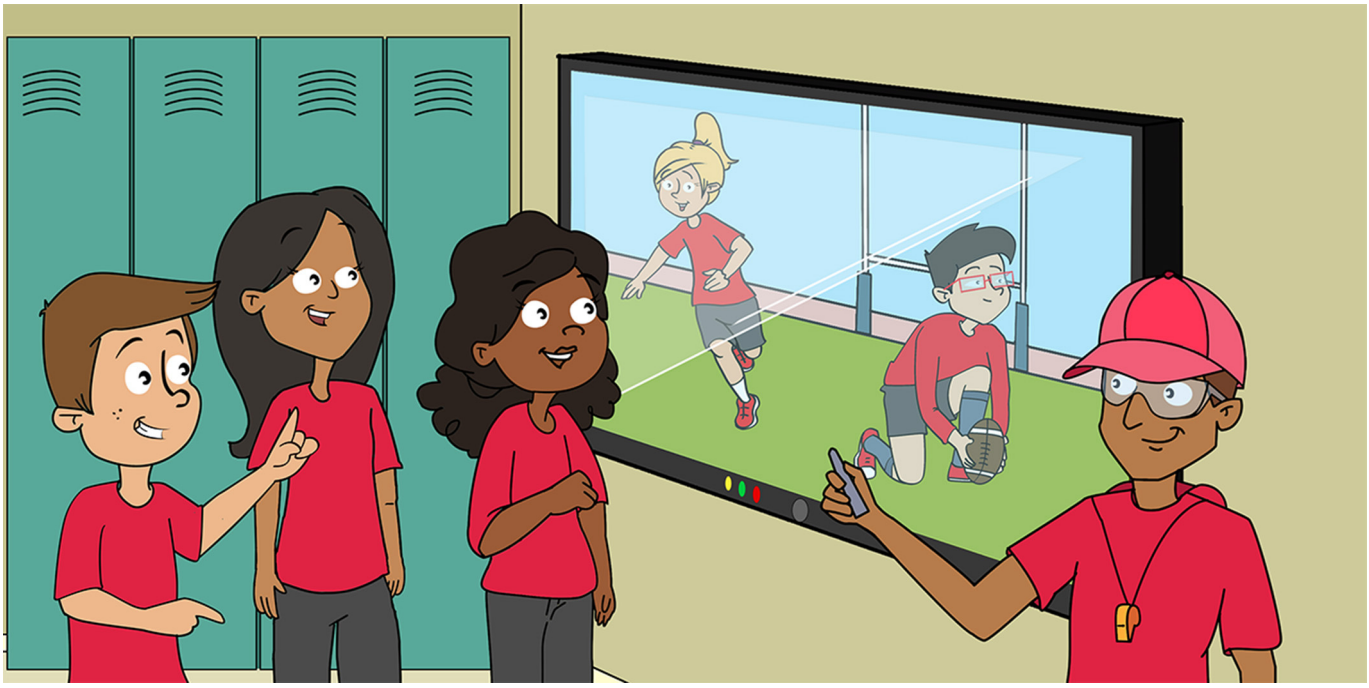

WATCH AND LEARN: ATHLETES CAN IMPROVE BY OBSERVING THE ACTIONS OF OTHERS

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[1] *School of Life and Health Sciences, University of Roehampton, London, United Kingdom*

[2] *Department of Psychology, Manchester Metropolitan University, Manchester, United Kingdom*

YOUNG REVIEWER:

KAYLEE

AGE: 15

Athletes spend a lot of time and effort practicing skills to get better at their sports. In addition to physical practice, athletes can use a technique called action observation to help themselves improve. Action observation is the process of watching movement. Humans naturally learn how to perform movements by watching the movements of other people. For example, from an early age, children learn important skills such as walking, throwing, and kicking by seeing other people perform those actions. Research has shown that watching movements activates similar parts of the brain to those that are involved in performing movement. This means watching sports performance might help athletes improve by strengthening the brain areas used when actions are performed. Coaches and sport psychologists use action observation methods, such as live demonstrations and video footage, to help athletes improve their techniques, develop their confidence, and get better at their sports.

WHAT IS ACTION OBSERVATION?

Humans spend a lot of time watching other people and watching actually helps us to learn how to do new things. If you think back to when you were a small child, you learnt how to walk, run, kick a ball, and throw a frisbee by watching your friends, siblings, parents, and grandparents doing those actions. This is **action observation**! Scientists have discovered that action observation can help people learn new movements or get better at sports [1]. Nowadays, smartphones have excellent cameras for video recording, making it really easy for coaches or sport psychologists to record high-quality videos of athletes performing, which can then be used as part of their training. As a result, coaches and sport psychologists have explored different types, delivery methods, and uses of action observation with athletes.

ACTION OBSERVATION

Watching oneself or another person performing a movement, either live or on video.

WHY DOES ACTION OBSERVATION WORK?

There is a famous saying, "monkey see, monkey do." This saying applies to a scientific discovery of action observation in monkeys, one of the closest animal relatives to humans. In 1992, an influential group of Italian scientists conducted an experiment to try to understand the brain activity of monkeys when they performed actions with various objects [2]. The scientists happened to notice changes in the monkeys' brain activity when they *watched* the scientist picking up the objects and placing them inside a box; so, the scientists adjusted their experiment to also look at the brain activity that happened when monkeys were watching the scientist performing movements. To the scientists' surprise, brain cells called **neurons**, in an area of the monkeys' brains that is involved in planning movements, were activated both when the monkeys performed movements *and* when the monkeys watched the scientist perform the same movements. The scientists called these neurons **mirror neurons**, to indicate that the monkeys' brain activity during action observation "mirrored" the brain activity recorded when they performed the same movements.

NEURONS

Nerve cells that make up the human brain and nervous system.

MIRROR NEURONS

Brain cells that are activated during both action observation and physical performance of the same movement.

Scientists proposed that humans might also have similar brain activity when they are observing and performing movements. Thousands of experiments have explored the brain areas involved in action observation in humans. A recent study analyzed data from all the research that used **functional magnetic resonance imaging** (fMRI) during action observation and movement execution [3]. fMRI is a brain scanning technique that detects changes in blood flow to specific areas of the brain, which indicates the amount of brain activity. This study collected fMRI data from 595 action observation experiments and 142 movement execution experiments, which included a combined total of 13,334 participants! The researchers identified two brain areas that are involved in both action observation and movement execution in humans (Figure 1). The first area, called

FUNCTIONAL MAGNETIC RESONANCE IMAGING

A brain scanning technique that measures changes in blood flow to different areas of the brain, which are then interpreted as a marker of brain activity.

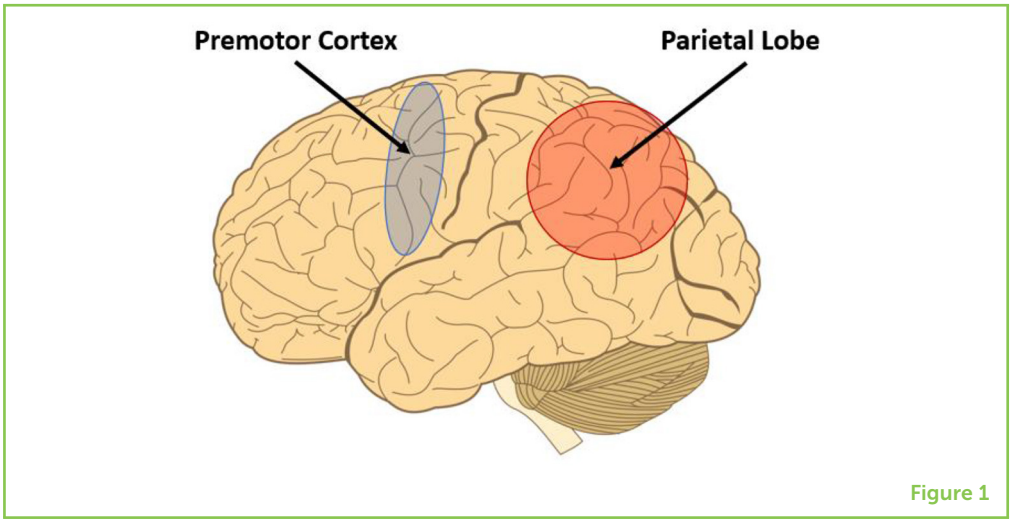

Figure 1

Locations of brain areas that are activated during both action observation and performance of movements. The premotor cortex (blue) is involved in planning movements. The parietal lobe (red) is involved in copying movements and the feelings associated with movements (Figure based on [3]).

the **premotor cortex**, is located in the center of the brain and is involved in planning movements. The second area, called the **parietal lobe**, is positioned toward the back of the brain and is involved in copying movements and the feelings associated with movements. So, it does in fact seem that action observation activates the human brain in a similar way to the mirror neurons that were discovered in monkeys. These findings suggest that repeated use of action observation by athletes might produce similar changes in the brain to physical practice, leading to improved sport performance!

PREMOTOR CORTEX

Part of the frontal lobe located in the upper center area of the brain that is involved in movement planning.

PARIETAL LOBE

A brain lobe located in the upper rear area of the brain that processes sensory information such as taste, temperature, and touch.

DOES ACTION OBSERVATION WORK IN SPORTS?

Watching another athlete performing is only useful if the watching athletes have a reason to be interested in what they are viewing. Athletes are often interested in watching other athletes because they always need to perform at their best. Athletes must outperform others to be selected for a team or to win a competition. This means that athletes are constantly trying to improve their skills during training or perform their skills well during competition. Action observation can help with both [4].

One scientific article on action observation in sport showed that action observation can be beneficial in sports in which athletes compete as individuals [4]. For example, action observation helped inexperienced golfers putt the ball closer to a target hole and helped youth gymnasts achieve higher judge ratings for their gymnastics routines. This scientific article also reported similar positive outcomes for individual athletes in team sports [4]. For example, action observation helped skilled volleyball players improve their serving accuracy and helped low-skilled basketball players increase the number of free throws they scored. Athletes have also been shown to move with greater quality, speed, and force after using action observation [4]. Overall, using action observation together with physical practice can help

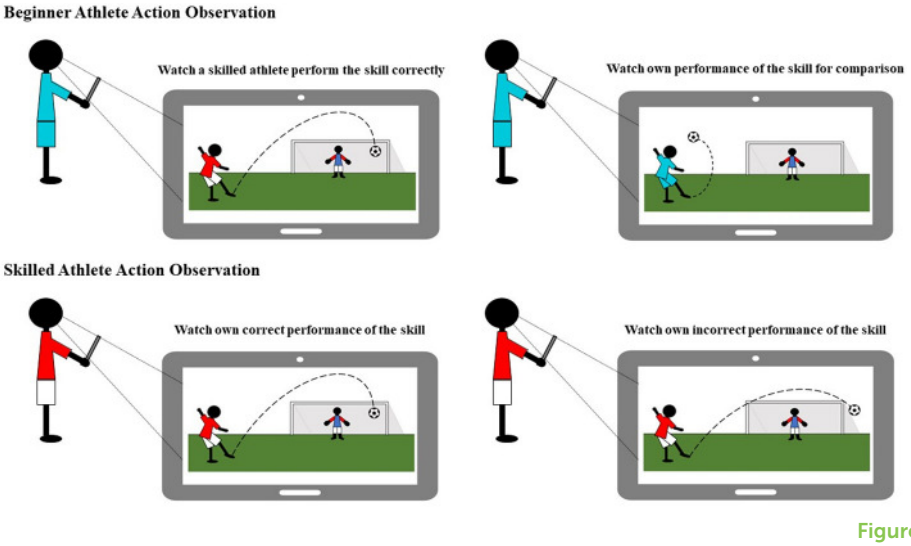

Figure 2

Action observation involves watching a video of a movement, such as kicking a ball. Athletes can watch footage of others or of themselves. The movements being performed can be successful or unsuccessful attempts. The decision to use videos of self vs. other and success vs. failure should be based on the skill level of the athletes and the specific reasons they are using action observation.

athletes perform a skill better than if they only physically practiced that skill. This is good news for athletes and coaches, as action observation is easy to use and can produce big improvements in sport performance.

Action observation also has psychological benefits for athletes [4]. Sport skills are like a jigsaw puzzle: when the pieces are put together in the correct order, the puzzle (or skill) works perfectly, but if something is out of place, the entire thing breaks down. Athletes can use action observation to link the different parts of a skill together so they can perform it well. Action observation can also help athletes overcome some of the negative thoughts and feelings they experience when they perform badly during training or competition [4]. In these situations, it is common for athletes to feel less motivated or lack confidence. Watching video footage of their own previous successful performances can remind athletes that they *can* perform well [4]. For example, if a soccer player is not feeling confident after missing a penalty shot in a big game, watching videos of times when they previously scored important penalties can help them feel more confident when preparing to take a similar shot again.

HOW SHOULD ATHLETES USE ACTION OBSERVATION?

Action observation should target the specific needs of athletes (Figure 2). For beginner athletes, the coach should provide frequent demonstrations of a skill. It is helpful for athletes if the coach explains the different parts of the skill during the demonstration. Once athletes get better at the skill, it is useful for them to see a video of what it looks like when they perform the skill themselves. This allows them to compare their own movements with those in the demonstration. Normal speed and slow-motion video footage of the movements

could both be used, as slow-motion video can help athletes see the technique more easily. Once athletes become even more skilled, they should be allowed to decide when they think action observation would best benefit their physical practice of the skill.

Skilled athletes may use action observation slightly differently than beginners do. They will probably watch videos of their own performances rather than demonstrations by others because they already know how to perform the skill well and have developed their own way of performing it over time. Skilled athletes will watch videos that include both successful and unsuccessful performances of the skill, which will help them continue to improve by identifying the differences in technique between good and bad attempts.

CONCLUSION

Action observation is part of everyday life and involves watching others or oneself moving. Action observation helps with performance of sports skills because it activates similar brain areas to those active when athletes physically perform those skills. Action observation can also help athletes with important psychological factors, such as confidence. Athletes of different skill levels should use various forms of action observation to improve their performance. Overall, action observation combined with physical practice is an excellent way to help athletes of all skill levels to get better at their sports.

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YOUNG REVIEWER

KAYLEE, AGE: 15
Hi, my name is Kaylee! I live with my two brothers, my parents, and my 5 pet snails (I love them, they are very cute). Besides constantly talking about my snails, I like to read and watch movies. I also play volleyball and love, love, love food. Did I mention I love food?

AUTHORS

ADAM M. BRUTON
I am a senior lecturer in psychology of human performance at the University of Roehampton. My research focuses on the use of psychological techniques based on watching or imagining actions, to improve learning and performance in settings such as sport. I am currently exploring how these techniques may lead to changes in brain activity and movement patterns across a range of tasks, including basic sit-to-stand movements, martial arts sequences, and soccer set-pieces. Outside of work, I enjoy spending lots of time with my wife and 1-year-old daughter and I can be found playing golf with my friends at my local golf course. *adam.bruton@roehampton.ac.uk

DAVID J. WRIGHT

I am a senior lecturer in psychology at Manchester Metropolitan University. My research focuses on two mental training techniques called action observation and motor imagery. I am interested in activity in the brain when people do these techniques, as well as how they can be used to help people improve their movement skills. I am currently exploring brain activity when people observe and imagine performing movements at the same time, and how combined action observation and motor imagery interventions can help people to learn and improve sport skills or everyday movement tasks. When I am not working, I enjoy spending time with my wife and two young children, riding my bike, and running.

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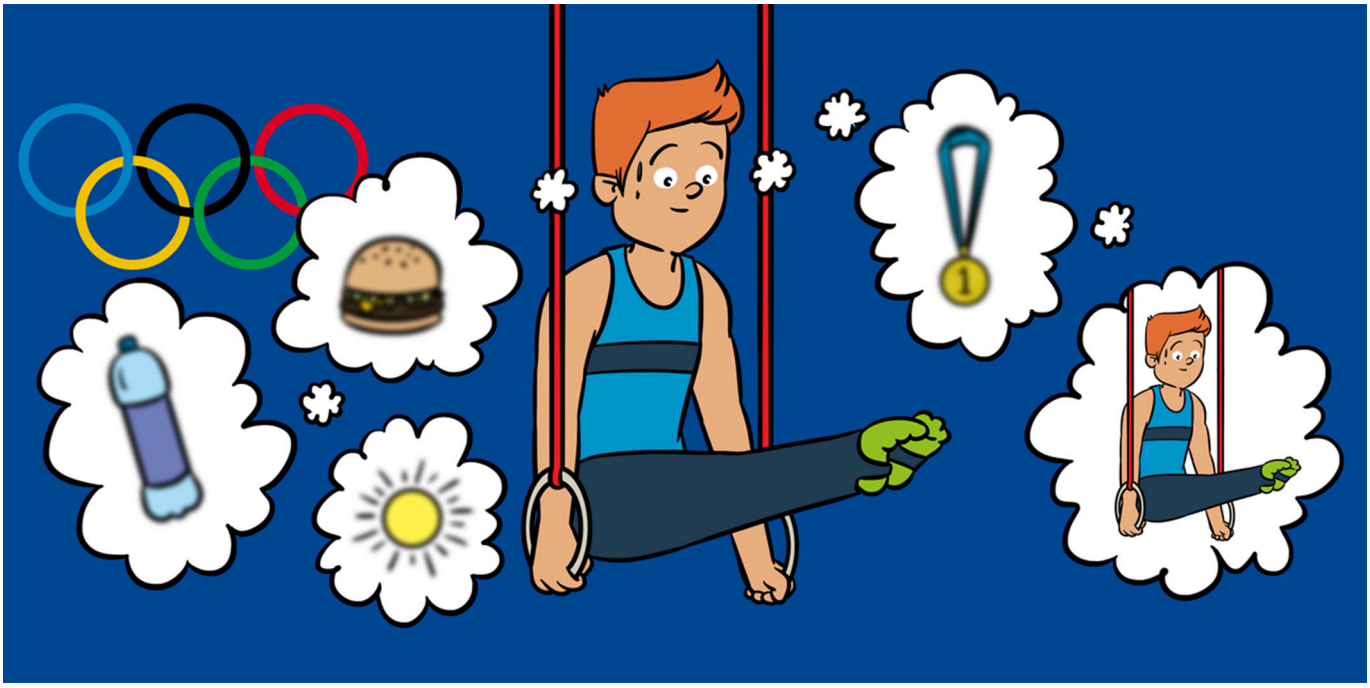

THE MAGIC OF MINDFULNESS IN SPORT

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YOUNG REVIEWER:

BAO-TÂM
AGE: 13

Top-level athletes are not only strong and fast, but they also look totally focused as if, in the moment of performance, the world around them does not exist. In the early days of sport psychology, this led to two misconceptions. First, we thought that when athletes looked calm and confident, their minds were quiet and positive. Second, we thought these people were born with extraordinary minds. Today, sport psychologists know better. We know the mind is busy and even the best athletes experience unpleasant thoughts and doubt at times. We also know that athletes can learn to refocus on the task at hand. They can do so by practicing mindfulness, which is training their attention to stay in the present moment, by bringing it back when it wanders. It is like taking the mind to the gym. In this article, I will explain how mindfulness training helps athletes perform at their best.

INSIDE THE MIND OF A WORLD-CLASS ATHLETE

Let me start by inviting you inside the mind of a world-class athlete. Imagine an Olympic sailor. Over the last 10 years, she has trained hard

in pursuit of one goal: Olympic glory. Now she is at the Olympics and the dream is within reach.

The competition takes place over 6 days, with two races every day. The first 5 days have gone well. She is in the lead, but the other sailors are close behind, and a medal is by no means guaranteed. The morning of the final, she knows exactly what she must do in today's race. She must observe the winds closely and sail with good technique—then she can win. Winning will require her to be totally focused on the present moment, concentrated on the task.

She knows this, but she is nervous. Two times this year she has been in the lead, only to be overtaken in the final. As today's race begins, her start is not very good. Inevitably, thoughts about her previous losses come creeping in. Her attention wanders from the present moment to the past ("What did I do wrong?") and on to the future ("What if it happens again?"). While her mind wanders, she is not focused on the present moment. She misses a good puff of wind and forgets about technique. Luckily, she notices that her focus is not right and brings her attention back to where it needs to be.

