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Self efficacy, locus of control, and physical ability

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Abstract

This research investigated the relationship among two personality variables- locus of control (LOC) and self efficacy (SE)- and perceptions of physical ability for a specific sport. In the first phase of the research, tennis players (12-14 year old males), their parents, their coaches, and three objective raters were asked to rate the players' physical talent. In phase two the players were ranked by a computer that based the rankings on their overall performance for a year. After these rankings were published the same groups were again asked to rate the players' physical talent. The ratings are compared to each other and in relation to SE and LOC.

Self Efficacy, Locus of Control, and Athletic Ability

Introduced by Bandura (1977) the self efficacy theory deals with an individual's perceived coping ability in a given situation. Persistence in an activity is mediated by the level of self efficacy that an individual possesses. Self efficacy is learned, according to Bandura, from accomplishments and experiences. It is further modified through feedback from other sources such as parents and peers. Bandura divides self efficacy into four categories: social, cognitive, linguistic, and physical. The latter, physical is the most pertinent to this study.

An actual physical self efficacy scale has been developed by Ryckman,Robbins, Thornton, and Cantrell (1982) in an attempt to measure physical self concept. The study shows that individuals with high levels of perceived physical self efficacy have higher self esteem, are internally oriented on the locus of control scale, have a lack of social anxiety and self consciousness, and participate in dangerous or adventuresome activities as compared to their counterparts-individuals with low physical self efficacy. Ryckman's Physical Self Efficacy Scale (PSE) has also been found to be valid and reliable

(McAuley and Gill, 1983) with a group of gymnasts.

There are many factors that can influence an individual's self efficacy (Minor and Roberts, 1984; White, 1959; Barling and Abel, 1983), yet two that have had very little focused research are task difficulty and the individual's involvement in the task.

Bandura (1977; Bandura, Adams, & Beyer, 1977; Bandura, Adams, Hardy, & Howells, 1980) has done the most extensive research with the concept of self efficacy in relation to involvement. Bandura et al (1977; 1980) worked with snake phobics and used self efficacy as a measure of improvement. The degree of involvement in the task- learning to be tolerant of snakes- was high. This is so because of the anxiety that was caused by being around the feared object. Some phobics could not look at a picture of a snake without being overcome by extreme fear and/or revulsion. As the phobics became desensitized to the dreaded objects, their levels of self efficacy rose. In other words, their perceived coping ability increased as a result of the treatment.

Anxiety reflects involvement in a task and a study was done that measured female athletes anxiety level

prior to competition (Huddleston and Gill, 1981). It was found that skill level interacts with competitive anxiety. Less skilled athletes were more anxious prior to competition than were the more skilled athletes.

Another study involved children's learning of mathematic skills (Schunk, 1983). It was found that rewards that were contingent upon performance, as opposed to rewards for participation or no reward, produced the most rapid problem solving and acquisition of mathematic skills. Involvement can be seen here as the child who performs best because he or she knows that correct actions will result in a reward. The children became more involved and their levels of self efficacy rose if they were rewarded on a performance contingent basis. Yet another study that ties self efficacy and involvement together was conducted with college students to test their perceived levels of self efficacy (Rebok and Offermann, 1983). Students who perceived themselves as having high levels of self efficacy participated in exciting and adventurous activities as opposed to those possessing low levels of perceived self efficacy. Stated differently, because of their high levels of self efficacy, the first group was more involved

in physical activities than were students with lower levels of perceived self efficacy.

Schunk (1981) found that perceived self efficacy is an accurate predictor of performance across different levels of task difficulty. The subjects used were children who showed lower than average arithmetic skills. They were exposed to a modeling learning situation or didactic instruction and practice. Both methods increased efficacy and performance. The levels of difficulty increased with time, and the experimenter was able to accurately predict performance through perceived efficacy. Bandura and Adams (1977) posited that by using self efficacy, behavior could be predicted on tasks with varying degrees of difficulty. Once again the subjects were snake phobics and the levels of difficulty ranged from watching a film about snakes to actually handling a snake. The individuals' perceived self efficacy was recorded in the test situations, and it was found to accurately predict their behavior in these situations.

Very little work has been done in relation to sports and self efficacy. Barling and Abel (1983) conducted a self efficacy study with forty tennis players as subjects.

