PENNISI, NORI SIE. Ed.D. Psychological Characteristics and Skills of Junior Competitive Swimmers. (2023)
Directed by Dr. Diane L. Gill. 57 pp.

Research has consistently found that psychological factors influence sport performance and athletic talent development (Collins & MacNamara, 2012). Most of this research has focused on the psychological underpinnings of elite adult athletes rather than youth athletes. The purpose of this study was to identify and compare the psychological characteristics and skills of competitive junior swimmers across age, gender, and ability. Online surveys that included established measures of psychological skills and characteristics were completed by 278 competitive swimmers at a year-round swim club. Age x gender x ability univariate and multivariate results revealed the participants rated themselves within the top third of scores on most of the psychological characteristics and skills assessed, including grit and growth mindset. In terms of coping skills, the participants averaged moderate scores ($M = 43.48$), with some specific coping skills (coping with adversity, goal setting/mental preparation, peaking under pressure, and freedom from worry) falling below the midpoint of possible scores. Males perceived significantly better overall coping skills ($M_{total} = 46.16$) than females ($M_{total} = 41.05$). An age x ability interaction was found for several measures. Within the higher ability or elite track, the oldest participants scored significantly lower than the younger participants on almost all the assessments, whereas in the lower ability or challenge track, participants' scores tended to increase with age on most assessments. Responses to a question about why swimmers found self-selected psychological factors important to their success, revealed that many struggled with confidence and anxiety. Survey results suggested some differences related to age, gender and ability, and ratings and open-ended responses indicate that swimmers consider psychological skills important and helpful in dealing with stress and anxiety.

PSYCHOLOGICAL CHARACTERISTICS AND SKILLS

OF JUNIOR COMPETITIVE SWIMMERS

by

Nori Sie Pennisi

A Dissertation
Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

Greensboro

2023

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APPROVAL PAGE

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March 16, 2023
Date of Acceptance by Committee

February 22, 2023
Date of Final Oral Examination

ACKNOWLEDGEMENTS

I would like to acknowledge those who have been with me throughout this journey. To Dr. Dan Gould – thank you for serving on my committee, being my mentor and, most importantly, one of my very best friends. Thank you for continuing to push and challenge me to be better and for believing in me, especially when I did not believe in myself. I would not be where or who I am today without you. I am forever grateful. To Dr. Diane Gill and Dr. Erin Reifsteck – thank you for all the guidance and support that you both provided me throughout this whole process. Thank you for serving on my committee and for all the time you spent with me. I feel so fortunate to have been able to learn from both of you. To my GTSD friends – thank you for all the support, encouragement, and laughs these last four year. I am glad we had each other. You made this journey so much more fun. Lastly, to my husband and three girls – thank you for putting up with me throughout this process and being supportive and patient. You all mean everything to me.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I: PROJECT OVERVIEW

Over 46 million children and adolescents participate in youth sports in the United States (Aspen Institute, 2020). Many of these young athletes become committed to their sport and strive to reach the highest levels. Thus, attention has been paid to how to develop such athletes to be successful (Vaeyens et al., 2009). As research has consistently found that psychological factors influence the process and outcome of performance and talent development (Collins & MacNamara, 2012), researchers have focused on the psychological underpinnings of elite athletes, including their psychological makeup, and the athlete talent development process (e.g., Gould et al., 2002; Orlick & Partington, 1988). While much has been learned about the psychological characteristics and skills of elite adult athletes, not as much is known about the psychological characteristics and skills within youth athlete development. With concerns regarding the process of athlete talent development becoming more prevalent in the past few decades, such as negative effects of specialization and issues surrounding burnout (Gould, 2010; Wiersma, 2000), there is a critical need to better understand young athletes' psychological characteristics and skills that can impact their performance and positively influence their overall psychological and talent development. A gap exists regarding the psychological characteristics and skills of young athletes, including which characteristics and skills are associated with success at different ages. Hence, the purpose of this study was to identify and compare psychological characteristics and skills in youth athletes (i.e., competitive year-round swimmers) across age, gender, and ability levels.

Review of Literature

To comprehend the psychological characteristics of youth athletes, an understanding of the athlete development process is first necessary. The following literature review begins with an

overview of the athlete talent development process and then reviews the research on psychological characteristics associated with elite athletes as well as gender. The review concludes by focusing on the role of psychological characteristics in youth development.

Overview of Elite Athlete Talent Development Process

As elite athletic success is a desire of many individuals, countries, and institutions, much research has gone into identifying and developing talent. Conclusions based on reviews of talent identification and development literature (e.g., Coutinho et al., 2016; Johnston et al., 2018; Vaeyens et al., 2009) reveal that a complex combination of psychological, physical and cognitive skills, characteristics, abilities, and dispositions interact in a distinct and multifaceted way to comprise and influence athletic talent. Research has emphasized understanding the athletic talent development process, including its various stages, and the factors and experiences that are associated with success at an elite level (Bailey & Collins, 2013; Gould & Maynard, 2009; Morgan & Giacobbi, 2006).

Models of Talent Development

To describe the process of elite athlete talent development, researchers have looked to, and extended, Bloom's (1985) model of talent development, which includes three main stages of development based on the early, middle, and late years of talent development. According to Benjamin Bloom's (1985) original study on high performers in sports, science, and the arts, successful performers follow three main stages for developing their talent: the stage of initiation, the stage of development, and the stage of perfection. In the stage of initiation or the early years, children are introduced to fun and playful activities that might stimulate their interests and provide a fundamental skills base that is a prerequisite for specialized skill development. Then, during the stage of development, the middle years, children develop a passion for and become

2

more serious about their interest in a particular activity or sport. The stage of perfection, the late years, represent the time when performers become more of an expert at their chosen talent.

Following up on Bloom's seminal work, researcher Jean Côté (1999) introduced a model for talent development in sport based on his research of elite adolescent athletes and their family members to explore patterns of family dynamics throughout the athletes' sport development. Like Bloom's stages, Côté's (1999) model identified three stages of talent development in sport in which young athletes progress. The initial stage is known as the sampling years as children are given the opportunities to participate in a variety of sports with the focus on fun and motor skills fundamentals. The next stage, called the specializing stage, is where athletes slowly decrease their involvement in other activities and become more focused on fewer sports. The investment stage is characterized with an increased commitment and engagement in more competitive, intense and higher quality training. Based on research by Durand-Bush and Salmela (2002), the maintenance phase, where athletes focus on performance and managing demands of developing and maintaining success at an elite level, was identified. A discontinuation phase is often added to Côté's four stage model of the athlete talent development process. Based on career transition models, the discontinuation phase is when an elite athlete's career ends and the athlete transitions out of elite level sports (Wylleman & Reints, 2010).

Most experts agree that athletes typically progress through the above stages of talent development (Côté, 1999; Durand-Bush & Salmela, 2002; Wylleman & Reints, 2010) but that the progression through these stages is not necessarily uniform and can be complex and complicated (McNamara et al., 2010; Gould et al., 2020). This research has led to the examination of factors and experiences that influence this talent development process, in

particular, the psychological characteristics and skills that impact this process (e.g., Gould and Maynard, 2009; MacNamara et al., 2010; Rees et al., 2016).

Psychological Characteristics and Skills and Athlete Talent Development

Within the research on the role of psychology in athlete talent development, researchers have identified a variety of psychological factors, from psychological skills and dispositions to mental skills and psychological competencies and strategies, associated with athletes, mainly elite adult athletes (Gould et al., 2002; Mahoney et al., 1987; Thomas et al., 1999). For the purposes of this literature review, the term of 'psychological characteristics and skills' will be used to represent psychological factors, skills, and dispositions as well as mental skills and abilities. In addition, operationalizing 'elite' is necessary. In line with the majority of research focusing on elite athletes, the term 'elite' will be used to classify athletes competing at a professional level and/or participating in international and world competitions, including the Olympics.

Elite Athletes

Elite athletes are often thought to possess or learn certain psychological characteristics and skills throughout their development that contribute to their success. Thus, over the past 40 years, researchers in sport psychology have sought to identify these characteristics and skills of successful elite athletes (Gould et al., 2002; Mahoney & Averner, 1987; Orlick & Partington, 1988; Taylor et al., 2008). In an extensive literature review of psychological factors that have been associated with success at the Olympics, Gould and Maynard (2009) were able to identify certain personal characteristics and dispositions that have been related to the Olympic success for an athlete, such as adaptive perfectionism and hope, cognitive-behavioral strategies, including routines, imagery and self-talk, and emotional states and attributes, such as emotional control and

4

motivation. In addition, Rees and his collaborators (2016) provided a review of what is known and thought to be accurate about the development of sporting talent focusing on three fundamental topics, the performer, the environment, and practice and training. Similar to Gould and Maynard's findings, Rees and colleagues (2016) concluded that in terms of the performer, athletes who were more successful exhibited higher levels of confidence, resilience, and mental toughness as well as motivation and perceived control at higher levels, stronger abilities to handle or cope with adversity, and had a strong understanding and use of a wide variety of mental skills, including anxiety control, self-talk, goal setting, and imagery.

