

A conceptual model for mental health and performance of North American athletes: A mixed methods study

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ABSTRACT

Objective: The demands of sport create psychological and physical challenges for athletes, making it essential to understand what factors contribute to mental health and performance optimization in sport. The purpose of this mixed-methods investigation was to develop a conceptual model for mental health and performance of North American athletes.

Method: Forty-three experienced athletes, coaches, and sport professionals identified, sorted, and rated 113 behaviors, thoughts, and feelings that contribute to optimal mental health and performance for athletes. Using Multidimensional Scaling, the research team created a two-dimensional point map of participant responses. Hierarchical Cluster Analysis was then used to reveal underlying clusters in the data.

Findings: Seven clusters emerged from the data: Stress Management, Mental Skills, Self-Awareness, Managing Setbacks, Intentional Practice, Team Relationships, and Social Support. Though all clusters were rated as important to mental health and/or performance, the Managing Setbacks cluster displayed high importance ratings for both mental health and performance.

Conclusion: Our preliminary findings suggest a comprehensive approach to athlete thoughts, feelings, and behaviors contributes to optimal mental health and performance for North American athletes.

The life of an athlete is one in which competitive performance demands, organizational pressures, and personal stressors require high levels of resilience (Sarkar & Fletcher, 2014). Though athletes are expected to meet the demands of training and competition to excel, such demands can create difficulties for those who strive to balance their responsibilities in sport with other areas of life (Whitehead & Senecal, 2020). The desire to meet these demands can take a toll and contribute to decreased mental health in athletes (Henriksen et al., 2020). Mental health is defined as “a state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community” (World Health Organization (WHO), 2014, p. 2).

Sport culture in North America, which can encourage athletes to prioritize performance over well-being (i.e., a state of optimal functioning; Ryan & Deci, 2000), tends to stigmatize mental health concerns when they arise (Whitehead & Senecal, 2020). Though organizations have invested resources toward athlete mental health in recent years (e.g., NCAA Sport Science Institute, 2016; USOPC, 2020), conflicting

messages remain. For example, collegiate sports in the United States are a significant revenue source for higher education institutions (Barnes, 2020). Athletes in the highest level of intercollegiate sport may also rely on athletic scholarships to fund their post-secondary education, which creates pressure to prioritize performance over well-being (Barnes, 2020). The time of collegiate athletes becomes limited, and they may find it difficult to engage in activities outside of sport that support their well-being (Karagiorgakis & Blaker, 2021). In addition to psychosocial stressors, the physical expectations of collegiate athletes can promote intense training regimens while simultaneously demoting other important aspects of health (e.g., sleep, nutrition, social relationships; Whitehead & Senecal, 2020).

Elite and professional athletes also face demands that pertain to performance, sport culture, and work and family roles (Ni et al., 2021). Career uncertainty, financial insecurity, relocation, and injury also contribute to the stress of professional athletes (Noblet & Gifford, 2002). Finally, the physical demands of an elite athlete may be inflexible and intense, leading to difficulty with work-life balance and an increased likelihood of burnout (Ni et al., 2021).

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The cultural context above suggests North American athletes may face mixed messages regarding their mental health and performance. As Corman et al. (2019) state, there is “a deeply institutionalized system of cultural narratives [that] promote toughness, masculinity, perseverance, and opportunity for those who adhere to these ideals” (p. 17). As concerns increase regarding the mental health of North American athletes (Jurecka et al., 2021), it is essential to conceptualize their mental health and performance within their cultural context. The International Society of Sport Psychology (ISSP) recognizes these nuances in sport; they recently called for “a more contextualized definition of athlete mental health and more comprehensive strategies of assessment” (Jurecka et al., 2021, p. 553). The sport psychology field thus has an obligation to understand how athletes can work toward sport optimization while prioritizing their mental health. This mixed methods study centers the perspectives of athletes, coaches, and sport professionals to create a conceptual model for athlete mental health and performance.

Factors that promote athlete mental health and performance

Social support, sport psychology services, psychological skills training, and physiological factors have consistently shown benefits for athlete mental health and their performance (e.g., Amemiya & Sakairi, 2019; Gavrilova & Donohue, 2018; Gulliver et al., 2012). Athletes who feel a sense of value, support, and belonging are likely to experience strong mental health in and outside of sport contexts (Gavrilova & Donohue, 2018; Kuettel & Larsen, 2020). Meaningful and authentic relationships are powerful tools for well-being and may serve as protective factors for mental health concerns (Kuettel & Larsen, 2020). Such relationships may also prevent early dropout and support the continued development of high performance (e.g., Rocchi et al., 2020).

Researchers have also examined what types of services cultivate positive experiences for athletes, as well as how to make quality services more accessible. Athletes may experience stigma or ambivalence when seeking sport psychology services (Gulliver et al., 2012). Research suggests athletes are more likely to use services when others offer support and education regarding mental health services (Kuettel & Larsen, 2020). Providers who integrate sport-specific services and mental health interventions into athletic culture may also facilitate higher levels of satisfaction in their athletes (Donohue et al., 2018; Gulliver et al., 2012). By creating welcoming environments and demonstrating an understanding of sport culture, athletes may be more receptive to services that can promote their mental health (Gulliver et al., 2012).

