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"I Think I Can, I Think I Can…" Self-Efficacy Among Injured Athletes with Concussions and Their Parents: A Mixed Methods Analysis

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ABSTRACT

Background: Sport-related concussion (SRC) is both challenging and fascinating to treat. Little guidance exists regarding the methods used to educate patients and families in physical therapy (PT) for SRC. To address this, I crafted educational materials emphasizing the positives regarding recovery prospects, along with pragmatic positivity in word choice and demeanor, when working with injured athletes and their families. After discharge, I conducted semi-structured interviews to explore their experiences and identify common themes, analyzing them through the lens of the Theory of Self-Efficacy (SE).

Methods: Athletes and a parent/guardian, who met criteria, were interviewed remotely. A 5-step phenomenological hermeneutic method was used for thematic analysis, and reports relating to operationally defined SE characteristics were recorded. A SE questionnaire was also given at the time of the interviews.

Results: SE scores were high among all participants, particularly the parents/guardians, who averaged 36 out of a maximum score of 40 on the New General Self-Efficacy Scale (NGSE). Student athletes averaged 33.25 on the same scale. SE principles were frequently reported among athlete participants, who averaged 3.5 out of 4 themes represented. They reported strong peer and provider influence via social persuasion and mastery experience over their improvement during the process. Parents reported far fewer self-efficacy elements, with an average of 1.5, and relied heavily on their own prior experiences and opinions.

Conclusion: Although the positive materials used in this study were not mentioned, the importance of rapport building and trust was evident in the participants' responses. The high SE levels contributed to participants' successful rehabilitation experiences, and the specific comments they made were varied and rich for clinicians to review and consider when thinking of their own interactions with patients and their families.

Keywords: self-efficacy, concussion, social modeling, social persuasion, mastery experience, state of physiology.

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INTRODUCTION

Concussions, defined by Ferry et al. (2023) [1] as traumatically induced transient disturbances of brain function, disrupt function and quality of life in many ways [2]. Symptoms may appear in broadly similar phenotypical patterns, but specific impairments and their severity levels vary widely from one individual to another [3]. The recovery process that patients experience can be just as unique, as most report symptomatic resolution within 7-10 days [4], but 7.4% report symptoms that last 4 weeks or more [5].

Hallock et al. (2023) [6] report that 3.8 million concussions occur during sports participation in the United States per year, and underreporting is likely. More than 35 individual risk factors have been identified that may increase an individual's predisposition to sustain concussions, precipitate an injury event, and/or perpetuate symptoms for longer-than-normal durations [7]. While many of these personal factors may be outside of the influence of clinicians or patients to change, one potentially modifiable characteristic, perception of self-efficacy, is both clinically influenceable and influential among rehabilitating patients [8,9]. Educational interventions have been shown to have a positive impact on self-efficacy scores [10].

Faulkner et al. (2024) [11] report that patients with concussion see consistent, high-quality education as a key factor in promoting understanding, engagement, and positive expectations during the recovery process. Little focus has, however, been given to the specific educational methods that PTs utilize in the clinic when working with patients with concussions and their families. Simple interventions, including the use of a phone application that frames elements of concussion recovery in a positive, encouraging manner, show improvement in the rate of symptomatic recovery and self-ratings of optimism [12]. Conversely, Polich et al. (2020) [13] found that negative messaging can foster fear, anxiety, activity avoidance behaviors, and negative expectations in patients with concussions. Given this information, it stands to reason that positive framing and encouraging educational methods may be helpful for patients with concussions. The belief that one can take actions that lead to positive results is a central component of the theory of self-efficacy (SE) [14].

I sought to explore these concepts by crafting encouraging educational materials to distribute to high school athletes with concussions and their families during their episodes of PT care and interviewing them afterward to learn more about their lived experiences. Using a hermeneutic, phenomenological methodology allowed me to include analysis through the lens of self-efficacy-related principles [14-16]. The dual aims of this study were, therefore, to implement positive educational methods with patients with concussions and their families, to interview them about their experiences, and to apply self-efficacy principles to their responses for further analysis. This paper focuses on the latter.

