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Use of the Athletic Coping Skills Inventory for Prediction of Performance in Collegiate Baseball

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Abstract

The Athletic Coping Skill Inventory (ACSI-28) was completed by twenty-six collegiate baseball players. Performance statistics were collected, including batting average (BA), number of errors committed (ERR), and earned run average (ERA) for pitchers. Regression analysis was carried out using the seven areas of the ACSI-28 (peaking under pressure, freedom from worry, coping with adversity, concentration, goal setting and mental preparation, confidence and achievement motivation, and 'coachability') as the independent variables, and the current season's performance statistics as the dependent variables. Correlation coefficients revealed significance between concentration, confidence, and ERA, while there were no significant relationships with BA or ERR and any of the psychological variables. Many of the psychological variables were highly related. While sequential linear regression did not reveal statistically significant relationships between the performance statistics and the psychological variables, large effect sizes indicated a strong degree of practical significance. Specifically, peaking under pressure and 'coachability' appeared to be strong predictor variables for ERA, concentration for ERR, and 'coachability' for BA.

Introduction

Athletes and theorists in human performance agree on the influence of psychological factors in the performance of motor skills, particularly at a high level of competition. As a result, an abundance of research has been dedicated to finding out not only how to prepare athletes mentally for high-pressure situations, but also what psychological factors are specifically determinants of performance. The link between research and application is of great importance because the business of sports is at an all-time peak and athletes from early childhood to advanced age are seeking ways to improve their game not only physically but mentally.

The use of self-reporting instruments that indicate specific psychological skills is widespread, especially in collegiate and professional athletics. Because of the comparable levels of physical abilities among top-tier athletes, coaches seek to understand which psychological factors separate the elite from the non-elite. In sports where "choking" may cost a player or team a championship ring or millions of dollars, it is understandable that non-invasive, simple indicators of psychological skill measures have become popular.

The baseball skills of pitching, hitting, and fielding are arguably as mental as they are physical. Pressure can affect a pitcher at any point in the game; managers and pitching coaches make it their business to "know" which pitchers will crumble under pressure and which will rise to the occasion. Certainly, if a method for predicting correctly the mental toughness (coping, if you will) of an athlete was shown to be valid and reliable, it would be of great benefit to coaches, managers, and athletes alike.

The Athletic Coping Skills Inventory (ACSI-28), created in 1988, contains seven sport specific subscales: coping with adversity (COPE), peaking under pressure (PEAK), goal setting/mental preparation (GOAL), concentration (CONC), freedom from worry (FREE), confidence and achievement motivation (CONF), and 'coachability' (COACH) (Smith, Schutz, Smoll,

& Ptacek, 1995). Smith and Christensen (1995) defined the subscales as follows as they apply to the sport of baseball:

> Peaking under Pressure: is challenged rather than threatened by pressure situations and performs well under pressure; a clutch performer
> Freedom from Worry: does not put pressure on self by worrying about performing poorly or making mistakes; does not worry about what others will think if he/she performs poorly
> 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
> Concentration: not easily distracted; able to focus on the task at hand in both practice and game situations, even when adverse or unexpected situations occur
> Goal Setting and Mental Preparation: sets and works toward specific performance goals; plans and mentally prepares self for games and clearly has a "game plan" for pitching, hitting, playing hitters, base running, and so on
> Confidence and Achievement Motivation: is confident and positively motivated; consistently gives 100% during practice and games and works hard to improve skills
> 'Coachability': open to and learns from instruction; accepts constructive criticism without taking it personally or becoming upset (p. 402).

Smith and Christensen (1995) studied the usefulness of the ACSI as a performance prediction tool in an elite athlete population, namely professional baseball players. The participants were 104 minor league baseball players (forty-seven pitchers and fifty-seven position players) of the Houston Astros organization. Participants completed the ACSI during spring training; batting averages (BA) for the position players and earned run averages (ERA) for the pitchers were used as performance indicators. For position players, only CONF was a significant predictor of BA, while ERA for pitchers correlated significantly with CONF and PEAK scores. High CONF and PEAK scores were related to lower ERA's. Interestingly, ACSI results were predictive of survival in professional baseball two and three years after the testing was conducted and ACSI predicted ERA better than coaches' ratings of physical skill.

Guarnieri, Bourgeois, and LeUnes (1998) used the ACSI with aspiring baseball umpires at three professional umpire training schools in Florida. They found that the more experienced umpires used athletic coping skills more effectively than did those in training. Little research has been done with the ACSI recently, other than the development of a Greek version in 1998 (Goudas, Theodorakis, and Karamousalidis), and its usefulness as a predictive tool for success in sport may remain to be seen.

The purpose of the current study was to examine the usefulness of the ACSI in predicting BA, ERA, and errors (ERR) for collegiate baseball players. The seven skills identified by the ACSI at surface level appear to be related not only to each other, but also to success in discrete motor skills in baseball that are always performed in the context of pressure: batting, pitching, and fielding.

