Journal for Advancing Sport Psychology in Research

Volume 3, Issue 2 • 2023

ISSN 2770-8306

https://doi.org/10.55743/JASPR

Journal for Advancing Sport Psychology in Research

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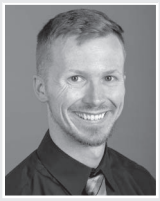

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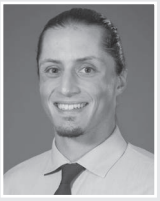

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Qualitative Analysis of Modern Dancers' Post-Injury Psychological Experiences

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Athletic injuries often trigger psychological distress, including frustration, depression, and anger (e.g., Tracey, 2003). Like sport athletes, dancers face injury risks due to the physicality of dancing (e.g., Jacobs et al., 2017; Skvarla & Clement, 2019). There is limited research on psychological responses to dance-related injuries; particularly absent in the extant literature are the experiences of injured modern dancers (Thomas & Tarr, 2009). Studies are needed on this population, given differences in training, choreography, and culture in modern dance compared to other dance forms (Clabaugh & Morling, 2004). The purpose of the present study was to qualitatively explore post-injury psychological experiences of adult modern dancers. Participants included eight modern dancers (seven women, one man; M_{age} = 30.5 years; 75% White; M = 23.6 years of modern dance training) who suffered a recent serious injury (≥ 6 weeks recovery). Semi-structured, individual interviews were coded line-by-line using thematic analysis (Braun & Clarke, 2006). Analysis resulted in six themes: *Emotional Upheaval and Reactivity, Stress-Inducing External Factors, Challenges Presented by Physical Pain, Mental Disruptions and Eventual Cognitive Shifts, Coping through Redirection of Energy,* and *Buffering Effects of Positive Social Support*. The dancers' reported interpersonal trust/support, loss of independence, and growth were similar to previously studied sport athletes' reports (e.g., Kampman et al., 2015). A novel theme in the current study was the influence of COVID-19 on reactions to injury. Overall, findings indicate that injuries are complex events that not only involve a mechanical disturbance to the physical body but also initiate profound psychological experiences.

Keywords: social support, surgery, athletic injury, emotional, semi-structured interview

Dancers face inherent risks for injury due to the artistry and physicality of dancing, and injury prevalence and musculoskeletal pain have been reportedly high in dancers of varying levels (e.g., Hincapié et al., 2008; Jacobs et al., 2017; Kotler et al., 2017; Skvarla & Clement, 2019). Psychologically, dancers' experiences with injury may include various emotional responses, such as a loss of self-identity (e.g., Air, 2013; Reel et al., 2018), yet research on psychological responses to dance-related injuries remains limited. It is possible that dancers' psychological responses to injury are similar to other types of sport athletes. In addition to a decrease in physical function, athletes who suffer from serious injuries often experience emotional distress or maladaptive coping, such as non-adherence to rehabilitation or excessive alcohol consumption (Wiese-Bjornstal et al., 1998). Individual differences in injury perceptions may also influence one's psychological responses to injury.

RECEIVED: August, 29, 2022

ACCEPTED: September, 20, 2023

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In recognition of the various psychological responses to injury, Wiese-Bjornstal et al. (1998) developed the integrated model of psychological response to sport injury and rehabilitation process (from now on, referred to as the integrated model). According to the model, personal and situational factors influence an athlete's cognitive appraisals of an injury, which then influence their emotional responses and ultimately affect the athlete's behavior related to the injury, ability to cope, and recovery outcomes (Wiese-Bjornstal et al., 1998). For example, if an individual perceives an injury as a threat to one's athletic career (cognitive appraisal), fear and hopelessness may ensue (emotional response), perhaps followed by non-adherence to rehabilitation (behavior). The lack of adherence to rehabilitation, in turn, may lead to negative healing outcomes and reinforce the belief that the injury is a threat (Wiese-Bjornstal et al., 1998).

Although many sport athletes may appraise an injury as a negative event, others may have less adverse responses. For example, Wiese-Bjornstal et al. (1998) found that individuals with positive mood state profiles prior to injury, as opposed to those with negative mood state profiles, had more positive responses following an injury occurrence. In support of the integrated model, Bianco et al. (1999) found that cognitive, emotional, and behavioral responses resulted following an injury, and both appraisal and coping were ever-evolving processes affected by rehabilitation progressions. Moreover, sport athletes may have varying levels of cognitive, emotional, and behavioral responses based on individual circumstances (Wiese-Bjornstal et al., 1998). In short, factors such as type of injury and individual personality differences, in addition to social and sporting environments, can influence how individuals perceive their injuries and, subsequently, how the injuries affect the individuals' emotional reactions and behaviors.

Common emotional reactions to sport injury include grief (e.g., Tunick et al., 1996), distress (e.g., de Munter et al., 2020), depression (e.g., Gervis et al., 2020), fear of reinjury (e.g., Bianco, 2001; Hsu et al., 2017; Lee et al., 2020), and in some cases, optimism (e.g., Macchi & Crossman, 1996; Rabinowitz & Arnett, 2018) and gratitude (e.g., Beaton & Thorburn, 2019; Tracey, 2003). Behavioral responses to athletic injury are often conceptualized and assessed by one's coping behavior. Coping refers to the emotional, physical, and cognitive responses directed at reducing burdens that are associated with daily struggles and general life stress (DeNelsky & Boat, 1986; Lazarus & Folkman, 1984). Further, coping skills (e.g., cognitive restructuring and stress management) may help protect people from psychological harm following challenging life experiences (Pearlin & Schooler, 1978).

The integrated model (Wiese-Bjornstal et al., 1998) is a framework for assessing not only differences in overall response to injury but also in changes over time in personal cognitive appraisals, emotional responses, and recovery outcomes during various phases of rehabilitation. Athletic trainers have conceptualized three phases of physiological injury rehabilitation: the acute injury phase (injury onset), the repair phase (recovery phase), and the remodeling phase (return-to-sport phase; Prentice & Arnheim, 2011). Researchers have used these three phases to identify trends in psychosocial responses to injury during each phase (Clement et al., 2015). Although researchers have studied the phases of rehabilitation in relation to different types of sport athletes, fewer studies have been conducted on dancers' injuries, and most do not follow a phased approach to rehabilitation (e.g., Macchi & Crossman, 1996; Reel et al., 2018). Due to the limited research on injured dancers, it is unknown whether dancers follow similar phases of rehabilitation as sport athletes.

Regarding athletic injury, much of the research has been conducted on elite athletes from a variety of sports (e.g., Arvinen-Barrow et al., 2019; Clement et al., 2015; Tripp et al., 2007). Responses to injury depend on several individual (e.g., personality characteristics), sport-specific (e.g., sporting environments), and situational (e.g., access to social support) factors, and thus, it is unclear whether modern dancers will have similar psychosocial responses to injury compared to athletes representing different sports. Within the general population, individuals faced with stressors often turn to others for support (Dooley et al., 2020). Similarly, social support has been found to be an integral piece of injured athletes' coping experiences (e.g., Bianco, 2001; Goddard et al., 2021; Mitchell et al., 2014). Although similar to other types of athletes in many regards, dancers are a unique type of artistic athlete (Hincapié et al., 2008) who are judged and viewed on more subjective movement qualities, technical abilities, and style rather than the more objective scoring systems used in several other sports (Hughes et al., 2019). Additionally, Krasnow et al. (1994) stated that due to modern dancers' high risk for injury and relatively limited financial and emotional resources, they may not receive adequate attention when injured. Ojofeitimi and Bronner (2011) argued that modern dance companies are often strained by the financial costs of injury. Modern dancers' injury experiences may also be unique because they often do not have access to athletic trainers or adequate funding (Krasnow et al., 1994).

Literature on Injuries Among Dancers

Although there has been some prior research on dancers' post-injury psychological experiences (e.g., Air, 2013; Encarnacion et al., 2000; Macchi & Crossman, 1996; Mainwaring & Finney, 2017; Markula, 2015; Patterson et al., 1998; Reel et al., 2018), much of the research focuses on ballet dancers, or mixed samples of ballet and modern/contemporary dancers, and dates back several years. For example, Macchi and Crossman (1996) interviewed injured professional ballet dancers and found that negative emotions including fear, distress, depression, and anger, slowly transitioned into higher levels of optimism and excitement as rehabilitation progressed. Encarnacion et al. (2000) focused on ballet dancers' coping styles in response

to pain, finding that professional-level dancers were more likely to be prepared to experience pain and thus coped differently than academy-level dancers. Within a competitive ballet environment, Patterson et al. (1998) found that in addition to physical factors, psychosocial factors (e.g., social support) impacted injury vulnerability in ballet dancers. In another sample of injured professional dancers (10 ballet dancers, three modern dancers), Reel et al. (2018) found that dancers reduced their nutritional intake during injury recovery and felt anxiety and uncertainty about future dance involvement. Dancers' coping responses included exercising other parts of the body, involvement in alternative interests, focusing on other aspects of artistry, and seeking social support (Reel et al., 2018). In a study of contemporary dancers (i.e., a style similar to modern dance), many of the 14 injured female contemporary dancers blamed themselves for their injuries and continued to dance despite injury (Markula, 2015). Overall, researchers investigating ballet and contemporary dancers' injury experiences have found a variety of emotions and coping responses in participants depending on the level and style of dancer, recovery phase, and other individual circumstances.

Because few researchers have directly investigated modern dancers' experiences with injury (Thomas & Tarr, 2009), expanding the literature to this population could identify possible unique characteristics of modern dancers compared to sport athletes and ballet dancers. Although many advanced modern dancers have training in ballet, there are distinct differences between the dance forms in terms of training, choreography, and culture (Clabaugh & Morling, 2004). Modern dance is slightly less formally structured than classical ballet and more focused on dancers' personal movement interpretation with an emphasis on improvisation and the body's response to gravity and fewer constraints related to form and position (Mazo, 2000). Additionally, because research has often focused on professional dancers (e.g., Macchi & Crossman, 1996; Reel et al., 2018), studying multiple levels of modern dancers in the present study is important for understanding a wider scope of experiences.

Purpose of the Present Study

The purpose of the present study was to explore the post-injury experiences of adult modern dancers who had a history of a serious injury (to a part of the body other than the head)[1] within the last five years. Given the lack of research on modern dancers' experiences, a qualitative study design allowed for an open-ended investigation of cognitive, emotional, and behavioral experiences from injury onset through the rehabilitation and recovery process.

Historically, physical health has tended to be the focus, and psychological health may be overlooked within dance injury experiences (Mainwaring & Finney, 2017). Learning more about dancers' psychological experiences could inform dance educators, certified mental performance consultants, medical professionals, and mental health professionals on how to better support their students and clientele. Moreover, results could help guide professionals in providing effective techniques to support injured dancers beyond solely recommending physical rehabilitation.

Method

Participants

The present sample consisted of eight participants (M_{age} = 30.5 years; *SD* = 10.9 years), all of whom were adult modern dancers (seven identified as women, one identified as a man), with 23.6 average years of modern dance training (*SD* = 4.79 years). Participants identified as Black/African American (*n* = 1), Asian/Chinese American (*n* = 1), and White (*n* = 6). Participants ranged in dance training and performance levels from college (*n* = 3; dancers who took classes and performed at universities), community (*n* = 2; dancers who took classes and performed in community settings as volunteers), and professional (*n* = 3; dancers whose primary source of income came from dancing). Participants had a range in the types of modern dance training, including Limon technique, Graham technique, and Horton technique. Types of injuries included muscle sprains, broken bones, nerve damage, torn ligaments, and dislocated joints. The average length of time since the injury onset was 2.9 years (*SD* = 1.3 years), and the average length of time in rehabilitation was 4.4 months (minimum = 2 months; maximum = 10 months). Of the total sample, eight reportedly received both medical treatment and physical therapy for their injuries, and four received surgeries (including two receiving an additional surgery due to complications). Four dancers' injury experiences overlapped with the timing of the COVID-19 pandemic.

[1] Due to the specific psychological effects that head injuries have on individuals (e.g., Prien et al., 2018), either focusing solely on head injuries, or excluding head injuries altogether, is an important consideration for researchers to make when assessing athletic injury experiences.

Data Collection Measures

The principal researcher conducted a pilot interview with an injured modern dancer (a known personal contact of the researcher, who thus could not be used as a participant in the current study). No adjustments were made to the interview guide following the pilot interview. Participants completed one-on-one interviews with the principal researcher over Zoom. The interviewer used a semi-structured interview guide that began with the open-ended prompt: "Walk me through your injury and recovery experiences, starting from the initial onset of your injury through your recovery process." Next, the interviewer asked participants about the psychological experiences that they recalled during the injury and recovery process, prompting for their thoughts, emotions, behaviors, and coping techniques. These topic areas were selected as prompts based on Wiese-Bjornstal et al.'s (1998) integrated model. Finally, the interviewer prompted participants to describe any social support they received during the injury and recovery experience; this topic area was included due to previous research indicating that social support plays a role in injury appraisals and coping responses (e.g., Bianco, 2001; Goddard et al., 2021; Mitchell et al., 2014). To increase trustworthiness and avoid priming participants' responses, the interviewer asked open-ended, non-leading questions and follow-up questions.

Procedure

Prior to beginning data collection, the researchers obtained Institutional Review Board approval. The principal researcher has training and experience as a dancer but has not personally experienced a serious injury. The principal researcher recruited participants through convenience sampling via emails to contacts in various dance communities; however, apart from the pilot participant, no close contacts of the principal researcher participated in the study. Participant interviews were scheduled on a first-come, first-served basis. Participants who enrolled in the study were asked to share the study's information with other dancers. Thus, researchers also used snowball sampling. In addition, recruitment emails were sent to university dance departments, and social media posts with recruitment materials were posted to online dance research platforms via Facebook. The principal researcher called all interested participants and screened them to assess whether they fit inclusion criteria, which were that all participants must (a) be over the age of 18, (b) have been actively participating in modern dance training and/or performance during the time of injury, (c) have had any injury (except those to the head) that was severe enough to take them out of regular dance training or performance for a minimum of six weeks (Clement et al., 2015), and (d) have been fully recovered or medically cleared to return to dance by the time of the study. Participants verbally provided their informed consent to participate. Zoom interviews lasted an average of 33 minutes and 6 seconds, with a range of 23 minutes and 30 seconds to 49 minutes and 5 seconds in length, and all interviews were verbally recorded using a separate audio recording device. All participants received a $15.00 electronic gift card after participating in the study. Although some researchers recommend sending participants their transcripts for review to enhance trustworthiness and reduce the power differential between researcher and interviewee (e.g., Rowlands, 2021), the present researchers elected not to send transcripts for several reasons. First, other scholars claim that sending transcripts may do little to improve the quality of analysis (Hagens et al., 2009; Thomas, 2017). Next, the recording quality was very high, and thus, correcting mistakes was not necessary. Finally, the lead interviewer was an active member of the modern dance community, which enhanced rapport and likely reduced participants' sense of power differences.

Data Analysis

Data collection and analysis included both deductive and inductive elements. Interview questions were created deductively in that researchers used Wiese-Bjornstal et al.'s (1998) model as a framework to develop questions that would target typical aspects of injury experiences. Although Wiese-Bjornstal et al.'s (1998) model guided question development, the researchers did not actively align codes to concepts or language used in the model, nor did they organize themes according to this theory. Instead, researchers used the six steps of Braun and Clarke's (2006) thematic analysis procedures, which enable researchers to identify patterned meaning in data. Researchers took a bottom-up approach to coding by attempting to bracket any deductive theoretical information so as to be open to novel information shared by participants. Researchers employed an essentialist/realist epistemology, assuming a generally unidirectional relationship between meaning and the participants' reports, with the understanding that the meaning and interpretations participants attached to their experiences were created through social frameworks and conditioning (Braun & Clarke, 2006). As such, the researchers subscribed to a subjectivist ontology that assumes participants' reports reflect a subjective meaning-making process rather than an objective reality.

The principal researcher audio-recorded and manually transcribed interviews verbatim, removing only filler words such as "ah," "so," "like," and "um." Transcriptions were coded line-by-line by hand and sorted into patterned responses (Braun & Clarke, 2006). The principal, second, and third researchers met to discuss coding decisions and organize the patterned responses (i.e., subthemes) into themes. Coding disputes were discussed until consensus was achieved between the three researchers. Titles of themes were created based on the patterned meaning of the participants' responses (Braun & Clarke, 2006). Similar themes were grouped under a higher-order category to organize the analysis. There was evidence of data saturation in that there were no new themes identified in the final participant's interview, indicating that the sample size was adequate (Braun & Clarke, 2021).

Results

Data analysis resulted in six themes, four subthemes, and 26 codes (see Table 1). Results are described below, organized by themes.

Table 1. Coding Structure for the Data

Themes	Subthemes	Codes
Emotional Upheaval and Reactivity		Disappointment (*n* = 3) Sadness/Grief (*n* = 4) Frustration/Annoyance (*n* = 5) Anger (*n* = 3) Anxiety (*n* = 5) Fear (*n* = 5) Embarrassment (*n* = 2)
Stress-Inducing External Factors		COVID-19 Pandemic Influence (*n* = 3) Financial/Work Shifts (*n* = 3) Delayed Diagnosis Experiences (*n* = 6)
Challenges Presented by Physical Pain		Pain (*n* = 7)
Mental Disruptions and Eventual Cognitive Shifts	Uncertainty	Shock (*n* = 3) Doubt in Recovery Process (*n* = 3) Questioning Career Identity (*n* = 3)
	Loss	Loss of Independence (*n* = 3) Loss of Identity as Dancer (*n* = 3)
	Coming to Terms	Acceptance of Severity (*n* = 2) Confidence in Recovery Process (*n* = 4) Gratitude (*n* = 4)
	Growth	Growth (*n* = 6)
Coping Through Redirection of Energy		Movement Engagement (*n* = 8) Quiet Activity Engagement (*n* = 5) Compensatory Behavior (*n* = 5) Motivation for Recovery (*n* = 4)
Buffering Effects of Positive Social Support		Interpersonal Trust/Support (*n* = 8) Interpersonal Protection (*n* = 5)

Emotional Upheaval and Reactivity

Dancers discussed several negative emotional reactions throughout the course of their injury and recovery experiences. Three dancers reported fear of re-injury. For example, Participant 4 stated, "The anxiety never really went away. Even when I got back onstage, there was just that little bit of me that was paranoid that I was going to reinjure something." Another prominent fear was about surgery. Participant 7 mentioned, "My biggest fear was probably someone cutting into me majorly." Dancers also expressed being angry about various aspects of the injury experience. For example, Participant 6 stated, "I was just angry. I was just irritated that my body did this." Five dancers expressed feeling frustrated, particularly about recovery progress and feeling restless to get back into dancing. Additionally, one reported "a lot of frustration at my insurance and the things you have to jump through just to get basic care" (P2). Some dancers also shared feelings of disappointment related to missed dance opportunities.