She manages to reach the top mark as one of the first sailors. Back in the front group, she can almost taste the sweetness of success. Her mind wanders off to the future—to victory and national celebration. Daydreaming, she almost misses a very windy patch on the water. Again, however, she notices her mind is wandering and brings her attention back to the task. This happens many times during the race. At times she is almost celebrating, convinced that victory is in hand. At other times, panic, anxiety, and memories of previous defeats cloud her mind. Every time, she notices her wandering mind and brings it back to the present moment. This is something she has been training intensely. She continually reminds herself of her strategy and she goes on to win a medal.

ALWAYS FOCUSED: AN UNREACHABLE GOAL

You may be surprised to learn that even a world-class athlete and Olympic medal-winner struggles to stay focused. This is not actually so surprising. The human mind is equipped with extraordinary powers, which are also a weakness. Humans can evaluate their mistakes to make sure they do not happen again. Unfortunately, it is hard for us not to constantly evaluate our performance. Humans can foresee problems before they occur, which is why we can do things like build safe bridges. Unfortunately, it is hard for us not to worry about all the things that could go wrong.

Athletes are human beings. Just like the rest of us, they are born with minds that are prone to wandering. Sometimes the mind wanders off

to the past ("Why did I make that mistake?) Other times, it wanders off into the future ("If I win the next point, I will be world champion!").

The mind wanders easily during moments of intense pressure [1]. Often, in sport, the outcome is highly uncertain. At the same time, that outcome has significant personal meaning. The Olympic games are a good example. For most athletes, success at the Olympics can mean financial rewards and eternal glory. At the same time, *all* the competitors are well-prepared and eager to win. No wonder athletes get nervous and find it hard to stay in the present moment.

Although the sailor we described is often distracted, she manages, again and again, to put her mind where it needs to be—on the task. She does this using the **3R process** (Figure 1). Her mind wanders, but the ability to refocus is a skill she has trained and perfected, like all her other sailing skills. **Mindfulness** is a good tool for the job.

3R PROCESS

A mindfulness in action process that consists of (1) *registering* that the mind has wandered, (2) *releasing* from the difficult thoughts or emotions and (3) *refocusing* on the task.

MINDFULNESS

The ability to pay attention, on purpose, to the present moment, without judgment or reaction.

Figure 1

The 3R process. Coming back to the present moment starts with the ability to notice that the mind has wandered (register), followed by acceptance (release), to finally bringing the attention back to the task (refocus).

Figure 1

WHAT IS MINDFULNESS?

Let us do a short mindfulness exercise. Read this description first and then try it.

Sit comfortably. Close your eyes. Notice your breath. You do not need to slow it down or change it in any way—just notice it. You may notice how your belly expands and contracts, or the feeling of air passing through your nose. Whenever a thought pops into your head, just notice it. Remember, "Why do I have so many thoughts?" or "This exercise is stupid!" are also thoughts. Try not to judge whether the thought is good or bad—just notice. When you notice thoughts, gently bring your attention back to your breath. Go ahead and do this for 1 min.

How often did your attention wander from your breath? How often were you distracted? If you are like the rest of us, probably quite often. This is also true for athletes. And, the more pressure a person is under, the more the mind tends to wander.

Mindfulness has been described as paying attention on purpose, in the present moment, without judgment [2]. That means being aware of what is going on both inside and outside of yourself, without getting lost in the thoughts that are always in your mind. Mindfulness is an ancient Eastern concept, and back then it had a religious purpose. Today it is also very popular in the West, but without any ties to religion.

In sport psychology, mindfulness is the ability to put attention where it needs to be. It is a very important skill that must be practiced so that it can be used when performing under pressure. Mindfulness training is an essential tool to help athletes develop the skill of mindfulness. Mindfulness training has been gaining popularity as sport psychologists have seen how even the best athletes experience intruding negative thoughts during their most important events.

WHAT DOES MINDFULNESS DO FOR ATHLETES?

Although athletes in competition look totally focused, as if the world around them does not exist, we know that their minds are busy. Even the best athletes experience doubt and worry. Luckily, they can learn to refocus on the task at hand. This ability to take charge of their attention in crucial moments of a performance is the most important psychological skill for athletes. Gandalf would say it is the one ring to rule them all.

If an athlete is not fully focused, their performance will suffer. A sailor may miss a windy patch. A football player may miss an opportunity for a brilliant pass because he does not see that a teammate is free. A boxer may react a second too slowly and be punched in the face. Tobias Lundgren and his colleagues taught mindfulness to a group of ice hockey players in Sweden and found that these players performed better at goals, assists, and shots taken, and that they were rated by their coaches as being more focused and committed [3]. Mindfulness simply helps athletes do their best.

At the same time, training mindfulness regularly is good for wellbeing. Through mindfulness training, athletes get to know their minds, accept how the mind works, and engage with what is important to them. As a result, they are less stressed and experience higher wellbeing. Athletes with high wellbeing are more likely to stay in sport.

HOW CAN ATHLETES TRAIN MINDFULNESS?

Like any other skill, mastering mindfulness requires training [4]. Athletes can train the ability to keep their attention in the present moment, bringing it back each time it wanders. It is like taking the

mind to the gym. Mindfulness can be practiced formally and informally (Figure 2) [5].

Figure 2

Both informal and formal mindfulness training result in increased attention and awareness or, in other words, in a better ability to focus.

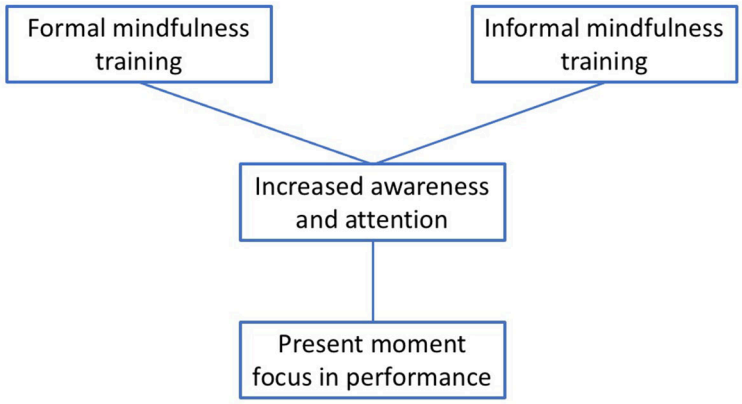

Figure 2

FORMAL MINDFULNESS TRAINING

Setting aside time to train, for example through a meditation exercise.

ATTENTION

The ability to focus on one thing (often the task at hand).

AWARENESS

The ability to notice when attention wanders and bring it back.

INFORMAL MINDFULNESS TRAINING

Training while engaged in another task.

Formal mindfulness training means setting aside time for training, like going to the gym for a workout. It often takes the form of meditation exercises. Athletes will lie down and listen to a voice telling them what to focus on, typically for between 5 and 20 min. Exercises vary, but they always have an element of practicing **attention** (focusing on the breath, a sound, or a sensation) and **awareness** (noticing when attention wanders and bringing it back).

Informal mindfulness training means training awareness and attention while you are engaged in another task, like exercising by biking to school. For example, a sailor polishing his boat may bring all his attention to the sensation of polishing. Every time he thinks about what is for dinner, he gently brings his attention back to polishing. Or imagine a cyclist practicing mindfulness on her bike. She focuses all her attention on a smooth pedal stroke and practices her ability to bring her attention back every time a distracting thought pops up.

CONCLUSION

Like the rest of us, athletes' minds are prone to wandering and losing focus. Teaching athletes to be fully present in the moment of performance and to maintain their attention on the task at hand can help them to perform better. Mindfulness training is an invaluable method for training athletes—and others—to keep their attention on the present moment, which helps them to attain maximum performance and wellbeing.

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YOUNG REVIEWER

BAO-TÂM, AGE: 13
Hey, my name is Bao-Tam and I am 13 this year (2022). I like listening to music, singing and reading. My hobbies are ballet, aïkido and roller skating. I am very excited to learn about the world and share discoveries with Frontiers for Young Minds!

AUTHOR

KRISTOFFER HENRIKSEN

Kristoffer Henriksen, Ph.D., is a professor at the Institute of Sport Science and Clinical Biomechanics, University of Southern Denmark, and head of the research unit Learning and Talent in Sport (LETS). His research mainly looks at successful talent-development environments and the psychology of top performers. For more than 12 years, he has also been a sport psychology practitioner for Team Denmark. In this function, he has worked to develop mentally strong athletes and coaches. He has supported athletes and teams during several World and European Championships and during the London, Rio, and Tokyo Olympic Games. *khenriksen@health.sdu.dk

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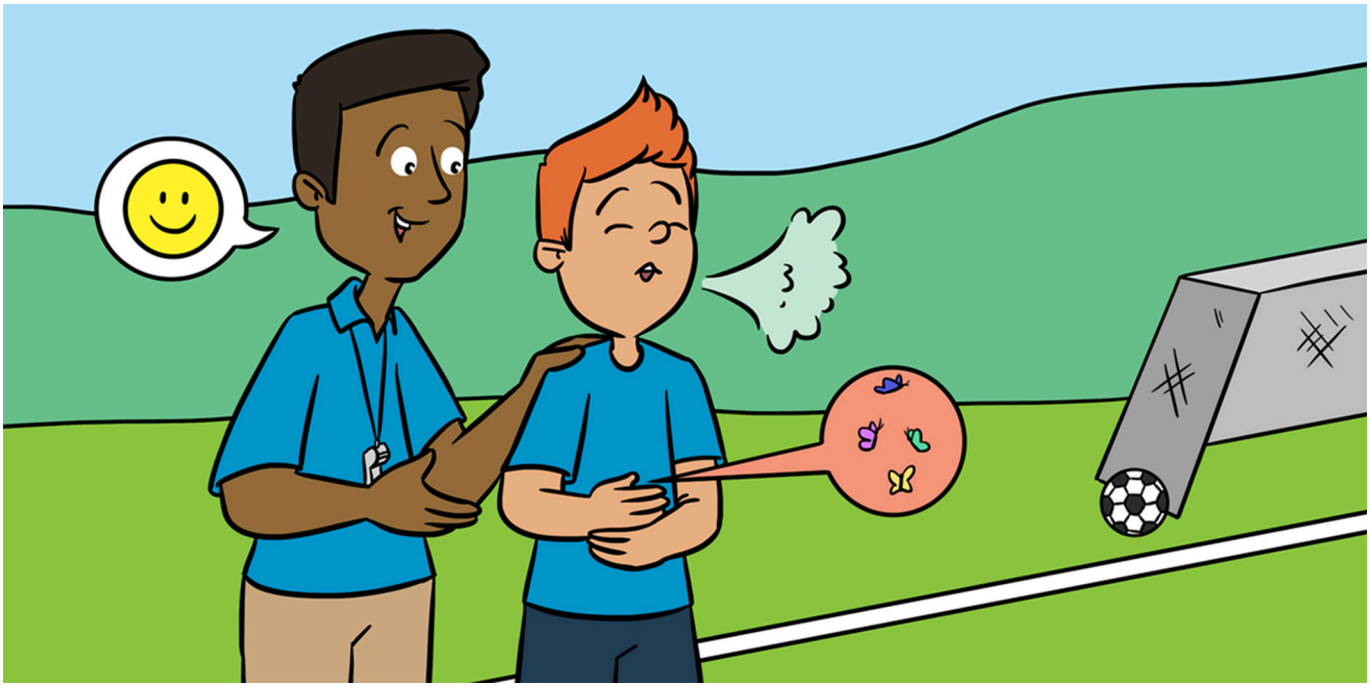

HOW DO EMOTIONS AFFECT SPORT PERFORMANCE?

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B. D. BILLINGHURST MIDDLE SCHOOL

AGES: 11–13

Playing sports can be filled with emotions. Athletes might feel nervous about try-outs or before a big competition, upset about losing or performing poorly, or excited and happy after a big win or a major accomplishment. To perform well in sport, athletes can learn to manage their emotions and cope with stress. However, some emotion regulation and coping strategies might be more useful than others. So, how can athletes learn to deal with their emotions and cope with stress in sport? In this article, we review what emotions are and how they influence athletes' thoughts and behaviors in sport, as well as their impact on sport performance. We also review types of coping strategies that athletes can use to deal with stress and emotions in sport, and we explore ways that athletes can learn to develop better coping skills for sport performance.

Athletes feel all kinds of emotions in sport. Some of these emotions feel bad or negative, like the feeling of being anxious, nervous, or scared before a big competition. Sometimes athletes feel so nervous

they do not know what to do, they just ca not shake it off, and they end up having a bad performance as a result of their emotions. Other sport-related emotions feel great, like the feeling of happiness and the thrill of winning a game, or the feeling of pride after pulling off a new skill or move for the first time. The emotions athletes feel in sport can sometimes be helpful for performance, but sometimes they can be tough to deal with and can make them perform worse.

WHAT CAUSES US TO FEEL EMOTIONS IN SPORT?

Emotions arise when we are in situations that are important to us [1]. Some examples of important situations for athletes include trying out for a team, making friends with teammates, getting playing time in games, performing skills correctly, or winning competitions. In these situations, it is natural to want to be successful, and sometimes these situations can feel stressful because it seems like there is a lot at stake. We might worry about what will happen if we do not make the team, or if we make a mistake, or if we lose a competition. Some emotions, like anxiety or fear, can arise when we feel that we do not know what to do, or when we do not have the ability to deal with the situation. For example, a soccer player in a penalty shoot-out might think that the outcome of the game depends on her performance, and she might be unsure about whether she can succeed. If she believes that she is not very good at penalty shots, she might feel negative emotions like anxiety. Therefore, the first thing to know about emotions is that they arise when we are in situations that are important to us—our emotions give us valuable information about the things we care about.

HOW DO EMOTIONS AFFECT SPORT PERFORMANCE?

Emotions can affect our bodies as well as our minds. Imagine you have a big, important sport event coming up tomorrow, and maybe you feel pressure to perform well because you really want to win. If you feel pressure about the upcoming competition, you might notice changes in your body: your heart might beat faster, your breathing might quicken, you might feel butterflies in your stomach, your chest might feel tense—all of these bodily sensations are the result of emotions. At the same time, you might find it hard to stop thinking about the competition, and it might be very difficult to focus on anything else! You might find yourself extremely distracted during the days and hours leading up to the competition. Emotions such as anxiety often feel this way—they have physical effects in the body as well as effects on the mind [2]. In Table 1 and Figure 1, we highlight some key points about the ways that various emotions may affect our bodies and our minds.

Such emotional experiences can also impact how we behave or perform. For example, an anxious or fearful athlete might perform

Table 1

The effects of emotions on the body and mind, and common responses to emotions.

Emotion	Effects on our bodies	Effects on our minds	Common actions and responses
Anxious	• Butterflies in the stomach • Feeling nauseous • Tingling sensations • Struggling to sit still or relax	• Racing thoughts • Trouble focusing on one thing • Negative thoughts	• Poor sport performance • Poor timing of sports skills
Sad	• Slumping shoulders • Moving slowly • Feeling fatigued or a loss of energy	• Negative thoughts: thinking that you are bad at something • Lack of confidence • Easily irritated or angry at people	• Trouble sleeping • Crying • Changes in appetite • Lack of motivation
Happy	• Moving with lots of energy • Smiling and laughing	• Confident thoughts • Thinking things will work out well • Able to focus more easily	• Good sport performance • Talkative
Fearful	• Feeling nauseous • Feeling too hot or too cold • Sweating	• Thinking one might be in danger • Racing thoughts • Struggling to focus	• Crying • Attempting to make the body small or trying to hide • Short, shallow breathing

Table 1

Figure 1

The effects of emotions on our minds and bodies. Our thoughts (top) and bodily feelings (bottom) change when we are **(A)** anxious, **(B)** happy, or **(C)** sad.

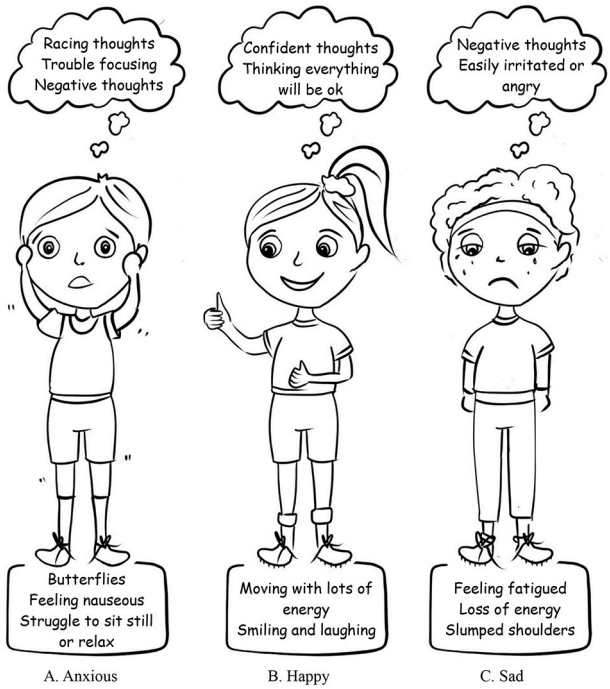

Figure 1

poorly or have poor timing for their kicking or catching skills. An athlete who feels sad might struggle to sleep the night before a competition and may cry during the game, while an athlete who feels happy might be very talkative, move with lots of energy, and perform well.

Emotions can also "spread" throughout a team or between people, which could impact sport performance. In some situations, the happiness and mood of players within a team has been "linked" to the moods of other players on the team, suggesting that emotions can have a ripple effect and spread to teammates [3]. This is important because it tells us that some people's emotions can affect others. In your own sport experiences, have you ever been affected by someone else's good or bad mood? The spread of emotions between teammates could also impact performance: if more athletes on a team are feeling good, then the team may perform better in competition. On the other hand, if lots of athletes on a team are feeling anxious, worried, or nervous, the team may perform worse.

MANAGING EMOTIONS FOR BETTER PERFORMANCE

When the feelings and thoughts associated with our emotions become overwhelming, we must find ways to manage the emotions. Trying to change or reduce the intensity of emotions is called **emotion regulation** [4]. Because emotions affect our bodies and our minds, this means that we must try to deal with the physical effects of emotions in our bodies, and we must also try to deal with the thoughts and effects of emotions in our minds.

EMOTION REGULATION

Emotion regulation refers to how people try to influence which emotions they feel, when they feel them, and how they show these emotions to others [3].

How do I manage the physical effects of emotions in my body?

To manage the effects of emotions in the body, it can be helpful to first notice your bodily sensations and name them. For example, you might notice and name the feelings of "tension in my muscles," "butterflies in my stomach," or "jittery legs." You can scan your body from head to toe notice your sensations, and gently name what is happening. Second, once you have noticed which physical sensations you are experiencing, take a few moments to breathe deeply. You can also focus on the sensations you are having and imagine you are breathing into that part of the body.

How do I manage the thoughts and effects of emotions in my mind?

One of the key things to do when trying to manage emotions is to recognize that they are normal, and they happen to everyone. In fact, these emotions are your body's way of preparing you for action. So, first, try thinking differently about the situation. This is known as **reappraising** the situation. You can reappraise your emotions by viewing your body's reactions and sensations as things that can *help* you in your sport, or by convincing yourself that they are not as important as they feel. Reappraising can help you to feel better. Second, you can think about some concrete steps you can take to fix the root of the problem. For example, if you feel overwhelmed and anxious because you are busy and have trouble keeping track of your schedule and your equipment, you could ask a parent to help you

REAPPRAISAL

Reappraisal is when a person deliberately tries to change how they think about a situation in order to change the emotions that they are experiencing.

write a schedule. You could also plan strategies for organizing your equipment so that you are not rushed before practices or games.

Other ways of coping with stressful situations in sport

Here are a couple more strategies you could try to cope with the stressful effects of emotions. First, seek support. Ask a coach, parent, or teammate to help you address the problem. You could also try to change the situation or stressor. This might require you to ask a coach, parent, or teammate to help you change the situation to something you know you are able to manage. For example, you could ask your coach to teach you additional skills for beating a defender, you could ask your coach if you can sit out of the next play so that you can manage your emotions, or you could ask a teammate on the bench to help you calm down.

ARE SOME STRATEGIES BETTER THAN OTHERS?

