Performance Block Prevalence and Contributing Factors in Individualized versus Team Sports

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REVIEW OF LITERATURE

Performance block is defined as a sudden, unexplained loss of the ability to perform a previously automatic skill (Bennett & Maynard, 2017). It is commonly referred to as yips, lost move syndrome (LMS), flikikammo, performance phobia, performance block, paradoxical performance, and mental block in the literature (Bennett et al., 2016; Day et al., 2006; Sato, 2017; Bennett & Maynard, 2017; Klämpfl et al., 2013; Maaranen et al., 2020; Lobinger et al, 2014). In recent news, it has also been called the twisties, a common term used in the gymnastics community that was brought to light by American Olympic gymnast, Simon Biles, after having to withdraw from multiple events in the 2020 Tokyo Olympics due to her twisties causing her to get confused in mid-air (Austin, 2021). No matter the term used, the experience for all conditions tends to be similar: a "gut feeling" that the skill simply cannot be performed (Maaranen et al., 2020). This said, as researchers continue to seek understanding what factors into the development of these conditions, how they can best be treated, and if such conditions carry into sports that have not yet been studied. A blanket term "performance block" for these similar conditions may aid in clarity and understanding of results (Bennett & Maynard, 2017). If prolonged, performance block has been shown to reduce an athlete's motivation which in turn may lead to the athlete leaving their sport (Pattinson & Cotterill, 2017). Thus, having a deeper understanding of performance block, will hopefully allow athletes to bounce back from these incidents faster, if not prevent them from occurring altogether (Bennett & Maynard, 2017).

Psychological Factors

In order for performance block to potentially be treated and better understood, researchers must first identify the etiology of performance block. In the literature, there are

multiple factors that appear to be related to the incidence of prolonged performance block. Some psychological traits such as unhealthy perfectionist tendencies, rumination, and reinvestment may increase one's likelihood of experiencing performance block (Bennett et al., 2016; Day et al., 2006; Sato, 2017). Rumination is an emotional elaboration consisting of reflection, brooding, and depression (Bennett et al., 2016). It is linked to how one copes with trauma, but research suggests rumination may also present in how athletes cope with failure, potentially contributing to performance block (Bennett et al., 2016).

Another psychological factor that researchers have been interested in is reinvestment. Reinvestment is essentially a switchover from automatic processing to conscious processing and relates to performance block as an athlete becomes more aware of movement in the skill they are attempting to execute (Bennett et al., 2016). This heightened awareness could stem from unhealthy perfectionist tendencies or adapting to new circumstances such as a correction on the skill, new equipment, disruption to automatic pattern (Klämpfl et al., 2013; Maaranen et al., 2020; Bennett et al., 2016). These descriptions entail a switch from automatic to conscious processing of the skill and appear to contribute toward a "paralysis by analysis," or, the inability to perform the previously automatic skill (Day et al., 2006). Lobinger and colleagues agree with reinvestment playing a role, but also introduce the idea of action control (2014). Action control is similar to reinvestment but includes the interaction between the athlete and their surroundings when executing the skill (Lobinger et al, 2014). While reinvestment regards cognitive control as it pertains to how much attention is shifted to executing the skill, action control utilizes cognitive control to anticipate, realize, and evaluate skill execution based on the athlete's surroundings and emotions (Lobinger et al, 2014). Lobinger suggests both variables of cognitive control are important to consider in identifying and treating performance block (2014).

Also regarding cognitive processing, research indicates a higher number of athletes who utilized a similar movement, but in a different sport prior to participating in their current sport experience a higher prevalence of performance block due to challenges in translating implicit memories (Klämpfl, Philippen, & Lobinger, 2015; Sato, 2017). For instance, Klämpfl and team questioned if having played a racket sport (a sport involving using equipment to strike a ball over a net) prior to golf-impacted prevalence of yips. The results showed more yips-affected previously played racket sports than non-affected athletes (Klämpfl et al, 2015). Klämpfl and team suspected that an athlete's implicit motor memory may have hiccups in translation to golf due to the task specificity differences between the sports (2015). Thus, though the skill is now automatic for the athlete, it is unable to be executed properly because the yips created a movement stereotype that blocked motor memory translation (Klämpfl et al, 2015). In other words, golfers who previously played racket sports never properly learned the technique of putting because their motor memory recognized the movement as an automatic skill learned in their previous racket sport and skipped steps in the learning process, thus contributing to the yips. This finding is reiterated by a questionnaire conducted by Sato that found 81% of yips affected Division 1 collegiate athletes that previously played a different sport prior to their current sport at the time of the questionnaire (2017).

Emotional and Social Factors

The onset of performance block is confusing for an athlete; they do not understand what happened or why it happened (Day et al., 2006). Philippen and Lobinger interviewed 17 athletes about their thoughts and feelings associated with the performance block situation and what they thought about as it occurred (2012). A content analysis categorized the responses into ordered themes. The results displayed athletes experienced negative thoughts (loss of control, loss of

confidence, worrying about mistakes) and negative emotions (disappointment, frustration, anger, anxiety) associated with their lost skill. Of the 17 athletes, eleven also described that they tended to focus on technical aspects and negative performance outcomes as their performance block occurred. The researchers can thus conclude that these negative reactions to the performance block onset linger and contribute to the longevity of the performance block (Philippen & Lobinger, 2012). Other research has found similar results in which anger, frustration, anxiety, loss of confidence, feelings of stupidity, embarrassment, and being out of control both physically and cognitively impact performance block occurrence (Maaranen et al., 2017; Day et al., 2006; Bennett et al., 2013; Bennett & Maynard, 2017).

Accompanying the impact of an athlete's negative reactions to performance block is the impact of pressure from the coach. Maaranen and researchers conducted two studies using questionnaires regarding flikikammo (performance block relative to a backwards skill) on gymnasts (2017). The first study displayed prevalence of flikikammo while the second showed what factors were present during the flikikammo. Aside from the negative emotions and reactions listed prior, the athletes in this study described perceived reactions from their coaches to have a significant impact on their performance block. Upon onset of flikikammo, the athletes described their coaches as being understanding and patient at first, but quickly became frustrated as they did not understand why it continued to go on. Some would even kick the athlete off the event, out of practice, or force them to perform the skill despite them having that "gut feeling" they just could not do it (Maaranen et al., 2017). More evidence regarding this pressure from coaches describe similar experiences for lost movement syndrome (LMS) creating an increased desire for social support and approval from the coach (Day et al., 2006; Maaranen et al., 2020;

Sato, 2017). This evidence suggests coaches' reactions to the onset of performance block may be just as important as the athlete's reaction in affecting the condition's longevity.

With increased coach pressure could come unfavorable skill acquisition because of an athlete wanting to satisfy the coach, or the coach pressuring the athlete to obtain the skill (Day et al, 2006; Pattinson & Cotterill, 2017). Day and team interviewed LMS affected trampolinists and the results presented participants who were self-taught, rushed, or were not quite ready to perform the affected skill in competition were the ones more likely to experience LMS which the researchers attributed to having a less established base of learning (2006). Yips-affected divers described unfavorable skill acquisition as well due to their coaches rushing them to try new skills (Pattinson & Cotterill, 2017).

