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The Perceived Effects of Psychological Skills Training on Anaerobic Performance of College Students

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Abstract

The purpose of this study was to test the perceived effects of psychological skills training (PST) on anxiety and anaerobic performance in college-aged students. Fifty-five college students (44 females, 11 males) volunteered to complete an online survey instrument. Participants were recruited via convenience sampling methods to answer questions built through a Qualtrics online survey. The questionnaire was split into two sections. The first section asked participants to identify psychological skills, their familiarity with them, and their frequency of use. The second section consisted of categorizing each skill so participants could mark the extent to which it influences their training goal. Data analysis showed males were more familiar with five out of six psychological skills when compared to females. This result is likely due to males showing higher stress levels during training and performance compared to females. The findings of this study confirm the importance of mental health education and PST in college students.

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Optimizing performance is one of the most sought out aspects of sport and exercise psychology. Individuals who struggle with performance during training or competition often lack the fundamental mental skills (i.e., mental coping strategies) rather than the physical attributes. The application of psychological interventions and techniques can lead to improvements in athletic behavior during training or competition (Keeler, 2006). One of the most researched mental interventions is psychological skills training (PST), which can be defined as the systematic and consistent practice of mental or psychological skills for the purpose of enhancing performance, increasing enjoyment, or achieving greater sport and physical self-satisfaction (Weinberg & Gould, 2018). Simply put, PST is training exercisers to learn mental skills that help these performers regulate their psychological state. Daily implementation of consistent processes may increase the likelihood that an individual reaches optimal focus resulting in a state of flow (Judge et al., 2010).

The most common psychological skill training interventions include imagery, goal setting, self-talk, and arousal control (Birrer & Morgan, 2010). Additionally, centering, mental rehearsal, and attention-shifting are known to help performance and are thus used in interventions (Coetzee et al., 2006; Sherwood et al., 2014; Rogerson & Hrycaiko, 2002). Sport and exercise psychologists use PST to teach individuals how to perform at the highest level possible regardless of the presented conditions. Increasing movement efficiency, limiting external distractions, focusing attention on relevant cues, and reducing negative emotions are expected responses from a properly implemented PST protocol (Röthlin et al., 2016).

The literature on PST has become increasingly available as the importance of mental health collides with exercise and sport. Weinberg and Williams (2001) reported on 45 studies. Of those, over 85% of the studies found positive performance outcomes associated with implementing PST into individual or group mental skill strategies. PST has been shown to be effective at enhancing athletic performance in a variety of sports and settings (Beauchamp et al., 1996; Hardy et al., 1996; Sheard & Golby, 2006). To that end, some studies have even shown performance benefits in as young as 12-year-old professional gymnasts (Fournier et al., 2005). The common ground on performance increases during PST interventions is

gym training. Success in training often leads to success elsewhere. It is important to note that almost all sports and athletic endeavors that seek to optimize performance utilize anaerobic training to an extent (Kraemer et al., 2002).

The American College of Sports Medicine (ACSM, 2013) defines anaerobic exercise as intense physical activity of short duration, fueled by the energy sources within the contracting muscles and independent of inhaled oxygen sources. Anaerobic exercise relies on fast-twitch muscles, which are responsible for high power and force outputs. The most common anaerobic activities include sprinting, rowing, cycling, and weight lifting and powerlifting. For the purpose of this study, anaerobic performance strictly refers to activities that use weight lifting or its derivatives.

All exercise places stress on the body, and the extent to which it influences physical and mental properties depends on the intensity, duration, and frequency. Increases in heart rate (HR) and respiratory rate (RR) are common physiological and psychological responses to stress (Patel et al., 2017). Anaerobic performance tends to induce rapid spikes in HR and RR due to high forces being produced over short periods. As stress increases past a certain threshold, cognitive and biomechanical functioning decreases (Hanin, 2007). In certain high-intensity exercise environments, acute stress is often expected, but if left unchecked, it can negatively impact performance. PST aids in minimizing those stress responses and controlling arousal level (Bali, 2015).

