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Bouncing Back: The Role Of Coping Style, Social Support And Self-Concept In Resilience Of Sport Performance

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ABSTRACT

The present study aimed to identify how self-concept, social support and coping style can act as protective factors against the potentially deleterious effects of negative performance in competitive sport. A cohort of swimmers ($N = 272$) competing at the Australian Age National Championships was examined to discriminate between three performance-related outcomes - initially successful performance, resilient performance (initial failure, followed by subsequent success) and non-resilient performance (initial failure followed by subsequent failure). A discriminant function analysis revealed two main discriminant functions. The first discriminated resilient performers from the other two groups. Resilient performers showed higher self-perceptions of physical endurance, but lower perceptions of perceived social support from significant others than the other two groups. The second discriminant function discriminated

initially successful performers from resilient and non-resilient performers. The initially successful performers scored more highly than the other groups on the coping with adversity and peaking under pressure subscales of the Athletic Coping Skills Inventory. Importantly, this study demonstrates a relationship between psychological constructs and a measurable performance outcome. It is suggested that a high concept of physical endurance, good self-perceptions for peaking under pressure and coping with adversity, and a level of independence from social support are important factors in swimming performance.

Introduction

Athletic careers are filled with fluctuations of fortune that allow athletes to experience both the thrill of victory and the agony of defeat within their own career. By example we can reflect on the career of American swimmer Pablo Morales. Morales was one of the swimming stars of the 1984 Olympic Games in Los Angeles. Although he won three medals in Los Angeles an individual title eluded him, as he was upset in the 100-meter butterfly final by German swimmer Michael Gross. Four years later, in 1988, Morales failed to make the U.S. team. However, he didn't quit there. After a brief retirement from the sport he returned in 1992 to make the U.S. Olympic team and went on to capture the gold in the 100-meter butterfly at the Barcelona Olympic Games. Kathy Love Ormsby, who in 1986 was favoured to win the 10,000 meters at the NCAA track meet, displayed a very different response to failure by an athlete at the elite level of competition. After falling to fourth place during the championship race, Ormsby dropped out of the competition and attempted suicide by jumping off a bridge (see Baumeister, 1991, pp. 89-90). Although the underlying reasons for Ormsby's maladaptive response to poor performance are not evident, it is apparent that this is not a desired behavioural response for an athlete at any level of competition.

These stories are but two extreme and heralded examples of individual response to poor athletic performance. Given the uncertainty of outcome that is the nature of sporting events, what leads individuals to produce dramatically different responses to failure? We all experience failure at one time or another. Indeed, this experience is endemic within sport. Yet, why do some people possess the ability to bounce back from adversity, while others simply give up or drop out? It is clear that the consequences of failure can be either motivating or disruptive depending on how one explains and subsequently deals with that failure.

One approach to understanding the differential abilities of people to cope with the same negative experience has been the examination of moderator variables, characteristics of persons or their environments that make them more or less vulnerable to the negative effects of stressful life events (Anthony, 1987). Resilience is one such moderator that has helped us to understand why one person reacts with negative symptoms to an objectively minor event when someone else may not experience distress even in the face of apparent major disruption. According to Rutter (1987), resilience is a set of protective factors that modify, ameliorate, or alter a person's response to some environmental hazard that predisposes one to a maladaptive outcome. Braddock, Royster, Winfield, and Hawkins, (1991) employed the term in a similarly general way by conceptualizing resilience as an individual's positive response to situations of stress and adversity. This perspective presents resilience as a protective mechanism that is thought to emerge from specific personality features, such as self-esteem, or from aspects of social support and adaptive coping

resources and strategies. In general, resilient persons are believed to possess the quality of rebounding and carrying on, an ability to bounce back and get on with life after adversity (Dyer & McGuinness, 1996; Richardson, Neiger, Jensen, & Kumpfer, 1990).

Resilience has been proposed as an appropriate concept that reflects the dynamic and fluid nature of the processes that act to modify responses to psychological risk (Rutter, 1985; Rutter, 1987). Rutter (1987) emphasizes the need to develop an understanding of individual responses to adverse life circumstances based on the identification of protective processes - which are developing and changing - as opposed to the isolation of fixed factors that counter risk.

Research regarding the protective factors contributing to a resilient response is equivocal. Cedarblad, Dahun, Hagnell, and Hanson, (1995) argued that protective factors could be considered to fall into two categories, namely individual dispositions and environmental factors. In contrast, a review of research into stress-resistant individuals by Garmezy (1987) identified three broad sets of variables whereby the environmental factors were further divided into family factors and other external support mechanisms. Hence, Garmezy identified personality features such as self-esteem, social factors such as family and peer support, and the availability of these systems to reinforce an individual's coping ability. These factors contribute to the competencies of individuals to develop problem-solving strategies needed to achieve the goodness of fit between situational demands and environmental contingencies. As pointed out by Block and Block, (1980), if individuals are able to invoke an available repertoire of problem-solving strategies, adaptive flexibility will be the result.