Demographic Factors

Three final potential contributing factors to performance block are type of sport, sport position, and gender. A survey conducted by Sato looked at many of the previously mentioned factors in yips versus non-yips affected Division 1 collegiate athletes, but also looked what sport was played and what position within the sport (2017). The results indicated 15% of individual sports (equestrian, golf, swim/dive, tennis, track/field/cc) and 12% of team sports (baseball, basketball, football, lacrosse, soccer, softball, volleyball) presented yips diagnosis. Within these sports, goalkeepers in both soccer and lacrosse had the highest yips prevalence on the team. Sato claims this may be due to their greater responsibility for the team and more dependence on accurate performance. This study also found that yips was most prevalent in females overall and may be due to differences in anatomy regarding common injury or differences in how information is processed in the brain (Sato, 2017).

Gap in Literature

The current literature provides a solid base for understanding performance block, but it is still lacking. There are gaps in the literature as it pertains to team sports. Current research is more specific to individual sports in which the athlete competes as an individual like gymnastics, diving, golf, and darts. More research needs to be done to be able to generally apply the term performance block to all sports, enabling better understanding (Bennett & Maynard, 2017). The current literature iterates that better identification, understanding, and education of performance block can be useful in both treating and preventing performance block from impacting an athlete's performance and career. Overcoming performance block can create greater psychological maturity, enabling one to become a better athlete (Matsuda et al., 2018). Hence, the aim of the current study was to investigate if performance block occurs in both individual and team-dependent collegiate sports and what factors play a role that can help identify high risk athletes via a modified questionnaire (Sato, 2017). The hope is that this questionnaire will encourage athletes to reflect on their experiences and increasing awareness of performance block (Klämpfl et al, 2015). As a result, this would encourage education to help athletes, teammates, and coaches better understand and sympathize, thus preventing further frustrations and negative emotions upon performance block onset (Bennett & Maynard, 2017; Day et al., 2006).

METHODS

Subjects

This study obtained approval from Point Loma Nazarene University (PLNU)'s institutional review board (IRB) and followed ethical standards set by the National Institute of Health Standard. Based on a *G*Power* analysis of performance block prevalence between

individual and team sports (Sato, 2017), a minimum of 11 participants would warrant 81% statistical actual power with a priori of 0.05 and an effect size of 0.64. All 187 PLNU National Collegiate Athletic Association (NCAA) athletes were sent a description of the study and asked to sign an informed consent Google form if interested to affirm their confidentiality and willingness to participate in the study. Participants were included if they were a PLNU division II athlete at some point in the 2020-2021 school year and college aged (18-23 years old). Of the 66 respondents to the informed consent, 7 were excluded because they did not complete the performance block questionnaire by the three-week deadline. Thus, this study obtained 59 participants (20.7 ± 1.4 yrs old), a response rate of 32%.

Procedure

Each participant was emailed a Google survey questionnaire to fill out regarding their performance block experiences. This questionnaire was a modified version of the one developed by Sato in a study on yips prevalence in DI collegiate athletes (r=0.979; 2017). Symptoms of performance block are determined with yes/no questions regarding a sudden lost awareness of body position, inability to perform a previously automatic skill (unrelated to injury), and involuntary jerks, spasms, tremors, or freezing while performing the impacted skill (Bennett et al., 2013; Sato, 2017). A disclosure regarding any concern if "diagnosed" with performance block symptoms is included at the end of the survey as well, stating participants can reach out to the school's sports medicine team if concerned and want resources regarding their condition.

Questionnaire

The questionnaire was emailed as a Google survey to all PLNU athletes within the 18 to 23-year old age range who responded to the informed consent google form. The questionnaire

was anonymous but asked the participant to identify their sport and position if applicable. This questionnaire consists of 29 questions broken up into three parts. Part I includes six questions consisting of descriptive statistics regarding gender, age, and sport history. Part II regards three symptom-based questions in which if the participant answers yes to one or more, they will continue on to Part III. Part III contains the remaining 21 questions asking about psychological, emotional, and social factors the literature has found relationships with to the condition (Sato, 2017; Bennett et al, 2016; Maaranen et al., 2020). If a participant answered no to all three questions in Part II, they were finished with the questionnaire and did not complete Part III.

Data Analysis

Descriptive statistics (mean ± SD) were calculated for Part I of the questionnaire. Point prevalence of performance block participants was calculated to determine how many PLNU athletes have experienced performance block in their athletic career. Then, the participants were categorized by their current sport into individualized sports (golf, tennis, track, cross country) and team sports (baseball, basketball, soccer, volleyball). This makes the independent variables type of sport and population while the dependent variable is performance block occurrence. Prevalence rates were calculated for each group and each sport to be compared. To determine if the differences between the two groups as well as between performance block individuals and non-performance block individuals are significant, an independent t test was conducted comparing the groups' scores for Part II of the questionnaire using Microsoft Excel. A post-hoc t-test with a Bonferroni correction was also conducted comparing each sport's Part II scores to determine any significantly higher prevalent sport using Microsoft Excel.

To determine what current findings of performance block are significant among PLNU performance block affected participants, a chi-squared analysis was conducted for each yes/no question and a post-hoc independent t-test was conducted for each multi-choice question using Microsoft Excel. These tests determine any significant difference in performance block occurrence between gender, type of sport, positions within the sport, having played a different sport prior to the affected sport, perfectionist tendencies, ruminative behavior, reinvestment tendencies, past trauma, and social pressures.

For all tests except for the post-hoc t-tests, *p*-value indicates a significant difference between groups if $p < 0.05$, with a 95% confidence interval. For the post-hoc t-tests, alpha was set at 0.05 and if p < the Bonferroni correction, a significant difference was indicated. Effect size was also calculated for each significant difference found using Cohen's *d* to describe clinical meaningfulness of the results. The criteria for effect size based on Cohen's *d* (1988) are as follows: trivial (0.19), small (0.20-0.49), medium (0.50-0.79), or large (≥ 0.80).

It was hypothesized that there will be no significant difference between individualized sports and team sports, meaning that prevalence of performance block is very similar in both types of sport. It was also hypothesized that the variables within Part III of the questionnaire (age range of first occurrence, condition of occurrence, frequency of occurrence, sport position, previous sport characteristics, affected movement, unfavorable skill acquisition, reinvestment, negative emotions, fear, social pressures, exclusion from competition, trauma, perfectionism, rumination, and injury status) that are most likely to promote performance block according to the literature will display a significantly higher representation among performance block affected participants.

RESULTS

Table 1

Descriptive Statistics

	Performance Block			Non-Performance Block			Total Participants		
Demographics	n	Mean	SD (±)	n	Mean	SD (±)	n	Mean	SD (±)
Age (yrs)	25	21.0	1.5	34	20.6	1.4	59	20.7	1.4
Male	9	21.6	1.7	11	21.2	1.3	20	21.4	1.5
Female	16	20.6	1.4	23	20.3	1.3	39	20.4	1.4
Career Length (yrs)	25	12.3	4.4	34	10.7	4.4	59	11.4	4.4
# of Previous Sports	25	1.6	1.7	34	1.4	1.4	59	1.4	1.5

Table 1 displays descriptive statistics for the participants based on Part I of the questionnaire. Of all the participants (20.7 ± 1.4 yrs), the average career length of their current sport was 11.4 ± 4.4 years and the average number of sports played prior to their current sport was 1.4 ± 1.5 sports. The average age for males in the study was 21.4 ±1.5 years while the average age for females in the study was 20.4 ± 1.4 years. Independent t-tests indicated between the performance block affected and non-performance block affected participants, there was no significant difference in age, gender, career length, or number of previously played sports.