Other negative mood states were sadness, grief, and embarrassment. The sadness often surrounded missing out on dance experiences, and grief was expressed in recognition of the non-linear recovery process. For example, Participant 7 stated, "Just like any crisis, I suppose, you go through those stages of grieving – you can't just say it's 'this step, this step, this step' – you know?" Further, two dancers reported feeling embarrassment, including Participant 6, who stated, "At first, I was completely embarrassed because it was this brand-new [dance] company." Furthermore, dancers' emotions were triggered by a variety of stimuli. Despite the negative mood states that dancers experienced, all eight dancers reported receiving no professional emotional support during their injury experiences (e.g., mental health counseling, certified mental performance consultant [CMPC] services, etc.).

Stress-Inducing External Factors

Stress-inducing external factors included factors outside of the dancers' internal processing systems yet deeply impacted the dancers' overall injury and recovery experiences. Medical care and quality of medical care, for example, were factors outside of the dancers' control that influenced their paths toward recovery. Interestingly, six dancers indicated having to wait a long time to receive an official diagnosis. Two dancers reportedly received an incorrect initial diagnosis, and one reported receiving an incorrect injury severity diagnosis. Several participants stated that they realized the injury was severe at the onset, prior to official diagnosis.

All dancers were interviewed during the early phases of the COVID-19 pandemic, yet given the timing of four of the dancers' injuries, COVID-19 was noted as a specific external disruption by three of those four dancers. Despite the inherent hardships that individuals faced during the early stages of COVID-19, Participant 1 mentioned that coping with the injury was easier due to the timing of the pandemic and stated, "I think that the biggest blessing, dare I say because I hate COVID more than anything – but not having the pressure of everyone around me dancing – that's been, I would say, the biggest blessing in all of this." Three dancers mentioned the external disruption of financial/work concerns, including having limited funds for medical treatment, concerns about losing income, and missing out on what was happening at work due to injury.

Challenges Presented by Physical Pain

Seven participants reported a recognition of unique pain experiences during their injury and/or recovery process. Three participants stated that being a dancer involved training to 'tough it out' during dance overall. Participant 1 stated, "It's really different to go into something expecting pain, and it's almost like I've conditioned myself to expect pain" and went on to share:

> Wow, I feel like I'm making up even a little bit of this pain just because it's what is expected. And I don't want to fully admit that I'm able to do things without pain because what if it comes back? Or what if I'm actually in pain and I'm just telling myself that I'm not? So, I think that the expectation of pain, even post-injury, is a lot.

Other dancers reported recognizing strong pain at injury onset or pain intense enough to hinder the ability to walk or sleep. Interestingly, only one participant reported feeling no pain during the injury.

Mental Disruptions and Eventual Cognitive Shifts

The theme of Mental Disruptions and Eventual Cognitive Shifts included four subthemes: *Uncertainty, Loss, Coming to Terms*, and *Growth*.

Uncertainty

At various points throughout the initial injury and recovery process, dancers expressed a sense of disorientation, uncertainty, and confusion regarding either the injury itself or factors related to being injured. For example, Participant 2 mentioned feeling "Mostly just confusion [at injury onset]," and Participant 3 shared that "right after my injury, I went into a major state of shock." Dancers also questioned the recovery process or

their capacity to fully come back to dance; for example, Participant 6 stated, "I don't know – I started worrying a lot about the future and how I will dance in adulthood."

Dancers also expressed uncertainty about their dance career decisions and/or the effect that the injury would have on future success as a dancer. Participant 1 demonstrated confusion in both not knowing if they could recover and what it would mean for their career:

> My thoughts on dancing at that point were along the lines of 'my heart's not in it right now,' and 'I don't know if I'm going to have it in me to fully come back from this surgery,' because I knew it would take a lot of work and a lot of me caring about dance enough to come back from it, which is funny because I also don't really know what else I would do with my life.

Loss

Dancers experienced significant loss during their injuries, which, for many, were related to their temporary loss of independence due to their injury and loss of their identity as dancers. For example, Participant 1 stated:

> There were probably three weeks of me needing help to do anything, and I'm [usually] super independent . . . it was crazy, humiliating, and painful too . . . And literally not being able to do anything by myself was kind of crushing for me because I don't like having to rely on people.

Participant 4 stated:

> I didn't know what my identity was. Like what was I supposed to be doing, and who am I if I can't [be] a dancer . . . not coming from a place of survival, but coming from a place of 'what is my self-worth? What is my identity?'

Coming to Terms

Despite their reported uncertainty, dancers also later expressed coming to terms with aspects of the injury. This process took some time, and many recalled the point at which they finally accepted the severity of the injury. For example, Participant 3 stated, "Eventually, I was able to get to a place where I knew that this was happening for a reason." Participant 7 acknowledged that dancing would never be the same and ultimately found a new level of acceptance in simple movements; this dancer ultimately shared a more philosophical viewpoint related to the experience:

> [Dance] is an amazing blend of things that really becomes a part of who you are. To see that start to get taken away, in a way, it's almost like having a preliminary view of what it's going to be like to get really old and eventually die.

For some dancers, coming to terms included feeling confident in the recovery process or a sense of gratitude. Participant 4 shared their inner dialogue, which included saying, "Keep doing what you're used to doing – your body's going to bounce back." Relatedly, Participant 5 stated, "I had moments of hope and 'I can still do this.'" Another expressed "a lot of gratitude for my body that was healing" (P7).

Growth

Growth was common as part of the recovery journey, whether in terms of learning and discovering something new or developing an increased awareness. A few dancers mentioned having naturally high body awareness prior to the injury, which enabled them to develop new awareness of their injury. Others mentioned discovering the importance of taking time to heal fully before returning to dance to avoid relapse. Further, dancers expressed learning lessons, gaining a new perspective on their capabilities, or a new outlook on dance in general. Participant 2 stated, "I'm learning about my body, and every time I come back from an injury, I come back stronger." Another dancer shared, "I didn't realize that that small imbalance in my ankle again was a chain reaction to the rest of my body. I think the injury is really what started my interest in really paying attention to the body" (P3). Participant 7 stated, "In a way [being taken out of dance] is almost a good learning experience even though it's harder than hell – what a weird epiphany to actually be able to get fixed and start to work harder."

Coping through Redirection of Energy

Dancers reported several behavioral coping mechanisms through redirection of energy; some were primarily adaptive, and in some cases, others were maladaptive redirections of energy. All dancers channeled energy into staying involved in dance in some way and/or engaging in alternative physical activity. One dancer discussed, "Showing up when I can even if it means I'm sitting on the side, and I can still be the rehearsal director or edit the dance or be involved in other ways" (P2), and Participant 8 stated, "I turned to yoga a lot instead of dance because it was a lot of the jumping aspect of dance that I felt like I couldn't do."

More than half of the dancers also redirect energy toward quiet activity engagement, which included reading, journaling/writing, meditation, TV watching, sleeping more than usual, relaxation, and taking time for oneself. For example, Participant 5 reported:

> I did a lot of Netflix binging, which was still pretty cool because I did not have a lot of time to relax [pre-injury], so that did actually help to just sit and chill and do something I want to do without having anybody asking me for stuff.

Four participants mentioned feeling motivated and directing energy into their recovery process and injury experiences. For example, Participant 3 reported feeling motivated to go to physical therapy and stated, "[I would say to myself]: 'I have to do this,' so I actually was able to shorten my healing time by a couple of weeks, which was super cool."

Some of the redirection of energy involved dancers engaging in compensatory behavior, which in some cases appeared to be maladaptive, including pushing oneself to come back to dance too soon or engaging in self-harm. These behaviors were either new or past behaviors that returned. Participant 7 stated that they would "knock a few beers back because you know – a little anesthesia goes a long way." Participant 4 shared:

> I think a big coping mechanism for me was to – since I couldn't control this [injury], I think my disordered eating really came out – like if I couldn't control this injury dance thing, I was going to control what I was eating.

Buffering Effects of Positive Social Support

Relationship buffers included dancers' reactions that surrounded topics of relying on, needing, or protecting other people in their lives during their injury experiences. All dancers described social support as a factor that strongly influenced their ability to cope with the injury. Moreover, they highlighted support and encouragement from friends, family, romantic partners, and dance colleagues. In addition, several participants felt trust in their medical professionals. Three dancers stated the importance of having support systems, including friends who have also gone through an injury experience. Participant 1 stated, "I think it's really important to have people who understand the way that your body works, and also the way that dance works – that are your support systems." Another shared feeling particularly supported by "friends who had been injured too. Because friends who haven't been injured, they just don't get it. It's nothing on them; it's just they haven't been there" (P2).

In addition to social support, relationship buffers also included protecting others. Interpersonal protections included having personal awareness of how one's own injury affected other people and/or an effort to avoid or minimize that effect. For example, Participant 5 stated, "I tried not to show any emotion," and Participant 1 said, "I didn't want to feel like a burden to them."

Discussion

The purpose of the present study was to explore modern dancers' post-injury psychological experiences. Ultimately, the researchers' goal was to develop a more comprehensive understanding of the injury experiences of modern dancers and assess the results in relation to past research on other types of sport athletes and ballet/contemporary dancers. In the present study, dancers' responses resulted in six themes related to overall injury and recovery experiences, some of which were similar to previous findings on sport athletes (e.g., Gervis et al., 2020; Hsu et al., 2017; Lee et al., 2020) and in some cases, ballet dancers (e.g., Bianco, 2001; Johnston & Carroll, 1998; Macchi & Crossman, 1996; Tracey, 2003), while others were unique to the modern dancers in the current study.

Comparison of Current Findings with Theoretical Models of Injury

Previous researchers have taken different approaches as far as the structure of the interviews; several injury researchers have followed or found a phased approach to recovery, specifically assessing athletes' responses during each stage of recovery: initial injury, recovery, and return to sport stages (e.g., Clement et al., 2015; Prentice & Arnheim, 2011). The researchers of the present study, however, did not find that participants' psychological experiences were aligned with the three sport injury stages. Rather, the dancers in the present study shared their memories overall from injury onset through recovery and did not naturally delineate between different stages of their recovery. The fact that dancers did not mentally characterize their reactions and experiences as falling within different phases/stages of recovery may indicate a difference between injured dancers and sport athletes due to the inherent structural differences between dance and sport. Specifically, the phases of athletic injury may be more concrete for sport athletes given that athletes who *return to sport* return to the same game or competition structure and activity (e.g., track and field throwers return to throwing, softball players return to batting). When dancers are seriously injured, they often do not return to the same performance or dance piece, so the *return to sport* stage may not be applicable or an accurate mental framework for dancers; they may return, but the dance pieces may be vastly different than those they completed prior to injury.

According to Wiese-Bjornstal et al.'s (1998) integrated model, personal and situational factors influence an athlete's cognitive appraisals, emotional responses, and behavioral outcomes of injury. Analysis of the present study resulted in six themes that fit within the integrated model and were organized into similar categories of cognitions (mental disruptions and eventual cognitive shifts), emotions (emotional upheaval and reactivity), and behaviors (coping through redirection of energy).

However, three additional themes could fit in the remaining categories of personal (challenges presented by physical pain) and situational factors (buffering effects of positive social support; stress-inducing external factors), albeit with different phrasing. Dancers reported some personal and situational factors that seemed to influence their reactions to injury (e.g., external disruptions such as financial concerns); however, not all such factors were the causes of cognitive, emotional, and behavioral reactions. More specifically, unlike Wiese-Bjornstal et al.'s (1998) model, dancers' different reactions did not have a clear delineation of cognitions leading to emotions leading to behaviors. Some of the dancers' reactions vacillated between two opposing responses (e.g., experiences included feeling a rotation of confidence or doubt that healing was possible). Commentary on thematic categories is detailed in the following sections.

Emotional Upheaval and Reactivity

Several of the emotional factors described in the present study have similarly been reported by sport athlete participants (e.g., Bianco, 2001; Gervis et al., 2020; Lee et al., 2020; Tracey, 2003), and in some cases, by dancers (e.g., Markula, 2015; Reel et al., 2018). Several negative mood states were threaded throughout athletes' and dancers' responses. For example, sport athletes reported a "fear of vulnerability" (Tracey, 2003) and a fear of reinjury (e.g., Bianco, 2001; Hsu et al., 2017; Lee et al., 2020), which was reported by dancers in the present study. Notably, emotional reactions were not always tied to a specific cognition or thought process. At times, when prompting for emotional reactions, some participants merely labeled an emotion without connecting that emotion to a particular cognition or resulting behavior, such as a general sense of sadness or grief. Perhaps these emotions were shared in that way due to the prompting, or perhaps given the expressive nature of dance in contrast to other types of sports, emotions may be experienced without a clear prompting from thoughts or situations.

Due to the prevalence of reportedly negative mood states, including grief, it is worth noting that models of grief have been developed and discussed in relation to injured athletes. For example, Kübler-Ross (1969) theorized a model on five stages of grieving, including denial, anger, bargaining, depression, and acceptance. The model was initially theorized in terms of the grieving process associated with death and dying; however, since then, it has also been conceptualized in terms of grieving the athletic injury experience (e.g., Van der Poel & Nel, 2011). Similarly, Tunick et al. (1996) developed a model influenced by Kübler-Ross (1969), focusing more specifically on injured and disabled athletes. The five stages in Tunick et al.'s (1996) grief response model include shock, realization, mourning, acknowledgment, and coping. Despite the order of the stages in both models, individuals may experience the stages in different orders or, perhaps, only experience some of the five stages (Kübler-Ross, 1969; Tunick et al., 1996). In the present study, the dancers reported several responses that related to the stages of grieving from both models, including shock, anger, acceptance, sadness/grief, acceptance of severity, and various behavioral responses and redirections of energy (i.e., related to coping). Moreover, the dancers in the present study expressed emotional reactions and other injury responses that aligned in part with both grief response models and some contrasting emotional reactions (e.g., gratitude). Thus, neither model tells the whole story of the dancers' post-injury experiences. Based on the researcher's findings, facing the adversity of an injury leads to highly complex emotional responses in modern dancers, which do not follow one consistent linear pattern.

Within the present study, all dancers reported receiving professional medical services (e.g., medical doctor visits, physical therapy, etc.) for their injuries. Despite emotional factors consisting primarily of negative mood states, participants did not, however, seek out emotional services from professional providers. Interestingly, several participants mentioned that they wished they had sought out or received such services. There was not a clear reason as to why participants did not seek such support; it could be that they were unaware that mental health counselors or CMPCs could be a useful avenue of support for dancers who are recovering from injury. Further, perhaps participants felt as though the emotional support offered by friends and family was sufficient, the social culture or stigma in the dance world may have discouraged seeking out support, or possibly financial resources were limiting factors (Krasnow et al., 1994). According to Pollitt and Hutt (2021), up to 60% of dancers who have experienced injury throughout their dance careers meet the criteria to be referred to a clinical psychologist. Further, given the fear and anxiety reported relating to surgery, practitioners could refer injured clients to perioperative hypnosis, given its efficacy on reducing pre and post-operative anxiety and pain (e.g., Langlois et al., 2022; Pestana-Santos, 2021; Prabowo, 2021). In the present study, the findings regarding modern dancers' emotional reactions and lack of professional emotional support can be a call to CMPCs to include outreach to this population of dancers.

Stress-Inducing External Factors

One unique characteristic of the present study was the timing of the interviews in relation to the COVID-19 pandemic. Three of the four participants who suffered an injury during the pandemic reported notable differences in experiences compared to those who were injured prior to the pandemic. Due to COVID-19 being the first global pandemic since sport psychology literature has developed, pandemic influences are not present in prior athletic injury-related research findings (i.e., studies that took place prior to the start of COVID-19). COVID-19 has reportedly affected collegiate athletes' emotional responses to athletic career transitions (Barcza-Renner et al., 2022). The effects of COVID-19 on participants in the present study thus parallel and support Barcza-Renner et al.'s (2022) findings. One dancer in the present study reported feeling blessed by the timing of the pandemic with their injury, and another stated that the pandemic negatively affected access to certain injury treatments. Moreover, the influences of COVID-19 affected the dancers in unique ways. Further, given dancers' inherent lack of control over certain medical support factors, the commonly reported delayed diagnosis experiences were categorized within stress-inducing external factors. Delayed diagnosis experiences were similarly reported by Tracey (2003) in their study on sport athletes. It appears that factors that disrupt events, such as a global pandemic or a delayed diagnosis, can influence reactions to injuries, and thus, CMPCs may want to include questions about any disruptions or delays when helping a client through injury.

Challenges Presented by Physical Pain

Pain experiences during injury reportedly had psychological effects on some dancers in the present study. Because of the subjectivity of pain with athletic injury due to the physical and psychological factors involved (Minev et al., 2017), pain has different effects on each individual. Anderson and Hanrahan (2008) discussed how dancers are often pushed to major physical limits and may not notice pain intensifying due to the typical experience of feeling pain as a dancer. Similarly, a few of the dancers in the present study reportedly had naturally high pain tolerances and, in some cases, conditioned themselves to expect pain during their injury experiences. On the other hand, other dancers reported feeling pain to the point of debilitation and the worst pain of their lives due to their injuries. Perhaps the heightened body awareness that dancers reported across some primary themes is related to the reports that pain was such a central component to their injury experiences. Because it was not specifically assessed, it was not clear whether the dancers' pain reached the level of pain catastrophizing that has been found in previous athletic and dance studies (e.g., Anderson & Hanrahan, 2008; Tripp et al., 2007). Overall, the inherent subjectivity of pain and individual differences in pain appraisals (e.g., Clement et al., 2015; Minev et al., 2017) likely influenced the dancers' pain experiences.