The study of success after failure in sport is not new. Taylor (1988) offered an in-depth examination of performance slumps in sport and delineates slumps from occasional drops in performance. Performance slumps are behavioural manifestations of extended poor performance. Although the source of the extended period of poor performance can be caused by physical or technical changes to the individual, efforts have been made from the psychological perspective to identify the ways that individuals adaptively cope with extended periods of poor performance. Although interesting, Taylor's insight into performance slumps is offered with no empirical evidence in support. Grove and Heard (1997) showed that dispositional optimism and trait sport confidence were positively related to the adaptive use of problem-focused strategies and negatively related to the maladaptive use of emotion-focused strategies. Underlying the study of psychology of slumps is the desire to rectify extended poor performance by the correct use of psychological skills or by inoculating the individual participant against the negative consequences of the initial poor performance.

There is evidence that psychological aspects associated with a single poor performance may beget future poor performance. Seligman, Nolen-Hoeksema, Thorton, and Moe-Thorton (1990) used measures of attributional style to predict swimming performance after perceived failure. As part of the study the researchers manipulated performance feedback given to a group of college swimmers to induce perceptions of relative success and failure. They found that participants exhibiting negative or pessimistic attributional patterns displayed greater performance deterioration on performance efforts following perceived failure than did the optimistic participants.

To date the use of the term resilience in the sport literature has been restricted to the realm of sport injuries (Smith, Smoll & Ptacek, 1990; Patterson, Smith, Everett & Ptacek, 1998). Resilience in this case has mostly been operationalized as the time required to return to competition, or participation. Smith, Smoll, and Ptacek, (1990) studied the moderating effects of social support and psychological coping skills on the total number of days of non-participation due to sport-related injury in a sample of adolescent athletes. The results indicated that individuals who had low levels of social support combined with low coping skills took longer to recover from injury compared to other combinations of variables. Similar results were found by Patterson et al., (1990) in a study on injury in ballet dancers. Results of their study demonstrated that psychosocial factors, including life stress events and social support, can affect injury vulnerability in the population studied.

The question remains as to why some people are able to bounce back from negative events or performances to regain high levels of performance, whereas others go on to prolonged poor performance or, as in the case of Kathy Orsmy, much worse. In the present paper we take the lead from existing psychological literature that suggests positive self-concept, social support and coping style can act as protective factors against the potentially deleterious effects of negative occurrences. In our research we specifically sought to discriminate between three performance-related outcomes - initially successful performance, resilient performance (initial failure, followed by subsequent success) and non-resilient performance (initial failure followed by subsequent failure) at an elite level of age-group competitive swimming using existing measures of self-concept, social support, and coping style.

Method

Participants

A sample of 272 competitors at the Australian Age Championship swimming competition provided data for use in the study. The participants represented 108 different swimming clubs originating from eight Australian states and territories and from New Zealand. The final sample consisted of age group competitive swimmers, ranging in age from 12 to 18 years ($M = 14.91$, $SD = 1.7$). The final sample was made up of 123 males (45.1%) and 149 females (54.9%). All participants provided informed consent in writing, co-signed by a parent or guardian, prior to initiation of the study.

Instrumentation

A questionnaire was given to participants that contained items that assessed coping style, social support and self-concept. The final questionnaire included the Athletic Coping Skills Inventory (ACSI-28; Smith, Schutz, Smoll, & Ptacek, 1995), the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990) and the Physical Self-Description Questionnaire (PSDQ; Marsh, 1996; Marsh, Richards, Johnson, Roche, & Tremayne, 1994).

Demographic data were also obtained from each participant regarding age, gender, home club, and city, state, and country of origin. All questionnaires were pilot tested to ensure clarity

and ease of comprehension.

Coping Style. The Athletic Coping Style Inventory (ACSI-28; Smith, Schutz, Smoll, & Ptacek, 1995) was used to assess individual coping style. The ACSI contains 28 items describing seven sport-specific subscales: Coping with Adversity (4 items), Peaking Under Pressure (4), Goal Setting/Mental Preparation (4), Concentration (4), Freedom from Worry (4), Confidence and Achievement Motivation (4), and Coachability (4). The athletes were required to rate how often they experienced the situations presented in each of the related questions using a 6-point Likert-type scale. Although the ACSI-28 in its original form used a 4-point scale, a common 6-point scale was adopted for all measures utilised in the current study in order to present a common response format to the participant. The ACSI-28 has previously been used in the study of resiliency in the context of sport injuries (Smith, Smoll, & Ptacek, 1990) and has established reliability and validity (Smith et al., 1995).

The definitions associated with the sub-scales of the ACSI-28, as outlined by Smith & Christensen, (1995) are as follows:

- Coping with Adversity: Remains positive and enthusiastic even when things are going badly; remains calm and controlled; can quickly bounce back from mistakes and setbacks.
- Peaking Under Pressure: Is challenged rather than threatened by pressure situations and performs well under pressure; a clutch performer.
- Goal Setting/Mental Preparation: Sets and works towards specific performance goals; plans and mentally prepares him/herself for competition and clearly has a 'game plan' for the competition.
- Concentration: Not easily distracted; able to focus on the task at hand in both practice and competitive situations, even when adverse or unexpected events occur.
- Freedom from Worry: Does not put pressure on him/herself by worrying about performing poorly or making mistakes; does not worry about what others will think if he/she performs poorly.
- Confidence and Achievement Motivation: Is confident and positively motivated; consistently gives 100% during practice and competitions and works hard to improve his/her skills.
- Coachability: Open to and learns from instruction; accepts constructive criticism without taking it personally or becoming upset.