An athlete's desire to maximize performance and mental health may also lead them to pursue psychological skills training. Imagery (MacNamara et al., 2010; Post et al., 2012), self-talk (Rothlin et al., 2020), goal setting, focus and distraction control (MacNamara et al., 2010), activation, and relaxation (Rothlin et al., 2020) all contribute to athletic performance in various ways. For example, the use of psychological skills is associated with increases in one's intention to use adaptive coping strategies needed for positive mental health outcomes (Sullivan et al., 2021). Studies about resilience training for athletes have shown promising results with respect to balancing the demands of a competitive athlete (Chung et al., 2013; Sullivan et al., 2021). Other researchers have suggested mindfulness interventions may improve performance while also reducing levels of burnout in athletes (Amemiya & Sakairi, 2019).

Physiological factors and proper recovery strategies also need to be managed when working toward performance optimization (Kellmann et al., 2018). To create an adaptive response and prepare for peak performance, athletes train to trigger an allostatic stress reaction in their body, resulting in physiological adaptations. Sleep (Watson, 2017), recovery time (Kellmann et al., 2018), proper nutrition (Bytomski, 2017) all play a critical role in performance given the toll that training has on the body. Additional forms of recovery may include cold-water immersion, massage, light physical activity, and social activities (Kellmann et al., 2018). When such factors are neglected, athletes are more likely to

experience overtraining syndrome, injury, illness, or plateaus in performance (Kellmann et al., 2018), or burnout (Gustafsson et al., 2008).

The study

Scholars have recognized that the mental health and performance optimization of athletes is a complex and nuanced issue (e.g., Gucciardi et al., 2017; Henriksen et al., 2020), and have suggested that the goal is to prevent ill-health while simultaneously enhancing mental health and performance. The purpose of this mixed-methods investigation was to create a conceptual model of factors that contribute to optimal mental health and performance for North American athletes.

Method

Concept mapping

Group Concept Mapping is a mixed methods approach to research that begins in an inductive manner by using the knowledge and insight of content experts (Kane & Trochim, 2007). Rather than defining a topic prior to conducting the study, researchers present an open-ended brainstorming prompt to participants. Qualitative responses are then sorted and ranked via multidimensional scaling and hierarchical cluster analysis to create a diagram of clusters to represent the topic of interest. Hence, qualitative and quantitative data are integrated consistently throughout the research process to create the mixed methods design (Rosas & Kane, 2012).

With respect to phenomenological positions, concept mapping embraces the complexity of participatory research approaches and group level models (Rosas, 2017). Rosas (2017) argues that the phenomenological lens of “emergent complexity” serves as the foundation to group concept mapping (p. 1409). Concept mapping methodologists view knowledge generation as an emergent process, through which latent constructs are revealed via a non-uniform pattern of information (i.e., a cluster map). Though the cluster map may seem uneven and non-uniform at first, it represents the relationships between constructs as well as the agreement and disagreement between and amongst participants (Rosas, 2017). Group concept mapping is a methodology ideally suited for several situations, including the need to conceptualize complex constructs (Kane & Trochim, 2007) such as athlete mental health and performance.

Research positionality

The four research team members are athletes with work experience in the sport industry and graduate education in sport psychology and organizational leadership. Their sport experiences range from recreational participation to Olympic competition. Each team member approached the project with experiences that influenced the approach to the investigation. To be mindful of biases that could affect findings, team members engaged in regular conversations about experiences in sport. Such conversations informed important decisions during the data reduction phase and when determining how many clusters to include in the final model.

Participants

The research team used purposive sampling to identify athletes, coaches, and sport professionals who represented a variety of competitive levels and sports. In group concept mapping, the goal for sampling is “to achieve a broad sampling of ideas rather than a representative sampling of persons” (Kane & Trochim, 2007, p. 36). A maximum variation approach was used to attain a broad set of ideas that represented the large constructs of athlete mental health and performance (Palinkas et al., 2015). The primary investigator contacted colleagues in her professional network and asked them to identify professional and

collegiate athletes, professional and collegiate coaches, high school and club coaches, athletic trainer, physical therapists, team physicians, and athletic counselors who had knowledge and insight into athlete mental health and performance. The recruitment email emphasized that the team needed to diversify participants with respect to demographics, sport, and level of competition. Participants were then selected to represent a broad array of expertise, occupation, and experience in sport. This recruitment method ensured that a full conceptual model could emerge from the data. More specifically, a heterogeneous sample provides more data for the statistical analyses and results in a clearer cluster map (Kane & Trochim, 2007). A total of 83 potential participants were identified via this approach.

Forty-three participants contributed to one to three phases of the research study; 32 participated in the brainstorming phase, 31 participated in the sorting phase, and 38 participated in the rating phase of the research. Twenty three of the 43 participants contributed to all three phases of the research. The decision to include participants in several phases of the research aligns with the participatory approach and supports the goal of creating a group level model (Rosas, 2017). The number of participants in the current investigation is similar to other concept mapping studies (see Rosas & Ridings, 2017). In a recent systematic review of 23 concept mapping studies, researchers found that the average number of participants in the idea generation step was 38 (Rosas & Ridings, 2017). The average number of participants in the sorting and ratings tasks was 27. Though the number is small in comparison to quantitative studies, it is considered adequate for concept mapping; the goal is to reach saturation of data, during which the same themes continue to appear in the brainstorming process and no new information appears with the addition of participants. Additionally, because there is no need to calculate an effect size to determine the strength of an effect or a relationship in concept mapping, the relatively low sample size is sufficient for the concept mapping methodology.