Mental Disruptions and Eventual Cognitive Shifts

Dancers shared several cognitive experiences, such as loss. One perception of loss reported in the current study parallels findings from previous studies. Tracey (2003) discussed loss of independence as well as loss of identity as a response to athletic injury within a sample of sport athletes. The current study's theme of uncertainty aligned with a previous qualitative study in which researchers reported that dancers with eating disorders felt uncertainty about future dance involvement (Reel et al., 2018). According to Mehling et al. (2011), it appears that dancers often minimize signs of injury, which may relate to uncertainty at injury onset. Similarly, downplaying the seriousness of injury was reported by Tracey (2003), which appears to reflect dancers' doubt in the recovery process. In sum, the modern dancers in the present study reported similar cognitive experiences to those of sport athletes and dancers in prior studies, reinforcing the notion that injuries can influence loss, particularly in one's self-identity (e.g., Air, 2013; Reel et al., 2018) and loss of independence, as well as uncertainty in many aspects related to injury (Reel et al., 2018).

Despite the doubt in recovery process and questioning both career identity and self-identity as a dancer, most dancers in the present study expressed coming to terms with their injuries and growth as a result of their injury experiences. Relatedly, Macchi and Crossman (1996) found that injured professional ballet dancers ultimately transitioned from fear, depression, and anger to higher levels of optimism and excitement as recovery progressed. The dancers in the present study, in contrast, did not express such linear recovery paths, as some dancers simultaneously experienced grief and growth. Moreover, the dancers' experiences were multifaceted and layered with complex cognitive, emotional, behavioral, and physiological responses.

Several dancers in the present study shared specific lessons they learned from the injury and recovery process, which relates to previous findings on sport athletes who reported personal discovery and learning (e.g., to not take things for granted) as a result of injury (e.g., Tracey, 2003). Broadly, stress-related growth has

been described as physical or psychological growth after facing a trauma or stressful event (Tedeschi & Calhoun, 2004). Stress-related growth has recently gained further acknowledgment within athletic injury research (e.g., Kampman et al., 2015; Roy-Davis et al., 2017; Wadey et al., 2011). Research on stress-related growth in terms of dance injuries, on the other hand, is limited. The findings of the present study indicate that dancers and sport athletes may have similar growth experiences when it comes to injury; however, the growth expressed by the dancers tended to relate more with body awareness, such as a peaked interest in studying human anatomy, in contrast with the personal, professional, and psychological growth indicated in sport athletes' experiences (e.g., Tracey, 2003). It could be that modern dancers perceive body awareness as more of a focus within their performance, so they specifically recalled the new information about their body awareness during their injury experiences. Further research is needed in order to more thoroughly assess dancers' growth after injury.

Coping Through Redirection of Energy

Dancers' behavioral responses to injury, which took the form of various redirections of energy, share both similarities and differences with sport athletes and dancers in previous studies. Specifically, despite some levels of deterred motivation in dancers in the present study, all dancers reported an adaptive coping behavior of adhering to physical therapy, which contrasts Clement et al.'s (2013) reporting that sport athletes varied from high to low rehabilitation adherence. Another adaptive behavioral response was seeking social support, which has commonly been found among others (e.g., Goddard et al., 2021; Mitchell et al., 2014). Further, some dancers' compensatory coping behaviors, such as disordered eating and alcohol consumption, were seemingly more maladaptive in nature, which appear to be consistent with Reel et al.'s (2018) findings on professional dancers who restricted caloric intake as a response to injury. Overall, modern dancers reported similar behavioral responses to injured athletes and other dancers; however, the purpose of the behaviors for the current sample of dancers seemed to emphasize a redirection of the pent-up energy that accumulated due to not being able to dance.

Buffering Effects of Positive Social Support

Within the present study, the influence of relationship buffers on the overall injury experience supported previous research findings (e.g., Goddard et al., 2021; Tracey, 2003). All dancers in the present study reported interpersonal trust/support, with a focus on social support from family, friends, romantic partners, and dance colleagues. A common report both in the present study and in previous studies was feeling gratitude for others' support (Bianco, 2001; Tracey, 2003). Several researchers have discussed social support in terms of athletic injury coping (e.g., Goddard et al., 2021; Mitchell et al., 2014). On the other hand, dancers also noted interpersonal protection, which included reports of feeling concerned about sharing the details of the injury with others. Tracey (2003) similarly reported that sport athlete participants stated feeling concerned about coaches' responses to the news of an injury diagnosis, in fear of losing playing time or losing a spot on a team. In contrast, in the present study, the concerns around sharing details about one's injury were reported as an effort to avoid burdening or inconveniencing others rather than a worry about being replaced. For the most part, the dancers in the present study described having trusting relationships with dance colleagues and choreographers. They perhaps were less fearful of losing a spot in companies and dance engagements due to the strong foundation in relationships.

Strengths and Limitations

Due to the qualitative study design with a small sample size, there were similarities and differences among participants; participants differed in age, type and severity of injury, and need for surgery, yet 87.5% and 75% of participants identified as female and White, respectively. For further understanding of injury experiences of modern dancers, future research would benefit from targeting a sample with more diversity in social, cultural, and gender identities. Further, the impact of COVID-19 affected 50% of participants, and thus, the injury experiences of those dancers were inherently different than those whose injuries took place prior to COVID-19. Nevertheless, given the structure and design of the study, there were strengths in addition to the limitations. One strength was the inclusion of modern dancers at different training levels (e.g., college, community, professional), as previous dance injury research tended to focus primarily on professional-level dancers. Additionally, the open-ended interview structure allowed dancers to openly share comprehensive accounts of their injury experiences, and using Zoom as the platform for the interviews offered an opportunity for the principal researcher to observe body language and ensure the dancers were understanding the context of each question.

Future researchers investigating modern dancers' injury experiences may consider studying a sample including a more diverse and underrepresented

population of dancers, as well as differences between dancers with chronic injuries versus acute injuries. Future researchers may also benefit from investigating differences in pain perception and expectations, experiences, and tolerance of pain depending on dance training level. Finally, researchers may consider further investigation on stress-related growth following an injury. Practitioners may benefit from facilitating a more transformative healing process when working with injured athletes and dancers, focusing on growth as a result of the injury experience (Wadey et al., 2019). If practitioners focus on growth following an injury, there may be the potential for an enhancement in dancers' levels of understanding and awareness, acceptance, less hesitation in seeking social support, and perhaps successful return-to-dance experiences.

Conclusion

As one of the first studies to qualitatively explore modern dancers' post-injury psychological experiences, the present investigation helped provide a framework for future modern dance research. While the Wiese-Bjornstal et al. (1998) integrated model was a helpful guiding framework for the present study, the dancers' responses did not directly fit the pattern of personal and situational factors influencing cognitive appraisals, emotional responses, and behavioral outcomes following an injury. Similarly, some of the dancers' injury responses aligned with Tunick et al. (1996) and Kübler-Ross's (1969) grief response models, yet neither model tells the full story of the dancers' experiences. Further, in contrast with Clement et al.'s (2015) findings, the dancers did not have clearly delineated phases of recovery. Themes included emotional upheaval and reactivity, stress-inducing external factors, challenges presented by physical pain, mental disruptions and eventual cognitive shifts, coping through redirection of energy, and buffering effects of positive social support. Overall, there were both similarities in findings between the dancers in the present study and sport athletes in previous studies (e.g., fear, anxiety) and differences (e.g., the nature of the interpersonal protections).

Injuries are complex events that not only influence the physical body but also initiate profound psychological experiences. The present study provides a starting point for research on the unique experiences of modern dancers. The results can help inform suggestions that practitioners can consider supporting injured dancers more effectively, such as providing resources for professional mental health services and encouraging transformative healing processes.

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JOURNAL FOR ADVANCING SPORT PSYCHOLOGY IN RESEARCH
2023 Vol. 3, Issue 2, 19–32, https://doi.org/10.55743/000021

The Effect of Ironman Taper on Mood and Engagement of Nonprofessional Triathletes: An Interrupted Time Series Study

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An Ironman triathlon, which consists of swimming 2.4 miles, biking 112 miles, and running 26.2 miles, requires extensive training with planned recovery to prevent overtraining. Prior to a race, athletes commonly take a period of time for reduced training, known as a taper. Although much is known about the physical benefits of a taper, little is known about the psychological changes that occur in athletes during taper. This study assessed the mood and athletic engagement (AE) of triathletes during Ironman training, tapering, and post-race, with specific attention paid to these variables during taper. Nineteen participants, who were training for one of three selected late-season Ironman races, were recruited for the study. Data were analyzed for eight participants (five males and three females, M_{age} = 46 ± 12 years) who provided data for all time points: training, taper, and post-race. Mood subscales of the Brunel Mood Scale (Terry et al., 1999) and an overall mood scale, as well as the Athlete Engagement Questionnaire (Lonsdale et al., 2007), assessed weekly mood and engagement, respectively. Data were analyzed using time series regression analysis. Results showed no overall trends in change of mood and engagement across the three time points. However, there were significant changes in several variables on an individual level during the taper and post-race period. These individual changes demonstrate that psychological reaction to taper is a personal experience, and factors such as goal orientation, goal satisfaction, social support, competence, and coping strategies can impact the training, tapering, and post-race experience.

Keywords: triathlon, motivation, BRUMS, AEQ, self-determination

For endurance athletes to meet the physical demands of competing and training for an event, as well as prevent overtraining, proper rest and recovery must be strategically incorporated into a training cycle (Mølmen et al., 2019). One period of rest, called a taper, occurs days or weeks prior to an event. Taper refers to a reduction in training load prior to an endurance event, designed to allow the body to rest and recover in order to minimize accumulated fatigue and maximize performance (Grivas, 2018). Tapering can improve a variety of physiological parameters, such as increased red blood cell count, improved VO2, increased single muscle fiber size, and enhanced endurance performance (Bosquet et al., 2007; Mujika et al., 2004; Zehsaz et al., 2011).

RECEIVED: September 27, 2022

ACCEPTED: October 16, 2023

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In addition to physiological adaptations, training load and tapering have been found to impact athletes' psychological state (Mujika et al., 2004). Several studies have analyzed mood fluctuations during training and tapering, although this measure is rarely the sole focus of the study (e.g., Myers et al., 2017; Zehsaz et al., 2011). Moods are transient, fluctuating affective states that reflect how an individual feels, in general, at a particular moment in time (McNair et al., 1992). Moods differ from emotions in that they tend to be less intense and are not elicited by a particular stimulus or event (Hutchinson & Jones, 2020).

Mood profile clusters have been examined in the sport and exercise domains, and the typical profile reported among athletes combines high vigor with low tension, depression, anger, fatigue, and confusion scores (Morgan, 1980; Terry, 1995). Conversely, below-average scores for vigor and above-average scores for tension, depression, anger, fatigue, and confusion represent total mood disturbance (TMD), and this profile is associated with overtraining and decreased athletic performance

(Terry, 1995). To assess mood in relation to training load, Terry et al. (2007) surveyed athletes from the sports of basketball, golf, hockey, and rowing. Average scores for depression, anger, and fatigue increased as the training load of the athletes increased across all sports. In an endurance setting, the taper period has been associated with a decrease in TMD among cyclists (Zehsaz et al., 2011), rowers (Raglin et al., 1990), swimmers (Raglin et al., 1996), and triathletes (Boucher et al., 2021; Margaritis et al., 2003). However, these research studies were conducted with athletes who were tapering for shorter events, such as a mile swim or 40K time trial. Little to no research has been conducted on athletes who are training for endurance events of much longer duration, such as an Ironman triathlon.

An Ironman triathlon consists of 2.4 miles of swimming, 112 miles of cycling, and 26.2 miles of running, completed consecutively. Training load for an event such as this can vary in regard to time and intensity but typically spans 6 to 12 months of training, with anywhere from 10-20 hours per week, most of which is spent in Zone 1 (i.e., lower-intensity, below aerobic threshold (Lacke, 2022; Muñoz et al., 2014). Participating in such rigorous training can lead to burnout (Gustafsson et al., 2011; Main et al., 2010), which is a psychological syndrome characterized by physical and emotional exhaustion, a reduced sense of accomplishment, and sport devaluation by the athlete (Raedeke, 1997). Athletic engagement (AE) might be an important factor in preventing the development of burnout; indeed, AE has been proposed as the conceptual opposite of burnout (Schaufeli et al., 2002). Although some authors challenge this as an oversimplification (DeFreese & Smith, 2013), there is an inverse relationship between the two constructs (De Francisco et al., 2017; Graña et al., 2021).

Athletic engagement is a state of generalized positive cognitions and affect about one's sport (Curran et al., 2015) that is characterized by the following four dimensions: confidence (i.e., a belief in one's ability to accomplish things in sport), enthusiasm (i.e., feelings of excitement and enjoyment in sport), dedication (i.e., the desire to invest effort and time toward personally meaningful goals in sport), and vigor (i.e., physical, mental, and emotional energy or liveliness; Lonsdale et al., 2007). Collectively, these dimensions create a fulfilling and positive experience that contributes to continued sports participation (Curran et al., 2015) and optimal performance (Swann et al., 2017). To the best of the authors' knowledge, the concept of AE has not been studied in relation to training load and taper in endurance sports.

Nonprofessional, recreational triathletes (i.e., those who do not meet qualifications set forth by USA Triathlon and do not compete for monetary prize winnings; USA Triathlon, n.d.) do not typically have external motivators such as monetary earnings for which to strive in their training and racing, and therefore rely more heavily on intrinsic motivation to propel their training and racing (Boucher et al., 2021; Liddell, 2013). One theory that focuses extensively on intrinsic motivation is Self-Determination Theory (SDT; Deci & Ryan, 1985). SDT is a macro theory of human behavior that provides a theoretical framework for the study of human motivation. According to this theory, the quality of motivation (i.e., whether intrinsic or extrinsic) is critical to both satisfaction and sustained success in achieving one's goals. A mini theory of SDT, Basic Psychological Needs Theory, outlines three essential needs that must be met in order for humans to thrive: autonomy, competence, and relatedness (Standage & Ryan, 2020). It has been hypothesized that the satisfaction of basic psychological needs may represent a likely motivational precursor for AE (Lonsdale et al., 2007). For example, in a sample of 201 elite athletes, basic needs satisfaction (particularly competence and autonomy) was found to predict AE, with 30% explained variance (Lonsdale et al., 2007). SDT aims to explain intrinsic motivation through mechanisms such as goal content, goal satisfaction, social support, and coping strategies. These mechanisms also help to explain individual differences in motivation towards exercise and sport and how individuals approach and manage emotions regarding exercise and sport (Teixeira et al., 2012).

The Present Study

The physiological effects of Ironman training and tapering have been well studied, yet little is known about how these processes affect the mood and engagement of triathletes. This study aimed to explore changes in the mood states and athletic engagement of amateur, nonprofessional triathletes across different time points in the training cycle (i.e., training, taper, and post-race) for an Ironman event. Based upon prior research, we hypothesized that self-reported measures of fatigue, tension, depression, anger, and confusion would decrease during taper and measures of vigor would increase. Overall, positive mood and the four dimensions of AE (i.e., confidence, enthusiasm, dedication, and vigor) were expected to increase during the taper period compared to during training. Finally, despite a lack of research on the relationship between the two, we hypothesized that AE and overall mood would be positively correlated; that is, athletes who experienced high engagement

would report better overall mood during the taper period. Conversely, an inverse relationship was expected between AE and TMD.

Method

Design

This study used an Interrupted Time Series (ITS) design. An ITS design is a powerful approach for examining dynamic changes in longitudinal data and is frequently used in clinical and public health research (e.g., Dennis et al., 2013; Stallings-Smith et al., 2013). In an ITS design, data are collected at multiple and equally spaced intervals over time. The time series data is then divided into segments by one or more 'interruptions' or change points. Change points are "specific points in time where the values of the time series may exhibit a change from the previously established pattern because of an identifiable interruption, such as a real-world event, policy change, or an experimental intervention" (Wagner et al., 2002, p. 299). In the present study, the interruptions refer to changes in the participant's training cycle (i.e., from training to taper and from taper to post-race).

Participants

Following institutional IRB approval, participants were recruited via email from local and national triathlon clubs and specific Ironman interest groups on social media in late June 2019. To be eligible to participate, all athletes needed to be racing as a nonprofessional, at least 18 years of age, and training for and planning to race in one of three late-season Ironman races: Ironman Louisville (October 2019), Ironman Florida (November 2019) or Ironman Arizona (November 2019). In order to provide for as many months of data collection as possible prior to race season, recruitment began in June, and the majority of participants began data collection in mid-July 2019. Data collection concluded two weeks after every race. Nineteen triathletes (eight females and 11 males) initially volunteered to participate in the study. All participants provided written informed consent prior to beginning the study. Of the initial 19 participants, eight participants (five females and three males) completed the questionnaire every week throughout the duration of the study and were retained for analysis. Those participants who either did not complete the study or missed multiple weeks of data collection were, therefore, omitted from the analysis. These participants did not provide specific reasons for attrition; however, two stopped answering the weekly questionnaires immediately following illness or injury.

Due to the difference in training and racing schedules, the exact number of time points for each participant varied despite their completion of questionnaires every week. For example, some participants reported competing in races of shorter distances during the preparation period for Ironman, with some periods of rest before and/or after these races. These periods did not fall under the operational definition of taper (i.e., the 14 days prior to the goal Ironman competition) and were considered to be part of the Ironman training process. For consistency, only the training, taper, and post-race data for the specified late-season Ironman were included in the analysis.

The average age of the eight participants was 46 ± 12 years. All participants were competing in nonprofessional, age-group divisions and were training for one of the three aforementioned late-season Ironman races. Six participants reported that this was their first Ironman event. Five participants had a coach, and two were self-trained. Descriptive data for the participants can be found in Table 1.

All measures were distributed electronically using Qualtrics. Prior to beginning the study, demographic information was collected using a survey. Demographic information such as marital, parental, and employment status were collected from participants using a questionnaire in order to describe the sample fully. Although we did not analyze these factors in regard to this study, it is acknowledged that they could also contribute to individual differences in mood and/or engagement fluctuations.

