Programm können Stabilität bzw. Veränderung der Faktorenlösung geprüft werden.

Darstellung und Diskussion der Ergebnisse

Tabelle 2 enthält die Ergebnisse der Faktorenanalyse mit den 129 Schülern.

Tabelle 2. Varimax-rotierte-Hauptsachen-Faktorenlösung; 5 Bilder; N=477.

Var.	FAK I	II	III	IV	V	h^2
AM1	.59					.38
AM2	.67					.51
AM3	.41				.22 (;)	.26
pE1	-.35 (;)	-.29 (;)		.50		.51
pE2				.56	-.33 (;)	.45
pE4				.60		.38
FM1		.71				.54
FM2		.49				.30
FM4		.42	-.25 (;)			.37
HE1			.52			.32
HE2			.47			.28
HE3			.59			.37
sE1					.67	.48
sE2	.24 (;)			-.22 (;)	.33	.28
sE4	.21 (;)				.22	.18

Die aufgeklärte Varianz beträgt etwa 57%. Auf dem ersten Blick ist zu sehen, daß die Faktoren I und III die Plätze in der Faktormatrix getauscht haben. Wenn man von den Einzelheiten der Faktorenlösungen absieht, kann man das Ergebnis der Faktorenanalyse als Bestätigung für die Annahme sehen, daß die Faktorenstruktur mehr oder weniger Stabilität aufweist. Diese Schlußfolgerung wurde mit dem statistischen Programm FAST geprüft.

Wenn die Ähnlichkeitskoeffizienten der 5-Faktoren varimax-rotierten Hauptachsenlösung groß genug wären, könnte man davon ausgehen, daß die Variablen und demzufolge die Motive bei denselben Personen über verschiedene Zeitpunkte hinweg stabil bleiben.

Einschränkend muß jedoch gesagt werden, daß das Programm mit über 100 Vpn für die Replikation gerechnet wurde. Die tatsächliche Anzahl der Vpn betrug jedoch 46. Deshalb müssen die eingeführten Stabilitätskoeffizienten mit entsprechender Vorsicht aufgenommen werden. Sie geben hier Hinweise in motivationsdiagno-

stischer und methodologischer Richtung. Der Gesamtähnlichkeitskoeffizient, der aus dem Vergleich der Gesamtstichprobe hervorgeht, beträgt R=.82. Die Ähnlichkeitskoeffizienten der einzelnen Faktoren zeigen, daß der sE-Faktor am schwächsten wiedergegeben werden kann, d.h. Instabilitäten aufweist (R am=.84, R fm=.90, R he=.92, R pe=.93, R se=.41).

Die Konsistenzkoeffizienten (Cronbach α) der einzelnen Skalen zeigen, daß die Skalen große Reliabilitätsgrade aufweisen (r am=.84, r pe=.79, r fm=.89, r he=.86, r se=.69).

Die Ergebnisse können insgesamt als Bestätigung für die Annahme betrachtet werden. Man kann sagen, daß das Auffinden der gleichen Faktorenstruktur Hinweise gibt, daß die Faktorenstruktur als etwas Überzufälliges zu betrachten ist.

Epilog

Ausgangspunkt der Arbeit war die Darstellung einiger Untersuchungsergebnisse aus dem Bereich der Motivgenese. Die berichteten Ergebnisse können in vielerlei Hinsicht verwendet werden.

1. Die Motivationstheorie hat wichtige Anhaltspunkte zur Verhaltenserklärung für die untersuchten Alterstufen gefunden.

2. Der Replikationsversuch - obwohl unvollständig - verstärkt die von Tsorbatzoudis (1990a) vorgestellten Ergebnisse. Das M-G spricht motivationspezifische Verhaltensmuster an. Dabei sind sie von den Bedingungen der SKZ- und Persönlichkeitsmerkmale abhängig.

3. Die Ergebnisse bestätigen das methodologisch-empirische Konzept.

4. Für den griechischen Sprachraum heißt es, daß mit dem M-G ein empirisch fundiertes Verfahren vorliegt, das zur Gruppendiagnose geeignet ist.

5. Es liegt ein bewährtes Konzept vor, das die transkulturelle Übertragungsarbeit bei Fragebögen erleichtert und vor Fehlern schützt.

Dieses Konzept hat, in neueren Versuchen erprobt, seine Brauchbarkeit bewiesen. Es handelt sich um Versuche zur empirischen Erfassung von Einstellungen (Tsorbatzoudis, 1991a) und der Selbstaufmerksamkeit (Tsorbatzoudis, 1991b). Da die Erfassung von Motiven, Selbstkonzeptvariablen und Einstellungen zum besseren Verständnis, zur Erklärung und Vorhersage des Verhaltens beitragen, meinen wir, damit einen wichtigen Schritt in psychodiagnostischer Richtung gemacht zu haben.

Literatur

Brosius, G. (1988). *SPSS/PC+. Basics und Graphics.* Hamburg.

Erdmann, R. (1979). *Ein Verfahren zur Erfassung von sozialisiertem Einflußstreben (sE) - theoretische Überlegungen und erste Befunde.* Unveröff. Diss. DSHS Köln.

Erdmann, R. (1983). Motiventwicklung als Lernprozeß. In R. Erdmann (Hrsg.), *Motive und Einstellung im Sport* (S. 35-47). Schorndorf: Hofmann.

Erdmann, R. (1987). *Relativierte Macht. Das Machtmotiv und seine sportpädagogische Bedeutung.* St. Augustin: Richarz.

Gabler, H. (1986). Motivationale Aspekte sportlicher Handlungen. In H. Gabler, J.R. Nitsch & R. Singer, *Einführung in die Sportpsychologie* (Bd. 1, S. 64-106). Schorndorf: Hofmann.

Heckhausen, H. (1963). *Hoffnung und Furcht in der Leistungsmotivation.* Meisenheim: Glan.

Heckhausen, H. (1972). Förderung der Lernmotivierung und der intellektuellen Tüchtigkeiten. In H. Roth (Hrsg.), *Begabung und Lernen* (S. 193-228). Stuttgart: Klett.

Heckhausen, H. (1974). Motive und ihre Entstehung. In F.E. Weinert, C.F.Graumann, H. Heckhausen & M. Hofer (Hrsg.), *Pädagogische Psychologie, Funkkolleg* (Bd. 1, S. 133-171). Frankfurt/Main: Fischer.

Heckhausen, H. (1977). Motivation: Kognitionspsychologische Aufspaltung eines summarischen Konstrukts. *Psychologische Rundschau, 28,* 175-189.

Heckhausen, H. (1980). *Motivation und Handeln. Lehrbuch der Motivationspsychologie.* Berlin: Springer.

Kleine, W. (1982). Zur Entwicklung eines Meßverfahrens für das Leistungs-, Macht- und Anschlußmotiv. Das Motiv-Gitter. In W. Decker & M. Lämmer (Hrsg.), *Kölner Beiträge zur Sportwissenschaft* (Bd. 10/11, S. 161-185). St. Augustin: Richarz.

Schmalt, H.-D. (1973). Die Gitter-Technik - ein objektives Verfahren zur Messung des Leistungsmotivs bei Kindern. *Zeitschrift für Entwicklungspsychologische und Pädagogische Psychologie, 5,* 231-252.

Schmalt, H.-D. (1974). *Entwicklung und Validierung einer neuen Technik zur Messung verschiedener Aspekte des Leistungsmotivs - das LM-Gitter.* Unveröff. Dissertation der Universität Bochum.

Schmalt, H.-D. (1976). *Die Messung des Leistungsmotivs.* Göttingen: Hogrefe.

Tsorbatzoudis, H. (1987). *Übertragung eines psychometrischen Meßverfahrens in der griechischen Schul- und Sportrealität - Das Motiv-Gitter.* Unveröff. Vortragsmanuskript anläßlich des "Symposions der Sportwissenschaft". Köln.

Tsorbatzoudis, H. (1990a). *Diagnostik von Motiven und motivrelevanten Konstrukten.* Bonn.

Tsorbatzoudis, H. (1990b). *Grundaspekte für den Aufbau psychometrischer Fragebögen.* Unveröff. Vortragsmanuskript anläßlich des A' Panhellenischer Kongresses der Sportpsychologie (im Druck).

Tsorbatzoudis, H. (1991a). *Einstellung und Motiv.* Unveröff. Arbeitsprojekt. Univers. Aristoteles, Thessaloniki.

Tsorbatzoudis, H. (1991b). *Diagnose der Selbstaufmerksamkeit.* Unveröff. Manuskript Univers. Aristoteles, Thessaloniki.

INTRINSIC MOTIVATION: ADAPTATION OF APTER'S TELIC DOMINANCE SCALE AND APPLICATION TO SPORTS WITH DIFFERENT LEVEL OF RISKS

ENRIQUE CANTON CHIRIVELLA AND LUIS MAYOR MARTINEZ, SPAIN

Introduction

This work is included in a broader investigation. Conceptually, it is based on Apter's general theory of motivation and personality development. The Reversal Theory (Apter, 1982) has been described as a structural phenomenology; this theory attempts to provide a systematic structure in order to explain the relationships among the level of arousal, the subjective perception of emotion, the influence of social contexts, and performance.

One of the most important elements in the structure of motivational phenomenology is called by Apter telic/paratelic dominance. This variable is composed of two orthogonal axes (meta-motivational states) in a bistable system, respectively referred to the degree in which the individual is predominantly oriented toward goal achievement and the reduction of his/her arousal level (telic state) and the extent in which the individual is predominantly oriented toward the performance itself and the increase of his/her arousal level (paratelic state).

According to model predictions, paratelic orientated individuals - or low telic individuals - tend to perform activities which increase the level of arousal, e.g. individuals who practise risk sports. Thus, "excitement seeking" becomes an element connected with the telic-paratelic system.

Within Reversal Theory, and applied with the conceptual ideas of bistability and reversal between metamotivational states, is the notion of "metamotivational dominance". Dominance is considered to be an innate bias within the individual in favour of one metamotivational state rather than its orthogonal and opposite. In the case of the telic-paratelic pair the Telic Dominance Scale -T.D.S.- (Murgatroyd, Rushton, Apter & Ray, 1978) was constructed to measure this bias and to categorize individuals as telic or paraletic dominant. The scale is comprised of 3 subscales: Planning Orientation, Seriousmindedness and Arousal Avoidance. It should be pointed out that the notion of "dominance" incorporated into reversal theory is different to the concept of "traits" found in some other personality inventories.

This study focuses on the analysis of the relationship between motivational states and the level of risk in the practice of different sports. Moreover, it tests the validity and utility of the following psychometric questionnaires: Telic Dominance Scale (T.D.S.) and Sensation Seeking Scale (S.S.S.). The latter, developed by Zuckerman (1979), is composed of 4 subscales: Boredom Susceptibility, Thrill and Adventure Seeking, Disinhibition, and Experience Seeking. The scale is employed to (1) discriminate individuals who practice sports with different levels of risk - and evaluate the perceived level of excitement associated to sports-, (2) analyse its theoretical relationship with the other factors examined (T.D.S. subscales, and individual characteristics - age, time of sport practice, or educational level).

Sample and Methodology

Sample: A total of 104 subjects (men and women) are allocated in three sport-groups: 30 tennis players, 53 karate trainees, and 21 parasailing practitioners.

The average age of the sample is 22.18 (Sx=8.5). The average length of time of practice is 56.4 months (Sx=49.8), ranging from 1 month to 240.

The individuals provided personal data and answered a test battery - which included the Telic Dominance Scale (T.D.S.) and the Sensation Seeking Scale (S.S.S.). This data collection took place in the habitual contexts of sport practice, before training.

The questionnaire responses were analised by means of different statistical analyses (factor analysis, correlation, analysis of variance, etc.) according to the purposes of the investigation.

Results

The results of the statistical analyses show that both scales (T.D.S. and S.S.S.) have factorial structures similar to those originally obtained by Murgatroyd et al. (1978) and Zuckerman (1979). Moreover, the different subscales/factors within both scales are highly correlated, whereas their correlations with the subscales of the other scale are lower (Table 1). This evidence indicates their internal consitency and adequacy for measuring different personality characteristics.

In general, the results show a significant relationship between both scales (S.S.S., T.D.S.), as hypothized in the theoretical model; i.e. the individuals who have high scores in the sensation seeking scale obtain low scores in the scale that measure the telic motivational state.

Table 1. Correlation matrix of telic dominance scale (T.D.S).[1]

	seriousmin.	plan. orien.	arou. avoid.	total scale
DTS-S	1.00			
DTS-PO	0.49*	1.00		
DTS-AA	0.29**	0.45*	1.00	
DT-TOT.	0.77*	0.84*	0.73*	1.00
SSS-BS	-0.26**	-0.37*	-0.44*	-0.45*
SSS-TAS	0.25**	-0.04	-0.27**	-0.02
SSS-DIS	-0.25**	-0.37*	-0.54*	-0.49
SSS-ES	-0.03	-0.17	-0.45*	-0.27**
SSS-TOT	-0.09	-0.32*	-0.59	-0.42*
L.R.S.	0.23**	-0.01	-0.02	-0.02
AGE	0.07	0.03	-0.07	-0.07
T.EXP.	0.07	0.29**	0.28**	0.28**
ED.LEV.	-0.02	-0.03	-0.18	-0.10

* level of significance p=0.01
** level of significance p=0.05

The Arousal Avoidance subscale of T.D.S. has the highest significant negative correlation scores with the factors and the total of Sensation Seeking Scale. Also, it is positive and significant correlated with "Length of Time of Sport Practice" variable (r=0.28, p=.05).

In T.D.S., the subscale Planning Orientation is significantly negative correlated with two factors of S.S.S.: Boredom Susceptibility (r=-0.37, p=.01), and Dishinibition (r=-0.37, p=.01), as well as the total score of S.S.S. (r=-0.32, p=.01).

The third subscale of T.D.S., Seriousmindedness, has the lowest correlation with the factors of S.S.S., positive in one case (Thrill and Adventure Seeking, r=0.25, p=.05). Moreover, this is the only scale which significantly correlates with the level of risk of sport (r=0.23, p=.05).

In this context it is important to stress the fact that the scale T.D.S. and two of its factors (Arousal Avoidance, Planning Orientation), are highly and significantly correlated with the length of the individual sport practice history. This relationship could be relevant with regard to the adherence and continuity in sport and health programmes.

On the other hand, as a result of the application of the analysis of variance to the

1: SSS = Sensation Seeking Scale; BS = Boredom Suspectibility; TAS = Thrill and Adventure Seeking; DIS = Disinhibition; ES = Experience Seeking; TOT = Total scale; L.R.S. = Level risk of sport; AGE = Age of subjects; T.EXP. = Time of sport experience; ED.LEV. = Educational Level.

data obtained as a function of the affiliation to a certain sport, we find generally significant differences. The groups of individuals who practise sports with different levels of risk obtain significantly different scores in the degree of telic dominance and sensation seeking (Figure 1).

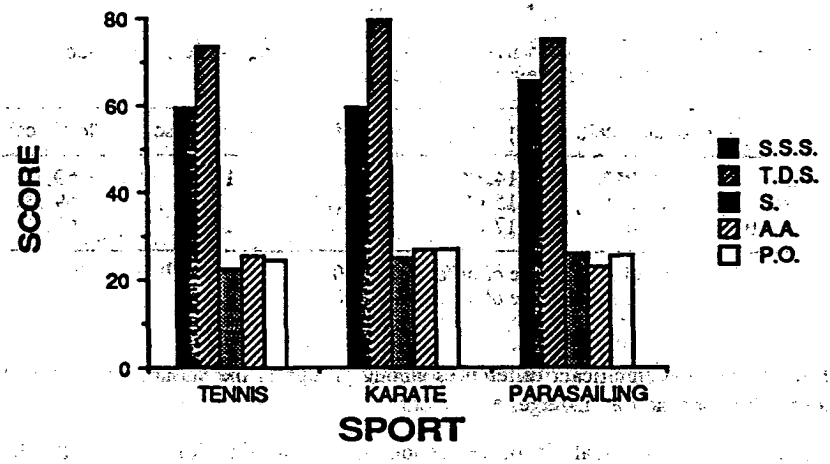


Figure 1. Scores of different risk sports on scales.

In relation to T.D.S., we find significant differences among practitioners of tennis, karate and parasailing in the subscales of Seriousmindedness, Arousal Avoidance, and the total of the scale (Table 2). The lower scores are found in the tennis group, except for the scale of Arousal Avoidance, which corresponds to the group of parasailing (p=.01).