METHODS

A hybrid self-efficacy hermeneutic phenomenological model was used for this work [15]. Phenomenology aims to capture the essence of experience, appropriate in this case because of the multi-faceted nature of the symptoms and impairments caused by sport-related concussion and because of the variety of perspectives provided by interviewing both athletes and their family members [17]. Hermeneutics allows for acknowledgement of the investigator's clinical role in the scenario [15]. The Theory of Self-Efficacy lends itself well to discussions of both education and clinical recovery after concussion [14-16].

Athletes were eligible for inclusion if they sustained a concussion during sport participation, the injury occurred 7 days or fewer before their physical therapy (PT) evaluation, a physician or extender diagnosed them, and if this was their first known concussion, to date. Parent/guardian participants had no specific exclusion criteria, except that the study required only one parent or guardian per athlete to participate. After recruiting directly from a convenience sample and obtaining their signed informed consent, participants were provided with positively focused concussion educational materials (Appendix 1). They viewed an educational video about the concussion recovery process [18]. They were also asked to complete a check-in form at each follow-up visit that asked them to record two areas that were improving and one that still needed work (Appendix 2). I tried to maintain a pragmatically encouraging disposition during the episode of care and make non-threatening word and analogy choices whenever possible. Physical therapy evaluation, treatment, and discharge/Return-to-Play procedures were completed normally.

Once the episode of care was completed and the athlete had successfully returned to their sport, I performed semi-structured, retrospective interviews with matched pairs of an athlete and a parent/guardian [19]. The interview script is available in Appendix 3.

Data was collected, with member checks then performed, using HIPAA-approved video conferencing software, Google Docs and its transcription function, and Voice Memo audio back-up recordings [20].

Anonymized participant names were assigned at random, and identifiable information was replaced with generic labels [21]. Interview transcripts were analyzed using Giorgi's 5-step Existential-Phenomenological Method [15]. Interviews continued until saturation, or the point at which no new thematic concepts emerged, as defined by Saunders et al. [22], was reached. Secondary data from the New Generalized Self-Efficacy Scale (NGSE) scores, given to each participant at the time of their interview, were also considered [23]. See Appendix 4 for the NGSE questionnaire.

Two PT peer reviewers analyzed the results openly to ensure confidence in the credibility of thematic conclusions and the application of self-efficacy principles [24].

Response analysis seeking evidence (or lack of) for self-

efficacy principles was based on factors that Bandura (1997) [14] says contribute most strongly to SE: mastery experience, social modeling, social persuasion, and state of physiology.

For student athletes, mastery experience was operationally defined as mentioning feeling better about themselves or the situation after overcoming a minor hurdle in the rehabilitation process, or when they mentioned their primary motivator as returning to play [14]. Returning to sport, as the final step in the recovery process, represents mastery of the recovery process. Social modeling was evidenced by following the example or lead of healthcare providers they interacted with or by reports of taking advice from a peer or friend who had gone through a similar situation in the past. Social persuasion was defined as athletes reporting being helped by words of encouragement or being motivated by peer involvement and inclusion [14]. Athletes with concussions begin their recovery in various states of duress. They should incrementally get better over time, organically, making the establishment of a useful operational definition of the state of physiology challenging [25].

Acknowledging that underlying pattern, I chose to define this as instances where an athlete made mention of a piece of advice or a treatment strategy speeding up the recovery process, or when they mentioned that one of these improved their affective state [14].

For parents/guardians, mastery experience was defined as examples where a parent described an action that they took to help the athlete overcome a specific obstacle or achieve a goal during the recovery process [14]. Social modeling included examples where the parent sought to be a model for the athlete or when they found provider viewpoints to align with their own closely [14]. Social persuasion was defined in this group as situations where a conversation changed the parent's pre-conceptions with a provider [14]. States of physiology were identified as examples provided by adult subjects where their personal worries or fears were assuaged by a provider interaction or by witnessing the progress the athlete was making along the way [14].

RESULTS

Student NGSE scores were moderately high, averaging 33.25 out of a maximum of 40, with higher scores indicating greater levels of reported perceived self-efficacy (compared to a mean elsewhere reported to be 23.78) [23, 26]. Among athlete participants, themes related to mastery experience and social persuasion were present for 100% of interviews, and those related to social modeling and state of physiology were present for 75%.