Participants' mood state was measured using the Brunel Mood Scale (BRUMS; Terry et al., 1999). The BRUMS is a 24-item inventory that uses a Likert scale ranging from 0 (not at all) to 4 (extremely) to assess levels of six subscales: tension, depression, anger, fatigue, confusion, and vigor. For the present study, participants responded to one-word statements that described how they felt at that exact moment. Words included relaxed, lively, and downhearted. Certain words align to specific subscales, and each subscale is scored by averaging the numeric rating for each answer. In order to calculate TMD, the negative subscales (tension, depression, anger, fatigue, and confusion) are subtracted from the positive subscale (vigor). Thus, a higher (or less negative) score represents less mood disturbance. The BRUMS was adapted from the Profile of Mood States (McNair et al., 1971) for use with non-clinical populations. The BRUMS has been validated with samples of adults, adolescents, and athletes in multiple languages and has been shown to have good internal consistency (Brandt et al., 2016;

Table 1. Participant Demographics

2019 Age Group	Gender	Ethnicity	Marital Status	Parental Status	Current Employment Status	Annual household income	Use of Training Software	Work with a coach	Race goals	Completed Ironman Races
60-64	Female	White	Married	2 children age 18+	Full-time (40+ hours per week)	above $150,000	Yes	Yes	• To finish • To finish under the cutoff time	1-3
55-59	Male	White	Married	2 children age 18+	Retired	$50,000-$99,999	Yes	No	• To finish • To finish in/around a specific time	0
25-29	Male	White	Single	No	Full-time (40+ hours per week)	$50,000-$99,999	No	No	• To finish • To finish in/around a specific time	0
45-49	Male	Hispanic or Latino	Single	2 children age 18+	Self-employed	$10,000-$49,999	Yes	Yes	• To finish	0
50-54	Female	Hispanic or Latino	Married	No	Full-time (40+ hours per week)	$50,000-$99,999	Yes	Yes	• To finish	0
45-49	Female	White	Married	No	Full-time (40+ hours per week)	$50,000-$99,999	Yes	Yes	• To finish in/around a specific time	0
45-49	Female	White	Married	2 children age 18+	Other	above $150,000	Yes	Yes	• To finish	0
25-29	Female	White	Married	No	Full-time (40+ hours per week)	$50,000-$99,999	Yes	No	• To finish in/around a specific time • To get a PR	0

Lan et al., 2012; Terry et al., 1999; Terry et al., 2003) and be sensitive to changes in training load (Anglem et al., 2008). In the present study, Cronbach's alpha levels of .72 to .91 indicated satisfactory internal consistency for the BRUMS subscales and for the TMD score (.87).

Overall mood was assessed using a single item which asked participants to rate their overall mood for the past week on a scale of 0 (very unpleasant) to 10 (very pleasant). This additional mood measure was used to capture fluctuations in positive mood that would not be reflected in TMD scores. Single-item scales have been successfully used for global assessment of mood in a number of studies; Tenenbaum et al. (2007) provided a strong rationale for the applicability of single-item scales where they demonstrate high face validity.

AE was measured using the Athlete Engagement Questionnaire (AEQ; Lonsdale et al., 2007). The AEQ assesses four subscales: confidence, dedication, vigor, and enthusiasm. Statements include "I feel capable of success in my sport" (confidence), "I want to work hard to achieve my goals in my sport" (dedication), "I feel really alive when I participate in my sport" (vigor) and "I feel excited about my sport" (enthusiasm). Participants are asked to rate their level of agreement with each statement on a scale of 0 (not at all) to 4 (extremely) based on how they feel about their current participation in sport. Each of the subscales has four items that align with it, and scores for each item are averaged to calculate a score for each subscale (range = 0-16). A global AE score is calculated by averaging scores across the four subscales. Factorial validity of the subscales is strong, ranging from .71 to .91 (De Francisco et al., 2017; Lonsdale et al., 2007; Martins et al., 2014). In the present study, Cronbach's alpha levels of .93 to .97 indicated satisfactory internal consistency for the AEQ subscales and for the global score (.95).

In order to quantify physical demands at the time that the questionnaire was distributed, participants also reported their weekly training load and competitions. When the athletes self-reported that they were tapering (about two weeks prior to their race), an additional question was added regarding their goal(s) for the race (e.g., to finish, to finish in a specific time, to qualify for Kona).

Procedures

Training for an Ironman typically requires many months of training and preparation; therefore, data collection spanned five to six months, which included the training period leading up to the race, the taper period, and several weeks following the event in order to capture any post-race fluctuations in mood and AE. To avoid a possible threat of reactivity, participants were informed that the research goal was to study mood fluctuations over the course of a training cycle, and information about the importance of the taper period was not revealed.

Participants were asked to complete the BRUMS, AEQ, and a measure of overall mood once per week for the duration of the study. A reminder email with the Qualtrics link was sent to participants each week. Participants were asked to complete the questionnaires on the same day of the week, at approximately the same time of day, given that mood can fluctuate throughout the course of a day due to factors such as circadian rhythm and caloric intake (Triantafillou et al., 2019; Swami et al., 2022).

Statistical Analysis

The independent variable for this study was the time point in the athletes' training cycle (i.e., training, taper, and post-race), with a particular focus on the one to two weeks leading up to an Ironman race. The dependent variables were the separate scores of all the individual BRUMS subscales (tension, depression, anger, fatigue, vigor, and confusion) and AEQ subscales (confidence, dedication, vigor, and enthusiasm), as well as the overall mood score. Subscales and the overall mood scale were examined separately from one another, and individual scores were plotted for each week, within every time period (training, taper, and post-race) that the questionnaire was administered. Therefore, the analysis generated 11 different time series plots for each participant; however, only significant findings are included in the results of this study. Data for this study were analyzed using a segmented time series regression model with two change-points (Zhang et al., 2020) in the statistical software R (RStudio Team, 2019). In this approach, a general linear model is used to estimate the mean level of each dependent variable for a baseline period of observation and to estimate mean changes in the mean level following one or more interruptions in the time series.

The present study analyzed changes in each participant's mood and engagement scores during the taper period (relative to the training period) and the post-race period (relative to the training period). The presence of autocorrelation, that is, the autoregressive moving average (ARMA) order, was determined for each of the 88 time series analyzed (eight participants, 11 dependent variables) using autocorrelation function

(ACF) and partial autocorrelation function (PACF) plots in R. Each individual time series was analyzed based on the ARMA order reflected by these plots (Chatfield, 1996). For example, a time series with plots showing a gradually declining ACF and a significant PACF at a particular time lag would indicate an autoregressive (AR) order, whereas the reverse (i.e., gradually declining PACF, significant ACF) would indicate a moving average (MA) order. Time series with non-significant ACF and PACF would indicate no autocorrelation. Seasonality, which is the presence of cyclical patterns in the data (Chatfield, 1996), was not included in the analysis based on the timescale on which data were collected. Data were collected weekly for a several-month period, so the presence of weekly (if measuring more frequently, e.g., daily) or yearly cycles would not have been relevant in the current study. There may be changes in an individual's overall mood associated with changes in season (e.g., summer to fall), which is a potential limitation of the study. However, it is not a manifestation of seasonality as defined in the time series literature (Chatfield, 1996). Finally, bivariate correlations were used to explore the relationship between AEQ subscales, BRUMS subscales, TMD, global AE, and overall mood during the taper period.

Results

ACF and PACF plots showed no presence of autocorrelation for 81 out of 88 (92%) of the time series, so these data were analyzed without the inclusion of any ARMA parameters. Eight out of 88 (8%) time series reflected a first-order autoregressive (AR1) process as evidenced by a PACF significant at lag one but non-significant thereafter and a gradually declining ACF. These eight time series[1] were analyzed by including AR1 coefficients to control for autocorrelation. Time series regression models were run for each participant and each dependent variable to estimate mean changes across the entire training, tapering, and post-race cycle. Eight out of the 88 analyses resulted in perfect model fit resulting from scores that showed no variability across all observations (e.g., a persistent score of 0 for confusion). These eight analyses were discarded[2].

Time series regression analysis of the data collected from the eight participants revealed no overall trends in changes in engagement and mood throughout training, taper, and post-race. However, some participants individually experienced significant ($p < .05$) changes in areas of mood and engagement during taper and post-race as compared to training.

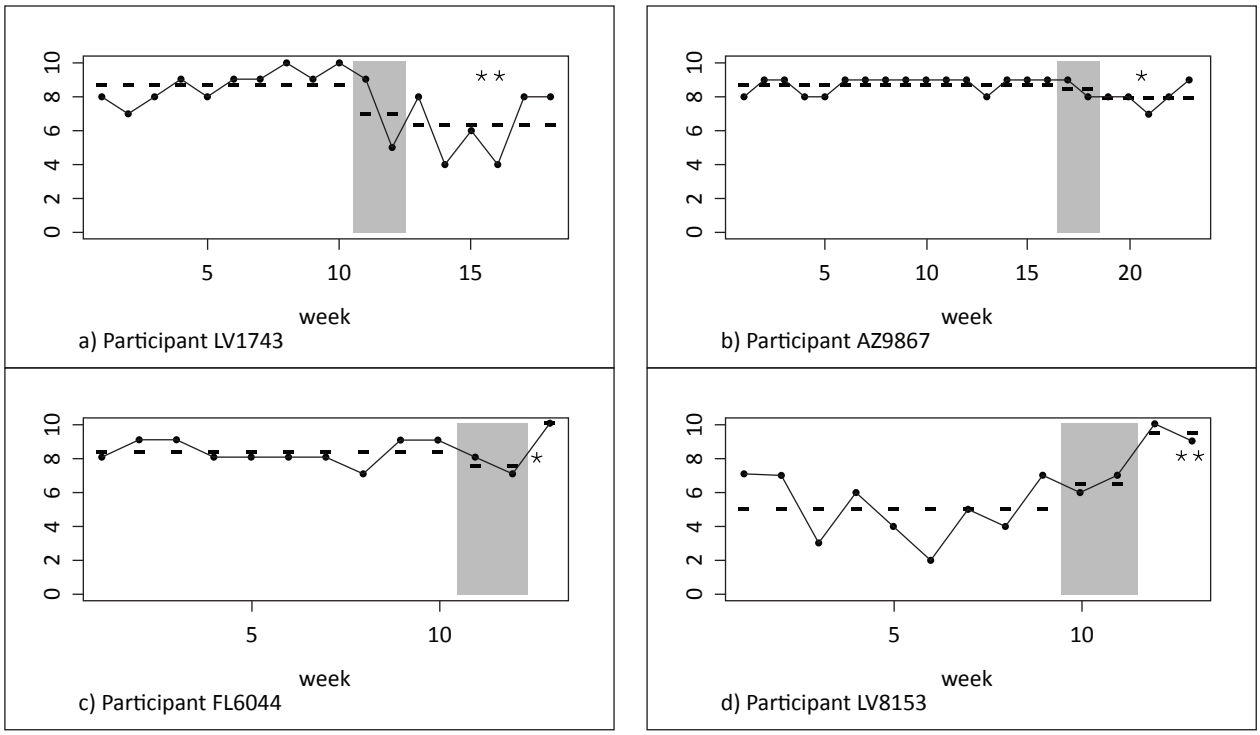
Relative to training, participant LV1743 showed a large post-race decline in overall mood (b = -2.37, 95% CI [-4.06, -.67], p = .009, see Figure 1a). Participant AZ9867 also showed a decrease in overall mood post-race (b = -.75, 95% CI [-1.31, -.19] p = .011, see Figure 1b). In contrast, participants FL6044 and LV8153 both showed an increase (i.e., improvement) in overall mood post-race (b = 1.70, 95% CI [.12, 3.28], p = .038, and b = 4.50, 95% CI [1.53, 7.47], p = .007, respectively. see Figure 1c and Figure 1d). There were no significant changes in overall mood during taper. When examining BRUMS subscale scores, LV1743 showed a decrease in fatigue post-race (b = -.78, 95% CI [-1.48, -.07], p = .033, see Figure 2a) as did LV8153 (b = -1.60, 95% CI [-2.7, -.50], p = .009, see Figure 2b) and AZ2014 (b = -.56, 95% CI [-1.07, -.05], p = .03, see Figure 2c). Participant LV2766 showed an increase in tension during taper, relative to the training period (b = 1.05, 95% CI [.38, 1.72], p = .005, see Figure 3a), whereas participant LV8153 showed a decrease in tension post-race (b = -2.06, 95% CI [-3.75, -.36], p = .022, see Figure 3b). Participant AZ2104 showed an increase in depression post-race (b = .36, 95% CI [.07, .65], p = .017, see Figure 4a). Participant AZ9867 also showed an increase in depression post-race (b = .20, 95% CI [.04, .36], p = .014, see Figure 4b), as well as an increase in confusion while tapering (b = .23, 95% CI [.06, .41], p = .012) and following the race (b = .13, 95% CI [.01, .26], p = .032, see Figure 5a). Participant AZ2014 showed an increase in confusion post-race (b = .20, 95% CI [.01, .40], p = .04, see Figure 5b). Participant LV1743 showed an increase in anger post-race (b = .84, 95% CI [.22, 1.46], p = .011, see Figure 6). Participant FL7943 showed a significant post-race increase in confidence (b = 1.41, 95% CI [.71, 2.10], p = .0005, see Figure 7).

Correlations among overall mood, TMD, and global AE and the means of each subscale of the BRUMS and AEQ were calculated for the taper period. The bivariate correlation between TMD and global AE (r = -.62) showed a strong but non-significant (p = .105) negative relationship. Overall, mood was significantly negatively correlated with TMD (r = -.72, p = .045) and positively correlated with global AE (r = .73, p = .040). A complete correlation matrix can be found in Table 2.

[1] AZ2104 dedication; AZ9876 enthusiasm, vigor; FL7943 confidence, confusion; LV1743 dedication; LV7332 tension

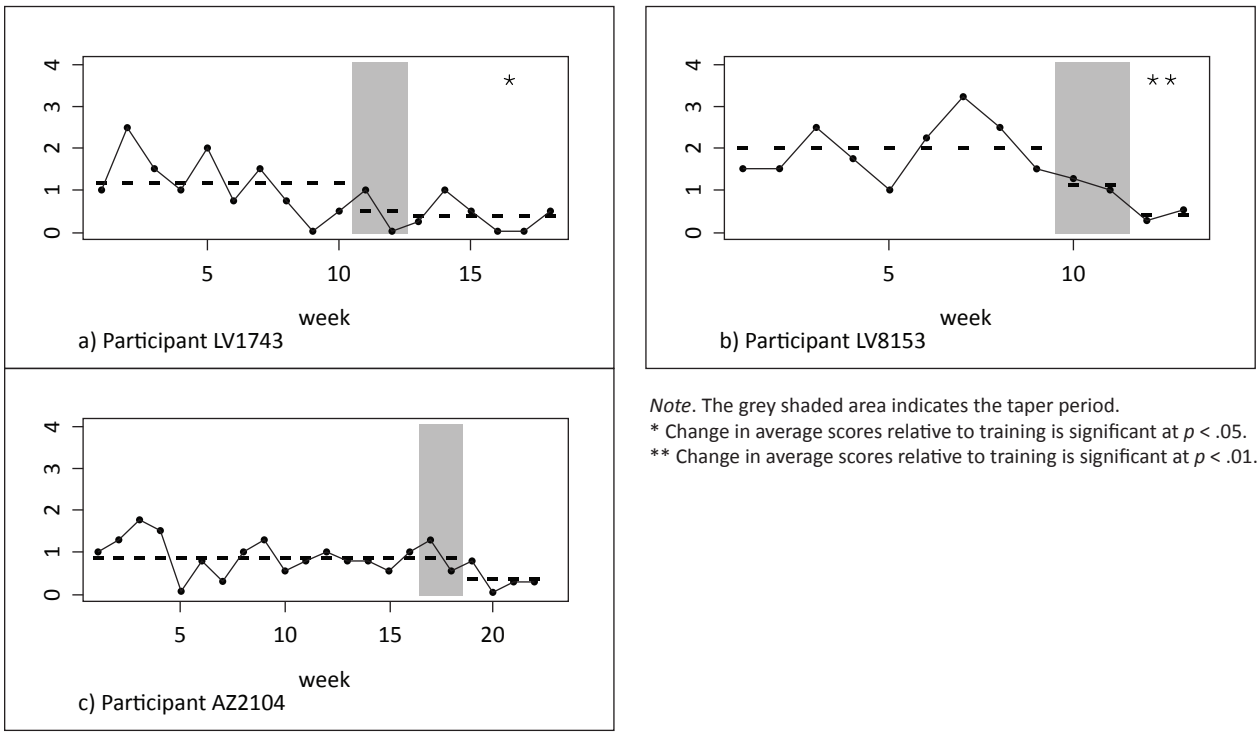
[2] AZ9867 anger, confidence; LV1743 confusion; LV7332 confusion, confidence, dedication, enthusiasm, vigor

Figure 1. Overall Mood



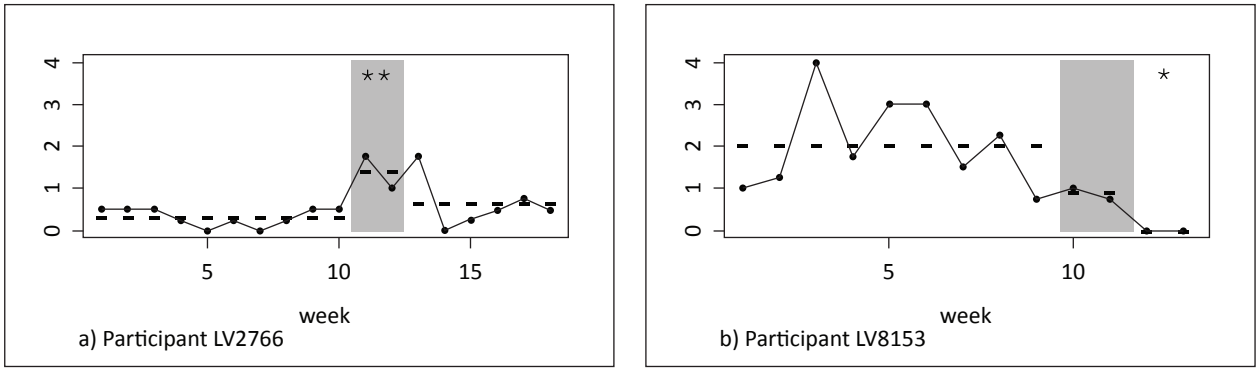
Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.
** Change in average scores relative to training is significant at $p < .01$.