Table 2 below displays the prevalence of performance block overall (42%) as well as the prevalence of performance block in individual sports (48%) and in team sports (39%) at PLNU. With an alpha of 0.05, there was no statistically significant difference between the individual

sport and team sport prevalence ($p = 0.55$). There was also no statistically significant difference between overall prevalence and individual sport or overall prevalence and team sport prevalence. No statistically significant difference was found in comparing prevalence of each sport using a Bonferroni correction of $p \leq 0.0018$.

Table 2

Prevalence Chart

	Performance Block (n)	Non-Performance Block (n)	Total (n)	Prevalence
Individual Sports	10	11	21	48%
Cross Country	1	2	3	33%
Golf	2	3	5	40%
Tennis	5	2	7	71%
Track & Field	2	4	6	33%
Team Sports	15	23	38	39%
Baseball	3	0	3	100%
Basketball	4	9	13	31%
Soccer	8	10	18	44%
Volleyball	0	4	4	0%
Overall	**25**	**34**	**59**	**42%**

Table 3 shows PLNU sport prevalence scores broken up by sport category. Track and field as well as cross-country were categorized as athletics. Invasion sports included basketball

and soccer. Tennis and volleyball were categorized as racket/net games. Golf was categorized a target sport and baseball was categorized as a fielding/striking sport. A Bonferroni correction $p \leq 0.005$ was used to determine significant difference. Though at a glance there appears to be some great differences between some of the sport categories, a post-hoc analysis indicated there was no significant difference determined between any of the sport categories regarding prevalence of performance block.

Table 3

Sport Category Prevalence Chart

	Performance Block (n)	Non-Performance Block (n)	Total (n)	Prevalence
Athletics	3	6	9	33%
Invasion Games	12	30	42	29%
Racket/Net Games	5	11	16	31%
Target Sports	2	5	7	29%
Fielding/Striking	3	0	3	100%

The tables below show the descriptive questions at the start of Part III of the performance block questionnaire. Table 4 shows the age ranges of when a participant first experienced symptoms of their performance block. The ages are organized into ranges based on typical school age: 12-14 years (middle school; M = 12.75, SD = 0.96), 15-18 years (high school; M = 16.38, SD = 1.04), and 19-22 (collegiate; M = 19.57, SD = 0.53). A Bonferroni correction of $p \leq 0.017$ was used to indicate a significant difference. The age range 15-18 years was significantly higher reported than 12-14 years old ($p = 0.006$; ES = 0.81) but no significant difference was

found between 12-14 years and 19-22 years ($p = 0.316$). There was no significant difference between 15-18 years and 19-22 years ($p = 0.086$).

Table 5 shows a count for conditions in which a participant experiences performance block symptoms. The categories include practice (M = 0.64, SD = 0.49), competition (M = 0.64, SD = 0.49), and conditioning (M = 0.16, SD = 0.37). A Bonferroni correction of $p \leq 0.017$ was used to indicate a significant difference. Performance block occurrence during practice was significantly higher compared to conditioning ($p = 0.0003$; ES = 1.1) and significantly higher during competition compared to conditioning ($p = 0.0003$; ES = 1.1). No significant difference was found between practice and competition ($p = 1.0$).

Table 6 displays frequency of performance block symptoms. Categories include "Once in my life" (M = 0.2, SD = 0.41), "More than once but not regularly" (M = 0.68, SD = 0.48), "Regularly but not all the time" (M = 0.08, SD = 0.28), and "All the time" (M = 0.04, SD = 0.2). A Bonferroni correction of $p \leq 0.0083$ was used to indicate significant difference. "More than once but not regularly" was reported significantly more when compared to "Once in my life" ($p = 0.00038$; ES = 1.08), "Regularly" (p-value = 0.000001; ES = 1.54), and "All the time" ($p = 0.0000001$; ES = 1.75). No significant difference was found between "Once in my life" and "Regularly" ($p = 0.23$), "Once in my life" and "All the time" ($p = 0.08$), and between "Regularly" and "All the time" ($p = 0.56$).

Table 7 breaks up performance block prevalence by sport position. The most common positions having experienced performance block were guards (basketball), singles (tennis), and doubles (tennis) with an n = 3. However, with a Bonferroni correction of $p \leq 0.00076$, there was no significant difference between any of the sport positions.

In Table 8, previously played sports are categorized into common sport categories: athletics, invasion game sports, gymnastics, ice sports (ice skating, skiing), racket/net games, water sports (swimming, diving), equestrian (horse-related sports), target sports, combat sports (martial arts), and fielding/striking sports. A Bonferroni correction $p \leq 0.0009$ determined if the difference between each category was a significant difference. Invasion game sports were reported as a previously played sport significantly more when compared to ice sports (p = 0.0006; ES = 1.04), equestrian (p = 0.0006; ES = 1.04), target sports (p = 0.0006; ES = 1.04), and combat sports (p = 0.0006; ES = 1.04). Racket/net sports were significantly more reported than combat sports (p = 0.0008; ES = 0.86). No more significant differences were determined between the other previously played sport categories.

Table 9 shows the remaining analysis for the descriptive variables correlating to performance block prevalence with an alpha of 0.05. There were 16 females and 9 males who identified having had performance block symptoms, but there was no significant difference (p-value = 0.16). Regarding previous sports played by participants, 17 had previously played a different sport while 8 had not; 14 were of a team sport while 9 were of an individual sport. In comparing whether previous sports were of the same category (see Tables 3 and 8) to the participant's current sport, 4 answered yes and 17 answered no, displaying a significant representation of previous sports being a different category from the current sport (p-value = 0.005; ES = 1.21). When asked if ever pulled or excluded from competition due to performance block condition, 10 answered yes and 15 answered no. There was no significant difference for this question (p = 0.32).

Table 4

Age Range of First Performance Block Occurrence

Age Range (yrs)	n	Mean (yrs)	SD (± yrs)
12-14*	4	12.75	0.96
15-18	13	16.38*	1.04
19-22	7	19.57	0.53

*significant difference between 12-14 yrs and 15-18 yrs (Bonferroni $p \leq 0.017$).

Table 5

Condition in Which Performance Block Occurs

Condition	n	Mean	SD (±)
Practice*	16	0.64	0.49
Competition	16	0.64**	0.49
Conditioning**	4	0.16*	0.37

*significant difference between practice and conditioning (Bonferroni $p \leq 0.017$).
**significant difference between competition and conditioning (Bonferroni $p \leq 0.017$).