Social Support: Individual perceptions of social support were assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). The MSPSS has been designed to assess adequacy of social support from three specific sources, family, friends and significant others. The MSPSS has been shown to be psychometrically sound, with good reliability, factor validity and adequate construct validity (Zimet et al., 1988). The authors have specifically constructed the scale to be economical, thus providing for the use of the instrument in conjunction with other measures. The MSPSS consists of 12 items describing three different sub-scales: Family Support (4 items), Friend Support (4), and Significant Other Support (4).

Self-Concept: To assess self-concept specific to the physical domain the Physical Self-

Description Questionnaire (PSDQ) by Marsh et al., (1994) was used. The PSDQ is designed for use by adolescents age 12 years and older and utilises 70 items to assess 11 scales: Appearance (6 items), Body Fat (6), Co-ordination (6), Endurance (6), Esteem (8), Flexibility (6), Global Physical (6), Health (8), Physical Activity (6), Strength (6), and Sports Competence (6). The PSDQ has demonstrated adequate validity and reliability (Marsh et al., 1994; Marsh, 1996) and was initially developed on a sample of Australian adolescents, thus increasing the cultural validity of the selected measure. The descriptions of the nine specific components of physical self-concept and two global components have been described by Marsh and colleagues (1994) as follows:

- Appearance: Being good looking, having a nice face
- Body Fat: Not being overweight, not being too fat
- Co-ordination: Being good at co-ordinated movements, being able to do physical movements smoothly
- Endurance: Being able to run a long way without stopping, not tiring easily when exercising hard
- Flexibility: Being able to bend and turn your body easily in different directions
- Health: Not getting sick often, getting well quickly when you are sick
- Physical Activity: Being physically active, doing lots of physical activities regularly
- Strength: Being strong, having a powerful body with lots of muscles
- Sports Competence : Being good at sports, being athletic, having good sport skills
- Global Physical: Feeling positive about one's physical self
- Esteem: Overall positive feelings about self

Procedure

Data were collected at the Australian Age Championship swimming competition in Adelaide, South Australia. The use of a national championship competition as the forum for data collection and performance observation provided an ecologically valid study of relative performance. Being a championship-level competition we could be relatively confident that the athletes' state of preparation would be aimed at performing to the highest level. Use of an in-season, as opposed to peak-season, competition would mean that the participating athletes could be at vastly different relative stages of preparation depending on their individual program. By collecting data at a national championship we were confident that the majority of participants were in peak season form with the implicit goal of posting seasonal or lifetime best performances. All participants completed the study questionnaire during the three-day period prior to the start of the championship competition.

Following the collection of the completed questionnaires, participant performance was tracked over the course of the competition. Classification of the participant's behavioural category was made based on the comparison of their performance time to their entry time listed in the official competition program. The reference performance for each individual participant was his/her first swim of the championship competition. Participants who recorded a personal best time relative to their official entry time on the initial swim of the competition were classified as having displayed a successful performance (initial success). Swimmers who failed to achieve a time equal to or better than their entry time in their initial event but who posted a best time in

their second event of the championship were classified as having displayed a resilient performance (initial failure followed by subsequent success). Swimmers were classified as having a non-resilient performance if they failed to achieve a best time on their initial swim of the competition and failed to achieve a best time in their second event of the competition (initial failure followed by subsequent failure).

Results

Data were coded and entered for each participant. First the psychological data for each participant were entered and matched with the individual's performance classification (successful, resilient, non-resilient). Descriptive statistics (Table 1) and internal consistencies (Table 2) were then calculated for each of the 21 different sub-scales that were derived from the three selected inventories. The alpha coefficients ranged from a low of .66 for ACSI Coachability to a high of .91 for PSDQ Body Fat and PSDQ Global Physical. The acceptable levels of internal consistency of the ACSI measures provide some support for the use of the 6-point scale adopted within the current study.

Table 1. Descriptive statistics for three performance categories (N = 272).

	Successful Performers		Resilient Performers		Non-Resilient Performers	
	(n = 138)		(n = 27)		(n = 107)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>M</i>	<i>SD</i>	<i>M</i>
ACSI - Coachability	4.66	1.04	4.70	1.05	4.76	0.99
ACSI - Concentration	4.56	.98	4.56	.81	4.42	1.03
ACSI - Confidence and Achievement	4.94	.96	4.98	.67	4.87	.82
ACSI - Coping with Adversity	4.44	.98	4.14	1.01	4.04	1.13
ACSI - Freedom from Worry	3.29	1.07	3.31	.91	3.9	.99
ACSI - Goal Setting and Mental Preparation	4.04	1.31	3.99	1.07	4.07	.98
ACSI - Peaking under Pressure	4.23	1.26	4.17	1.02	3.73	1.31
MSPSS - Family	4.93	1.08	5.03	1.19	5.09	1.03
MSPSS - Friends	4.82	1.14	4.46	1.25	4.91	1.09
MSPSS - Significant Other	4.98	1.21	4.50	1.48	5.11	1.20
PSDQ - Appearance	4.17	1.24	4.57	0.87	4.15	1.17
PSDQ - Body Fat	5.00	1.25	5.23	1.03	4.79	1.31
PSDQ - Coordination	4.70	1.02	4.87	.70	4.69	1.08
PSDQ - Endurance	4.93	1.04	5.42	.52	4.83	1.12
PSDQ - Esteem	5.01	.89	5.27	.61	5.09	.82
PSDQ - Flexibility	4.56	1.19	4.29	1.22	4.65	1.14
PSDQ - Global Physical	5.00	.95	5.23	.83	4.97	.96
PSDQ - Health	4.58	.97	4.55	.75	4.61	1.02
PSDQ - Physical Appearance	5.33	.72	5.34	.70	5.54	.61
PSDQ - Sport Competence	5.11	.84	5.26	.73	5.05	.92
PSDQ - Strength	4.83	1.02	4.50	1.12	4.85	.91