Table 1: *Commentary/Themes Related to Self-Efficacy Enhancement Principles: Athletes*

Theme	Arturo	Bart	Catie	Daisy
Mastery experience	✓	✓	✓	✓
Social modeling	✓	✓	✓	
Social persuasion	✓	✓	✓	✓
State of physiology		✓	✓	✓

Note. Checkmarks (✓) indicate athletes whose responses included the corresponding self-efficacy theme.

Daisy's mastery experience included the ability for her home exercise program to produce incremental, noticeable improvement. She said, "…even just being able to reread notes. It was encouraging to see progress along the way." Arturo focused on getting back to his sport, saying, "I really wanted to get better because I love playing lacrosse and that was the main thing I couldn't do until I was better, so…. I definitely wanted to do what I had to do to play again, because playing lacrosse is my favorite thing to do." Bart said something similar.

Social modeling was evident when Arturo and Catie credited physical therapy interactions with encouraging them to get more active, and Bart credited his athletic trainer (ATC).

Social persuasion was clear in athlete responses. Catie, whose father is also her coach, provided words of encouragement and helped build her confidence that she would be okay. Daisy found solace in her peers being understanding and accommodating in school. Arturo targeted a specific game against friends in another town as a goal to aim for while recuperating.

Many of the athletes mentioned that their physical therapy experiences helped improve their state of physiology, particularly affective symptoms and worries. Bart said, "… with you, it was obviously more of a validation because I was nervous about going straight back into it and getting another concussion. The PT definitely helped. It got my endurance up a bit, for sure…I felt really comfortable going to you, and I trust you. It really helped give me that extra push to get back into it." Daisy found hope during the evaluation visit, saying, "You made it seem like there was hope to get back sooner. I was happy about that…you were able to help me through it, and it helped to know that it was possible for me to get back when I wanted to, if things went well- which they did."

Parent/guardian NGSE scores were high, averaging 36 out of a maximum of 40. Parent/guardian participants, however, yielded very different commentary regarding SE than the student-athletes. Comments related to social persuasion and social modeling were present in 50% of subjects, while mastery experience and state of physiology were present in only 25%.

Table 2: *Commentary/Themes Related to Self-Efficacy Enhancement Principles: Parents*

Theme	Aleshia	Belinda	Carmen	Delila
Mastery experience				✓
Social modeling	✓			✓
Social persuasion			✓	✓
State of physiology				✓

Note. Checkmarks (✓) indicate parents whose responses included the corresponding self-efficacy theme.

There were far fewer instances of self-efficacious remarks when the parent subjects discussed their experiences than

when their student-athletes did. Only one participant, Delila, fit the mastery experience characterization by mentioning actions she took to help her athlete overcome obstacles during the recovery process. She maximized her role at home by helping Daisy perform her home exercises and by making sure that the home environment was minimally stimulating.

Half of the parents reported instances of social modeling, either acting as role models for their athlete or resonating with healthcare providers. Delila suffered through low lighting and muted tones in the house alongside her daughter, sympathizing and setting a good example. Aleshia identified with a more conservative, like-minded physician.

Regarding social persuasion, Carmen and Delila both identified myths that used to be conventional wisdom regarding concussion. Carmen discussed the outdated belief that people with concussions must be kept awake at all costs the night of the injury. She thankfully allowed her daughter to sleep as much as she needed after discussing this with her physician. Delila thought that allowing her daughter to rest for a few hours would take care of the problem, and things were obviously not quite that simple.

Results were mixed regarding the parent/guardian's understanding of physiology and whether provider interactions helped alleviate worry or fear. Delila was effusive in her praise of the process, describing it as educational, and said that the care her daughter received alleviated her worries at every step. Carmen, by contrast, reported being every bit as afraid of concussion as she has always been, and hoping aloud that the family can survive the remainder of her child's high school athletic career without any more head injuries. She went on to say, "You hear things in the media about concussions and mental health and possible suicide and that kind of stuff. I definitely feel like no one is going to be more cautious with my child than me, because at the end of the day, ya know, he's mine."