Method

Participants

Participants were twenty-six collegiate baseball players from the same team that were active players during the 2005 season (twelve pitchers, thirteen position players, and one pitcher/position player). The players signed a consent form that assured them that their responses would only be used for research purposes and would not be seen by any member of the organization or any other individual other than the investigators. None of the athletes had played baseball professionally.

Procedure

The ACSI (see Appendix) was distributed to the players at a regular meeting of the team and instructions were read by the investigator. After the participants signed and returned an informed consent form, they completed the ACSI-28. Participants were instructed to consider each item and answer

without consulting any other individuals. The procedure took about ten minutes, and all participants completed the instrument as instructed. Each participant also indicated on the instrument his/her position, year of eligibility, and scholarship status (full, partial, or none). Statistics from the 2005 baseball season were collected; batting average (BA), number of errors committed (ERR), and earned run average (ERA) for pitchers were computed.

Statistical Analysis

The statistical analyses were carried out in three stages using SPSS version 13.0 for windows (SPSS, 2004). First, data screening and descriptive statistics were completed to examine participant characteristics. Regression analysis was carried out using the seven areas of the ACSI (COPE, PEAK, GOAL, CONC, FREE, CONF, and COACH), as the independent variables, and the current season's earned run average (ERA05), and batting average (BA05) as the dependent variables. The primary outcome measures were analyzed using three separate regression analyses. Differences (*p* values) of less than .05 were considered statistically significant.

Results

After data collection, all variables were entered for analysis and screened to determine if statistical assumptions were met. This screening included examinations for distribution linearity and outliers. All statistical assumptions were met for the variables.

In the current study, baseball players were broken down by position, scholarship, and class level. Of this group, 54% were pitchers (n = 14), 23% were infielders (n = 6), and 23% were outfielders (n = 6). Only one athlete did not receive a scholarship; 85% percent of the athletes were on partial scholarships (n = 22), and 11% were on full scholarships (n=3). Lastly, 27% were freshman (n = 7), 19% were sophomores (n = 5), 19% were juniors (n = 5), and 35% were seniors (n = 9). When examining the relationships between variables, Pearson Product moment correlation coefficients revealed significance between CONC, CONF, and ERA05, while there were no significant relationships with BA05, ERR05, and any of the independent variables (Table 1). For the psychological skills variables, COPE was significantly related to PEAK, GOAL, and CONC. PEAK was significantly related to CONC and FREE. Lastly, CONF, COACH, GOAL, and CONC were significantly related. These correlations were moderately correlated, and ranged from r = 0.444 - 0.541 (see Table 1).

Table 1. Descriptive statistics and correlation coefficients between ACSI variables and performance statistics.

Variable	M	SD	AVG04	AVE05	ERA05	ERR05	COPE	PEAK	GOAL	CONC	FREE	CONF	COACH
BA05	0.30	0.13	0.50	----									
ERA05	6.98	2.70	0.32	NA	----								
ERR05	4.00	3.99	NA	0.34	NA	----							
COPE	2.04	0.48	-0.34	-0.13	-0.16	0.03	----						
PEAK	2.41	0.57	-0.34	-0.19	-0.23	-0.03	.521*	----					
GOAL	1.74	0.71	-0.19	-0.30	0.11	-0.17	.541*	0.32	----				
CONC	2.41	0.41	-0.19	-0.17	-0.08	-0.41	.444*	.606*	.485*	----			
FREE	1.74	0.73	0.08	-0.01	-0.12	-0.10	0.22	.447*	0.02	0.33	----		
CONF	2.63	0.39	-0.24	-0.02	0.22	0.14	-0.07	0.31	0.01	0.13	.408*	----	
COACH	2.52	0.48	0.25	0.31	0.37	0.23	-0.13	0.17	-0.10	0.05	0.31	.408*	----

*p<.05

Sequential linear regression was used to determine significant psychological predictors of ERA05 , ERR05, and BA05. There was not a statistically significant relationship among the predictors and ERA05, $F(7,6) = .507$, $p = .802$. A large effect size was evident, $R^2 = .37$, indicative of a strong degree of practical significance. Peaking and coaching appear to be stronger predictor variables, each uniquely accounting for 5% of the variance in the model (see Table 2).

Table 2
Results of Multiple Regression Analysis

Variable	B	SE B	ß	sr2
Regression for ERA				
coping with adversity	0.53	3.06	0.13	0.00
peaking under pressure	-2.24	3.04	-0.54	0.05
goal setting/motivation	0.39	2.28	0.10	0.00
concentration	-0.26	2.50	-0.06	0.00
freedom from worry	-0.41	1.80	-0.12	0.01
confidence	1.86	3.67	0.45	0.03
'coachability'	2.02	2.84	0.47	0.05
Regression for Errors				
coping with adversity	4.77	4.22	0.74	0.07
peaking under pressure	3.25	3.08	0.67	0.06
goal setting/motivation	-0.98	2.44	-0.18	0.01
concentration	-11.45	3.95	-1.87	0.49
freedom from worry	-0.25	2.58	-0.05	0.00
confidence	0.82	2.76	0.16	0.01
'coachability'	3.77	2.58	0.72	0.12
Regression for Batting Average				
coping with adversity	0.19	0.18	0.84	0.10
peaking under pressure	-0.09	0.13	-0.51	0.04
goal setting/motivation	-0.08	0.10	-0.39	0.05
concentration	-0.01	0.17	-0.03	0.00
freedom from worry	0.03	0.11	0.16	0.01
confidence	-0.09	0.12	-0.48	0.05
'coachability'	0.14	0.11	0.79	0.15