Table 6

Frequency of Performance Block

Frequency	n	Mean	SD (±)
Once in my life	5	0.2*	0.41
More than once (but* not regularly)	17	0.68	0.48
Regularly (but not all the time)	2	0.08*	0.28
All the time	1	0.04*	0.2

*significant difference in "More than once (but not regularly)" compared to "Once in my life," "Regularly (but not all the time)," and "All the time" (Bonferroni $p \leq 0.0083$).

Table 7

Sport Position within Performance Block Occurrence

Sport Position	n	Mean	SD (±)
Catcher	1	0.04	0.2
Guard	3	0.12	0.33
Goalkeeper	2	0.08	0.28
Wing	2	0.08	0.28
Centerback	1	0.04	0.2
Singles	3	0.12	0.33
Doubles	3	0.12	0.33
Hurdles	1	0.04	0.2
Forward	2	0.08	0.28
Pitcher	2	0.08	0.28
Midfielder	1	0.04	0.2
Defense	1	0.04	0.2

Table 8

Categories of Previously Played Sports within Performance Block Occurrence

Sport Category	n	Mean	SD (±)
Athletics	3	0.12	0.33
Invasion Game*	11	0.44	0.51
Gymnastics	3	0.12	0.33

Ice Sports	1	0.04*	0.2
Racket/Net Games	9	0.36**	0.49
Water Sports	3	0.12	0.33
Equestrian	1	0.04*	0.12
Target Sports	1	0.04*	0.12
Combat Sports**	1	0.04*	0.12
Fielding/Striking Sports	3	0.12	0.33
No Previous Sports	8	0.32	0.48

*significant difference in invasion game sports compared to ice sports, equestrian, target sports, and combat sports (Bonferroni $p \leq 0.0009$).
**significant difference between racket/net games and combat sports (Bonferroni $p \leq 0.0009$).

Table 9

Chi-Square Analysis of Descriptive Questions

Category	Variable 1 (n)	Variable 2 (n)	*p*-value
Gender (Male v Female)	9	16	0.16
Played Previous Sport? (Yes v No)	17	8	0.07
Previous Sport Type (Indiv. v Team)	9	14	0.30
Previous Sport Same Category as Current (Yes v No)	4	17	0.005*
Exclusion from Competition (Yes v No)	10	15	0.32

*significant difference ($p \leq 0.05$).

Below, Table 10 displays which movements participants described they were performing when they first experienced performance block symptoms. The most commonly described movement was serving (n = 4). Yet, using a Bonferroni correction $p \leq 0.000365$ to determine

significant difference, no significant differences were found in any of the comparisons between movements.

Table 10

Movement Impacted by Performance Block

Movement	n	Mean	SD (±)
Throwing to Pitcher	1	0.04	0.2
Serving	4	0.16	0.37
Forehand Swing	2	0.08	0.28
Backhand Swing	1	0.04	0.2
Shooting	2	0.08	0.28
Vaulting	1	0.04	0.2
Defense	2	0.08	0.28
Swinging	2	0.08	0.28
Putting	1	0.04	0.2
Jumping	1	0.04	0.2
Collision	1	0.04	0.2
Passing	3	0.12	0.33
Hurdles	1	0.04	0.2
Dribbling	1	0.04	0.2
Hitting	1	0.04	0.2
Diving	1	0.04	0.2
Free Throw	1	0.04	0.2
Running	2	0.08	0.28

Table 11 shows the analysis using an alpha of 0.05 for psycho-social variables suggested to contribute to performance block including unfavorable acquisition, reinvestment, negative emotions, social pressures, trauma, and perfectionism related questions from Part III of the questionnaire. The first two questions were geared toward unfavorable skill acquisition. When asked if the performance block-affected skill was self-taught, 9 participants answered yes and 16 answered no. Self-teaching had no significant difference, but the second question asking if the participants felt rushed to learn the affected skill did indicate a significantly greater response of "no" (p = 0.00003; ES = 3.03). 23 participants answered no with 2 answering yes.

Reinvestment provided a significantly higher representation (p = 0.009; ES = 1.19), with 19 answering to have felt an increased consciousness during performance block symptoms and 6 answering no. Though 17 participants answered yes and 8 answered no to experiencing negative self-talk and feelings during performance block symptoms, this question showed no significant difference. Likewise, more participants answered yes (n = 16) than no (n = 9) to being afraid to performing the affected movement, but no significant difference was indicated.

For social pressures, 12 participants answered yes to feeling pressure from coaches while 13 answered no, indicating no significant difference. However, only 6 participants answered yes to feeling pressure from teammates while 19 answered no, providing a significantly greater response for not feeling pressure from teammates (p = 0.009; ES = 1.19). Results were identical for feeling pressure from parents, indicating another significantly greater response for not feeling pressure from parents (p = 0.009; ES = 1.19). Participants were also asked if someone was there

to support them during their performance block; 16 answered yes and 9 answered no. This question did not indicate a significant difference.

Seven participants answered yes to having experienced a traumatic episode. Some described their episodes to include deaths of loved ones, consequences from parents after a bad game, car accidents, and humiliation. Eighteen participants answered no to having experienced a traumatic episode, indicating a significant difference ($p = 0.03$; ES = 0.96).

In regards to perfectionism, 21 participants answered yes to hating being less than the best at things while 4 answered no. This question did pose a significantly greater representation for hating to be less than the best at things ($p = 0.0007$; ES = 1.82). When asked if participants believed failing partly to them was a complete failure, 5 answered yes, while 20 answered no. This question provided a significantly higher response that participants did not believe failing partly made them a complete failure ($p = 0.003$; ES = 1.47). Participants were also asked if they believed others would think less of them if they made a mistake. To this, 16 answered yes and 9 answered no, but there was no significant difference.

Table 11

Chi-Square Analysis of Psycho-Social Variables Relating to Performance Block

Category	Yes (n)	No (n)	*p*-value
Unfavorable Skill Acquisition			
Self-Taught Skill	9	16	0.16
Rushed to Learn	2	23	0.00003*
Reinvestment			
Increased Consciousness	19	6	0.009*

Negative Emotions			
Negative Self-Talk/Feelings	17	8	0.07
Afraid to Perform Movement	16	9	0.16
Social Pressures			
Coach Pressure	12	13	0.84
Teammate Pressure	6	19	0.009*
Parent Pressure	6	19	0.009*
Feel Supported	16	9	0.16
Experienced Traumatic Episode	7	18	0.03*
Perfectionism			
Hate Being Less than Best	21	4	0.0007*
Fail Partly = Complete Failure	5	20	0.003*
Thought Less of if Make Mistake	16	9	0.16

*significant difference ($p \leq 0.05$).

The remaining psycho-social variables referenced in Part III of the performance block questionnaire are displayed in Tables 12 and 13. Both are related to rumination but are broken up by ruminative brooding and ruminative reflection. Table 12 shows ruminative brooding in which participants were asked if they often think about how passive and unmotivated they feel. 6 participants answered yes (M = 0.24, SD = 0.44), 9 participants answered no (M = 0.36, SD = 0.49), and 10 participants answered sometimes (M = 0.4, SD = 0.5). Using a Bonferroni correction $p \leq 0.017$ to determine significance, this question did not indicate a significant difference. Table 13 shows ruminative reflection through a question asking participants if they often reflect on their shortcomings, failures, and mistakes. 15 participants answered yes (M = 0.6, SD = 0.5), 4 answered no (M = 0.16, SD = 0.37), and 6 answered sometimes (M = 0.24, SD

= 0.44). A Bonferroni correction of $p \leq 0.017$ to determine significance indicated a significantly greater response for the answer "yes" compared to "no" ($p = 0.0009$; ES = 1.0) and compared to "sometimes" ($p = 0.009$; ES = 0.77).