In another study, MacNamara, Button, and Collins (2010a) performed retrospective interviews with seven elite athletes and one parent of each athlete with the purpose of identifying the psychological attributes these world-class athletes possessed and developed that were influential to their success and development. Based on these interviews, being competent in mental skills, such as imagery and goal setting, were found to be important to their success as was found in previous studies. Furthermore, MacNamara and collaborators (2010a) found the main psychological attributes influencing these world class athletes' successes were a strong self-belief, competitiveness, coping under pressure, commitment, importance of working on weaknesses, game awareness, and an overall vision of what is necessary to succeed. These psychological attributes and characteristics were seen by the athletes as significant factors in their ability to reach world-class status and were developed at various stages of the elite athlete talent development process (MacNamara et al., 2010a; 2010b). For example, for most of the athletes interviewed, their competitive nature was fostered through competing and playing with siblings when they were young. As their careers progressed, the psychological attributes of perseverance and the ability to cope with setbacks were developed and contributed to their

success as a world-class athlete. Notably, these athletes felt if they lacked or were weaker in a physical aspect of the sport, that deficit could be overcome by strong psychological attributes, like commitment and being driven to succeed, in order to achieve excellence (MacNamara et al., 2010a).

In sum, certain dispositions, such as optimism, emotional states like self-belief and emotional control, and mental skills such as imagery and anxiety control, have been commonly found across the literature on the psychological characteristics and skills most identified with elite athletes. Also consistently found in the research is that, compared to less successful athletes, successful athletes displayed higher levels of psychological characteristics like confidence, motivation, and ability to cope with adversity, and used several mental skills, especially imagery, goal setting, and positive self-talk (Gould & Maynard, 2009; Smith et al., 1995; Taylor et al., 2008). This identification of the psychological characteristics and skills of elite athletes has led to a better understanding of what characteristics and skills are associated with and needed for success at an elite level.

Gender

In addition to comparing the psychological characteristics and skills in successful elite athletes to less successful elite athletes, studies have also compared these characteristics and skills in male and female athletes (Rees et al., 2016; Taylor et al., 2008). According to Taylor and colleagues (2008), female Olympians reported higher levels of somatic anxiety, concentration disruption, and performance worry as well as the use of more positive self-talk than male Olympians. Criticos et al. (2020) found higher grit scores and use of more coping skills, such as breathing, in male collegiate throwers, while competence was found to be higher in female counterparts. In addition, through competition, males have been shown to have higher

6

motivation than females (Ong, 2017), although motivation similarities existed between males and females in achievement orientations and perceptions of motivational climate of Olympians (Taylor et al., 2008). In terms of confidence, differences in gender seemed to depend on the level in which the athletes compete (Mahoney et al., 1987; O'Connor et al., 2019; Vealey, 1988), with female athletes reporting lower trait sport confidence than their male counterparts at the high school and college levels, but no significant gender differences found at the elite level (Vealey, 1988). Similarly, Mahoney and collaborators (1987) found that non-elite male athletes reported significantly higher self-confidence than female athletes, however, these gender differences did not appear at the elite level. Finally, at the youth level, O'Connor et al. (2019) found that boys recorded higher self-confidence than their female counterparts. Based on the research, both differences and similarities of psychological characteristics and skills have been identified in female and male athletes. Moreover, an athlete's level of competition, from non-elite to elite, and age have been factors in these differences and similarities in psychological characteristics and skills.

Youth Athletes

Drawing from the literature on elite adult athletes and their psychological makeup, researchers have recently begun to look at the psychological characteristics and skills of younger junior athletes and how to develop these characteristics and skills as the athletes progress through the stages of talent development (Blijlevens et al., 2018; MacNamara et al., 2010a; 2010b). For example, in a systematic review of the literature on the psychological skills and characteristics of youth athletes, Dohme and colleagues (2019) found similarities in the psychological characteristics and skills between youth athletes and elite adult athletes, including self-confidence, motivation, emotional control, resilience, imagery, goal setting, and routines. In

addition, the review found that social support seeking, where an athlete seeks and receives advice and help from other people including coaches, teammates, teachers, or parents, was an ability important for youth athletes to have to be successful as was maintaining a sense of balance with other interests in their lives, such as school, family, friends, and other hobbies (Dohme et al., 2019). Importantly, Dohme and colleagues (2019) pointed out that although similarities in psychological characteristics and skills exist between elite adult and youth athlete populations and performances, the youth athlete population should be treated as its own distinct entity because cognitive development needs to be considered when developing psychological characteristics and skills in youth.

In another study designed to identify the psychological characteristics and skills necessary for the development and success of talented athletes as they progress through the stages of talent development, Blijlevens and colleagues (2018) found that the psychological skills and characteristics necessary for development in top level gymnasts differed depending on the gymnast's athletic talent development stage (i.e., initiation stage, development stage, mastery stage), with some characteristics and skills existing in all three stages. For instance, focus, perseverance, and self-confidence existed in all three stages, while stress resistance, adaptability, and competitiveness were only found in the mastery stage. This study showed how psychological skills and characteristics developed as the environment and demands changed with the different stages of athletic development, emphasizing the importance of developing and understanding the different psychological characteristics and skills needed at each stage of athlete talent development.

Further studies have looked at the psychological characteristics associated with the successful progression through the talent development stages. For instance, Nico Van Yperen's

(2009) prospective study identified the psychological characteristics that predicted career success for professional male soccer players based on a comparison of data collected at the beginning of their careers 15 years earlier, on players who reached the professional level and those who did not. Yperen (2009) found that the psychological characteristics that were predictors of professional career success were problem-focused coping, social support seeking, and goal commitment. Additionally, MacNamara and colleagues (2010a; 2010b) performed a series of studies to understand the role of psychological factors in developing athletes to reach elite levels by investigating the developmental pathways of elite athletes. These studies found a range of psychological characteristics, which MacNamara and collaborators (2010a; 2010b) termed the psychological characteristics of developing excellence (PCDE), that contributed to athletes being able to weather the many factors that influence the attainment of the elite level within the talent development process, including transitions, developmental opportunities, or setbacks. MacNamara et al. (2010b) further emphasized the need for an early, systematic development of PCDE for athletes to have the greatest chances of realizing potential, focusing more on learning and developing these characteristics and skills.

Expanding on this research, MacNamara and Collins (2011) developed and validated a measure, the Psychological Characteristics of Developing Excellence Questionnaire (PCDEQ), "to assess the possession and deployment of psychological characteristics of developing excellence" (p. 1275). This measure can be used as a practical tool for adults associated with developing young athletes and their talent as it would provide information about the characteristics "that are being properly addressed or neglected during different stages of development or in different contexts" (p. 1273).

9

Purpose and Aims

Interest on how to teach and develop psychological characteristics and skills has grown in recent years (Hardwood & Knight, 2015; Pierce et al., 2016). With the limited research on youth athletes, particularly later in their youth sport journey, and more attention paid to those older athletes who have already proven success (Blijlevens et al., 2018; Olszewski-Kubilius et al., 2019), a need for more research on youth athletes and their psychological characteristics and skills exists. Identifying these characteristics may provide a window of how these characteristics develop over time, and benefit those involved in helping youth transition through the talent development process (e.g., organizations, coaches, parents). Hence, the purpose of this study was to identify and compare the psychological characteristics and skills in youth athletes (i.e., competitive year-round swimmers) across age, ability, and gender.

Methods

To identify an athlete's psychological characteristics and skills, a cross-sectional self-report questionnaire was administered to competitive junior swimmers from a nationally ranked year-round swim club. Within the club the swimmers are divided into two tracks, an elite track and a challenge track. The swimmer's track is based on training ability, competitive aspirations, and commitment level. Each track includes both male and female swimmers within three age groups. See Appendix A for swim training group descriptions.

Participants and Procedures

Participants ($n = 278$; 50.7% female, 65.2% white) ranged in age from 11 to 19 years ($M_{age} = 14.3$). The average number of years a participant had been on a swim team that had organized practices and participated in meets was 7.81 years ($SD = 3.00$). The swimmers had participated an average of 7.20 years ($SD = 2.90$) on a year-round swim team and currently

attend an average 6.09 pool practice sessions per week (*SD* = 1.33). See Appendix C for participant demographics.

A waiver of parental consent with an informational letter was emailed to parents providing the option to refuse their child's participation in the study. Participant assent was also obtained before the survey was administered. Of the 424 swimmers in the club who met the criteria to participate, 278 participants consented to the study and completed the entire survey. Swim group coaches were contacted to schedule times to administer the survey. At the scheduled time for each group, the swimmers were taken to a classroom or a quiet area of the facility where a questionnaire was administered through Qualtrics, with most using their phones to complete. Thirty-six participants from the youngest age group completed the pen and paper version, and those data were entered into Qualtrics by the investigator. The study procedures were approved by the University of North Carolina at Greensboro's Institutional Review Board (IRB).