Figure 2. Fatigue



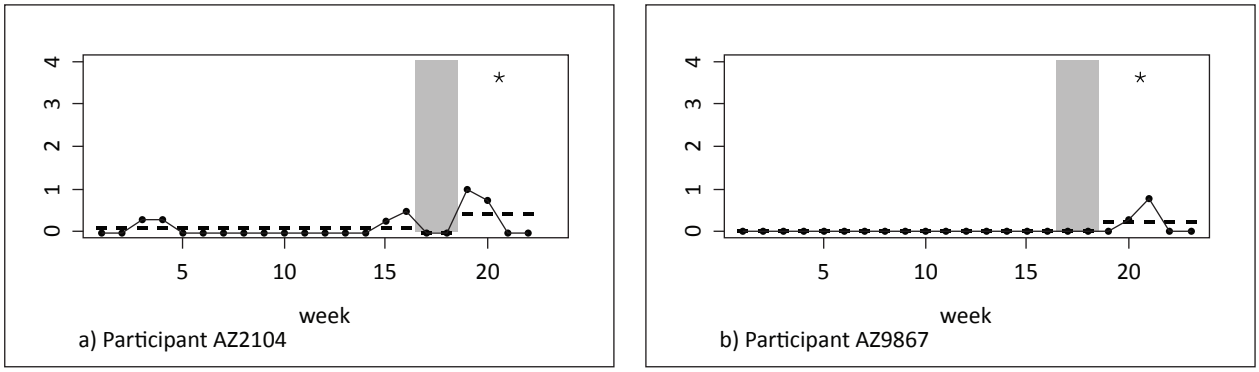
Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.
** Change in average scores relative to training is significant at $p < .01$.

Figure 3. Tension



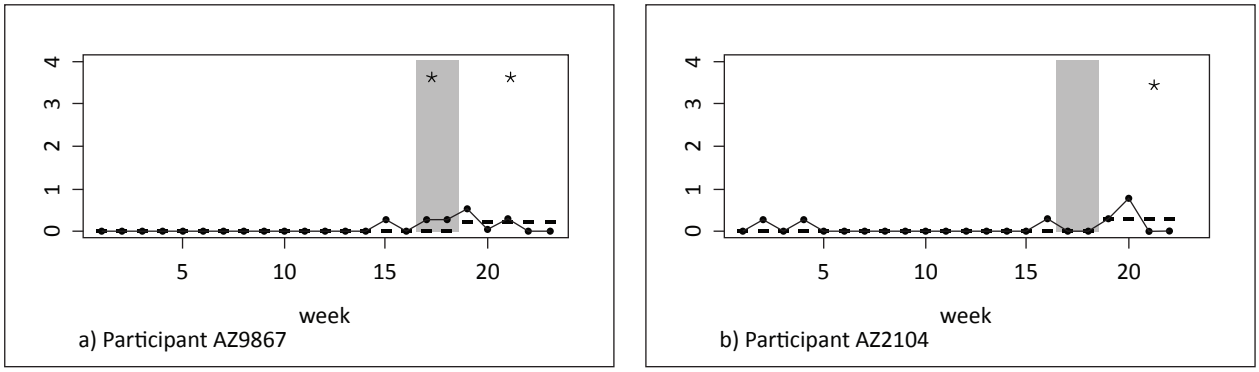
Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.
** Change in average scores relative to training is significant at $p < .01$.

Figure 4. Depression



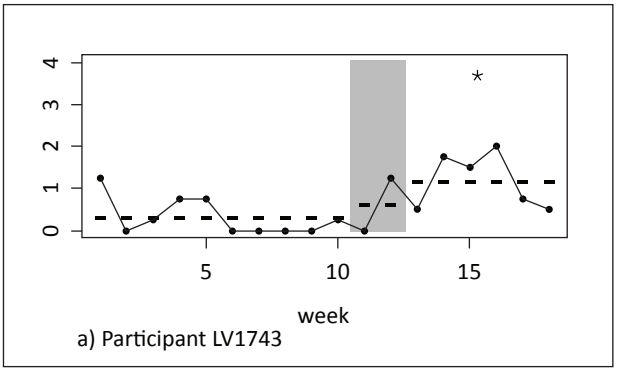
Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.

Figure 5. Confusion



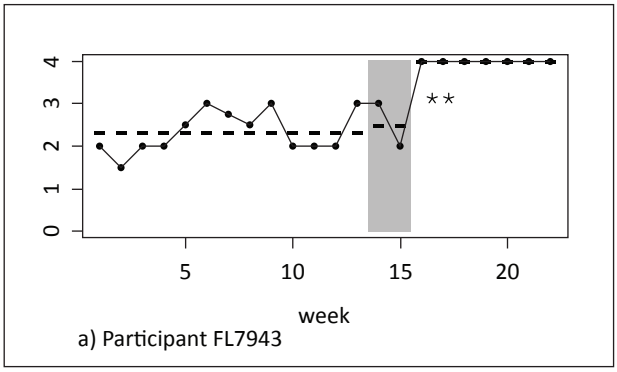
Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.

Figure 6. Anger



Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.

Figure 7. Confidence



Note. The grey shaded area indicates the taper period.
* Change in average scores relative to training is significant at $p < .05$.
** Change in average scores relative to training is significant at $p < .01$.

Table 2. Correlation between scales and subscales

	1	2	3	4	5	6	7	8	9	10	11	12
1. Vigor†												
2. Anger†	-.49											
3. Depression†	-.65	.43										
4. Tension†	-.58	-.25	.20									
5. Fatigue†	.02	-.65	.09	.57								
6. Confusion†	-.82*	.33	.77*	.61	.11							
7. Confidence‡	.19	-.37	-.60	-.10	.08	-.63						
8. Dedication‡	.36	-.45	-.22	-.02	.60	-.36	.46					
9. Vigor‡	.71	-.23	-.47	-.50	.12	-.78*	.45	.77*				
10. Enthusiasm‡	.73*	-.26	-.55	-.49	.11	-.81*	.50	.75*	.99**			
11. TMD	-.90**	.32	.77*	.72*	.30	.93**	-.44	-.20	-.65	-.70		
12. Global AE	.61	-.36	-.55	-.36	.22	-.78*	.69	.84**	.95**	.96**	-.63	
13. Overall mood	.81**	-.77*	-.53	-.32	.28	-.71*	.48	.62	.70*	.71*	-.72*	.73*

Note. † BRUMS subscales, ‡ AEQ subscales, * Correlation is significant at the 0.05 level (2-tailed),
** Correlation is significant at the 0.01 level (2-tailed).

Discussion

The training that is required for the completion of an Ironman is long and rigorous and typically culminates in a taper period prior to a race. Previous research has shown that tapering for an endurance event can produce beneficial physiological adaptations; however, little is known about the psychological changes that occur when athletes transition from training to the pre-race taper.

The main hypothesis of the present study was that fatigue, tension, depression, anger, and confusion would decrease and vigor would increase during taper as compared to training. Overall mood scores and AEQ subscale scores were also expected to increase during the taper period compared to training. These hypotheses were not supported by all participants. The results of the data analysis showed that although there were no overall trends, there were some significant changes that varied among the participants. Although all participants whose data were analyzed experienced at least one change in mood or engagement measures, these changes varied in a between-participant manner. For example, with

regard to fatigue, only two out of the eight participants experienced changes throughout the training, tapering, and post-race cycle. One of the participants, AZ2104, experienced no change in fatigue while tapering, which decreased post-race, whereas both LV1743 and LV1853 experienced a decrease in fatigue during taper that continued to decrease post-race.

Previous research with runners has demonstrated that performance expectations and goal realization have an influence on post-competition mood (Micklewright et al., 2009; Waleriańczyk et al., 2022). Changes in post-competition mood, as well as the magnitude of those changes, were associated with the extent of the discrepancy between how ultramarathon runners expected to perform and how they actually performed (Micklewright et al., 2009). Therefore, athletes who believed that they had a positive performance during competition might be expected to experience positive mood states following the competition as compared to those who believed that they had a negative performance. Although we did not include goal content and performance evaluation in our analysis, these are factors that influence motivation and potential mechanisms that may have impacted changes in mood and engagement for athletes during the taper and post-race periods. Another component of SDT is the basic psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 1985). Research has shown that satisfaction of these needs improves engagement of athletes and/or reduces burnout by positively impacting their self-determined, or intrinsic, motivation (De Francisco et al., 2018; di Luzio et al., 2020). Although little is known about the relationship between mood and motivation in nonprofessional athletes, mood and motivation to succeed share a positive association for elite athletes (Ekici, 2011), as do mood/affective states and performance in pentathletes (Samełko & Goszkowska, 2016) and swimmers (Samełko et al., 2018).

We expected that athletes with higher global AE scores would show lower TMD during the taper phase. A large negative correlation indicated that the relationship between AE and TMD was in the expected direction. However, the relationship was non-significant; therefore, the second hypothesis was not supported. We also hypothesized that athletes with a higher (i.e., more positive) overall mood would show a lower TMD score. Results indicated a significant negative relationship between the two, meaning that this hypothesis was supported. When looking at the relationship between the different subscales, three items of the AEQ were highly correlated with each other, which is in line with prior studies (e.g., Martins et al., 2014). That is, athletes who were more dedicated to their training during the taper period also felt more enthusiastic, vigorous, and confident during the taper period. BRUMS subscale items have been previously reported (e.g., Lan et al., 2012); however, the negative correlations of those subscales with enthusiasm, global AE, and overall mood are novel findings that warrant further study. In particular, scores for confusion also shared a relationship with several other variables; confusion was positively correlated with depression and was negatively correlated with vigor, enthusiasm, global AE, and overall mood. Previous authors have suggested that increased confusion prior to an endurance event indicates an anticipatory affective state that may be a consequence of participants' thoughts about their pre-race circumstances and the impending start of the race (Micklewright et al., 2009). Exploration of Ironman triathletes' pre-race cognitions may shed light on the findings of the present study.

Limitations and Future Directions

A limitation of this study was the difference in length of time between the three different periods of the training cycle. Although training and most post-race periods spanned several weeks, the taper period was only two weeks and, therefore, only contained two data points. More frequent data collection could have enabled the researcher to detect more specific changes in participants' mood and athletic engagement during the taper period. Two data points are also below the number recommended for segmented analysis in an ITS design, rendering the analysis underpowered (Zhang et al., 2020). That being said, although daily data collection during the taper period would have increased power, for the sake of consistency and in consideration of participant burden, we maintained weekly data collection versus daily data collection. Results should, therefore, be interpreted cautiously. Similarly, with a small sample size of eight participants who completed the study, the correlational analyses should be interpreted with caution and ought to be considered exploratory.

As an initial exploratory study, this study addressed a variety of factors that have little to no representation in previous research on training and tapering. For example, other studies have looked at this concept in cyclists, swimmers, and runners (e.g., Muijka et al., 2012; Myers et al., 2017; Zehsaz et al., 2011) but have paid less attention to Ironman athletes or triathletes as a whole. In addition, research has typically been experimental, in which the training of the participants was manipulated by the researchers, as opposed to observational, where

participants self-report their training and comparisons are made in regard to outcome measures (Bosquet et al., 2007). Based on previous literature and the results of the present study, it is clear that more research needs to be conducted with Ironman athletes to understand the psychological effects of training for an event of this magnitude. It is also worth investigating the relationship between athlete and coach and how this might impact the taper experience. Future applied research might involve working with coaches to make sure they can identify specific psychological changes throughout the training cycle, communicate with their athletes, and act accordingly to accommodate personal needs.

Due to the fact that changes in mood fluctuations varied between participants, it is recommended that demographic factors should be evaluated on an individual level and compared to the dependent variables. These factors might include the number of previously completed Ironman races, age, and socioeconomic status, as they may provide a different experience throughout training, tapering, and racing. Another important consideration for future investigations is performance expectations and outcomes. According to Micklewright et al. (2009), performance expectations have a strong influence on post-race mood. In their study of ultrarunners, a greater discrepancy between runners' predicted and actual performance was associated with higher post-race TMD. From the data we collected, it is not possible to account for the influence of predicted and actual performance on post-race mood; however, this may be one reason for the variation observed and should be considered in future studies.

Conclusion

The current study demonstrates that training and tapering for an Ironman is a unique experience that differs across participants, and an individual approach is recommended. The main implication from these findings is that the process for beginning to identify and monitor moods and relating that information to training engagement is one that should ideally begin when daily training begins and continues throughout the taper period. This information can then be used to determine the most effective methods to overcome behaviors or feelings that could hinder athletic performance and/or athlete well-being. For example, one athlete might demonstrate higher levels of tension and anxiety while they are tapering and could benefit from relaxation techniques, whereas another athlete may demonstrate an increase in depression or confusion during taper and could benefit from confidence and reframing techniques. Both athletes are experiencing adverse effects of tapering but would require different approaches and methods to improve their experiences. This knowledge is valuable for coaches and mental performance consultants, as well as nonprofessional athletes who monitor their training without the oversight of a coach or mental performance consultant. Being prepared to experience mood fluctuations as a normal part of the taper process and having resources planned for positive coping with whatever fluctuations one experiences can make the final days leading up to an Ironman triathlon less unexpected and reduce potentially negative interpretations of the experience.

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JOURNAL FOR ADVANCING SPORT PSYCHOLOGY IN RESEARCH
2023 Vol. 3, Issue 2, 33–52, https://doi.org/10.55743/000022

Online Psychological Skills Training Programs: A Systematic Review of Program Websites

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The purpose of this paper was to identify and describe sport-based psychological skills training (PST) programs available online. An eight-step systematic review methodology for identifying and describing websites was used to search for programs delivered asynchronously through online learning modules, designed for athletes, and presented in English. Information available through a program's home page(s) (i.e., website) was used for analysis, as individual modules were not evaluated in this study. Information from these websites was assessed for readability and quality; the DISCERN instrument was used to assess the quality of information included to describe each program. Descriptive statistics and content analyses were employed to describe various program characteristics, categorized as access and audience, delivery, and content. Overall, 18 online module-based PST programs were identified. Most information on a program's website was rated as fairly difficult to read, and DISCERN scores were often poor. Nevertheless, programs were generally framed for athletes of all competitive levels, varied considerably in how they were delivered (e.g., number of modules, time to complete), and offered content on a variety of topics in sport psychology (e.g., imagery, attentional control). This study identifies the current state of PST programs available online and provides a descriptive account of these programs. This research advances several implications for research and practice, including the need to investigate the effectiveness of online PST programs.

Keywords: online sport psychology, learning modules, mental skills, content analysis

In sport, many athletes complement their physical skills with psychological skills to improve their performance (Barker et al., 2020; Munroe-Chandler & Guerrero, 2017). In fact, when psychological skills (e.g., imagery) are taught in a deliberate and systematic manner (e.g., psychological skills training; PST), athletes may experience increased sport enjoyment and improved self-satisfaction (Munroe-Chandler & Hall, 2021). Athletes may engage in PST one-on-one with a practitioner (e.g., consultant, coach) or through educational sessions with their team (Winter & Collins, 2016). While such education and training often occur in person (Fletcher & Wagstaff, 2009; Munroe-Chandler & Guerrero, 2017), a growing trend in sport psychology has been the use of online (i.e., web-based) modalities to provide these services, such as videoconferencing or learning modules (Price et al., 2022; Weinberg et al., 2012). Although discussion and interest in online PST has been growing over the past two decades (e.g., Stodel & Farres, 2002; Weinberg et al., 2012), the need for online PST was accelerated by the COVID-19 pandemic (Price et al., 2022). With the cessation of most in-person sport programming (e.g., Kelly et al., 2020), practitioners pivoted to online modalities to offer PST (Price et al., 2022). Therefore, the general purpose of the current paper was to identify and describe sport-based PST programs available online. Specific research questions included: (a) how many online PST programs are available online? and (b) what are the characteristics of these programs (e.g., audience, content areas)?

RECEIVED: February 7, 2023

ACCEPTED: November 13, 2023

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Modalities and Types of Online Programs

Online intervention programs can be offered synchronously, asynchronously, or through a blended approach (i.e., a combination of online modalities and in-person sessions). How the athlete and practitioner interact is what distinguishes each modality. In synchronous programs, interaction occurs concurrently, often through videoconferencing software (e.g., Zoom). Conversely, in asynchronous programs, communication

between athlete and practitioner is not concurrent, such as through a self-paced learning module prescribed by the practitioner. Given the different ways synchronous and asynchronous programs could be designed, Barak and Grohol (2011) categorized online programs into five distinct types. Although these types were derived from clinical psychology, they parallel sport psychology online programming: (a) online counseling and psychotherapy (e.g., videoconferencing; Price et al., 2022), (b) psychoeducational websites (e.g., Farhat et al., 2022), (c) interactive, self-guided interventions (e.g., learning modules; Weinberg et al., 2012), (d) online support groups or blogs (e.g., Villani et al., 2017), and (e) other (e.g., mobile applications; Durand-Bush & DesClouds, 2018). While each type is unique, multiple types may be offered or combined within a given program (e.g., Thrower et al., 2019).

Interactive Self-Guided Interventions: Learning Modules

Barak and Grohol (2011) defined interactive self-guided interventions as a technology that "offers an individual the opportunity to interact with a structured, self-guided software program online that steps them through a program of self-help" (pp. 157–158). These programs include a series of learning modules aimed to provide education and exercises on a given topic (e.g., Weinberg et al., 2012). In general, most learning modules are asynchronous, interactive (e.g., activities in which participants engage with content), self-paced (i.e., participants can start, stop, and continue at any time), and integrate different modes of delivery (i.e., automated feedback, access to an expert) (Webb et al., 2010). Across different domains, learning modules can be effective for a host of outcomes. For instance, in clinical psychology, learning modules have been used to help patients mitigate symptoms of depression and anxiety (Barazzone et al., 2012; O'Kearney et al., 2009). These programs have also been popularized for providing a cost-effective opportunity for those in typically underserved communities to access counseling-related services (e.g., rural, low socioeconomic status; Barak & Grohol, 2011). Moreover, in a sport context, learning modules have been used in coach and parent education, as they offer a widespread, affordable, and convenient means to deliver content (Driska, 2018; Thrower et al., 2019). For example, coaches who completed a module-based coach education program developed by USA Swimming reported that the online program was delivered effectively and enhanced their knowledge of skills, drills, and pedagogy associated with coaching swimming (Driska, 2018).

