The purpose of the present investigation was to determine the relationship between competitive trait anxiety (CTA), state anxiety, and golf performance in a field setting. Ten low, moderate, and high CTA collegiate golfers \( (N = 30) \) performed in a practice round on Day 1 and Day 2 of a competitive tournament. State anxiety results indicated a significant CTA main effect with low CTA subjects displaying lower state anxiety than moderate or high CTA subjects. The competition main effect was also significant, with post hoc tests indicating higher levels of state anxiety during Day 1 and Day 2 than during the practice round. Performance results produced a significant CTA main effect with low CTA subjects displaying higher levels of performance than moderate or high CTA subjects. Correlations between SCAT and state anxiety indicated that SCAT was a good predictor of precompetitive state anxiety. The direction of state anxiety and performance CTA main effects provide support for Oxendine's (1970) contentions that sports requiring fine muscle coordination and precision (e.g., golf) are performed best at low levels of anxiety. Future directions for research are offered.

The effect of anxiety on motor performance has been a topic of great concern to both practitioners and researchers. For the most part, studies investigating the anxiety-motor performance relationship have been laboratory in nature. However, several sport psychologists (e.g., Alderman, 1979; Martens, 1979) have recently emphasized the need for more relevant field research in order to better understand the complex social interactions inherent in sport competition. Furthermore, the richness of field settings is important when one is interested in increasing the potency of an independent variable. This is particularly relevant for testing the anxiety-motor performance relationship because higher levels of anxiety can be obtained when one is placed in a situation which is ego-involving, important, and evaluative (Martens, 1977). A field setting which captures the intricate social milieu in which an athlete participates can meet these criteria. Although there recently have been some field studies investigating the relationship between anxiety and motor performance (e.g., Ahart, 1973; Fenz, 1975;

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This study was conducted by the second author in partial fulfillment of the requirements of the M.S. degree in Physical Education at North Texas State University.

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Kauss, 1978; Klavora, 1978; Lowe, 1973), there is a further need for examining the effects on anxiety in competitive settings. Therefore it was the purpose of the present investigation to determine the effects of anxiety on the performance of collegiate golfers.

Along these lines, Oxendine (1970) has speculated that the optimal level of arousal varies, based on the requirements of the task. More specifically, Oxendine argues that a high level of arousal is essential for optimal performance in gross motor activities involving strength and endurance whereas a low level of arousal is optimal for tasks requiring fine muscle movements, coordination, precision, steadiness and concentration. Finally, for skills requiring a combination of the above a moderate level of arousal is optimal. Although golf requires some strength (e.g., driving), it predominately is a game which requires precision, coordination, and fine muscle movements. Thus, it was predicted that optimal golf performance would be exhibited at low levels of arousal.

To test this hypothesis, collegiate golfers who scored either low, high, or moderate on Martens's (1977) Sport Competition Anxiety Test (SCAT) were selected, and state anxiety was assessed prior to one practice round and two competitive rounds of golf. SCAT is a situationally specific measure of trait anxiety which measures an individual's "tendency to perceive competitive situations as threatening and to respond to these situations with feelings of apprehension and tension" (Martens, 1977, p. 21). Consequently, it has been shown that SCAT is a better predictor of precompetitive state anxiety than more general trait anxiety measures (Martens, 1977). Thus, it was hypothesized that low SCAT golfers would exhibit lower levels of precompetitive state anxiety and better performance than moderate or high SCAT golfers.

Method

Subjects

SCAT was administered to 63 male intercollegiate golfers who participated in a tournament held at North Texas State University. From this sample, 10 high (upper 25%), 10 moderate (between 40% and 60%) and 10 low (lower 25%) SCAT golfers were selected. Subjects' performance (i.e., 18 hole score) and state anxiety were recorded during a practice noncompetitive round, and on the first and last day of competition. Thus the design was a $3 \times 3$ (CTA by competitive conditions) with CTA a between-subjects factor and the competitive condition a within-subjects factor.