As you can see, there are many different ways to manage emotions and cope with stress in sport. You might be wondering, "what is the *best* way to deal with my emotions for optimal sport performance?" Well, the answer is complicated, and it involves the idea of coping **effectiveness**, which means finding the best ways of coping with stressors and managing emotions. For example, in some sport situations, the stressor might be a referee who is making bad calls against you and your team, and you might be getting increasingly frustrated and angry with the referee. In this case, the best way of dealing with the situation might be to take a deep breath and remind yourself that you can keep trying hard, no matter what the referee does. Using strategies like relaxation, deep breathing, and positive self-talk can be very effective for managing your emotions in a situation like this. But actions like confronting the referee, yelling, or exploding with anger during the competition would probably *not* be very effective—these actions might make the situation even worse! Another example might be if you are feeling unsure about your performance or nervous about an upcoming game. In this situation, you could talk to your parents, grandparents, coaches, teammates, or friends to ask them for advice and support. Seeking support from the people around us is another very effective strategy for dealing with stressors and emotions in sport. If you would like to learn more about how stress affects us, you can read this Frontiers for Young Minds article [5]. To learn more about pressure in sport, you can read this Frontiers for Young Minds article [6].

EFFECTIVENESS

Effectiveness refers to how useful emotion regulation or coping strategies are in helping to deal with a situation or to deal with your emotions. Using strategies effectively means that people are good at managing their emotions to feel the way they want, or they are good at managing stressful situations.

In conclusion, athletes experience lots of emotions in sport. Sometimes emotions are positive and help performance, for example, feeling happy can help athletes to be more confident. However, sometimes emotions are negative and can harm performance, for example, a soccer player may forget how to perform a drill if they are feeling anxious. When athletes have negative emotions, they can

try to manage them in different ways. Athletes can try to change the situation, change how they think and feel about the situation, or ask a coach, parent, or teammate for support. The most important thing for athletes is to be aware of the emotions they are feeling, and the best ways that they can manage their emotions in sport. What emotions do you feel in sport? How do you think you could manage them in the future?

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YOUNG REVIEWERS

B. D. BILLINGHURST MIDDLE SCHOOL, AGES: 11–13

This review was conducted with 3 classrooms at B. D. Billinghurst Middle School. Each class wanted to share their own story with the reader: 1. Our 1st period class is bussin, we enjoyed the article. 2. Second period is cool, and this article was rad. 3. Almost all of us do sports in 3rd period, the article is relatable, interesting, and appropriate for all reading levels.

AUTHORS

KATHERINE A. TAMMINEN

I am an associate professor at the University of Toronto. My research in sport psychology focuses on two main areas: (1) stress, coping, and emotion in sport; and (2) young athletes' experiences in sport. My current research examines how adolescent athletes learn to cope with stressors in sport, how parents and coaches influence athletes' coping, and parent-child communication in sport. *katherine.tamminen@utoronto.ca

RACHEL DUNN

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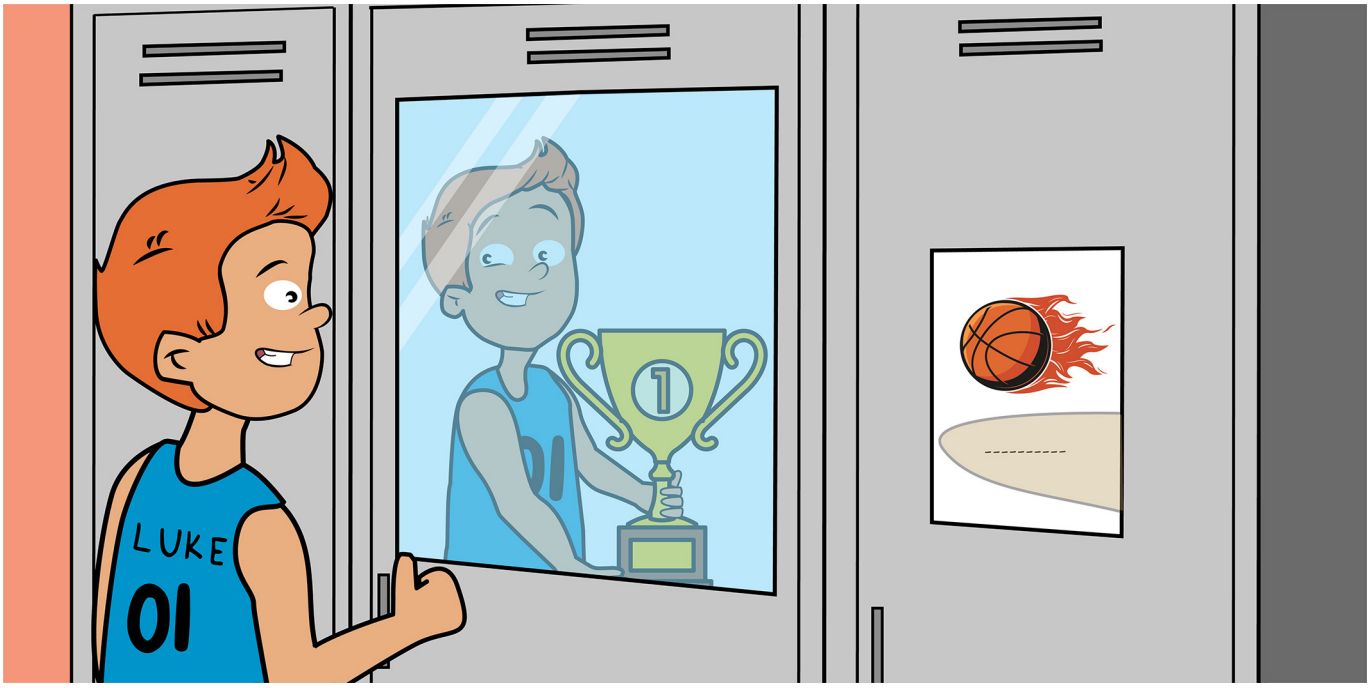

HOW TO SEE PRESSURE IN SPORT AS A CHALLENGE, NOT A THREAT

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YOUNG REVIEWERS:

ADVAITH
AGE: 15

MAYUKHA
AGE: 12

Playing sport is fun. But we can also get nervous about it. Many people competing in sports get nervous and feel pressure because doing their best is important to them. Feeling pressure is not automatically bad. If you see pressure as a positive challenge, it can help you do your best. However, seeing pressure as a negative threat can stop you from doing your best. Why? When you see pressure as something positive (a challenge), you believe in your abilities, feel in control of your situation, and are focused on facing the situation head-on. When you see pressure as a challenge, you might feel nervous, but you know this feeling helps you do your best, which helps your body respond in a helpful way. How can you make sure you see pressure as a challenge? One way is using techniques to help you to face pressure head-on, with self-belief, control, and excitement.

FEELING PRESSURE IN SPORT

In sport, there are many situations in which we can feel nervous. Imagine playing a match in front of a crowd of people or trying to qualify for a regional championship. Feeling nervous and experiencing pressure is completely normal, and in fact, many famous athletes have openly shared that they feel pressure before a match because doing the best they can is important to them. Sometimes you may view that pressure as a bad thing—as a threat. For example, you may feel that you do not have much control over what is happening, you might wish you could walk away, or perhaps you do not feel very sure of your abilities. But pressure does not have to be negative. You can learn to see pressure as a challenge—as something positive. When you make pressure your friend, and see it as a challenge, you feel more in control of the situation, you believe in your abilities, and you can face the situation head-on. Although you might feel nervous and notice your heart beating faster, you know that this means you are ready for the pressure situation. This will help you to do your best because your body reacts in a positive way to these thoughts and feelings, helping you to execute your skills properly.

WHAT ARE CHALLENGE AND THREAT?

PRESSURE

A situation where it is important for you to do well, but to do well you will have to try hard, and success is not guaranteed.

To feel **pressure**, something must be at stake. Maybe you have never played the opponent before, your family is watching, it is an important rivalry, you are unsure who is going to win, or you are worried about what others think of you. These are what we call the demands of the situation, and they are what creates pressure. To see this pressure as a good thing—a challenge—you need to know that you have the resources to match these demands. In our theory of challenge and threat states in athletes, we have identified three main resources: self-efficacy, perceived control, and approach and avoidance motivation (Figure 1) [1].

SELF-EFFICACY

The belief you have in your ability to successfully complete a task or meet the demands placed on you.

Self-efficacy, or self-belief, is the belief you have in your ability to successfully complete a task or meet the demands ahead of us. It is about the belief of what we can do with our skills in a situation. Self-efficacy is influenced by several factors, including our past experiences (earlier tasks we have succeeded at), having role models (perhaps a sibling or a training partner) who have been successful in a task, positive feedback from others or yourself, and, and how we interpret our physical symptoms of nervousness (heart rate, emotional responses such as anxiety).

PERCEIVED CONTROL

The feeling of having control over a situation.

Perceived control is the feeling of having control over a situation. It is different from *wanting to be* in control. Perceived control has to do with being aware of what is in your control and what is not, and accepting this. For example, when it is raining, you are aware that you cannot change the weather, but you feel you are in control of your

Figure 1

Challenge and threat states. In a challenge state the resources outweigh the demands, whereas in a threat states the demands outweigh the resources.

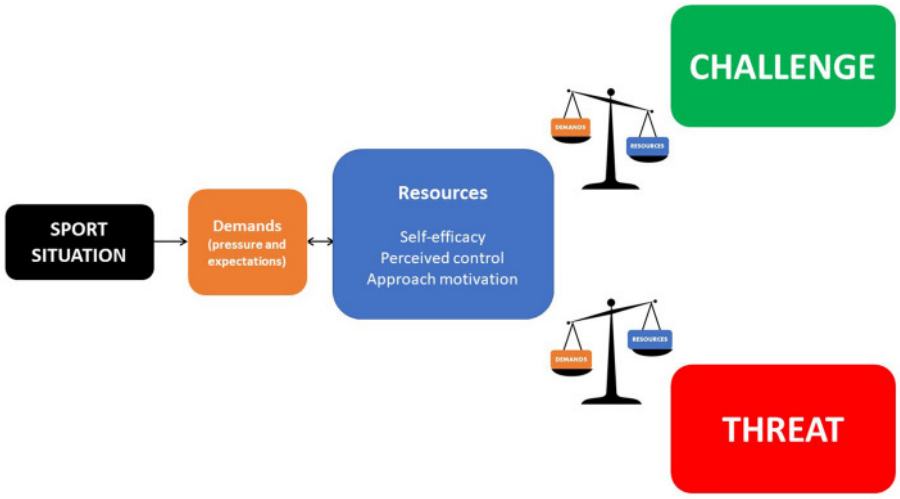

Figure 1

decision to wear shoes with a better grip. Or imagine that a referee makes a decision you disagree with—you probably cannot change the decision of the referee, but you can focus on your own effort and work hard.

Approach motivation has to do with focusing your efforts on doing your best. At other times, you may focus on trying to avoid mistakes—we call this **avoidance motivation**. The key difference is that, when you have an approach motivation, you focus on what you are going to do to perform well. Sometimes being focused on what you can avoid might feel easy, but it can actually take a lot of energy! Think about a downhill skier who is so focused on trying not to fall that he ends up missing an icy patch and falling. Approach motivation helps to turn pressure into a challenge.

APPROACH MOTIVATION

Focusing your efforts on doing your best and facing the situation head-on.

AVOIDANCE MOTIVATION

Focusing your efforts on trying to avoid making mistakes.

CHALLENGE STATE

Seeing pressure as something positive, where you feel you have the resources (self-efficacy, perceived control, approach motivation) to manage the demands of a situation.

THREAT STATE

Seeing pressure as something unhelpful, where you do not feel you have the resources (self-efficacy, perceived control, approach motivation) to manage the demands of a situation.

YOUR BODY UNDER PRESSURE

Having sufficient resources (self-efficacy, perceived control, and an approach motivation) helps people to manage the demands of a situation, and this is what we call a **challenge state** (Figure 2). How can we know whether someone sees a situation as a challenge or a threat? Researchers have found that the cardiovascular system (heart and lungs) responds differently when we feel that we have enough resources to deal with demands compared to when we feel we do not have enough resources [2]. When you experience a challenge state, the amount of blood that gets pumped through your heart each minute (cardiac output) increases and your blood vessels widen (which is called less vascular resistance), allowing that increased flow of blood to refuel your body. The way the cardiovascular system responds when you experience a **threat state** is much less efficient. Your blood flow remains pretty much the same, but your vascular

Figure 2

In a challenge state an athlete feels they have the resources (self-belief, perceived control, and approach goals) to manage the demands of the situation.

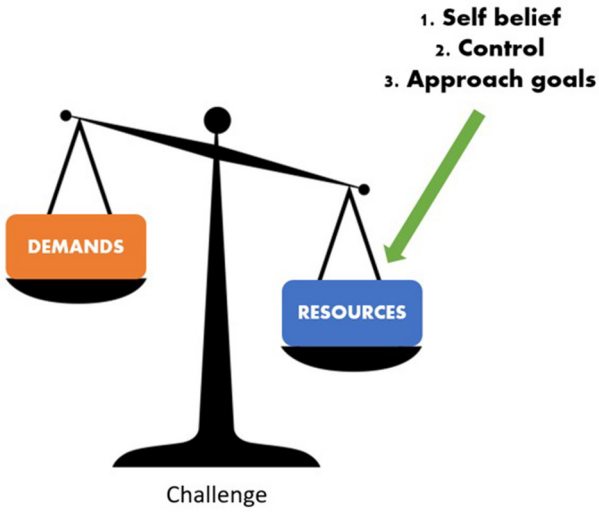

Figure 2

resistance increases, meaning that our body has to work harder to pump the blood around more narrow blood vessels. Taken together, when we feel we can deal with the demands of a situation, we have a more helpful cardiovascular response. Challenge has other positive outcomes, such as better performance and feelings of excitement and improved mood (Figure 3) [3].

HOW TO MAKE PRESSURE YOUR FRIEND: GETTING INTO A CHALLENGE STATE

Knowing that a challenge state is helpful might lead you to ask, "How do I get into a challenge state?" We suggest trying to increase your resources (self-efficacy, perceived control, and approach motivation) to help you deal with the demands of a situation. To move toward a challenge state by increasing your resources, we propose that you practice **psychological techniques** that will help you to feel more in control, enhance your self-efficacy, and allow you to focus on tackling the demands of the situation head-on.

PSYCHOLOGICAL TECHNIQUE

Mental strategies, such as self-talk and imagery, that you can use to help develop resources such as self-efficacy, perceived control, and approach motivation.

You can use a technique called self-talk to build the three key resources. Think about it as "What can I say to myself, to help me see this pressure as a good thing?" You can tell yourself what you want to achieve (approach motivation), remind yourself of what you can control (perceived control) and use positive affirmations in which you remind yourself of previous successes (self-efficacy). In one study, researchers asked participants who had never climbed before to mentally prepare to climb a ten-meter climbing wal—a tough task [4]! By reminding participants to be confident, in control, and focused on success rather than failure, researchers helped participants to see the task as a challenge, putting them into a challenge state.

Figure 3

An overview of a challenge state and a threat state. Reprinted with permission from Turner, M. J., and Barker, J. B. (2014). *Tipping the balance: the mental skills handbook for athletes.* UK: Bennion Kearny.

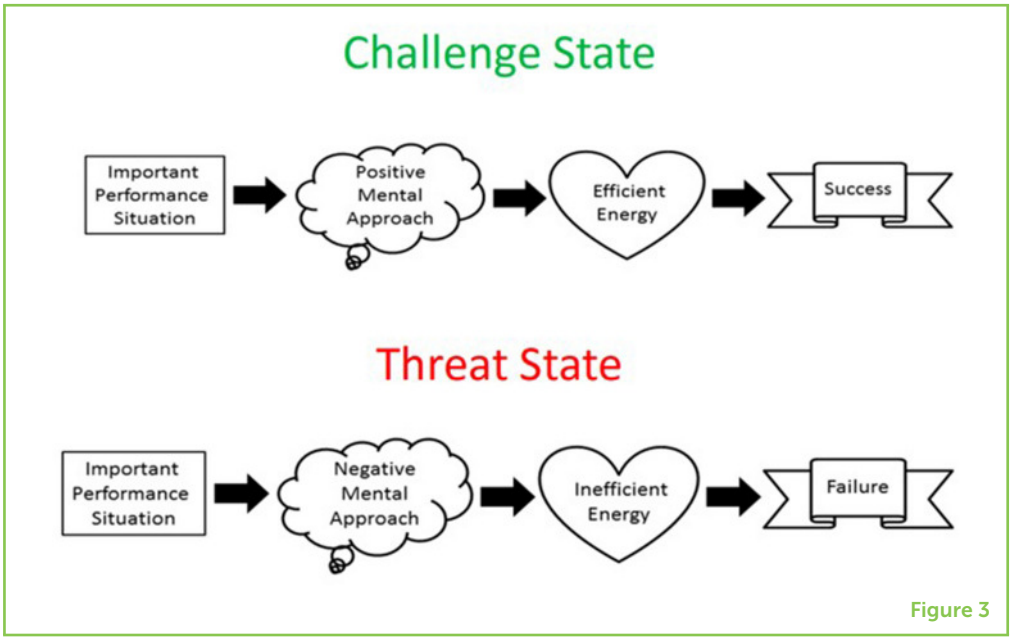

Figure 3

Imagery, where you create or recreate a situation in your mind using all your senses (vision, sound, touch, smell, taste), is another useful psychological technique to optimize your resources. For example, imagine a successful performance (confidence) in which you are focused on what you can control (perceived control) and what you are trying to achieve (approach motivation). The usefulness of imagery was shown by a study in which participants had to prepare to compete against a more skilled opponent [5]. Those who listened to "challenge" imagery, focusing on being confident in their abilities and enjoying the opportunity to compete against an opponent of a higher standard reported being more confident than those who listened to "threat" imagery, which included doubts about their abilities and worry about the competition.

If you would like to try using these psychological techniques in a demanding situation, it is important that you practice them first. Psychological techniques require training, just like you would train your technical skills (football kicks, or the starting position for a sprint) and tactical decisions (when to speed up in a cross-country race, or which offensive strategies to use in basketball).

In addition to using psychological techniques to build resources, you can use the support of the people around you. Getting positive feedback from your coach, or reminders from your family of times when you did well, can help build your self-efficacy. A teammate can help you to keep focused on the tasks you have control over (perceived control), or a friend may remind you of what you are trying to achieve (approach motivation). As an athlete, using the support around you will help you to fulfill your potential.

In summary, seeing pressure as a challenge can help you in your sport. To help the normal pressure of sport feel more like a challenge and less like a threat, we suggest focusing on building your resources so that you can face pressure head-on, with self-belief, control, and excitement. These skills will help you to have fun while playing sports—even if you feel a little nervous!

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YOUNG REVIEWERS

ADVAITH, AGE: 15

A prolific reader boasting to become a scientist! I enjoy experimenting physics, composing tunes on my flute and penning my thoughts through essays.

MAYUKHA, AGE: 12

Motivating people around gives me the energy to define my ambitions. Aspiring to join national administrative services, play national level tennis and become a Bharatnatyam dancer!

AUTHORS

CARLA MEIJEN

Carla Meijen is a senior lecturer in applied sport psychology at St Mary's University in London. She is fascinated by how athletes respond to pressure in sports, which she researches in her work on challenge and threat states. Her work also focuses on how psychological techniques (like self-talk and goal-setting) can be used to develop psychological factors such as motivation and self-belief. As a sport psychologist, she has worked with athletes from a wide range of sports and levels, and Carla enjoys using her knowledge from her research in her work with athletes.
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MARTIN J. TURNER

Martin Turner is a reader in psychology at Manchester Metropolitan University. He is most known for his work researching ways that athletes can optimize performance and wellbeing. In his work, he examines the links between the human mind and the human body when under stress, and how all this relates to human performance under pressure. As a practitioner, he has worked within professional, semi-professional, and amateur sport, at the team and individual level. Martin worked as England Futsal Psychologist from 2013 to 2020. Some of the work he did with the team came from his book "Tipping The Balance: The Mental Skills Handbook For Athletes."

MARC V. JONES

Marc Jones is a professor of psychology at Manchester Metropolitan University. His work is focused on understanding the impact of stress on health, wellbeing, and performance. The methods that Marc and his colleagues have developed to study the stress responses and enhance performance have been used in business, education, and sport. In addition to his ongoing work in sport and business, Marc is working on projects related to stress, wellbeing, and health in extreme environments. These include military settings, preparation for space travel, and emergency medicine groups.