Of the 43 participants, 25.58% ($n = 11$) were men and 62.79% ($n = 27$) were women. One participant was non-binary; 4 participants refrained from responding. Approximately half of the participants (48.84%, $n = 21$) were coaches or sport medicine professionals and 41.86% ($n = 18$) were athletes. The sport professionals included sport psychologists, sports medicine physicians, sport dietitians, a director of operations, two learning specialists for student athletes, an exercise physiologist, physical therapists, athletic trainers, and certified mental performance coaches.

Fifteen participants worked or competed at the professional, elite, or Olympic levels (34.88%). Nineteen respondents worked or competed at the collegiate level (44.19%). Three participants (6.98%) worked with or competed as amateur athletes and two (4.65%) worked with high school athletes. Four participants did not identify their level of competition.

Participants worked with or competed in a variety of sports, including basketball, ice hockey, softball, cycling, cross country, track and field, race car driving, rowing, American football, soccer, golf, baseball, triathlon, lacrosse, CrossFit, tennis, ninja and obstacle course racing, gymnastics, skiing, wrestling, figure skating, and swimming.

Procedure

Our team used a software, groupwisdom™, to facilitate execution of the research study (The Concept System® groupwisdom™, 2021). This software program allows researchers to conduct group concept mapping work remotely. Our team used our research question to guide the development of the brainstorming prompt, which served as the foundation for the research. Our prompt for participants read as follows:

“Please reflect on your experiences in sport and your observations of athletes. Consider what behaviors, thoughts, and feelings contribute to optimal mental health and performance in athletes. Then,

complete the following sentence. For athletes to maximize their mental health and performance, they should ...”

After agreeing to participate in the research, participants received a username and password for the groupwisdom™ website (The Concept System® groupwisdom™, 2021). They then accepted the informed consent to participate and responded to the following demographic questions: gender, sport, level of competition, and job title. Next, they responded to the brainstorming prompt above in groupwisdom™. Given the qualitative nature of the investigation, we did not provide a specific definition for mental health or performance, as we did not want to bias the findings. By leaving this prompt open-ended, we were able to capture a comprehensive view of each construct that reflected the multi-disciplinary sample of participants. Instructions for the brainstorming phase were as follows:

Thank you for taking the time to share your knowledge with our team! In this activity, you will add your valuable ideas to the project. You will also see the contributions of other participants as you brainstorm your ideas. Your input will set the stage for other activities in this project, so please pay attention to the main focus prompt - this is what our project is all about. Please keep each statement brief - just one unique idea per statement! You may add as many statements as you wish. Please think carefully about your ideas. Consider different experiences or information relating to the focus prompt.

All participants could view one another's statements as they were collected, which created a brainstorming experience like that of in person focus groups.

Next, the research team edited 225 unique participant statements that reflected the thoughts, feelings, and behaviors of athletes. The team reduced them to 113 statements using concept mapping criteria for the idea synthesis stage. We ensured each statement reflected one unique idea, was relevant to the brainstorming prompt, and could be rated on a Likert-type scale (Kane & Trochim, 2007). Statements were also edited for clarity and comprehension. Redundant statements were combined or removed (e.g., “be mindful of what they are experiencing,” “be mindful in training and competition”). Statements were finalized via a consensus process between the research team and one external auditor (i.e., sport psychologist). The goal for the final item set was to have a clear, comprehensive, and manageable number of statements for participants to sort and rate in the next phase of the study (Kane & Trochim, 2007).

For the next phase of participation, the research team presented the 113 statements to participants and asked them to sort them into piles based on conceptual relatedness to one another. Participants returned to the groupwisdom™ website to complete this step remotely and independently. After logging in, they received instructions on the sorting and rating tasks:

In this activity, categorize statements into piles according to your view of their meaning. To do this, sort each statement into piles in a way that makes sense to you. Group the statements based on how similar in meaning they are to one another. Read through the statements in the left sidebar. Sort each card into a pile as you create your version of how these ideas are related. Give each pile a name that describes its theme or contents. You can start naming the piles or groups right away, or name them as you go. You'll have the chance to check all your piles when you are finished. People vary on how many piles they create. Usually, 5 to 20 piles work well to organize this number of statements.”

These instructions were standardized by groupwisdom™ and designed by methodologists with expertise in group concept mapping. Finally, participants rated each of the 113 statements via a 5-point Likert scale (1 = *not at all important*, 5 = *extremely important*) on the importance of each statement to mental health. They then rated each statement on its importance to performance.

Statistical analyses

The statistical analyses for this investigation reflected the original group concept mapping analyses proposed by Kane and Trochim (2007), the founders of the group concept mapping method. After all participants completed the sorting task described above, groupwisdom™ created a 113×113 similarity matrix for each of the 31 participants (The Concept System® groupwisdom™, 2021). Each row and column within the matrix represented 1 of the 113 items in the model. These matrices were consolidated into one matrix to reflect the number of participants who sorted each item with the other items (Kane & Trochim, 2007). A “0” in a cell signified that no participants placed the two designated items in the same category, whereas a “31” signified that all 31 participants placed the two designated items in the same pile for the sorting activity. The software program then performed a nonmetric multidimensional scaling analysis to create a two-dimensional point map (see Figure 1). This statistical analysis is used for Group Concept Mapping studies because it effectively converts matrix data (i.e., similarity matrix) into an X-Y graph to aid in the interpretation of data.