Procedure

Golfers played a practice round which was followed by three consecutive

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1Although there are some differences, state anxiety is closely associated with the concept of arousal (Martens, 1977). In fact, besides physiological assessments, many researchers have operationalized arousal with measures of state anxiety. This has been done in the present investigation and thus the terms state anxiety and arousal will be used interchangeably.
competitive rounds. SCAT was administered to all golfers approximately 1 hour before the practice round. Spielberger, Gorsuch, and Luschene's (1970) state anxiety test was administered to the 30 high, low, and moderate SCAT subjects 15 minutes before the practice round, the first day of competition, and the last day of competition. State anxiety during the practice round was assessed in order to compare the relationship between anxiety and golf performance in noncompetitive as well as competitive conditions. Because coaches requested that their athletes not be tested on all three competitive rounds, it was decided that the first and last day of the tournament would provide the most relevant information concerning changes in state anxiety.

Results and Discussion

State Anxiety

A $3 \times 3$ (CTA by competitive condition) ANOVA with repeated measures on the second factor was used to investigate differences in state anxiety. Results indicated a significant CTA main effect, $F(2, 27) = 7.76, p < .002$. Scheffé's post hoc tests revealed that high CTA subjects exhibited significantly higher levels of state anxiety ($p < .05$) than moderate or low CTA groups. No significant differences were found between moderate or low CTA groups ($p < .10$) although the means were in the expected direction as presented in Table 1. This is in agreement with Martens's (1977) predictions that high CTA subjects will exhibit higher levels of precompetitive state anxiety than moderate or low CTA subjects. Furthermore, recent research also indicates that high CTA individuals exhibit higher levels of state anxiety than low CTA individuals when placed in evaluative (i.e., competitive) situations (Gill & Martens, 1978; Martens & Gill, 1976; Scanlan, 1977, 1978). Results also indicated a significant competition main effect, $F(2, 54) = 13.67, p < .001$. Post hoc tests showed that significantly higher levels of state anxiety were displayed on the first day of competition ($p < .05$) than the practice round.

Table 1—Means for State Anxiety and Performance

<table>
<thead>
<tr>
<th></th>
<th>Practice</th>
<th></th>
<th>Competition (First day)</th>
<th>Competition (Last day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State anxiety</td>
<td>Performance</td>
<td>State anxiety</td>
<td>Performance</td>
</tr>
<tr>
<td>High anxious</td>
<td>33.6</td>
<td>76.4</td>
<td>39.1</td>
<td>78.2</td>
</tr>
<tr>
<td>Moderate anxious</td>
<td>29.3</td>
<td>77.0</td>
<td>34.6</td>
<td>74.7</td>
</tr>
<tr>
<td>Low anxious</td>
<td>26.1</td>
<td>73.6</td>
<td>29.5</td>
<td>73.3</td>
</tr>
</tbody>
</table>

Note: The higher the performance score the poorer the performance; higher anxiety scores are indicative of greater state anxiety.
or the last day of competition. Furthermore, higher levels of state anxiety were produced on the last day of competition as compared to the practice round ($p < .05$). The CTA by competitive conditions interaction did not reach significance, $F < 1$. These results are consistent with previous research (Klavora, 1978; Martens & Simon, 1976) which has demonstrated increases in state anxiety from noncompetitive to competitive settings. The lower levels of state anxiety on the last day of competition were probably due to the fact that on the first day of competition, all golfers and teams theoretically had an equal opportunity to win or place high in the final standings, whereas on the last day of competition some golfers may have been out of contention which could have caused a decrease in motivation and state anxiety.

**Performance**

The same $3 \times 3$ ANOVA used for state anxiety was employed to investigate differences in golf performance. Results indicated a significant CTA main effect, $F(2, 27) = 12.57, p < .001$. Scheffé's post hoc procedures revealed that low CTA subjects performed significantly better ($p < .05$) than moderate and high CTA subjects. No significant differences were found between the moderate or high CTA subjects although inspection of the means in Table 1 reveals that moderate CTA subjects displayed better performance than high CTA subjects in both competitive rounds. These findings are generally in agreement with the anxiety-motor performance literature which indicates that low trait-anxious subjects perform better than high trait-anxious subjects on complex fine-motor tasks (e.g., Farber & Spence, 1953; Mandler & Sarason, 1952). Moreover, the CTA-performance and state anxiety-performance results, when combined with the CTA-state anxiety results, provide empirical support for Oxendine’s (1970) hypothesis that because golf requires well coordinated movements and precision, low level of arousal would be required for optimal performance. The results of the present investigation support this notion because low CTA subjects exhibited the lowest state anxiety and best golf performance, whereas high CTA subjects exhibited the highest levels of state anxiety along with the poorest golf performance.

