



## Psychological Skills Evaluation of Greek Swimmers with Physical Disabilities

### KEYWORDS

psychological skills, swimming, disabilities, classification

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### ABSTRACT

*This study examined the internal consistency and structural validity of the Athletic Coping Skills Inventory-28 for the Greek population of disabled swimmers. It also included research on the psychological skills of all participants of the National Championship for the first time with regard to their age, gender, classification, acquired or disability by birth, athletic experience and weekly training hours. Eighty two athletes (58 men and 24 women), answered voluntarily the ACSI-28 questionnaire. Results of the research showed that female swimmers were found to be more capable than men in coping skills like coachability, release of anxiety and peaking under pressure. The type of their disability affects the concentration of swimmers as classified functional ability made them more effective in under pressure conditions. Finally, swimmers practicing eight hours per week were more capable to put specific goals and to achieve better mental preparation for the race compared to those who trained ten or six hours per week.*

### Introduction

The need for greater research in sport psychology for disabled athletes has been documented within the bibliography (Page, Martin, & Wayda, 2001; Sherrill & Tripp, 2004). Sport psychologists have pointed out the importance of psychological skills training for athletes with physical disabilities (Hanrahan, 1998; Kasum, Lazarević, Jakovljević, & Bačanac, 2011; Martin, 2008; Spörner et al., 2009). Porretta and Moore (1997) proposed applied areas of psychological research that would be beneficial for athletes with severe disabilities. Such areas are identification of motivators, goal setting, self regulation and visual rehearsal. Cox and Davis (1992) conducted research, in which they compare psychological skills between elite wheelchair track and field athletes and able-bodied athletes. Other researchers examine the psychometric properties of athletic identity scale for swimmers with disabilities (Martin, Eklund, & Mushett, 1997). The characteristics of competitive anxiety of various athletes with disabilities have also been researched (Ferreira, Chatzisarantis, Gaspar, & Campos, 2007).

Sport psychologists use a variety of self-report inventories for the purpose of assessing an athlete's psychological characteristics and related behavior (Jagacinski & Duda, 2001; Spencer, 2003). Based on the results of such psychological assessment, strategies or programs designed to remediate equivalent problems noted that psychological deficiencies should be implemented (Bawden, 2005). Valid and reliable material is essential both for the assessment of the athletes' psychological profile and for the development of psychological skills.

There has been an increase in the amount of research on sport psychology in Greece (Georgiadis, 2009; Diamantakos, 2008) however, studies involving psychological descriptions of competitive and non competitive athletes with physical disabilities have received much less attention. Therefore, in the past twelve years, Greek researchers have been focusing on research both at national (Maggoutsa et al., 2004) and international level of athletes with physical disabilities (Kokari-

das, Natsis, Markopoulos, Chatzigeorgiadis, & Karpathakis, 2005; Skordilis, Koutsouki, Asonitou, Evans, & Jensen, 2002) in order to help them improve their exercise programs based on their psychological characteristics such as sport orientations, athletic identity, sport motivation and goal perspectives. In addition, Goudas, Kontou, and Theodorakis (2006) have developed a Greek version of the Test of Performance Strategies (TOPS), indicating via their results that this version could be used for assessing psychological skills for the disabled Greek athletes. Another valid and reliable tool for the Greek population of disabled athletes, the motives scale MOM's, has revealed a useful asset for coaches and sport psychologists (Polatidou, Batsiou, & Polatidou, 2010). Therefore, Greek researchers pointed out the importance of evaluating psychological skills of the entire population of Greek disabled competitive athletes in all sports, particularly in swimming which is the most popular sport in Greece.

The purpose of this study was to evaluate a) the internal consistency and structural validity of the Athletic Coping Skills Inventory-28 (ACSI-28) for the Greek population of disabled swimmers b) the psychological skills of the ACSI-28 of Greek competitive swimmers with disabilities and c) to examine the differences of the psychometric parameters of the ACSI-28 among Greek competitive swimmers with disabilities with regard to gender, age, classification, acquired or disability by birth, athletic experience and weekly training hours.