Online learning modules may offer several practical advantages to athletes interested in PST. Working with a consultant one-on-one can be costly, ranging from $100-150 USD per hour (Neff & Carlson, 2016; Weinberg et al., 2012), which could be a barrier to those without the financial resources to afford such services. Supporters of online module-based PST programs have proposed offering them at a reduced rate (Neff & Carlson, 2016; Stodel & Farres, 2002; Weinberg et al., 2012); however, to date, no empirical evidence has indicated if such programs are, in fact, cost-effective. Moreover, in North America, there are limited full-time sport psychology consultants (Martin, 2020), thereby reducing the opportunities for athletes across all levels of sport to access PST.

Given that learning modules are self-paced and delivered asynchronously, they could provide all athlete populations an avenue to pursue PST, particularly non-elite athletes (Stodel & Farres, 2002; Weinberg et al., 2012). Nevertheless, even if an athlete has the financial means and access to a consultant, there are still logistical barriers that make consistent engagement with PST challenging (e.g., scheduling, limited time; Stodel & Farres, 2002; Weinberg et al., 2012; Wylleman & Lavallee, 2004). An online PST program may provide flexibility to those athletes looking to incorporate PST into their already busy schedule (e.g., reduce travel, instant access). Weinberg and colleagues (2012) considered many of these reasons when they developed an online PST program for athletes. Although no empirical data were presented within their paper, these authors provided details on the characteristics of their program, including that it was fully asynchronous, contained interactive activities, and was developed by experts in sport psychology who followed best-practice recommendations for PST.

Availability of Online PST Programs

Online PST programs could have immense practical value; however, it is unclear whether these types of programs are readily available to athletes. In commentaries by Stodel and Farres (2002) and Weinberg et al. (2012), each reported searching the internet for online PST programs, with both sets of authors finding no such programs. Despite the possibility that no online PST program existed at the time of previous internet searches (e.g., Stodel & Farres, 2002; Weinberg et al., 2012), these searches did not appear to follow a systematic structure. For instance, Stodel and Farres (2002) simply noted they were unable to locate any interactive online PST program developed by expert practitioners on the internet. Weinberg and colleagues

(2012) reported the same findings from their search in 2010. Although these authors may have followed some type of systematic process when conducting their search, no methodology was reported. However, in more recent publications, others have noted athletes' engagement in online PST programs (Cogan, 2019; Neff & Carlson, 2016; Schneider, 2016), suggesting that online PST programs do exist. Therefore, identifying available online PST programs and, in turn, describing what they entail would be valuable information for researchers and practitioners.

Since those initial searches in the early to mid-2000s, Rew and colleagues (2018) developed a systematic review methodology for conducting internet searches to identify and describe online content found on websites. This methodology incorporates guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Shamseer et al., 2015) to assist in the description and transparency of the steps employed in the search and analysis. This eight-step approach includes (a) select topic, (b) determine purpose of analysis, (c) select search terms and engines, (d) develop and apply website inclusion and exclusion criteria, (e) develop processes and tools to manage search results, (f) specify measures of quality, (g) compute readability, and (h) evaluate websites (Rew et al., 2018). Given that online module-based PST programs would need to be 'housed' on a website (e.g., Neff & Carlson, 2016; Weinberg et al., 2012), the methodology put forth by Rew et al. (2018) would seemingly allow researchers to identify PST programs available online, which could then be described by a variety of program characteristics (e.g., content areas, developed by an expert; Stodel & Farres, 2002; Weinberg et al., 2012).

Characteristics of Online PST Programs

In some domains, the prevalence of online module-based programs has allowed researchers to evaluate programs on their effectiveness (e.g., Barazzone et al., 2012; Driska, 2018; O'Kearney et al., 2009; Thrower et al., 2019). However, in sport, there is so little descriptive knowledge of these programs that evaluation may not be plausible. Instead, describing the characteristics of these programs would appear to be a timely next step. For example, Rew and colleagues (2018) noted that when assessing information on a website, it is valuable to record general information (e.g., date program was created) and assess both the readability and quality of information provided on a website. Readability refers to one's ability to read and understand the material presented in order to make an informed decision on the information and program (Storms et al., 2017).

Moreover, one way to measure the quality of information on a website is through the DISCERN instrument (Charnock et al., 1999). DISCERN (not an acronym) was developed to assess the quality of treatment choices for health conditions provided on consumer-oriented websites (Charnock et al., 1999; Rew et al., 2018). DISCERN does not assess quality information on a specific health condition but rather provides a list of general quality-related items (e.g., are the aims clear?) so those with specific content expertise can assess within their own discipline (Rew et al., 2018). Although, to our knowledge, this instrument has not been used within sport psychology, it has been employed to assess websites containing information on psychological conditions such as depression (Zermatten et al., 2010) or bipolar disorder (Morel et al., 2008) and thus could be beneficial when assessing the quality of information on PST.

Other characteristics of interest include the audience, delivery, and content of these programs. Conceptually, it makes sense that an online PST program could reach more athletes than any consultant could. However, who are these programs designed to serve? Researchers have noted that online PST programs could be used to target non-elite athletes (Stodel & Farres, 2002; Weinberg et al., 2012), but are these opportunities available to athletes of various ages, sport types, typically marginalized groups, or who have limited access to high-speed internet (e.g., Curtis et al., 2022)? Knowledge of such information would demonstrate the current audience of online PST programs and create opportunities to grow programming in the future. Moreover, how are these programs delivered? While this could include details on the length of a program (e.g., number of hours of content; Santos et al., 2019), it could also extend to the specific ways in which content is communicated within a module (e.g., automated features, supplemental material; Webb et al., 2010). Lastly, which psychological skills are presented in these programs? Beyond the psychological skills noted in the online program developed by Weinberg and colleagues (e.g., imagery, attentional control; 2012), little is known regarding which psychological skills might be used in these programs and whether or not these align with common frameworks for designing PST programs (e.g., Durand-Bush et al., 2023; Ely et al., 2023). Altogether, the purpose of the current paper was to identify and describe sport-based PST programs available online.

Method

Design

The current study followed Rew and colleagues' (2018) eight-step systematic review methodology for conducting an internet search of websites to identify available online PST programs. As module-based programs are generally housed on a website (e.g., Neff & Carlson, 2016; Weinberg et al., 2012), such websites often serve as a home page for a program and operate as a marketing tool to inform prospective clients about a program's services (Farres & Stodel, 2003). Prospective clients (e.g., athletes) can use these home pages to gather information about an online PST program to ultimately decide if they will enroll in the program or not. To mirror this approach and broadly describe online PST programs, only information available through a program's home page was used to describe program characteristics; no program was evaluated for its effectiveness. Specific program characteristics were noted using descriptive statistics or content analyses. Descriptive statistics included calculating means, percentages, and/or frequency counts, while content analyses were conducted from a deductive and/or inductive approach; each is outlined in more detail in the data analysis section.

Data Collection and Measures

The data collection process followed Rew and colleagues' (2018) eight-step systematic review methodology for conducting an internet search for websites. Each step is presented below. The measures used to describe program characteristics can be found in Steps 6, 7, and 8.

1. Select Topic

The topic of online module-based PST programs was selected given its novelty in the literature and the practical benefits that could arise from such programming. This topic was considered specific enough to produce a manageable and meaningful search (Rew et al., 2018).

2. Determine Purpose of Analysis

The general purpose of this search and analysis was to broadly identify and describe online PST programs. This included identifying PST programs available online and subsequently describing the characteristics of these programs. In all, this search was intended to be descriptive in nature as opposed to an evaluation of any particular online PST program.

3. Select Search Terms and Engines

A total of 16 web searches were conducted in June 2022 to identify online PST programs. Eight search terms were developed to reflect both technical and lay interpretations of online PST programs in sport (e.g., "mental skills training for athletes online"; see Table 1). No quotation marks or Boolean search strategies were employed to simulate a typical consumer search (Stern et al., 2021). The search engines Google and Bing were used for each search term (e.g., Rew et al., 2018), resulting in eight searches per search engine (Google and Bing account for almost

Table 1. Search terms and number of hits by search engine

Search Term	Total number of hits	
	Google	Bing
Psychological skills training online	119,000,000	24,000,000
Mental skills training online	203,000,000	227,000
Psychological skills training for athletes online	104,000,000	56,500,000
Mental skills training for athletes online	63,100,000	76,100,000
Performance psychology for athletes online	9,240,000	76,600,000
Sport psychology for elite athletes online	9,290,000	104,000,000
Sport psychology for youth athletes online	141,000,000	126,000,000
Online learning modules on sport psychology	22,700,000	120,000,000

Note. All searches took place on June 23 or 24, 2022.

95% of all searches worldwide; Chris, 2022). Further, all searches were conducted using the web browser Google Chrome and utilized 'incognito mode' to limit the impact of previous search history (Dy et al., 2012; Stern et al., 2021).

Identification. For each of the 16 searches, the first 25 'hits' (i.e., web links) were recorded for further screening, resulting in 400 total hits. Recording the first 25 hits per search was determined as the cut-off for each search as this mirrors that of a consumer search and aligns with previous research (Dy et al., 2012; Rew et al., 2018). Further, as the number of hits per search ranged from 227,000 to 203,000,000 (see Table 1), it would be impractical for the research team to evaluate each hit (Rew et al., 2018).

4. Develop and Apply Website Inclusion Criteria

Screening. Once the list of 400 hits was populated, all duplicate links were removed (n = 192). To be included, website content had to be intended for or framed in a sport context, be related to sport psychology (e.g., PST, team building), and be written in English; 48 websites were removed for not meeting these criteria. Further, websites were excluded from analysis if they were an advertisement, academic program, book, journal article, link to resources, link to consultants, certificate program, module exclusively for coaches, expired link, course content, link to a video, or a news article on sport psychology; 82 websites were excluded (see Figure 1)

Eligibility. The remaining websites (n = 78) were then categorized by type of online intervention (see Figure 1). Based on Barak and Grohol's (2011) categorization of online intervention types, websites were organized into five distinct categories: (1) online counseling and psychotherapy (n = 30), (2) psychoeducational websites (n = 19), (3) interactive, self-guided interventions (n = 18), (4) online support groups or blogs (n = 23), and (5) other (e.g., mobile applications [apps]) (n = 8). In cases where a website contained multiple intervention types (e.g., online counseling and psychotherapy and interactive, self-guided intervention), it was recorded in both categories; that is, these 78 websites collectively offered 98 different intervention types.

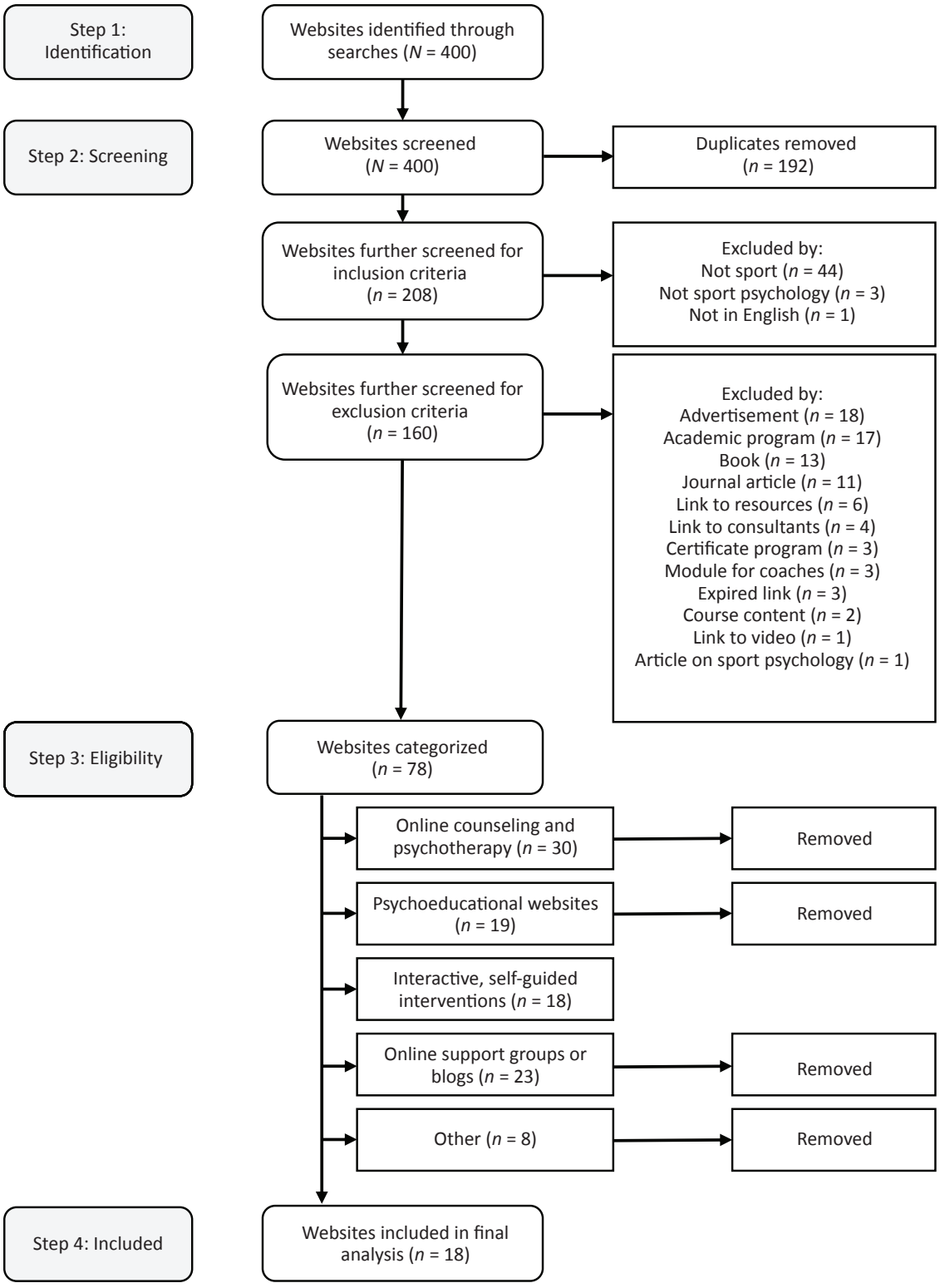
Included. Only those websites categorized as interactive, self-guided interventions (i.e., learning modules) were included in the final analysis, yielding a final sample of 18 distinct programs (see Table 2).

Table 2. URL links for websites included in final analysis

URL Link
https://amplifysportpsychology.com/athletes/
https://athletesauthority.com.au/mental-skills-training/
https://mentaltraininginc.com
https://olympics.com/athlete365/courses/sports-psychology/
https://premiersportpsychology.com
https://sport-mi.com
https://www.flowinsports.com/courses
https://www.flowperformancepsych.com/online-courses
https://www.futurelearn.com/courses/mental-skills-training-sport/2
https://www.jdcourses.com/e-learning/sports-psychology-course
https://www.learndirect.com/course/sports-psychology
https://www.learnpst.com
https://www.mentaltoughnesstrainer.com/sports-psychology-youth-sports/
https://www.peaksports.com/online-sports-psychology-training/
https://www.qpathlete.com/mental-toughness-online-course
https://www.teammentaltraining.com
https://www.udemy.com/course/applied-psychological-skills-training-for-sport/
https://www.udemy.com/course/mental-toughness-training/

Note. All links were active as of October 25, 2022.

Figure 1. PRISMA diagram of systematic process used for data collection



5. Develop Processes and Tools to Manage Search Results

Throughout the data collection process, steps were taken to manage search results and improve methodological rigor. First, two independent reviewers were used throughout the data collection process (i.e., first and third authors) (Belur et al., 2021). Both reviewers independently screened all links for inclusion and exclusion criteria, categorized websites by type of intervention, and analyzed program characteristics for all included websites (Rew et al., 2018; Shamseer et al., 2015). Any disagreements were resolved through discussion between both reviewers and a third member of the research team (i.e., second author) until a consensus was reached (Rew et al., 2018). Second, given that website content can be modified or updated quite frequently, an online screen-capturing tool (https://webpagetopdf.com) was used to capture website content electronically as of July 30, 2022, to maintain consistency. Third, tables were developed to assist the research team in the data collection process, thereby increasing transparency and mitigating biases between reviewers (Rew et al., 2018).

6. Specify Measures of Quality

A modified version of the DISCERN instrument was used to assess website quality (Charnock et al., 1999). DISCERN includes 16 items related to the reliability of the information included on the website (i.e., items 1-8; e.g., "Are the aims clear?") and the specific details on treatment choices (i.e., items 9-15; e.g., "Does it describe how each skill, strategy, or technique works?") with a final item rating the overall quality of information on the website; items 2 and 11 were not applicable to the current paper (see Figure 2 for a list of items). Items are rated on a five-point Likert-type scale, with higher scores indicating the criteria were fulfilled to a greater extent (i.e., 1 = *no*, 3 = *partially*, 5 = *yes*).

Other indicators of quality included the education and credentials of the program creator(s), the use of external references, and whether the information was reported as evidence-based. Education was recorded based on the description of the program creator(s), wherein one's highest reported degree was retained for analysis. Within the field of sport psychology, various organizations (e.g., Applied Association for Sport Psychology [AASP]) have established certifications that recognize one's knowledge of the discipline and their ability to effectively provide consultation to athletes, teams, and other performers (e.g., Certified Mental Performance Consultant [CMPC]; AASP, n. d.). If credentials related to a certification in sport psychology were provided for the program creator(s), this information was recorded. Moreover, the inclusion of references (e.g., journal articles, other websites) was reported as either 'yes' (i.e., the website provides references to support its program's content) or 'no' (i.e., no references provided). Similarly, if the website stated that the content used to create the online modules was evidence-based (i.e., based on research or empirical evidence), this was also captured with a 'yes,' whereas a 'no' was recorded if no such mention of evidence-based was provided.