Measures

The self-report questionnaire included demographics, four established mental skills and psychological characteristics assessments, and added ratings and open-ended items on psychological skills. See Appendix B for the questionnaire. The following assessments were included in the questionnaire:

The Athletic Coping Skills Inventory-28 (ACSI-28)

The ACSI-28 (Smith et al., 1995) is a 28-item multidimensional measure of sport specific psychological skills within seven different subscales related to athletic performance including coping with adversity; peaking under pressure; goal setting and mental preparation; concentration; freedom from worry; confidence and achievement motivation; and coachability. Each subscale contains four questions based on a 4-point Likert scale (*almost never* to *almost*

always). A total score is calculated by summing and averaging the seven subscales. The ACSI-28 was shown to have sound psychometric properties in samples of high school and professional baseball players (Smith & Christensen, 1995; Smith et al., 1995).

The Short Grit Scale (Grit-S)

The Grit-S (Duckworth & Quinn, 2009) is an 8-item scale based on a 5-point Likert scale (*very much like me* to *not like me at all*) that measures the extent to which individuals can maintain focus and interest and persevere in obtaining long-term goals. Good psychometric properties for this scale have been shown with adolescents and adults (Duckworth & Quinn, 2009).

Growth Mindset Scale

The Growth Mindset Scale (Dweck, 2006) is a 3-item measure based on a 6-point Likert scale (*strongly disagree* to *strongly agree*) that measures an individual's growth mindset. Rammstedt, Grüning, and Lechner (2021) found acceptable psychometric properties for this scale in adolescents and adults.

Psychological Characteristics of Developing Excellence Questionnaire (PCDEQ)

Two of the six factors of the PCDEQ (MacNamara & Collins, 2011) based on a 6-point Likert scale ranging from *very unlike me* to *very like me* were used in this study. Both factors have been shown to impact successful development in sport. Factor 1 (PCDE 1): Support for Long-Term Success has 17 questions and examines how much significant others encourage the use of psychological characteristics, such as goal setting and distraction control, to help with long-term success. Factor 2 (PCDE 2): Support from Others to Compete to my Potential has 7 questions and examines the extent to which others encourage progression and competing up to

one's potential. The PCDEQ has been shown to have sound psychometric properties for adolescents and adults (MacNamara & Collins, 2011).

Additional Questions

Swimmers were asked to rate how important mental/psychological factors are to swimming success on a 5-point Likert scale ranging from *not at all* to *very important.* Next, from a list of 16 psychological characteristics and skills, swimmers selected two that were most important to swimming success. An open-ended question explaining why they selected those two factors followed.

Results

All collected data were exported from Qualtrics into SPSS and cleaned. Only participants that completed the whole survey were included in all subsequent analyses. Descriptive statistics (M, SD, Range, Frequencies) were run (see Appendix D). A gender by ability by age (2 x 2 x 3) ANOVA was conducted on each of the total scores for grit, growth mindset, and the ACSI-28 as well as the additional question regarding the importance of psychological characteristics for swimming success. A gender by ability by age (2 x 2 x 3) MANOVA was performed for the two PCDE scores and then for the ACSI-28 seven subscales. Any significant multivariate effects were followed up by univariate analyses and pairwise comparisons. Descriptives and the results of the three-way ANOVA on each of the total scores (grit, growth mindset, ACSI-28) are presented first. Next, descriptives and the three-way MANOVA results for the PCDE scores and the ACSI-28 subscales are presented. Lastly, the results, including the three-way ANOVA, for the additional questions are presented.

Growth Mindset, Grit, and ACSI-28 Total Score

For the Growth Mindset Scale, the swimmers averaged 4.16 on a scale of 1 to 6, with the higher number signifying a stronger growth mindset. There were no significant main effects or interactions in the three-way ANOVA for growth mindset.

The swimmers had an average grit score of 3.35, on a scale of 1 to 5, with 5 being extremely gritty. The three-way ANOVA for grit revealed a statistically significant main effect for ability, $F(1, 256) = 6.32$, $p = .013$, $\eta_p^2 = .02$. While the main effect was significant, the effect size was small. Swimmers from the elite group had higher grit scores than swimmers from the challenge group as shown in Table 1. No other main effects or interactions reached significance.

The ACSI-28 total score ranges from 0 to 84, with higher scores indicating greater strength of overall athletic coping skills. The swimmers averaged 43.01 for the ACSI-28 total score, falling in the midrange of the total possible score. The three-way ANOVA on the ACSI-28 total score revealed a statistically significant main effect for gender, $F(1, 256) = 13.11$, $p < .001$, $\eta_p^2 = .05$, with a medium effect size. Males ($M = 46.16$, $SD = 11.03$) had higher ACSI-28 total scores than females ($M = 41.05$, $SD = 10.63$). There was also a statistically significant age x ability interaction, $F(2, 256) = 3.66$, $p = .027$, $\eta_p^2 = .03$, with a small effect size. The elite group had higher total scores compared to the challenge group for both the 11-12 years old and 13-14 years old group. However, for the oldest age group, the challenge group had better scores than the elite group. No other interactions or main effects were found to be significant.

Table 1. Means for Main Outcomes Based on Age and Ability

Assessment		11-12 years old	13-14 years old	15 and above years old	Total
		M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Grit					
	Challenge	3.18 (0.75)	3.19 (0.66)	3.42 (0.57)	3.25 (0.67)
	Elite	3.46 (0.65)	3.43 (0.53)	3.38 (0.52)	3.41 (0.54)
Growth Mindset					
	Challenge	4.25 (1.37)	3.89 (1.51)	4.38 (1.26)	4.15 (1.40)
	Elite	4.26 (1.33)	4.26 (1.16)	4.04 (1.24)	4.15 (1.23)
ACSI-28					
	Challenge	42.21 (10.27)	43.50 (12.11)	44.42 (10.93)	43.32 (11.10)
	Elite	46.70 (10.64)	45.27 (11.72)	41.50 (10.55)	43.57 (11.13)
PCDE 1					
	Challenge	3.65 (0.80)	4.40 (0.63)	4.33 (0.69)	4.14 (0.78)
	Elite	4.26 (0.85)	4.01 (0.78)	3.98 (0.88)	4.03 (0.84)
PCDE 2					
	Challenge	3.90 (0.92)	4.48 (0.64)	4.64 (0.55)	4.33 (0.78)
	Elite	4.39 (0.96)	4.34 (0.74)	4.35 (0.84)	4.35 (0.83)
Importance of Psychological Characteristics					
	Challenge	3.46 (1.00)	4.12 (0.88)	4.54 (0.72)	4.02 (0.97)
	Elite	4.29 (0.94)	4.42 (0.69)	4.30 (0.86)	4.34 (0.82)

PCDEQ and ACSI-28 Subscales

The total score for the PCDEQ Factor 1: Support for Long-Term Success, ranges from a low of 1 to a high of 6, with higher scores signifying a greater perception of significant others encouraging the use of mental skills and characteristics associated with developing excellence, such as coping, distraction control and goal setting. Overall, the sample had a mean of 4.05. The total score for the PCDEQ Factor 2: Support from Others to Compete to my Potential ranges from 1 to 6 also with higher scores indicating greater support. The swimmers averaged 4.34 for this factor.

An age x ability x gender three-way MANOVA on the two PCDEQ factors (PCDE 1 and 2) revealed a statistically significant age x ability multivariate interaction, Wilks' $\lambda = 0.95$,

$F(4,504) = 3.26$, $p = .012$, $\eta_p^2 = .03$, as well as significant univariate age x ability interactions for both PCDE 1, $F(2,253) = 6.20$, $p = .002$, $\eta_p^2 = .05$ and PCDE 2, $F(2,253) = 3.64$, $p = .028$, $\eta_p^2 = .03$. Although significance was found, the effect sizes for the age x ability interactions for both PCDE 1 and PCDE 2 were relatively small. Pairwise comparisons revealed that for both PCDE 1 and PCDE 2, in the youngest age group, the elite group had higher means than the challenge group, but the challenge group for both the 13-14 years old and 15 years old and above age groups had higher means than the elite group (see Table 1). No gender differences were found for the two factors of the PCDEQ.

Each ACSI-28 subscale score ranges from 1 to 12, with the higher the score representing greater strength. Table 2 shows the swimmers' mean scores for each subscale (coping with adversity, coachability, concentration, confidence and achievement motivation, goal setting and mental preparation, peaking under pressure, and freedom from worry). The subscales with scores below the midpoint of the possible scores (i.e., score of 6), indicating less strength, were coping with adversity, goal setting/mental preparation, peaking under pressure, and freedom from worry. The subscales with scores above the midpoint, signifying greater strength, were coachability, concentration, and confidence and achievement motivation. The swimmers' scores were highest on coachability and lowest on peaking under pressure.