Although a wealth of exercise and sport psychology information is available, the recommended protocols are often quite generic. Even with adequate available information, there is an extreme limit on research for the psychological demands of a specific sport. Thus, it can be hard to generalize this information to specific sports, as the performance tasks for an Olympic weightlifter, for example, differ greatly from those of a 200-m sprinter. When presenting the framework for psychological demand in sport, one must look at and test multiple variables. Duration, intensity, frequency, complexity and variability of action, movement pattern, team cooperation, and fluidity are variables that influence the psychological skills required for performance success (Birrer & Morgan, 2010; Schnabel et al., 2008). This creates a one-size-fits-all mindset that makes it difficult

to connect sport-specific variables to the psychological skills best suited for the athlete. Narrowing down the exact recommendations to best utilize PST is a great starting point for future researchers.

Despite evidence that PST has positive effects on exercise and athletic performance, many studies fall short when investigating empirical evidence. In a meta-analysis, Gardner and Moore (2006) explored the efficacy of PST using objective measurements. Of the over 104 studies assessed, only a small fraction met the criteria for appropriate design and methodology, and an even smaller fraction showed tangible performance enhancements. Furthermore, almost all studies involving PST tested skilled or professional athletes. This leaves a gap in available recommendations for the average, college-aged individual who stands to benefit equally from these interventions. The most meaningful research targeting college-aged individuals regarding PST comes from the push to include these interventions in academic courses (Curry & Maniar, 2003). The purpose of this pilot study was to identify the extent to which college students use psychological skills and the impact it has on their anaerobic training regimens and performance. We hypothesized that women would utilize PST to a greater degree than men. We also hypothesized that the overall stress during training and performance would be considerably higher for men.

Method

Participants

Sixty-nine participants submitted responses for an online questionnaire. Of those participants, 14 either did not meet the inclusion criteria or did not completely fill out the form and thus their data were removed from the set. The age of the participants ranged from 18 to 25 ($M = 21.02$, $SD = 2.51$ years), with 89% of the population responding that they were Caucasian ($n = 49$). In the end, 55 usable surveys were available for data analysis. Participants were randomly sampled from a college in the Northeastern United States and two surrounding universities. Participants were required to be college age (between 18 and 25 years of age) and participating in regular aerobic activity (at least three times a week for 60 min) for at least the past 18 months. Only healthy participants who completed a demographic survey and provided informed consent were included in

the study. The university's institutional review board (IRB) approved this study and no data collection occurred prior to this approval.

Protocol

Demographic Form

The demographic form verified participants met the inclusion criteria prior to online submission. Additionally, demographic variables such as gender and race were added to the survey instrument.

Psychological Skills Questionnaire

The psychological skills questionnaire included 11 questions that combined the previously validated scales of Athletic Coping Skills Inventory 28 (ACSI-28) and the Psychological Skills Inventory for Sports Form-5 (PSIS). The questionnaire helped measure participants' psychological skills related to training and performance, as well as their level of comfort and familiarity with these skills.

Statistical Analyses

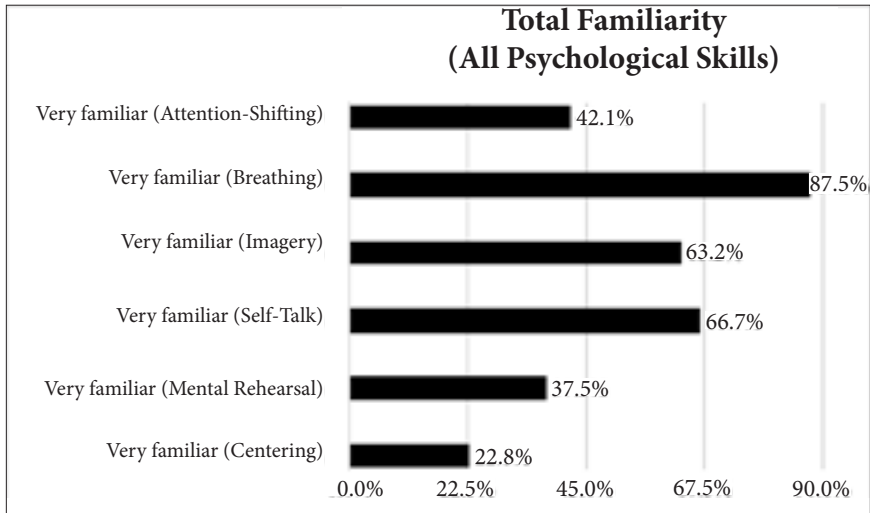
Descriptive statistics were computed with IBM SPSS 23, showing participants' familiarity levels with PST. Frequency of PST use between genders was computed by means of Mann-Whitney U nonparametric tests, showing differences between median ranks of men and women. Significance level was set at .05.