Table 2. Analysis of variance, Telic Dominace Scale (mean scores of groups, and level of significance "F").

	seriousmin.	plan. orie.	arou. avoid	total scale
Tennis	22.77**	24.93	25.68*	73.37**
Karate	25.08**	27.19	27.32*	79.59**
Parasailing	26.29**	25.76	23.05*	75.10**

* level of significance of differences p=0.01
** level of significance of differences p=0.03

Significant differences among sport groups were also found in three out of the four

factors (Experience Seeking, p=.01; Desinhibition, p=.01; Thrill and Adventure Seeking, p=.02), and the Total of Sensation Seeking Scale - S.S.S. (p=.01). In all cases, including Boredom Susceptibility subscale, the parasailing group scored the highest (Table 3). The karate group scored higher than the tennis group in Experience Seeking, Thrill and Adventure Seeking and Total Scale.

Table 3. Analysis of variance, Sensation Seeking Scale (mean scores of groups, and level of significance of F).

	thr. & ad. seek.	exp. seek.	disinh.	bore. susc.	total scale
Tennis	16.9**	14.3*	14.3*	13.7	59.3*
Karate	17.2**	15.0*	14.1*	13.3	59.5*
Parasailing	18.6**	17.0*	15.6*	14.1	65.3*

* level of significance of differences p=0.01
** level of significance of differences p=0.03

Finally, we find significant differences among groups in the variables educational level, time of practice, and age.

As a result of the analysis of regression applied to the 'kind of sport', the following variables were found significative (p=.02): Boredom Susceptibility, Experience Seeking, Total S.S.S., Arousal Avoidance, Seriousmindedness, and personal variables - age, educational level, time of sport practice (Table 4).

Table 4. Analysis of variance, level of study and time of practice (mean scores of groups, and level of significance of F).

	Educational level	Time of Experience
Tennis	1.96*	50.3*
Karate	1.75*	74.9*
Parasailing	2.33*	17.7*

* level of significance of differences p=0.01

Interpretation

It could be concluded that both, the T.D.S and the S.S.S. scales maintain their structure and validity cross-culturally. There are subscales, e.g. Arousal Avoidance in the T.D.S. - which seem to be more adequate to discriminate between groups with different levels of risk seeking.

Significant differences in sensation seeking are found among individuals who tend to practise different sports. In our study, trekking practitioners obtained the higher scores in sensation seeking, followed by karate and tennis players.

As Apter's model states, individuals who seek risk and excitement sensations - i.e. to incresase their level of arousal - are orientated to risk sports. These data seem to confirm the relationship between paratelic dominance and arousal seeking. This is reflected by the data of the subscale of Arousal Avoidance in the T.D.S., and the subscales of S.S.S.

But evidence is not so concluding with regard to other factors, e.g. Seriousmindedness and Planning Orientation, in spite of the importance of the former as predictor of the kind of sport. This lack of conclusion is due to a certain degree of overlap between the kind of practised sport and age - the tennis group had a higher number of young people - the presence of this effect will be better controlled in a later report.

Finally, these data seem to sustain Apter's model and its applications in the area of sport psychology. Other factors which seem to have a differentiating role that modulates the relationship between the level of risk and the meta-motivational state should be considered with more detail, though - e.g. age, time of practice, or the variety of risk of other practiced sports.

References

Apter, M.J. (1982). *The experience of motivation: The theory of psychological reversals.* London: Academic Press.

Murgatroyd, S., Rushton, C., Apter, M.J. & Ray, C. (1978). The development of the Telic Dominance Scale. *Journal of Personality Assessment, 42,* 519-528.

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal.* Hillsdale, NJ: Erlbaum.

6

Emotionen im Sport

Emotions in Sport

FUNCTIONAL ATTRIBUTIONS TO EMOTIONS IN SPORTS

DIETER HACKFORT, GERMANY

For many people involved in sports, sports is fun. Asking athletes and physical education students about experienced emotions in sports, they quote predominantly joy. A review of the literature on emotions in sports gives the impression that just the opposite is true: anxiety seems to be the most relevant emotion in sports. Sportpsychological research on emotions focusses on so called "negative" emotions, e.g. anxiety or aggression.

We are used to regard "negative" emotions (e.g. anxiety, anger) as disturbing agents which we have to handle, and to do so effectively, coping strategies are necessary. "Positive" emotions (e.g. joy, pride) are regarded commonly as desirable states, but all of us know from proverbs that e.g. "love is blind" - as it is formulated in the United States; in Germany we say "love makes blind". A widespread attitude among coaches is to avoid satisfaction in athletes: Satisfaction is regarded "to kill hunger" - hunger for improvement and further success.

More generally also "positive" emotions are attributed negative consequences by coaches referring to action regulation: they reduce or may reduce sensitiveness, scope of attention, concentration, or may inhibit aspirations and further effort.

A main interest of sportpsychologists is to develop strategies for emotion control which can be used in sports situations, especially in competition or pre-start situations. This practical orientation lacks theoretical considerations referring to a functional analysis of so called "positive" and "negative" emotions. This is possible in the frame of an action theoretical pespective which emphasizes the meaning in action regulation. A first step is to analyze the functional attributions to "positive" and "negative" emotions.

Theoretical Approach

Psychological phenomena or processes as emotions have to be regarded in complex interrelations to understand the functional meaning. This is also true for analyzing dependencies and consequences of emotions sufficiently. The interactions between the three systems, the physical system, the psychical system, and the social system seem to be fundamental (Figure 1).

Research on emotions - even in sport psychology - has to consider two fundamental links, namely the connection between psycho-physiological processes as well as psycho-social processes (see Hackfort, 1986). Crucial for the understanding and

analyzation of the fundamental meaning of emotions is the action in the actual action situation as the fundamental unit. Actions are intentional, organized behavior and action situations are individual reconstructions of a given (objective) person-task-environment constellation by subjective definitions of the situation (Figure 2; see Nitsch & Hackfort, 1981, 1984; Hackfort, 1986; Nitsch, 1986; Hackfort & Nitsch, 1989).

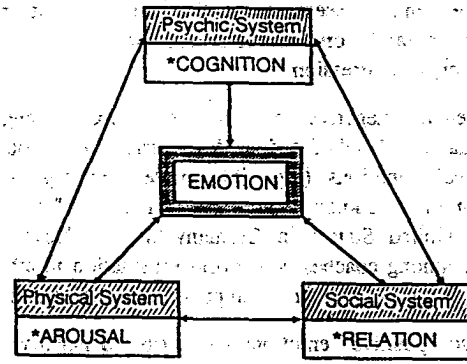


Figure 1. Emotion in the frame of interactive systems.

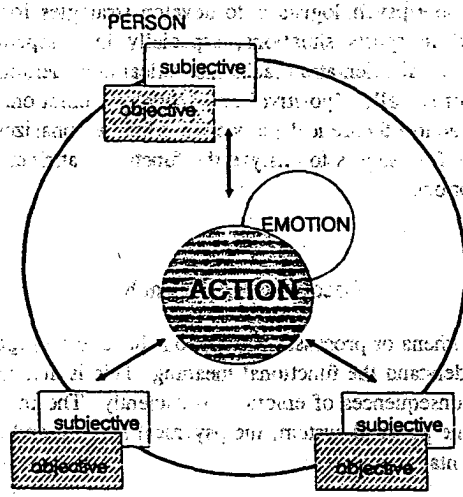


Figure 2. Action theoretical approach to emotion.

The way we perceive the situation as a person-environment-task constellation determines our actions and as the movements may be regarded as behavioral objectivations of our actions, emotions may be regarded as psychic objectivations of actions. The debate on interrelations between cognition and emotion (see Lazarus, 1984; Zajonc, 1980, 1984) seems to be somewhat misleading (see Hackfort, 1986). Perhaps referring to a functional triangle put up by perception, action, and emotion leads to a more appropriate understanding including the concept of motivation. These functional relations are very dominant in every-day thinking.

In this conceptual frame comments of top athletes can be understood as functional attributions when they argue that it is important to generate positive feelings and to develop positive emotions in addition to positive thinking just before a competition. After his latest world record in high-jumping Javier Sotomayor explainded (in The Straits Times, Singapore, August 10, 1989) that he visualizes for several minutes a perfect performance connected with a flow-feeling immediately before each jump:

> I try to imagine the perfect movements that I would make for a perfect jump and I repeat that image in my mind.

This imagination does not only mean "positive thinking" but also induces positive feelings and a positive evaluation of the activation: The connection of arousal with positive emotions induces a positive motivation which can be characterized as "a tendency to do it and to be successsful". This is in contrast to a tendency "to avoid failure", which is closely connected with the feeling of anxiety. In my practical work with top athletes I follow up a strategy in psychoregulation which uses the stimulation of positive emotions and the stimulation by positive emotions as a key to open the door to positive thinking and a success-oriented action tendency.

In the past the energizing aspect of emotions was brought into focus of sportpsychological research. In programmes of psychoregulation psyching up and psyching down have been emphasized. Less attention has been paid to the functions of emotions in interindividual action regulation. Referring to interindividual tuning in my research group especially the presentation of emotions is of major interest at the moment (see Hackfort & Schlattmann, 1991). We are investigating emotion-presentation in competitive high level sports with respect to the functional attribution by athletes and coaches of

- demonstrating experienced emotions.
- demonstrating not experienced emotions.
- not demonstrating experienced emotions.

Methodological Approach

Observational data are insufficient and have to be supplemented by data from verbal reports to learn whether

- a person, e.g. an athlete, experiences an emotion,
- only demonstrates an emotion to influence others, e.g. opponents or the referee,
- or experiences emotions but doesn't show them because of emotion control.

If it is of interest which functional attributions are connected with different emotions in special situations and to learn about techniques of emotion control used by the subject, a strategy of communication with the individual subject is appropriate.

We developed a special procedure (Hackfort & Schlattmann, 1988): subjects comment on their behavior and feelings in videotaped situations. This technique is called "videostimulated self-commentary". In a first run, subjects are given the opportunity to observe themselves on videotapes. Then, in a second run, they are asked to comment on their behavior referring to (a) the quality of experienced emotions, (b) the intensity and consequences of these emotions and (c) if they have hidden or faked emotional reactions. These comments are recorded, partially written down and used for a content analysis. Then we make an interview with the subjects referring to special sequences and their comments on functional meanings of emotions.

The methodological strategy of single case studies seems to be especially appropriate for investigations in top athletics. We have chosen this strategy and combined it with a validation procedure by verbal communication.

Selected Empirical Evidence

Referring to the outlined concept, the results of the content analysis of videostimulated self-commentary provide evidence for the following aspects:

(a) Self regulative meaning of emotion-presentation.

- To demonstrate emotional reactions serves to overcome disturbing high arousal, to reduce its intensity and to change the emotional quality. This was often explained with respect to anger and seems especially true for so called "negative emotional feelings".
- To demonstrate an emotion opposite to actually experienced emotions is used to overcome that emotion. This was reported with respect to anxiety.

Demonstrating self confidence seems to be an effective strategy to control feelings of anxiety and insecurity in social situations. Such a strategy was not reported with respect to the provocation of "positive emotions".

- To demonstrate no emotional reactions while experiencing emotions is used with respect to "negative emotions" to protect one's self image and not being dominated by emotionally induced doubts (cognitions of worry) and disturbing arousal. With respect to "positive emotions" it is used to control the involvement in good feelings and the risk of being less engaged in solving the task at hand.

All those strategies serve the self regulation in interindividual actions and they are self regulative by a special kind of self-presentation. But there are also emotionally based self-presentational strategies to influence other persons.

(b) Socially regulative meaning of emotion-presentation.

- To demonstrate no emotions is used to hide information or to irritate an opponent. This is connected with controlling "negative" as well as "positive" emotions.
- By demonstrating "positve emotions" it is possible to motivate and enhance effort for team mates and opponents (joy) or to frustrate and inhibit effort in opponents (pride, luck).
- The demonstration of "negative emotions" (e.g. anger) is regarded to strengthen opponents because it is a signal for them that there is a chance to overcome the opponent while he is out of balance. Sometimes the demonstration of "negative emotions" is a strategy to induce a feeling of guiltiness e.g. in the referee after a decision which brings disadvantage for an athlete and the athlete wants to provoke a correction in a subsequent situation.
- Demonstrating feelings of bad luck and dejection is used to provoke pity and helping behavior (social support). The connected external causal attribution should prevent further negative consequences.

Table 1 summarizes the results of these investigations.

There are common functional attributions for the presentation of special (differential) emotions in different settings but also different functional attributions for the same emotion in diverse situations and persons. From experimental studies we know about positive effects of "negative" emotions, e.g. improvement in self-perception. In addition, these studies demonstrate negative effects of "positive" emotions, e.g. the reduction of accuracy in self-perception by "positve" emotions. If moderate positive emotions reduce perceptive discrimination, this might be of

support if disturbing agents, e.g. pain, are not noticed and thus effort does not decrease. If this is strengthened because positive emotions become stronger, the risk of negative consequences is heightened, e.g. the danger of serious injuries.

Table 1. Positive and negative functional attributions to emotions.

(a) "negative" emotions
- signal for danger (anxiety)
- initiation of safety strategies (anxiety)
- release of defiance (anger)
- activation of additional capacity (anger, anxiety)
- strengthen sensibility/more realsitic decisions (general)

(b) "positive " emotions
- actualization of motives (general)
- amplification of motivation (general)
- social stimulation (joy)
- social synchronization: "we-feeling" (joy, pride)
- enhancement of risk taking behavior (curiosity)

(a) "negative" emotions
- loss of task orientation
- release of coping strategies
- loss of concentration
- disturbance of coordination

(b) "positive " emotions
- loss of precaution
- reduction of attention/attentional narrowing
- loss of sensibility
- neglect of plans, tactics, and strategies

Moderate negative emotions improving perceptual discrimination may be beneficial to prevent negative consequences because the signals are used to prepare safety strategies. The investigations by Epstein and Fenz (1965; Fenz & Epstein, 1968) could support this: experienced parachute jumpers feel nervous a long time before the jump and they show a more elaborate check up than not-experienced jumpers, who become nervous immediately before the jump, which is too late for extensive safety strategies.

Very often emotions occur in combination with each other and so a "positive" emotion may serve to neutralize or to balance a "negative" emotion. For example Greg Norman, the golf player, explained after a tournament (The Straits Times, Singapore, August 10, 1989):

> I'm very proud of what I did. In the last round of the British Open, I fought my way back into it, Norman said. Not many guys can fight their way back after seven shots behind like I did. I'm *disappointed with the outcome*, of course, *but* I'm *proud* of *what I did*.

References

Epstein, S. & Fenz, W.D. (1965). Steepness of approach and avoidance gradients in humans as a function of experience: Theory and experiment. *Journal of Experimental Psychology, 70,* 1-12.

Fenz, W.D. & Epstein, S. (1968). Specific and general inhibitory reactions associated with mastery of stress. *Journal of Experimental Psychology, 77,* 52-56.

Hackfort, D. (1986). *Theorie und Analyse sportbezogener Ängstlichkeit.* Schorndorf: Hofmann.

Hackfort, D. & Nitsch, J.R. (1989). *Das Sportangst-Deutungsverfahren - SAD.* Schorndorf: Hofmann.

Hackfort, D. & Schlattmann, A. (1988). Erfassung der Selbstdarstellung. In P. Schwenkmezger (Hrsg.), *Sport-psychologische Diagnostik, Intervention und Verantwortung* (S. 146-159). Köln: bps-Verlag

Hackfort, D. & Schlattmann, A. (1991). Functions of emotion presentation in sport. In D. Hackfort (Ed.), *Research on emotions in sport* (pp. 95-110). Köln: Strauss.

Lazarus, R.S. (1984). On the primacy of cognition. *American Psychologist, 39,* 124-129.

Nitsch, J.R. (1986). Zur handlungstheoretischen Grundlegung der Sportpsychologie. In H. Gabler, J.R. Nitsch & R. Singer (Hrsg.), *Einführung in die Sportpsychologie, Teil 1: Grundthemen* (S. 188-270). Schorndorf: Hofmann.

Nitsch, J.R. & Hackfort, D. (1981). Streß in Schule und Hochschule - eine handlungsanalytische Funktions-analyse. In J.R. Nitsch (Hrsg.), *Streß. Theorien, Untersuchungen, Maßnahmen* (S. 263-311). Bern: Huber.