Table 12

Ruminative Brooding – Passive & Unmotivated

Answer	n	Mean	SD (±)
Yes	6	0.24	0.44
No	9	0.36	0.49
Sometimes	10	0.4	0.5

Table 13

Ruminative Reflection – Shortcomings, Failures, & Mistakes

Answer	n	Mean	SD (±)
Yes*	15	0.6	0.5
No	4	0.16*	0.37
Sometimes	6	0.24*	0.44

*significant difference in "yes" compared to "no" and "sometimes" (Bonferroni $p \leq 0.017$).

Table 14 shows the final variable of the questionnaire, injury status. When asked what their injury status was at the time their performance block first occurred, 20 participants answered no injury (M = 0.8, SD = 0.41). 5 participants were returning from injury (M = 0.2, SD = 0.41) and no participants were currently (M = 0, SD = 0) or chronically injured (M = 0, SD = 0). A Bonferroni correction $p \leq 0.0083$ was used to determine statistical significance of each

answer choice. There was a significantly higher representation of no injury compared to returning from injury ($p = 0.000004$; ES = 1.47), playing with chronic injury ($p = 0.0000000000005$; ES = 2.77), and currently injured ($p = 0.0000000000005$; ES = 2.77). No other significant differences were determined.

Table 14

Injury Status Upon Occurrence of Performance Block

Injury Status	n	Mean	SD (±)
No Injury*	20	0.8	0.41
Returning from Injury	5	0.2*	0.41
Playing with Chronic Injury	0	0*	0
Injured	0	0*	0

*significant difference in no injury compared to returning from injury, playing with chronic injury, and injured (Bonferroni $p \leq 0.0083$).

DISCUSSION

Prevalence

Part II of the questionnaire determined 42% of respondents have experienced performance block in their athletic career. Of this 42%, 48% experiencing performance block played individual sports at PLNU (cross-country, golf, tennis, and track and field). Meanwhile, 39% experiencing performance block played team sports at PLNU (baseball, basketball, soccer, and volleyball). There was no significant difference between these prevalence rates in the current study. These results are consistent with the miniscule difference of prevalence between team and

individual sports found in Sato's data on division I athletes at California State University of Fresno where 15% of participants impacted by yips played an individual sport while 12% of participants impacted by yips played a team sport (2017). This suggests performance block prevalence is similar in both individual and team sports. Yet, the current literature appears to only focus on individual sports such as golf, gymnastics, trampolining, tennis, diving, and darts (Klämpfl et al., 2013; Bennett et al., 2016; Day et al., 2006; Pattinson & Cotterill, 2017). The exceptions to research on team sports are baseball and cricket in which yips has been studied and cheerleading in which flikikammo has been studied (Matsuda et al., 2018; Maaranen et al., 2020; Maaranen et al., 2017). Therefore, the lack of significant difference between individual and team sports performance block prevalence indicates more research should be done on team sports to better understand how performance block is presenting to these athletes.

There was also no significant difference in prevalence when comparing each sport studied at PLNU. This suggests each sport has the same chance of developing performance block, which is why figuring out what may lead to performance block in any sport is important. There was also no significant difference in prevalence when comparing sport categories at PLNU. Sport categories are broken up based on similarities of game rules and objectives across sports (Leadership and Sport, 2021). No significant difference here suggests one sport category is not more prevalent among performance block affected participants than another.

Descriptive Variables of Performance Block Affected

Part III of the questionnaire revealed many helpful details to what may relate to an increased risk of developing performance block. For starters, the age range of an athlete's first performance block occurrence presented a significantly higher response at 15-18 years old

compared to 12-14 years old (p-value = 0.006; ES = 0.81), but not between 15-18 years old and 19-22 years old or between 12-14 and 19-22 years old. The age range of 15-18 years old is a typical high school age range. The significant difference between 12-14 years old and 15-18 years old may be due to an increase in competitiveness from middle school to high school within the sport, where crowds are larger and commodities such as a weight room, practice facility, and athletic trainers are more common, which could increase the pressure felt by the athlete during this age. This is supported by a positive correlation that has been found between performance block severity and life stresses in athletes under 18 years old (Maaranen et al., 2020). Yet, research is needed in this area to confirm that an increase in pressure does exist at a high school age, especially with the strong effect size (0.81) this age group provided.

Table 5 showcases the condition in which participants have experienced performance block. A significantly higher reporting of performance block occurrence was found in practice compared to conditioning (p-value = 0.0003; ES = 1.1) as well as in competition compared to conditioning (p-value = 0.0003; ES = 1.1). Both practice and competition had equal reports of performance block symptoms. Research has debated whether performance block and choking under pressure are the same. Lobinger and Klämpfl argue choking under pressure may be an explanation for performance block because of either an increased pressure to perform well which leads to an increased arousal, pressure-induced anxiety which can cause fear of performing, or an increased reinvestment effect where athletes are extra conscious of their movements (2014). What these explanations have in common is the pressure component of performing well in a game, which could also explain the significant difference found at PLNU between competition and conditioning. However, in Sato's study, practice had a higher reporting of performance block than competition, which was attributed to performance block being separate from choking under

pressure (2017). There was a similar reporting of performance block occurrence during a combination of practice and competition in Sato's study, which still supports performance block being separate from choking under pressure because practice is included in this reporting (2017).

In the current study, practice and competition were equally reported as the condition a participant experiences a performance block, consistent with what Sato reported (2017). Therefore, based on the relationship between reporting of performance block in practice alone and a combination of practice and competition in Sato's research, the current data supports that performance block is not the same as choking under pressure (2017). What may explain performance block symptoms occurring similarly in both practice and competition is the relationship between intensity and executive function. Executive function in sport impacts inhibitory control (knowing when to and when not to react), working memory (memorizing plays and taking into account spacing of players), and cognitive flexibility (allows an athlete the ability to adapt to changes throughout the game) (Brisswalter et al., 2002). All three components involve execution of a skill based on an athlete's surroundings and emotions, a characteristic of cognitive control called action control (Lobinger et al., 2014). At a heart rate reserve (HRR) of 80-100%, executive function ability significantly decreases (Stone et al., 2020). This said, when an athlete is performing an executive function task in sport at a high intensity, the skill being performed may be at a higher risk of a performance block occurrence. Practice and competition share a similar session time spent at $\geq$ 80% max heart rate: practice at > 80% max heart rate for 23.3 ± 5.3% of practice duration and competition at > 80% max heart rate for 26.1 ± 9.2% of competition duration (Spiering et al., 2003). Assuming this intensity-executive function relationship does impact performance block, it may explain why performance block is experienced more during these conditions. High intensity is experienced in conditioning as well,

but the significant difference of practice and competition occurrences over conditioning indicates it is likely a sport-specific skill being affected. This finding is supported in the current research, as the performance block affected skills described by participants in Table 10 are mainly sport-specific movements. It may also be that an intensity of > 80% max heart rate is not experienced in conditioning for the same duration of time as practice and competition, but this has yet to be determined. Whether the intensity-executive function relationship truly does contribute to performance block should be researched further in the future.