### Method

#### Participants

All swimmers were informed about the purpose of the study and they all completed the questionnaire voluntarily and anonymously. The study was part of a doctoral thesis which was approved by the Department of Psychological Education and Sports Sciences-Democritus University of Thrace, ensuring the privacy of personal information of athletes and guaranteeing institutional ethical approval. Eighty two (n=58 men, n=24 women) disabled competitive swimmers (from the total amount of 121 participants of the National Championship) participated voluntarily in the study. Their Classification Sta-

tus ranged S1- S10: (nS1=1, nS2=6, S3=7, nS4=2, nS5=7, nS6=16, nS7=13, nS8=11, nS9=8 and nS10=10). Thirty nine of the participants had acquired physical disability and 43 of them disability by birth. Swimmers had various disabilities: Cerebral Palsy (n=32), Spinal Cord Injury (n=18), Amputations (n=8), Poliomyelitis (n=4), Achondroplasia (n=3), Traumatic Brain Injury (n=2), Multiple Sclerosis (n=2), Muscle Dystrophy (n=1), orthopedic disorders and rheumatic diseases (n=12). Researchers divide them in five age groups: 10-19 years (n=13), 20-29 (n=22), 30-39 (n=36), 40-49 (n=8) and 50-59 (n=3). All swimmers were also divided by athletic experience: 1-3 years (n=11), 4-6 (n=27), 7-10 (n=15), over 11 years (n=29) and by weekly training hours: six hours per week (n=24), eight (n=18) and ten (n=40).

### Measures

The Athletic Coping Skills Inventory-28 – (ACSI-28) (Smith, Schutz, Smoll, & Ptacek, 1995), which was adapted to the population of Greece by Goudas, Thedorakis, and Antoniou (1996), was used to measure the coping skills in swimming for disabled athletes. This particular measure of coping skills is composed by the following subscales with four issues each: coping with adversity (e.g. "I maintain emotional control no matter how things are going for me"), peaking under pressure (e.g. "To me, pressure situations are challenges that I welcome"), goal setting/ mental preparation (e.g. "On a daily basis, I set very specific goals for myself that guide what I do"), concentration (e.g. "It is easy for me to direct my attention and focus my attention on a single object or person"), release of anxiety (e.g. "While competing, I worry about mistakes or failing to come through"), confidence and achievement motivation (e.g. "I feel confident that I will play well"), and coachability (e.g. "If a coach criticizes or yells at me, I correct the mistake without getting upset about it"). All subscales of the ACSI-28 were assessed on a 6-point Likert scale ranging from 1 (never) to 6 (always).

### Procedure

The ACSI -28 was given to the swimmers at regular swimming training hours in the middle of training season. Instructions were read by the investigator or by the coach and athletes were informed that participation was voluntary and that all information reported in their questionnaire was confidential. Fifty two swimmers from 11 clubs in Northern Greece completed the questionnaire under the guidance of the researcher inside swimming facilities of the town each athletic club cited. Thirty swimmers from 11 clubs in Southern Greece completed the questionnaire after hearing the written instructions from their coaches at the swimming facilities of the town each athletic club is cited. These questionnaires returned to the researcher by post. All participants signed and returned an informed consent form and were instructed to consider each item and answer without consulting any other individuals. Instructions were the same for all participants. In the last page of the questionnaire participants were instructed to fill out a brief demographic summary: age, gender, classification, acquired or disability by birth, type of disability, athletic experience and weekly training hours.

### Statistical analyses

The Statistical Package for the Social Sciences (SPSS) version 16.0 was used as a tool for data analysis. Statistical analyses included descriptive statistics for demographic data, reliability and factor analysis of the ACSI-28, non parametric analysis of variance Test Kruskal-Wallis for the variables of age, classification, type of disability, years of athletic experience and weekly training hours and Test U Mann- Whitney (2 independent) for the variables of gender and acquired or disability by birth.