DISCUSSION

Student athletes in this study referenced many thoughts and experiences about their recovery processes that echoed the principles of the Theory of Self-Efficacy strongly.[14] However, no specific mention was made of the positive educational materials or methods used in this study as having any direct impact on those experiences.

Instead, their mastery came from gradual symptomatic improvement and strong motivation to return to the sports that they loved. Motivation has been shown by McGrane et al (2015) [27] and Tao et al (2024) [28] to strongly influence rehabilitation outcomes and correlate with self-efficacy.

Student athlete social modeling came from healthcare providers who developed a good rapport with these clients and encouraged them to work back toward being active again. Black et al (2012) [29] report that patients are more likely to change health-related behaviors when their provider serves as a credible role model of healthy behaviors. Though this study was performed in a physical therapy clinic, there were several positive comments regarding athletic trainers and how much they clearly care for their student athletes.

Social persuasion might best be viewed, in this context, as a positive form of peer pressure. The athletes under study all had their everyday routines and roles on their team and in their friend groups temporarily disrupted. Most participants were at least partially driven by wanting to return to playing with (or against, in one case) their friends and took solace in encouraging words from trusted sources. A collegiate peer support intervention, used by O'Brien et al. (2021) [30], showed promise among athletes with concussions, citing the specific utility of hearing others' success stories and being able to share personal experiences. The challenge of concussion as it relates to mental health crises in young people, whether they are equipped with sound coping strategies to deal with such a disruptive injury, and what healthcare providers can do to screen and best care for patients and their families in this regard, is a rich topic worthy of ongoing, comprehensive investigation. As Putukian et al. (2016) [31] assert, normalizing respect for the psychological components of recovery and the stress that injuries like this can introduce remains a high priority.

Many athletes mentioned that their PT care helped ease their worries and speed up the recovery process. While some mentioned the exercises and advice they were given, most of the comments related to PT care and states of physiology were vague. Reading between the lines, it seems that rapport might have had a greater effect than any printed educational materials or shared videos. Rapport building and fostering trust are vital for PT in many other scenarios, so it's reasonable that concussion would be no different [32].

This study was not designed to examine relationships between self-efficacy and the amount of follow-up care patients required or other such variables. Still, the athlete with the lowest self-reported self-efficacy score did end up needing the most total PT visits (five).

Parent/guardian reporting included only one example of mastery experience via reported proactive behaviors. This, perhaps unsurprisingly, came from the subject who physically accompanied her child throughout every session and scored the highest, individually, on the NGSE.

Social modeling in the adult group was absent from most accounts. The parents/guardians in this group had all had prior experience dealing with concussions, either with their other kids, another family member, or in their work, and they seemed to rely more on their prior experience than on following the lead of any healthcare provider. The same could be said of the lack of evidence of parents/guardians feeling better from provider interactions, thereby improving their states of physiology. Failing to control for prior experiences of parents or guardians, and the influence those might have, is a previously unanticipated but important limitation of this study.

The exception to this perceived lack of malleability can be

seen in the parent/guardian social persuasion commentary. Mostly debunked beliefs about avoiding sleep the night of injury or waking someone up every hour to perform "neuro checks" have long been abandoned in "routine" concussion cases. Still, they linger in the zeitgeist [33]. Misconceptions like these were present in 48% of parents in a survey study performed by Rieger et al (2018) [34]. Overcoming these persistent notions likely requires engaged, communicative parents and trusted providers with the time to provide high-quality, personalized patient and family education experiences.

Like athletes, the data do not reveal any specific, gravitational impact of positive materials on the self-efficacy-related behaviors or beliefs among parent/guardian participants. This was less surprising for two reasons. First, the parents were all present for the evaluation visit, and I spoke with them about the athlete's status and progress after each follow-up. Still, only Delila came back into the clinic and was engaged in the conversation and process throughout every appointment. There was much less parent-therapist contact and interaction than athlete-therapist, overall. Second, parent/guardian subjects had higher self-efficacy in general, with less room or potential need for positive change in this area. The average score for the parents on the NGSE, being 36 out of a possible 40, well above the reported mean of ~24 from Tait et al (2013) [26], may indicate a ceiling effect.