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DEVELOPING AND MAINTAINING SPORT-CONFIDENCE: LEARNING FROM ELITE ATHLETES

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[2] *School of Life and Health School of Life and Health Sciences, Universality of Roehampton, London, United Kingdom*

YOUNG REVIEWERS:

ALEXA
AGE: 14

HATHAWAY BROWN SCHOOL
AGES: 14–15

SUA
AGE: 15

YUQING
AGE: 15

Have you noticed how you can feel very confident in some sporting situations but in others, usually at the worst possible moment, that confidence can suddenly disappear? When athletes feel confident, they are focused on the task, feel relaxed, and commit fully to decisions—all of which help them perform well. However, when they do not feel confident, they sometimes focus on the wrong things, doubt themselves, feel nervous, and often make poor decisions, which often results in poorer performances. In this article, we talk about a study that investigated what young elite athletes feel confident about, where they get their confidence from, and what reduces their confidence. The results help to explain why the confidence of young athletes often fluctuates and, importantly, gives us clues about how to develop and maintain sport-confidence.

WHAT IS SPORT-CONFIDENCE?

SPORT-CONFIDENCE

The belief, or degree of certainty, that athletes' have about their ability to be successful in sport.

APPLIED SPORT PSYCHOLOGIST

An individual who works with athletes, coaches, and/or sporting organizations to enhance performance and wellbeing.

TYPES OF SPORT-CONFIDENCE

The personal and social factors that influence what an athlete is confident about in relation to their sport.

SOURCES OF SPORT-CONFIDENCE

The personal and social factors that athletes use to gain sport-confidence.

The link between confidence and sports performance is something coaches, athletes, and commentators often talk about. For example, when talking about how important confidence was before playing in a World Cup final, a rugby World Cup winner said:

> "We knew we could play (opposing team) week-in-week-out and beat them. Having confidence like that going into a big game makes a game so much simpler. You are not worried about things, you are not worried about your opposite number, you are not worried about what they are going to throw at you. You are just completely focused on your performance and your team's performance. As long as we got that right we were going to win. So, from that side of it, it was just confidence, and the fact we knew we were not going to lose" [1].

Sport-confidence is the belief that athletes have about their ability to be successful in sport [2]. Scientific studies have consistently shown that athletes who believe they will be successful perform better in sport [3]. As a result, interest has grown in trying to understand sport-confidence and produce models (Figure 1) that enable **applied sport psychologists** and coaches to help athletes develop it. So far, most sport-confidence research has focused on exploring what athletes are confident about (**types of sport-confidence**), where they get their confidence from (**sources of sport-confidence**), and what reduces their confidence (**sport-confidence debilitating factors**).

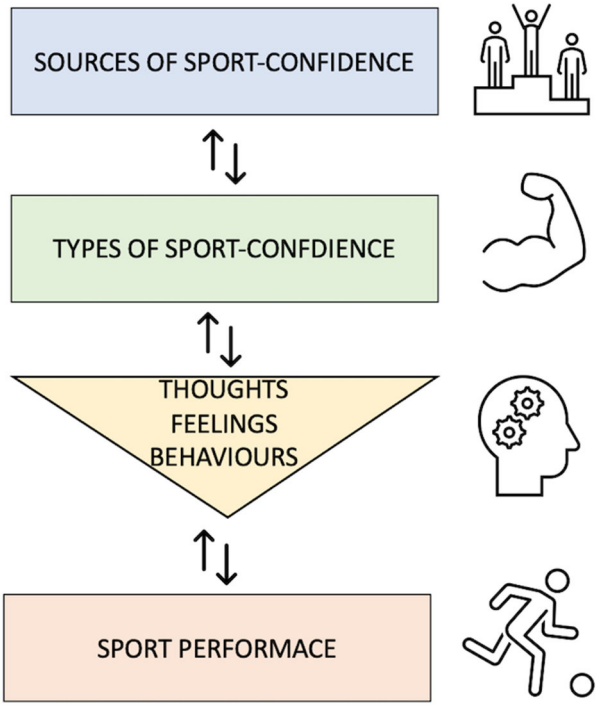

Figure 1

This simplified model shows that where athletes get their sport-confidence from (sources of sport-confidence) influences what they are confident about (types of sport-confidence). This in turn affects their thoughts, feelings and behaviors—things that all influence sporting performance (Adapted from [2]).

TYPES, SOURCES, AND DEBILITATING FACTORS OF SPORT-CONFIDENCE

SPORT-CONFIDENCE DEBILITATING FACTORS

The personal and social factors that reduce or limit athletes sport-confidence.

In 2007, an important research study was conducted with world-class sport performers (Olympic medallists and/or World Champions) that identified their types and sources of sport-confidence [1]. Findings suggested that world-class athletes were confident about achievement (winning or performing well), skill execution (physical and technical skills), physical factors (strength, fitness), psychological factors (controlling nerves, competing under pressure), feeling superior to their opposition (being quicker or more skilful), and tactical awareness (knowing when to attack in a race, reading the game). The world-class athletes sourced their sport-confidence from nine different areas (preparation, performance accomplishments, coaching, social support, innate factors, experience, competitive advantage, trust, self-awareness, and athlete specific factors), but indicated their confidence was mostly gained from high-quality mental and physical preparation, performance accomplishments (improving their sport skills or previous success), and the social support they received from the people around them (coaches, teammates, parents). Importantly, the findings supported the idea that the sources of an athlete's confidence influence what they are confident about. For example, when the world-class athletes physically and mentally prepared well (a source of sport-confidence) they were more confident about their skill execution (a type of sport-confidence).

In addition to types and sources of sport-confidence, more recent studies have looked at how sport-confidence influences world-class athletes' thoughts, feelings, and behaviors, as well as what reduces their levels of sport-confidence [4]. When the world-class athletes felt confident, they were focused on the task, relaxed, and fully committed to decisions. However, when they did not feel confident, they sometimes focused on the wrong things, doubted themselves, felt nervous, and often made poor decisions. The factors that debilitated sport-confidence included poor performance (like playing badly in a competition), poor preparation/training, injury or illness, poor coaching, pressure and expectations from others, and psychological factors (such as focusing on uncontrollable things, like the performance of an opponent).

EXPLORING YOUNG ATHLETES' SPORT-CONFIDENCE: NEW DISCOVERIES

Although we know a reasonable amount about world-class athletes' sport-confidence, until very recently we knew very little about younger athletes' sport-confidence. It seemed that young people might base their sport-confidence on a small number of sources, such as performance accomplishments and positive feedback from coaches.

CONFIDENCE PROFILING

A method of measuring and understanding an individual athlete's types, sources, and debilitating factors of sport-confidence.

However, as psychologists, we must be more confident (excuse the pun!) that our hypotheses are supported by research. Therefore, in 2019, we used a technique called **confidence profiling** with a sample of elite academy soccer players in the UK and made some new discoveries about their types, sources, and debilitating factors [5].

MEASURING SPORT-CONFIDENCE: CONFIDENCE PROFILING

Measuring sport-confidence can be challenging. In the past, researchers have used questionnaires that include confidence-related statements (like, "I usually gain confidence in my sport when I improve my skills") which athletes rate on a numbered scale—for example from 1 (not at all important) to 7 (high importance). One problem with this method is that it assumes everyone gains confidence from the same source. To overcome this, researchers developed **confidence profiling**, a technique in which athletes complete a diary and a follow-up interview to captures their specific types and sources of sport-confidence and any confidence-debilitating factors they may experience [6]. This approach allows sport psychologists to obtain key information about athletes' sport-confidence.

STUDY RESULTS: FEWER SOURCES AND TYPES OF SPORT-CONFIDENCE

The results from our study (Figure 2) suggest that the confidence of elite young athletes shows some similarities to that of world-class athletes. For example, consistent with world-class athletes, young elite athletes were confident about their ability to perform specific skills (passing, positioning, shooting), physical factors (speed, work rate, strength), and some psychological factors (ability to handle pressure, ability to communicate, ability to lead). However, the young elite soccer players were not confident about achievement or being better than the opposition. In terms of sources of sport-confidence, young athletes gained confidence from their accomplishments and the support (positive feedback, encouragement, advice) they received from their parents, friends, and coaches. The quote below highlights how important accomplishments are during competition:

> "Once I am passing well, I normally play well. When I have put 3, 4, 5 in a row together, that is when I start to grow in confidence. That is like the heartbeat of my confidence passing" [5].

Preparation was also a widely used source of sport-confidence. However, young players mostly relied on physical rather than psychological preparation. Some young athletes in our study also gained confidence from innate factors (natural ability) and vicarious

Figure 2

Types, sources, and debilitating factors of sport-confidence in elite young athletes. The sources of sport-confidence influence their types of sport-confidence—and confidence debilitating factors can influence both these things.

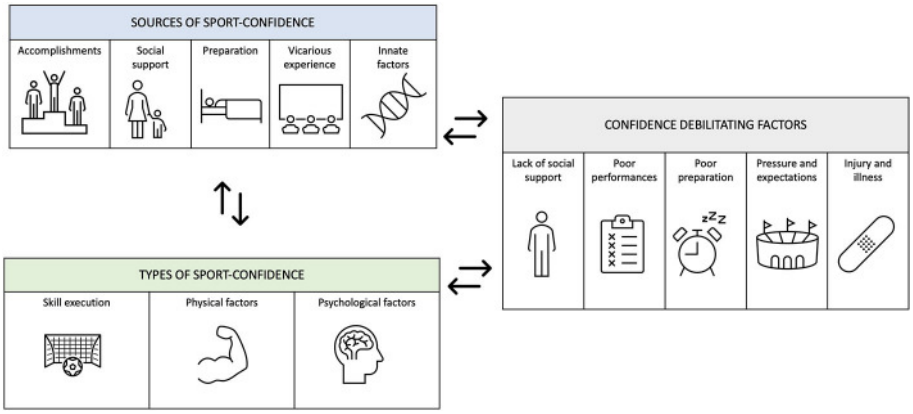

Figure 2

experience (watching other people successfully perform a task). As one player suggested:

> "Observing better players and learning from what they do gives you confidence when you go away and do what they do, maybe not to the same level, but you can take parts of their game and put it into yours" [5].

Finally, the confidence-debilitating factors identified by young elite academy soccer players included a lack of social support, poor performance, poor preparation, pressure and expectations, and injury/illness [5]. As you might have noticed, some of these confidence-debilitating factors (like poor preparation) are the opposites of the sources (good preparation) from which they gained their confidence.

DEVELOPING AND MAINTAINING SPORT-CONFIDENCE

Our study suggested that, compared to world-class athletes, young elite athletes are confident about fewer things and gain their sport-confidence from a relatively small number of sources. This may help explain why young athletes' confidence levels often go up and down. For example, if a young footballer's confidence is solely based on scoring goals and that player has not scored for a few matches, their confidence will drop and they may start to doubt their ability, feel pressured, and make bad decisions. The problem here is that the player's confidence is based solely on one relatively uncontrollable confidence source—scoring goals.

A simple way to develop and maintain sport-confidence is to broaden the base of sport-confidence sources used. As mentioned above, even though scoring a goal or receiving positive feedback from a coach will increase confidence in the short term, those things do not always happen, so players should not rely on them. We have

learnt that world-class athletes use lots of other controllable sources (meaning sources they can do something about) to develop and maintain their confidence. These include working on areas that need improvement during training, watching and learning from others who perform skills well (teammates or other elite athletes), and mentally and physically preparing for competitions by sleeping well, recovering, eating healthily, imagining previous or future successes, and using positive self-talk [1]. These things also help world-class athletes to develop effective coping strategies, so they can perform under pressure and ensure their confidence remains stable and steady when they need it most! In conclusion, these insights show how both personal and social factors (e.g., age, level, coaching behaviors) play a role in influencing sport-confidence and in doing so can help to develop interventions aimed at developing and maintaining sport-confidence in young athletes.

ORIGINAL SOURCE ARTICLE

Thomas, O., Thrower, S. N., Lane, A., and Thomas, J. 2019. Types, sources, and debilitating factors of sport confidence in elite early adolescent academy soccer players. *J. Appl. Sport Psychol.* 33:192–217. doi: 10.1080/10413200.2019.1630863

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YOUNG REVIEWERS

ALEXA, AGE: 14
Alexa is a secondary 3 student attending a highschool in Montreal, Canada. Alexa uses she/her pronouns. She is looking into studying biology and is interested in fungi and foraging. She has a pet cat named Carlos and a couple fish. Alexa used to play the flute and the piano but now enjoys expressing herself by listening to her favorite artists. She also recently discovered her passion for drawing.

HATHAWAY BROWN SCHOOL, AGES: 14–15
We are students from the Science Research & Engineering Program at Hathaway Brown School. We enjoy learning about the peer review process, learning how to communicate science to different audiences, and offering our suggestions. We are helped by our Science Mentor, Crystal Miller.

SUA, AGE: 15
I am a secondary 3 student who very much takes interest in all things science such as astronomy. I also enjoy drawing or listening to music in my free time.

YUQING, AGE: 15
Yuqing is a secondary 3 student in Montreal, Canada. She is interested in biology and astronomy and enjoys writing. She hopes to pursue a career in the medical field or become an astronaut. In her spare time, she plays the piano, skates, and chats with her friends.

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HOW SPORTS CAN PREPARE YOU FOR LIFE

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YOUNG REVIEWER:

AMELIE

AGE: 13

Sports are fun activities that help kids learn skills, like how to shoot a free throw or skate backwards. But what if sports could teach us more than physical skills and prepare us for life? If the environment is safe and welcoming, sports can also teach us skills that we can use in our lives—*life skills*! Participating in sports can teach us about teamwork, being a leader, how to relax if we are upset, and much more! In this article, we discuss different ways that life skills can be developed through sports. We also talk about what you and your coaches can do to help you develop life skills. As you learn these skills in sports, you can use them anywhere, like at school or home. Life skills learned in sports can help you become a good person on whatever path you choose in life.

HOW SPORTS CAN PREPARE YOU FOR LIFE

Sports can be fun activities that help kids to learn different skills, like how to shoot a free throw, skate backwards, or hit a fastball. But what if sports can teach us more than physical skills? What if they can prepare

us for life? Kids across the world engage in different types of organized sports, whether at school or in their communities. This makes sports an important context to help prepare kids for life. You might have heard the phrase "sports build character" before. Building positive character does not always happen by accident. It requires hard work from the kids participating, but also from their coaches and teammates.

Coaches play an important role in sports. If coaches make sports safe and welcoming, kids can have fun, learn new skills, and be part of a team or club. If coaches do not structure sports well, sports can lead to negative things, like not having fun, cheating, or bullying. In this article, we discuss how coaches can help kids learn **life skills** through playing sports.

LIFE SKILLS

Values, assets, or skills that help us in life. They can include respect, honesty, teamwork, emotional regulation, perseverance, and many more.

WHAT ARE LIFE SKILLS?

If the sports environment is safe and welcoming, sports can teach kids skills they can use in their lives—*life skills*! Life skills means different things to different people. Sometimes people use words like values, assets, lessons, or character traits. In this article, we will call them life skills. Within sports, life skills can include:

- *Respect*: showing consideration and being kind to people (teammates, opponents, referees) and things (rules of the sport, equipment, sports facility);
- *Honesty*: always telling the truth to yourself and others;
- *Teamwork*: working together as a group to achieve a goal;
- *Emotional regulation*: having control over your emotions and staying calm; and
- *Perseverance*: always trying your best and never giving up.

You may learn about some of these skills at school, when you are working on a group project, or at home, from your parents and family. Learning life skills in many different contexts is an important part of your development. Developing life skills is a *process*, which means they take time and practice to develop. Sports can be one part of the process of developing life skills. Life skills can be learned, practiced, and improved upon in any sport, whether team or individual. Yet, for these skills to be called life skills, kids need to transfer these skills. **Life skills transfer** means that life skills learned in sports are used in other areas of your life, like at school, at home, or in other sports or activities [1].

LIFE SKILLS TRANSFER

The process in which the life skills learned in sports are applied in other areas of a kid's life, like at school, at home, in other sports, or in their community.

WHY IS IT IMPORTANT TO DEVELOP LIFE SKILLS?

You may be asking yourself why developing life skills is important. Learning and practicing life skills in sports can help you be a good

teammate and player, but they can also help you to be a good person outside of sports. Even if you do not become a professional athlete or play sports your whole life, you can still use life skills in other contexts. For example, learning relaxation techniques can be very helpful in sports. When stepping up to the plate for your first pitch in cricket or standing on the basketball free-throw line, you can learn different ways to relax, such as taking deep breaths or calming your mind by counting to five. Learning about relaxation techniques in sports can also help when you feel nervous or anxious at school. Before a test, you can take deep breaths to relax and calm your nerves. If you get into an argument with a friend or sibling, relaxation techniques, like deep breathing, can also help you act calmly, so you choose your words carefully and come to a peaceful solution.

HOW CAN I DEVELOP LIFE SKILLS IN SPORT?

There is a lot to focus on while playing sports—the rules, your position—without thinking about life skills. But do not worry; you do not have to go through this process on your own! As mentioned, coaches are important in helping kids develop life skills when playing sports. Life skills can be developed through sports in two different ways.

First, life skills can be developed based on how the sport is structured, including the rules, competition, and relationships developed with coaches and teammates [2]. In this **implicit approach**, coaches focus mainly on teaching sport-specific skills, like passing and shooting. They do not place any specific effort on discussing or practicing life skills. In cheerleading, kids can learn to communicate with their teammates during a routine. In golf, kids can learn to be respectful through the rules about respecting the course and one's opponents. In these examples, coaches are not doing anything specific to support the development of life skills. Essentially, if coaches use this implicit approach, they leave life skills learning in sports up to chance.

IMPLICIT APPROACH

An approach to teaching life skills in which coaches focus on teaching sport-specific skills, without placing any specific effort on teaching life skills or providing time to practice life skills.

EXPLICIT APPROACH

An approach to teaching life skills that occurs when coaches take specific steps to teach kids life skills.

Second, life skills can also be developed explicitly [2]. This **explicit approach** occurs when coaches take specific steps to teach kids life skills. There are different ways for coaches to teach life skills through sports. Below, we give an example of Coach Jane using an explicit approach during a handball practice or competition. This approach has five steps. First, Jane picks one life skill to teach—leadership. The theme of the entire session is to learn how to be a leader. Second, Jane works with players to define that life skill. Together, they come up with a definition of what it means to be a leader in handball, at home, and at school. Third, Jane gives players opportunities to practice being leaders during the session, including asking them to lead the warm-up or to act as the team captain. Jane provides feedback while they practice being leaders. She asks players to consider if their way of leading includes all of their teammates. Fourth, Jane finishes the

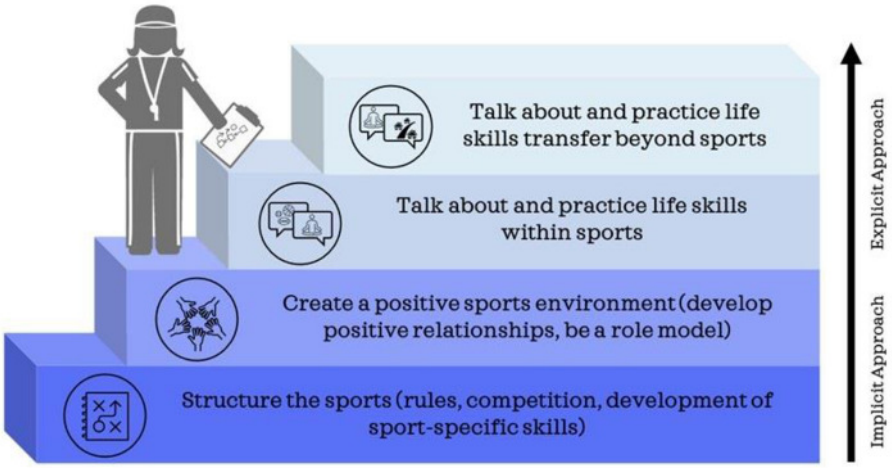

Figure 1

Figure 1

We can imagine coaches who use implicit and explicit approaches as climbing a staircase. The first two steps represent the implicit approach, and the last two steps represent the explicit approach. Coaches need to climb the stairs in order to explicitly teach life skills. The stairs build on each other—to be on stair three, coaches need to also be using strategies from stairs one and two. This allows coaches to use a combination of implicit and explicit approaches for teaching life skills (Image credit: adapted from [3]).

session by reviewing the chosen life skill. She asks players questions like, "What activities required you to be a leader in today's session?" and "Where else can you be a leader beyond handball?" Together, Jane and the players talk about how they can be leaders at home, at school, and even at work as they get older. The point of these discussions is for players to develop connections between their sports experiences and their lives outside of sports. Finally, Jane can provide opportunities for players to practice the life skills learned in handball in other contexts. As mentioned earlier, this is called life skills transfer. For example, to practice transferring leadership, Jane arranges for the players to lead activities at a younger team's practice. Jane also works with the players' teachers and parents to encourage players to practice being leaders in school, at home, or in other extracurricular activities, like mentoring a classmate who is struggling with their math homework. Overall, Coach Jane *explicitly* supports players' leadership skills, within and beyond handball.