There was not a statistically significant relationship among the predictors and ERR05, $F(7,7) = 1.46$, $p = .315$. A large effect size was evident, $R^2 = .59$, indicative of a strong degree of practical significance. CONC was the strongest predictor, uniquely accounting for 49% of the variance to the model. COACH was also a strong predictor, uniquely accounting for 12% of the variance to the model. COPE uniquely accounted for 7% of the variance to the model. PEAK uniquely accounted for 6% of the variance to the model.

There was not a statistically significant relationship among the predictors and BA05, $F(7,7) = .60$, $p = .745$. A large effect size was evident, $R^2 = .37$, indicative of a strong degree of practical significance. COACH was the strongest predictor, uniquely accounting for approximately 15% of the variance to the model. COPE uniquely accounted for 9% of the variance to the model. GOAL and CONF each uniquely accounted for 5% of the variance to the model.

Discussion

The results of this exploratory study indicate that the usefulness of the ACSI in predicting performance outcomes in collegiate baseball may be of benefit. Due to the small sample size of this study, coupled with the large number of predictor variables, no statistical significance was found in any of the relationships. However, the large effect sizes for all three criterion variables were indicative of a strong degree of practical significance. Specifically, concentration appears to be strongly related to errors, and 'coachability' to batting average. To even a casual observer of baseball, this observation may seem to be simply common sense. The usefulness of the ACSI-28 may be designed for managers of relatively young teams where batting order, starting positions, and pitching strategies have not yet been determined. If a coach knows (with some certainty) which players are can be coached and which can maintain high levels of concentration, the coach's decisions can be based more on fact than feeling. Please note that the use of the ACSI does not guarantee success of the athletes who complete it or coaches who make decisions based on it. However, I strongly suggest that managers take advantage of these findings and add the ACSI-28 to their arsenal for strategic decision-making.

Future research in this area should focus on obtaining larger sample sizes. An increase in statistical power would likely identify statistically significant relationships, given the meaningfulness of the predictor variables

in this study.

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Appendix

ACSI SURVEY
NAME:
POSITION: OF INF P C
YR: F SO JR SR
SCHOLARSHIP: NONE PARTIAL FULL

0 = ALMOST NEVER, 1 = SOMETIMES, 2 = OFTEN, 3 = ALMOST ALWAYS

1. On a daily or weekly basis, I set very specific goals for myself that guide what I do. 0 1 2 3
2. I get the most out of my talent and skills. 0 1 2 3
3. When a coach or manager tells me how to correct a mistake I've made, I tend to take it personally and feel upset. 0 1 2 3
4. When I am playing sports, I can focus my attention and block out distractions. 0 1 2 3
5. I remain positive and enthusiastic during competition, no matter how badly things are going. 0 1 2 3
6. I tend to play better under pressure because I think more clearly. 0 1 2 3
7. I worry quite a bit about what others think about my performance. 0 1 2 3
8. I tend to do lots of planning about how to reach my goals. 0 1 2 3
9. I feel confident that I will play well. 0 1 2 3
10. When a coach or manager criticizes me, I become upset rather than helped. 0 1 2 3
11. It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to. 0 1 2 3
12. I put a lot of pressure on myself by worrying how I will perform. 0 1 2 3
13. I set my own performance goals for each practice. 0 1 2 3
14. I don't have to be pushed to practice or play hard; I give 100%. 0 1 2 3
15. If a coach criticizes or yells at me, I correct the mistake without getting upset about it. 0 1 2 3
16. I handle unexpected situations in my sport very well. 0 1 2 3
17. When things are going badly, I tell myself to keep calm, and this works for me. 0 1 2 3
18. The more pressure there is during a game, the more I enjoy it. 0 1 2 3
19. While competing, I worry about making mistakes or failing to come through. 0 1 2 3

20. I have my own game plan worked out in my head long before the game begins. 0 1 2 3
21. When I feel myself getting too tense, I can quickly relax my body and calm myself. 0 1 2 3
22. To me, pressure situations are challenges that I welcome. 0 1 2 3
23. I think about and imagine what will happen if I fail or screw up. 0 1 2 3
24. I maintain emotional control no matter how things are going for me. 0 1 2 3
25. It is easy for me to direct my attention and focus on a single object or person. 0 1 2 3
26. When I fail to reach my goals, it makes me try even harder. 0 1 2 3
27. I improve my skills by listening carefully to advice and instruction from coaches and managers. 0 1 2 3
28. I make fewer mistakes when the pressure's on because I concentrate better. 0 1 2 3