### Results

Table I. presents the descriptive statistics for the factor composite scores and Cronbach's' alpha for the seven Subscales of the questionnaire. From the main scores it appears that five out of seven subscales tend to reach the maximum score

(6 - always) for each question (range 4,92 to 5,52). Respectively, the other two subscales exceed the half of maximum score (range 3,27 to 3,9). Cronbach's Alpha indicator proved to be satisfying to high as far as the reliability of the scale (.88).and of the 7 subscales (.79-.98) are concerned. The questionnaire responses showed that the Cronbach' alpha was high for both total scale (.88) and seven subscales (range .79 to .98) (Howitt & Cramer, 2006).

**Table I. Means, Standard Deviation and Cronbach's' alpha for ACSI-28 and Subscales**

Subscales	N	(mean+s)	$\alpha$
coping with adversity	4	5.13±.56	.806
peaking under pressure	4	3.9±.1.5	.961
goal setting/ mental preparation	4	4.92±.72	.801
concentration	4	5.25±.67	.874
freedom from worry	4	3.27±.1.9	.981
confidence / achievement motivation	4	5±.68	.792
coachability	4	5.52±.41	.798
Scale	28	4.7±.57	.885

The factor analysis (main axes- principal components) of the athletes' replies revealed seven factors with an eigenvalue over 1 explaining 75% of the total variance. The Test of Kaiser-Meyer-Olkin as a measure of sampling adequacy (KMO) and the Bartlett's sphericity Test were conducted and revealed high values (range .65 to .89) for all seven factors (Table II). The four items of each factor presented a range of medium to high loads (Table III).

**Table II. KMO Test and the test of Bartlett's sphericity**

Subscales	KMO	Bartlett's Test	
	Chi-Square	P	
coping with adversity	.77	105,237	,000
peaking under pressure	.86	383,584	,000
goal setting/ mental preparation	.77	100,940	,000
concentration	.76	184,741	,000
freedom from worry	.89	526,441	,000
Confidence / achievement motivation	.66	116,520	,000
coachability	.65	211,188	,000

**Table III. Components in Rotation axes (varimax).**

Subscales	Components						
	1	2	3	4	5	6	7
peaking under pressure 1	.934						
peaking under pressure 2	.912						
peaking under pressure 3	.909						
peaking under pressure 4	.882						
concentration 3		.899					
concentration 1		.862					
concentration 4		.835					
concentration 2		.788					
coping with adversity1			.848				
coping with adversity 4			.826				
coping with adversity 2			.729				

coping with adversity 3			.688			
goal setting / mental preparation 1			.853			
goal setting / mental preparation 4			.747			
goal setting / mental preparation 2			.736			
goal setting / mental preparation 3			.720			
coachability 1			.949			
coachability 2			.940			
coachability 3			.666			
coachability 4			.645			
freedom from worry 4				.758		
freedom from worry 1				.717		
freedom from worry 2				.707		
freedom from worry 3				.703		
Confidence / achievement motivation 1					.905	
Confidence / achievement motivation 4					.773	
Confidence / achievement motivation 3					.743	
Confidence / achievement motivation 2					.667	

**Note: The number next to the subscales indicates the order of appearance the issue of each factor on the scale.**

The non parametric test U of Mann-Whitney (2 independent) for the variable gender spotted significant difference between men and women in subscales "peaking under pressure" (U = 311,5, n1 = 58, n2 = 24, z = -3,931, P < .001), "release of anxiety" (U = 311,5, n1 = 58, n2 = 24, z = -4,581, P < .001) and "coachability" (U = 442,5, n1 = 58, n2 = 24, z = -2,660, P < .05) (Table IV). By checking the Mean Rank women scored significantly higher than men in these three factors (Table V). Non parametric test U of Mann-Whitney revealed no statistically significant difference between the averages of the factors of ASCI-28 and acquired or disability by birth (Table IV).