Results also indicated a significant competition main effect, $F(2, 54) = 13.67, p < .001$. Post hoc tests showed that subjects performed significantly better during practice and on the first day of competition ($p < .05$) than on the last day of competition. There were no significant differences in performance between practice and the first day of competition. Once again, the interaction effect did not reach significance. These results are consistent with the state anxiety results. Because state anxiety was at its lowest level during the practice round, superior performance would be predicted during practice as compared to the initial day of competition.

In addition, state anxiety-performance results indicated a significant relationship for the first day of competition but not for the practice round. This apparent discrepancy might be due to the fact that the golfers were familiarizing themselves with the course during the practice round, thus depressing perform-
ance when compared to the first day of competition. Another discrepancy was
that performance was poorest on the last day of competition although state
anxiety levels were lower than the first day of competition. An explanation of the
playing conditions on the last day of competition may shed some light on this
inconsistency. It began raining approximately 1 hour before tee-off time and
continued as a drizzle throughout the entire day. Because the rain was
continuous, the majority of golfers were unable to hit any practice balls.
Furthermore, the golf course itself was not in a desirable playing condition and
comments by coaches indicated that this caused a disruption of concentration in
many of their golfers. Thus, with improved playing conditions perhaps
performance results would have improved to better correlate with state anxiety
levels for the last day of competition. Finally, it should be noted that the state
anxiety-performance relationship was slightly stronger than the SCAT-
performance relationship for both days of competition.

In order to further determine the degree of relationship between SCAT, state
anxiety, and performance, Pearson product moment correlations were com-
puted. Results indicated a significant correlation between SCAT and perform-
ance on the first day of competition, \( r = +.45, p < .001 \) and a marginally
significant correlation, \( r = +.27, p < .07 \), on the last day of competition. The
correlation between SCAT and the practice round seemingly contradicts
Martens's contention that SCAT is a better predictor of precompetitive state
anxiety. However, Martens (1975) maintains that a competitive situation exists
when "the comparison of an individual's performance is made with some
standard in the presence of at least one other person who is aware of the criterion
for comparison and can evaluate the comparison process" (p. 69). During the
practice round, golfers played in fivesomes which included teammates and
coaches. Furthermore, each golfer was out in the open while performing and any
mistake was glaringly obvious. Thus, since the opportunity for evaluation by
others was great, the practice round could be considered a competitive setting
which explains the significant correlation between SCAT and state anxiety. It
also should be noted that other studies have also found significant SCAT-state
anxiety relationships in seemingly noncompetitive situations (e.g., Scanlan

Correlational procedures were also employed to determine the relationship
between SCAT and state anxiety. Significant correlations were found for the
practice round, \( r = +.50, p < .002 \), the first day of competition, \( r = +.57,
\( p < .001 \), and the last day of competition, \( r = +.54, p < .001 \). These findings are
in agreement with Scanlan and Passer's (1977) field study investigating the
relationship between SCAT and precompetitive state anxiety for boys competing
in soccer. In addition, other research also supports the contention that SCAT is a
good predictor of precompetitive state anxiety (Gerson & Deshaies, 1978;

Finally, because SCAT is not a perfect predictor of precompetitive state
anxiety, it was desired to directly assess the relationship between state anxiety
and golf performance. A significant correlation was found for the first day of
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competition, \( r = +.54, p < .001 \) and the last day of competition, \( r = +.34, p < .05 \).

In summary, the results of this field study provide empirical support for Oxendine's hypothesis concerning the anxiety-performance relationship. More specifically, it was found that low levels of anxiety facilitate golf performance (a precision skill) whereas high levels of anxiety are detrimental to golf performance. More field studies need to be conducted using a variety of skills ranging from those requiring predominately precision to those requiring mostly strength and endurance. This information would be invaluable for both coaches and athletes who are interested in optimizing their performance. Finally, the significant relationships between SCAT and state anxiety provide further support for the continued use of SCAT in the prediction of precompetitive state anxiety.

References


*Manuscript submitted: 11/15/79
Revision received: 2/13/80*