Participants reported experiencing performance block symptoms "more than once, but not regularly" significantly more than only once (*p*-value = 0.00038; ES = 1.08), regularly (p-value = 0.000001; ES = 1.54), or all the time (p-value = 0.0000001; ES = 1.75) and with strong clinical meaningfulness. This is consistent with Sato's data and suggests more than once but not regularly to be a common frequency of performance block (2017). This may be explained by the impact of outside factors such as lack of sleep, emotions, and cognitive difficulties (Bennett et al., 2013). These factors change day to day and in combination with the intensity-executive function relationship may explain the significant frequency of performance block found in this study. For example, if an athlete is extremely tired one day, dealing with some frustration due to a fight with a friend, and then experiences executive function decline due to an intense practice, a performance block occurrence could be more likely. This example is a condition that likely occurs more than once, but not regularly, explaining the frequency found in the present study. Another factor may be the cyclic nature of performance block. Maaranen discovered there are two phases of performance block: a balking phase where the skill is difficult or impossible to execute and a performance phase where executing the skill is not a problem (2017). The amount of time spent in these phases depends on severity of the condition (Maaranen et al., 2017;

Maaranen et al., 2020). This said, the frequency of performance block recorded in the current study may be indicative of a moderate severity in which the balking phase is much shorter than the performance phase. These cycles and severity of performance block could be crucial to understanding performance block and should be further explored in future research.

There was no significant difference found between males and females impacted by performance block in the current study. This differs from Sato's data yet may be explained by a more equal representation of males and females in this study (2017). This indicates males and females have the same chance of experiencing performance block. Of the participants impacted by performance block, none of the reported sport positions indicated a significantly higher prevalence. This suggests no sport position has a higher risk of developing performance block over another. Similarly, the movements reported to be impacted by performance block had no significant difference between them. This demonstrates any sport skill is at risk of being affected by performance block. In Sato's study, the results did indicate a greater count of performance block in upper extremity movements which was attributed to a greater number of fine motor muscles which can be affected by psychological stress (2017). Though upper and lower extremity movements are not delineated in the present study, upper versus lower extremity performance block affected movements would be beneficial to research in future studies to better understand if upper body skills do pose a greater likelihood of performance block.

The present study analyzed whether performance block affected participants had previously played sports different than their current sport, and what those sports were. Most participants affected by performance block had previously played sports different from their current sport, similar to Sato's study (2017). However, this difference was not significant. Whether a participant's previous sport was a team or individual sport was also compared. The

results provided that most were team sports, but the difference was not significant. This suggests that the previous sport's type is not predictive of performance block occurrence. Or, the results may also suggest individual sports and team sports are too broad of categories to differentiate an impact. Klämpfl discovered many yips affected golfers had previously played a racket sport (2015). Klämpfl attributed the racket sport to contributing to yips by interfering with the implicit memory in the learning process, trying to shortcut learning the skill with familiar muscle motor movements (2015). This said, the previously played sports reported by participants in the current study were broken up by category and compared to that of their current sport. The categories included athletics (competitive throwing, running, jumping), invasion games (possession of an object in an opposing team's side of the playing field; ie soccer, basketball), gymnastics, ice sports (ice skating, skiing, snowboarding), racket/net games (hitting an object over a net into opponent's side; ie tennis, volleyball), water sports (swimming, diving), equestrian, target sports (aiming an object toward a specific target; ie golf, darts), combat sports (goal of sport is of physical altercation; ie martial arts), and fielding/striking sports (hitting an object out into a field of opponent's players; ie baseball) (Leadership and Sport, 2021). In reference to these categories, a participant's previous sport was significantly not the same category as their current sport (p-value = 0.005; ES = 1.21). While Klämpfl only studied golf, resulting in a previous racket sport correlation, the current study's findings parallel that of Klämpfl (2015). Golf is a target sport while racket sport is its own separate category. It is possible that if the movements of skills required of one sport category have similarities with a different category of a previous sport, a participant's mind may recognize some of the motor muscle movements and try to skip steps learning the new skill, interfering with proper execution of a skill (Klämpfl et al., 2015). Thus, differing sport categories may pose a relationship to performance block occurrence.

Within the previously played sport categories, invasion sports showed a significantly higher count compared to ice sports ($p = 0.0006$; ES = 1.04), equestrian ($p = 0.0006$; ES = 1.04), target sports ($p = 0.0006$; ES = 1.04), and combat sports ($p = 0.0006$; ES = 1.04). Invasion sports are typically team sports while the sports it has a significant difference with are individual sports. But not all the individual sport categories reported share a significant difference with invasion sports. Perhaps this difference is simply due to popularity of invasion sports compared to ice sports, equestrian, target, and combat sports. Although, there is not much research on team sports and performance block, let alone invasion game sports and performance block. So, sport categories may be beneficial to include in future research. Another significantly greater reporting was found in racket sports compared to combat sports ($p = 0.0008$; ES = 0.86). Unlike the difference found with invasion game sports, racket/net sports can be either a team or individual sport whereas combat sports are individual. This difference may again be explained by popularity of participating in racket/net sports over combat sports within performance block affected individuals. Overall, there was not a single category of previously played sport that displayed a significant difference over all other categories. Thus, one can not conclude one specific category of a previously played sport has a relationship with performance block occurrence.

Injury status upon performance block symptoms provided results of a significant response of no injury present during first occurrence of performance block. This defies Day's suggestion that injury can create a traumatic experience associated with the skill that was performed when the injury occurred, leading to performance block (2006). Although, injury status has typically only been used as exclusion criteria to control for fear of re-injury from skewing the data (Day et al., 2006; Bennett et al., 2013). This significant report of no injury at

the time of performance block occurrence reinforces that performance block is not related to injury or fear of re-injury.

Psychological Variables of Performance Block Affected

Perfectionism is broken up into two main domains: perfectionist striving and perfectionist concerns. Perfectionist striving is defined by having high personal standards and striving for perfection, displayed in survey questions addressing personal standards and organization sub-domains (Roberts et al., 2013). Perfectionist concerns relate to critical self-evaluation, displayed in survey questions addressing concern over mistakes, doubts about actions, and parental concerns sub-domains (Roberts et al., 2013). To analyze perfectionist tendencies in performance block affected individuals, questions in the present study targeting perfectionist concerns were asked. The three questions concerning performance block in the current study were taken from the Frost Multidimensional Perfectionism Scale (FMPS) and address the concern over mistakes/doubts about actions sub-domain (1990). This specific sub-domain of questions was chosen to represent perfectionism due to Roberts's suggestion of future research isolating specific domains in studying perfectionism and yips (2013). Concern over mistakes has resulted in being a significant predictor, hence the concern over mistakes/doubts about actions FMPS domain was used in the present study's questionnaire (Roberts et al., 2013).