The main analysis on the ACSI-28 seven subscales was a gender x ability x age (2 x 2 x 3) MANOVA. Significant multivariate main effects were found for age, Wilks' $\lambda = 0.90$, $F(14, 500) = 1.85$, $p = .029$, $\eta_p^2 = .05$, and gender, Wilks' $\lambda = 0.93$, $F(7, 250) = 2.91$, $p = .006$, $\eta_p^2 = .08$, as well as an age x ability interaction, Wilks' $\lambda = 0.86$, $F(14, 500) = 2.74$, $p < .001$, $\eta_p^2 = .07$, and a three-way gender x ability x age interaction, Wilks' $\lambda = 0.91$, $F(14, 500) = 1.81$, $p = .035$, $\eta_p^2 = .05$. The effect sizes were medium for gender and the age x ability interaction, while

the other effect sizes were smaller. Univariate analysis revealed no age group main effects for any of the subscales, but a significant main effect for gender was found in four of the seven subscales, coping with adversity, $F(1, 256) = 11.34$, $p < .001$, $\eta_p^2 = .04$, concentration $F(1, 256) = 4.62$, $p = .033$, $\eta_p^2 = .02$, confidence and achievement motivation, $F(1, 256) = 4.563$, $p = .034$, $\eta_p^2 = .02$, and freedom from worry, $F(1, 256) = 15.92$, $p < .001$, $\eta_p^2 = .06$. Although significant, the effect sizes were relatively small except for freedom for worry, which was medium. Males scored higher than females on all four of those subscales.

Table 2. ACSI-28 Subscale Means and ANOVA Results

Subscale	Male M (SD)	Female M (SD)	Total M (SD)	F	p	η_p^2
Coping with Adversity	6.05 (2.33)	5.00 (2.61)	5.50 (2.53)	11.34	<.001	.04
Coachability	9.28 (1.90)	9.05 (1.81)	9.16 (1.86)	3.06	.082	.01
Concentration	6.71 (2.56)	5.79 (2.35)	6.23 (2.49)	4.62	.033	.02
Confidence and Achievement Motivation	7.52 (2.29)	6.97 (2.12)	7.24 (2.21)	4.56	.034	.02
Goal Setting and Mental Preparation	5.18 (3.00)	5.42 (2.30)	5.31 (2.64)	0.00	.987	.00
Peaking Under Pressure	5.17 (3.09)	4.32 (2.94)	4.59 (3.02)	3.25	.072	.01
Freedom From Worry	6.23 (3.08)	4.50 (3.08)	5.33 (3.19)	15.92	<.001	.06

A statistically significant two-way age x ability interaction was found for three subscales, coping with adversity, $F(2, 256) = 4.75$, $p = .009$, $\eta_p^2 = .04$, coachability, $F(2, 256) = 9.79$, $p < .001$, $\eta_p^2 = .07$, and goal setting and mental preparation, $F(2, 256) = 3.82$, $p = .023$, $\eta_p^2 = .03$. The effect size for coachability was medium while the other two subscales had smaller effect sizes. Pairwise comparisons revealed that for the challenge group there were no age group differences for coping with adversity, but in the elite group, the oldest swimmers had lower scores than the 11-12 age group ($p < .001$) and the 13-14 age group ($p = .007$). In addition, the

youngest swimmers in the elite group scored higher for coping with adversity than the challenge

group, while the oldest challenge swimmers scored higher than the oldest elite swimmers. For

coachability, the youngest age group scored lower than the two older groups from the challenge

group, and no age group differences were found for swimmers in the elite group. Also, the

youngest swimmers in the elite group scored higher than the challenge group for coachability,

and the oldest swimmers from the challenge group scored higher than those in the elite group.

For goal setting and mental preparation, the youngest swimmers scored lower than the oldest age

from the challenge group, while no other age group differences were found. Also, the youngest

swimmers from the elite group had higher scores than the challenge group for goal setting, and

no ability differences were found within age groups. See Table 3 for age x ability interactions M

and SD.

Finally, the univariate three-way interaction of gender x ability x age for the coachability

subscale was statistically significant, $F(2, 256) = 3.13$, $p = .046$, $\eta_p^2 = .02$, with a small effect

size. Pairwise comparisons showed significant age differences for males in both the challenge

and elite groups. The youngest age group was significantly lower than the two older age groups

within the challenge group. In the elite group, however, the oldest males scored lower than the

two younger age groups. Also, the elite group scored higher on coachability than the challenge

group for the youngest males, while the challenge group scored higher than the elite group for

the oldest males. There was no significant age x ability interaction for females.

Table 3. ACSI-28 Subscales Means for Age and Ability

ACSI-28 Subscale	11-12 years old	13-14 years old	15 and above years old	Total
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*
Coping With Adversity*				
Challenge	5.34 (2.42)	5.74 (2.67)	6.00 (2.75)	5.68 (2.59)
Elite	6.33 (2.54)	5.84 (2.51)	4.87 (2.39)	5.42 (2.51)
Coachability*				
Challenge	8.17 (2.39)	9.68 (1.75)	10.00 (1.35)	9.26 (2.04)
Elite	9.59 (1.87)	9.34 (1.77)	8.82 (1.70)	9.11 (1.77)
Concentration				
Challenge	6.21 (2.55)	7.00 (2.55)	6.00 (2.59)	6.45 (2.53)
Elite	6.04 (2.16)	6.26 (2.49)	6.04 (2.53)	6.12 (2.45)
Confidence and Achievement Motivation				
Challenge	7.21 (2.13)	7.09 (2.25)	6.79 (1.93)	7.05 (2.11)
Elite	8.00 (2.06)	7.76 (2.19)	6.84 (2.28)	7.33 (2.26)
Goal Setting and Mental Preparation*				
Challenge	4.00 (2.83)	5.06 (2.64)	6.00 (2.38)	4.97 (2.72)
Elite	5.70 (2.61)	5.65 (2.91)	5.28 (2.41)	5.47 (2.61)
Peaking Under Pressure				
Challenge	5.76 (3.64)	4.15 (3.08)	4.75 (3.50)	4.85 (3.42)
Elite	4.81 (2.51)	4.79 (2.93)	4.54 (2.90)	4.67 (2.84)
Freedom From Worry				
Challenge	5.52 (3.20)	4.79 (3.34)	4.88 (3.34)	5.06 (3.27)
Elite	6.22 (2.75)	5.65 (3.11)	5.11 (3.28)	5.46 (3.16)

Note. Age x ability significant interaction denoted by *

Additional Analyses

Participants were asked to rate how important they felt psychological and mental factors were to their swimming success. Frequencies of responses are listed in Table 4. The three-way ANOVA for this question revealed statistically significant main effects for age, $F(2, 255) = 4.74$, $p = .010$, $\eta_p^2 = .04$ and ability level, $F(1, 255) = 8.08$, $p = .005$, $\eta_p^2 = .03$, both with small effect sizes. The youngest age group swimmers had lower means compared to both the 13-14 years old and 15-19 years old age groups. In addition, swimmers from the elite group had higher scores than swimmers from the challenge group as shown in Table 4. The age x ability interaction was

also statistically significant, $F(2, 255) = 5.58$, $p = .004$, $\eta_p^2 = .04$, with a small effect size. See Table 1 for interaction M and SD. The elite group had higher total scores compared to the challenge group for both the 11-12 years old and 13-14 years old group. However, for the oldest age group, the challenge group had better scores than the elite group. No other main effects or interactions reached significance.

Table 4. Importance of Psychological Characteristics Response Frequencies and Means

Group	Frequencies (%)					*M(SD)*
	Not at all important	Slightly important	Moderately important	Very important	Extremely important	
			Age			
11-12 years old	0(0)	7(12.1)	13(22.4)	18(31.0)	20(34.5)	3.88(1.05)
13-14 years old	0(0)	3(3.1)	13(13.3)	36(36.7)	46(46.9)	4.31(0.77)
15 and above years old	1(0.8)	4(3.3)	12(10.0)	39(32.5)	64(53.3)	4.35(0.84)
			Ability			
Challenge	0(0)	8(9.0)	18(20.2)	28(31.5)	35(39.3)	4.02(0.97)
Elite	1(0.5)	6(3.2)	20(10.7)	65(34.8)	95(50.8)	4.34(0.82)
Total	1(0.4)	14(5.1)	38(13.8)	93(33.7)	130(47.1)	4.22(0.89)

Additionally, the participants were asked to review a listing of prominent psychological/mental factors derived from the sport psychology literature and asked to identify the two they felt were most important. Overwhelmingly, confidence was selected the most (160 times), with anxiety control next (56 times). Self-control and a more general category labeled other were selected the least, both only identified three times. Appendix E lists the results in order from the most selected to the least selected psychological/factor with their frequencies.