Table 2. Correlation matrix and alpha (α) coefficients for predictor variables from ACSI, MSPSS, PSDQ (N = 272).										
	1	2	3	4	5	6	7	8	9	10
1. ACSI Coachability	--	.37	.35	.34	.37	.05	.11	.25	.12	.15
2. ACSI Confidence and Achievement		--	.63	.54	.08	.56	.31	.44	.29	.34
3. ACSI Concentration			--	.62	.18	.41	.44	.26	.19	.27
4. ACSI Coping With Adversity				--	.27	.47	.41	.25	.19	.22
5. ACSI - Freedom From Worry					--	-.09	-.11	.10	.03	-.03
6. ACSI - Goal Setting & Mental Prep						--	.33	.28	.24	.30
7. ACSI - Peaking Under Pressure							--	.01	.14	.19
8. MSPSS - Family								--	.46	.59
9. MSPSS - Friends									--	.63
10. MSPSS - Significant Others										--
11. PSDQ - Appearance										
12. PSDQ - Body Fat										
13. PSDQ - Coordination										
14. PSDQ - Endurance										
15. PSDQ - Esteem										
16. PSDQ - Flexibility										
17. PSDQ - Global Physical										
18. PSDQ - Health										
19. PSDQ - Physical Activity										
20. PSDQ - Strength										
21. PSDQ - Sports Competence										
Alpha (α) Coefficients	.66	.67	.70	.73	.74	.73	.80	.78	.87	.89
Continued										
Note. If $r \geq 0.11$ $p < .05$; If $r \geq 0.15$ $p < .01$										

	11	12	13	14	15	16	17	18	19	20	21
1. ACSI Coachability	.22	.41	.22	.16	.44	.16	.29	.20	.38	.26	.21
2. ACSI Confidence and Achievement	.34	.34	.51	.42	.54	.41	.53	.28	.18	.48	.50
3. ACSI Concentration	.26	.22	.44	.21	.37	.24	.40	.18	.13	.40	.37
4. ACSI Coping With Adversity	.29	.23	.40	.13	.29	.21	.37	.11	-.01	.40	.33
5. ACSI - Freedom From Worry	.01	.25	.02	.02	.23	.01	.14	.17	.02	.04	-.02
6. ACSI - Goal Setting & Mental Prep	.15	.07	.32	.21	.20	.27	.25	.08	.07	.29	.29
7. ACSI - Peaking Under Pressure	.22	.09	.26	.21	.15	.12	.19	-.01	.01	.21	.28
8. MSPSS – Family	.23	.25	.31	.20	.50	.23	.37	.22	.20	.37	.29
9. MSPSS – Friends	.12	.10	.16	.06	.24	.14	.23	.13	.09	.21	.16
10. MSPSS - Significant Others	.23	.22	.28	.17	.37	.26	.29	.16	.24	.24	.28
11. PSDQ – Appearance	--	.42	.41	.21	.52	.27	.55	.04	.13	.42	.44
12. PSDQ - Body Fat		--	.37	.29	.61	.18	.56	.26	.24	.33	.44
13. PSDQ - Coordination			--	.40	.50	.52	.55	.22	.29	.52	.67
14. PSDQ – Endurance				--	.38	.29	.39	.28	.26	.28	.48
15. PSDQ – Esteem					--	.39	.65	.36	.27	.50	.50
16. PSDQ – Flexibility						--	.30	.18	.23	.34	.33
17. PSDQ - Global Physical							--	.22	.22	.56	.64
18. PSDQ – Health								--	.22	.20	.21
19. PSDQ - Physical Activity									--	.18	.34
20. PSDQ – Strength										--	.55
21. PSDQ - Sports Competence											--
Alpha (α) Coefficients	.87	.91	.86	.85	.82	.88	.91	.80	.62	.85	.85