Nitsch, J.R. & Hackfort, D. (1984). Basisregulation interpersonaler Handlungen im Sport. In H. Rieder & E. Hahn (Hrsg.), *Sensumotorisches Lernen und Sportspielforschung* (S. 148-169). Köln: bps-Verlag.

Zajonc, R.B. (1980). Feeling and thinking. Preference needs no interference. *American Psychologist, 35,* 151-175.

Zajonc, R.B. (1984). On the primacy of emotion. *American Psychologist, 39,* 117-123.

EMOTIONS AS MEDIATORS OF BEHAVIORAL CONSEQUENCES IN SPORTS

SABINE RETHORST, GERMANY

Introduction

The general question explored in the present investigation is to what extent motivation in sport can be understood by Weiner's attributional theory of motivation and emotion. Weiner's theory conceives of behavior as determined by a sequence of cognitions and emotions. Although this theory intuitively appears to be well applicable to the sport context, it has been relatively neglected in sport psychology. Most of the pertinent investigations have centered on only relations between attributions and emotions (e.g. McAuley & Duncan, 1989; Robinson & Howe, 1987, 1989; Biddle & Hill, 1988, Rethorst, 1992). The present study expands that endeavor by testing the influence of a sequence of cognitions and emotions on intended sporting behavior, using a simulational paradigm.

The Theory

The cognition-emotion-behavior sequence proposed by Weiner (1986) starts with the result of a prior action. The first step is an evaluation of this prior outcome, which in part depends on one's level of aspiration. This evaluation produces general emotions (happiness given success, sadness and disappointment given failure). The second step follows if the outcome of the event is important, unexpected or negative. Under these conditions, it is highly probable that one will ask why the outcome occured. That is, there is a desire to know to what the event should be attributed.

In the third step it is assumed that the actor evaluates the attributions according to certain properties that are shared by all causal explanations. Two of these properties demonstrated to influence the cognition-emotion process are the stability of the cause, that is whether the cause is constant or stable over time, and causal controllability, that is, whether the cause is under personal controll or not. The causal dimensions are hypothesized to generate specific emotions. The controllability dimension will generate emotions containing a moral aspect. For example, subjective failure which is attributed to a controllable cause should lead to feelings of guilt because one should have been able to do it better. If the cause of the failure is controllable by a person outside the actor, anger toward that person

will be evoked. The stability of the cause is believed to influence first the expectancy of future success and secondary feelings like hope and resignation. A stable explanation for success results in an increase of expectancy of success and generates hope, whereas a stable cause for failure decreases the expectancy of success and evokes resignation (see review in Weiner, 1986). Finally, the affects associated with the causal dimensions have behavioral consequences. Feelings of guilt generally increase motivation, whereas hopelessness and resignation typically result in a decrease of motivation.

Hypothesis 1

If an athlete percieves the cause of a subjective failure as controllable, feelings of guilt will be evoked. These feelings will increase the readiness to engage in behaviors to improve the performance. In this study, the influence of guilt on intended training intensity will be tested. It is hypothesized that the intended training intensity will increase with higher intensity of guilt. On the other hand, the outcome dependent emotion of disappointment will be unrelated to intended training intensity.

Hypothesis 2

If an athlete percieves the cause for failure as stable, hopelessness and resignation will follow. This should result in a withdrawal from behavior suitable to attain the goal of performing well. In an extreme case, this will result in giving up the training. Disappointment will again not be related to the intended training intensity.

Method

Subjects were 122 students (58 males, 64 females) of the ninth and tenth grade of a German high school. We used a simulational technique for the investigation. The students were administered a questionnaire containing descriptions of competitive situations in sport with resulting in failure. Each student received the following scenarios in an incomplete factorial design:

In the story with a controllable and variable cause, a tennis player was described who liked to play tennis very much, but disliked to work out. Therefore he did not work very hard. He lost a match against a club mate because he got tired during the match (lazy-condition).

In the story with a uncontrollable and stable cause a young, very ambitious high jumper was told to do a lot of practice. But he had some disadvantage because of his height. Compared to him, his competitors were much taller. Therefore he was

unsuccessful in a competition (height-condition).

In the story with the uncontrollable and variable cause a swimmer was described, who missed the finals in a competition because he caught a cold and was not physically fit (cold-condition).

Table 1 gives an overview over the stories and the dimensions of the causes in these stories. The presentation of the stories was counterbalanced in two different orders.

Table 1. Dimensions of the causes in the stories.

	controllable		uncontrollable
stable			height-condition
			⇕ H2
		H1	
variable	laziness-condition	⇔	cold-condition

To test the first hypothesis about the consequences of perceived controllability of a cause, the laziness-condition and the cold-condition were compared. To test the second hypothesis about the consequences of the perceived stability of the cause, the height-condition and the cold-condition were compared. The students were asked to read the stories carefully and to imagine themselves as intensively as possible in the situations. Subsequently, they answered questions about their likely cognitve, affective, and behavioral reactions in the situations. First we examined the outcome perception of the failure on a 5-point Likert-scale with the anchors of "not at all a failure" and "intense failure". Then the subjects were asked about their intentions concerning the training intensity after that failure on a 11-point scale (from "strong decrease" through "strong increase" in training intensity). Emotional consequences were examined for the intensity of disappointment, guilt, and resignation (5-point scale from "not at all" to "very intense"). Finally, we asked them about the dimensions of the reasons for the failures using a German short version of Causal Dimension Scale by Russell (cf. Rethorst, 1991). This scale measures the individual perceptions of causes on the three dimensions locus, stability, and controllability. The original version of the scale consists of three items per dimension, the short version uses only one item for each dimension. Each dimension was rated on a 9 point scale. The stability item was anchored by "is the cause something variable over time" and "... something stable over time", the controllability item by "is the cause something controllable by the athlete or other people" and "... something uncontrollable by the athlete or other people". The dependent variables were measured in the order mentioned above.

Data analysis consists of t-tests, of MANOVAs and (to test the sequence as a

process) of path analysis. For that purpose independent measures are required. Therefore we divided the sample in two groups (n1=53, n2=69), both consisting of students of ninth and tenth grade. To test the first hypothesis the data of group 1 were used for the lazy-condition and the data of group 2 for the cold-condition. To test the second hypothesis the data of group 1 are used for the height-condition and the data of group 2 again for the cold condition. To confirm the results for hypothesis 1 we also analysed the data of group 2 for the lazy-condition versus the data of group 1 for the cold-condition and for hypothesis 2 the data of group 2 for the height condition versus the data of group 1 for the cold condition.

Results

Hypothesis 1

The analysis shows that the cause of being lazy in the work out is perceived much more controllable than the cause of having caught a cold ($t(74.74)=8.07$, $p=.000$). The intensity of feelings of guilt is significantly higher in the lazy condition than in the cold condition ($t(117)=8.57$, $p=.000$, see Figure 1). The intensity of disappointment is also significantly higher in the lazy condition ($t(116)=3.47$, $p=.001$), but this difference is smaller than that for feelings of guilt. This result is shown by a significant interaction using MANOVA with one factor concerning the emotions disappointment and guilt on the one hand and one factor concerning the conditions of a controllable versus an uncontrollable cause on the other hand ($F(1,117)=50.35$, $p=.000$). The intended training intensity also reveals higher values for those who worked on the story with the controllable cause of laziness ($t(117)=6.95$, $p=.000$, see Figure 2).

These results seem to support the assumptions but they are not a direct test of the hypothesis. To test the sequential order of the cognition-emotion-behavior relations we used path analysis, a method also used by psychological research to investigate the effects of cognitions and emotions on behavior. We translated the hypothesis in a structural or path model.

The results show a quite good confirmation of the hypothesis (cf. Figure 3). There is a strong, significant path from evaluation via controllability and feelings of guilt to the intended training intensity. The positive sign of the coefficients indicate that higher perceived controllability causes more intense feelings of guilt, which cause an increase in the intended training intensity. The path via disappointment is weaker by a lower coefficient between the controllability and the emotion. The path from evaluation directly via disappointment to training intensity is also weaker by the coefficient with the value of .29. Goodness of fit (GFI) of the model is .81.

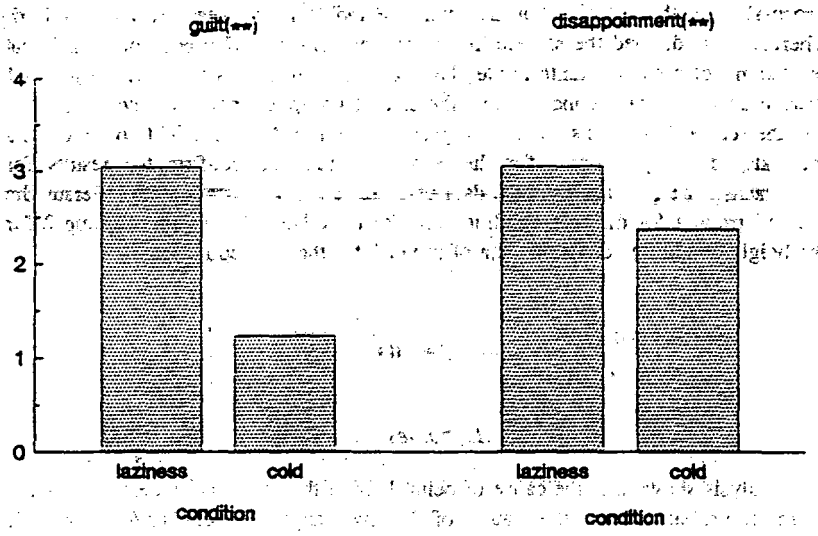
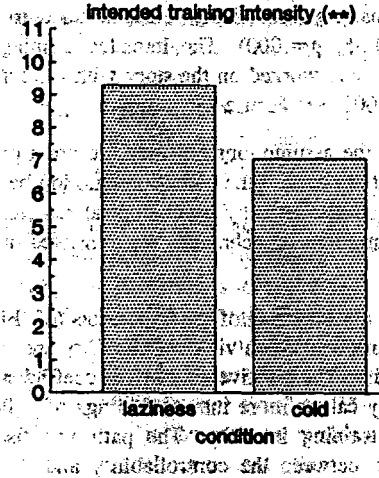


Figure 1. Intensity of emotions (0: "not at all" to 4: "very strong") in the laziness condition versus the cold condition (** difference significant at the 1% level).



Figur 2. Intended training intensity (0: "decrease" to 11: "increase") in the laziness condition versus the cold condition (** difference significant at the 1% level).

Overall the results support well the hypothesis. The results were confirmed when the analyses were carried out with group 2 for the lazy condition and group 1 for the cold condition.

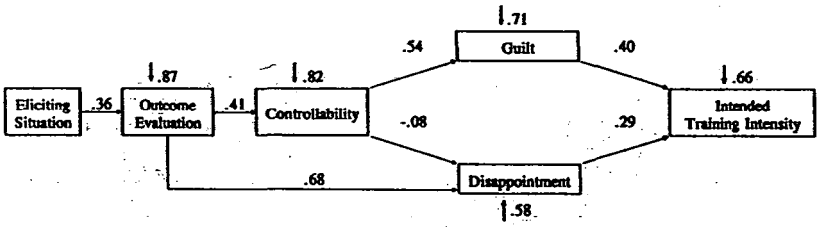


Figure 3. Results of the path analysis.

Hypothesis 2

The results of the analysis of variance show that the cause of small height is perceived as much more stable than the cause of having caught a cold ($t(104.47)=13.20$, $p=.000$). Resignation is more intense given a failure because of a stable reason than given a failure because of a variable cause ($t(120)=4.14$, $p=.000$, Figure 4). Disappointment is also more intense in the small height condition ($t(120)=2.33$, $p=.022$), but the difference for this outcome dependent emotion is smaller than that for resignation: The MANOVA with the emotion-factor and the condition-factor reveals a significant interaction ($F(1,121)=14.91$, $p=.000$). The values for training intensity are smaller given failure because for a stable cause, although the difference is not significant ($t(118.22)=1.01$, $p=.314$, Figure 5).

As could be expected by the result of the t-tests the support of the second hypothesis by path analysis is quite weak (Figure 6). There is a significant path from evaluation via stability and resignation to intended training intensity. Higher perceived stability results in more resignation. This leads to a decrease in training intensity (indicated by the minus of the coefficient). The same path via disappointment is weaker by a quite low coefficient between stability and disappointment. The relative high coefficient for the path from evaluation directly via disappointment to training intensity show that this influence should not be neglected. Higher disappointment is linked to an increase in training intensity, not a decrease! GFI of the model is .80.

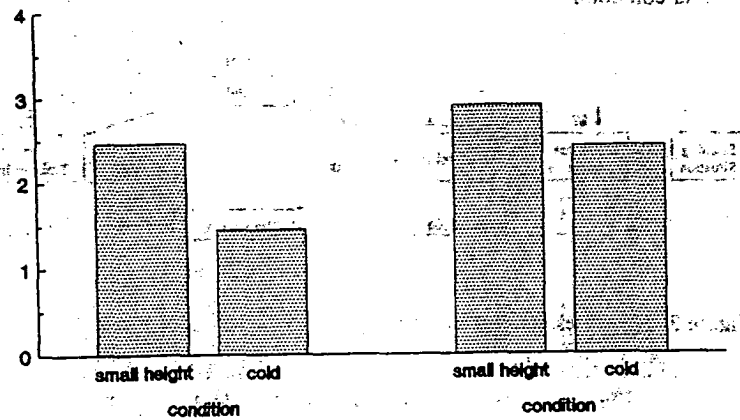


Figure 4. Intensity of emotions (0: "not at all" to 4: "very strong") in the height condition versus the cold condition (** difference significant at the 1% level; * difference significant at the 5% level).

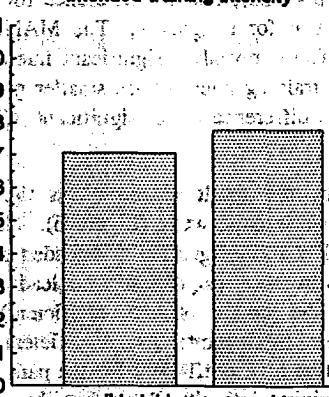


Figure 5. Intended training intensity (0: "decrease" to 11: "increase") in the height condition versus the cold condition (** difference significant at the 1% level).

To conclude, the results are in the supposed direction, although the values of the path coefficients are quite low. The results for the analysis with group 2 for the small height condition and group 1 for the cold condition are almost the same for the t-tests and the ANOVAs but in the path analysis the crucial coefficient between resignation and training intensity is even lower than in the reported case.

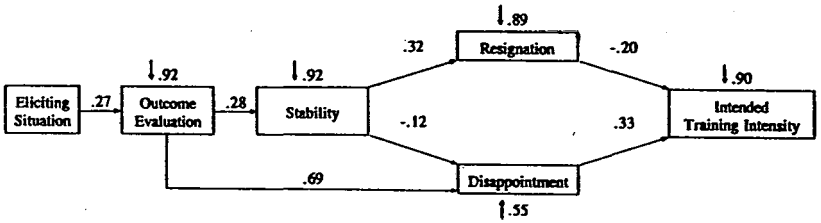


Figure 6. Results of the path analysis

Conclusions

The two examples show that Weiner's attributional theory of motivation and emotion is worth to be used to explain emotions and behavior in sporting contexts. However the study is burdened with many problems. Perhaps the most critical aspect is that we investigated thoughts about emotions and behavior by the chosen procedure. It is necessary to test the hypotheses about cognition-emotion-behavior relations in real life settings. We take the results as an encouragement to do so.

References

Biddle, S.J.H. & Hill, A.B. (1988). Causal attributions and emotional reactions to outcome in a sporting contest. *Personality and Individual Differences, 9,* 213-223.

McAuley, E. & Duncan, T.E. (1989). Causal attributions and affective reactions to disconfirming outcomes in motor performance. *Journal of Sport and Exercise Psychology, 11,* 187-200.

Rethorst, S. (1991). Die Kausaldimensionsskala - Eine deutsche Version der Skala von Russell zur Erfassung von subjektiven Kausaldimensionierungen. In R. Singer (Hrsg.), *Sportpsychologische Forschungsmethodik - Grundlagen, Probleme, Ansätze* (S. 191-197). Köln: bps-Verlag.

Rethorst, S. (1992). *Kognitionen und Emotionen in sportlichen Leistungssituationen - Eine Überprüfung einer attributionalen Theorie von Emotionen.* Köln: bps-Verlag.

Rethorst, S. & Willimczik, K. (1991). An attributional explanation of positive emotions in sports. In D. Hackfort (Ed.), *Research on emotions in sports* (pp. 21-39). Köln: Sport und Buch Strauß.