**Table IV. Test U Mann- Whitney for gender and acquired or disability by birth**

Subscales	gender			acquired/ disability by birth		
	U	Z	P	U	Z	P
coping with adversity	686.500	-.098	.922	806.000	-.306	.760
peaking under pressure	311.500	-3.931	.000*	711.500	-1.183	.237
goal setting/ mental preparation	523.000	-1.775	.076	797.500	-.383	.702
concentration	674.000	-.227	.821	784.000	-.512	.609
freedom from worry	248.500	-4.581	.000*	724.500	-1.063	.288
Confidence / achievement motivation	657.000	-.088	.930	828.000	-.098	.922
coachability	442.500	-2.660	.008*	703.000	-1.295	.195

**Note: \*statistical significance level P<.05**

The non parametric test Kruskal-Wallis for the variable weekly training hours also found significant differences in the subscale "goal setting / mental preparation" ( $\chi^2 = 7.878$ , df = 2, P = 0.019). In order to find separate differences, the U test of Mann Whitney was conducted after applying Bonferroni correction, which resulted in coefficient significance P = 0.017. By checking the Mean Rank, the results revealed that athletes with eight hours of training per week scored significantly higher on the parameter setting of goal setting/ mental preparation than those with ten hours of training (Table V).

**Table V. Mean Ranks in gender and h/week comparisons**

Subscales	gender	N	Mean Rank	Sub-scale	h/ week	N	Mean Rank
peaking under pressure	M	58	34.87	goal setting	6	24	48.79
	W	24	57.52		8	18	48.47
freedom from worry	M	58	33.78		10	40	33.99
	W	24	60.15				
coachability	M	58	37.13				
	W	24	52.06				

The non parametric test Kruskal-Wallis for variable disability found significant difference only in the subscale "concentration" ( $\chi^2 = 16,978$ , df = 8, P = 0.030). In order to find separate differences, the test U of Mann Whitney was conducted after applying Bonferroni correction, which resulted in coefficient significance P = 0,0014. The analysis in this level of coefficient significance reveals no statistical differences between pairs of comparisons of disability types. Values of Mean Ranks for each type of disability are available in Table VI.

The comparison between ten categories of classification status (S1-S10) revealed significant difference in the subscale "peaking under pressure", ( $\chi^2 = 18,322$ , df = 9, P = .032). In order to find separate differences, the test U of Mann Whitney was conducted after applying Bonferroni correction, which resulted in coefficient significance P = 0,001. Analysis in this level of coefficient significance reveals no statistical differences between pairs of comparisons of classes. Values of Mean Ranks for each Class are available in Table VI.

**Table VI. Mean Ranks for type of disability and classification status comparisons**

Subscale	Type of disability	Z	Mean Rank	Subscale	Classification	Z	Mean Rank
concentration	CP	32	39.83	peaking under pressure	1	2	41.50
	SCI	18	40.17		2	6	63.67
	Amputations	8	18.63		3	7	49.21
	Poliomyelitis	4	61.13		4	2	63.50
	Achondroplasia	3	61.67		5	7	61.64
	Ortho-rheumatic diseases	12	46.21		6	16	35.38
	Muscle Dystrophy	1	38.00		7	13	34.38
	Traumatic Brain Injury	2	43.75		8	11	32.55
	ms	2	73.50		9	8	43.50
					10	10	31.60
	Total	82			Total	82	

There was no statistically significant difference between the averages of the factors of ASCI-28 and the variables of age, years of athletic experience and acquired or disability by birth (Table VII).