Finally, in a follow up question, the participants were asked why the two specific characteristics were selected. The 264 individual responses were reviewed and grouped into two general categories: performance enhancement (261 responses); and specific personal issues and challenges (27 responses). The performance enhancement category was further broken down into

the two subcategories of general statements about improving performance (134 responses) and specific performance enhancement process skills and attributes (127 responses). General statements related to improving in races and competitions, becoming great, getting better, stronger, or faster, and achieving goals. For example, one swimmer said they chose determination and imagery/visualization "because it will help me do better in competition." Another swimmer said that confidence and discipline were important "because if you have confidence, you can achieve much more in swimming and if you have more discipline, you can grow and get stronger in the sport." Specific performance enhancement process skills and attributes identified a specific skill or attribute that helped improve performance, such as visualization, handling setbacks, or staying positive. For instance, one swimmer wrote, "Growth mindset is important because it helps you stay positive and confident in yourself even when things get challenging," while another stated, "Visualization of an event helps you know when to breathe and pace yourself."

Specific personal issues and challenges responses were associated with issues with which swimmers struggle. The psychological/mental skills selected helped them with the specific issue, such as dealing with anxiety or helping them with their confidence because they lack confidence. The majority of responses dealt with anxiety. A swimmer chose confidence and anxiety control because "I have trouble maintain(ing) my anxiety, so in order for me to have a clear headspace and do well, I need to have control over it." Another selected imagery/visualization and emotional control because "imagery helps me focus on what's in front of me rather than what could be, and I struggle with anxiety and emotional control helps ground me in the present." Another swimmer wrote:

> These are important to me because as someone with anxiety, I know that I can let it get the best of me and when I am able to get it under control it makes me feel more confident

21

in my ability to swim. Emotional control is also something extreme(ly) important to me because being in an emotional environment can cause me to lose focus or it distracts me from what is in the current moment and what is important in the current moment.

While this grouping process helped identify categories in the athletes' responses, it was challenging to place comments into specific categories because the open-ended question responses often were non-descriptive partial sentences or thoughts. Thus, findings should be interpreted with some caution.

Discussion

The purpose of this study was to identify and compare the psychological characteristics and skills in junior competitive swimmers across age, ability, and gender. As having a growth mindset, grit, strong coping skills, support for long term success, and support from others have been linked to successful performance in adult elite athletes, those psychological characteristics and skills were examined. Overall, the swimmers in this study rated themselves relatively high (i.e., within the top third of possible scores), on most characteristics and skills, including growth mindset, grit, and support for long term success and from others. However, in terms of coping skills, the swimmers averaged more moderate scores, with some specific skills (coping with adversity, goal setting/mental preparation, peaking under pressure, and freedom from worry) falling below the midpoint of the total possible scores.

Some gender differences were found, with males reporting better coping skills than females regardless of age or competition level. In contrast, Townsend and colleagues (2022) found no gender differences on overall coping skills, and younger athletes reported higher coping skills than older athletes in their study. However, the findings of the present study are consistent with other research; males have often been found to report higher confidence and better skills to cope with adversity than their female counterparts (Correia & Rosado, 2019; Criticos et al.,

2020; Hanton et al., 2008). Even among adolescents, the literature suggests males having more freedom from worry when compared to females (Du Plessis et al., 2019). These gender differences might result from females perceiving more anxiety than males or that males experience similar levels of anxiety but feel less comfortable disclosing their feelings. These differences may affect an athlete's confidence and ability to cope with adversity.

The interaction of age x ability was significant for several psychological characteristics and skills. In general, one pattern that emerged was a drop in almost all of the characteristics and skills with the oldest elite group compared to the younger elite groups. For example, the younger elite swimmers perceived themselves as having better overall copings skills, and some specific coping skills, than the oldest elite swimmers. The means for growth mindset and grit followed the same pattern, but the interactions were not significant. Possible considerations for this shift in the elite group may arise from older swimmers having more stress in their lives with school, recruiting, and future college plans, as well as the fact that it becomes more difficult to swim faster times at older ages.

Another age x ability pattern was found with the youngest swimmers of differing ability levels. In most cases, the youngest age group of the elite track had better psychological characteristics and skills compared to those on the challenge track. Although there is no clear reason why these differences exist, each age group and ability level has a different coach, each with their own coaching style and personality. Thus, the climate the coach creates may help to explain these findings. Additionally, the environment of this highly accomplished and competitive swim club may impact these findings. As the club has several junior swimmers at the Olympic level, older junior swimmers at the club may not feel as successful even though many are highly ranked nationally for their ages. This might reflect the big-fish-little-pond

23

effect, which implies that psychological characteristics and skills are judged relative to one's peer group (Marsh & Parker, 1984). The swimmers in this study may have lower self-perceptions because the club is a top-ranked club and has some of the highest ranked swimmers in the world. Thus, in the elite group, older swimmers may perceive less confidence and lower grit due to whom they are comparing themselves with as a reference point.

Finally, during this time in society when anxiety has risen considerably in the past few years, especially among adolescents (Kaishian & Kaishian, 2022; McGuine et al., 2021), it is interesting that one's ability to control anxiety was selected as one of the top psychological factors important to swimming success. Based on their open-ended responses, it is evident that anxiety is an issue with which many struggle. Interestingly, the finding of confidence and anxiety control as the top two most cited characteristics important for success reflects the two issues on which sport psychology consultants most frequently work with athletes (Gould, 2021). Also, of the 16 psychological and mental factors from which the swimmers selected their top two, goal setting, visualization and imagery, and self-talk were selected by less than 10% of the swimmers. This finding is relevant as these mental skills are consistently associated with more successful athletes (Gould & Maynard, 2009; Rees et al., 2016) and are often part of psychological skills training programs since they can be taught and learned more readily than determination or discipline, both of which were selected more frequently.

It is important to note that all 16 psychological characteristics and skills were selected by the swimmers, emphasizing that each of those characteristics and skills had value. Thus, for those working with junior swimmers, it is important to know how to teach, encourage, and develop the items from this list. For example, it is critical for coaches and sport psychology consultants working with youth athletes to know that confidence and anxiety control were cited

the most and to make sure they have a strong working knowledge of ways to improve those psychological skills.

As with all studies, this study has strengths and limitations. The large number of participants and the use of psychometrically sound instruments are strengths. Limitations include participants only being from one swim club and a lack of racial diversity with participants identifying predominately as white. In addition, findings are based on cross-sectional data; a longitudinal study of young swimmers' psychological characteristics and mental skills starting when they join a program and assessing them every year until they enter college would be beneficial to the understanding and development of them as an athlete progresses through the talent development process. This type of study would also allow for a prospective comparison of characteristics and skills of less and more successful athletes.

Although a cross-sectional study has its limits, overall, the study's findings suggested some differences about junior competitive swimmers' psychological characteristics and skills that is valuable to those who play a role in developing youth athletes. As the findings indicated that anxiety and confidence are issues with which junior athletes struggle, coaches, parents, and youth sport professionals need to be aware of how they impact an athlete's confidence and anxiety. Of notable consideration is the type of climate created by a coach or parent since that influences the strength of an athlete's psychological characteristics, including confidence and anxiety control. A process and task-oriented climate with a long-term development focus will better prepare athletes as they advance through the athletic talent development process, especially as they get older and compete at higher levels.

CHAPTER II: DISSEMINATION

These results on the psychological characteristics and skills of junior competitive swimmers can be beneficial to those who are involved in these swimmers' sport talent development process. The dissemination of the findings will begin by providing a written summary report to the coaches of the year-round swim team whose athletes participated in the study. This summary will be emailed to the coaches and include the descriptive statistics for the participants as well as the findings of how the psychological characteristics differed based on age, gender, and ability. In addition, the coach report will include implications of the study and practical strategies to help improve the development of a swimmer. As coaches are not used to reading research reports, the dissemination document was made more user friendly by eliminating academic jargon, highlighting key results, and not including citations in the text itself but listed after in a reference list. See Appendix F for the Coach Report.

CHAPTER III: ACTION PLAN

Once the coach report is distributed, a presentation of the findings will be given to the coaches to provide further explanation and answer any questions. Included in this presentation will be strategies and opportunities that can be implemented to facilitate the development and enhancement of skills and characteristics found to be important and/or lacking. Specifically, a more tailored and structured mental skills training program based on varying ages and ability levels will be created. The findings on certain coping characteristics showed how the older swimmers within the elite track differ from those of younger ages and, at times ,from those on the challenge track, such as having a lesser ability to deal with adversity or having less freedom from worry. This finding exemplifies how a mental skills training program for these older groups needs a better focus on these skills as well as consideration as to why this finding exists, possibly such things as recruiting or team culture.

Next, a summary report will be written for parents of the club. This report will be similar to the coach report but more tailored to parents and the implications of the study's findings for them. This report will be emailed to all parents of the swim club. A presentation for the parents will also follow the report and structured around the findings and best parenting practices to encourage the appropriate development of psychological characteristics and skills relevant to the different stages of athlete talent development and ages of their swimmer. This presentation will most likely be at the intrasquad meet in September where a parent presentation by the author is usually given. Further, the parents' report will be put on the swim club's website as well.