Robinson, D.W. & Howe, B.L. (1987). Causal attribution-mood state relationships of soccer players in a sport achievement setting. *Journal of Sport Behavior, 10,* 137-146.

Robinson, D.W. & Howe, B.L. (1989). Appraisal variable/affect relationship in youth sport: A test of Weiner's attributional model. *Journal of Sport & Exercise Psychology, 11,* 431-443.

Weiner, B. (1986). *An attributional theory of motivation and emotion.* New York: Springer.

KÖRPERLICHE SYMPTOME, VERHALTENS- UND SITUATIONSMERKMALE AUSGEWÄHLTER EMOTIONEN BEIM SPORTLICHEN HANDELN

ANDREAS SCHLATTMANN UND DIETER HACKFORT, DEUTSCHLAND

Problemstellung

Die Beschreibung und Klassifizierung emotionaler Situationen stellt eine Hauptaufgabe der Emotionsforschung dar. Als theoretischer Rahmen zur Emotionsanalyse bietet sich ein handlungstheoretischer Ansatz an, wie er von Nitsch und Hackfort (1981; Hackfort, 1987; Hackfort & Nitsch, 1989) entwickelt und auf Probleme der Angst- und Streßforschung bezogen wurde. In diesem Konzept werden u.a. die Bedeutungen von handlungsdeterminierenden Kompetenz- und Valenzeinschätzungen für die Emotions- und speziell für die Angstgenese hervorgehoben.

Darüber hinaus ist in der Emotionsforschung die Diskussion darüber von großer Bedeutung, ob von der Existenz diskreter Emotionen auszugehen ist. Vor allem Vertreter allgemeiner Erregungstheorien postulieren, daß Emotionen sich auf generelle Erregungsprozesse zurückführen lassen, aufgrund derer einzelne Emotionen nicht differenzierbar sind. Kennzeichnungen wie Freude oder Angst stellen danach lediglich Attributionen zur Erklärung der physiologischen Prozesse dar (vgl. z.B. Duffy, 1941; Schachter & Singer, 1962). Auf der anderen Seite legen die Arbeiten von z.B. Ekman und Oster (1979), Plutchik (1980) oder Izard (1981) die Annahme nahe, daß sich diskrete Emotionen anhand verschiedener Merkmale unterscheiden lassen. Einen Überblick über vorliegende Befunde gibt z.B. Asendorpf (1984). Im Bereich des Sports wurden Untersuchungen zu differentiellen Emotionsmustern noch nicht durchgeführt, obwohl immer wieder auf differentielle Emotionen, z.B. Angst (siehe etwa Hackfort & Spielberger, 1989), Bezug genommen wird. Dieses Defizit wird mit dieser Studie aufgegriffen, indem u.a. analysiert wird, ob sich beim sportlichen Handeln für ausgewählte Emotionen jeweils typische körperliche Symptome, Verhaltens- und Situationsmerkmale identifizieren lassen und inwieweit diese Merkmale zur Diskrimination der jeweiligen Emotionen beitragen.

Methodik

Empirische Emotionsforschung sieht sich einer Vielzahl methodischer Probleme gegenüber, die sicher mit ein Grund dafür sein dürften, daß der Bereich der Emotionen in der Psychologie lange Zeit vernachlässigt wurde (vgl. Scherer, 1981). Zur Beantwortung der hier interessierenden Fragestellungen bietet es sich an, Personen explizit nach emotionsauslösenden Situationen sowie den subjektiv wahrgenommenen körperlichen Symptomen und Verhaltensmerkmalen zu befragen. Über die Beschreibung der verschiedenen Komponenten soll es möglich werden, die unterschiedlichen Emotionen zu charakterisieren und voneinander zu unterscheiden (vgl. auch Wallbott & Scherer, 1985; Schlattmann & Hackfort, 1991). Dabei sind sowohl sog. "negative" wie "positive" Emotionen (siehe dazu Hackfort, 1991) in die Analyse einzubeziehen. Aus ökonomischen Gründen soll allerdings eine Einschränkung insofern erfolgen, als lediglich die Emotionen Ärger und Angst sowie Freude und Stolz berücksichtigt werden. Von diesen Emotionen ist bekannt, daß sie beim sportlichen Handeln besonders häufig erlebt werden (vgl. z.B. Schlattmann, 1991; Rethorst, 1992).

Untersuchungsteilnehmer

An dieser Studie nahmen insgesamt 30 weibliche und 30 männliche SportstudentInnen teil. Die Altersspanne lag zwischen 20 und 30 Jahren (M=24.55, SD=2.57).

Untersuchungsverfahren

Als Untersuchungsverfahren kamen neben einem Interview verschiedene Fragebogen zur Anwendung, auf die an dieser Stelle nicht eingegangen werden kann (siehe Hackfort & Schlattmann, i.V.). Im Rahmen des Interviews wurden den Teilnehmern zu jeder Emotion (Ärger, Angst, Freude, Stolz) eine Reihe von Fragen gestellt, von denen hier die folgenden besonders interessieren:

1) Einschätzung handlungsdeterminierender Konzepte (Skala von "1 = schlecht" bis "3 = gut")

2) Körperliche Symptome (Skala von "0 = nicht zutreffend" bis "2 = zutreffend")

3) Verhaltensmerkmale (Skala von "0 = nicht zutreffend" bis "2 = zutreffend")

Untersuchungsdurchführung

Die Untersuchungen wurden als Einzeluntersuchungen im Sommersemester 1991 am Institut für Sport und Sportwissenschaft der Universität Heidelberg durchgeführt. Die Teilnehmer wurden gebeten, sich in eine sportbezogene Situation hineinzuversetzen, in der eine bestimmte Emotion erlebt wurde. Die sich daran anschließende Befragung umfaßte neben den o.a. 3 noch weitere 7 Fragen. Danach wurde zur nächsten Emotion übergegangen. Um Reihenfolgeeffekte zu kontrollieren, wurden die Teilnehmer zufällig einer von vier Gruppen mit jeweils unterschiedlicher Reihenfolge der Emotionsvorgabe zugewiesen. Die gesamte Befragung wurde mit Kassettenrekorder aufgezeichnet und später transkribiert.

Untersuchungsauswertung

Die so gewonnenen Befunde beziehen sich auf Daten für die vier Emotionen (Ärger, Angst, Freude, Stolz), die hinsichtlich verschiedener Merkmale einzuschätzen waren (vgl. Tabelle 1). Der hier zu analysierende Datensatz umfaßt insgesamt 240 Beurteilungen (60 Personen x 4 Emotionen) der 28 Merkmale. Mittels einer Diskrimanzanalyse soll nachfolgend untersucht werden, (a) inwieweit sich bestimmte Emotionen (Gruppen) hinsichtlich der erfaßten Merkmalsvariablen unterscheiden und (b) inwieweit die erfaßten Merkmale geeignet sind, Einschätzungen, deren Gruppenzugehörigkeit unbekannt ist, anhand der jeweiligen Merkmalsausprägungen einzuordnen.

Ergebnisse

Im folgenden werden die Ergebnisse der drei hier interessierenden Fragestellungen dargestellt.

Analyse der emotionsspezifischen Einschätzung körperlicher Symptome

Die Abbildung 1 zeigt, daß immerhin neun der elf subjektiv eingeschätzten körperlichen Symptome sehr signifikante Mittelwertunterschiede aufweisen und somit deutlich zwischen den Emotionen trennen. Es wird die Tendenz deutlich, daß die hier vorgegebenen Merkmale in bezug auf Ärger und Angst eher als beim Erleben von Freude und Stolz wahrgenommen werden.

Im Vergleich zu Ärgersituationen beschreiben die Untersuchungsteilnehmer beim Erleben von Angst eher Herzklopfen, feuchte Hände, ein flaues Gefühl, Gänsehaut, Blässe und Muskelspannung. Bei Ärger wird dagegen eher als bei Angst ein "Blutdrang zum Kopf" beschrieben. Freude und Stolz unterscheiden sich

lediglich in bezug auf das Item "Gänsehaut" signifikant.

Tabelle 1. Definition der Gruppen und Auswahl der Merkmalsvariablen.

Gruppen (Emotionen)	Merkmalsvariablen (subjektive Einschätzungen)
1 Ärger	01 Fähigkeitskonzept
2 Angst	02 Möglichkeitskonzept
3 Freude	03 Lösbarkeitskonzept
4 Stolz	04 Interessenkonzept
	05 Anregungskonzept
	06 Attraktivitätskonzept
	07 Herzklopfen
	08 feuchte Hände
	09 Blutdrang zum Kopf
	10 flaues Gefühl
	11 Magenschmerzen
	12 Gänsehaut
	13 Hitzewallungen
	14 blaß werden
	15 Engegefühl
	16 Kloß im Hals
	17 Muskelspannung
	18 umarmen
	19 absondern
	20 Späße machen
	21 Kontakt suchen
	22 schauspielern
	23 zittrige Stimme
	24 schreien
	25 Zähne zusammenbeißen
	26 strahlen
	27 böse gucken
	28 ausflippen

Die Ergebnisse einer schrittweisen Diskriminanzanalyse weisen darauf hin, daß die Variablen "flaues Gefühl", "Engegefühl", "Muskelspannung" und "Gänsehaut" die größte diskriminatorische Bedeutung bei dieser Merkmalskombination besitzen. Die Güte, d.h. die Trennkraft, der Diskriminanzfunktion wird nachfolgend geprüft, indem die durch die Diskriminanzfunktion bewirkten Klassifizierungen der Untersuchungsobjekte mit der tatsächlichen Gruppenzugehörigkeit verglichen wird.

Die Häufigkeiten der korrekt und falsch klassifizierten Elemente sind in der nachfolgenden Klassifikationsmatrix zusammenfassend dargestellt (vgl. Tabelle 2).

Tabelle 2. Relative Häufigkeit der korrekt klassifizierten Gruppen in bezug auf die Einschätzung der Handlungsdeterminanten (1), der körperlichen Symptome (2), der Verhaltensmerkmale (3) sowie aller Einschätzungen (4).

	Trefferquote			
Gruppe	1	2	3	4
Ärger	51.5%	55.0%	83.3%	90.0%
Angst	45.0%	78.3%	73.3%	88.3%
Freude	18.3%	41.7%	65.0%	71.7%
Stolz	60.0%	50.0%	66.7%	81.7%
Gesamt	43.8%	56.3	72.1%	89.9%

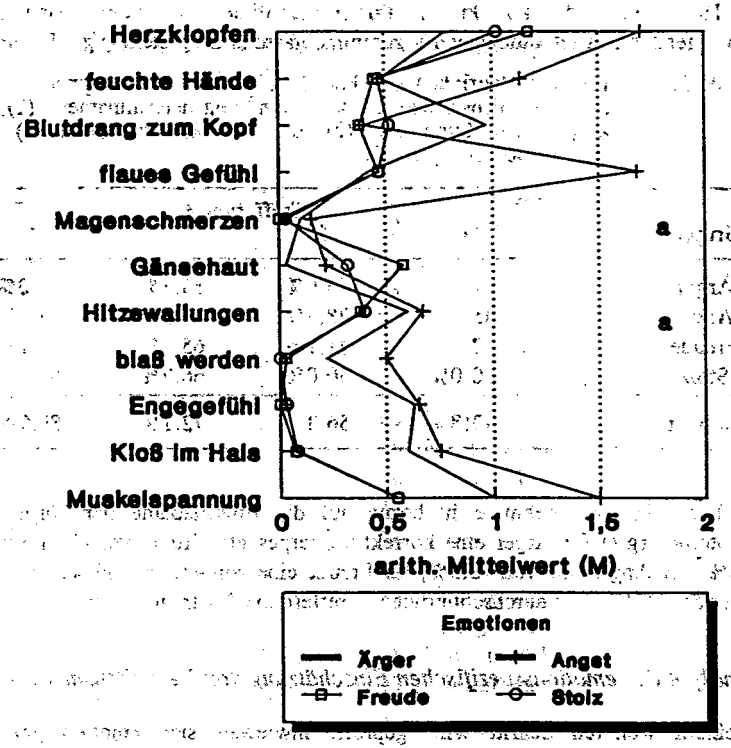
Die Klassifikationsergebnisse in bezug auf die Einschätzung der körperlichen Symptome ergibt für Ärger eine korrekt vorhergesagte Gruppenzugehörigkeit von 55.0%, für Angst eine von 78.3%, für Freude eine von 41.7% und schließlich für Stolz von 50.0%. Die durchschnittliche "Trefferquote" beträgt 56.3%.

Analyse der emotionsspezifischen Einschätzung von Verhaltensmerkmalen

In einem weiteren Schritt wird geprüft, inwieweit sich emotionsspezifische Einschätzungen bei ausgewählten Verhaltensmerkmalen ergeben. Die Abbildung 2 zeigt, daß bis auf das Item "schauspielern" sämtliche Variablen signifikante Mittelwertunterschiede aufweisen.

Betrachtet man auch bei dieser Merkmalsgruppe "positive" und "negative" Emotionen getrennt, dann scheint es so zu sein, daß sich die befragten Personen in Ärgersituationen eher als in Angstsituationen absondern, schreien und böse gucken. Auch in bezug auf die "positiven" Emotionen ergeben sich eine Reihe signifikanter Unterschiede: Bei Freude flippen die SportstudentInnen eher aus, sie schreien eher, suchen deutlicher Kontakt und umarmen sich eher. Dabei beschreiben sie ihre Stimme als noch weniger zittrig als dies beim Erleben von Stolz der Fall zu sein scheint. Insgesamt gesehen wird Freude und Stolz deutlicher zum Ausdruck gebracht als Ärger und Angst.

Die Klassifikationsergebnisse zeigen, daß sich für Ärger eine korrekt vorhergesagte Gruppenzugehörigkeit von immerhin 83.3%, für Angst eine von 73.3%, für Freude eine von 65.0% und schließlich für Stolz von 66.7% ergibt. Die durchschnittliche "Trefferquote" beträgt 72.08% (vgl. Tabelle 2).



Mittelwertevergleiche sign., p < .01
a = n.s.

Abbildung 1. Emotionsspezifische Einschätzung körperlicher Symptome (N=240).

Analyse der emotionsspezifischen Einschätzung handlungsdeterminierender Konzepte

Der Abbildung 3 ist zunächst zu entnehmen, daß der univariate Mittelwertvergleich für alle handlungsdeterminierenden Konzepte signifikant ist. Dabei weisen die "positiven" Emotionen durchweg höhere Mittelwerte als die "negativen" Emotionen auf.

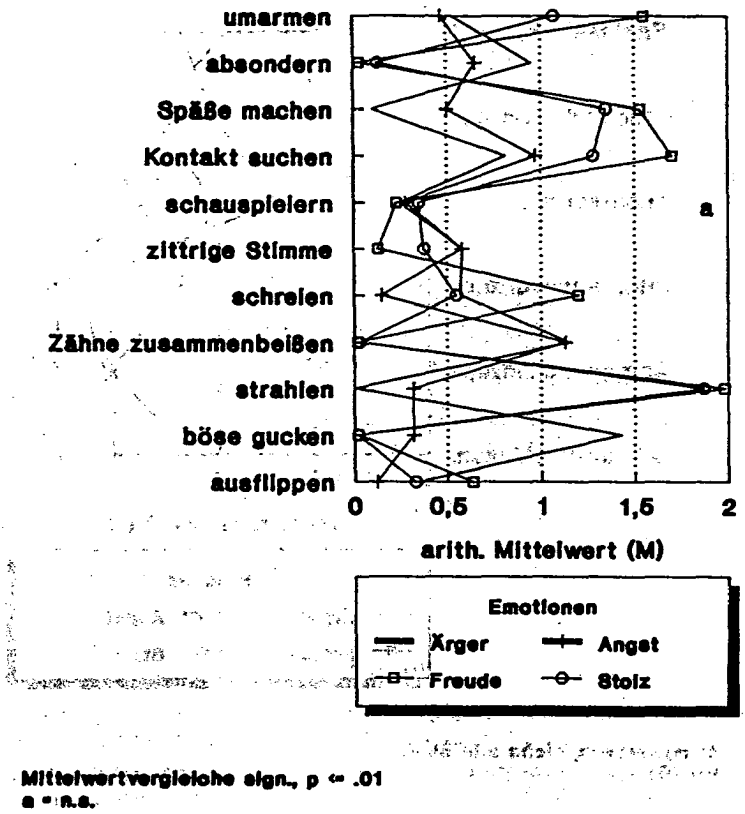


Abbildung 2: Emotionsspezifische Einschätzung von Verhaltensmerkmalen (N=240).