7. Compute Readability

Readability relates to the consumer's ability to read and understand a website's content (Rew et al., 2018). Readability was determined using the Flesch-Kincaid Reading Ease test through an online calculator (https://www.webfx.com/tools/read-able/; e.g., Rew et al., 2018; Tahir et al., 2020). The link (i.e., URL) for each website home page (see Table 2) was inserted into the online calculator, which then generated a score for reading ease. The reading ease formula considers the average sentence length and average number of syllables per word to determine readability. This formula generates a numeric score ranging from 0-100, with higher scores representing greater readability with an optimal score of 65 or greater (0–30 = very difficult; 31–50 = difficult; 51–60 = fairly difficult; 61–70 = standard; 71–89 = easy; 90–100 = very easy; Aaronson et al., 2018; Tahir et al., 2020). The mean score for the Flesch-Kincaid Reading Ease test was 60.93 (*SD* = 7.04), with scores ranging from 47.2 (difficult to read) to 78.1 (easy to read). Most scores fell between fairly difficult to read (51–60) and standard readability (61-70).

8. Evaluate Websites

Four areas of program characteristics were described: (a) general characteristics, (b) access and audience, (c) delivery, and (d) content.

General Characteristics. The affiliation, date of publication, and date of modification were assessed for each website. Affiliation refers to the type of company or organization that hosts the website (e.g., commercial [.com], educational [.edu], organizational [.org]), as this provides the consumer clear information on a website host (or sponsors) (e.g., Stern et al., 2021). Date of publication (i.e., date website was first published online) and modification (i.e., most recent date content was modified) (Rew et al., 2018; Silberg et al., 1997) were included to document the longevity and recency of a website's content.

Access and Audience. Components of access included the cost of the program, registration options, and the use of high-speed internet. In some cases, programs offered both a packaged program (i.e., consisting of multiple modules) or individual modules (i.e., one module on a given topic); only the cost of the packaged programs was retained for analysis. Registration options were recorded under three options: individual registration, team registration, or both. In addition, given that programs are delivered online, these may require the use of, and access to, high-speed internet. Whether a program operated off the web (i.e., high-speed internet required) or if a program could be downloaded and accessed offline (i.e., high-speed internet not required) was also recorded.

The intended audience of each program was identified. This included the target audience of a program, the competitive level of this target audience, and if images of visible minorities were shown on program home pages. Target audience focused on to whom the program was designed (e.g., athletes, coaches). The competitive level of that target audience was also reported (e.g., recreational, competitive). Both target audience and competitive level were only reported if explicitly identified (e.g., our program is designed for competitive athletes). Moreover, the inclusion of visible minorities within the images embedded on websites was recorded. If a photo of a person was included on the website, our raters assessed both sex (i.e., male or female) and if a person(s) of color was included. Sex was reported as a 'yes' if an image of a female was present (i.e., 'no' for images only of males). At the same time, if a person of color was shown, this was reported as a 'yes' (i.e., 'no' for images with no person of color) (Coleman & Harrison, 2022). For both sex and visible minorities, if images contained both males and females or both visible minorities and white individuals, these were categorized as 'both.' Instances where this information was not provided or was unclear (e.g., blurry image) were omitted.

Delivery. The number of modules provided within a program and the length of time to complete the program were recorded. Further, whether a program delivered modules in a pre-determined sequence (i.e., tunneled) or if participants had the choice to pick the order one completes the program (i.e., choice) was recorded (Webb et al., 2010). Webb and colleagues' (2010) coding scheme for evaluating various modes of delivery within module-based programs was used, which includes three general sections: (a) automated functions (i.e., the types of automatically generated content or feedback provided within a module; e.g., tailored feedback; three items), (b) communicative functions (i.e., the ways a participant can interact with others within the module, e.g., access to an expert; three items), and (c) supplementary modes (i.e., the additional modes of communication included within the program, e.g., email; five items) (see Table 3). All items were coded based on whether the modules within a program appear to offer a given feature (i.e., 'yes' or 'no'). Although this scheme was developed to evaluate the content within a module (Webb et al., 2010), in the current paper, this scheme was employed to describe the information provided about what the module includes. Therefore, it is possible that modules may, in fact, include some of these features, but the description of the program does not mention them.

Content. Two areas of program content were described. These included (a) the topics related to sport psychology that are covered within a program (e.g., imagery, confidence) and (b) the target outcomes for participants following completion of a given program (e.g., enhance sport performance). Each of these content areas was assessed using a content analysis, described in more detail below.

Data Analysis

DISCERN Instrument

DISCERN was completed by two independent reviewers for all websites. Inter-rater reliability was assessed between reviewers using the weighted kappa analysis (i.e., 0 to 0.20 = slight agreement; 0.21 to 0.40 = fair agreement; 0.41 to 0.60 = moderate agreement; 0.61 to 0.80 substantial agreement; 0.81 to 1 = nearly perfect agreement). The weighted kappa score was 0.47, indicating moderate agreement between raters. Instances where scores differed between raters by two or more points were discussed until a consensus was reached (this occurred only six times out of 234 ratings), while scores within two or less points were averaged (Huynh et al., 2019). Thus, the final scores for all items were summed, generating a score between 14 and 70 for each website, with larger scores reflecting higher quality information (i.e., 14–25 = very poor; 26–35 = poor; 36–45 = fair; 46–55 = good; 56–70 = excellent) (Tahir et al., 2020).

Content Analysis

A content analysis is a systematic method to understand text-based data, allowing for the broad description of a phenomenon (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005; Patton, 2002). A content analysis can be inductive or deductive. In an inductive content analysis, categories

or themes are derived from the data, whereas a deductive content analysis is structured on previous knowledge from a theory or framework (Elo & Kyngäs, 2008). Both types of analyses were employed in the current study and followed three phases: preparation, organizing, and reporting (Elo & Kyngäs, 2008). The preparation phase included pulling text segments (e.g., words, sentences) from websites that reflected either a topic related to sport psychology or a target outcome (Hsieh & Shannon, 2005); two independent reviewers completed this step. To organize the data, text segments from each reviewer were then combined for further analysis, with duplicate text segments removed. Following the collection of, and subsequent immersion in, the data, a series of deductive and inductive analyses were performed (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005).

Topics Related to Sport Psychology. A deductive content analysis was first used to explore if common topics related to PST were delivered through online module-based programs. The Sequence of Basic Mental Skills (Ely et al., 2023) and the Gold Medal Profile for Sport Psychology (Durand-Bush et al., 2023) were used as frameworks to guide the deductive content analysis. The Sequence of Basic Mental Skills includes the psychological skills of goal setting, imagery, self-talk, and relaxation (Ely et al., 2023), whereas the Gold Medal Profile for Sport Psychology includes fundamental competencies (i.e., motivation, confidence, resilience), self-regulation competencies (i.e., self-awareness, stress management, emotion and arousal regulation, attentional control), and interpersonal competencies (i.e., athlete-coach relationship, leadership, teamwork, communication). These frameworks were selected due to their recency of publication, the breadth of psychological skills and competencies covered between them, and the systematic nature upon which each framework was built (Durand-Bush et al., 2023; Ely et al., 2023). Thus, sport psychology topic areas were categorized into these specific content areas. Following this deductive content analysis, not all topic areas presented within the online programs were categorized in these frameworks. Therefore, an inductive content analysis was then employed by the first author. Similar topics were grouped into categories to demonstrate patterns within the data and labeled to describe the topic in a meaningful way (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). After the development of these categories, all authors met to critically discuss and debrief the process and categories. This peer debriefing facilitated an opportunity for discussion and refinement of categories that broadly reflected these data (Hsieh & Shannon, 2005).

Target Outcomes. Given that no frameworks were used to conceptualize the potential target outcomes of these programs, an inductive content analysis was employed. This analysis followed the same process as previously mentioned, wherein target outcomes were grouped into categories and provided labels. For example, text segments detailing target outcomes such as "enhance performance" or "perform at your best" were categorized as *improve sport performance*. In addition, peer debriefing was also utilized to facilitate conversation between the three authors regarding the development of these categories (Hsieh & Shannon, 2005).

Descriptive Statistics

All other variables were analyzed using descriptive statistics. Depending on the variable, this included the calculation of means, percentages, and/or frequency counts.

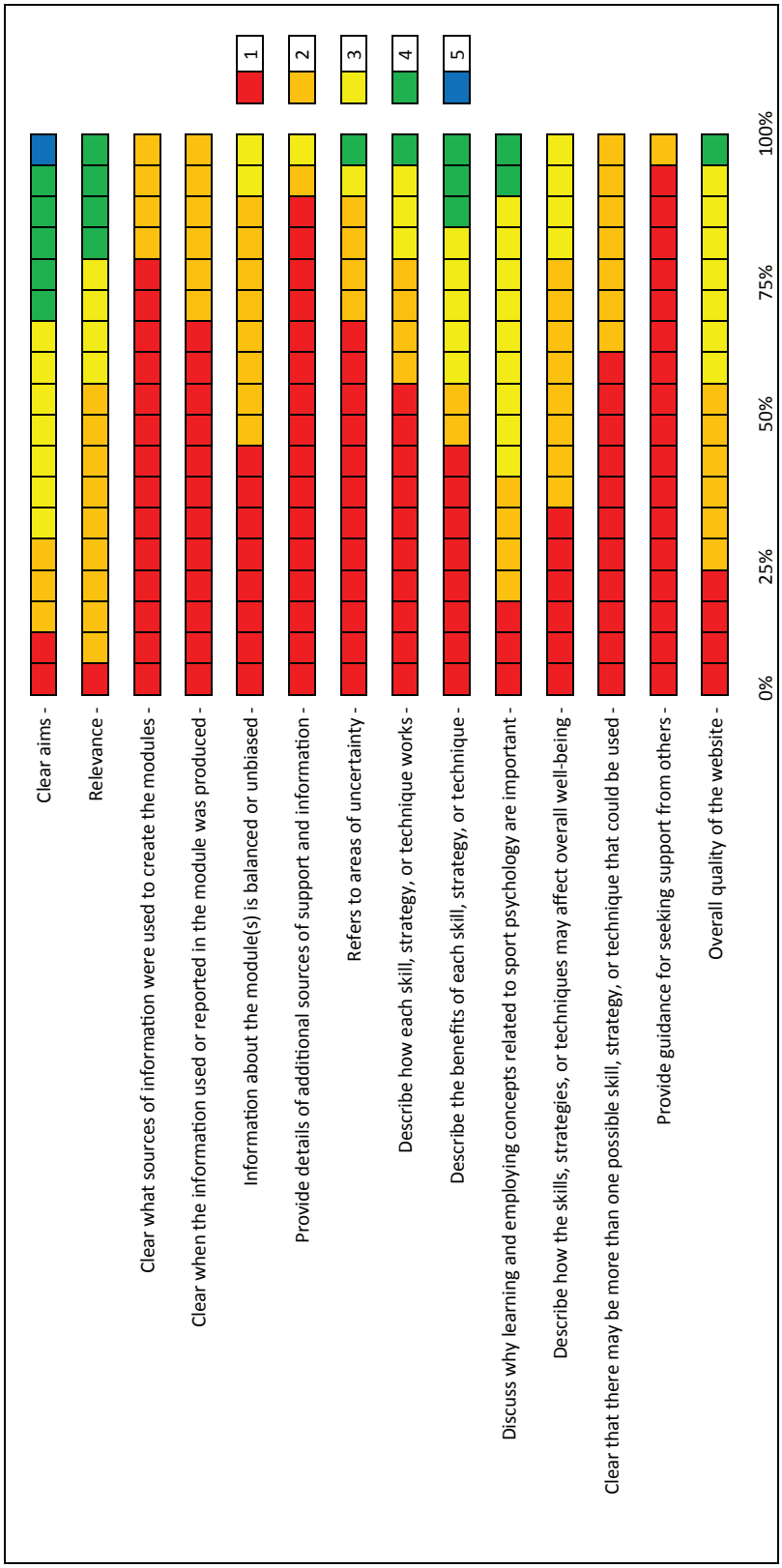
Results

Quality

The mean DISCERN score was 25.22 (*SD* = 6.26), with scores ranging from 16.5 (very poor quality) to 36.5 (fair quality). In all, ten websites (55.6%) scored in the very poor quality range (14–25), seven websites (38.9%) in the poor quality range (26–35), and just one (5.6%) in the fair quality range (36–45). Score distributions for individual DISCERN items can be found in Figure 2.

The highest level of education received by program creator(s) included those with a Doctorate in Philosophy (i.e., Ph.D., *n* = 6; 33.3%), Doctorate of Psychology (i.e., PsyD, *n* = 1; 5.6%), and Masters of Science or Arts (i.e., MS or MA, *n* = 6; 33.3%); five websites (27.8%) did not report the education for the program creator(s). A variety of credentials were listed, including CMPC (*n* = 2; 11.1%), Canadian Sport Psychology Association (*n* = 2; 11.1%), British Association of Sport and Exercise Sciences (*n* = 1; 5.6%), licensed psychologist (*n* = 2; 11.1%), sport psychologist (*n* = 1; 5.6%), and Certified Mental Trainer (*n* = 1; 5.6%); however, it should be noted that each type of credential was recorded exactly as seen on a programs website and therefore may not reflect an accredited or widely recognized certification. Most websites (*n* = 11; 61.1%) did not report any credentials for their program creator(s). Although no websites included any references, seven (38.9%) stated their content was evidence-based.

Figure 2. DISCERN Quality Scores for Online PST Programs



Note. DISCERN quality scores for the included websites (n = 18), ranging from 1 (*no/low quality*) to 5 (*yes/high quality*).

Program Characteristics

General Characteristics

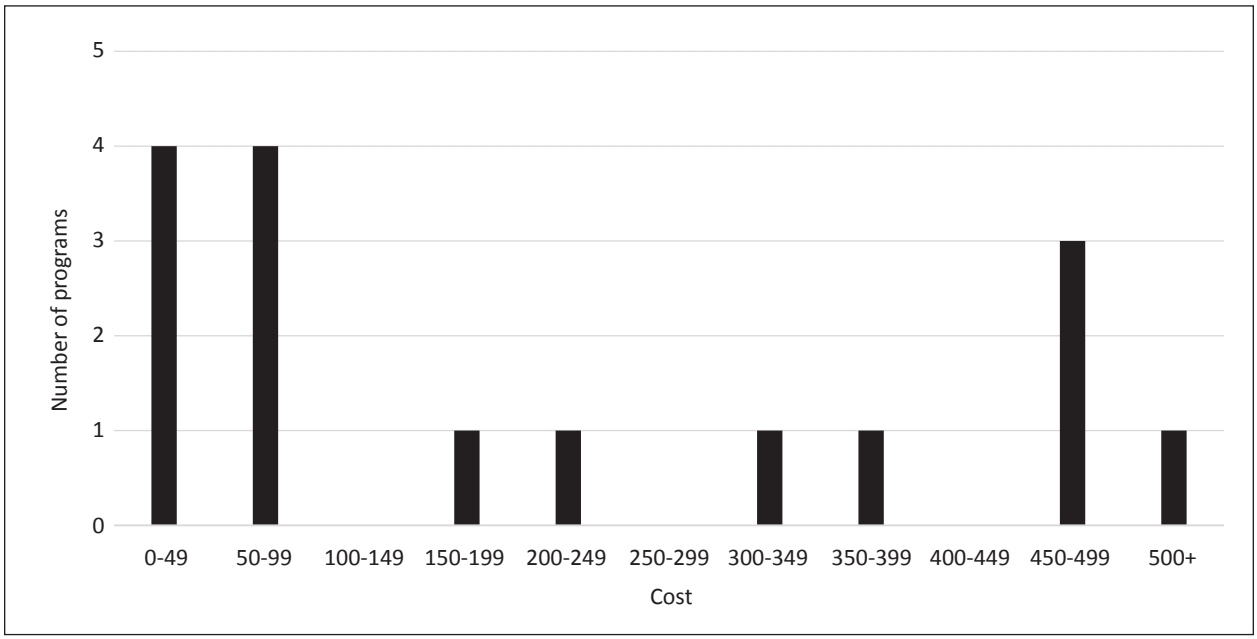
All programs (*n* = 18; 100%) included in the analysis were hosted commercially (i.e., .com). Regarding date of publication, eight were created in 2022 (44.4%), with two (11.1%), one (5.6%), and two (11.1%) created in 2021, 2020, and 2019, respectively; five (27.8%) websites did not report year of publication. One website (5.6%) was modified in 2022, whereas no other websites included a year of modification (*n* = 17; 94.4%).

Access and Audience

The cost of online PST programs ranged from $0 (free) to $697.00 (USD). The mean and median costs were $245.08 and $195.00, respectively. Although not all programs listed a cost, of the 16 programs that did, eight were between $0 – 100.00, two were $150.00 – 249.00, and the remaining six were $300.00 – 697.00 (see Figure 3). Two programs (11.1%) did not provide a cost on the website and implied this cost would be provided after initial steps toward registration were taken. Registration was available at the individual level (*n* = 10; 55.6%) or both individual and team level (*n* = 5; 27.8%); three programs (16.7%) did not provide registration options. Seemingly, all programs required access to high-speed internet (*n* = 16; 88.9%); however, for two (11.1%), this information was not available.

These programs were generally intended for athletes (*n* = 15; 83.3%) or para-athletes (*n* = 1; 5.6%); two programs did not explicitly state a target sport population. Additionally, other populations stated to benefit from these programs included coaches (*n* = 9; 50.0%), sport parents (*n* = 2; 11.1%), sport officials/referees (*n* = 1; 5.6%), exercisers (*n* = 1; 5.6%), and other performers (*n* = 1; 5.6%). Similarly, these programs were designed for (para-)athletes at various competitive levels, including all levels of sport (*n* = 7; 38.9%), high school and higher (*n* = 2; 11.1%), youth (*n* = 1; 5.6%), and elite (*n* = 1; 5.6%); seven programs (38.9%) did not include this information. Moreover, following a visual analysis of the images included on these websites, males appeared on 72.2% (*n* = 13) of websites, compared to 50.0% (*n* = 9) for females. Specifically, 44.4% (*n* = 8) included images of both males and females, 27.8% (*n* = 5) just males, and 5.6% (*n* = 1) just females; four websites (22.2%) did not show images of people or sex was not identifiable due to poor image quality. Further, 83.3% (*n* = 15) included images of white individuals, with only 27.8% (*n* = 5) showing people of color; three websites (16.7%) did not include images of people. In more detail, 55.6% (*n* = 10) included images of only white individuals, 27.8% (*n* = 5)

Figure 3. Cost distribution of Module-Based Online PST Programs



Note. All costs are listed in United States Dollars (USD).

of both white individuals and people of color, with no (0%) websites only showing people of color.