Researchers have found that using a combination of implicit *and* explicit approaches is most useful for kids to learn life skills in sports (Figure 1) [4]. When coaches use both approaches, kids can have more opportunities to develop life skills based on how the sports environment is structured and what kinds of skills coaches choose to teach. Coach Jane supports her players' leadership development by using the five steps outlined above (explicit approach), along with strategies like being a role model and setting clear rules about playing fairly (implicit approach). Research shows that using both approaches can help to increase kids' awareness of how to transfer their life skills and strengthen their abilities for life skills transfer beyond sports, like at home and at school [5]. For example, if a player sees a classmate being bullied by a peer at school based on their gender identity or skin color, the player can transfer his or her leadership skills developed in sports by standing up for that classmate and leading the conversation toward kindness and inclusion rather than bullying.

SO NOW YOU KNOW!

In this article, we talked about ways sports and coaches can help you develop important skills that you can use in life. These life skills, like respect, leadership, and honesty, can improve your ability to perform in sports, but they also go beyond sports. What is important to remember is that YOU, as the athlete, also play an important role in this learning process. First, think about the different skills you are learning in sports. What are they? Look for important connections between your sport and your life in school or at home. Second, take initiative and use your life skills without your coach having to ask you. Stand up for a teammate who is being bullied or try to focus while waiting to receive a serve in tennis. Third, keep these skills in mind as you grow up. As you go to high school or secondary school and work your first job, there may be different life skills that are useful for you to transfer from your sports experiences. So, next time you are about to give a big class presentation, think about what you did on the court or field to help you relax and prepare. Practicing these life skills in sports and life can help you be a good athlete *and* a good person, on whatever path you choose in life.

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YOUNG REVIEWER

AMELIE, AGE: 13

I have started practicing judo (I am a yellow-belt) and love playing squash with my friends and swimming. I am very interested in aviation and at school, my favorite subjects are physics, chemistry, and biology.

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Corliss Bean is an assistant professor in the Department of Recreation and Leisure Studies at Brock University in Ontario, Canada. Her research involves working with community organizations at local and national levels to develop, implement, and evaluate programming, with the goal of fostering youth's life skills development. Corliss is also the co-director of the Center for Healthy Youth Development through Sport. Her research interests include positive youth development, life skills development, sport psychology, girls and women, and coaching. *cbean@Brocku.ca

SARA KRAMERS

Sara Kramers is a doctoral student in sport psychology within the School of Human Kinetics at the University of Ottawa, Canada. Her research aims to explore how to support youth sport coaches as they intentionally and explicitly support young athletes' life skills development and transfer through sport. Through her research and community service, Sara ultimately aims to promote the development of sport environments that are inclusive, equitable, and meaningful for those participating.

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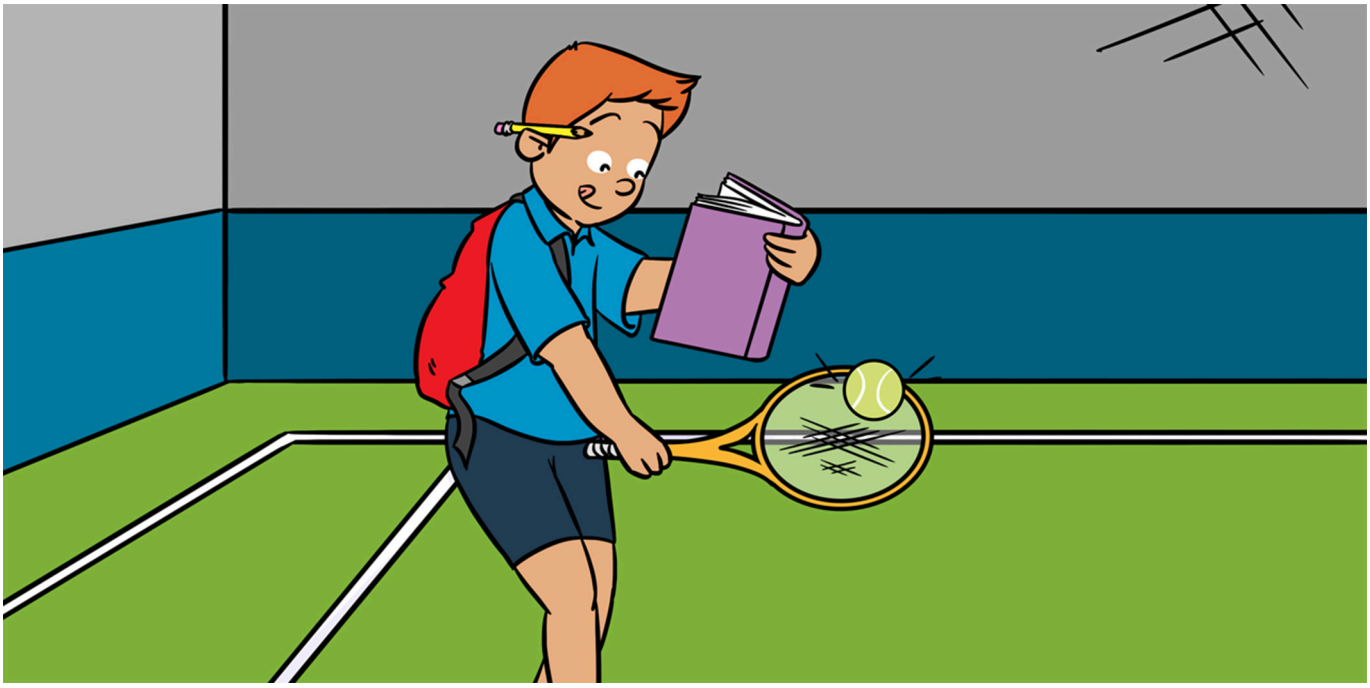

A "DUAL CAREER": COMBINING SPORT AND STUDIES

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YOUNG REVIEWERS:

MASSIMO
AGE: 5

MONICA
AGE: 8

SUYANG
AGE: 15

School-aged athletes face the need to balance competitive sports and their studies. In doing so they follow what is called a dual-career pathway. Both pursuits take time and effort, both are expected to lead to success, and either could lead to a life-long career. A dual-career pathway begins when children start to play sports and might continue throughout the school years and beyond. Research shows that it is beneficial to combine sport and studies, but it is also challenging. How can kids optimally juggle their sport, studies, social, and private lives? How do they gain the benefits of a dual career and avoid harming their prospects in sport or school? This article explains what a dual career is, why it is important, and why it is difficult. It also describes the skills and strategies for coping with dual-career challenges and presents tips from researchers to achieve success in dual-career pursuits.

WHAT IS A DUAL CAREER?

DUAL CAREER

Dual career is a combination of sport and studies (or work).

Many young readers are engaged in sport training and competitions while simultaneously pursuing an education. In the field of sport sciences, such a combination is called a **dual career**. A dual career requires managing two major activities, both of which are important. Young people are in school during the same years that are favorable for developing talent in sport. So, young athletes find themselves on a dual-career path. Researchers in the field of talent development estimate that it takes 10,000 h of purposeful practice to reach an expert level in sports, music, or performing arts [1]. Therefore, an athletic career often begins during childhood and continues through youth and adulthood as the young person progresses through primary school, secondary school, high school, and college/university education. Such an athletic career flows through the following stages:

- *Initiation*—an introduction to sports and playing for fun,
- *Development*—an emphasis on one sport, learning sport-specific skills, and involvement in structured practice and competitions,
- *Mastery*—achieving a personal peak in sport performance and possibility of pursuing sport professionally,
- *Discontinuation*—leaving competitive sports and shifting priorities to education or work.

WHY IS A DUAL CAREER IMPORTANT?

Sport psychology researchers view athletes as whole individuals, who not only engage in sport, but also have other life priorities such as education, work, family, friends, and hobbies. Human life is viewed as a personal journey through various "landscapes," which include physical places, historical periods, and developmental stages (childhood, youth, adulthood, and older ages). We rarely journey alone in life. Parents, siblings, teachers, coaches, teammates, and peers might place expectations and demands on us, and also provide us with support and care. For example, in one study researchers interviewed athletes from all over the world about their dual-career experiences [2]. All the athletes interviewed acknowledged the importance of their support networks. Supporters in the athletes' lives had a strong belief in the value of education and a whole-person approach, they understood what athletes go through, and they helped the athletes to face barriers along the way. An athlete's support network and the help those people supplied were viewed as key factors for dual-career success.

In life's journey, it is important to do things at the right time, which requires good planning and preparation for the future. Athletes with dual careers aim to win in the short and long run. Winning in the long run means preparing for adult life by getting an education, which provides future job and financial security. Researchers interviewed

15 former Olympic athletes and revealed that dual-career athletes adjusted better and experienced less difficulty finding their places in society after exiting sport than did those athletes who put sport *ahead* of everything else [3]. So, by having multiple pursuits, student-athletes create a safety net for the future. Winning in the short run means reaping more immediate benefits of combining sport and studies. One of these benefits, revealed by another group of researchers, is that changing from a mainly mental activity (studies) to a mainly physical one (sport) is a form of recovery from the other activity [4]. These athletes also built resilience by thinking "It is great to do well in both sport and school, but if I fail in one, I have the other to fall back on."

WHY IS A DUAL CAREER DIFFICULT?

In both sport and studies, young people have goals or visions of what they want or ought to achieve. Some goals are set by the young people themselves and may include making a national team or "acing" a school test. Other goals might be communicated to young people by coaches, teachers, family members, or peers, and then accepted by young people. The difficulty of each new goal is determined by the person's **resourcefulness**, which means the degree and quality of **resources** this person has to reach the goal in mind. Resources are internal (such as a person's character, skills, and experience) and external (such as the availability of support) factors or assets facilitating goal achievement. Depending on their resourcefulness, a young person might see a goal as routine (readily achievable), challenging (difficult, but achievable with additional resources), or risky (too far from readily achievable). The same demand or goal can present a different level of difficulty from person to person, depending on how resourceful the person is.

RESOURCEFULNESS

Resourcefulness is the degree and quality of resources the person has to reach the goal or meet the challenge in mind.

RESOURCES

Resources are the person's internal assets and relevant external factors facilitating goal achievement.

Sport and studies each present their own challenges but combining them into a dual career adds a whole new layer of challenge. For example, doing important things on time, allowing time for physical and mental recovery, and still finding time to nourish friendships and participate in family events can be especially challenging. One group of researchers created a questionnaire to study student-athletes' challenges and their **dual-career competencies** [5]. These competencies included using time efficiently, prioritizing tasks, setting realistic goals, viewing setbacks as growth opportunities, seeking advice from the right people at the right times, listening and learning from others and from past experiences, and being flexible to alter plans if necessary. Responses from 3,247 student-athletes representing nine European countries revealed that the participants found all the competencies important, and possession of such competencies contributed significantly to their success in coping with dual-career challenges.

DUAL-CAREER COMPETENCIES

Dual-career competencies are experiences, knowledge, skills, and attitudes helping student-athletes to deal with dual career challenges. Such competencies create a good part of student-athletes' resources.

WHAT ARE THE SECRETS OF DUAL-CAREER SUCCESS?

In one interesting study, researchers surveyed and interviewed athletes at the beginning and the end of the first educational year at a national elite sport school [4]. The athletes confessed to experiencing challenges and noted that it was impossible to constantly invest 100% into both sport and education. The research showed how the sport-education balance was individual and changing. Depending on how they perceived the relative importance of sport and academics, student-athletes could be divided into—and freely shift between—three categories: students who engage in sport, athletes trying to study, and student-athletes searching for an optimal dual-career balance (Figure 1).

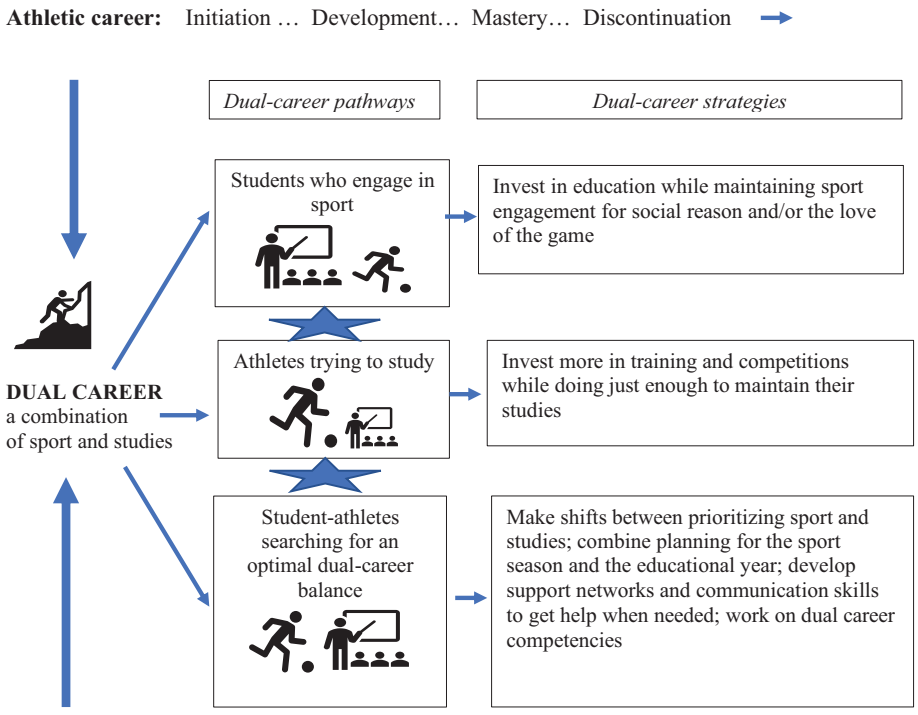

Figure 1

Dual-career pathways and strategies. Athletes fall into, and can freely switch between, three different dual-career pathways, depending on how they view the relative importance of sport and studies at a given time. Each pathway is characterized by specific strategies for balancing sport and studies.

Student-athletes in the first category dream of high achievement in sport, but over time often find these dreams unrealistic and invest more of themselves in education. In their dual-career pathway, they maintain sport engagement for social reasons or for the love of the game. The second category of student-athletes sees sport as their passion and education as a need, so in their pathway, they focus more on sport training and competitions, while doing just enough to maintain their studies. The third category of student-athletes tries to find an optimal dual-career balance. Dual-career balance is defined as a combination of sport and studies that allows student-athletes to

reach their sport and study goals, lead a satisfactory social and private life, and stay healthy both mentally and physically. In offering some useful strategies to find such balance, researchers [4] recommended that young people:

- Make shifts between prioritizing sport and studies. Give more time and effort to the prioritized role and any relevant tasks, while simply maintaining the other role and relevant tasks;
- Combine planning for the competitive sport season and the academic year;
- Develop support networks (family, sport and study peers, coaches, teachers, and counselors) and communication skills to get help when needed; and
- Work on dual-career competencies.

HOW CAN YOU WORK ON YOUR DUAL-CAREER COMPETENCIES?

There are basic competencies that are transferable or movable from one activity or sphere of life (where they were initially developed) to another, making these competencies even stronger. To conclude this article, here are some recommendations, based on our many years of research in this field, for becoming more resourceful when dealing with dual-career challenges:

1. *Set realistic goals.* Goals should be challenging but achievable. Avoid risky goals that might compromise your mental health and wellbeing. When feeling overwhelmed by steep goals, ask for support to re-negotiate those goals.
2. *Keep expanding your resources* by learning from important events in your life and from multiple people. Use your own or your peers' experiences to learn what to do and what to avoid when facing dual-career challenges. Consult with the people you trust when you need help processing the lessons you have learned.
3. Work on your *time management* by setting a daily schedule. Decide what is the most important task of the day and set aside the proper time for it first. Then, plan other activities around it, and do not forget to save time for recovery. Although the priority for that day might not be what you really want to do, put an earnest effort into it.
4. Keep things in perspective and *plan for the near-* (days, weeks, months) *and long-term* (years) *future,* based on your past experiences and present situation. Planning should be flexible because life circumstances change, and plans must be adjusted.
5. *Watch your stress*. Stress can be good if helps you grow. You should learn how to use good stress to your advantage, and how to recognize, avoid, and cope with unnecessary stress. Often, unnecessary stress comes from conflicting demands from authority figures. For example, a teacher might not be supportive of your

athletic goals, or a coach might not see the value of academics. Do not keep such stress inside; communicate the situation to parents, counselors, or other people who support you.

6. *Stay positive!* In the journey of life, there are no truly good or bad events, only opportunities for self-discovery and personal growth. Often, what looks like a loss might turn into a gain in the long run, but the opposite is also true. Therefore, learn from your past, live in the present, and plan for the future to be successful in your dual career and your life journey!

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YOUNG REVIEWERS

MASSIMO, AGE: 5

Hey, I am Massimo. I am 5 years old. I am curious and I like to learn new things. My passions are dinosaurs, astronauts, and football. I like ice-cream and playing video games with my sister. I love exploring nature and running in London's parks.

MONICA, AGE: 8

My name is Monica. I am 8 years old and live in London. Reading, science, art, and swimming are my favorite things to do. Also, I play tennis and piano, and I like going to Italy during the holidays to play with my grandparents and friends. I enjoy reading books, cooking, using the computer, and watching cartoons.

SUYANG, AGE: 15

Hello, I am a current 9th grader. I have been involved in a several science and speech competitions, I have been swimming for 10 years and I love it! I love reading books (mostly science books and biography), my favorite historical character is Chinese poet Sushi (Su Dongpo). I am interested in pursuing careers ranging from Engineering, to Medicine, and AI. I am excited to be a reviewer for "Frontiers for Young Minds."