Results

Due to the sample size consisting of majority females ($F = 44$, $M = 11$), the distribution of the data is slightly skewed. From the total count of college-aged individuals with familiarity of PST, over 50% categorized as very familiar only three of the six listed skills (Figure 1). Of all the skills (see Table 1), the participants were most familiar with breathing (87.5%, $N = 48$) and the least familiar with centering (22.8%, $N = 12$).

Figure 1

Total Familiarity Between Males and Females Across All Psychological Skills Presented



In terms of familiarity, two significant differences were found. Men were found to be more familiar with mental rehearsal compared to women (female rank: 25.16; male rank: 39.36; $p = .004$), and women were found to be more familiar with breathing as a psychological technique compared to men (female rank: 29.15; male rank: 21.05; $p = .009$). There were no significant differences in familiarity between men and women for the remaining four skills ($p > .05$).

In terms of inclusion of psychological skills into training, men were only slightly more likely to incorporate these skills compared to women (female rank: 25.94; male rank: 36.23; $p = .047$). No significant differences were found between sexes in effectiveness of the skills, visualization, inclusion of pregame rituals, or frequency of stress (Table 2; $p > .05$).

Table 1*Gender Familiarity With Psychological Skills Training*

Answer to the question, are you familiar with the following examples of psychological skills?	Total	Female	Male
Total count	55	44	11
Centering			
Not at all familiar	40.4%	45.7%	18.2%
Somewhat familiar	36.8%	32.6%	54.5%
Very familiar	22.8%	21.7%	27.3%
Mental rehearsal			
Not at all familiar	17.9%	22.2%	0.0%
Somewhat familiar	44.6%	48.9%	27.3%
Very familiar	37.5%	28.9%	72.7%
Self-talk			
Not at all familiar	7.0%	6.5%	9.1%
Somewhat familiar	26.3%	30.4%	9.1%
Very familiar	66.7%	63.0%	81.8%
Imagery			
Not at all familiar	10.5%	10.9%	9.1%
Somewhat familiar	26.3%	28.3%	18.2%
Very familiar	63.2%	60.9%	72.7%
Breathing			
Not at all familiar	1.8%	0.0%	9.1%
Somewhat familiar	10.7%	6.7%	27.3%
Very familiar	87.5%	93.3%	63.6%
Attention-shifting			
Not at all familiar	15.8%	17.4%	9.1%
Somewhat familiar	42.1%	43.5%	36.4%
Very familiar	42.1%	39.1%	54.5%

Table 2*Frequency of Stress During Exercise and Performance*

Answer to the question, do you experience any signs of stress during training or performance?	Gender		
	Total	Female	Male
Total count	55	44	11
About half the time (50%)	21.1%	21.7%	18.2%
Always (100%)	3.5%	0.0%	18.2%
Most of the time (75%)	14.0%	17.4%	0.0%
Never (0%)	12.3%	10.9%	18.2%
Sometimes (25%)	49.1%	50.0%	45.5%

As familiarity with mental rehearsal and breathing differed significantly, their inclusion into performance and training differed as well. Men were more likely to include mental rehearsal into their performance and training compared to women (female rank: 25.86; male rank: 36.55; $p = .036$), and women were more likely to incorporate breathing as a psychological skill into their performance and training compared to men (female rank: 30.07; male rank: 19.73; $p = .023$). No significant differences were found between sexes for the remaining four skills ($p > .05$).