Each point on Figure 1 represented one item. Items placed close to one another on the map were conceptually like one another because several participants grouped them into the same piles (Kane & Trochim, 2007). Items far apart from one another on the point map were seen as conceptually dissimilar to one another because participants were not likely to sort them into the same pile. Figure 1 is further discussed in the Results section.

Groupwisdom™ then ran a Hierarchical Cluster Analysis (HCA) to determine how items could be grouped with one another conceptually based on the sorting task (The Concept System® groupwisdom™, 2021). HCA is the preferred statistical analysis for group concept mapping because it places the items on the map into groups based on conceptual similarity (Kane & Trochim, 2007). The HCA provided solutions ranging from 4 to 18 clusters. As suggested by Kane and Trochim (2007), the research team identified the upper and lower limits for interpretation and reviewed each model within that range. The goal of this process was to identify the simplest solution in which each cluster was conceptually distinct from the others.

The team reviewed each model that included between 4 and 8 clusters and proceeded to follow concept mapping guidelines for the selection of clusters (Kane & Trochim, 2007). Starting with the 4-cluster model, the team examined the cluster that was separated when moving to a 5-cluster model. The team then considered whether the statements

within this cluster were best understood as one cluster or two. This same process was applied to subsequent models until the team reached the 8-cluster model.

The team selected the seven-cluster model; this model captured the nuances of mental health and performance in sport in the most parsimonious manner. The six-cluster model was also considered, though the team felt that the differences between social support and team relationships were conceptually different enough to retain separate clusters. The seven clusters were then superimposed onto the point map to display each cluster of items that contributes to mental health and performance in athletes. The team used participant names and titles for their respective piles from the sorting task to name each cluster in the model.

Methodological integrity

The research team took several steps to ensure methodological integrity. First, to ensure adequacy of the data (Levitt et al., 2017), we selected a heterogeneous group of participants to capture diverse perspectives that were relevant to the research question. To limit the effects of researcher bias, we discussed how our experiences in sport informed our understanding of the data. The fourth author's experiences as an Olympic athlete led the team to adjust the planned analysis early on. Initially, the team planned to ask participants to rate each item based on its importance to athlete mental health and performance within one question. Following his reflection, we split the ratings into two categories: 1) mental health; and 2) performance.

We ensured that findings were grounded in evidence by using direct quotes and excerpts from participants whenever possible (Levitt et al., 2017). The research team regularly reminded one another to “stay close to the data,” particularly when cleaning the data to reduce the initial item pool to 113 statements. For example, when choosing whether items were redundant with one another, the research team first processed how personal biases influenced their understanding of each item (e.g., “take time for self-care,” “develop a balanced routine”). No alterations were made to methodology during the project, which ensured consistency in the analytic process. Two external auditors, both of whom are sport psychologists with expertise in athlete mental health and performance, served as external auditors for the final stage of data analysis. During this process, the auditors received 3 possible solutions for the data (i.e., 6 clusters, 7 clusters, 8 clusters) and provided the research team with feedback on each solution. Both auditors favored the 7-cluster solution,

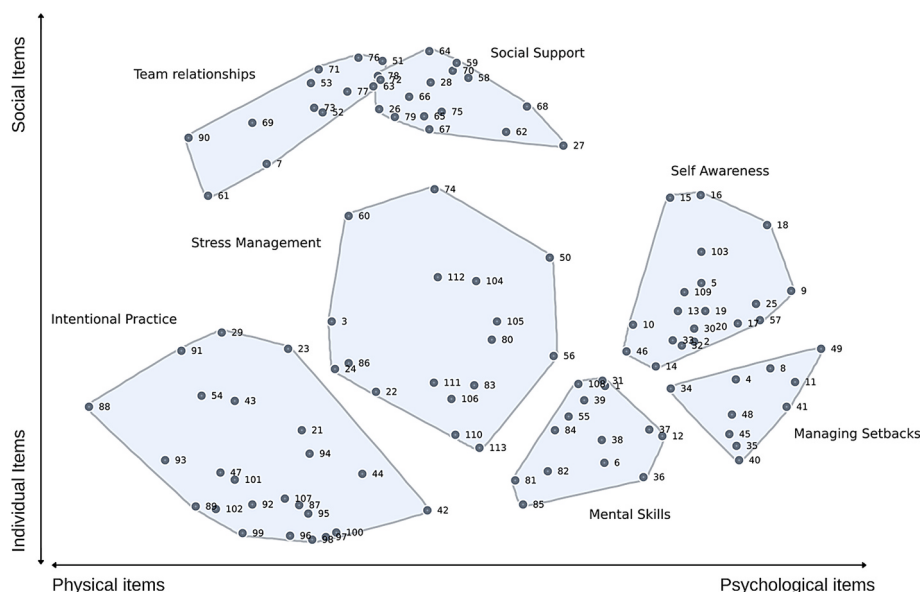


Figure 1. Two-dimensional solution derived from multidimensional scaling analysis and hierarchical cluster analysis

given that it captured the nuances between team relationships and other areas of social support for athletes.

Results

Wellness and performance clusters

The 113 items and their corresponding clusters can be found in Table 1. The first cluster in the model, titled *Stress Management*, included behaviors that promote balance in various aspects of life. This cluster included items such as building stress relieving activities into one's schedule. The cluster also included a willingness to use the support resources (e.g., support groups, counseling) available to athletes. The most important behaviors in this cluster included being flexible with unexpected circumstances and knowing when to take a break due to physical or mental stress.