AUTHORS

NATALIA B. STAMBULOVA

Natalia B. Stambulova, Ph.D. is a professor in sport and exercise psychology in the School of Health and Welfare at Halmstad University, Sweden. Her professional experiences in sport psychology reflect her four decades as a teacher, researcher, and practitioner in Russia and Sweden. Her research and approximately two hundred publications relate mainly to athlete career development, with an emphasis on athletes' dual careers, various career transitions, and developmental crises. *natalia.stambulova@hh.se

CHRIS HARWOOD

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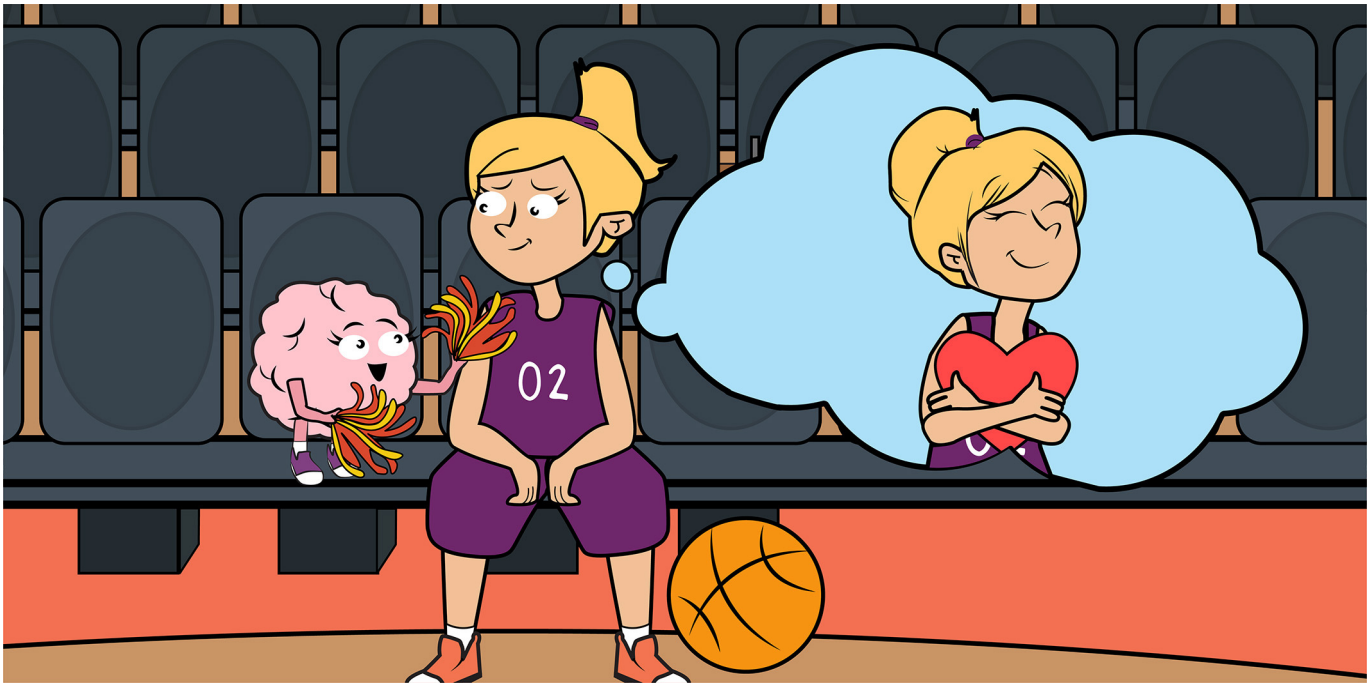

USING SELF-COMPASSION TO MANAGE DIFFICULT SPORT EXPERIENCES

Leah J. Ferguson [1*] ***and Tara-Leigh F. McHugh*** [2]

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YOUNG REVIEWER:

AMELIE

AGE: 13

Do you ever have that awful feeling in your gut after you mess up during an important competition? When training is really tough, do you ever say to yourself, "I am not good enough"? Do not worry, you are not alone in these tough times. All athletes—including us, the authors of this paper—have difficult sport experiences. Fortunately, there are skills we can learn to manage these difficult experiences! We can learn to recognize that sport is sometimes difficult and that all athletes mess up from time to time. We can also learn to be kind to, and supportive of, ourselves just like we would be to a close friend or teammate. Having self-compassion in sport can reduce the negative thoughts and feelings we might have about ourselves, and can decrease fears we might have about failing. Self-compassion can contribute to reaching our potential in sport; but how can we be self-compassionate?

DIFFICULT SPORT EXPERIENCES

Picture the following situation: you are an ice hockey player and have been in love with the sport for what seems like forever. Your mom put you in skates soon after you learned how to walk, and you have basically been playing hockey ever since. You are pretty good at it too. You catch on to new skills quickly, your coaches frequently ask you to demonstrate drills for your teammates, you often lead your team in points, and you know your teammates think of you as a leader. As the new season is about to begin, you are excited to hear who will be named team captain. You were an alternate captain on the team last year, and with last year's captain moving up a division, you figure you are next in line to be team captain. Your coaches plan to announce the new captain after the pre-season tournament. Following the final game in the tournament, you are even more certain that you will be named captain. You played well in the tournament, got two goals and three assists, supported your teammates, and kept a positive attitude when the team was behind on the scoreboard. At the team meeting following the final game, your coaches announce that Jordyn, your teammate who has been playing hockey for only a few years, is the new captain.

If you were the athlete in the above scenario, how might you respond? How would you feel? What would you think or say to yourself? Difficult experiences are very common in sport. They can range from the little mistakes made during practice to bigger mistakes that can result in losing an important competition. Difficult experiences can also occur when learning new skills and techniques, when trying to manage nerves before a big competition, or when feeling frustrated after an official makes an unfair call. Unfortunately, injuries are common in sport and athletes must sometimes face the difficult challenge of being unable to train, practice, or compete. When these or other difficult situations occur, we might feel badly about ourselves, criticize ourselves, and even think or say things like, "I am not good enough." Fortunately, we can use **self-compassion** to help with such difficult sport experiences.

SELF-COMPASSION

A kind, connected, and balanced attitude we extend toward ourselves when experiencing a difficult situation, specifically involving mindfulness, self-kindness, and common humanity.

SELF-COMPASSION

Self-compassion might be a new term for some athletes. Sometimes it is easiest to understand self-compassion by thinking about what it is like to have compassion for someone else. Imagine that it was your good friend or close teammate who experienced not being named team captain. How might you respond? How would you feel? What might you to say? Chances are, you would have compassion for your friend, meaning you would recognize that your friend is going through a difficult time. You would most likely treat your friend with kindness, and try to make the person feel better. Compassion is a positive and energizing emotion. Out of compassion, you would likely listen if your

Figure 1

The 3 components of self-compassion interact to create a self-compassion mindset. Mindfulness involves recognizing when we are experiencing a difficult situation without becoming overwhelmed by the situation; self-kindness involves being kind and caring toward ourselves instead of being self-critical; and common humanity involves recognizing that other athletes experience difficult situations too instead of feeling alone (1).

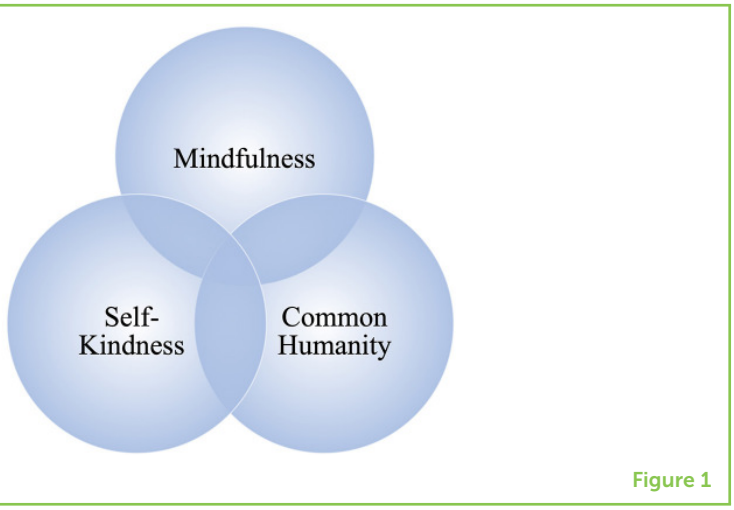

Figure 1

friend wanted to talk. You might also say something comforting like, "I think you deserved to be captain, and I know you are going to be a great leader on the team anyway." Extending compassion helps your friend feel safe and cared for. Self-compassion is very similar. The main difference is that, instead of offering compassion to someone else, we offer it to ourselves.

Self-compassion consists of three components: mindfulness, self-kindness, and common humanity (Figure 1) [1]. **Mindfulness** involves recognizing that we are going through a difficult experience. It is not about exaggerating the situation or ignoring the situation, but simply acknowledging that it is happening. **Self-kindness** involves being kind and caring toward ourselves instead of being mean or self-critical. **Common humanity** involves recognizing that other athletes experience difficult situations too, and that we are not alone. Being self-compassionate means that we care about ourselves and want to support ourselves in managing difficult experiences. This often means taking action to make the difficult experience better. As such, self-compassion can be very motivating and help us meet our goals in sport.

MINDFULNESS

Acknowledging that we are going through a difficult experience without exaggerating or ignoring the situation.

SELF-KINDNESS

Being kind and caring toward ourselves instead of being mean or self-critical.

COMMON HUMANITY

Recognizing that other athletes experiences difficult situations too, and that we are not alone.

RESILIENCE

The ability to recover from setbacks and difficulties.

WHY BOTHER WITH SELF-COMPASSION?

Researchers have been studying the benefits of self-compassion for almost 20 years. Self-compassionate young people are more likely to take positive risks, learn new skills, and embrace new situations [2]. Being self-compassionate means that we are kinder to ourselves when we fail. So, even if we struggle or experience failure while trying something new (like new drills or techniques in sport), we will not get caught up in negative emotions and we will comfort ourselves rather than being overly self-critical. Young people who are more self-compassionate also have greater **resilience** [2], meaning they have an easier time "bouncing back" from setbacks. Basically,

self-compassion provides young people with ways to cope with challenges as they explore and try new things.

Within sport, researchers have focused mainly on adult athletes (usually 18 years and older) and found that being self-compassionate is linked with more positive thinking, less negative emotions and more positive ones, and healthy coping habits [3]. Some research with athletes between the ages of 14–17 years found that being compassionate toward one's body in sport may help build confidence and encourage a focus on what the body can do [4]. All these research findings suggest that developing self-compassion is worthwhile. Some of us might be more naturally self-compassionate than others; fortunately, there are activities we can do to develop our self-compassion skills.

SELF-COMPASSION ACTIVITIES

So, how can an athlete *use* self-compassion? Again, imagine yourself as the hockey player who was not selected as team captain. How might you be self-compassionate in this situation? Instead of exaggerating the situation ("This is the end of my hockey career!"), you might be *mindful* by recognizing that it is difficult, but certainly not the end of hockey for you. You might think to yourself, "This is really disappointing, and I am pretty upset right now, but it does not change who I am as an athlete." Instead of being really critical of yourself ("I suck and I will never be good enough to be the captain!"), you could offer yourself *kindness*. Perhaps you give your hand a little squeeze of reassurance to let yourself know it is going to be okay. Instead of feeling alone ("I am the only athlete who has ever been this close to being captain and failed"), you could recognize your *common humanity* with other athletes. You might talk to one of your teammates, friends, or parents about similar experiences they have had. Which do you think is a more effective way to respond: getting down on yourself and spiraling into a cycle of negative self-criticism, or recognizing the difficult scenario and offering yourself the kindness and understanding needed to move forward?

It takes practice to extend compassion toward ourselves, especially if our typical response to failure or a setback includes exaggerating the situation, being self-critical, and feeling alone. Self-compassion may not be an easy or natural response for many of us. The good news is that there are activities we can do to develop self-compassion. As an example, we could ask ourselves how things might change if we responded to a difficult situation in the same way we typically respond to a close friend when they are going through a difficult time. Figure 2 includes the specific instructions for this activity. There are also self-compassion programs specifically for children and teens. One such program is called "Making Friends with Yourself" [5], and it includes several sessions that break down the components of

Figure 2

How would you treat a friend? This is an activity that can help you to develop your self-compassion.[1]

[1] Adapted from https://self-compassion.org/exercise-1-treat-friend/

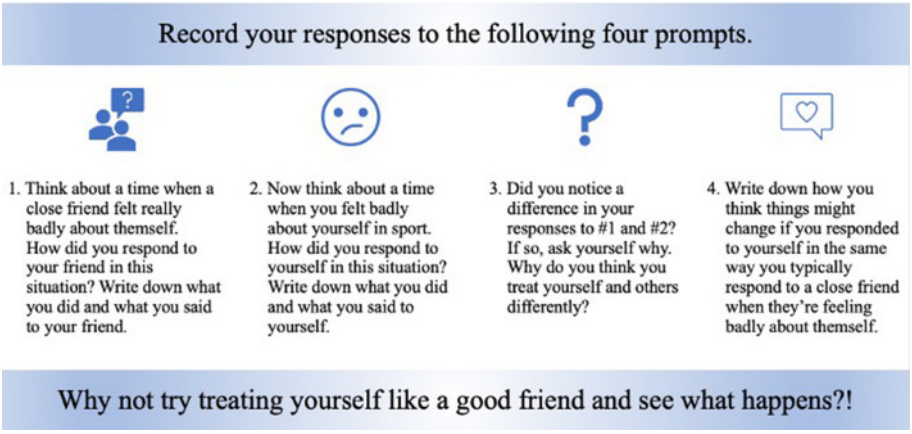

Figure 2

Table 1

Examples of self-compassion activities (adapted from Bluth et al. [5])[2].

[2] Some activities are available with full instructions and/or as guided audio meditations at https://self-compassion.org/category/exercises/#exercises

Self-Compassion activity	Brief description
How would you treat a friend?	Write down the things you say to a close friend when they are feeling badly. Consider saying these same things to yourself
Supportive touch	Comfort yourself (gentle hand squeeze, hand on heart, hold hands together) to support yourself and feel calm and cared for
Self-Compassion phrases	Create phrases or cue words that remind you to do three things: (1) acknowledge the difficult moment; (2) extend kindness toward yourself; and (3) recognize that all athletes struggle at times
Mindful breathing	Take some time to pay attention to your breath, which can help train the mind to be more focused and calmer
Body scan	Notice sensations in each part of the body while bringing kindness to the body
Self-compassion break	Think about a difficult sport situation and bring to mind the three components of self-compassion

Table 1

self-compassion into workable activities. Table 1 briefly introduces some activities we can do to develop self-compassion.

Similar to how we learn new skills, techniques, and drills in sport, self-compassion is a skill that we can learn. Self-compassion can be applied in other settings beyond sport, such as in school and with family and friends. The important thing to remember is that it takes practice. Just like we eventually get better at each sport-specific skill we practice, eventually it will become easier to use self-compassion to manage difficult sport experiences.

MENTAL PERFORMANCE STRATEGIES

Techniques that can be used to support athletes' wellness and performance, including goal setting, imagery, relaxation, and self-talk.

SELF-COMPASSION AND SPORT PSYCHOLOGY

As athletes, we might be familiar with several sport psychology techniques, or what are often called **mental performance strategies**, such as goal setting, visualization or imagery, and various relaxation

exercises, like deep breathing. We like to think of these strategies as the various "tools" athletes can use to assist themselves in sport. Self-compassion is another skill or tool that can be added to the mental performance "toolbox." There is growing interest in the use of self-compassion in sport, including its relevance for high-performance athletes and to support athletes' mental health. While difficult situations are certain to happen in sport, self-compassion is a useful tool that might help during those times. Go ahead, give it a try!

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YOUNG REVIEWER

AMELIE, AGE: 13

I have started practicing judo (I am a yellow-belt) and love playing squash with my friends and swimming. I am very interested in aviation and at school, my favorite subjects are physics, chemistry, and biology.

AUTHORS

LEAH J. FERGUSON

Leah (she/her) is an associate professor in the College of Kinesiology at the University of Saskatchewan. As a youth she danced competitively, primarily in tap and jazz, until she was 18 years old. Her experiences as a competitive dancer sparked her interests in sport psychology research and application. Leah's research includes a focus on women athletes' sport experiences, and she explores self-compassion as a resource to promote athletes' wellbeing and performance. Leah is also a mental performance consultant with the Sport Medicine and Science Council of Saskatchewan, and a professional member of the Canadian Sport Psychology Association. She works with athletes, coaches, and teams to apply mental skills to support flourishing in sport. *leah.ferguson@usask.ca

TARA-LEIGH F. MCHUGH

Tara-Leigh (she/her) is a professor in the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta. She competed in sprint kayaking and canoeing for 15 years, from the ages of 5–20 years old. She was also a coach for 6 years and had the opportunity to coach some of her athletes at national championships. Tara-Leigh has experienced the many potential benefits of sport participation and, as such, her program of research is focused on enhancing sport experiences for *all* youth. She is particularly committed to working collaboratively with girls and women, as well as many other young people who are often underrepresented in sport. Tara-Leigh is also a mother to three competitive alpine ski racers and is committed to exploring the important role that parents play in supporting their athletes' sport experiences. Her experiences as an athlete, coach, and sport parent are foundational to her youth-focused program of sport research.

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NEUROSCIENCE AND PSYCHOLOGY
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CAN WE BECOME BETTER PEOPLE AFTER THINGS GO WRONG?

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YOUNG REVIEWERS:

CARLA
AGE: 16

DAVID
AGE: 11

When a plant is battered and nearly destroyed by the rain, its survival is uncertain, but as the sun comes up and shines on it, the plant starts to recover. Over time, not only does the plant get better but it also comes back stronger. This is growth, and it can happen to us too after an adversity. An adversity is something that is very difficult to deal with and causes us to be upset, have unhappy thoughts, and might even make us cry. But what if something good can come from that bad experience? What if we can learn something that helps us to be different, and maybe better than before? Growth is not just about getting bigger; it can mean changing as a person too. Growth will not stop the adversity from being upsetting, but can lead to powerful, positive changes in a person.

Sometimes life can be tough. People get ill or injured, or loved ones die. Sometimes sport can be tough, too. For example, a gymnast may not make the national team and no longer be able to train with the same squad, or an academy football player may be dropped from the

SPORT PSYCHOLOGY

This is the study of how the mind impacts on how we perform in sport. It can focus on how we feel, how we think and how we behave.

ADVERSITY

This is an event or experience that we think is negative and upsetting.

GROWTH

Involves the positive things that we can see in ourselves after we have experienced an adversity.

team, crushing their dream to follow in their hero's footsteps. In **sport psychology**, we call these extremely unpleasant events **adversity**. Adversities can make us feel really upset, angry, or sad. In the past, many researchers have spent time looking at what this upset, anger, and sadness can do to us. For example, some researchers focused on the bad memories that kept coming back after the adversities. However, researchers have started to find that even though bad things can happen because of adversities, some good things can also come out of those horrible experiences. This is like a battered plant that recovers from a storm and comes out of it stronger. The young athlete who fails in his or her sport may be more motivated to work hard at that sport to achieve success. The athlete might even discover that he or she is much better in a different position on the team. Or the athlete may now have time to enjoy a different sport, activity, or spend time with friends. In sport psychology, we call this **growth**.

WHAT HAPPENS WHEN WE EXPERIENCE ADVERSITY?

Adversities can happen to anyone, whether you are an adult or a child. Adversities are experiences or events that we think are very serious, unpleasant, and meaningful. Everyone has their own ideas of whether something is an adversity or not, but what matters most is how horrible the experience or event is for the person who experiences it. Adversity in sports is usually more than having an argument with a teammate or losing a league match. When an adversity happens, it can be very upsetting, and the person might not know how to make things better. People facing adversities might feel like something very important to them is ruined and that their hopes for the future are destroyed. Things that they used to believe were achievable might now feel impossible. Adversity might mean that people can not reach their goals, like becoming a professional footballer or participating in the Olympic Games. Adversities can also happen outside of sport. Children whose parents have split up may feel like an important part of their lives has changed, because a parent who always supported them is no longer around.

For some people, it might be difficult to stop thinking about the thing that happened. They may find that memories pop into their heads even when they do not want them to, like when trying to concentrate at school. Some people even find that the adversity causes bad dreams. It is very likely that an adversity will make people feel angry or upset. It may be difficult to talk to anyone about it and people may want to spend more time alone. They might feel like crying more than usual or may get into more arguments with others. They will probably feel really bad about what has happened to them, but over time may think about it less. With support from friends and family, and by talking to others about their feelings, sometimes good things can come out of their bad experiences.

Figure 1

A smashed vase shows how we can respond the adversity. Once broken the vase can be stuck back together but it is still broken, or it can be transformed into something better (the mosaic).

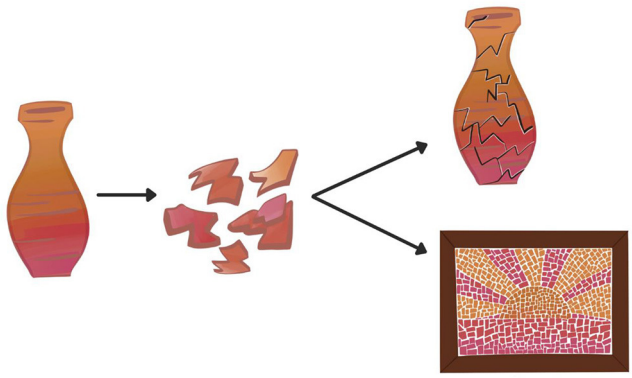

Figure 1

WHAT IF ADVERSITY COULD LEAD TO SOMETHING POSITIVE?

Even though adversities can be upsetting, many people have told researchers that some good things have come from their horrible experiences. In 2005, two researchers came up with a really useful way of describing this [1]. Imagine a beautiful vase sitting on your windowsill. One day, the vase gets knocked over and shatters on the floor. You have a couple of options: 1) You could glue the vase back together. The vase would be repaired, but it might not look as good anymore. Water might leak through the cracks, and it would be fragile and likely to break again. 2) You could take the broken vase pieces and make something new, like a beautiful mosaic to decorate the room. The vase would not be a vase anymore, but it might be better (Figure 1).