No significant differences were found between sexes for focusing attention, positive self-talk, shifting attention, or taking breaths to remain focused ($p > .05$).

Discussion

The purpose of this pilot study was to identify the extent to which college-aged individuals utilize psychological skills and the impact it has on their anaerobic training regimens and performance. First, we hypothesized that women would utilize PST to a greater degree than men. Second, we hypothesized that the overall stress during training and performance would be considerably higher for men. There is a paucity of literature on gender differences and PST. The results of this pilot study did not display a strong enough connection for us to make concrete conclusions.

Regarding the first hypothesis, males had more overall familiarity with psychological skills during training and performance. This contradicts most research on stressors and coping between genders in sport. The typical results of gender differences are in favor of females being significantly better at problem-solving, planning, communication, and utilizing psychological skills (Nicholls et al., 2007).

However, the data support our second hypothesis. Men reported higher rates of stress during training and performance. These data assume training stressors are individual and not team-based or coaching influenced, which best reflects the defined parameters of anaerobic performance mentioned in the introduction. These data are further consistent with the literature that showed males consistently score higher on competitiveness and win-orientation than females (Gill, 1998). Men placing themselves in highly competitive environments can be a precursor for added stress, especially when in a performance-idolized setting.

According to Judge et al. (2010), the goal of flow is to create the idyllic mindset that enables the body to function automatically with little conscious effort. Sport and exercise psychology consultants often refer to the optimal mindset as a flow state or being in “the zone” (Judge et al., 2010). Additionally, training collegiate recreation professionals to implement a PST program may help bring the need for sport and exercise psychology to the forefront of their minds. That way, individuals utilizing facilities and classes on college campuses can have at their disposal all the physical and mental tools that they need to reach the flow state and get the most out of their recreation fitness activities. Last, training professionals in this subject matter may help foster a consistency with mental training that seems to be a factor in helping individuals achieve flow as they establish healthy lifestyle patterns.

Limitations

This study is not without limitations. With retrospective designs, subjects’ recall could be limited. A larger sample would have served to increase the statistical power for this research. This descriptive study could have included a stronger qualitative component such as

a number of short open-ended questions that relate to topics such as time spent training and hours performed per month. The reply to these questions would have further bridged the gap on current research and would have allowed for more meaningful conclusions. Giving voice to the viewpoints expressed in the survey data could have added depth to the results. The discussion of the study, therefore, was limited to issues potentially surrounding the quantitative descriptive data collected.

While there was a lack of data that explained which psychological skill best influenced training and performance for college-aged individuals, there were some important findings on gender differences. College-aged males reported higher levels of stress during performance, but also showed greater knowledge on PST. The data showed the importance of PST and mental skills education; however, further research needs to thoroughly investigate which psychological skill has the greatest impact on performance and stress reduction for this specific population.

Conclusion

College students have a lot of potential obstacles when it comes to staying healthy. There is the stress of rigorous coursework, work, overscheduled calendars, and newly found emancipation. College campuses often have a variety of resources available (e.g., recreation facilities and fitness classes) to help students get fit and stay healthy. But exercise can sometimes be stressful to the body; the extent to which stress influences physical and mental properties depends on the volume, intensity, and density of the task. PST is as important to the individual as the physical training and can make a large contribution (between 50% to 90%) to their performance. Goal setting, self-talk, mental imagery, mental rehearsal, and relaxation are among the methods that individuals utilize to assist with PST (Birrer & Morgan, 2010). Narrowing down recommendations for college-aged participants to best utilize PST is a great starting point. Most of the available PST research has focused on competitive (high performance) athletes. The lack of research on this important demographic leaves a gap in recommendations for the average, college-aged individual who stands to benefit from these interventions as they attempt to establish healthy lifelong exercise patterns.

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