**Table VII. Kruskal-Wallis test for h/week, type of disability, classification, age and years of athletic experience**

	h/week			type of disability			classification			age			years of athletic experience		
	X <sup>2</sup>	Df	P	X <sup>2</sup>	Df	P	X <sup>2</sup>	Df	P	X <sup>2</sup>	Df	P	X <sup>2</sup>	Df	P
A	2.041	2	.360	4.883	8	.770	10.626	9	.302	1.330	4	.856	1.933	3	.586
B	.076	2	.963	3.419	8	.905	18.322	9	.032*	1.528	4	.822	.065	3	.996
C	7.878	2	.019*	9.612	8	.293	8.637	9	.471	4.471	4	.346	4.347	3	.226
D	.272	2	.873	16.979	8	.030*	10.376	9	.321	2.939	4	.568	1.679	3	.642
E	2.163	2	.339	6.108	8	.635	14.655	9	.101	6.917	4	.140	.770	3	.857
F	.816	2	.665	8.247	8	.410	14.383	9	.109	2.093	4	.719	3.645	3	.302
G	1.670	2	.434	7.966	8	.437	12.461	9	.189	.498	4	.974	3.469	3	.325

**Note: \*statistical significance level P<.05**

Subscales: A= coping with adversity, B= peaking under pressure, C=goal setting / mental preparation, D=concentration, E= freedom from worry, F= Confidence / achievement motivation, G= coachability

## Discussion

Reliability analysis (Cronbach's  $\alpha$ ) showed that there was strong internal consistency among the questions regarding the seven subscales. Bibliography views about adequacy of participants to perform factor analysis differ. Tabachnick's (2007) requires 300 participants, while Comrey and Lee (1992) consider poor a number of 100 participants (as of this survey), moderate a number of 200 participants, good a number of 300 participants, very good a number of 500 and an excellent a number of over 1,000 participants. In contrast, MacCallum, Widaman, Zhang, and Hong (1999) point out the dynamic of factor analysis arguing that when the load is above .60 and each factor is defined by many items, then a small number of participants is also adequate. In this study, the test of KMO and that of Bartlett's sphericity were conducted to evaluate the adequacy of the number of participants. Results revealed values above .65 for all seven factors (score which is acceptable) (MacCallum et al., 1999). Also Bartlett's sphericity test was statistical significant for all factors. Thereafter, factor analysis confirmed the structural validity of the scale, proving that it can be a reliable tool concerning its use on Greek swimmers with kinetic disabilities. The seven factors accounted for 75% of the variance, confirming the scale as a valid tool for use in Greek swimmers with physical disabilities. High values of Cronbach's  $\alpha$  in subscales of the questionnaire were observed also in a study assessing psychological skills of athletes with disabilities in weightlifting which confirmed by researchers the validity and reliability of this questionnaire as a means of evaluation of psychological skills in disabled weightlifting athletes (Derikoglou, Batsiou, Mavridis, & Bebetos, 2009). Respectively, on research evaluating psychological skills of wheelchair basketball athletes and athletes without disabilities (Perreault & Vallerand, 2007), the scale on the whole had an adequate level of internal consistency despite the fact that two of the subscales had low internal consistency. These results were carefully interpreted by researchers due to particular characteristics of the participants with disabilities in their study (lack of coaches).

High scores in all questions of the questionnaire factors were found by the examination of the responses of swimmers. The highest scores were presented in the factors "coachability", "concentration", "coping with adversity" and "confidence and achievement motivation" which are particularly developed in athletes with disabilities (Bawden, 2005). As athletes utilize their free time to exercise, they ensure low stress levels and high levels of confidence. This combination enhances the strength of their personality and psychomotor behavior (Martin, 1999).

Lower scores were observed in questions of factors "release of anxiety", "peaking under pressure" and "goal setting/ mental preparation". The determining role of setting targets to improve performance of athletes with disabilities has been highlighted by researchers in previous studies. Porreta and Moore (1997) even pointed the difficulty of disabled people to set goals, to be bounded on what each athlete can do according to their motor and mental state. Respectively, performance in stressful conditions such as those experienced by athletes before and during a sporting event-match day is a challenge. This challenge depends on many parameters for athletes with disabilities as they face external factors that may be distracting and eventually affecting their performance (access to swimming facilities, time and mode of transportation to and from the swimming pitch, the muscle spasms the time of the race) (Bawden, 2005).