Growth for a person is like the vase that is transformed into the mosaic. The person may be different, but maybe even better than before. The adversity may still be upsetting, but it can lead to powerful, positive changes in a person. These changes can happen when people facing adversities have other people around them who care and are prepared to listen and be supportive. Talking to those people and not keeping the upsetting thoughts and feelings inside is really important to help growth occur. For young athletes, this support may come from family, coaches, teachers, or friends.

POSTTRAUMATIC GROWTH INVENTORY

This is a questionnaire that measures growth after (or post) adversity. Sometimes we refer to adversities as traumatic.

Researchers made a questionnaire called the **Posttraumatic Growth Inventory** (PTGI) that researchers can use to study growth [2]. The questionnaire has 21 statements that measure five different signs that can tell us whether someone has grown after an adversity. For each statement, people are asked to select a score from 0 to 5 to show how much they agree with that statement, where 0 is "never experienced" and 5 is "experienced a lot." The higher the score, the more likely someone is to have grown. These five signs are:

1. Appreciation of life: Sometimes when people have experienced an adversity such as a bad injury, they tell researchers that they have changed their minds about what is important to them. One of the statements on the PTGI that measures appreciation of life is, "I have different priorities about what is important in life." In one study, an Olympic swimmer said that when he gave up swimming, he was able to enjoy life more. He told the researchers he loved spending more time with his family [3].

2. Relating to others: After an adversity, athletes sometimes talk about how their friendships and relationships get better. This might be because they have spent more time with friends and family or have needed their support to get through the experience. One of the statements that measures whether someone has improved how well they get on with others is, "I put effort into my relationships." Sometimes, athletes who have recovered from injuries tell researchers that they have a better understanding of how teammates feel when they are injured.

3. New possibilities: Adversities sometimes give people the chance to try new things that they may not have been able to do before. They may have more time to find new things that they enjoy. For example, a footballer who had to give up his sport because of a knee injury may find that he is able to play other sports instead. Or he may discover that he really enjoys drama and turn out to be great at acting. One of the statements that measures whether people can see new possibilities in life is, "I developed new interests."

4. Spiritual development: This is when people who have had an adversity feel more religious or have a better understanding of the meaning of life. For children, this may involve asking questions about the purpose of life or whether God exists. One of the statements that measures spiritual development is, "I have stronger religious faith."

5. Personal strength: This is not about physical strength. Instead, after an adversity, people may believe they can manage things better than before. One of the statements that measures personal strength is, "I am stronger than I thought." Some adults might say, "it made me stronger," which means they believe they are more able to deal with other horrible events. A young athlete who has recovered from a very bad injury might be able to cope better if something else nasty happens in the future.

The process that leads to growth is shown in Figure 2.

Not everyone who experiences an adversity will show signs of growth. When people do, they might not believe that all five signs of growth

Figure 2

The process of growth in response to adversity happens when we get support from friends and family and when we are ready to talk about the adversity. Growth can be recognized by an increase in the five signs mentioned.

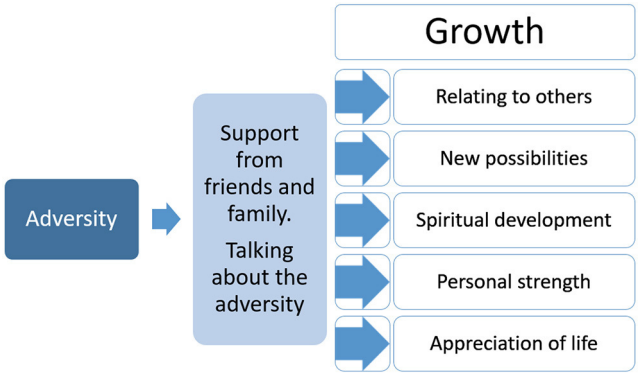

Figure 2

happened to them, sometimes it is just one or two. Also, there are *other* good things that can happen after an adversity that do not fit into one of the five areas above. For example, what is really interesting is that when elite athletes talk about growth, they often say that they got better at their sports as a result of their adversities—even when the adversity involved injury! One of the most famous swimmers ever, Michael Phelps, wrote in his autobiography that when he was a child his teacher said that he would never be good at anything. Even though it was very upsetting, he believes that it made him more determined to become a world-class swimmer. Other athletes find that, when they fail, it makes them realize how much they want to do well in their sports. This can motivate them to work hard on their skills to become the best athletes they can be. Even if people experience growth, this does not mean that the adversity was a good thing; they might still feel sad or upset about it. But growth means that because we have gone through the adversity, there are some things in our lives that improve. Not everyone believes they have grown after adversity, and that is ok too.

TAKE-HOME MESSAGE

Life has its ups and downs. Even when adversity happens and it makes us feel upset and angry, some good things can still come from it. These good things are called growth. Growth can involve improvements in five areas: appreciation of life, relating to others, new possibilities, spiritual development, and personal strength. When we talk to supportive people around us, then growth is more likely to happen. So, if something bad happens to you, talking to people about it is a really important thing to do!

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YOUNG REVIEWERS

CARLA, AGE: 16
My name is Carla and I live in Mexico in a small city of Hidalgo state. I just turned 16 and am about to go into 10th grade. I enjoy reading, drawing, math, embroidering and watching television. I want to be a veterinary or an architect, I have a small chihuahua named Lola. My favorite music genre is Kpop, my ultimate groups being BTS, Stray Kids, SHINee and Blackpink. I really like the Harry Potter book series, my favorite being "The Prisoner of Azkaban." My favorite TV shows are; Brookyn 99, The Umbrella Academy, FRIENDS and Stranger Things.

DAVID, AGE: 11
My name is David and I live in Mexico in a small city called Huejutla. I am currently 11 years old and I am about to pass into 6th grade. I like to read, play lego and watch TV. I want to be a biologist or an architect, I have a turtle and a dog that I like very much and I am also making a 1,000 piece puzzle of star-wars and my favorite superheroes is wolverine.

AUTHORS

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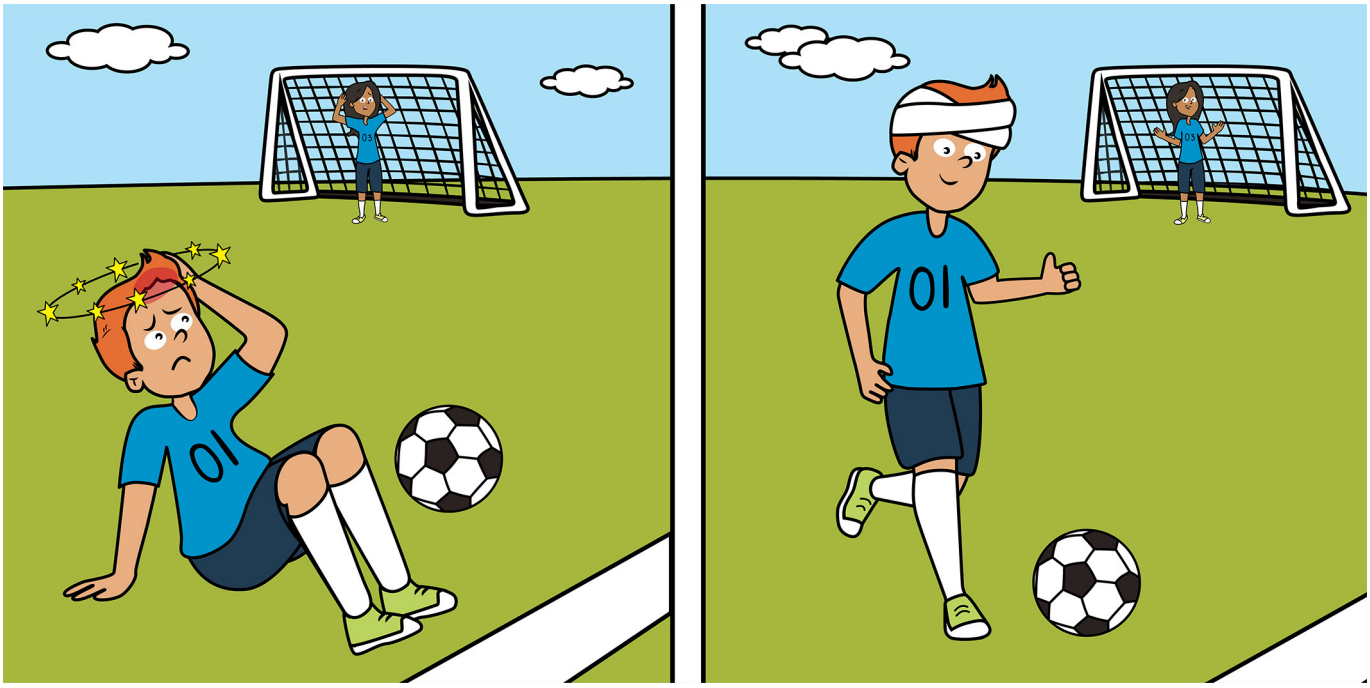

RETURNING TO SPORTS AFTER A HEAD INJURY

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YOUNG REVIEWERS:


HENRY
AGE: 11


JAMES
AGE: 10


MATTHEW
AGE: 9


RONAV
AGE: 9


VIHAAN
AGE: 10

When most people think of a sports injury, they picture a broken leg or arm. However, concussions and other head injuries are also common. Head injuries can cause physical issues like bruising and bleeding and can also cause issues like memory problems. Because every athlete recovers differently, it is best to use guidelines for their return to play. Head injuries can have long-term effects on an athlete's mental health. This article will discuss the impact of and recovery from head injuries, and how athletes can safely return to sports.

INTRODUCTION

Imagine watching an American football player when the following situation unfolds: 3 min left in the game, and—thump!— the player crashes into the ground, headfirst. He passes out and his head is bruised and bleeding. Medics rush to the injured player. Fans around the stadium hope the player does not have an injury that ends his career. Everyone is thinking, "Will he ever be able to play again?"

Most people are familiar with the feeling of hitting one's head. Some sports, like American football, boxing, and football, require a lot of contact. In these sports, athletes may suffer from **concussions** and other severe head injuries (Figure 1). In the short term, head injuries can result in physical injuries, which include bleeding, headaches, and swelling. Concussions also impact other aspects of health, causing short- and long-term symptoms [1]. Besides concussions, other head injuries include breaks in the skull bone and bleeding beneath the skull. These head injuries are typically more severe and require a hospital stay for recovery. This article will discuss the impact of and recovery from head injuries. We will also look at how athletes can safely return to playing sports after a head injury.

CONCUSSION

A type of head injury caused by a direct impact or abrupt back-and-forth movement of the brain. It can lead to temporary loss of normal brain function.

HOW DO HEAD INJURIES AFFECT BRAIN FUNCTION?

NEUROCOGNITIVE

Relating to or involving cognitive functions within the nervous system.

NERVOUS SYSTEM

The body system that includes the brain, spinal cord, and nerves. The nerves collect information and send it to the brain, which creates a response, controlling everything we do.

Head injuries can affect a person's **neurocognitive** functions. First, let us break down the word neurocognitive. "Neuro-" refers to the nerves and nervous system, which control everything we do. "Cognitive" refers to intellectual activities, like thinking, reasoning, and remembering. Putting these two words together results in "neurocognitive," so neurocognitive functions are the cognitive functions relating to the **nervous system**.

Concussions usually affect neurocognitive tasks, including learning, memory, and attention. Athletes who have experienced mild, moderate, or severe head injuries may become worse at these tasks [1]. The variety of symptoms makes it hard to know when it is safe for an athlete to return to the field. As a result, researchers have started to perform tests to measure cognitive abilities after a head injury. These tests allow researchers to identify the short-term and long-term effects of concussions on an athlete's cognitive performance [1].

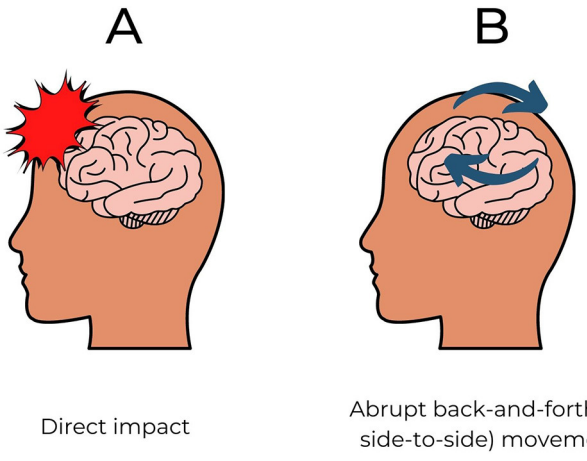

Figure 1

There are two main causes of concussions. **(A)** Concussions can occur from a direct impact (hit) to the head. This can occur by head on collisions between two players. **(B)** Concussions can also occur from sudden back-and-forth (or side-to-side) movements of the head. This might happen when the ball hits a player's head and causes a rebound which leads to a repetitive motion.

WHAT ARE SOME LONG-TERM EFFECTS OF HEAD INJURY?

Let us look at the long-term effects of head injuries on athletes. When athletes have repeated hits to the head, they may develop illnesses. These illnesses can affect them and their sports performance, potentially for the rest of their lives.

Junior Seau was an American football player for the New England team. He was born on January 19, 1969 and passed away on May 2, 2012. During his football career, he had many head injuries. These injuries affected his **mental health** and contributed to his death. His family donated his brain to the National Institutes of Health (NIH). NIH is a government agency focused on advancing scientific research. After studying his brain, the scientists confirmed that he had **chronic traumatic encephalopathy** (CTE) [2]. CTE is a long-term effect of single or repeated hits to the head. CTE can affect athletes who play any type of contact sports, including American football, football, basketball, and rugby. For example, a basketball player who hits his or her head against the court may suffer from a concussion or CTE. CTE causes physical changes in the brain that can only be diagnosed after death. These changes include abnormal protein shapes, a smaller brain size, and even nerve damage (Figure 2). Researchers at Boston University CTE Center are currently working on using PET scans (performed using a machine like an X-ray machine) to diagnose CTE in living people![1] There are some known symptoms of CTE, including headaches and behavior changes. Behavior changes can be aggression, mood swings, and suicidality [2]. All these symptoms caused by brain injury influence how the athlete performs on and off the field. Junior Seau's story reminds us about the importance of mental health and how head injuries can affect it.

MENTAL HEALTH

A person's condition in terms of their mental processes and emotional well-being.

CHRONIC TRAUMATIC ENCEPHALOPATHY

A disease of the brain, particularly one that changes the brain structure or function, that results from repeated head injuries.

[1] https://www.bumc.bu.edu/busm/2019/04/10/toward-diagnosing-cte-in-living-people/

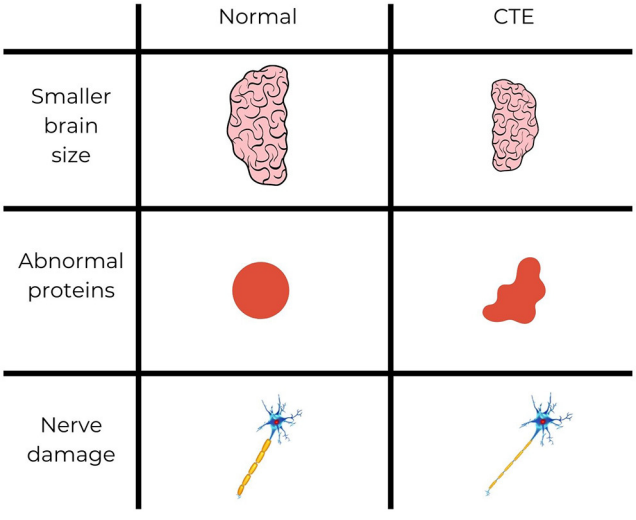

Figure 2

Chronic traumatic encephalopathy (CTE) is a long-term condition that results from repeated head injuries. CTE results in structural changes to the brain that can only be diagnosed after death.

HOW CAN A HEAD INJURY AFFECT MENTAL HEALTH?

Before an Injury Happens

Before an injury even happens, there are factors that can affect how an athlete heals mentally. For example, athletes with a family history of mental health issues are more likely to have such issues themselves following head injury. These issues could include anxiety, depression, and sleep-pattern changes [3]. Another thing to consider is whether an athlete is male or female [3]. After a head injury, females usually have more symptoms than males do. The reasons for these differences are not fully known but could include both biological and social factors. Traditionally, females are encouraged to be more open about their emotions, while males are often expected to be stronger, which may lead males to report their injuries and other symptoms less often than females do.

After an Injury Happens

Let us look at what makes people more likely to have mental health issues after an injury happens. Recovering from a head injury is different for each individual and can be very difficult for some people. The skills people use to deal with difficult situations like serious injuries are called coping skills, and these skills can affect recovery. Athletes with poor coping skills generally have more anxiety, depression, and neurocognitive issues [3]. An example of a poor coping strategy is avoiding normal activities, like not wanting to go to school. This could lead to lower grades and feelings of loneliness and isolation. Athletes who are better able to manage their emotions have less depression and anxiety compared to those who do not cope well in negative situations [3]. Managing emotions is more challenging for some people. For example, Junior Seau had mental health issues such as aggression, depression, and addiction [2]. It was not until after his death that his CTE diagnosis was confirmed. Since then, evidence supporting the link between CTE and mental health has continued to grow.

We also know that doctors who do not diagnose head injuries properly and give treatments that are too strict can make symptoms last longer. If the prescribed periods of rest are too long, athletes may report feeling sad from lack of social interaction, physical activity, and team involvement [3]. So unnecessary treatment could also negatively affect athletes' mental health. After a head injury, it is important to plan the treatment process carefully and specifically for each athlete.

WHAT DOES THE RECOVERY PROCESS ENTAIL?

The best treatment for sports-related head injuries is not fancy medicine but is in fact getting lots and lots of rest. During this rest period, athletes should refrain from driving. They should also limit the use of their brains for purposes like problem-solving, analysis, or

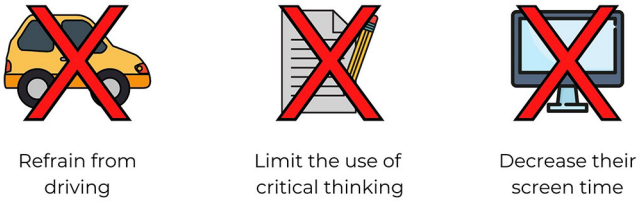

Figure 3

During recovery from a head injury, patients should take a rest period of at least 48 h, in which they follow certain guidelines. These may include limitations on physical activity, critical thinking, driving, or screen time. Refraining from these activities helps reduce brainpower which allows for a faster and better recovery.

creative thinking. Finally, athletes should also decrease their screen time (Figure 3). Athletes should only begin to readjust to daily tasks after 48 h of rest, but this number might vary from person to person. Research shows that, without the initial rest period, athletes increase their chances of getting another injury[2]. Some athletes may need more treatment if their brains have not fully recovered. So, doctors encourage these athletes to attend therapy. Physical therapy allows athletes to work on certain parts of their bodies. For example, they can improve their head and neck movements through exercise and stretches. Athletes may also benefit from psychological therapy, in which an athlete works with a counselor to understand and manage emotions.

What could happen if players return to playing sports before they fully recover? Research indicates that athletes who have had one concussion are 5.8 times more likely to have another similar injury[2]. There are many reasons for this, but it may be due to not taking enough time to recover or to lingering symptoms. Those with a history of concussions are at increased risk for consequences such as losing consciousness, confusion, memory loss, and longer recovery times.

So, when can injured athletes get back to playing their sports? This question does not have one answer, but doctors and sports officials have created return-to-play guidelines to help players return. Instead, doctors suggest that players return to play in stages, under specific guidelines. Using progressive stages can allow doctors and officials to determine the seriousness of an athlete's symptoms. Based on this analysis, athletes can be eased back into playing again. These stages often begin with completing small exercises (push-ups, sit-ups, etc.), progressing to playing without contact, and finally achieving full-contact play.

CONCLUSION

Junior Seau's story shows the importance of taking a head injury seriously, as such an injury can negatively impact a person's entire body and mind. Head injuries have the potential to affect neurocognitive health, long-term livelihood, and mental health.