Ärgersituationen unterscheiden sich insofern von Angstsituationen, als die Fähigkeiten zwar etwas höher, dafür die Möglichkeiten und Lösbarkeiten signifikant geringer eingestuft werden. Bei Ärger ist zudem die person und aufgabenbezogene Valenz gegenüber der Angst deutlich erhöht. Stolz und Freude unterscheiden sich nicht bezüglich der durchschnittlichen Einschätzungen.

Die Klassifikationsanalyse ergibt für Ärger eine korrekt vorhergesagte Gruppenzugehörigkeit von 51.7%, für Angst eine von 45.0%, für Freude eine von 18.3% und schließlich für Stolz von 60.0%. Die durchschnittliche "Trefferquote" beträgt 43.75%.

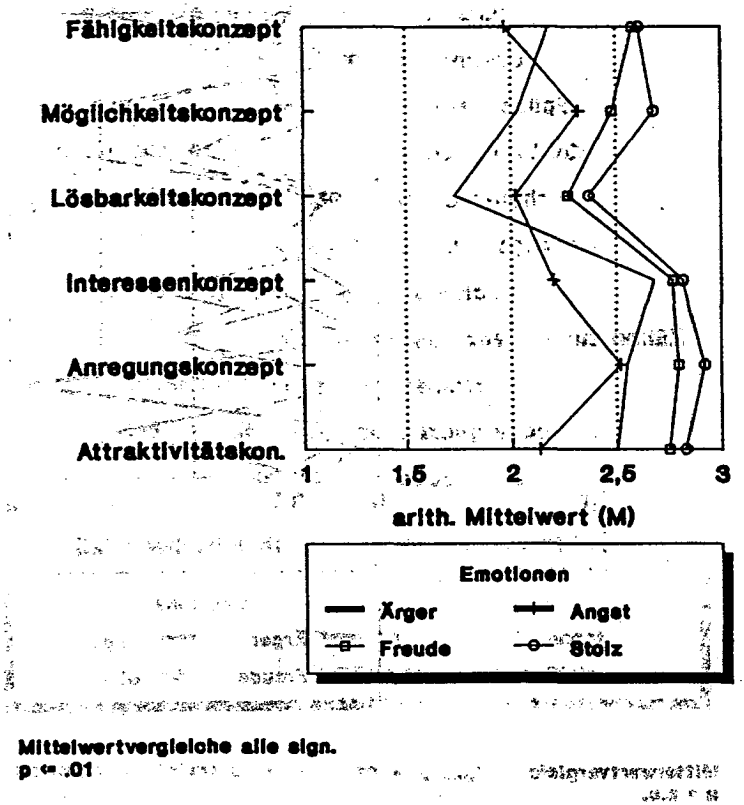


Abbildung 3: Emotionsspezifische Einschätzung handlungsdeterminierender Konzepte (N=240).

Faßt man abschließend die Klassifikationsergebnisse in bezug auf die Einschätzung der Handlungsdeterminanten, der körperlichen Symptome, der Verhaltensmerkmale sowie aller Einschätzungen (=28 Merkmale) zusammen, dann zeigt die Tabelle 2, daß die durchschnittliche Trefferquote bezüglich der Handlungsdeterminanten mit 43.8% am geringsten ausfällt und bei Analyse der körperlichen Symptome auf 56.3% bzw. bezüglich der Verhaltensmerkmale sogar auf 72.1% ansteigt. Die höchste durchschnittliche Trefferquote wird bei gemeinsamer Analyse der drei Merkmalsgruppen mit 89.9% erreicht.

Freude läßt sich offensichtlich am schwierigsten anhand der hier in die Analyse

einbezogenen Merkmale korrekt klassifizieren. Die Verhaltensmerkmale scheinen Ärger gut zu diskriminieren, Angst erreicht die höchsten Werte unter Beachtung der subjektiv eingestuften körperlichen Symptome. Die Beachtung der Handlungsdeterminanten verweist auf eine größere Trennfähigkeit hinsichtlich solcher Situationen, in denen Stolz erlebt wird.

Diskussion

Die hier dargestellten Ergebnisse zeigen, daß (a) die Unterscheidung der handlungsdeterminierenden Konzepte nach Nitsch und Hackfort ein brauchbarer Ansatzpunkt für weitere emotionsbezogene Situationsanalysen darstellt und (b) daß sich auch beim sportlichen Handeln diskrete Emotionen mit jeweils spezifischen, subjektiv wahrgenommenen Merkmalen differenzieren lassen (vgl. Wallbott & Scherer, 1985). Die z.T. weniger zufriedenstellenden Ergebnisse der Diskriminanzanalyse in bezug auf die Einschätzungen der Handlungsdeterminanten sind durchaus verständlich, wenn man das hohe Abstraktionsniveau der erhobenen Konzepte in Betracht zieht. Die noch durchzuführende Analysen der freien Situations-, Symptom- und Verhaltensbeschreibungen lassen weitere wichtige Aufschlüsse zu den hier dargelegten Ergebnissen erwarten.

Literatur

Asendorpf, J. (1984). Lassen sich emotionale Qualitäten im Verhalten unterscheiden? Empirische Befunde und ein Dilemma. *Psychologische Rundschau, 35* (3), 125-135.

Duffy, E. (1941). An explanation of 'emotional' phenomena without the use of the concept 'emotion'. *Journal of General Psychology, 25*, 283-293.

Ekman, P. & Oster, H. (1979). Facial expressions of emotion. *Annunal Review Psychology, 30*, 527-554.

Hackfort, D. (Hrsg.). (1987). *Theorie und Analyse sportbezogener Ängstlichkeit.* Schorndorf: Hofmann.

Hackfort, D. (1991). *Research on emotions in sport.* Köln: Sport und Buch Strauß.

Hackfort, D. & Nitsch, J.R. (1989). *Das Sportangst-Deutungsverfahren SAD. Grundlagen und Handanweisung.* Schorndorf: Hofmann.

Hackfort, D. & Spielberger, C.D. (Eds.), (1989). *Anxiety in sports. An international perspective.* Washington, DC.: Hemisphere.

Hackfort, D. & Schlattmann, A. (i.V.). *Körperliche Symptome, Verhaltens- und Situationsmerkmale ausgewählter Emotionen beim sportlichen Handeln.* Köln: bps.

Izard, C.E. (1981). *Die Emotionen des Menschen.* Weinheim: Beltz.

Nitsch, J.R. & Hackfort, D. (1981). Streß in Schule und Hochschule - eine handlungspsychologische Funktionsanalyse. In J.R. Nitsch (Hrsg.), *Stress. Theorien, Untersuchungen, Maßnahmen* (S. 263-311). Bern: Huber.

Plutchik, R. (1980). A general psychoevolutionary theory of emotion. In R. Plutschik & H. Kellermann (Eds.), *Emotion. Theory, research and experience*. Vol. 1: Theories of emotion (pp. 3-33). New York: Academic Press.

Rethorst, S. (1992). *Kognitionen und Attributionen in sportlichen Leistungssituationen*. Köln: bps.

Schachter, S. & Singer, J. (1962). Cognitive, social and physiological determinants of emotional state. *Psychological Review, 69*, 379-399.

Scherer, K.R. (1981). Wider die Vernachlässigung der Emotionen in der Psychologie. In W. Michaelis (Hrsg.), *Bericht über den 32. Kongreß der Deutschen Gesellschaft für Psychologie in Zürich 1980* (Bd. 1, S. 304-317). Göttingen: Hogrefe.

Schlattmann, A. (1991). *Funktionen der Emotionspräsentation im Sport*. Unveröff. Diss., Universität Heidelberg.

Schlattmann, A. & Hackfort, D. (1991). Attributions of functional meanings of 'positive' emotions in acting in sport. In D. Hackfort (Ed.), *Research on emotions in sport* (pp. 1-19). Köln: Sport und Buch Strauß.

Wallbott, H.G. & Scherer, K.R. (1985). Differentielle Situations- und Reaktionscharakteristika in Emotionserinnerungen: Ein neuer Forschungsansatz. *Psychologische Rundschau, 36*, 83-101.

BETA - ENDORPHIN IMMUNOREAKTIVES MATERIAL IM BLUTPLASMA UND SELBSTBEFINDLICHKEITS-VERÄNDERUNGEN BEI ULTRA - LANGSTRECKENLÄUFERN

OLIVER STOLL UND PETRA WAGNER, DEUTSCHLAND

Einführung

In den frühen 70er Jahren gelang es einigen Pharmakologen, Rezeptoren für endogene Opiate im Gehirn zu lokalisieren. Daraus wurde abgeleitet, daß bei einer Existenz solcher Rezeptoren die Wahrscheinlichkeit recht groß ist, daß unser Körper opiatähnliche Substanzen selbst produzieren kann (vgl. Hughes, 1975; Crandall, 1986). Kurze Zeit später fand man eine Substanz, die opiatähnliche Strukturen aufwies und nannte diese Substanz Endorphine. Die Endorphine haben eine morphiumähnliche Funktion und wirken wie starke Analgetika.

In der Sportwissenschaft interessierte man sich anfangs vor allen Dingen für den Zusammenhang von ß-Endorphin-Ausstoß, induziert durch Ausdauersportarten, und daraus resultierenden "euphorische Zuständen" bei den Athleten, genannt "Runner's High" (vgl. Crandall, 1986; Hinton, & Taylor, 1986; Mandell, 1981; Markoff, Ryan & Young, 1982).

Die vorliegende Studie befaßt sich ebenfalls mit dieser Fragestellung. Ziel unserer Untersuchung war es, einen möglichen Zusammenhang zwischen ß-Endorphin-Ausstoß, induziert durch extreme Laufbelastung (80km-Lauf), und Selbstbefindlichkeitsveränderungen nachzuweisen.

Untersuchungsdurchführung

Unsere Stichprobe bestand aus 11 freiwilligen Langstreckenläufern zwischen 24 und 57 Jahren. Ihr wöchentliches Trainingspensum vor dem 80km - Lauf betrug ca. 40 -160 km pro Woche.

Folgende Variablen waren Gegenstand unserer Untersuchung:

Physiologische Parameter:

- ß-Endorphin Immunoreaktives Material (ß-End ARM)

Psychologische Parameter:

- FPI-A nach Fahrenberg, Hampel und Selg (1972) zur Bestimmung des Persönlichkeitsprofiles;
- SB/EMI-S nach Ullrich & Ullrich de Muynck (1979) zur Bestimmung der Situationsbefindlichkeit (6 Skalen: Schwierigkeit/Leichtigkeit der Situation, Neutralität/Bedrohlichkeit der Situation, Annäherung/Vermeidung der Situation, Belohnung/Ablehnung durch das soziale Umfeld, Positives/Negatives Selbstwertgefühl, Unterstützung/Gleichgültigkeit des sozialen Umfeldes).

Eine Stunde vor dem Start, nach Erreichen des Ziels und 48 Stunden nach Zieleinlauf wurden 20 ml Blut aus der Armvene der Probanden entnommen.

Die Bestimmung von ß-Endorphin Immunoreaktivem Material im Labor erfolgte mittels HPLC und RIA.

Vor dem Start führten wir die Erfassung des Persönlichkeitsprofils und der Situationsbefindlichkeit durch. Im Ziel erfaßten wir die Situationsbefindlichkeit und die erbrachte Leistung (Einlaufzeit).

Gruppenmittelwerte und arithmetische Mittel für SB/EMI-S und FPI-A wurden berechnet. Eine multiple Regressionsanalyse für Einlaufzeit, Stanine und Rohwerte der psychologischen Parameter und Abfall/Anstieg der ß-Endorphin Immunoreaktivität im Blutplasma wurde ebenfalls durchgeführt (vgl. Abbildung 1).

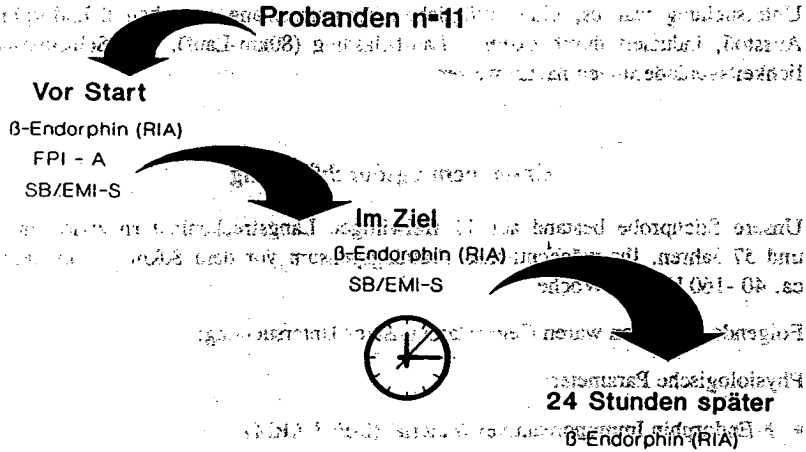


Abbildung 1. Messinstrumente und -zeitpunkte / Studie: 80km - Lauf.

Ergebnisse

Wir fanden signifikante Anstiege der Konzentration von ß-End IRM bei 4 Probanden, davon bei 3 der Leistungsstärksten. Bei den übrigen 7 Läufern konnte kein signifikanter Anstieg von ß-End ARM im Blut festgestellt werden (vgl. Abbildung 2).

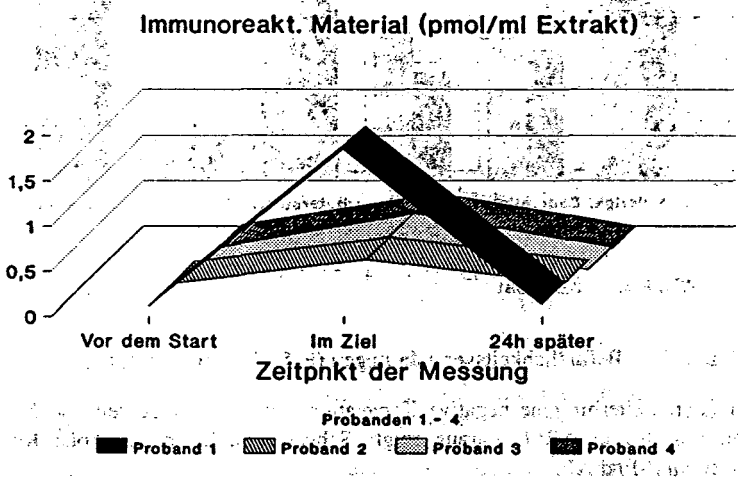


Abbildung 2. Beta - Endorphin Kurvenverlauf aller 4 Probanden mit signifikanten Anstiegen.

Persönlichkeitsprofil

Alle Probanden lagen mit ihren Staninen des FPI-A im "unauffälligen Mittelbereich" der Unterskalen und zeigten damit ein normales Persönlichkeitsprofil.

Selbstbefindlichkeitsveränderungen

Insgesamt zeigten unsere Probanden ein hohes Selbstwert- Gefühl und eine große Erwartung hoher Belohnung durch Außenstehende.

Der t-Test für gepaarte Erhebungen zeigte signifikante Veränderungen auf den Skalen (vgl. Abbildung 3):

- Schwierigkeit/Leichtigkeit der Situation,
- Neutralität/Bedrohlichkeit der Situation,
- Annäherung/Vermeidung der Situation,
- Positives/Negatives Selbstwertgefühl,
- Unterstützung/Gleichgültigkeit des sozialen Umfeldes

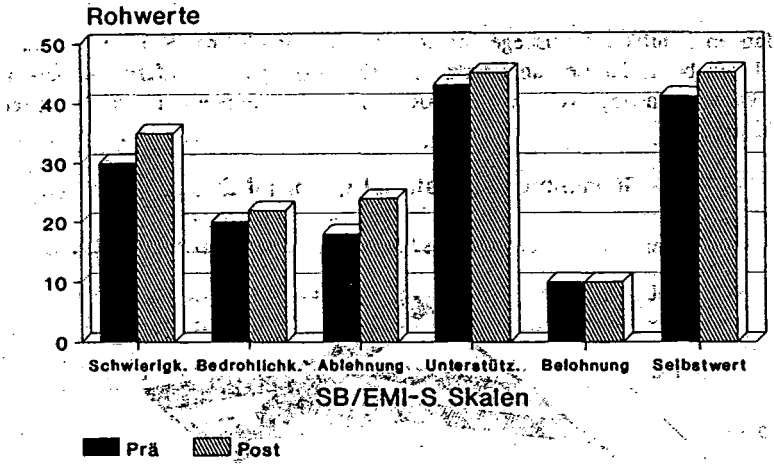


Abbildung 3. Befindlichkeitsveränderungen (Prä - Post Belastung).