Mental Skills was the second category and included items in psychological skills training modules: goal setting, mindfulness, imagery, and present-moment focus. The most important items in this category included setting aside time for mental preparation before competition, regularly revisiting the athlete's purpose for competing, and being present in the current moment.

The third cluster in the model was titled *Self-Awareness*. This cluster included behaviors that promote awareness of an athlete's values, emotions, and past experiences (e.g., know how emotions affect performance and training). Items in this category also captured behaviors that are likely to promote self-compassion and reflection in athletes (e.g., be kind to yourself when you need a break). The top-rated items included "don't expect perfection in life or sport" and "view challenges as opportunities for growth, rather than points of potential failure."

The next cluster, *Managing Setbacks*, reflected a willingness to prepare for and face adversity. The items that were sorted into this cluster include the ability to accept emotions, effectively manage distractions, and let go of unhelpful thoughts that may negatively affect competition. This cluster also included skills and behaviors that are needed in high pressure situations that demand focus and attention on the present moment. The items with the highest rated importance in this category included "do not be afraid of failure," "let go of mistakes and unhelpful thoughts," and "effectively manage performance-related anxiety." This cluster also included the ability to shift one's mindset when things are not going well.

The fifth category was titled *Intentional Practice* and included items that contribute to physical and psychological restoration. Nutrition, sleep, stretching, rehabilitation exercises, rest, and training consistency were included in this cluster of items. Of these, the most important items included taking a day to decompress when needed, maintaining good sleep patterns, and taking care of physical well-being during intense training regimens.

The final two clusters pertained to interpersonal relationships. *Team Relationships* included items that demonstrated the importance of having strong, meaningful connections with teammates and coaches. Items in this cluster also included the willingness to have open and honest conversations with coaches. The items with the highest importance in this category were "feel challenged and supported in your training environment," maintain clear communication with coach(es) about what is going well and what is not, collaborate with coaches to create personalized training, and develop meaningful relationships with teammates.

Finally, participants identified *Social Support* as an important cluster to mental health and performance. Behaviors, thoughts, and feelings in this cluster reflected those that are associated with a strong social support system. Items included having people to go to during times of triumph and defeat without the fear of judgement, particularly outside of sport. This cluster also included having mentors and people in one's network that see beyond a person's identity as an athlete. In this cluster, the most important behavior to mental health and performance was to seek out honest feedback from trusted sources. Other important items

included developing a strong support network and having people to talk to about successes and failures.

Figure 1 depicts the seven-cluster model for athlete mental health and performance. To assess suitability of the model to the data, we used a fit called the stress value (Rosas & Kane, 2012). This value reflects the extent to which the multidimensional scaling analysis aligns with the data in the original similarity matrix. Lower stress values reflect a good fit to the model. The average stress value for concept mapping studies is 0.28 ($SD = 0.04$; Rosas & Kane, 2012). Our stress value for the research was 0.246, suggesting the data were a good fit to our model.

The 113 items from the sorting and rating phase can be found in figure one. Items that are close to one another on the map represent items that are conceptually like one another (e.g., talk openly with others about mental health; feel comfortable sharing concerns without fear of being shamed or punished). Items that are placed far from one another on the map are conceptually different from one another (e.g., reflect on the impact of current events; follow guidelines for injury prevention).

The size of each cluster represents the breadth of thoughts, feelings, and behaviors within each area. In this case, clusters that are relatively large are likely to capture a broad construct (e.g., *Stress Management*). Clusters that are relatively small reflect a specific construct of items with high similarity (e.g., *Mental Skills*). The cluster map can also be interpreted by visualizing an X and Y axis. Items along the top of the Y axis represent social thoughts, feelings, and behaviors (e.g., have honest conversations with teammates whereas items along the bottom of the Y axis represent individual thoughts, feelings, and behaviors (e.g., track progress toward goals). Items along the left side of the X axis pertain to physical thoughts, feelings, and behaviors (e.g., follow guidelines to prevent injury); Items along the right side of the X axis pertain to psychological thoughts, feelings, and behaviors (e.g., let go of unhelpful or negative thoughts).

Item importance ratings

Figure 2 displays the relationships between mental health and performance at the item level. Each point on the graph represents one of the 113 thoughts, feelings, and behaviors in the model with respect to its perceived importance to mental health and performance. Items in the top left quadrant (Quadrant 1) displayed moderate importance to mental health and high importance to performance. This quadrant included items such as mobility exercises and nutrition. Items in the top right quadrant (Quadrant 2) were rated as having high importance to mental health and performance. Such items included belief in self and viewing challenging situations as opportunities for growth. Items in the bottom left quadrant (Quadrant 3) were rated as having moderate importance to mental health and performance (e.g., intuitive eating). Items in the bottom right quadrant (Quadrant 4) were rated as having high importance to mental health and moderate importance to performance (e.g., feeling supported by family and friends).

Cluster Ratings for mental health and performance

Following the cluster analysis, the team examined the average rating of each cluster based on its importance to 1) mental health; and 2) performance. As seen in Figure 3, all clusters were rated as at least somewhat important to mental health and performance. *Social Support*, *Managing Setbacks*, *Self-Awareness*, and *Stress Management* were rated as being important to mental health. *Intentional Practice*, though moderately important, was lowest in importance to mental health when compared to the other clusters. With respect to performance, *Managing Setbacks* was the highest rated cluster, followed by *Intentional Practice*. *Social Support* was lowest in comparison to others and was seen as somewhat important to performance. Internal consistency for mental health ratings amongst participants was strong ($\alpha = 0.980$), as was the internal consistency for performance ratings ($\alpha = 0.981$).