Players rated their own skill levels and were also rated by external raters. The subjects also filled out a questionnaire that revealed their levels of self efficacy. The results were correlated, and it was found that players who were rated as highly skilled- both by themselves and by the external raters- had higher self efficacy levels. Personal mastery was postulated to be the factor that mediated self efficacy. In other words, the higher the levels of mastery are, the higher the levels of self efficacy are. Just as Bandura (1977) suggested, successes were found to be motivating forces. In the above discussed study and the following, self efficacy is related to behavior. The following experiment deals with tennis players and self efficacy. The factors to be investigated are whether one's self efficacy is effected differentially for those who have greater or lesser involvement in the activity.

Several hypothesis among the variables are explored. It is expected that the players' physical talent will show high correlations with the players' self rating of physical talent, the coaches' rating of physical talent, the parents' rating of physical talent, and the computer

rank of the players' standings at the end of the season. SE and LOC are expected to have a strong relationship with the players' self rating of physical talent and a significant yet not as strong relationship with both coach and parent ratings. The ratings are also hypothesized to interact and, therefore, to show a good correlation. LOC and SE are expected to have an indirect effect on coaches' and parents' ratings of the players' physical ability as well as a weak yet noticeable effect on the computer rank. These hypothesized relationships are explored in the following study,

Method

Subjects

The subjects consisted of thirty male junior tennis players ranging in ages from 12 years and 6 months to 14 years and 2 months of age. They were all members of the fourteen and under division of the Mid Atlantic Tennis Association. The players' coaches and parents were also included in the study. All subjects were white and would be considered middle to upper middle class.

Materials and Procedure

Letters requesting participation were sent to 55

families and of those 36 replied. Full data were collected on 30 subjects. All participants signed consent forms that gave a limited description of the study.

Parents (PPRT), coaches (PCRT), and players (PPRT) were interviewed and asked to rate the player's physical talent on a percentile scale relative to all of the players competing in the 14 and under division of the Mid Atlantic Tennis Association. Three objective raters who were college tennis coaches also rated the players physical talent on a percentile scale (PORT). The interrater correlation was .87, and the rating used was the average of the three raters' scores. All the percentiles were rounded to the nearest 5.

Locus of control (LOC) was measured by the Nowicki-Strickland Locus of Control scale (Nowicki and Strickland, 1973). It is a 40 item scale answered by yes or no responses. High scores show external orientation or the propensity to attribute wins and losses to external causes such as luck or fate. Low scores indicate an internal orientation or the tendency to attribute wins and losses to internal causes and the self. With the original testing sample of 1,017 third to twelfth grade students, an internal

consistency of .68 for grades 6-8 was established. The validity was established by correlations with both the Intellectual Achievement Responsibility Questionnaire (r= .51) (Crandall, Katkovsky, and Crandall, (1965) and the Bialer Cromwell scale (r=.41) (Bialer, 1961). Self efficacy (SE) was measured by the Physical Self Efficacy scale developed by Ryckman, Robbins, Thornton, and Cantrell (1982). This test is a Likert scale ranging from 1 (strongly agree) to 6 (strongly disagree). It measures the degree of an individual's perceived physical competence. The internal consistency as obtained on a sample of 83 undergraduates at the University of Maine is .82. With the same sample the test-retest reliability was found to be .80. This scale also correlates highly with other measures of self concept. Among the validity correlations was one with the Tennessee Physical Self-Concept Scale (Fitts, 1965) which attained a correlation of r=.41.

Data were gathered after the first one third of the season. At the end of the season computer rankings were collected from the Mid Atlantic Tennis Association computer and were used as rank values (R values). These

values were calculated by an iterative process that took the player's wins and losses along with the level of the opponents' achievement. After publication of these rankings, players (SRT), parents (PRT), coaches (CRT), and three new objective raters (ORT) were again asked to rank the players' physical talent.

Results

The means and standard deviations of the variables were calculated and are displayed in Table 1.

Insert Table 1 about here

The correlations among all of the variables were also computed using a Pearson Product and are shown in Table 2.

