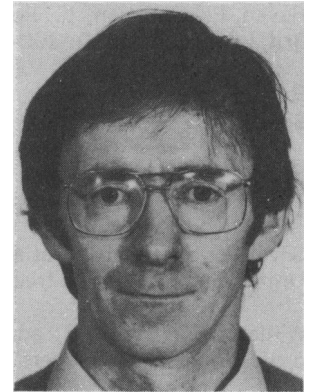




F. H. Sanderson



T. Reilly

TRAIT AND STATE ANXIETY IN MALE AND FEMALE CROSS-COUNTRY RUNNERS

F. H. SANDERSON, PhD and T. REILLY, PhD

Department of Sport and Recreation Studies, Liverpool Polytechnic

ABSTRACT

The purpose of this study was to explore the relationships between state/trait anxiety and competitive cross-country performance for males and females. A-trait and A-state pre- and post-competition were monitored in 38 females and 26 males at major meetings. The females' A-trait was correlated with pre-race A-state ($p < .05$) which was itself correlated significantly with race performance ($p < .05$). A significant post-race A-state reduction occurred only with the better runners. The correlation between A-trait and pre-race A-state was also found in the male athletes ($p < .05$) while A-trait significantly correlated with race performance ($p < .05$). A-state was significantly reduced post-race, the greatest decrease being observed in the top performers. It is concluded that trait as well as transient dispositions are relevant when psychological determinants of performance are considered.

In recent years, there has been increasing focus by researchers on sport competition stress and its effects on performance. Traditionally, this problem has received little direct attention, perhaps largely because of the lack of sensitive measuring instruments which could be used *in situ*. The appreciation by investigators that the personality of the athlete is instrumental in his reactions to competition stress generated numerous studies which have examined trait personality profiles of various kinds of sports competitor. The results of these investigations have been equivocal, partly because of methodological shortcomings (Sanderson, 1978), but also, it is maintained, because the individual's perception of and reaction to stress are mediated by situational and transient personality factors, which may not be predicted from trait characteristics. This situational interpretation of stress reactions has been given useful impetus by the development of phenomenological questionnaires designed to measure state anxiety with minimal inconvenience to the respondent, and allowing repeated applications if required (Spielberger, Gorsuch and Luschene, 1970). Additionally, they have developed a comple-

mentary trait anxiety questionnaire, thus allowing measurement of the relationship between transient and dispositional anxiety reactions, as well as the links between these measures and performance. This approach has tended to replace psychophysiological measures as a criterion of arousal/anxiety because of ease and acceptability of administration in a pre-competitive context. Typically, such questionnaires have been administered to sports participants shortly before and after competition.

A subject indicates strength of feeling about items such as "I feel calm", "I feel tense" on a 4-point scale from "NOT AT ALL" to "VERY MUCH SO". For scoring, extremely non-anxious responses are allocated 1 point and extremely anxious responses, 4 points, which gives a scoring range of 20-80 on each of the questionnaires. The major difference between the questionnaires is the instructions: for the trait version, which is concerned with those characteristics of the individual which are persistent and stable, the subject is asked to indicate how he feels *generally*. For the state

questionnaire which is concerned with transient aspects, the subject indicates how he feels *right now*. A-trait and A-state need not be related, as for example when a normally calm individual (low A-trait) exhibits anxiety reactions (high A-state) in circumstances which he perceives to be stressful.

Gruber and Beauchamp (1979), for instance, measured the changes in pre- and post-match A-states of College women basketballers. Players showed a significant A-state reduction after victory, but after defeat A-state remained at a high level. Moreover, the more crucial games elicited higher pre-match anxiety levels. They concluded that changes in A-state were contingent upon, not only the outcome of the competition, but also the perceived importance of the competition. Similar findings were reported by Sanderson and Ashton (1981) who examined pre- and post-match A-states of top level colt badminton players. There was found to be a significant decrease in the female players' anxiety after winning matches. The discussion was concerned with the confounding effects upon A-state measures of factors such as denial, expectancies of success and failure, the relative importance of overall success as compared to sub-goal achievement, and the timing of questionnaire administration. With reference to the last point, Huddleston and Gill (1981) demonstrated that A-state increases as time to competition nears, with a substantial increase being noted from the "pre-meet" (45 min prior to the meet) to the event (5 min before the event) measure. This finding serves to emphasise the importance of collecting A-state data as close as possible to the start of the competition.

An examination of the literature would suggest that reduction in post-competitive A-state is contingent upon success (e.g. Martens and Gill, 1976; Scanlon, 1977) but it should be recognised that the criteria for success may be complex and individual-specific. For instance, if the probability of winning is assumed to be $\frac{1}{N}$ then the badminton player is clearly more hopeful of absolute success than, say, the cross-country runner. This raises questions about the nature of the relationship between performance in situations where there is one winner and many "losers", and state/trait anxiety measures. In the present study, the performance of cross-country runners was examined in the light of both trait and anxiety state scores, the latter being administered both pre- and post-race. In correlating anxiety and performance data, competitive success was equated with absolute performance proficiency, i.e., a direct function of finishing position. It was hypothesised that both trait and state anxiety would be positively related to this index of performance. Because of the greater impact match outcome was found to have had on state anxiety of female badminton players (Sanderson and Ashton, 1981) it was decided to monitor both male and female competitors in this study.