Table 1
Factors, importance ratings, and quadrants for athlete mental health and performance items.

Item		M _{MH}	M _{PERF}	Quad*	Item		M _{MH}	M _{PERF}	Quad
Stress Management					Managing Setbacks (cont.)				
3	Flexible with unexpected circumstances	3.94	4.30	2	40	Manage performance-related anxiety	4.25	4.73	2
22	Identify areas of improvement in performances	3.31	4.23	1	41	Shift mindset when things are not going well	4.23	4.60	2
24	Know when to take a break due to stress	4.53	4.24	2	45	Mentally prepare for adversity	4.08	4.23	2
50	Willing to get professional mental health support	4.69	4.20	2	48	Focus on controllables	4.66	4.47	2
56	Take care of mental health during intense training periods	4.46	4.20	2	49	Let go of mistakes	4.38	4.20	2
60	Use resources such as counseling	4.27	4.00	2	Intentional Practice				
74	Spend time with people outside of sport	3.77	3.00	3	21	Give self a day to decompress when needed	4.20	4.20	2
80	Be aware of how behaviors outside of sport affect goals	3.58	4.10	1	23	Analyze performances for what went well	3.60	4.33	1
83	Enjoy the process of personal & athletic development	3.89	4.10	1	29	Celebrate small wins	3.89	3.97	3
86	Create goals that pertain to things other than outcome	3.97	3.70	4	42	Put forth 100% effort	3.06	4.50	1
104	Have good balance between different areas of life	4.08	3.53	4	43	Be on time & prepared	3.38	4.00	1
105	Be willing to say “no” when maxed out	4.53	3.70	4	44	Consistent daily & weekly schedule	3.54	3.80	3
106	Take accountability for actions	3.63	4.07	1	47	Maintain consistent training schedule	3.14	4.20	1
110	Use effective strategies to decompress	4.17	3.72	4	54	Feel good about their body	4.14	3.70	4
111	Be intentional with time spent in each area of life	3.74	3.83	3	87	Use hunger & fullness cues to guide eating behavior	3.14	3.13	3
112	Have interests outside of sport	4.42	3.38	4	88	Follow guidelines to prevent injury & burnout	3.61	4.30	1
113	Take time for self-care activities	4.37	3.62	4	89	Complete workouts as assigned	3.49	4.27	1
Mental Skills					91	Quickly address issues that impact training	3.86	4.33	1
1	Use strategies to increase motivation	3.66	4.30	1	92	Follow dedicated rest periods	3.92	4.47	1
6	Practice visualization using all 5 senses	3.03	3.83	3	93	Understand how physical factors affect health & performance	3.54	4.24	1
12	Mental preparation before competition	3.94	4.28	2	94	Minimize stress on recovery days	3.92	4.27	1
31	Revisit the “why” behind sport	4.00	4.17	2	95	Good sleep habits	4.33	4.67	2
36	Present moment awareness	4.06	4.50	2	96	Be fully attentive to food they eat	3.16	3.67	3
37	Mindfulness activities	3.66	3.63	3	97	Eat well balanced meals	3.59	4.30	1
38	Manage distractions	3.57	4.20	1	98	Fuel bodies with nutrients needed for health & recovery	3.81	4.57	1
39	Take calculated risks	3.06	3.97	1	99	Mobility exercises	2.84	4.30	1
55	Know personal signs of stress	4.67	4.17	2	100	Get the amount of sleep needed for health & recovery	4.51	4.73	2
81	Measurable short-term goals	3.68	3.97	1	101	Refrain from alcohol & drug use	3.67	4.20	1
82	Clear long-term goals	3.36	3.83	3	102	Complete rehab or PT exercises as assigned	3.09	4.27	1
84	Goals that are personally meaningful	4.17	3.97	4	107	Take care of physical well-being during intense training	4.08	4.60	2
85	Track progress toward goals	3.50	3.86	3	Team Relationships				
108	Behave in ways that reflect values	4.09	3.53	4	7	Have choices regarding approach to training/competition	3.66	3.70	3
Self-Awareness					51	Teammates care about their well-being	4.17	3.59	4
2	Do not expect perfection	4.47	4.07	2	52	Medical staff cares about their well-being	4.08	3.80	4
5	Be kind to self when fall short of expectations	4.49	3.97	4	53	Coaches care about their well-being	4.06	3.77	4
9	View challenges as opportunities for growth, not failure	4.11	4.43	2	61	Feel challenged & supported in training	3.92	4.17	1
10	Reflect on & learn from experiences	3.80	4.40	1	63	Have a voice on their team	3.94	3.40	3
13	Know physical & mental limits	3.92	4.00	1	69	Communicate with staff about what is(n't) going well	4.03	3.77	
14	Recognize where they are in relation to goals	3.78	4.13	1	71	Talk about life (not just sport) with coach	3.64	3.13	3
15	Process incidents of prejudice & discrimination in sport	4.00	3.27	4	72	Be open & honest in conversations with coaches	3.81	3.63	3
16	Reflect on cultural bias, stereotypes, & microaggressions	3.63	2.97	3	73	Communicate with coach about what is(n't) going well	3.94	4.10	1
17	Engage in honest self-reflection	4.19	3.83	4	76	Have honest conversations with teammates	4.09	3.59	4
18	Reflect on impact of current events	3.43	2.63	3	77	Meaningful relationships with teammates	4.11	3.77	4
19	Know how emotions affect performance or training	4.00	4.28	2	90	Collaborate with coaches for personalized training	3.28	4.07	1
20	Be kind to self when in need of a break	4.51	4.03	2	Social Support				
25	Separate self-worth from performance outcomes	4.64	4.27	2	26	Feel welcome & part of the play	3.95	3.53	3
30	Embrace their strengths	4.26	4.30	2	27	See others who look like them in sport	3.71	3.00	3
32	Enjoy their sport	4.28	4.40	2	28	Feel valued regardless of performance	4.37	3.80	4
33	Believe in self	4.69	4.73	2	58	Be open & honest with staff	4.14	3.86	4
46	Face adversity to prepare for future challenges	3.63	4.17	1	59	Share concerns without fear of shame or punishment	4.34	3.53	4
57	Understand how past experiences affect them today	4.20	3.53	4	62	Be seen as more than an athlete	4.40	3.31	4
103	Develop healthy identity outside of sport	4.51	3.53	4	64	Coach listens to them	4.11	3.67	4
109	Know their life values	4.06	3.27	4	65	Have someone to trust	4.54	3.90	4
Managing Setbacks					66	Have people to talk to about successes & failures	4.33	3.70	4
4	Embrace opportunities to step outside of comfort zone	3.58	4.43	1	67	Seek out honest & constructive feedback	3.49	4.13	1
8	Not afraid of failure	3.94	4.40	2	68	Feel supported by friends, family	4.61	3.73	4
11	Let go of unhelpful thoughts	4.58	4.47	2	70		4.35	3.90	4