[2] https://ksi.uconn.edu/emergency-conditions/traumatic-brain-injury/#

Recovery procedures are different depending on the person, which is why it is important for athletes to return only when they are ready. It is important for everyone who plays sports—even kids playing for fun—to protect themselves from head injuries. To prevent yourself from a head injury, you can wear safety gear when playing high-contact sports. You should also be aware of your surroundings. Always remember that playing sports with friends can be fun, but safety comes first!

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YOUNG REVIEWERS

HENRY, AGE: 11

My name is Henry. At home I love to game and hang out with my friends and family. At school I like music, math, drama and science. When I am older I hope to go into either a science or medical career.

JAMES, AGE: 10

I am very inquisitive and always question how the world works, and why. I love building things e.g., a salt-powered car and a solar-powered robot, puzzles and reading fantasy books. Last year I learnt how to play the recorder, now I am learning cello and am part of the school ensemble. I train at my swim club and am a blue belt in Taekwondo. In my free time I play computer games and watch TV. And I love holidays!

MATTHEW, AGE: 9

Hi I am Matthew. I am interested in human biology and anatomy. When I grow up I want to be a surgeon. My favorite sport is gymnastics with my friends. I also like playing with cats.

RONAV, AGE: 9

Ronnie is so strong that only onions can make him cry.

VIHAAN, AGE: 10

My parents have always told me if I can be anything Be Kind—kindness changes everything. With progress of science we must remember to not forget to be caring for the world. My curiosity and logic totally make me Mr. Fix It at home and I always ask questions about science like: Why do batteries have to be replaced? And why not make cars run on water?

AUTHORS

SEFIA KHAN

I am an undergraduate student at the University of Texas at Austin pursuing a major in Computational Biology with a minor in the Business of Healthcare. I enjoy topics regarding statistics, global health, and neuroscience. In the future, I hope to attend medical school while also pursuing my interests of research. When I am not studying, I love exploring my city, spending time with friends, and trying out new recipes!

ADDISON XU

I am an undergraduate student at the University of Texas at Austin pursuing a biology major with a minor in business. After I graduate, I plan to attend medical school and am interested in public health and endocrinology. In my free time, I love going to coffee shops, biking, and watching sunsets!

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I am an undergraduate student at the University of Texas at Austin pursuing a major in Biochemistry and a minor in Business. I am enthusiastic about biological and medical-related research, community impact, and empowerment through science, and I hope to attend medical school in the future. In my free time, I love to write creative stories, cook new recipes, and spend time with my cats!

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I am an undergraduate student pursuing a major in International Relations and Global Studies with a minor in Korean. I enjoy medical-related research and serving my community. I intend to pursue a medical career as a physician in the future. In my free time, I enjoy reading books and dancing!

NICO OSIER

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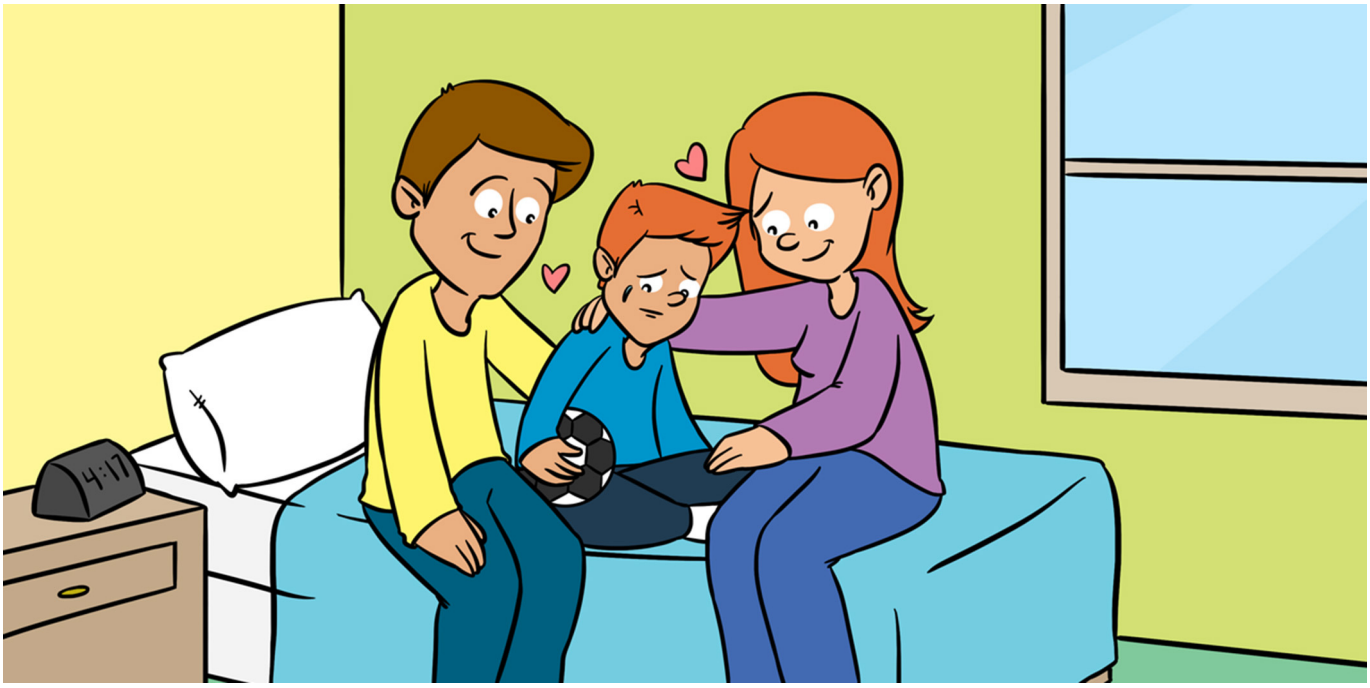

BOUNCING BACK: COPING AFTER BEING CUT FROM A TEAM

Kacey C. Neely*

Faculty of Health Sciences and Sport, University of Stirling, Stirling, United Kingdom

YOUNG REVIEWER:

MRITTIKA

AGE: 14

Each new season, youth athletes show up to team tryouts in hopes of making the team. However, there are only so many spots on the roster, and sometimes athletes get cut. Deselection, or getting cut, is the elimination of an athlete from a competitive sport team based on a coach's decision. Deselection is an aspect of competitive sport that many youth athletes experience, and it can result in negative psychological, social and emotional consequences such as a lost sense of self, loss of friendships, and feelings of anxiety, embarrassment, and sadness. This article presents a study looking at how athletes (and their parents) coped with deselection from sport teams. The results explain some of the coping strategies youth athletes and their parents used together and how athletes can bounce back after getting cut.

DESELECTION: GETTING CUT

Have you ever tried out for a sports team and not made it? You are not alone! Youth sport is very competitive and, each new season, athletes

DESELECTION

When an athlete is cut or not selected to be a member of the team.

like yourself try out for teams in hopes of making it. However, there are only so many spots on the roster, and sometimes athletes get cut. The academic or formal term for getting cut is **deselection**. Deselection is defined as the elimination of an athlete from a competitive sport team based on the decisions of the coach [1]. Deselection can also happen when an athlete is invited to a tryout or a selection camp and, after training with the group for a certain length of time, is ultimately not selected as part of the final team. Given the competitive structure of youth sport, there are fewer team spots available at higher levels of sport. So, for most youth athletes, deselection is likely to happen at some point. This means that, sometime during your youth sport career, you may get cut and will need to learn to cope with that experience. Even star athletes like Michael Jordan and Lionel Messi were cut as young teenagers and still went on to have successful sporting careers.

CONSEQUENCES OF DESELECTION

While coaches should handle deselection with care, athletes are the ones who must deal with the consequences of being cut. If you have ever been cut from a team, you will relate to some of the negative feelings other athletes have reported. Many athletes describe deselection as a negative experience with lots of psychological, social, and emotional consequences (Figure 1). For example, after being cut, youth athletes report feelings of depression, anxiety, anger, embarrassment, and humiliation. They also report feeling less confident, not feeling like themselves, losing friends, and losing connection to their school or community. Many athletes also experience a loss of athletic identity, which means they no longer feel like athletes. When some young athletes get cut from teams they no longer want to play their sports, so they stop participating either in their specific sport or in *all* sports. However, other athletes may continue to participate in sport but must cope with the psychological, social, and emotional consequences described above.

Did you know deselection can be stressful for parents as well? Parents also have a hard time when their children get cut from teams. This can be emotionally stressful, and parents worry about the short- and long-term effects of deselection on their children [2]. We know parents are often important sources of support, but we do not know their specific roles in helping their children cope with deselection.

THE INTERVIEW PROCESS

Until recently, we knew very little about how athletes and their parents respond to and cope with the negative experience of deselection. In a recent study, we looked at how adolescent athletes and their parents coped with getting cut from sport teams [1]. We conducted interviews

Figure 1

Possible consequences of being cut, or deselected, from a sport team.

Figure 1

with 14 female athletes (ages 13–17) who had been cut from a provincial (similar to regional or state) soccer, basketball, volleyball, or ice hockey team. Only female athletes were included in the research because girls and boys cope differently with stress and adversity. Other researchers have shown that girls usually use more social support when coping, so we decided to study just girls and their experiences. We also did interviews with 14 of their parents (9 moms and 5 dads). That means we did 28 interviews in total.

To do the interviews (Figure 2), we first had to find athletes who were the right age, played the right sports, and had just been cut from a provincial team. This process is called participant recruitment. Once we found willing athletes and their parents, we scheduled times to talk to them. Next, we had to get everyone in the study to sign a sheet saying they agreed to be in the study. This is called informed consent. The interviews themselves were the last step. We met with athletes and parents at their own houses, or they came to a research office at the university. Each interview was done separately. First, we met with each athlete and asked questions about when she got cut, how she felt, and how her parents helped her. Then we asked parents similar questions about their daughter's experience and how they tried to help her. Each interview lasted about 1 h.

Figure 2

The interview process used in our study.

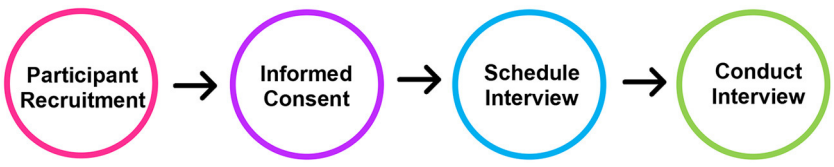

Figure 2

COMMUNAL COPING

When members of a connected network (like a family) work together to manage a stressful event.

STRESSOR

An event or situation that causes stress.

Because we knew that deselection was probably negative for both athletes *and* parents, we looked at **communal coping**, which is a process in which a stressful event (like deselection) is dealt with by members of a connected network, like a family [3]. Although the **stressor** may cause different consequences for those involved, the event is viewed as a shared stressor and coping requires shared actions. This involves an "our problem, our responsibility" perspective, shared between the athletes and their parents. Studying communal coping helped us to understand the ways parents and young athletes together dealt with being cut.

COPING TOGETHER WITH DESELECTION

Coping with deselection seems to happen in three phases (Figure 3). If you have ever been deselected, you may remember that, right after being cut, you wanted to be left alone. The athletes in our study felt this way, too. While they experienced a rollercoaster of emotions in the first few days after deselection, they did not want to talk to their parents about their feelings; they wanted to be alone. It was important to the athletes that their parents did not ask a whole bunch of questions, but that they were there for hugs and support and waited for the athlete to be ready to talk about deselection. When athletes finally opened up about being cut, parents needed to be sensitive and respond delicately. Parents felt it was their responsibility to protect their daughters from the negative emotions experienced after deselection.

Figure 3

The three general phases of coping with deselection.

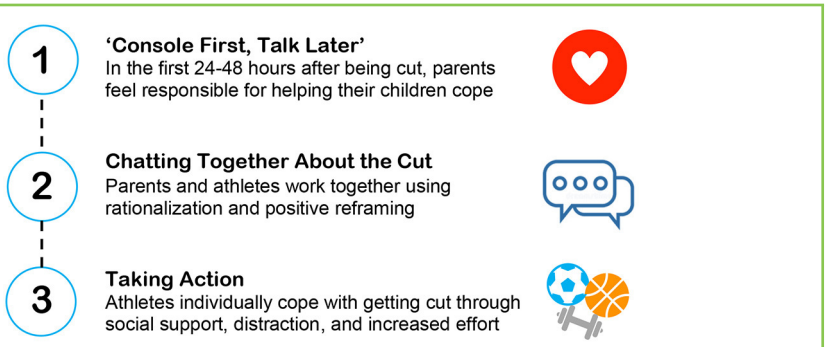

Figure 3

RATIONALIZATION

Explaining or justifying a behavior or situation in a way that makes it seem reasonable or logical.

POSITIVE REFRAMING

Thinking about a negative or challenging situation in a more positive way.

Once athletes decided to talk about being deselected, parents and athletes used several coping strategies to deal with their emotions together. First, they talked about various reasons for deselection. This coping strategy is called **rationalization**. Reasons for deselection could include being smaller or younger than other athletes, or playing a specific position for which there were limited spots (like a goalie). Second, athletes and parents talked about finding the positives in the experience. This is known as **positive reframing**. For example, parents highlighted the accomplishment of making it to the final round of cuts. Athletes and parents also positively reframed deselection by seeing it as an opportunity to learn and grow. Athletes could

develop resiliency and learn to overcome challenges, which would help them in the future. Finally, athletes and parents recognized that just because they were cut did not mean they had to leave sport altogether; there were lots of other opportunities to play their sport at a competitive level.

After developing some cooperative coping strategies with their parents, athletes used several coping strategies themselves. Social support was one common coping strategy. Athletes texted their teammates and non-sport friends to vent about their frustration and disappointment. Their teammates and friends listened and provided reassurance that they were still good athletes and encouraged them to keep playing, which helped boost their confidence. Athletes also used distraction as another coping strategy. Athletes focused on other teams they played on, or on another sport, which helped distract them from the disappointment of being deselected. Distraction with other sports also helped because the athletes were having fun rather than being sad at home. Lastly, athletes developed a "prove coaches wrong" attitude after deselection and used the coping strategy of increased effort. Increasing effort involved things like practicing certain skills for an extra 20 min after school.

BOUNCING BACK AFTER DESELECTION

The results of this study show that athletes and parents viewed deselection as a shared stressor, meaning it was negative and stressful for all of them, and that coping with deselection was a process that changed over time. Parents should be there for the athlete in the first few days, and then slowly and delicately talk about the deselection when the athlete is ready. Parents and athletes can cope together by engaging in rationalization and positive reframing. Finally, athletes can use social support from their teammates and non-sport friends, focus on their other teams, and put effort into training. Together, these coping strategies can help athletes bounce back after the negative deselection experience.

Although getting cut from a team can be very discouraging for a young athlete, remember that deselection does not mean you are not a good athlete—and it certainly does not mean you must stop playing the sport you love! By using the suggested coping strategies and the support of parents, young athletes can overcome deselection and continue to compete in sport at high levels. Deselection and communal coping can occur in other performance areas beyond sport, such as music, theater, and dance.

Interestingly, other research shows that athletes who were deselected during adolescence have gone on to compete at the university level. Further, these athletes learned from deselection and experienced positive growth after getting cut [4]. They became mentally tougher,

developed coping skills that helped them manage other challenges in and out of sport, and strengthened their relationships with their parents, siblings, and teammates. We know that deselection will continue to happen in competitive youth sport. Now that we understand some of the ways athletes and parents can cope with the negative experience of deselection, we hope that athletes will bounce back, grow into stronger players, and continue to compete in their sports.

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CONFLICT OF INTEREST: The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

YOUNG REVIEWER

MRITTIKA, AGE: 14

Mrittika loves hanging out with friends and family. Her interests include: playing the viola, dancing, singing, reading, and calligraphy. Math, Social Studies, and Music are her favorite subjects and she enjoys volleyball, karate, and running. Mrittika's favorite accomplishments are becoming a senior editior on her yearbook editing team and being a publicist for her school's Drama Department. She received an award for being the best foreign language student of the year in middle school and is a finalist in a nationwide computer science competition. Mrittika aspires to be a more open-minded and knowledgable person.

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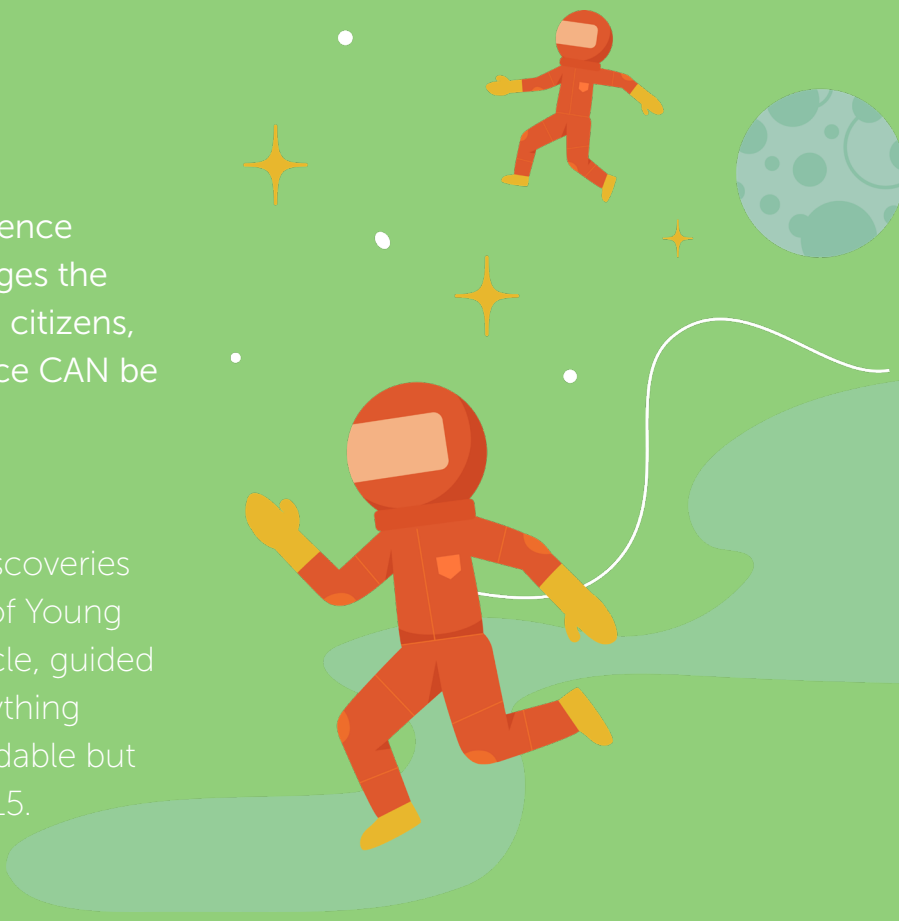

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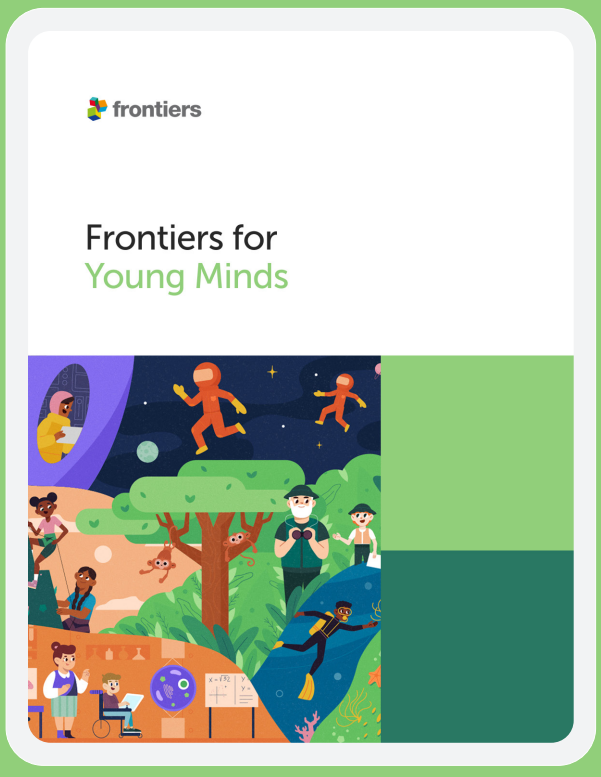

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