Note. If $r \Rightarrow 0.11$ $p = <.05$; If $r \Rightarrow 0.15$ $p = <.01$

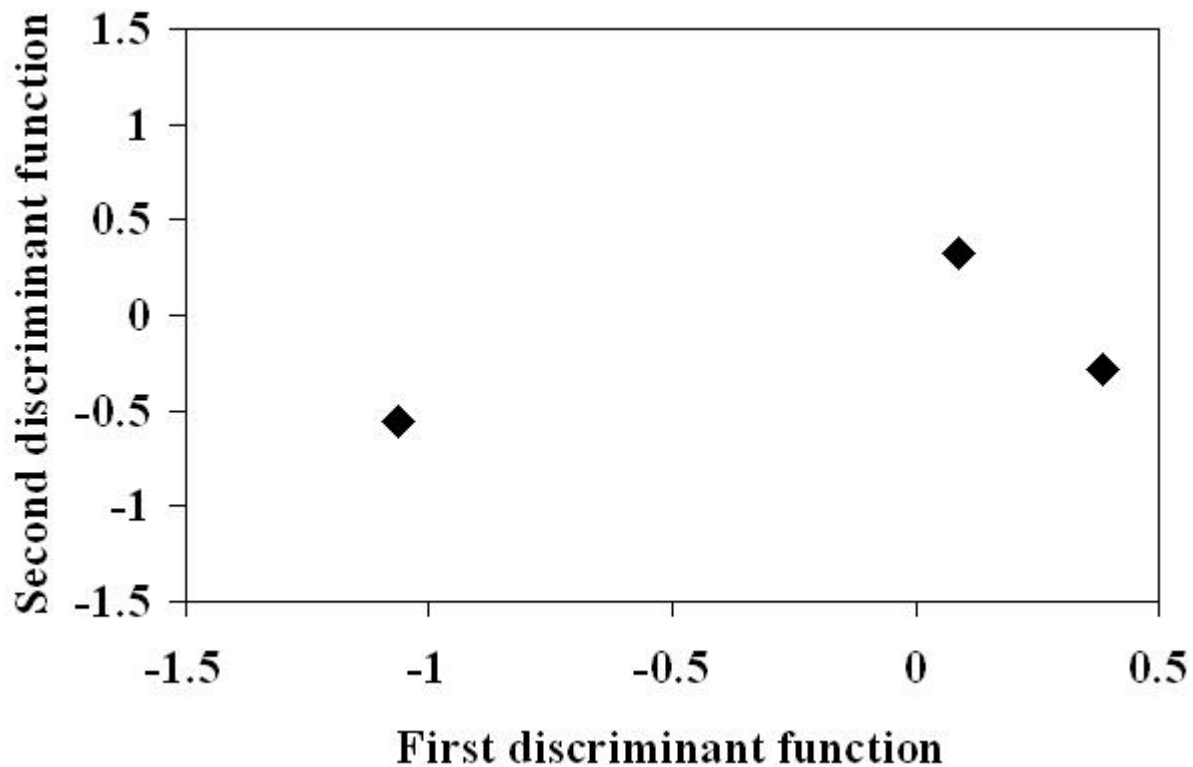
A discriminant function analysis was conducted on the grouping variable, successful performance, resilient performance, non-resilient performance, with the 7 items of the ACSI, 3 items of the MSPSS and 11 items of the PSDQ utilised as the discriminating variables. Of the 272 participants who provided complete data for the study, 138 were classified as successful performers, 27 as resilient performers and 107 as non-resilient performers.

Discriminant function analysis is generally a robust technique with respect to violations of assumptions, especially if sample sizes are relatively large. One potential problem in discriminant function analysis can be a low predictor variable to case ratio. Diekhoff (1992) recommends that the smallest group should have more cases than predictor variables whereas Tabachnick and Fidell, (1996) recommend a minimum group size of 20 cases in the smallest group. In our study the grouping decision process led us to have 27 participants classified in our smallest group (resilient performers). This result exceeded both the number of predictor variables used (21) and the minimum recommendation by Tabachnick and Fidell. Discriminant function analysis is sensitive, however, to multivariate outliers. Multivariate outliers were examined using Mahalanobis distances generated using multiple regression analyses (SPSS version 8.0). Examination of the resultant values indicated that 11 participants exceeded the critical value of chi-squared for 22 predictor variables, at the recommended alpha (α) level of .001. These participants were removed from further analysis.

Linearity was examined using scatterplots of pairs of predictor variables. No serious non-linearities were observed. In addition examination of the bivariate correlations (Table 2) showed an expected degree of relationship without evidence of multicollinearity. Results indicated that Box M's were not significant ($p > .001$), thus the assumption of homogeneity of variance-covariance matrices had not been violated.

An examination of the resulting discriminant function output revealed two main discriminant functions. In combination, the two functions provided a reliable discrimination between the three performance response categories ($\chi^2(42) = 71.13, p < .01$). With the first function removed, the second function failed to make a significant discrimination between performance classifications ($\chi^2(20) = 28.99, p > .05$). The two discriminant functions accounted for 59.9% and 40.1% respectively of the between group variability. As shown in Figure 1, the first discriminant function maximally separates resilient performers from the other two groups. The second discriminant function discriminates initial successful performers from resilient and non-resilient performers.

Figure 1. Plots of Three Group Centroids on Two Discriminant Functions Derived From Measures of the ACSI, MSPSS and PSDQ.



Examination of the structure matrix of correlations between predictor variables and discriminant functions, as shown in Table 3 suggests that the best predictors for distinguishing between resilient performers and the other two groups (first function) are self-perceptions of physical endurance and perceived social support from significant others. Resilient performers displayed higher levels of perceived endurance as measured by the PSDQ ($M = 5.42$), than competitors who recorded as

initially successful performance ($M = 4.93$), or than did non-resilient performers ($M = 4.83$), yet perceived less social support from significant others ($M = 4.50$) than did initially successful performers ($M = 4.98$) or non-resilient performers ($M = 5.11$). Initially successful performers were distinguished from resilient and non-resilient performers (second function) by measures of coping skills. Participants who were initially successful in their competitive performance scored higher on the ACSI Coping With Adversity scale ($M = 4.44$) than did resilient ($M = 4.14$) or non-resilient performers ($M = 4.04$). In addition the initially successful group displayed higher scores on the ACSI Peaking Under Pressure scale ($M = 4.23$) than did resilient ($M = 4.17$) or non-resilient performers ($M = 3.73$). Loadings of less than .30 are not interpreted.