(continued on next page)

Table 1 (continued)

Item		M_{MH}	M_{PERF}	Quad*	Item		M_{MH}	M_{PERF}	Quad
34	Observe & accept emotions	4.11	4.17	2	75	Talk honestly with others about mental & physical health	3.51	3.37	3
35	Use techniques to refocus in competition	3.68	4.34	1	78	Have a mentor to help with challenging situations	4.00	3.59	4
						Strong social support network			

Note. Quad = quadrant that represents importance of mental health by importance to performance. Quadrant 1 = moderate importance to mental health and high importance to performance. Quadrant 2 = high importance to mental health and performance. Quadrant 3 = moderate importance to mental health and performance. Quadrant 4 = high importance to mental health and moderate importance to performance.



Figure 2. Average Importance Rating for Mental Health (x axis) and Performance (y axis) Items
Note. The r value is a Pearson product-moment correlation that reflects the relationship between the average item ratings based on importance to mental health (x axis) and importance to performance (y axis).

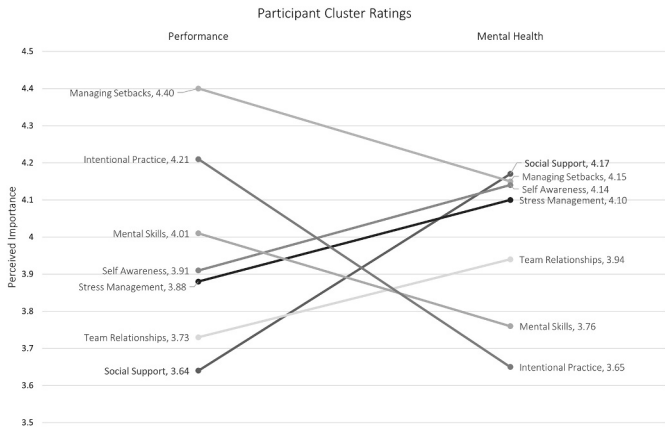


Figure 3. Cluster ratings for mental health importance and performance importance

Discussion

The purpose of this study was to create a concept model of behaviors, thoughts, and feelings that lead to mental health and performance optimization for North American athletes. Our findings identified seven core areas: *Stress Management*, *Self-Awareness*, *Mental Skills*, *Managing Setbacks*, *Intentional Practice*, *Team Relationships*, and *Social Support*. Overall, the content within the conceptual model reflects a balanced approach to sport that combines psychological, physiological, and social factors. The scholarly literature also supports these findings. For example, previous research has shown that relationships within sport (e. g., teammates, coaches) affect athlete well-being (DeFreese & Smith, 2014). Romantic partners, friends, and family can also contribute to an

athlete’s belief in oneself and their abilities (Anstiss et al., 2020). These themes were captured in more than one cluster, including *Stress Management*, *Self-Awareness*, *Team Relationships*, and *Social Support*.

An interesting finding that may reframe some traditional sport psychology philosophies pertains to the perceived importance of *Mental Skills*. Psychological skills training typically includes behaviors that appeared in our study (e.g., goal setting, imagery, motivation, focus, competition preparation; Durand-Bush et al., 2001). Interestingly, two skills that are routinely addressed in these programs are confidence and self-talk, neither of which emerged in our results. Given the prevalence of research on cognitive restructuring and other models that emphasize self-talk (e.g., Silva, 1982), these findings were surprising. However, many of the items that referred to thoughts and cognition focused on letting go of thoughts and accepting thoughts and emotions without judgment. Such items reflect the third wave of cognitive-behavioral therapy, in which mindfulness and acceptance are central components (Hayes, 2016).