Participants significantly answered yes to "I hate to be less than the best at things" (p = 0.0007; ES = 1.82) but significantly answered no to "If I fail partly, it is as bad as being a complete failure" (p = 0.003; ES = 1.47). The final perfectionist-related question, "People will probably think less of me if I make a mistake" displayed a higher yes response, but it was not significant. "Hating to be less than the best at things" as well as "people thinking less of me if I

make a mistake" are specifically concerns over mistakes questions due to their display of a tendency to react negatively to mistakes (Antony et al., 1998). Meanwhile, "if I fail partly, it is as bad as being a complete failure" aligns with doubting the quality of performance and is thus categorized as representing doubts about actions (Antony et al., 1998). The present study resulted in a significant difference and a positive trend for concerns over mistakes, while a significant difference that doubts about action did not relate to performance block. Though the questions regarding performance block in this study were limited, this is consistent with Roberts's findings that concerns over mistakes were a significant predictor while doubts about actions had no influence on yips (2013). A regression analysis of all domains has also revealed that concern over mistakes in combination with personal standards and organization is predictive of performance block, supporting the FMPS which declares an unhealthy level of perfectionism if one scores high in both perfectionist striving and perfectionist concerns domains (Roberts et al., 2013). Likewise, Bennett found significantly higher scores for both perfectionist striving and concern domains in yips affected participants compared to the control (2016). In future research, personal standards and organization domains should be combined with concern over mistakes to better determine if unhealthy perfectionism has a relationship with performance block occurrence.

Rumination questions in the current study showed a significantly higher yes answer to ruminative reflection behavior, while ruminative brooding was not significant. Rumination has been linked to yips, but it has not yet been studied broken up into different categories as it was in the current study (Bennett et al., 2013). Ruminative reflection entails constantly thinking about shortcomings, failures, and mistakes, which has some similarities to the concerns over mistakes domain of perfectionism. Both ruminative reflection and the concerns over mistakes questions

resulted in significant representation among performance block affected participants, consistent with a link found between rumination and perfectionism in the literature (Bennett et al., 2013). Ruminative brooding, on the other hand, describes constantly thinking about passive and unmotivated feelings (Bennett et al., 2013). If prolonged, these characteristics of ruminative brooding can attach to and escalate the symptoms and thus the severity of performance block (Bennett et al., 2013). The most common answer choice for experiencing ruminative brooding in the current study was "sometimes." Though not significant, this coincides with a moderate severity as described previously in that the ruminative brooding may not be severe enough to push severity of performance block in this population into a regularly occurring condition.

Reinvestment is a commonly described characteristic of performance block. Essentially, one who is experiencing performance block tends to experience an increased self-awareness when attempting to complete the affected skill (Bennett et al., 2016). This study resulted in a significant occurrence of reinvestment among performance block affected participants (p = 0.009; ES = 1.19), consistent with Sato's findings (2017). Reinvestment has been attributed to having been corrected on the skill and over-analyzing the movement, having a pattern interrupted surrounding the skill, or having extreme concern over potential mistakes within unhealthy perfectionist tendencies (Bennett et al., 2016; Klämpfl et al., 2013; Maaranen et al., 2020). No matter the explanation, something occurs to the athlete to make them switch from an automatic processing to conscious processing of the skill, making them more aware of their movement and at a greater inability to properly execute the skill (Day et al., 2006). Reinvestment is a characteristic of cognitive control, as is action control. The difference is, reinvestment relates to the skill itself while action control relates to an athlete's ability to anticipate, react, and evaluate use of the skill based on their surroundings and emotions (Lobinger et al., 2014). To better

understand the cognitive processes taking place during performance block and if there is a relationship between reinvestment and action control that could be useful for treatment, more research should be done in this area.

Emotional and Social Variables of Performance Block Affected

Negative feelings, self-talk, and visualizations while experiencing performance block symptoms provided no significant difference, although there was a positive trend in the current study, consistent with Sato's study (2017). Fear to perform the movement is also a negative emotion that resulted in no significant difference, but a positive trend. These positive trends are consistent with the literature in which athletes experiencing performance block symptoms have shown to experience negative feelings surrounding the occurrence such as worrying about mistakes and loss of control, as well as negative emotions such as frustration, anger, fear, and anxiety (Philippen & Lobinger, 2012). Embarrassment, disappointment, avoidance, and visualization of a negative or failed execution of the skill have also been recorded (Maaranen et al., 2017; Day et al., 2006; Bennett et al., 2013; Bennett & Maynard, 2017). If these negative effects were present before the performance block occurred due to an off day, emotions or stress levels, it is possible for negative effects to increase the likelihood of performance block in the presence of such emotions (Bennett et al., 2013). Yet the trends in the present study were not significant, so this cannot be concluded from this study. However, a prolonged occurrence of negative feelings, self-talk, visualizations, and fear to perform the movement can prolong the balking phase of performance block, impacting the severity (Maaranen et al., 2017; Maaranen el al., 2020; Philippen & Lobinger, 2012). The moderate severity of performance block present in this study's population may therefore explain the positive trend, but lack of significance in negative effects.

Anxiety, fear, and avoidance listed as negative emotions associated with performance block are also common responses to trauma (Bennett et al., 2013). Using the impact of events scale (IES), Bennett compared trauma scores between LMS and a control as well as between yips and a control, but found no significant difference in either (2013). The current study found most performance block affected participants had significantly not experienced a traumatic episode ($p = 0.03$; ES = 0.96). This suggests that while trauma has similar psychological components to what is experienced during performance block, traumatic episode does not impact performance block occurrence.

Maaranen has found a significant relationship between pressure from coaches and performance block symptoms (2017). However, the present study found no significant difference in pressure from coaches experienced by performance block affected participants. The explanation for this lack of significant difference may go back to the frequency of performance block symptoms in this population. The participants reported experiencing symptoms more than once, but not all the time. Perhaps their performance block symptoms were not present consistently enough for it to become a significant issue with their coach. Maaranen's subjects described coaches being patient and encouraging at first, but as symptoms prolonged, they would become easily frustrated and punish by pulling the athlete from practice/competition or by forcing them to perform the affected skill despite the participant's inability to (2017). This increased the pressure felt from the coach as well as the desire for social support and coach's approval (Maaranen et al., 2017). This said, lack of significant pressure from coaches in the current study may also explain a lack of significant difference in exclusion from competition. No significant difference in pressure from coaches or exclusion from competition does not discard these variables from contributing to performance block occurrence, but a conclusion of these

variables directly contributing to performance block can not be drawn either. More research on a relationship between frequency of performance block occurrence and/or severity and coach's pressure should be conducted in the future.

Pressure from parents and teammates was analyzed alongside coaches to determine if a similar relationship could be found. Results indicated that both pressure from parents ($p = 0.009$; ES = 1.19) and pressure from teammates ($p = 0.009$; ES = 1.19) was not significantly experienced by performance block affected participants. This suggests pressure from parents and teammates does not influence performance block occurrence but does not necessarily mean participants felt supported during their performance block occurrence. While the majority of participants answered "yes" to feeling supported during their performance block symptoms, there was no significant difference, meaning strength of a support system cannot be concluded to have a relationship with performance block. The trend toward feeling supported found in this study is consistent with Day's results in which participants reported feeling an increased desire for support, but even those who felt supported still felt a need for further support (2006). This may explain why the trend in feeling supported fell short of a significant difference.