Predictor Variables	Function	
	1	2
PSDQ Endurance	-.37	.14
MSPSS Significant Others	.33	-.09
MSPSS Friends	.27	-.08
PSDQ Body Fat	-.26	-.07
PSDQ Strength	.22	-.13
PSDQ Appearance	-.21	.16
PSDQ Flexibility	.20	-.03
PSDQ Global Physical	-.18	.08
PSDQ Sports Competence	-.16	.03
PSDQ Coordination	-.11	.08
ACSI Freedom from worry	-.09	-.09
ACSI Confidence and Achievement	-.09	-.04
PSDQ Health	.05	.03
ACSI Goal setting and mental prep	.04	-.01
ACSI Coping with adversity	-.17	-.52
ACSI Peaking under pressure	-.32	-.43
PSDQ Physical Activity	.26	.31
PSDQ Esteem	-.11	.24
MSPSS Family	.08	.20
ACSI Concentration	-.12	-.13
ACSI Coachability	.06	.11

The final step in the analysis was to attempt to classify the cases into the three groups - successful performance, resilient performance and non-resilient performance - based on the measures collected. Results of the classification indicated that we were able to classify 59.9% of the original cases correctly compared to an expected 42.4% based on existing prior probabilities. The best prediction occurred for the successful performers, where 76.1% of cases were correctly classified. The prediction for the resilient and non-resilient groups was less satisfactory, where there was 77.8% and 51.4% misclassification respectively. Thus it appears, for classification purposes, that the successful performers constituted a relatively more homogeneous group than did resilient and non-resilient performers.

Discussion

The primary purpose of the study was to investigate the concept of performance resilience within a sample of elite age-group competitive swimmers. Resilience has been posited as a set of protective factors that alter a person's response to an environmental hazard that predisposes a maladaptive outcome (Rutter, 1985, 1987). Arguably, a negative sport performance - especially

in a situation where success has been extensively planned and prepared for - has the potential to produce negative responses that can beget future negative performance. Previous research studying the concept of resilience in the area of human service has shown varying combinations of self-esteem, social support and coping skills reduce individual vulnerability to potentially stressful situations (Cederbald et al., 1995; Garmezy, 1987). Selection of commonly used measurement instruments for each of the posited variables allowed the study of the ability of the selected constructs to discriminate between resilient and non-resilient performances as operationalized within an ecologically valid competitive situation - performance at a national age-class championship swimming competition.

Results of this study indicate that a combination of psychological measures relating to self-concept, social support and coping skills, can successfully discriminate between those who perform well initially; those who perform poorly initially and rebound to perform well, and those who display initial poor performance and follow that with subsequent poor performance. As expected, individuals displaying performance resilience displayed higher levels of physical self-concept - specifically perceived endurance, as measured by the PSDQ-Endurance scale - than did those classified as non-resilient on the basis of their performance profile. Contrary to expectations the resilient competitors displayed lower perceptions of social support from significant others as measured by the MSPSS Significant Others scale, than did non-resilient or initially successful competitors. Although the second discriminant function failed to reach an acceptable level of significance we could still see differences between the initially successful competitors and the resilient and non-resilient participants in terms of coping skills. Competitors who recorded an initially successful performance scored higher on the Peaking Under Pressure and Coping with Adversity scales of the ACSI.

The positive effects of perceived domain-specific self-concept in terms of performance resilience and the evidence of beneficial effects of coping skills on initial competitive performance was to be expected. A positive self-concept, albeit measured in numerous different ways, has previously been identified as a core moderator variable in the concept of resilience (Rutter, 1985, 1987; Garmezy, 1987). In the realm of sport, Grove and Heard (1997) have showed that trait sport confidence was positively related to the adoption and utilization of adaptive, rather than maladaptive strategies dealing with performance slumps. Additionally, evidence exists to support the finding that adaptive coping skills are related to resilient responses in psychology in general and in (Cederblad et al., 1995; Garmezy, 1987) the realm of sport and sport injury in particular (Patterson et al., 1998; Smith et al, 1990).

The finding that lower levels of perceived social support distinguished resilient performers from non-resilient or initially successful competitors is contrary to predictions that would arise from existing resilience research in the domains of general (Cederblad et al., 1995; Garmezy, 1987) and sport psychology (Patterson et al., 1998; Smith et al., 1990; Smith et al., 1992;). It is important to note that the resilient performers were not lacking in perceived social support, recording a mean score of 4.5 out of a possible 6 on the MSPSS Significant Others scale. Rather, the score by that group was simply lower than the other two groups. Thus, a conclusion that a lack of social support leads to resilient performance would be incorrect, instead we should likely look for reasons why the non-resilient, or stress vulnerable individuals reported unexpectedly high levels. It may be that the measure of social support revealed a certain level of dependence in the

participant. This finding has been supported by the work of Schinke and da Costa (2001). Since the competition in question occurred at a site geographically removed from the majority of participants' homes, it is possible that the non-resilient participants did not have immediate access to the social support they reported. It may be that the competitors reporting less perceived social support were able to act more independently at a competition where family, friends and significant others may not have been in attendance. Since no effort was made to assess the various support structures present at the competition, this alternate explanation remains simple speculation. It is likely that alternate explanations for the unexpected finding relating to aspects of social support may be found if studied more in depth in future studies. The counterintuitive finding demonstrates the need for future research to clarify the role of social support in the area of resilient sport performance.