Similarly, an article highlighting the relevant results with practical implications will also be written for the swimmers and put on the relevant social media platforms used by the swimmers of the club as well as be emailed to them from their coaches. In addition, a

presentation of the findings will be scheduled for local practitioners and professionals who work with competitive youth athletes, as the findings may help to inform their practices or profession. Other implications for practice include parent and coach education talks on the findings for sport clubs, including other year-round swim clubs as well as and organizations and schools, particularly for those with swim teams.

In the long term, based on these findings and other relevant resources about psychological characteristics and skills, a psychological skills training manual or guide that would provide more direction and structure for professional practice could be created for coaches as well as practitioners. With this type of manual or guide, age appropriate as well as stage appropriate guidelines would be provided to inform coaches and other practitioners who work with developing young athletes. This manual would help to inform the role of psychology in the talent development process for both coaches and professional practitioners. In addition, a guide for parents regarding best parenting practices for the development of psychological characteristics and skills could be developed. Furthermore, to disseminate this information as well as any products from this dissertation where it may be useful to those practitioners who do similar work, an abstract submission or presentation at professional conferences, such as the Association for Applied Sport Psychology (AASP) annual conference or the North American Coach Development Summit held by the United States Center for Coaching Excellence, could be given. Abstract submission for the annual conference for AASP will happen in February of this year. Additionally, dissemination could take place in June with a coaches' presentation at the Michigan State University Summer Coaches' School where the Institute for the Study of Youth Sports with the Department of Kinesiology conduct educational programs geared towards the growth and development of sport coaches in educational athletics. Another place to do a

presentation for coaches could be through USA Swimming which provides presentations and webinars for their member coaches. Finally, an article based on the knowledge gained could be submitted for publication to a practitioner-oriented journal, such as the *Journal of Sport Psychology in Action* which has an applied focus, as well as to a swimming specific magazine, such as *SwimSwam Magazine*, which has a sports science section, or USA Swimming's *Splash Magazine*.

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APPENDIX A: SWIM TRAINING GROUPS

	Elite Track Groups	Challenge Track Groups
15-19 years old	**Olympic Elite** *(n = 50)* **Goal**: To achieve Olympic Trial qualifications **Qualifications:** Women - 1 USA Swimming Winter Junior National qualifying time or 3 Futures cuts Men - 1 USA Swimming Winter Junior National qualifying time or 2 Futures cuts	**Senior Champs** *(n = 39)* **Goal:** To achieve multiple swims at the NC Senior Championship meet **Qualifications:** At least 1 Senior Champs cut and/or 3 USA Swimming "A" qualifying time standards in two different strokes **Minimum Attendance Rate:** 80%
	National *(n = 40)* **Goal:** To score at the Senior Sectional meets and USA Futures Championships **Qualifications:** At least 1 USA Futures cut or 4 Senior Sectional qualifying time standards **Minimum Attendance Rate:** 85%	**Senior Challenge** *(n = 26)* **Goal:** To achieve a NC Senior Championship Cut **Qualifications:** 2 USA Swimming BB qualifying time standards or be recommended by a coach **Minimum Attendance Rate:** 70%
	Sectional *(n = 36)* **Goal:** To score at Senior Championship meets and entering the National group **Qualifications:** At least 1 spring or summer sectional cut and 3 Senior Champs cuts. A swimmer moving from a 13-14 year old group must have at least 6 Age Group Champs cuts. **Minimum Attendance Rate:** 85%	
13-14 years old	**Tag 1** *(n = 39)* **Goal:** To final at Age Group Champs and Age Group Sectionals while striving for Junior National time standards **Qualifications:** Boys: 5 USA swimming "A" time standards with 2 Age Group Champs cuts Girls: 5 USA swimming "AA" time standards with 2 Age Group Champs cuts in two different strokes **Minimum Attendance Rate:** 85%	**Platinum** *(n=23)* **Goal:** To move to TAG 1.5 and Senior Groups with the goal of achieving USA Swimming "A" and "AA" time standards **Qualifications:** A swimmer moving up from an 11-12 group must have achieved at least 4 USA Swimming "B" time standards. A swimmer coming from a 13&14 group must have achieved at least 4 USA Swimming "BB" standards
	Tag 1.5 *(n = 33)* **Goal:** To move to TAG 1, Sectional or National group **Qualifications:** Boys: Three 13-14 USA Swimming "BB" and 1 USA Swimming A time standards Girls: Four 13-14 USA Swimming "A" time standards **Minimum Attendance Rate:** 80%	**Gold 1** *(n = 26)* **Goal:** To move to Platinum with the goal of achieving USA Swimming "BB" and "A" time standards **Qualifications:** A swimmer moving up from an 11-12 group must have achieved at least 2 USA Swimming "B" time standards. A swimmer coming from a 13&14 group must have achieved at least 2 USA Swimming "BB" standards
11-12 years old	**Tag 2** *(n = 35)* **Goal:** To final at Age Group Champs and Age Group Sectionals **Qualifications:** A swimmer moving up from a 10&U group must have 6 10&U USA swimming "AA" time standards. A swimmer from an 11-12 group must have 6 USA 11-12 "BB" time standards, plus 2 11-12 USA swimming "A" time standard and 1 Age Group Champs cut. **Minimum Attendance Rate:** 75%	**Silver 1** *(n = 26)* **Goal:** To achieve USA swimming "A" time standards **Qualifications:** A swimmer moving from a 10&U group must have achieved 1 USA "A" or 5 USA "BB" time standards. Swimmers moving from an 11-12 group must have 1 USA "BB" time standard plus 4 USA "B" time standards. All swimmers must have previous experience in the Challenge Track.
	Tag 2.5 *(n = 22)* **Goal:** To move to TAG 2, TAG 1.5 or TAG 1 group **Qualifications:** A swimmer moving up from a 10&U group must have 4 10&U USA swimming "A" time standards. Swimmers moving from an 11-12 group must have 4 11-12 USA "BB" time standards. **Minimum Attendance Rate:** 70%	**Silver 2** *(n = 29)* **Goal:** To achieve USA Swimming "A" time standards **Qualifications:** A swimmer moving up from a 10&U group must have achieved 1 10&U USA "BB" time standard. A swimmer moving forward or up from an 11-12 group must have achieved 1 USA "B" time standard.

Note. n = number of current swimmers in the group at the time of the study

Age in <u>years</u>:

11   12   13   14   15   16   17   18   19

Gender: Male   Female

Race/Ethnic Background (circle all that apply):

        Caucasian/White

        African American/Black

        Asian

        Native American/Alaskan Native

        Native Hawaiian/Pacific Islander

        Hispanic

        Other

        Prefer not to answer

Current Swim Group (circle one):

        Tag 2   Tag 2.5

        Tag 1   Tag 1.5

        Silver I   Silver II

        Platinum   Gold I

        Sectional   National   Olympic Elite

How many <u>years</u> have you participated on any swim team (e.g., summer swim team, club team)?

1   2   3   4   5   6   7   8   9   10   11   12   13+

How many <u>years</u> have you been swimming **year-round**?

Less than 1   1   2   3   4   5   6   7   8   9   10   11

     12   13+

In a typical week how many <u>pool practice sessions</u> (**not including dryland**) do you attend?

     1   2   3   4   5   6   7   8   9   10

Athletic Coping Skills Inventory: Assessing Your Sport Psychological Skills

Instructions: The following are statements that athletes have used to describe their experiences. Please read each statement carefully, and then recall as accurately as possible how often you experience the same thing. There are no right or wrong answers. Do not spend too much time on any one statement. **Please circle how often you have these experiences when swimming.**

1. On a daily or weekly basis, I set very specific goals for myself that guide what I do.

   Almost never   Sometimes   Often   Almost always

2. I get the most out of my talent and skill.

   Almost never   Sometimes   Often   Almost always

3. When a coach tells me how to correct a mistake I've made, I tend to take it personally and

   feel upset.

   Almost never   Sometimes   Often   Almost always

4. When I'm swimming, I can focus my attention and block out distractions.

   Almost never   Sometimes   Often   Almost always

5. I remain positive and enthusiastic during meets, no matter how badly things are going.

   Almost never   Sometimes   Often   Almost always

6. I tend to swim better under pressure because I think more clearly.

   Almost never   Sometimes   Often   Almost always

7. I worry quite a bit about what others think of my performance.

   Almost never   Sometimes   Often   Almost always

8. I tend to do lots of planning about how to reach my goals.

   Almost never   Sometimes   Often   Almost always

9. I feel confident that I will swim well.

   Almost never   Sometimes   Often   Almost always

10. When a coach criticizes me, I become upset rather than feel helped.

    Almost never   Sometimes   Often   Almost always

11. It is easy for me to keep distracting thoughts from interfering with something I am

    watching or listening to.