Wir fanden weiterhin eine negative Korrelation zwischen Einlaufzeit und Konzentration von ß-End ARM; daraus folgt: Schnelle Läufer hatten hohe Konzentrationen an ß-End ARM.

Die hohe positive Korrelationen zwischen Einlaufzeit und Ablehnung (von außen) ließ uns folgern: Die schnellsten Läufer empfanden eine niedrigere Ablehnung.

Errechnet wurde außerdem eine hohe negative Korrelation zwischen Einlaufzeit und Schwierigkeit; daraus folgt: Die schnellsten Läufer schätzten die Schwierigkeit der Situation höher ein.

Diskussion

Anstiege von ß-End ARM nach verschiedenen Arten von körperlicher Belastung sind in der Wissenschaft schon häufig berichtet worden. Unsere Untersuchung unterstützt die Ergebnisse anderer Studien, daß ß-Endorphin nach langen Ausdauerläufen in das Blutplasma ausgeschüttet wird und es zu einem Anstieg von ß-End ARM in der Körperperipherie kommt. Wir stellten jedoch fest, daß die größten Anstiege von ß-Endorphin nur bei den zeitschnellsten Läufern auftraten. Dies unterstützt die Untersuchungen von Sforzo (1988), der berichtet, daß es nur zu einem Anstieg von ß-Endorphin kommt, wenn die Intensität der körperlichen Belastung größer als 75-80% der individuellen Leistungsfähigkeit ist.

Bezüglich unserer Ergebnisse könnte man folgern, daß nur die zeitschnellsten Läufer in der Lage waren, an ihre Leistungsreserven zu gehen.

Das insgesamt hohe Selbstwertgefühl und die große Erwartung hoher Belohnung durch Außenstehende zeigt die hohe Bedeutung des Wettkampfes für die Athleten. Das angestiegene positive Selbstwertgefühl und die höhere empfundene Unterstützung von außen weisen zunächst auf eine positive Stimmungsveränderung hin. Jedoch stiegen ebenfalls das Bedrohungs- und Schwierigkeitsempfinden, sowie das Gefühl der Ablehnung von außen an. Sollten durch das Laufen euphorische Zustände entstanden sein, hätten sich diese Werte in entgegengesetzte Richtung bewegen müssen.

So konnten übereinstimmend mit anderen Studien (Harber & Sutton, 1984; Schrode, Larbig, Heitkamp & Wurster, 1986) keine rauschähnlichen Zustände nach dem absolvierten Lauf festgestellt werden.

Da ß-Endorphin die Blut-Gehirn-Schranke nicht durchdringen kann, können die gefundenen Korrelationskoeffizienten zwischen den psychologischen Parametern und der Konzentration an ß-End IRM keinen kausalen Zusammenhang wiedergeben. Jedoch lassen sie den Schluß zu, daß die schnelleren Läufer die Situation im Ziel realistischer einschätzen (hohe Schwierigkeit der Situation im Ziel) und durch ihren Erfolg eine niedrigere Ablehnung von außen empfinden.

Zusammengefaßt kann festgestellt werden, daß einerseits Befindlichkeitsveränderungen, induziert durch extreme Ausdauerbelastungen, auftraten, andererseits diese aber nicht mit rauschähnlichen Zuständen gleichzusetzen sind.

Literatur

Crandall, R.C. (1986). *Running - the consequences*. Jefferson, NC: McFarland.

Harber, V.J. & Sutton, J.R. (1984). Endorphins and exercise. *Journal of Sports Medicine, 1*, 154-171.

Hinton, E.R. & Taylor, S. (1986). Does placebo response mediate Runner's High ? *Perceptual and Motor Skills, 62*, 789-790.

Hughes, J. (1975). Isolation of an endogenous compound from the brain with pharmacological properties similar to morphin. *Brain Research, 88*, 295-308.

Mandell, A.J. (1981). The second second wind. In M.I. Sachs & M.H. Sacks (Eds.), *Psychology of running* (pp. 221-223). Champaign, Ill.

Markoff, R.A., Ryan, P. & Young, T. (1982). Endorphins and mood changes in long-distance-running. *Medicine Science Sports & Exercise, 14*, 11-15.

Schrode, M., Larbig, W., Heitkamp, H.C. & Wurster, G.C. (1986). Veränderung psychophysiologischer Parameter beim Marathonlauf. *Sportwissenschaft, 16*, 303-316.

Sforzo, G.A. (1988). Opioids and exercise - An update. *Sports Medicine, 7*, 109-124.

ANXIETY IN SPORT: WHY ARE FINDINGS CONTRADICTORY?

FRANK C. BAKKER, THE NETHERLANDS

Introduction

Notwithstanding the existence of a large number of research studies on the relationship between anxiety and (sport) performance, the subject continues to attract the interest of researchers. Evidently the relationship is intriguing and, in some aspects, rather puzzling. Recently, Kleine (1990) published a meta-analysis of fifty empirical studies on the relationship between anxiety and sport performance, published between 1970 and 1988. The database for the meta-analysis included 77 independent samples, with N=3,589 subjects. The weighted mean effect size (r_w) was r_w=-.19, with a range from r_w=-.70 to r_w=+.59. Needless to say, the results were conflicting. In an attempt to identify factors which might moderate the relationship between anxiety and performance, and thus might partly explain the contradictory findings, Kleine analysed several subsamples. If person, situation and task characteristics were included in the analysis, the variability in the results decreased, but remained considerable.

The study reported below is one more addition to the existing literature. The relationship between anxiety and speed skating was investigated in a sample of young elite speed skaters. The study did, however, differ in several aspects from most of the studies investigating the relationship between anxiety and performance. Briefly, the main characteristics of the study were: (1) a relatively homogeneous sample of young, elite sport performers; (2) assessments which were repeatedly performed at six national (youth) championships over a period of four years and which in fact enabled several "replications" of the first assessment; (3) a longitudinal design, which resulted in (in part) the same subject-sample on all six occasions.

The aim of the study was to investigate the consistency of the anxiety-sport performance relationship over a series of six important contests.

Method

Subjects

A total of 33 (16 male and 17 female) elite speed skaters participated as subjects in this study. All subjects were members of the Dutch national youth speed skating team for at least one winter season. In the 1987/88 season, the age range of the subjects who participated in the study was 16-19 years. The age range of subjects participating in the 1990/91 season was 18-21 years. On average, 10 male and 10 female speed skaters from the sample participated in the study at each of six national championships.

Procedure

Data were collected at six national speed skating championships: from 1988-1991 at all junior championships and in 1989 and 1990 at national 1,500 meter championships.

Twenty minutes prior to the start of subjects' 1,500 meter races, they filled in an anxiety thermometer, a ten-point Likert-type rating scale ranging from "not at all nervous" (1) to "extremely nervous" (10) (Houtman & Bakker, 1989)[1].

About 20 minutes after finishing, subjects filled in the anxiety thermometer again. However, this time they were required to indicate how they felt at 9 separate moments, from the night prior to the competition when going to bed, to the moment they filled in the thermometer. Relevant here are: moment 6: ice warming-up (the moment they had filled in the thermometer prior to the start); moment 7: announcement to prepare for the start (about 4 minutes before starting); moment 8: announcement to come to the start (between 1 and 2 minutes prior to starting).

In the study reported by Houtman and Bakker (1989), the procedure of retrospective anxiety ratings had proven to be fairly reliable and to be unaffected by the subject's achievement. To check whether this procedure would also prove to be reliable in this study, Pearson correlations were computed between the anxiety thermometer score filled in 20 minutes prior to the start and the score filled in, for this same moment, after completing the race. This was done for the 1988 junior championships only. The correlations were r=.80 for men (N=10), r=.70 for women (N=10) and r=.80 for men and women (N=20).

---

[1] This procedure was performed only in 1988. At the other championships, subjects did not fill in a thermometer prior to their start.

After completing the anxiety thermometer for the 9 moments, subjects were asked to fill in a Dutch version of Martens, Vealey and Burton's (1990) Competitive State Anxiety Inventory (CSAI) (Bakker & Kayser, in press; Bakker, Vanden Auweele & Wylleman, 1990)[2]. The CSAI allows assessment of (1) cognitive anxiety, (2) somatic anxiety and (3) self-confidence. The subjects were instructed to fill in this questionnaire as they felt just prior to the start ("when the speaker announced your name to come to the start").

Performance Measure

Three performance measures were computed: (1) the difference between the subject's 1,500 meter time and the 1,500 meter time of the winner in the age class of the subject, converted into "points" (Δ nr.1) (points are computed by dividing the 1,500 meter time by 3); (2) the difference between subject's 1,500 meter time and his/her best performance at that distance in the preceding season (Δ best performance); (3) the angle between the vertical and the line joining the blade of the skate, the ankle and knee (ζ) at the moment of pushoff. Since the results are almost the same for the three performance only the results for the first-mentioned performance measure (Δ nr.1) will be presented.

Results

In Table 1, Pearson correlations are presented for the anxiety thermometer score (moment 8), cognitive anxiety and somatic anxiety with 1,500 meter performance (Δ nr.1), for male and female subjects separately. It should be noted that a smaller difference between a speed skater's 1,500 meter time and the winner of the 1,500 meter indicates a better performance.

To find out whether a curvilinear relationship could fit the data of the anxiety thermometer scores for moment 8 and 1,500 meter performance, a quadratic regression analysis was carried out. The R-values which were computed for males (for six championships) and females (five championships) ranged from $R=.14$ to $R=.70$. None of the R-values reached the 5% level of significance. Only for the females in 1988 and for the males in 1990 at the national 1,500 meter championships, was there a tendency ($p<.10$) for a curvilinear relationship.

To further explore the possibility of a curvilinear relationship, individual curves were fitted to the anxiety and performance data for 15 subjects, for whom anxiety thermometer data were available for 4 or more championships. For only 3 subjects did the curves fitting the data indicate an individual inverted-U relationship. For

[2] At the 1989 national 1,500 m. championship, the CSAI was not administered.

the remaining 12 subjects, there appeared to be no such relationship.

Table 1. Pearson correlations between anxiety just prior to the start of 1,500 m races and Δ nr.1 - male and female speed skaters.

	male				female			
	Δ nr. 1 ♦)				Δ nr. 1 ♦)			
	N	anxiety thermometer	cognitive anxiety	somatic anxiety	N	anxiety thermometer	cognitive anxiety	somatic anxiety
1988 a)	10	-.11	-.32	.90**	10	-.49	.14	-.20
1989 b)	8	-.19	-	-	4	-	-	-
1989 a)	12	-.09	.67*	.07	12	-.47	.15	-.38
1990 b)	9	.66*	.23	.47	11	-.66*	-.57	-.77**
1990 a)	9	-.33	.21	-.16	10	-.59*	.21	.29
1991 a)	9	-.37	-.34	-.77	9	-.06	.61*	.68*

* $p<.05$
** $p<.01$
♦) a small difference means a better performance
a) national junior championships; Δ nr. 1 is computed within subject's own age-class
b) national championships for seperate distance

Discussion

The results presented in the preceding section clearly indicate contradictory findings: Using the same design, the same subjects and collecting data in similar circumstances, led to results which on some occasions indicated a (significant) positive association between anxiety and speed skating performance, while on other occasions the opposite appeared to be true.

In Kleine's (1990) meta-analysis, it appeared that the anxiety-performance relation was weak in the group aged 15-18 years (r_w=-.10), also weak (r_w=-.10) in the high skill level group and absent for sports with aerobic demands (r_w=+.01). In addition, Kleine reported lower weighted r's for non-contact sports (compared to contact sports), individual sports (compared to team sports) and closed skill sports (compared to open skills sports). All these factors, which lead to lower correlations between anxiety and sport performance, apply to the present study: Subjects were about 18 years old and highly skilled. Speed skating is an aerobic task, and is an individual, non-contact, closed skill sport. It could, therefore, be argued that the results in the present study merely reflect random variations around a zero correlation. This would imply that the significant correlations between the anxiety measures and performance would be purely occasional. The number of significant correlations (1/3 of the correlations which were computed) are, however, relatively

high.

As an alternative explanation, it might be proposed that the contradictory findings reflect the variable effects of anxiety itself. Anxiety as an emotional state has both positive and negative effects. On the positive side, the energizing and motivation effects (Hackfort, 1989) and an increase in alertness (Hockey & Hamilton, 1983) could be mentioned. On the other side, several negative effects of anxiety are well-documented. Adam and Van Wieringen (1983) found, for example, that timing ability deteriorated under high levels of anxiety. Weinberg (1978) reported a disturbance in neuromuscular patterning under high levels of anxiety and Bootsma, Bakker, Van Snippenberg and Tdlohreg (1992) found more variability in the assessments of the reachability of a passing object under stress conditions. These negative aspects of anxiety, however, would only incidently affect the performance of top-level athletes, specifically in a sport such as speed skating. Consequently, it might be expected that in some situations positive effects will dominate, while in other situations the opposite might be true and negative effects will be dominant. The contradictory findings in the present study would then not be the result of random fluctuations, but merely a reflection of the two sides of anxiety.

The present study has shown that even if several factors are kept (almost) constant, conflicting results will appear. Differences between studies (for example, differences in samples, the nature of the sport, or methodological differences between studies) would appear to be an insufficient explanation for the differences in the outcomes of the studies into the relationship between anxiety and sport performance. The contradictory findings which are reported in the literature might thus, at least in part, be related to the nature of anxiety itself.

Acknowledgement: I would like to acknowledge Mieke Mitchell for her assistance in preparing this manuscript.

References

Adam, J.J. & Wieringen, P.C.W. van (1983). Relationships between anxiety and performance on two aspects of a throwing task. *International Journal of Sport Psychology, 14*, 174-185.

Bakker, F.C. & Kayser, C. (in press). Effects of a self-help mental training programme. *International Journal of Sport Psychology*.

Bakker, F.C., Vanden Auweele, Y. & Wylleman, P. (1990). *Competitie Belevings Vragenlijst (CBV) en Vragenlijst Beleving voor een Sportwedstrijd (VBS)*. [Dutch version of the Sport Competition Anxiety Test (SCAT) and the Competitive State Anxiety Inventory (CSAI)]. Vrije Universiteit, Amsterdam, Faculteit der Bewegingswetenschappen/Katholieke Universiteit Leuven, Instituut voor Lichamelijke Opleiding.

Bootsma, R.J., Bakker, F.C., Snippenberg, F.J. van & Tdlohreg, C.W. (1992). The effects of anxiety on perceiving the reachability of passing objects. *Ecological Psychology, 4,* 1-16.

Hackfort, D. (1989). Emotion and emotion control in sports: Benefits and costs. Paper presented at the First IOC World Congress on Sport Sciences, October 23-November 3, 1989. (Proceedings, pp. 375-379).

Hockey, G.R.J. & Hamilton, P. (1983). The cognitive patterning of stress states. In G.R.J. Hockey (Ed.), *Stress and fatigue in human performance* (pp. 331-362). New York: John Wiley & Sons.

Houtman, I.L.D. & Bakker, F.C. (1989). The anxiety thermometer: A validation study. *Journal of Personality Assessment, 53,* 575-582.

Kleine, D. (1990). Anxiety and sport performance: A meta-analysis. *Anxiety Research, 2,* 113-131.

Martens, R., Vealey, R.S. & Burton, D. (1990). *Competitive anxiety in sport.* Champaign, IL: Human Kinetics.

Weinberg (1978). The effect of success and failure on the patterning of neuromuscular energy. *Journal of Motor Behavior, 10,* 53-61.

Zur psychischen Wettkampfbelastbarkeit im Leistungssport: Die Wirkung von Angst und Ärger

Georg Steffgen und Peter Schwenkmezger, Deutschland

Vor und während eines Wettkampfes sind Leistungssportler und sportlerinnen vielfältigen Belastungen ausgesetzt. Abhängig vom Ausprägungsgrad der individuellen psychischen Wettkampfbelastbarkeit sind unterschiedlich häufige und unterschiedlich intensive Streßreaktionen mit meist negativen Folgen auf die sportliche Leistung zu erwarten.