Delivery

Online PST programs varied in the number of modules included, ranging from four to 21. The mean number of modules was 8.1, with a median of 7.0; four websites (22.2%) did not include information on the number of modules within their program. It should be noted that some programs had variations regarding what was considered 'one' module, with some considering a module to be a start-to-finish lesson. In comparison, others considered a series of interactive videos to encompass one module. Only eight websites (44.4%) provided information on how long their program would take to complete. Those that did report length did so in different formats: minutes per module (n = 2), total hours (n = 4), and expected number of weeks to complete (n = 2). In cases where minutes per module were provided, this number was converted to total hours (i.e.,

Table 3. Modes of delivery within module(s) as reported on website

Mode of delivery and description	Included	
	Yes	No
Automated Functions		
Enriched information environment: Supplementary content and links, testimonials, videos, games.	*n* = 13 (72.2%)	*n* = 5 (27.8%)
Automated tailored feedback: Comparison to norms or goals (previously inputted by participant), reinforcing messages, or coping messages).	*n* = 3 (16.7%)	*n* = 15 (83.3%)
Automated follow-up messages: Reminders, tips, newsletters, encouragement.	*n* = 0 (0%)	*n* = 18 (100%)
Communicative Functions		
Access to expert: e.g., "ask an expert", expert-led discussion board, or chat sessions.	*n* = 4 (22.2%)	*n* = 14 (77.8%)
Scheduled contact with expert: e.g., emails, synchronous sessions.	*n* = 1 (5.6%)	*n* = 17 (94.4%)
Peer-to-peer access: e.g., buddy system, peer-to-peer discussion boards, forums, or live chat.	*n* = 1 (5.6%)	*n* = 17 (94.4%)
Supplementary Modes		
Email: Includes communication through email.	*n* = 3 (16.7%)	*n* = 15 (83.3%)
Phone: Includes communication through phone call.	*n* = 0 (0%)	*n* = 18 (100%)
Text: Includes communication through texts.	*n* = 0 (0%)	*n* = 18 (100%)
CD's: Includes access to CDs.	*n* = 0 (0%)	*n* = 18 (100%)
Synchronous sessions: Includes built-in synchronous sessions.	*n* = 3 (16.7%)	*n* = 15 (83.3%)

Note. Adapted from Webb et al. (2010).

minutes per module multiplied by number of modules, divided by 60). Thus, the total hours needed to complete a program ranged from 2-140, with a mean of 26.3 hours and a median of 4.3 hours. Further, the two programs wherein the expected number of weeks were provided were listed as taking one week and four to eight weeks to complete. Half of the programs (*n* = 9; 50.0%) featured a tunneled program with modules to be completed in a particular order, whereas only three (16.7%) provided participants choice as to what order to complete the modules; for six programs (33.3%), this information was not available. Last, most elements of automated functions, communicative functions, and supplementary functions were rarely included (see Table 3), apart from including an enriched information environment (i.e., providing supplementary content and links, testimonials, videos, or games) wherein 72.2% (*n* = 13) of programs appeared to include these elements.

Content

Many of the sport psychology topics covered within these programs corresponded to the psychological skills and competencies presented in the Sequence of Basic Mental Skills (Ely et al., 2023) and the Gold Medal Profile for Sport Psychology (Durand-Bush et al., 2023), respectively (see Table 4). Imagery was the most widely included psychological skill (*n* = 12; 66.7%), followed by goal setting (*n* = 10; 55.6%), self-talk (*n* = 10; 55.6%), and relaxation (*n* = 6; 33.3%). Aspects of fundamental, self-regulation, and interpersonal competencies were included within online programs. Confidence (*n* = 10; 55.6%) was the most prevalent fundamental competency, followed by motivation (*n* = 8; 44.4%) and resilience (*n* = 2; 11.1%). All four self-regulation competencies were listed as topics: attentional control (*n* = 11; 61.1%), emotion and arousal management (*n* = 7; 38.9%), stress management (*n* = 5; 27.8%), and self-awareness (*n* = 4; 22.2%). Last, interpersonal competencies were the least reported competencies, with only three programs including communication (16.7%) and teamwork (16.7%), and two including leadership (11.1%); no program promoted content on the athlete-coach relationship.

Beyond the two frameworks mentioned above (Durand-Bush et al., 2023; Ely et al., 2023), other sport psychology topics included mental toughness (*n* = 6; 33.3%), routines and preparation (*n* = 6; 33.3%), mindfulness (*n* = 5; 27.8%), recovery and training (*n* = 4; 22.2%), attitude (*n* = 3, 16.7%), flow (*n* = 3, 16.7%), growth and mastery (*n* = 3, 16.7%), optimism (*n* = 2, 11.1), and well-being (*n* = 2, 11.1). Topics that only appeared in a single program can be found in Table 4 (e.g., observational learning).

Many different target outcomes were listed for online PST programs. The most prevalent outcomes were improving sport performance (*n* = 8; 44.4%), developing mental toughness (*n* = 5; 27.8%), and improving one's mindset for sport (*n* = 5; 27.8%). Additionally, other target outcomes mentioned included holistic benefits (*n* = 4; 22.2%), managing anxiety and emotions (*n* = 4; 22.2%), building confidence (*n* = 3, 16.7%), and overcoming challenges (*n* = 2, 11.1). Several target outcomes only appeared for a single program: develop routines, getting in the zone, increase focus, learn psychological skills, and maintain composure.

Discussion

The purpose of this paper was to identify and describe sport-based PST programs available online. Following a systematic review methodology used for conducting an internet search of websites (Rew et al., 2018), 18 unique online PST programs were identified, thereby confirming that module-based PST programs in sport are available online. Each online PST program was assessed for readability and by the quality of the information provided on their website using the DISCERN instrument. Additionally, various program characteristics were recorded to broadly describe these programs. These ranged from general characteristics, such as when a program was developed, to more specific characteristics associated with access and audience, delivery, and content. These findings lay a foundation for the description of online PST programs in sport and warrant areas of future research.

By using the systematic review methodology developed by Rew et al. (2018), 18 unique online module-based PST programs were identified. This finding situates the current landscape of available online PST programs and confirms previously anecdotal accounts of their existence (e.g., Cogan, 2019; Neff & Carlson, 2016; Schneider, 2016). Indeed, the use of the eight-step systematic review methodology for identifying websites was quite helpful in this pursuit and offers a tool to track the development of this field over time. Moreover, though only module-based programs were subsequently described in the current paper, other types of online programming were also identified (e.g., psychoeducational websites; *n* = 19). Though beyond the scope of the current paper, researchers may consider describing these types of programs to expand knowledge of online programming in sport psychology more broadly (e.g., Barak & Grohol, 2011).

A unique area of interest within this study was to explore the quality of information presented regarding

each online PST program. Through the use of the DISCERN instrument, it was apparent that the quality of information provided about these programs was quite poor. Although most programs offered partially clear aims (e.g., what their program is about) and explained why sport psychology is important (e.g., benefits of sport psychology), information on where such information originated or how to find additional resources was largely absent. This lack of transparency is problematic for at least two reasons. First, the rigor and methodological nature of content generation is likely a notable difference between those with and without accredited education and training in sport psychology (Gould, 2016). Thus, if most programs lack transparency regarding their content, it is nearly impossible to evaluate one program's legitimacy over another. Second, those searching for an online PST program may want sufficient information on what a program will cover and how it will

Table 4. Distribution of sport psychology topics following deductive and inductive content analysis

Framework	Sport Psychology Topic	*n*	%
Sequence of Basic Mental Skills	Goal Setting	10	55.6
	Imagery	12	66.7
	Self-Talk	10	55.6
	Relaxation	6	33.3
The Gold Medal Profile for Sport Psychology	Motivation	8	44.4
	Confidence	10	55.6
	Resilience	2	11.1
	Self-Awareness	4	22.2
	Stress Management	5	27.8
	Emotion & Arousal Management	7	38.9
	Attentional Control	11	61.1
	Athlete-Coach Relationship	0	0
	Leadership	2	11.1
	Teamwork	3	16.7
	Communication	3	16.7
Inductive Content Analysis	Mental Toughness	6	33.3
	Routines & Preparation	6	33.3
	Mindfulness	5	27.8
	Recovery & Training	4	22.2
	Attitude	3	16.7
	Flow	3	16.7
	Growth & Mastery	3	16.7
	Optimism	2	11.1
	Well-being	2	11.1
	Assessment	1	5.6
	Conflict	1	5.6
	Emotional Intelligence	1	5.6
	Fear	1	5.6
	Feedback	1	5.6
	Getting in the Zone	1	5.6
	Identity	1	5.6
	Mental Skills (broadly stated)	1	5.6
	Observational Learning	1	5.6
	Perspective	1	5.6
	Professionalism	1	5.6

Note. Topic could be content of an entire module or presented within a given module; *n* represents the number of programs to include that topic.

be delivered before registering. If this information is not provided or is unclear, perhaps they will move on to a new program or give up their pursuit of PST altogether. Interestingly, though over 70% of these programs were created by individuals with graduate-level education in (sport) psychology, the low DISCERN scores across programs suggest the need to give deliberate attention to the information used to promote a program. With at least 12 of the 18 programs created following the onset of the COVID-19 pandemic, it is possible that many who created these programs were pivoting from in-person to online programming. As researchers have noted the extensive knowledge of both education and technology (not to mention sport psychology) needed to sufficiently create an online PST program (Farres & Stodel, 2003; Weinberg et al., 2012), perhaps creators would have benefitted from extra training in these areas. Thus, it is possible that the low DISCERN scores reflected creators' limited training or knowledge on how to promote their program, as opposed to a lack of content knowledge.

Several findings provide insight into who these programs were designed to serve. It was encouraging that most online module-based PST programs were framed for athletes of all competitive levels, demonstrating the potential for non-elite athletes to access PST (Farres & Stodel, 2003; Weinberg et al., 2012). Nevertheless, almost 40% of programs did not indicate which athlete populations their program was designed for, which could undermine the proportion of available programs intended for all athlete populations. With a host of barriers to in-person PST (e.g., limited consultants, logistical challenges; Martin, 2020; Weinberg et al., 2012; Wylleman & Lavallee, 2004), it is important that online PST programs are available to all athletes. This could involve general programs that aim to provide online PST to as many athletes as possible. Another approach is to design online modules for specific athlete populations. For example, programs may be tailored specifically for youth athletes or other underserved athlete populations (e.g., para-athletes; Bastos et al., 2020). Along the lines of inclusion, programs' home pages predominantly included images of white and male athletes compared to females and visible minorities. Researchers in sport psychology have discussed the need to advocate and include programming for athletes of diverse populations (e.g., Bejar et al., 2022; Krane & Waldron, 2021; Schinke et al., 2019). Schinke and colleagues (2019) discussed the importance of practitioners taking steps to become educated and aware of diversity and the role they play in facilitating positive experiences with their athletes. Online PST programs may not include the one-on-one nature of traditional PST in sport psychology; however, the practitioner (or creator of the program) can still ensure the athlete feels safe and supported in this environment (Barazzone et al., 2012). Although such aspects may largely be dependent on interactions while participating in the online PST program itself, ensuring that all elements of a program (e.g., including home pages) create and maintain such a connection is important to fostering inclusion for all athletes.

Program characteristics related to cost and internet access may also impact who can access these programs. Although eight programs featured costs of $100 or less (i.e., the low-end rate of in-person PST; Neff & Carlson, 2016; Weinberg et al., 2012), six programs were $300 or more, suggesting that whether an online module-based PST program is more cost-effective than in-person PST is dependent on the program. With such variations in cost, it would seem consumers (e.g., athletes, parents, coaches) may need to conduct a more thorough search of programs and compare various price points to find one that works with their budget. In addition to the cost of the program itself, it appeared all programs required access to high-speed internet; that is, the program cannot be downloaded and completed without the internet. This could present a barrier for athletes to access these programs. For example, a 2019 survey of over one hundred million households in the United States showed that 32% of households were without a computer with high-speed internet; those living in rural communities or those of various minority groups (e.g., Hispanic, Black) were significantly more likely to be without internet compared to those living in metropolitan areas or who were white (Curtis et al., 2022). Regarding online PST programs, it may be advantageous to consider avenues for offering downloadable programming that may be more accessible for athletes within these populations.

There was great variability in how modules were delivered. For instance, the average number of modules per program was eight, however, this ranged from four to 21. Further, although the length of time required to complete a program was often omitted, when this was provided, it also varied drastically between programs. Such discrepancies raise questions regarding the ideal number of modules or program length. On the one hand, offering more modules could be viewed as favorable, given that a wide variety of content areas could be presented. For example, Driska (2018) found that coaches had favorable impressions of a coach education program that contained roughly two hours of content spread over a series of modules. On the other hand, a shorter program could help maintain interest and, in turn, program adherence (e.g., Beatty & Binnion, 2016).

Researchers in online education have noted that online learning in shorter durations (e.g., less than 11 minutes) and incorporating interactive activities lead to higher completion rates (Geri et al., 2017). In regard to online modules for PST, such answers are at the intersection of what athletes desire and what practitioners aim to provide. In addition, information on specific within-program delivery modes (e.g., communicative functions; Webb et al., 2010) was largely absent from program home pages. Although such features may appear within the program itself, providing information on these interactive elements could help promote the program to athletes, parents, and coaches (Beatty & Binnion, 2016; Farres & Stodel, 2003; Weinberg et al., 2012).

Many of the topic areas within sport psychology associated with these programs aligned with common psychological skills and competencies (Durand-Bush et al., 2023; Ely et al., 2023). Imagery was the most prominent topic mentioned, which is not surprising given its empirical support and practical application (Cumming & Williams, 2013; Munroe-Chandler & Hall, 2021). With goal setting and self-talk also listed quite frequently, it appears online PST programs are adopting many basic mental skills, all of which lay the foundation for the development of more complex skills (Ely et al., 2023). Fundamental and self-regulation competencies of the Gold Medal Profile for Sport Psychology (Durand-Bush et al., 2023) were also oft-mentioned, signaling the breadth of content areas presented across programs. Moreover, although improving sport performance was the most common target outcome (Barker et al., 2020), a host of other outcomes were mentioned without much consistency. Together, it appears more deliberate attention should be placed on identifying specific target outcomes and offering greater transparency on how certain psychological skills and competencies contribute to achieving such aims.

Limitations

There are several limitations to this study that should be addressed. First, it is possible that other online PST programs exist beyond those identified in the current study. Using additional search terms or going beyond the first 25 'hits' may have identified other programs to include. Second, although information related to online PST programs was assessed, no learning modules associated with these programs were reviewed as part of this process. In clinical psychology, researchers have examined specific programs by engaging in the program itself to assess various design and delivery elements (Barazzone et al., 2012; Webb et al., 2010). As those programs had already demonstrated clinical effectiveness, such insights were used to explain why programs were effective. In the landscape of online PST programs in sport, no such effectiveness trials have been conducted; thus, the present study focused on the description of online PST programs more broadly. Third, although information on program content or delivery may have been limited to program home pages, it is possible such information is, in fact, presented within the program itself. Thus, these findings do not insinuate that these programs lack this information within their program but rather demonstrate the lack of transparency on program home pages. Fourth, visual analyses of sex and visible minority status were based on physical appearance and, therefore, were not intended to assess these individuals' identified gender or racial group. Although this is a limitation to conducting a visual analysis based on physical appearance, doing so aligns with the scope of this paper, wherein only information available to the consumer was assessed. By including information on sex and visible minority status, these findings contribute to the discussion around equity, diversity, and inclusion within sport psychology research and practice. Fifth, no between-program analyses were conducted. Such insights could be useful to describe if programs of higher or lower cost differ in terms of what is included within a program, among other comparisons. Finally, sport psychology topics were only described by the information available on program home pages, which does not account for additional topics that may be provided within the modules themselves or how these topics are taught.

Future Directions

The descriptive nature of this research provides many opportunities for future research. With 18 online PST programs identified, there is a great need for researchers to evaluate the effectiveness of such programs (Farres & Stodel, 2003; Weinberg et al., 2012). Little is known concerning the success of achieving the program's aims or if they help athletes acquire information on PST. Before more detailed exploration into program-specific features can be conducted (e.g., Webb et al., 2010), it is imperative to understand if online PST programs are a sufficient tool for athletes to pursue PST online. In addition, the current systematic review methodology (Rew et al., 2018) and the use of the DISCERN instrument (Charnock et al., 1999), to our knowledge, are new to the area of sport psychology. Researchers may consider using such approaches to evaluate the quality of websites that disseminate information on sport psychology to help extend knowledge mobilization initiatives (Graham et al., 2006). Last, information present on the home pages

of online PST programs appears to both serve as an educational resource and marketing tool for potential consumers (Farres & Stodel, 2003). Research exploring what information is of interest to athletes and other sport stakeholders would be useful to optimize such programs moving forward.

Practical Implications

The identification and description of online module-based PST programs is of practical importance to numerous sport stakeholders. Athletes and coaches should be made aware that these programs exist and are available online. Although there is a need to evaluate these programs for their effectiveness, the availability of such programs offers another avenue for athletes and coaches to pursue PST. Findings related to program characteristics will certainly be of interest to practitioners interested in developing or improving an online PST program. Although great effort likely goes into the development of the modules themselves, perhaps equal weight should be put towards providing quality details on the program on their website. This could be thought of as the first 'rapport builder' between practitioner and athlete and may have implications for whether someone will engage in a program or not. Finally, given the complexity of developing online learning modules, practitioners may benefit from collaborating with a multidisciplinary team to create such a platform. For instance, this may include practitioners in clinical psychology who have developed self-help programming or educational learning specialists familiar with the use of such technology.

Conclusion

In this paper, online module-based PST programs were identified and described. Using a systematic review methodology to conduct an internet search of available online PST programs, 18 unique programs were found and subsequently described. Overall, indicators of quality suggest that the information presented on each website was poor, despite over 70% of the programs being created by individuals with graduate-level education in (sport) psychology. Moreover, various program characteristics were described, with variables categorized as access and audience, delivery, and content. In general, most online module-based PST programs were framed for athletes of all competitive levels, varied in program length, and promoted the inclusion of many well-established psychological skills and competencies within the program. This study offers a descriptive account of online PST programs, introduces a unique methodology to sport psychology research, and outlines many areas for future research. Most notably, this research highlights the need for further investigation into the effectiveness of online PST programs and exploration into what information athletes want to see on program home pages..

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