    Almost never   Sometimes   Often   Almost always

12. I put a lot of pressure on myself by worrying about how I will perform.

    Almost never   Sometimes   Often   Almost always

13. I set my own performance goals for each practice.

    Almost never   Sometimes   Often   Almost always

14. I don't have to be pushed to practice or swim hard; I give 100%.

    Almost never   Sometimes   Often   Almost always

15. If a coach criticizes or yells at me, I correct the mistake without getting upset about it.

    Almost never   Sometimes   Often   Almost always

16. I handle unexpected situations in swimming very well.

    Almost never   Sometimes   Often   Almost always

17. When things are going badly, I tell myself to keep calm, and this works for me.

    Almost never   Sometimes   Often   Almost always

18. The more pressure there is during a meet, the more I enjoy it.

    Almost never   Sometimes   Often   Almost always

19. While competing, I worry about making mistakes or failing to come through.

Almost never   Sometimes   Often   Almost always

20. I have my own game plan worked out in my head long before the meet/race begins.

Almost never   Sometimes   Often   Almost always

21. When I feel myself getting too tense, I can quickly relax my body and calm myself.

Almost never   Sometimes   Often   Almost always

22. To me, pressure situations are challenges that I welcome.

Almost never   Sometimes   Often   Almost always

23. I think about and imagine what will happen if I fail or screw up.

Almost never   Sometimes   Often   Almost always

24. I maintain emotional control regardless of how things are going for me.

Almost never   Sometimes   Often   Almost always

25. It is easy for me to direct my attention and focus on a single object or person.

Almost never   Sometimes   Often   Almost always

26. When I fail to reach my goals, it makes me try even harder.

Almost never   Sometimes   Often   Almost always

27. I improve my skills by listening carefully to advice and instruction from coaches.

Almost never   Sometimes   Often   Almost always

28. I make fewer mistakes when the pressure is on because I concentrate better.

Almost never   Sometimes   Often   Almost always

Grit Scale

Here are a number of statements that may or may not apply to you. There are no right or wrong answers, so just answer honestly.
1. New ideas and projects sometimes distract me from previous ones.

- o   Very much like me

- o   Mostly like me

- o   Somewhat like me

- o   Not much like me

- o   Not like me at all

2. Setbacks don't discourage me.

- o   Very much like me

- o   Mostly like me

- o   Somewhat like me

- o   Not much like me

- o   Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.

- o   Very much like me

- o   Mostly like me

- o   Somewhat like me

- o   Not much like me

- o   Not like me at all

4. I am a hard worker.

- o   Very much like me

- o   Mostly like me

- o   Somewhat like me

- o   Not much like me

- o   Not like me at all

5. I often set a goal but later choose to pursue a different one.

- o Very much like me

- o Mostly like me

- o Somewhat like me

- o Not much like me

- o Not like me at all

6. I have difficulty maintaining my focus on projects that take more than a few months to complete.

- o Very much like me

- o Mostly like me

- o Somewhat like me

- o Not much like me

- o Not like me at all

7. I finish whatever I begin.

- o Very much like me

- o Mostly like me

- o Somewhat like me

- o Not much like me

- o Not like me at all

8. I am diligent/hard-working.

- o Very much like me

- o Mostly like me

- o Somewhat like me

- o   Not much like me

- o   Not like me at all

Growth Mindset Scale

Instructions: Read each sentence below and then circle the *one* answer that shows how much you agree with it. There are no right or wrong answers.

1. You have a certain amount of swimming ability, and you can't really do much to change it.

   Strongly agree   Agree   Mostly agree   Mostly disagree   Disagree   Strongly disagree

2. Your swimming ability is something about you that you can't change very much.

   Strongly agree   Agree   Mostly agree   Mostly disagree   Disagree   Strongly disagree

3. You can learn new things, but you can't really change your basic swimming ability.

   Strongly agree   Agree   Mostly agree   Mostly disagree   Disagree   Strongly disagree

Psychological Characteristics of Developing Excellence Questionnaire

Instructions: Read each sentence below and then circle the *one* answer that shows how much the statement applies to you. There are no right or wrong answers.

Likert Scale

1	2	3	4	5	6

Very Unlike Me   **Like Me**   **Very Like Me**

Factor 1: Support for long-term success

1. My coach encourages me to seek advice from appropriate others.

2. My coach and I plan on the basis of my future success, not just for today.

3. My coach helps me to stay committed to swimming.

4. My coach evaluates my performances against long-term goals for future success.

5. My coach prepares me to cope with the pressures of performance.

45

6. My coach always tells me what I should be aiming for and helps to direct my goals.

7. My coach helps me identify what is good and bad in my performances.

8. My coach and I keep an eye on my total workload to help me balance college/school and practice.

9. I work together with my coach to monitor my progress towards my goals.

10. My coach sets my targets and we work towards these.

11. I can rely on my coach to push me in activities that I do not really like.

12. My coach helps me to keep a record of my progress.

13. My coach provides me with clear routines.

14. My coach helps me focus on the objectives in practice.

15. My coach structures practice to work mostly on my weaknesses.

16. My coach encourages me to talk things through.

17. My coach makes sure that I know the steps I have to take to maintain my progress.

Likert Scale

1	2	3	4	5	6

Very Unlike Me   **Like Me**   **Very Like Me**

Factor 2: Support from others to compete to my potential

18. Before an important performance people around me keep me focused.

19. We are encouraged to help each other in my practice environment.

20. My coach helps to keep me focused in practice.

21. My coach helps me to prepare for the unexpected.

22. People around me help me to accommodate the demands of my activity.

23. I listen and learn from the people around me.

24. My coach uses practice to build my confidence in my own ability.

Additional Questions:

How important do you feel mental/psychological factors are to swimming success?
(Circle your answer)

1	2	3	4	5
Not at all		Important		Very Important

Circle the two psychological factors you feel are the most important to swimming success.

    Confidence
    Coping with adversity
    Imagery/Visualization
    Self-talk
    Goal setting
    Handling pressure well
    Focus and concentration
    Anxiety control
    Emotional control (ability to control emotions)
    Self-control
    Discipline
    Determination
    Coachability
    Growth mindset (belief that talents and abilities can be developed and are not fixed or
limited)
    Grit (ability to maintain focus and interest and persevere in trying to reach long-term
goals)
    Positive attitude/mindset
    Other (Please specify) _____

Why do you think each of these two are important?

APPENDIX C: PARTICIPANT DEMOGRAPHICS

Characteristic	*n*	%
Gender		
Female	141	50.7
Male	128	46.0
Prefer not to answer	9	0.03
Age Group		
11-12 years old	59	21.2
13-14 years old	98	35.3
15-19 years old	121	43.5
Ability		
Challenge	90	32.4
Elite	188	67.6
Race/Ethnic Background		
Caucasian/White	197	65.2
African American/Black	5	1.7
Asian	72	23.8
Native Hawaiian/Pacific Islander	1	0.3
Hispanic	11	3.6
Other	9	3.0
Prefer not to answer	8	2.6

Note. n = 278

APPENDIX D: OVERALL MEANS FOR ASSESSMENTS

Assessment	*M (SD)*	Range
Grit	3.35 (0.59)	1-5
Growth Mindset	4.15 (1.28)	1-6
ACSI-28	43.49 (11.10)	0-84
ACSI-28 subscales		
Coping with Adversity	5.50 (2.53)	0-12
Coachability	9.16 (1.86)	0-12
Concentration	6.23 (2.49)	0-12
Confidence and Achievement Motivation	7.24 (2.21)	0-12
Goal Setting and Mental Preparation	5.31 (2.65)	0-12
Peaking Under Pressure	4.73 (3.04)	0-12
Freedom From Worry	5.33 (3.19)	0-12
PCDE 1	4.07 (0.82)	1-6
PCDE 2	4.35 (0.81)	1-6
Importance of Psychological Characteristics	4.24 (0.88)	1-5

Note. n = 278

APPENDIX E: PSYCHOLOGICAL CHARACTERISTICS IMPORTANT TO SWIMMING
SUCCESS

Psychological Characteristic/Mental Factor	Frequency	Percentage
Confidence	160	57.6
Anxiety control	56	20.1
Determination	42	15.1
Growth mindset	41	14.7
Discipline	36	12.9
Positive attitude/mindset	32	11.5
Focus and concentration	30	10.8
Grit	29	10.4
Handling pressure well	28	10.1
Goal setting	27	9.7
Emotional control	24	8.6
Coachability	13	4.7
Imagery/visualization	13	4.7
Coping with adversity	11	4.5
Self-talk	8	2.9
Self-control	3	1.1
Other	3	1.1

Note. $n = 278$

Psychological Characteristics and Skills of Junior Competitive Swimmers

Coach Report

Nori Sie Pennisi
Mental Training Consultant

Rationale for the Current Study

Research has shown that psychological factors influence an athlete's talent development and performance. Much of the research has focused on older elite athletes and not on youth athletes, especially not youth swimmers. Thus, **the purpose of this study was to identify and compare the psychological characteristics and skills of competitive year-round swimmers of different ages, gender, and ability**.