This study's strengths included an open-ended design that allowed subjects to describe their experiences freely, the dualistic nature of hearing the tales of both injured athletes and their parents/guardians about the same events, and a good fit for a clinician-investigator situation, thanks to the pragmatic and adaptable nature of hermeneutic phenomenology.

Weaknesses included the lack of pre vs. post NGSE scores, the absence of any male parent/guardian participants, and the inclusion of only one clinician, site, and community. Similar studies would benefit from a broader scope and possibly from considering quantitative design elements to explore better the possible impact of positive materials in a demonstrable way.

CONCLUSION

All athletes reported full symptomatic recovery and were back to their sport in 11-35 days. The high levels of self-efficacy shown among both those athletes and their families likely played a significant role in that success. Clinicians and researchers should continue to explore interventions and methods that promote self-efficacy, and there may yet be a role for pragmatic positivity in the service thereof.

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Tables/Illustrations

Appendix 1: Encouraging Educational Handout [35-38]

Positive Messaging in Concussion Management among Injured Athletes and their Parents: A Hybrid Qualitative Investigation

Encouraging Concussion Facts and Findings
Compiled by: Ben Cooksey PT, DPT, OCS, ITPT

- "approximately 85% to 90% of athletes with concussion recover symptomatically within 1 to 2 weeks, and only a small percentage have symptoms lasting from weeks to months" (McKeon et al, 2013, p. 836).
- "the expected duration of symptoms in children with sport related concussion is up to 4 weeks" (McCrory et al, 2017, p. 844)
- "this cross-sectional study failed to identify any observable effect of adolescent concussion history on cognition or motor performance with age." (Martini, Eckner, Meehan, & Broglio, 2017, p. 1420).
- participation in contact sports in adolescence did not adversely impact participants' cognition or depression status in young adulthood in a prospective cohort study of nearly 11,000 subjects (Bohr, Boardman, & McQueen, 2019)

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Appendix 2: Follow-Up Visit Check-In Questionnaire

Follow-Up Visit Check-In Questionnaire:

Patient Name _____

Date _____

Visit # _____

Please list two symptoms or other things that have improved/gotten better since your last visit.

1) _____

2) _____

Please list one ongoing challenge or symptom that you would like to address/ work on today.

1) _____

Appendix 3: Interview Script

Positive Messaging in Concussion Management among Injured Athletes and their Parents: A Hybrid Qualitative Investigation- Interview Prompts

- Greet recovered patient and parent and inquire about how the post-discharge period has gone, i.e. returning to sport participation, how things are going at home, etc. Remind involved parties about the purpose of the study and of the semi-structured interview, and review procedures regarding recording, transcription, and steps that will be taken to safeguard anonymity/ privacy. After ensuring that all parties would still like to participate- 1 on 1 interview will be performed using the following list of prompts as a guide (with one participant, and then the other):

1) Please describe what you knew about concussions before this injury and where you received that information or education.
2) What was it like for you and your family right after the concussion?
3) What was the recovery process from this injury like, for you personally?
4) What was it like for your family?
5) How did the information you received from other healthcare providers influence your views on this injury and recovery process?
6) How did the information you received from your physical therapist influence your views on this injury and recovery process?
7) Did you feel empowered to take appropriate action to help the recovery process? If so, what helped you feel that way? If not, please describe what held you back.
8) Have your opinions about concussions changed because of this experience? If so- how?
9) What would you recommend that healthcare providers do to make the rehabilitation process better for injured athletes and their families in the future?

Appendix 4: New General Self-Efficacy Scale (NGSE)

Using a 5-point rating scale (1= strongly disagree; 3 = neither agree nor disagree; 5 = strongly agree), respondents rate how much they agree with these statements:

New General Self-Efficacy Scale

1. I will be able to achieve most of the goals that I have set for myself.
2. When facing difficult tasks, I am certain that I will accomplish them.
3. In general, I think that I can obtain outcomes that are important to me.
4. I believe I can succeed at most any endeavor to which I set my mind.
5. I will be able to successfully overcome many challenges.
6. I am confident that I can perform effectively on many different tasks.
7. Compared to other people, I can do most tasks very well.
8. Even when things are tough, I can perform quite well.

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