The presence of pressure has pushed athletes to learn new skills in an unfavorable manner (Day et al., 2006; Pattinson & Cotterill, 2017). The present study found that participants experiencing performance block significantly answered "no" to feeling rushed to learn the skill that is being affected by performance block. There was no significant difference, but a trend towards the answer "no" when participants were asked if their performance block affected skill was a skill they taught themselves. Both rushing to learn a skill and self-teaching a skill are characteristics of unfavorable skill acquisition (Day et al., 2006; Pattinson & Cotterill, 2017). These findings are not consistent with the literature, but perhaps there is an explanation.

Research describes higher reports of unfavorable skill acquisition in performance block affected trampolinists and divers (Day et al., 2006; Pattinson & Cotterill, 2017). Trampolinists and divers perform similar, artistic movements that are perhaps more complex to acquire than most sport skills. This said, maybe unfavorable skill acquisition is a more sport-specific performance block variable.

Limitations

The limitations in this study include a fairly small sample size, a specific population, and a limited number of sports, and a lack of control group. This study's sample was on the smaller side (n = 59) and only had a response rate of 32%, but it still succeeded the minimum 11 participants needed for statistical power. In future research, greater representation would be ideal to strengthen the relationships found. The sample was limited to PLNU, a division II school with only eight NCAA sports. But, compared to Sato's study from which the questionnaire was derived, this study's results had many consistencies with the results of a division I school with 242 participants and 12 NCAA sports. Methodical procedure of Part III of the questionnaire was modeled after that of Sato's study in which if a participant did not meet criteria of performance block symptoms in Part II, they did not complete Part III of the questionnaire. This limits the Part III analysis to only performance block affected participants (n = 25) and may limit the strength of the relationships found compared to the population as a whole. However, there were still many consistencies between this study's results and that of supporting research, and with strong effect sizes. This also allowed for a combination of performance block occurrence in both team and individual sports to be measured and compared together to the literature's findings. Therefore, the results of Part III of the questionnaire are strong, but could be further validated by

including the whole sample of performance block and non-performance block affected participants when studying variables contributing to performance block in future research.

Implications for Future Research

Currently, many sports have different names for the same description of symptoms. The literature describes a sudden loss or inability to perform a previously automatic skill as yips, LMS, flikikammo, paradoxical performance, and mental block to name a few. Having so many names across a variety of sports makes it confusing and difficult to piece together an understanding of what contributes to this condition. To coin the term performance block as an umbrella term for all the previously described sport specific names, an understanding of whether all sports can experience symptoms must first be determined. With research mainly focused on individualized sports, the present study investigated if team sports experienced performance block symptoms as well. It was the first to do so and found no significant difference in prevalence between individual and team sports. Therefore, more research on performance block occurrence in team sports is needed to gauge better understanding.

After comparing prevalence between individual and team sport performance block, this study analyzed how the performance block affected participants answered to questions addressing variables found to have relationships with yips, LMS, flikikammo, and mental block in the literature. Where the findings of this study aligned with that of the literature, one can conclude performance block fits as a blanket term for this condition across all sports. Bennett has found similar reports of some variables relating to performance block between yips and LMS, suggesting that though they apply to differing sports, they have the same characteristics (2013). However, because the present study is the first study to seek this same effect across the multitude

of variables believed to contribute to performance block, more research needs done on the term performance block to validate the use of it as a blanket term.

This study presented interesting findings regarding previously played sports as well. This is a variable that is uncommon in the research, but it appears to have played a sport of a different category prior to an athlete's current sport is high among performance block affected participants. This is consistent with Klämpfl's results in golfers who played a racket sport prior to golf, but this is the only other research on this relationship (2015). Therefore, previous sport category and performance block should be included in future research to validate the motor muscle shortcut theorized to play a role (Klämpfl et al., 2015).

Within the findings of the present study, an explanation of severity of performance block was mentioned a number of times. Severity of performance block has been studied regarding the effects of negative emotions and rumination, but not among the other variables. It also has not been studied broken into a scale of low, moderate, and severe. Given what was discovered in this study, further research on relationships between performance block contributing variables and levels of severity should be conducted to better understand where an athlete is at in severity and identify methods to prevent it from getting worse.

To treat performance block, there is no gold standard recommendation. Athletes experiencing performance block have tried cognitive methods such as relaxation techniques, and positive self-talk, as well as visualizations, distraction methods, and talk therapies, but the effects are only short-term (Bennett et al., 2013; Bennett & Maynard, 2017). Another method in the literature is the use of emotional freedom techniques (EFT). EFT is typically used for trauma but given performance block and trauma have similar psychological components, the use of EFT can

focus on these components and ideally treat them (Bennett et al., 2013). EFT has shown to directly improve putting performance in yips-affected golfers postintervention, but more research needs to be conducted to verify the effectiveness of this technique in other sports (Rotheram et al., 2012). Similarly, researchers have tried to target the anxiety either causing or caused by performance block and treat it with a common anxiety treatment: eye movement desensitization and reprocessing (EMDR). EMDR in combination with graded exposure was effective, but the results are limited to only two case studies (Bennett & Maynard, 2017). While these treatment options are focused on cognition, another potential treatment could be training for executive function (i.e. action control). Referring to the intensity-executive function relationship, perhaps training the executive function sport task required of the affected skill at a HRR of 80-100% over time can improve an athlete's ability to perform the task, performance block or not, at this higher intensity (Stone et al., 2020). Treating to this relationship targets the specific adaptations to imposed demands (SAID) principle and if deemed effective, could be implemented by a coach rather than a psychology professional. However, this treatment option has yet to be explored. Overall, none of these treatment options have been researched enough to determine which is most effective. But, if an athlete is experiencing performance block, seeking guidance from a sport psychology professional is a good first step.

Conclusion

This study unveiled new realizations about performance block such as a similar prevalence between team and individual sports, a need for levels of severity within understanding performance block, and validations of previous research not just in individual sports, but team sports as well. Much more research is needed to continue bettering an understanding of performance block. Each new finding provides a clearer understanding as to

what contributes to performance block occurrence, so effective treatment can be found. Also, knowing how severe cases of performance block can push an athlete to end their athletic career, it is important to address it before the condition gets to that point (Day et al., 2006; Bennett et al., 2013). While researchers continue searching for a method of best treatment, sports teams can focus on education. Educating the athletes and coaches about performance block symptoms can help in effectively managing the athlete's environment if performance block does occur (Bennett & Maynard, 2017). This can help prevent performance block from increasing in severity and help the affected athlete feel more supported. On a positive note, Matsuda discovered that athletes who have overcome yips had a more accurate understanding of their abilities, a more active attitude towards practice and competition, a re-gaining of self-confidence, and therefore a greater psychological maturity (2018). While performance block is not an ideal condition to experience, it can help an athlete come out of the experience better than they were before.

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