One of the prime limitations of the study was our inability to study the conjunctive effects of the selected moderator variables. Although our study assessed the additive influence of a number of moderator variables posited to be related to resilience, we were unable to investigate the interaction of these measures due to sample size restrictions. As noted by Smith et al. (1990) the assessment of conjunctive and disjunctive moderator influences requires extremely large sample sizes, particularly if one wishes to isolate extreme groups of sufficient size to demonstrate an effect. The study of such interaction variables has helped to clarify the relationship between identified variables and posited outcomes. Smith et al., for example, showed that only the athletes low in both coping skills and social support exhibited a significant stress-injury relation defining a non-resilient or vulnerable response in their study.

Given the low correlation between the social support measures and the measures of self-concept and coping skills in our study, it is likely that some individuals low in social support may be high on one, or more of the other construct measures. Without the ability to effectively test for the conjunctive effects of social support with the other measures the true effects of social support may be attenuated across the present study population.

From a practical perspective the finding that a series of psychological measures can reliably distinguish between selected outcomes measured directly in terms of objective sport performance is important. The link between latent psychological constructs and manifest measures of sport performance are often difficult to establish without a number of intermediary measures. More specifically the findings display the importance of positive self-perceptions and appropriate psychological skills as a precursor of adaptive responses in case of initially poor sporting performance. Competitive swimming in particular is a sport that, at a relatively young age, requires its participants to log large amounts of physical training, much of which is aimed at improving physical endurance by means of large doses of aerobic training. Besides the obvious beneficial physiologic aspects of such training, it is important to note that individual self-perceptions of endurance capacity may impact on performance resilience. Besides the physical hardening associated with such training, coaches should be aware of developing positive self-perceptions of endurance-related capabilities within their swimmers during the course of regular training as these perceptions have now been shown to be related to the ability to bounce back from an initial performance lapse. The finding that participants who were successful in their initial performance reported higher scores on the selected measures of coping skills than those who did not supports previous recommendations to provide athletes with psychological skills

training to improve various aspects of the competitive situation (Smith, 1989; Smith, et al., 1990). Unfortunately similar recommendations for planned interventions to assist in the development of social support cannot be supported as a result of the present study.

Success and failure relative to entry time is a common measure of competitive performance in adolescent competitive swimming. Certainly there are a myriad of reasons why an individual participant may, or may not, perform well initially, or subsequently in any competition, but the ability to successfully identify some underlying psychological measures that can contribute provides better insight into athletic performance. In this case the selected competition was the premier competitive event in the Australian age-class swimming calendar. This provided us with our basic assumption that individual participants would approach the competition in peak physical and psychological condition, an assumption that was not tested. The present approach did not seek to measure participant perception of competitive performance, or analyse the specific value the individual placed on the initial and subsequent performances measured. The rationale for this was that, at elite levels of sport, the focus is often on objective, as opposed to subjective outcomes. It is possible that participants may have placed differential value on good performance for different events. For the most part however, any violation of these assumptions would attenuate the findings since overriding level of physical preparedness, or decisional processes affecting direction of effort would not be expected to be related to assessed measures of self-concept, social support or coping style.

One of the principal limitations to a stronger discriminant result was the use of general trait measures of self-concept, global measures of social support and non-event specific measures of coping capacity.. In this instance the manifest resilient response was operationalized as an objectively-measured good performance following an objectively-measured poor performance. This trait-state differentiation is not unlike the distinction made by Peterson (2000) between 'big' and 'little' optimism. Big optimism is a more global or trait-like view of the world, whereas 'little' optimism is a more state-like situation-specific perception. Although a better prediction of performance resilience may have resulted from more specific (little) measures, the nature of resilience research has been to study general, more global, protective factors that reduce the vulnerability of the individual to negative life occurrences.

The ACSI has been shown to capture some of the psychological skills associated with sport performance. Smith and Christensen (1995) showed that a significant portion of the variability in baseball performance could be accounted for by the measures within the ACSI even when physical skill differences were accounted for. Although the current study made no attempt to control for the relative swimming ability of the participant, there is evidence that psychological and physical skills are independent of each other in relatively homogeneous performance groups (Smith & Christensen). The participants in the present study were homogeneous in the respect that they had all qualified for an elite age championship level of competition. Of course within this level of competition there would be a high degree of relative dispersion.

The primary goal of this study was to see if selected psychological measures could reliably discriminate between three distinct levels of manifest, or objective performance outcomes operationalized as resilient, non-resilient and successful performances, in a sample of adolescent competitive swimmers. Using measures of social support (MSPSS) coping skills (ACSI) and self-

concept (PSDQ) we were able to obtain a significant discriminant function, most clearly discriminated between resilient performers and the other two categories. The present findings provide support for Garmezy's (1987) proposition that stress-resistant (resilient) individuals display high levels of self-esteem and positive coping mechanisms. Surprisingly mixed results were found for the role of social support with the finding that resilient performers reported lower perceived levels of social support from significant others than did resilient and initially successful performers. The findings add to the body of evidence that supports a psychological component to performance resilience in sport, be it short term (Seligman et al., 1990) or long term (Taylor, 1988; Grove & Heard, 1997). In particular the present study emphasizes the importance of positive self-perceptions (self-concept) as well as the presence of effective psychological skills (coping styles) in assisting the athlete to rebound from short-term performance deterioration. The results regarding social support are much less clear however. The finding that lower perceptions of social support were reported by the participants displaying performance resilience is contrary to existing literature from outside of the field of sport performance. Obviously more work remains to be done to clarify the nature and role of social support with respect to sport performance.