How the Study Was Conducted

A questionnaire was given to competitive junior swimmers from a nationally ranked year-round swim club to identify the swimmers' psychological makeup. The survey contained demographic and general questions about psychological characteristics as well as four specific mental skills and psychological characteristics assessments where the swimmers rated themselves on either 4-, 5- or 6-point scales (e.g., I finish whatever I begin. 1 = very much like me, 5 = Not like me at all). These included:

- **The Growth Mindset Scale** which measures the extent to which one believes their abilities and success can be developed and improved through hard work and dedication (e.g., Your swimming ability is something about you that you cannot change very much).

- **The Grit Scale** which measures the extent to which one can maintain focus and interest and persevere in obtaining long-term goals (e.g., Setbacks don't discourage me).

- **The Athletic Coping Skills Inventory-28 (ACSI-28)** which is an assessment of sport-specific psychological skills and has seven different subscales related to athletic performance including *coping with adversity*; *peaking under pressure*; *goal setting* **and** *mental preparation*; *concentration; freedom from worry*; *confidence and achievement motivation*; **and** *coachability* (e.g., I feel confident I will swim well).

- **The Psychological Characteristics for Developing Excellence Questionnaire (PCDEQ)** which assesses factors that impact successful development in sport. Two subscales were used in this study. The first factor, *PCDE 1 - Support for Long-Term Success,* examines how much significant others, especially coaches, encourage the use of psychological characteristics (e.g., My coaches help me stay committed to swimming). The second, *PCDE 2 - Support from Others to Compete at the Athlete's Potential*, examines the extent to which others, such as parents, encourage progression and competing up to one's potential (e.g., I listen and learn from people around me).

Characteristics of the Swimmers Surveyed

A total of **278 participants from ages 11 to 19 years old (average 14.3 years)** completed the survey. They were characterized by the following:

- **11-12 years old**: 59 (21.2%) swimmers; **13-14 years old**: 98 (35.3%) swimmers; **15-19 years old**: 121 (43.5%) swimmers

- **Male**: 128 (46%) swimmers; **Female**: 141 (50.7%) swimmers
- **Challenge track**: 90 (32.3%) swimmers; **Elite track**: 188 (67.6%) swimmers
- Caucasian/White: 197 (65.2%); Asian: 72 (23.8%); Hispanic: 11 (3.6%); African American/Black: 5 (1.7%); Native Hawaiian/Pacific Islander: 1 (0.3%); Other: 9 (3.0%); and Preferred Not to Answer: 8 (2.6%).
- Average years participated on an organized swim team: 7.81 years
- Average years on a year-round swim team: 7.20 years
- Average pool practice sessions attended: 6.09 sessions per week

What Was Found

Overall, the swimmers **rated themselves relatively high, within the top third of scores, on most of the characteristics and skills assessed**.

- The swimmers felt they *were pretty gritty* and had *more of a growth mindset* than a fixed mindset.

- The swimmers *perceived a good amount of support from others* for both their long-term success and for reaching their potential.

- In terms of coping skills, the swimmers averaged more *moderate scores*, with *specific coping skills (coping with adversity, goal setting/mental preparation, peaking under pressure, and freedom from worry) falling below the midpoint* of the total possible scores.

- *Greater strength was found for confidence, coachability, and concentration.* The swimmers' average scores were *highest on coachability* and *lowest on peaking under pressure.*

- When asked to select from a list of 16 common psychological/mental *factors important for swimming success, confidence was overwhelmingly the top choice with anxiety control next*. Also, it is important to note that all 16 psychological characteristics and skills were selected by the swimmers, emphasizing that each of those characteristics and skills had value.

Gender differences

- *Males reported better overall coping skills than females*. For *specific* coping skills, males also were better at coping with adversity, had higher confidence, had better concentration, and worried less than females.

Differences existed when considering both age and ability (challenge or elite track) at the same time.

- One pattern that emerged was *within the elite track, the oldest swimmers scored lower than the younger swimmers on almost all the assessments*, whereas on the *challenge*

track, swimmers' scores went up with age on most of the assessments. However, the difference with grit and growth mindset, while in the right direction, did not reach statistical significance.

- o *The youngest age group of the elite track had better psychological characteristics and skills compared to those on the challenge track*.

- o Swimmers on the *elite track were found to be grittier* than those on the challenge track.

- o **Important Note:** Although differences did exist, generally, all the swimmers scored relatively high on most of the assessments, apart from some specific coping skills.

Other Findings

- o Overall, *swimmers recognize the importance of psychological characteristics and mental factors to swimming success* as almost 75% rated these factors to be either very important or extremely important.

- o Of the 16 psychological and mental factors from which the swimmers selected the two most important to swimming success, the mental skills of *goal setting (10th), visualization and imagery (13th), and self-talk (15th) ranked well into the bottom half.* This finding is relevant as these mental skills are consistently associated with more successful athletes and are often part of psychological skills training since they can be taught and learned more readily than determination (3rd) or discipline (5th). Of concern is that these characteristics are not as well recognized by the swimmers as being as important to their success.

Practical Implications

Understand your swimmers and their needs.

Knowing the psychological characteristics and skills swimmers deem important to their success will help coaches know what to emphasize and develop. The following were all selected as valuable to a swimmer's success (listed in order of frequency cited):

1. Confidence
2. Anxiety control
3. Determination
4. Growth mindset
5. Discipline
6. Positive attitude/mindset
7. Focus and concentration
8. Grit
9. Handling pressure well
10. Goal setting
11. Emotional control
12. Coachability
I3. Imagery/visualization
14. Coping with adversity
15. Self-talk
16. Self-control

Psych-up your coaching.

Having a ***strong working knowledge of strategies*** that can be used to teach and develop psychological characteristics and skills will elevate you as a coach and the level of your swimmers, regardless of what their end goal may be.

- *Strategies to increase confidence*
  - **Write down** what has been accomplished so far, including mastery of skills and previous training/race achievements.
  - **Imagine/visualize success** in a meet or in executing a stroke/finish/strategy.
  - Focus on **positive self-talk**. Tell yourself that you can do it or that you are strong.
  - **Rename confidence as courage**. Tell swimmers to have courage to leave everything they have in the pool. Emphasizing courage and having no fear takes the focus off an outcome and puts it on an action.

- *Strategies to help control anxiety and nerves*
  - Focus on the **controllables,** including effort, attitude, actions, nutrition and sleep.
  - Focus on being in the **present**. Use breathing techniques and self-talk to become more present.
  - **Visualize** yourself handling the anxiety well and being calm.
  - Remind swimmers that nerves are your body just getting ready to do something great. You want to have the butterflies. You just want them flying in formation.

- ***Skills such as visualization, self-talk, and goal setting are skills that can be taught***, so coaches will want to incorporate age-appropriate mental training programs starting at younger ages and building these skills throughout the teenage years.

- A coach who emphasizes and tries to develop these characteristics and skills ***will impact a swimmer's life*** by not only helping swimmers succeed, but also teaching them life skills through swimming.

Create the optimal psychological environment for your swimmers.

Focusing on growth and development as well as the process over outcome creates an environment more conducive to long term success.

- ***Culture is developed by knowing what to emphasize and praise.*** It is easier to focus on improvement and fun at younger ages. However, pressure and expectations increase with age, and the focus becomes more on times and outcome, such as when swimmers know certain times are necessary to swim in colleges they may want to attend.

- Praising times and outcome often or posting on social media only those who perform well can create an outcome-oriented environment which can cause more stress and pressure. Focus more on ***improvement and development by emphasizing the process.***

- *Teach swimmers that other markers of success exist and are as important, if not more important, as a result*, such as doing more underwaters or not giving up through challenging sets.

  - *Success is not only about outcomes but as much about the things they conquer or overcome*. This focus will encourage a more process-oriented culture.

- *A focus on individual effort and perseverance at younger ages is critical to foster,* especially since swimming is not an instant gratification sport and swimmers can train all year without drops in times.

  - *Emphasize that abilities can still be developed even at an older age*, especially as swimmers become more aware of others and begin to think they have limits.

See the individual swimmers.

- Have *individual meetings* throughout the year to monitor growth, not only as a swimmer but also as a person, especially at older ages. Meetings can be a better place to teach and continue to develop mental skills as these skills can be more personalized as you get to know the individual.

  - *Build relationships by learning more about each individual and knowing what motivates them.* Let them tell you what motivates them and how they want to be given instruction and critique.

- *Catch swimmers doing things right.* Make sure to point out when they do things you like.

- *Be specific with feedback.* Let them know why you liked or didn't like something and how they can improve.

- *Remind swimmers to focus on their own journey rather than a comparison of others*. Swimmers need to know that other people's success does not take away from their own success or prevent them from being successful. *Avoid comparisons of that swimmer to others.*

- *Have fun getting to know each individual and influencing their development as a swimmer and a person!* A caring coach can positively impact a swimmer in their sport and their life through simply getting to know them.

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