As seen in Figure 1, the *Managing Setbacks* cluster was close in conceptual proximity to *Mental Skills*. This cluster resembles important components of resilience that also appear in third wave cognitive-behavioral interventions; such skills facilitate adaptive responses to stressors and contribute to optimal performance in athletes (Fletcher & Sarkar, 2012). *Stress Management* and *Self Awareness* were also connected to the *Mental Skills* cluster. Both topics have gained traction and interest in the sport psychology field, as practitioners look for the best ways to help athletes perform at a high level and have high levels of mental health (e.g., Shannon et al., 2019).

Sport, and the performance demands with which it coincides, can take a physical and psychological toll on an athlete, particularly when engaged in intense training regimens. Many athletes may approach training with a “more is better” mentality, which can lead to over-training or burnout (Richardson et al., 2008). The *Intentional Practice* cluster included several items pertaining to rest periods, minimizing stress on recovery days, and training consistency. This cluster also addressed the importance of sleep, nutrition, and rehabilitation exercises. As suggested by Henriksen and colleagues, an athlete’s training environment has the potential to nurture or inhibit athlete mental health due to an organization’s accepted practices and training expectations, including intense training without proper recovery (2020). Perhaps athletes, coaches, and sport medicine professionals can model a quality over quantity mentality when training and working with athletes. Doing so will demonstrate the importance of taking a comprehensive approach to training and well-being.

Strengths and limitations

The primary strength of this study included the North American context of athletes, which includes important cultural nuances. The interdisciplinary nature of participants also serves as a strength of this study; their breadth of experiences allowed us to create a conceptual model with a broad range of perspectives. The mixed methods approach allowed us to develop the model in an inductive manner, while also obtaining quantitative data regarding the importance of each item.

The sampling method and participant demographics serve as two potential limitations to the study. Most of the participants represented

collegiate or professional athletics, meaning that the results may look different for masters or adult amateur athletes, as well as youth athletes. Athletes likely need a unique combination of items in the conceptual model based on their sport, educational level, career stage, age, and gender. The sampling method also lends itself to bias; all participants were connected to the research team via professional networks and were thus likely to share some of the strengths-based perspectives of the research team. Finally, the brainstorming process allowed participants to see one another's responses. Though this was done intentionally to create a synergistic effect (Kane & Trochim, 2007), there is a possibility of group think, in which participants choose not to offer additional insight.

Implications for future research

Future researchers could expand upon these findings by studying the seven clusters longitudinally across the length of a season or career. As with many aspects of mental health and performance, athletes' scores on each of these clusters are bound to ebb and flow. For example, feelings of social support may differ for collegiate athletes when comparing their first week on campus to the last competition of their senior year. Other clusters, such as stress management, are likely to depend on the demands of academics or the competition season.

In addition to assessing how athlete experiences differ within each of these clusters, future studies should examine the extent to which cultural identities inform the thoughts, feelings, and behaviors of athletes. For example, perceived social support may be especially important for athletes of color (Carter-Francique et al., 2015). By identifying and understanding cultural nuances, practitioners can take an individualized approach to assisting athletes based on their needs, their resources, and their environmental demands.

Practical implications

As governing bodies in North America continue to direct resources to athlete mental health and performance, it is important to provide stakeholders with information and tools needed to contribute to a positive sport culture in North America. The conceptual map in this survey can serve as the foundation for these initiatives, as it addresses social, psychological, and physiological factors that contribute to optimal mental health and performance for athletes. Given its rigorous methodology, group concept mapping is a core technique used in measurement development and assessment (Rosas & Ridings, 2017). The items in this conceptual model could thus be used to create a psychometrically sound assessment for athlete wellness and performance. An assessment that includes the seven areas in this model would allow athletes, athletic medicine staff, and coaches to monitor well-being and performance in a proactive manner over the course of a season.

In 2016, the NCAA Sport Science Institute noted the importance of athletic departments in promoting student-athlete wellness and released their best practices for mental health. Their best practices included: 1) clinical licensure for mental health providers; 2) identification and referral procedures for student-athletes with mental health concerns; 3) pre-participation mental health screenings; and 4) environments that promote health, well-being, and resilience (NCAA Sport Science Institute, 2016). Sport administrators can use the content in this conceptual model to inform the development of their health-promotion programming for student-athletes.

Conclusion

Mental health and performance are not mutually exclusive constructs that can be easily compartmentalized. Athletes are multifaceted beings who need balance between physical health, mental health, and the demands of their performance-oriented environment (Whitehead & Senecal, 2020). To maximize mental health and performance in athletes

while finding a balance between various areas of life, athletes and professionals may want to consider the extent to which factors in this conceptual model are emphasized individually and in their team environments.

Our findings suggest a multifaceted approach to athlete thoughts, feelings, and behaviors is most likely to contribute to optimal mental health and performance. These findings deepen the call to research for recognizing athlete mental health, in addition to performance, as a core component of an overall effective sport system (Henriksen et al., 2020). Moreover, our findings echo suggestions for athletes, coaches, and sport professionals who are invested in the performance of athletes to invest in their athletes' mental health (Henriksen et al., 2020). By investigating these areas and identifying factors via a conceptual model, professionals and performers may intentionally focus on multifaceted growth. Our findings and conclusions answer Henriksen et al.'s (2020) calls to contextualize athlete mental health, expand research, and identify key factors to environments that support the whole athlete. Those who actively address all seven areas identified in this study may be likely to develop high performing athletes with strong mental health for years to come.

Declaration of competing interest

The authors whose names are listed immediately below conducted this research as employees of Premier Sport Psychology. Premier Sport Psychology sponsored this research initiative.

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