References

- Anthony, E. J. (1987). Risk, vulnerability and resilience: An overview. In E. J. Anthony & B. Kohler (Eds.), *The invulnerable child* (pp. 3-48). New York: Guildford Press.
- Baumeister, R. F. (1991). *Escaping the self: Alcoholism, spirituality, machoism, and other flights from the burden of selfhood*. New York: Basic Books.
- Block, J., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behaviour. In W. W. Collins (Ed.), *Development of Cognition, Affect and Social Relations*. Hillsdale, N.J.: Erlbaum.
- Braddock, J. H., Royster, D. A., Winfield, L. F., & Hawkins, R. (1991). Bouncing back: Sports and academic resilience among African-American males. *Education and Urban Society*, 24, 113-131.
- Cedarblad, M., Dahun, L., Hagnell, O., & Hanson, K. (1995). Intelligence and temperament as protective factors for mental health. A cross-sectional and prospective study. *European Archives of Psychiatry and Clinical Neuroscience*, 245, 11-19.
- Diekhoff, G. (1992). *Statistics for the Social and Behavioural Sciences: Univariate, Bivariate, Multivariate*. Dubuque, IA: Wm. C. Brown.
- Dyer, J. G., & McGuinness, T. M. (1996). Resilience: analysis of the concept. *Archives of Psychiatric Nursing*, 10, 276-282.
- Garnezy, N. (1987). Stress, competence, and development: Continuities in the study of schizophrenic adults, children vulnerable to psychopathology and the search for stress resilient children. *American Journal of Orthopsychiatry*, 57, 159-174.
- Grove, R. J., & Heard, N. P. (1997). Optimism and sport confidence as correlates of slump related coping among athletes. *The Sport Psychologist*, 11, 400-410.
- Marsh, H. W. (1996). Construct validity of Physical Self-Description Questionnaire responses: Relations to external criteria. *Journal of Sport and Exercise Psychology*, 18, 111-131.
- Marsh, H. W., Richards, G. E., Johnson, S., Roche, L., & Tremayne, P. (1994). Physical Self-Description Questionnaire: Psychometric properties and a multitrait-multimethod analysis of relations to existing instruments. *Journal of Sport and Exercise Psychology*, 16, 270-305.
- Patterson, E. L., Smith, R. E., Everett, J. J., & Ptacek, J. T. (1998). Psychosocial factors as predictors of ballet injuries: Interactive effects of life stress and social support. *Journal of Sport Behaviour*. 21, 101-112.
- Peterson, C. (2000). The future of optimism. *American Psychologist*, 55(1), 44-55.

Richardson, G. E., Neiger, B. L., Jensen, S., & Kumpfer, K. L. (1990). The resiliency model. *Health Education, 21*, 33-39.

Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*, 598-611.

Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57*, 316-331.

Schinke, R. J. & da Costa, J. (2001). Understanding the development of major games competitors' explanations and behaviours from a contextual viewpoint. *Athletic Insight, 3*(3). Available on the World Wide Web:
<http://www.athleticinsight.com/Vol3Iss3/ExplanationDevelopment.htm>.

Seligman, M.E., Nolen-Hoeksema, S., Thornton, N. & Thornton, K.M. (1990). Explanatory style as a mechanism of disappointing athletic performance. *Psychological Science, Vol 1*(2), Mar 1990, pp. 143-146

Smith, R. E. (1989). Athletic stress and burnout: Conceptual models and intervention strategies. In D. Hackfort & C. D. Spielberger (Eds.), *Anxiety In Sports - An International Perspective* (pp. 183-201). New York: Hemisphere .

Smith, R. E., & Christensen, D. S. (1995). Psychological skills as predictors of performance and survival in professional baseball. *Journal of Sport and Exercise Psychology, 17*, 399-415.

Smith, R. E., Schutz, R. W., Smoll, F. L., & Ptacek, J. T. (1995). Development and validation of a multidimensional measure of sport-specific psychological skills: The Athletic Coping Skills Inventory-28. *Journal of Sport and Exercise psychology, 17*, 379-398.

Smith, R. E., Smoll, F. L., & Ptacek, J. T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support and coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology, 58*, 360-370.

Smith R.E., Ptacek J.T., Smoll F.L., (1992) Sensation seeking, stress, and adolescent injuries: a test of stress-buffering, risk-taking, and coping skills hypotheses. *Journal of Personality and Social Psychology 62*, 1016-1024.

Tabachnick, B. G., & Fidell, L. S. (1996). *Using Multivariate Statistics*. (3rd ed.). New York: Harper Collins.

Taylor, J. (1988). Slumpbusting: A systematic analysis of slumps in sports. *The Sport Psychologist, 2*, 39-48.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment, 52*, 30-41.

Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, 55, 610-617.