Streßanfälligkeit läßt sich nach Nitsch (1982) allgemein als Bereitschaft einer Person, aus dem psychophysischen Gleichgewicht zu geraten, definieren. Die psychische Belastbarkeit stellt dabei das positive Gegenstück zu dem Konzept der Streßanfälligkeit dar. Prädiktoren verringerter Belastbarkeit bzw. erhöhter Streßanfälligkeit sind nach Jerusalem (1990) u.a. vorrangig in den personenspezifischen Bewertungs- und Bewältigungsmustern (z.B. Emotionen und deren Bewältigungsstile) zu sehen.

Theoretische Überlegungen und empirische Befunde hinsichtlich der Emotion Angst verweisen auf eine enge Relation mit Streß. Hochängstliche Personen reagieren verstärkt in belastenden Situationen mit Streß (zusf. Hackfort & Schwenkmezger, 1985; Kleine & Schwarzer, 1991). Ein vergleichbarer Zusammenhang zwischen *Ärger* und Streß wurde bisher sportspezifisch nicht untersucht (bzgl. theoretischer Annahmen siehe Schwenkmezger & Steffgen, in Druck).

Auf Grundlage dieser theoretischen Überlegungen wurde folgende zentrale Fragestellung hergeleitet: *Lassen sich sowohl Ängstlichkeit als auch Ärgerneigung als Prädikatoren der Wettkampfbelastbarkeit bzw. Streßanfälligkeit nachweisen?*

Methode

Zur Überprüfung dieser Fragestellung wurde eine Studie am 'Institut National des Sports' (INS) in Luxemburg durchgeführt. Bei den Vpn (N=75) handelt es sich durchgängig um luxemburgische Nationalsportler und -sportlerinnen aus diversen Einzel- und Mannschaftssportarten. In Tabelle 1 sind die Verteilungen hinsichtlich Geschlecht, Alter, Wettkampfjahre und Sportart angegeben. Aufgrund dieser Daten und der Vielzahl vertretener Sportarten erweist sich die Stichprobe als relativ heterogen.

Tabelle 1. Verteilung und Stichprobenkennwerte.

		Alter		Wettkampfjahre		Sportart	
Gruppe	N	M	SD	M	SD	Einzel	Manns.
Männer	62	23.45	6.43	8.77	4.68	42	20
Frauen	13	24.39	8.43	9.77	4.07	9	4
Gesamt	75	23.61	6.77	8.95	4.57	51	24

Als Meßinstrumente wurden in zahlreichen Untersuchungen erprobte Fragebogen eingesetzt. Das State-Trait Angstinventar (STAI) von Laux, Glanzmann, Schaffner und Spielberger (1981) diente der Erfassung der Variablen *Zustandsangst* (SAN) und *Ängstlichkeit* (TAN).

Das State-Trait Anger Expression Inventory (STAXI) von Schwenkmezger und Hodapp (1989), wurde zur Erfassung der unabhängigen Variablen *Zustandsärger* (SAE), *Ärgerneigung* (TAE) und der Ärgerausdrucksweisen *Ärgerabreagieren nach Außen* (AXO), *Ärgerunterdrückung* (AXI) und *Ärgerkontrolle* (AXC) verwendet.

Eine verkürzte und auf die sportliche Wettkampfsituation adaptierte Version des Streßverarbeitungsfragebogen (SVF) von Janke, Erdmann und Boucsein (1985) diente der Ermittlung unterschiedlicher Streßbewältigungsstile. Von den 19 aus jeweils 6 Items bestehenden Subskalen des SVF wurden 5 Skalen aufgrund der für sportliche Wettkampfsituationen unangemessenen Itemformulierungen und der zum Teil geringen Reliabilitäten nicht übernommen. Bezüglich der verbleibenden 14 Skalen (siehe Ergebnisteil) wurden jeweils die 4 Items mit den günstigsten Itemstatistiken und den adäquatesten Formulierungen aufgenommen. Zur Erhöhung der Situationsspezifität wurde der jedem Item vorgelagerte Satz auf die sportliche Wettkampfsituation bezogen.

Die *psychische Wettkampfbelastbarkeit bzw. Streßanfälligkeit* als abhängige Variable wurde mittels des Belastungssymptomtest (BST) von Frester (1972) erfaßt. Die Instruktion wie auch die 21 Items des Fragebogens wurden beibehalten, einzig die Ratingskala wurde optimiert.

Ergebnisse

Die Befunde zu den itemmetrischen Kennwerten, Mittelwerte, Standardabweichung, korrigierte Trennschärfe und Reliabilitäten (Cronbach-Alpha), können hinsichtlich aller Skalen als sehr zufriedenstellend bezeichnet werden. Nur drei Items des BST (Item 2, 16 und 20) erweisen sich als wenig trennscharf und wurden für die weiteren Berechnungen eliminiert. Detaillierte Ergebnisse sind bei Steffgen (in Vorb.) aufgeführt.

Die günstigen Itemkennwerte und Internen Konsistenzen der 14 Skalen des SVF ermöglichten es auch, eine Faktorenanalyse über die Summenwerte dieser Skalen zu berechnen. In Übereinstimmung mit den von Janke et al. (1985) vorgelegten Ergebnissen ergab sich hierbei eine eindeutige dreifaktorielle Lösung mit den Faktoren 'Emotionale Betroffenheit und Aufgeben' (SVFG1) mit den Skalen Fluchttendenz, Gedankliche Weiterbeschäftigung, Resignation, Selbstbemitleidung, Selbstbeschuldigung und Aggression, 'Kognitive Bewältigung durch Bewertungsänderung' (SVFG2) mit den Skalen Bagatellisierung, Herunterspielen im Vergleich mit Anderen, Schuldabwehr und Ablenkung von Situationen und 'Aktiver Kontrollversuch von Belastungssituation und -reaktion' (SVFG3) mit den Skalen Situationskontrollversuche, Reaktionskontrollversuche, Positive Selbstinstruktionen und Vermeidungstendenz.

Die Interkorrelationen der Variablen verweisen auf hoch signifikante Zusammenhänge zwischen Streßanfälligkeit einerseits und Emotionaler Betroffenheit bzw. Trait-Angst andererseits, Trait-Angst einerseits und Emotionaler Betroffenheit bzw. Trait-Ärger andererseits und Trait-Ärger und Emotionaler Betroffenheit.

Bei Anwendung hierarchischer Regressionsanalysen erweist sich Trait-Angst insgesamt als nützlicher Prädiktor der psychischen Belastbarkeit, nahezu alle Haupteffekte sind signifikant (siehe Tabelle 2). Trait-Ärger hingegen erweist sich nur in *Interaktion* mit der Moderatorvariable 'Aktiver Kontrollversuch' als signifikanter Prädiktor der Belastbarkeit. Die Interaktion beider Variablen klärt dabei 11% der Varianz auf.

Tabelle 2. Beta-Gewichte und R^2 der hierarchischen Regressionen.

Prädik./ Moderat.	Beta-Gew. PRÄDIKTOR	Beta-Gew. MODERATOR	Beta-Gew. INTERAKTION	R^2
TAN/AXI	.44 ***	-.04	-.31	.17 **
TAN/AXO	.46 ***	-.14	-.49	.19 **
TAN/AXC	.43 ***	.04	.06	.17 **
TAN/SVFG1	.28	.19	.39	.19 **
TAN/SVFG2	.45 ***	.23	-.32	.22 ***
TAN/SVFG3	.42 ***	-.06	-.75	.18 **
TAE/AXI	.08	.16	-.48	.04
TAE/AXO	.24	-.17	-.29	.03
TAE/AXC	.11	-.03	-.48	.02
TAE/SVFG1	-.12	.45 ***	-.13	.16 **
TAE/SVFG2	.15	.19	-.29	.05
TAE/SVFG3	.12	-.04	-1.92 **	.11 *

*** $p<.001$; ** $p<.01$; * $p<.05$.

Dieser Interaktionseffekt ist dahingehend zu interpretieren, daß Personen, die über den Bewältigungsstil 'Aktiver Kontrollversuch' verfügen, bei *hoher* Ärgerneigung eine *geringe* Streßanfälligkeit aufweisen. Demgegenüber erweisen sich Personen, die über eine *hohe* Ärgerneigung und eine *geringe* Ausprägung auf der Skala 'Aktiver Kontrollversuch' verfügen, als sehr streßanfällig. Bei Personen mit *geringer* Ärgerneigung ergeben sich *keine* Unterschiede hinsichtlich der Streßanfälligkeit.

Schlußfolgerungen

Allgemein läßt sich der aufgetretene Interaktionseffekt als Beleg für die Notwendigkeit interpretieren, innerhalb der Ärgerforschung differentielle Untersuchungsansätze zu verfolgen. Die Kompetenz des Aktiven Kontrollversuchs erweist sich dabei als äußerst wirksamer Moderator zur Reduktion der Wettkampfstreßanfälligkeit.

Vorhandene Streßinterventionsprogramme, die auf dem Konzept der Kontrollerhöhung beruhen und leicht auf den leistungssportlichen Kontext übertragen werden können (z.B. Meichenbaum, 1975), sind demnach vor allem für Sportler und Sportlerinnen mit hoher Ärgerneigung adäquat.

Zudem sind Unterschiede in den Relationen Angst - Streßanfälligkeit bzw. Ärger - Streßanfälligkeit offensichtlich. Ein Erklärungsansatz dieser differentiellen Relationen kann in unterschiedlichen Aufmerksamkeitsprozessen gesehen werden. Hochängstliche Personen neigen in selbstwertrelevanten Situationen dazu, die Beschäftigung mit sich selbst zu erhöhen. Dadurch wird der Einsatz aufgabenbezogener Bewältigung verhindert. Bei Ärger sind hingegen Erhöhungen der Aktivierung und der Aufmerksamkeitszuwendung zu erwarten, welche mit verstärktem Einsatz unterschiedlicher aufgabenbezogener Bewältigungsreaktionen einhergehen.

Literatur

Frester, R. (1972). Der Belastungssymptomtest - Ein Verfahren zur Analyse der Verarbeitung psychisch belastender Bedingungen bei Sportlern. In P. Kunath (Hrsg.), *Beiträge zur Sportpsychologie I* (S. 148-161). Berlin-Ost: Sportverlag.

Hackfort, D. & Schwenkmezger, P. (1985). *Angst und Angstkontrolle im Sport* (2. Aufl.). Köln: bps-Verlag.

Janke, W., Erdmann, G. & Boucsein, W. (1985). *Streßverarbeitungsfragebogen (SVF)*. Göttingen: Hogrefe.

Jerusalem, M. (1990). *Persönliche Ressourcen, Vulnerabilität und Streßerleben*. Göttingen: Hogrefe.

Kleine, D. & Schwarzer, R. (1991). Angst und sportliche Leistung - eine Meta-Analyse. *Sportwissenschaft, 21*, 9-28.

Laux, L., Glanzmann, P., Schaffner, P. & Spielberger, C.D. (1981) *Das State-Trait-Angstinventar (STAI)*. Weinheim: Beltz.

Meichenbaum, D. (1985). *Stress inoculation training*. New York: Pergamon.

Nitsch, J.R. (1982). Zum Problem der Personspezifität von Stressreaktionen. In B.C. Kirkcaldy (Ed.), *Individual differences in sport behavior* (pp. 183-199). Köln: bps-Verlag.

Schwenkmezger, P. & Hodapp, V. (1989). *Das State-Trait Anger Expression Inventory (STAXI): Itemmetrische und faktorenanalytische Befunde und Untersuchungen zur Konstruktvalidität* (Trierer Psychologische Berichte 16, Heft 1). Trier: Universität, Fachbereich I - Psychologie.

Schwenkmezger, P. & Steffgen, G. (in Druck). Ärger und Ärgerausdruck: Diagnostik, Funktionalität und Bewältigung. In J.P. Janssen, W. Schlicht & H. Rieckert (Hrsg.), *Belastung und Beanspruchung*. Schorndorf: Hofmann.

Steffgen, G. (in Vorb.). *Ärger und Ärgerbewältigung: Ein Gruppentrainingsprogramm.*

OPTIMIZING PRE-CONTEST ANXIETY

YURI L. HANIN, RUSSIA[1]

The goal of this presentation is to examine conceptual, methodological and applied issues of monitoring situational pre-competition anxiety through the change of athlete's attitude to the forthcoming contest (AFC). What will follow is based on research findings and applied work with top Soviet and Finnish athletes and coaches. As a general framework to integrate research findings and practical experience in the assessment and regulation of emotions in top sport performance environment the "Performance-Anxiety-Communication-Enhancement" (P-A-C-E) Model with four components and relationships between them might be appropriate:

Performance (P) as a task execution process with definite outcomes in training and competition;

Anxiety (A) as one of widely spread situational emotional experiences in performance. It is an important component of adaptive behavior in organism-environment interactions in case of subjectively perceived imbalance manifesting itself in a high level of tension (psychological discomfort) due to the inability of an individual to cope with task demands and/or the expectations of partners (Hanin, 1989);

Context (C) as a social environment and a primary determinant of emotional experience (anxiety reactions). In peak performance settings basic manifestations of the context are observed in communication processes - verbal and nonverbal contacts of participants executing tasks at hand;

Enhancement (E) as a pre-planned, purposeful optimization (improvement, correction) of performance, anxiety, communications, and/or relationships between them with clear-cut criteria of optimization.

The main focus of this presentation is on optimizing performance anxiety following our three dimensional "Form-Time-Context" model for the study of performance mental states as a wholistic and integrative approach to anxiety as a multidimensional construct. As is shown in Figure 1, it includes 6 form modalities (cognitive, affective, motivational, bodily-somatic, motor-behavioral, and performance), 3 temporal (past, present, future) and 3 space-environmental (individual, interpersonal and intragroup) vectors.

---

1 now with the Research Institute for Olympic Sports, Jyväskylä, Finland

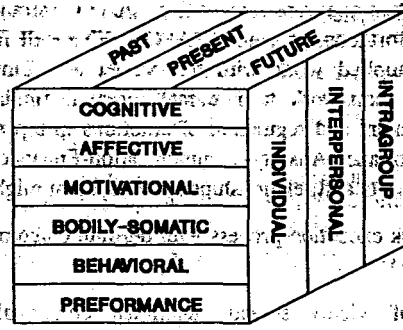


Figure 1. The three dimensional "Form-Time-Context" Model as a framework to study performance mental states.

Definition of optimal anxiety represents one of the challenging theoretical and practical problems in the existing approaches to the study of anxiety-performance relationships (Gould, Petlichkoff & Weinberg, 1984; Hanin, 1980; Morgan & Ellickson, 1989; Raglin, Morgan & Wise, 1990; Weinberg, 1990).

Our approach to the problem, or Individual Zones of Optimal Functioning (IZOF) Theory (Hanin, 1980-1989), is based on the following assumptions: 1) best individual performance is achieved when one's anxiety level is within individual optimal zones, 2) optimal anxiety is individual and can be relatively high, moderate or low, 3) performance deteriorates if anxiety before or during task execution falls outside the previously identified IZOF, 4) performance-anxiety relationships are very individual for the same/different tasks. According to the IZOF theory, optimal anxiety is most relevant, adequate, and appropriate for a particular individual performing a particular task under specific conditions of activity.

We shall be concerned with the *affective* component of anxiety as starting point taken in time and context perspective through especially developed assessment procedures using Spielberger's State-Anxiety subscale of the STAI, though with different instructions to get recall, predicted and current anxiety in performance and interpersonal communications with partners (Hanin, 1986, 1989). It should be emphasized that other forms of anxiety and their constellations could be optimal as

well. However, emotional component is not only one of the most important in top sports but also closely related to athlete's perception of the contest situation, not to mention the fact that its assessment through self-report measures is perhaps most developed.

Optimal functioning then is the performance of the task facilitated by individual's anxiety providing for the highest probability to achieve the expected results usually close to one's potential. Optimal functioning is not always one's outstanding, exceptional, or ideal performance, but, in fact, the most realistic and usually the best situational solution of the task at hand from performer's and/or client's perspective. Optimal performance results in either increasing or maintaining relatively high situational performance status.

From the definition of performance as a task execution process two main criteria of optimal anxiety are suggested: process- and outcome-oriented. Performance *process*-oriented criteria require contrasting anxiety level (range, zones, thresholds) with the quality of task execution, involvement level of the participant(s). Performance *outcome*-oriented criteria are used to predict and evaluate the results of the performance achieved by the individual participant(s) against self- (one's personal, season or last contest best) and/or other-related (ranking among the top best in one's category - national, European, World, Olympic, professional) comparison levels. Outcome criteria are, in fact, supplementary to the process of task execution but in the current research and practice are usually considered as principal or even the only criteria for post-performance evaluations.