Insert Table 2 about here

Discussion

The data produced several interesting relationships. SE and LOC displayed a high negative correlation at $P < .05$ ($r = -0.8665$). Individuals who score high on the LOC

scale are external (those who feel that they do not have much control over events in their lives) and individuals who score high on the SE scale have high levels of perceived coping ability. The negative correlation between the two accurately represents this interpretation of the scales. Interestingly enough, SE did not interact with either of the parent ratings of physical ability. It seems, then, that parents can separate personality variables from physical ability. Parents may recognize that levels of SE and LOC exist in some capacity in their child's personality and that they may interact with physical ability, but the parents are able to delineate the criteria in rating their children. LOC did not correlate with PPRT or PRT thus reinforcing this idea.

It is also interesting to note that SE correlated with both PORT and ORT and that LOC showed a significant correlation with ORT. The objective raters are supposed to be just that- objective. Their instructions were to rate the players' physical talent. It seems then that the raters look at criteria other than physical talent. Their cues are different than the ones the parents observe. It is possible that the objective raters recognized

the interaction of SE, LOC, and physical talent. Perhaps the raters observed the players' actions prior to the match. The players may have exhibited aggressive or confident behavior that led the raters to give higher ratings based on these other cues. The opposite may also be true.

Similarly, SE correlated with PCRT and CRT. Like the objective raters, coaches attend to physical talent as well as to other cues. They may recognize the relationship between the two variables as an important one. It seems likely that the coaches would do this for they spend large amounts of time with the players and are, therefore, familiar with their personalities. Contrary to this idea is the fact that SE and PPRT and PRT do not correlate.

As expected, SE and PSRT and SRT correlated at a significant level. Like the coaches, it seems as though it would be hard for the players to delineate between physical talent and personality variables. Once again, perhaps the players recognize the interaction between SE and physical ability. The two seem to be intertwined. Contrary to the original hypothesis, LOC did not interact with PSRT and SRT. THe players may not be as aware of

their LOC orientation as they are of their SE orientation.

Another interesting finding is that the R Value, or the computer ranking correlated with every other variable. The computer calculates the players' rank based on wins, losses, and the opponents' ability. Physical ability has a direct effect on these three variables. The SE and LOC correlations indicate that both SE and LOC have some effect on the players' abilities. Further research needs to be done on what exactly these effects are. One would suppose that those with high levels of SE and physical talent as opposed to those with a low level of SE and a high level of physical talent would be more likely to win in the face of difficult circumstances. Another interesting study could involve the players' LOC orientation (internal or external) in relation to PSRT and SRT. Obviously, there needs to be more in depth research on the effect of personality variables such as SE and LOC on physical ability and ratings of physical ability.

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Table 1

Means and Standard Deviations

	MEAN	STANDARD DEVIATION
SE	15.80	2.61
LOC	14.03	2.93
PSRT	57.50	24.66
PPRT	65.50	19.36
PCRT	63.50	21.46
PORT	50.50	28.36
R VALUE	498.40	71.20
SRT	60.17	23.69
PRT	63.50	20.35
CRT	63.50	19.39
ORT	49.17	26.88

Table 2 Pearson Product Correlations

	SE	PSRT	LOC	PPRT	PCRT	PORT
SE	*	.45	-0.87	.08	.48	.56
PSRT	.45	*	-0.11	.64	.70	.81
LOC	-0.87	-0.11	*	.16	-0.27	-0.30
PPRT	.08	.64	.16	*	.72	.67
PCRT	.48	.70	-0.27	.72	*	.89
PORT	.56	.81	-0.30	.67	.89	*
R VALUE	.72	.65	-0.56	.56	.81	.82
SRT	.41	.87	-0.15	.66	.75	.85
PRT	.10	.60	.11	.84	.54	.56
CRT	.39	.66	-0.15	.71	.82	.88
ORT	.57	.79	-0.31	.64	.85	.98

Table 2 continued

	R VALUE	SRT	PRT	CRT	ORT
SE	.72	.41	.10	.39	.57
PSRT	.65	.87	.60	.66	.79
LOC	-0.56	-0.15	.11	-0.15	-0.31
PPRT	.56	.66	.84	.71	.63
PCRT	.81	.75	.54	.82	.85
PORT	.81	.85	.56	.88	.98
R VALUE	*	.76	.51	.75	.82
SRT	.76	*	.62	.73	.84
PRT	.51	.62	*	.68	.54
CRT	.75	.73	.68	*	.87
ORT	.82	.84	.54	.87	*