Results with regard to gender indicate that women had significantly higher scores on the factors "coachability", "release of anxiety" and "peaking under pressure", which indicates the excellence of female athletes versus male athletes on the psychological skills like self-determination and self-commitment (Fung, 1992; Vallerand & Bissonnette, 1992). Studies that continually highlight the importance of the experience of participation in the sport of women with disabilities in both social and personal development and independence have caused Particular interest (Olenik, Matthews, & Steadward, 1995).

The results concerning weekly training hours display special interest. Athletes with 8 hours of training per week scored significantly higher on the parameter "goal setting / mental preparation" from those with 10 hours training per week. Bawden (2005) analyzes the parameters that may affect disabled athletes to determine short and long term goals and highlights the importance of realistic goals depending on the ability of each individual. The diversity of every athlete in combination with the demanding environment of swimming training for athletes with disabilities (access to swimming facilities, entrance and exit the pool, locker room-wc) may affect the parameter of goal setting which leads swimmers who train fewer hours - not by choice but by external factors - to achieve higher scores than those with more hours of training. However, for the disabled, the importance of systematic workout in order to develop the skill of setting goals is not rejected, as far as the scores of athletes remain high.

Results were interpreted based on the type of disability. Differences in athletes' score were observed only in the param-



eter "concentration", but no difference was found during the comparisons between the types of disability. This can be justified by the complexity of the physiology of each disability. All athletes, regardless the type of disability, adjusted, both in their private and athletic routine, their training in such a way, that they put themselves in constant pursuit of proficient and effective methods of concentration (Dummer, 2001).

Respectively, in the present study the functional ability of swimmers determined by the classification status affected the score of swimmers in the parameter "peaking under pressure" without though pointing any difference between classes. This may be associated with their ability to achieve optimum management of stressful conditions, as a result of the fact that they have been coping with the disability. As swimmers have already been trained to manage their disability in an equally challenging environment in their daily lives (Hanrahan, 2007), they are also effective in the under pressure conditions of the coaching process and their competitive efforts.

It is remarkable that no significant differences were found on the average of subscales compared with acquired or disability by birth, age and athletic experience. As far as the evaluation of the acquired one and of the disability by birth, the results of this study are underpinned by the findings of researchers who used the scale ACSI-28 for disabled athletes of Powerlifting (Derikoglou et al., 2009). It is likely that the lack of differences is associated with a general approach of participation in sports activities for people with physical disability, regardless the disability type (Roussou, Tsiatskari, Avgerinos, & Kourtesis, in press).

Additionally, no differences were observed in psychological skills of ACSI -28, regarding the athletic experience and the age of athletes in contrast with results of Derikoglou et al. (2009). The outcome concerning the age of training can be justified by the level variation of the participating athletes, given that the present study was conducted on a national

level. Although equivalent recent research concerning wheelchair basketball athletes didn't also reveal differences related to the age of the athletes (Perreault & Vallerand, 2007).

## Conclusions

The psychological characteristics of Greek competitive swimmers with disabilities were examined using ACSI-28, which is considered a valid and reliable tool for disabled athletes. Results of the research showed that disabled swimmers possess psychological skills that are adequately developed. Women swimmers were found to be more capable from men in coping skills like coachability, release of anxiety and peaking under pressure. Additionally, the type of disability affects the concentration of swimmers, but no difference was found during the comparisons between the types of disability. Respectively, classified functional ability made the swimmers more effective in under pressure conditions, without determining any difference in comparisons between classes. Finally, swimmers with eight hours of training per week were more effective to put specific goals and better mental preparation for the race when compared with those who train ten hours per week. No significant differences were found on psychological characteristics between acquired or disability by birth, age and athletic experience. Further studies are necessary in order to adapt other psychological scales to the population of Greek disabled athletes, to evaluate psychological characteristics of Greek disabled athletes in all Paralympic Sports and also to compare the differences between sports.

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