METHOD

Subjects consisted of 38 randomly selected female runners aged between 18 and 41 years who were competing in the English Womens' Cross-Country Championships in February 1978, and 26 males aged 19 to 31 (randomly selected from a field of 102) from the Hollymount International Road Race in November 1978. Only one investigator was present at each of these events, which placed restrictions on the number of athletes monitored. In each case, runners completed a Spielberger trait questionnaire 1 hour before the race as dictated by circumstantial constraints, and a state questionnaire within 15 minutes of the start of the race. A-state was again measured immediately after the athletes finished the race.

RESULTS AND DISCUSSION

1. **Women's National Championships.** Correlation analysis revealed that A-trait was significantly related to pre-race A-state ($r = 0.47$; $p < .01$), which in turn was marginally related to race performance on the basis of the unidirectional hypothesis ($r = 0.29$; $p < .01$). This suggests greater control and composure in the better runners. Pre- and post-race A-states were significantly related ($r = 0.34$; $p < .05$). Unlike the badminton research, a useful distinction could not be made between winners and losers, but an attempt was made to distinguish between more or less proficient runners. To this end, subjects were divided into 2 approximately equal groups: Group A, consisting of 20 athletes who finished in the first 55 places and Group B consisting of 18 athletes who finished between 68th and 158th place. Pre-race A-states of the groups (49.7/8.8 and 46.0/11.8 respectively) did not differ significantly. Similarly, post-match A-states (33.1/12.0 and 41.0/12.4 respectively) did not differ, but matched pairs analysis revealed a significant post-race A-state reduction for the more successful group ($p < .01$). The mean A-trait scores of the groups approximated to the combined mean score of 39.8.
2. **Hollymount Road Race.** It was found that A-trait was significantly correlated with race performance ($r = 0.43$; $p < .05$) and, as was the case with the women, pre-race A-state was related to A-trait ($r = 0.43$; $p < .05$). Pre- and post-race A-states (42.4/10.7 and 33.3/11.0 respectively) were found to be significantly different. The average A-trait of 38.1/7.6 compares closely with the average A-trait for the female runners.

The major finding is that there were clear post-race reductions in A-state for the high finishers in the women's race and for the whole group in the men's race. For the top five men, it was noticed that the A-state reduction was even more marked. In the light

of previous findings that A-state reductions are associated with absolute success in badminton and basketball (Sanderson and Ashton, 1981; Gruber and Beauchamp, 1979) it is clear that cross-country running is in a different category in that winning is not the sole criterion of success. The hypothesis that cross-country runners are likely to assign importance to and find comfort in the achievement of individual specific sub-goals, which leads to A-state reduction, irrespective of absolute achievement level, is given some support. A qualifying factor seems to be that low finishers in large fields of runners may have more difficulty in perceiving their performance as having redeeming features. Perhaps too it reflects ill-defined criteria of "success" amongst such individuals and/or unrealistic levels of aspiration. It is also likely that age and/or experience will affect subjective interpretations of quality of performance.

Elevated A-state levels post-competition would suggest that specific attention of coaches and mentors might need to be directed to athletes recognised as poor losers. The aim would be to develop positive coping behaviour in the athlete which would enable him to

recover quickly from any competitive trauma associated with performing poorly.

It was interesting that race performance was related to men's A-trait and less emphatically, women's pre-race A-state. That the men's performance appears to be related to underlying emotional stability rather than transient anxiety reactions poses questions about situationism and, perhaps about the validity of the Spielberger A-trait measure as compared with other measures of "anxiety", such as Martens' Sport Competition Anxiety Test (SCAT) and, indeed, Spielberger's Anger Scale. Martens and Simon (1976) provided evidence that the SCAT is a better predictor than Spielberger's A-trait test of pre-competition A-state of athletes, as measured by a modified version of Spielberger's A-state test – the Competitive State Anxiety Inventory (CSAI). It is important that in the search for the psycho-situational determinants of performance in sport, both the state and trait characteristics of the individual are explored and that the efficacy of the above-mentioned inventories should be fully investigated.

REFERENCES

- Gruber, J. J. and Beachamp, D., 1979 "Relevancy of the competitive state anxiety inventory in a sport environment". *Research Quarterly* 50: 207-214.
- Huddleston, S. and Gill, D. L., 1981 "State anxiety as a function of skill level and proximity to competition". *Research Quarterly* 52: 31-34.
- Martens, R., 1977 "Sport competition anxiety test". Human Kinetics Publishers: Champaign, Illinois.
- Martens, R. and Gill, D., 1976 "State anxiety among successful and unsuccessful competitors who differ in competitive trait anxiety". *Research Quarterly* 47: 698-708.
- Martens, R. and Simon, J. A., 1976 "Comparisons of three predictors of state anxiety in competitive situations". *Research Quarterly* 47: 381-387.
- Sanderson, F. H., 1978 "A critique of personality assessment of sports competitors". *Research Papers in Physical Education* 3: 66-67.
- Sanderson, F. H. and Ashton, M. K., 1981 "Analysis of anxiety levels before and after badminton competition". *International Journal of Sport Psychology* 12: 23-28.
- Scanlon, T. K., 1977 "The effects of success-failure on the perception of threat in a competitive situation". *Research Quarterly* 48: 144-153.
- Spielberger, C. D., Gorsuch, R. L. and Lushene, R. E., 1970. *Manual for the state-trait anxiety inventory*. Consulting Psychologists Press: Palo Alto, Cal.