From this perspective three level of optimality can be distinguished in performance anxiety: a) optimal (matching process and outcomes criteria), b) para-optimal (matching either process or outcome criteria), or c) pessimal (matching neither process nor outcome criteria) debilitating performance process and leading to average, below average and even poor results.

Optimizing anxiety will be defined here as a pre-planned process aimed at producing and/or maintaining the level of anxiety within the athlete's individual zones of optimal functioning (IZOF). It is one of the possible approaches to optimizing performance and as a step-wise procedure this process includes several practical actions which require the assessment of:

1. the task as a part of performance event,
2. the individual's past and current performance status relative to his/her own achievement level and/or that of other performers',
3. individual optimal anxiety level and zones (IZOF) for the particular task using recalls of previous successful performances ("greatest ease and efficiency of actions", "everything under control", "did my best or close to it") or a series of

repeated measures of anxiety associated with different individual performance levels (Hanin, 1980, 1986, 1989);

4. the actual level of situational anxiety 7-10 days before the forthcoming contest and contrast it with the athlete's IZOF,

5. anticipated (predicted or "would-be") anxiety level just before the start (and during the event in long duration tasks) in the context of athlete's IZOF,

6. athlete's perception and attitude to the forthcoming competition (AFC),

7. the direction of anxiety monitoring: a) to keep this level as it is if actual and anticipated anxiety levels are within the IZOF, b) change the anxiety level either by increasing or decreasing actual and anticipated anxiety,

8. the practical ways to monitor actual and/or anticipated anxiety levels in training and/or competition.

Monitoring actual and anticipated anxiety. From the existing concepts of stress as a process (Spielberger, 1985) there are at least three distinct approaches to monitoring situational performance anxiety through deliberate changing of: a) the stressors eliciting actual/anticipated anxiety, b) the perception of these stressors and c) stress-reaction itself.

In top level competition setting there's not very much that could be done directly with the stressors unless the athlete decides not to take part in the contest. Much efforts are concentrated, therefore, on direct monitoring of anxiety level through relaxation, imagery, self-suggestion, etc. But if sources of stress are not eliminated an inadequate level of anxiety will still be experienced since the perception of the situation has not changed. It is only through purposeful change of the perception of the stressors that optimal anxiety can be produced and maintained. Through the extensive research of athletes' and coaches' perceptions of pre-competitive and competitive situations four main components of the attitude to the forthcoming contest (AFC) were identified: 1. Self-confidence (appraisal of one's readiness to achieve expected results based on past and present performance status), 2. Immediate opponents (athlete's performance status relative to the opponents), 3. Importance of the contest to the participant (short- and long-term motivations), 4. Other people evaluations of the participant's resources (athlete's perception of other people' opinion about his/her chances for the successful performance in this contest).

Assessment of AFC is possible both during individual interviews or administration of the standardized AFC-scale including 28 items (seven for each of the four components) which was developed and validated on samples of Soviet athletes (Hanin, 1980). From several studies using IZOF approach it was found that about

20-35% athletes and coaches have high optimal anxiety levels. For highly important competitions with a lot of stress and anxiety more often reduction of current/anticipated anxiety is required to get into IZOF range in time. Reducing or increasing anxiety can be achieved by coach or sport psychologist through several procedures during training for the particular contest by modifying the key components of the athlete's attitude towards competition described above. If, for instance, current and/or anticipated pre-competition anxiety is above the athlete's IZOF then it might be useful to:

a) increase athlete's self-confidence and raise his/her performance status through "creating" successful performance on especially designed or selected tasks monitoring task complexity with a special emphasis on the strongest points of this particular athlete, using testing procedures and test results to provide positive re-enforcement and encouragement, re-analysis of past successful performances (video-tapes, films, press coverage),

b) reappraise athlete's attitude to the opponents (stressing their weak points or avoiding comparisons with them) and refocus on one's own performance status as the main criteria to assess the expected results of the performance. Deliberate demonstrations of athlete's strengths over typical opponents might be also effective so that the athlete perceives himself as either stronger than (or equal to) his opponents or that he can perform much better than before (self-orientation),

c) set more realistic goals and reduce the subjective significance of the forthcoming contest by lowering expectations about the anticipated performance level or refocusing the expectations to match the priorities and overall goals of the season ,

d) establish a "focused social-emotional support" in the immediate environment of the athlete in sport and outside and sometimes reduce the number of significant others to whose evaluations the athlete may be strongly oriented by regulating and controlling communications and interactions among partners and coach-athlete relationships using the principles of optimal interpersonal influences described in detail elswhere (Hanin, 1980, 1988).

Through monitoring these four main components of athlete's attitude to the contest it is possible not only to reduce but also to increase performance and communication anxiety and keep it at the required level. In practical work with top athletes designing a programme of optimizing pre-contest anxiety is best done in joint individual or group sessions with coaches. Individually assessing the attitude and behavior of the particular athlete in recent training situations could be followed by generating suggestions and creating special situations most appropriate for the particular environment. Another approach which proved to be successful in designing such programmes was to use small group discussions of coaches from similar/different sport event around all four components of athletes/team attitude to the competition aiming to develop a list of verbal and nonverbal interventions

potentially effective in changing performance anxiety. An additional by-product of these discussions was the growing sensitivity of coaches to the immediate impact of their behavior and tasks assigned for athletes to form appropriate or inappropriate attitudes and consequently the level of anxiety within or outside of individual zones of optimal functioning.

As a conclusion it might be emphasized that in top performance sport practicing psychologists are concerned mostly with monitoring situational anxiety aiming at its correction. Now the prevention programmes might be developed since optimal anxiety (high, moderate, low) is related to the optimal attitude to the forthcoming task. From this perspective all coach and athletes do in training and outside is important in forming the most adequate expectations and attitude to the forthcoming contest(s). Optimizing pre-contest anxiety should be considered as the first step to be supplemented by monitoring anxiety and other emotions during and after performance. In relatively long duration events subjective splitting of the task is important to assess IZOF as well as the patterns of positive and negative motivations reflected in the situational proportions of psychological comfort-discomfort emotions while performing the task.

References

Gould, D., Petlichkoff, L. & Weinberg, R.S. (1984). Antecendents of temporal changes in, and relationships between CSAI-2 subcomponents. *Journal of Sport Psychology, 6*, 289-304.

Hanin, Y. (1980). A study of anxiety in sports. In W.F. Straub (Ed.), *Sport Psychology: An analysis of athlete behavior*. Ithaca, NY.: Movement Publications.

Hanin, Y. (1986). The state-trait anxiety research on sports in the USSR. In C.D. Spielberger and R. Diaz-Guerrero (Eds.), *Cross-Cultural Anxiety* (Vol. 3, pp. 45-64). Washington: Hemisphere.

Hanin, Y. (1988). Optimization of communication in sports. *Proceedings of the VII FEPSAC Congress* (Vol. 2, pp. 763-767). Leipzig

Hanin, Y. (1989). Interpersonal and intragroup anxiety in sports. In D. Hackfort & C.D. Spielberger (Eds.), *Anxiety in sports: An international perspective* (pp. 19-28). Washington, DC: Hemisphere.

Morgan, W.P. & Ellickson, K.A. (1989). Health, anxiety, and physical exercise. D. Hackfort & C.D. Spielberger (Eds.). *Anxiety in sports: An international perspective* (pp. 165-182). New York: Hemisphere.

Raglin, J.S., Morgan, W.P. & Wise, K.J. (1990). Pre-competition anxiety and performance in female high school girl swimmers: a test of optimal function theory. *International Journal of Sports Medicine, 11*, 171-175.

Spielberger, C.D. (1985). Assessment of state and trait anxiety: Conceptual and methodological issues. *The Southern Psychologist, 2*, 6-16.

Weinberg, R.S. (1990). Anxiety and motor performance: Where to from here? *Anxiety Research, 2*, 227-242.

Zu Wirkungen eines Entspannungstrainings mit Schülern unter besonderer Berücksichtigung der sportbezogenen Ängstlichkeit

Kerstin Wandke, Deutschland

Einführung

Im Rahmen der Gesundheitserziehung in der Schule kommt es im Sportunterricht u.a. darauf an, solche sportbezogenen Kompetenzen und Erfahrungen zu vermitteln, die die Zuwendung der Kinder zum Sport und die sportliche Aktivität der Kinder und Jugendlichen fördern. Dies setzt voraus, daß die Schüler den Schulsport emotional überwiegend positiv erleben. Treten bei einem Schüler vorwiegend negative emotionale Zustände auf, wird er sich einer sportlichen Betätigung in seiner Freizeit eher abwenden. So wirkt sich auch Angst hemmend auf sportliche Aktivitäten und auf das Leistungsverhalten im Sport aus (Fuchs, 1990; Kleine & Schwarzer, 1991). Dem State-Trait-Modell von Spielberger zufolge müßten Schüler, die viele Situationen im Sportunterricht als bedrohlich wahrnehmen und mit Zustandsangst reagieren, eine ausgeprägte Eigenschaftsangst bzw. Ängstlichkeit aufweisen. Ängstlichkeit ist deshalb auch eine mögliche personale Determinante einer Leistungsschwäche von Schülern im Sportunterricht.

Ausgehend von der Theorie der gelernten Angst (Eysenck, 1978) läßt sich die Ängstlichkeit solcher Schüler verringern, indem körperlich-sportliche Aktivitäten mit ihnen durchgeführt werden, die ein geringes Angstpotential aufweisen und ein positives Erleben eigener physischer und psychischer Fähigkeiten fördern. Nach vorliegenden Erfahrungen (z.B. Kiphard, 1989; Wandke & Richter, 1990) eignet sich hierfür unter schulischen Bedingungen u.a. Hatha-Yoga mit besonderer Aktzentuierung von Entspannungsübungen. Allerdings sind solche positiven Wirkungen von regelmäßigen Yoga-Übungen auf die psychische Entwicklung von Kindern empirisch bisher nicht nachgewiesen.

In der vorliegenden Untersuchung soll deshalb folgende Fragestellung bearbeitet werden:

Wirkt sich ein Entspannungstraining (Yoga) auf die Ausprägung sportbezogener Ängstlichkeit aus?

Methodik

13 Schülerinnen und Schüler der 4. und 5. Klasse einer Berliner Schule nahmen vom Februar bis Juni 1991 an einem Yoga-Kurs teil.

Die Ausprägung sportbezogener Ängstlichkeit wurde im Prätest-Posttest-Design mit dem Sportangst-Deutungs-Verfahren von Hackfort und Nitsch (1988) in der Versuchsgruppe und einer Kontrollgruppe erfaßt. Der Kontrollgruppe gehörten 17 Schülerinnen und Schüler an, die in ihrer Freizeit keinen organisierten Sport betrieben.

Ergebnisse

Die Schüler der Versuchsgruppe wiesen im Prätest in den SAD-Angstdimensionen und SAD-Tätigkeitsbereichen ein geringes bis mittleres Niveau sportbezogener Ängstlichkeit auf (vgl. Tabelle 1). Am geringsten ist die "Angst vor Blamage" ausgeprägt. Problematische Testwerte sind auf dieser Dimension bei keinem Schüler vorhanden. Sie treten auch auf den anderen SAD-Angstdimensionen und SAD-Tätigkeitsbereichen selten auf.

Tabelle 1. Mittelwert (x), Konfidenzintervall (95%) und Standardabweichung (s) der Versuchsgruppe im Praetest.

Angstdimension/ Tätigkeitsbereich	x	Konfidenz-intervall (95%)	s
Blamage	3.61	3.18 - 4.04	1.56
Konkurrenz	4.38	3.92 - 4.84	1.66
Mißerfolg	4.61	4.14 - 5.08	1.71
Unbekanntes	5.15	4.78 - 5.52	1.34
Verletzung	4.07	3.56 - 4.58	1.85
Ballspiele	4.62	4.20 - 5.04	1.50
Kampfspiele	4.85	4.40 - 5.30	1.63
Leichathletik	5.62	5.31 - 5.92	1.12
Schwimmen	5.46	5.09 - 5.83	1.33
Turnen/Gymnastik	3.92	3.49 - 4.35	1.55

Im Posttest verringern sich die Angstdimensionen "Blamage", "Konkurrenz" und "Mißerfolg". Allerdings überschneiden sich die Konfidenzintervalle, und die Unterschiede sind nicht signifikant (vgl. Tabelle 2).

Tabelle 2. Mittelwert (x), Konfidenzintervall (95%) und Standardabweichung (s) der Versuchsgruppe im Posttest.

Angstdimension/ Tätigkeitsbereich	x	Konfidenz-intervall (95%)	s
Blamage	3,07	2.69 - 3.55	1.38
Konkurrenz	3,62	3,11 - 4,13	1,85
Mißerfolg	4.15	3.76 - 4,54	1,41
Unbekanntes	5.46	5,13 - 5,79	1,20
Verletzung	4,46	4,03 - 4,89	1,56
Ballspiele	4,23	3,80 - 4,66	1,54
Kampfspiele	4,31	3,88 - 4,74	1,55
Leichtathletik	5,46	5,11 - 5,81	1,27
Schwimmen	5,46	5,32 - 5,60	0,52
Turnen/Gymnastik	4,15	3,85 - 4,45	1,07

Die Schüler der Kontrollgruppe weisen im Prätest ein mittleres bis hohes Niveau sportbezogener Ängstlichkeit auf (vgl. Tabelle 3). Sie unterscheiden sich von den Schülern der Versuchsgruppe signifikant auf dem 5%-Niveau in den SAD-Angstdimensionen "Blamage" und "Verletzung" sowie in den SAD-Tätigkeitsbereichen "Leichtathletik" und "Turnen/Gymnastik". Problematische Testwerte sind in der Kontrollgruppe häufiger vertreten.

Tabelle 3. Mittelwert (x), Konfidenzintervall (95%) und Standardabweichung (s) der Kontrollgruppe im Prätest.

Angstdimension/ Tätigkeitsbereich	x	Konfidenz-intervall (95%)	s
Blamage	5,29	4,76 - 5,82	2,17
Konkurrenz	5,00	4,58 - 5,42	1,73
Mißerfolg	5,70	5,24 - 6,18	1,93
Unbekanntes	6,06	5,56 - 6,56	2,07
Verletzung	5,82	5,30 - 6,34	2,16
Ballspiele	4,76	4,38 - 4,98	1,56
Kampfspiele	5,29	4,86 - 5,72	1,76
Leichtathletik	6,88	6,43 - 7,33	1,87
Schwimmen	6,29	5,91 - 6,67	1,57
Gymnastik/Turnen	5,65	5,19 - 6,10	1,84

Im Posttest verringert sich die sportbezogene Ängstlichkeit der Kontrollgruppe

(vgl. Tabelle 4). Die Unterschiede im Vergleich zum Prätest sind für fast alle Dimensionen signifikant (Ausnahmen: "Blamage" und "Ballspiele"). Dadurch nähert sich die Angstausprägung von Versuchs- und Kontrollgruppe an. Signifikante Unterschiede bestehen nicht mehr.

Tabelle 4. Mittelwert (x), Konfidenzintervall (95%) und Standardabweichung (s) der Kontrollgruppe im Posttest.

Angstdimension/ Tätigkeitsbereich	x	Konfidenz-intervall (95%)	s
Blamage	4,72	4,23 - 4,66	2,01
Konkurrenz	4,35	3,89 - 4,81	1,90
Mißerfolg	4,53	4,15 - 4,91	1,59
Unbekanntes	5,06	4,63 - 5,49	1,78
Verletzung	4,24	3,81 - 4,67	1,79
Ballspiele	4,59	4,25 - 4,93	1,41
Kampfspiele	4,76	4,34 - 5,18	1,75
Leichtathletik	5,47	5,06 - 5,89	1,70
Schwimmen	5,53	5,29 - 5,77	1,01
Turnen/Gymnastik	4,41	3,96 - 4,86	1,84

Interpretation

Die Untersuchungsergebnisse gestatten es nicht, die eingangs gestellte Fragestellung zu beantworten. Ursachen dafür sind darin zu sehen, daß Veränderungen der einzelnen Angstdimensionen differenziert verlaufen und offenbar weitere Faktoren maßgeblich wirken, die in der Untersuchung nicht berücksichtigt wurden.

Eine Abnahme der Angstwerte, die jedoch nicht signifikant ist, tritt in der Versuchsgruppe in solchen Angstdimensionen auf, die mit sozialen Vergleichen und Leistungserwartungen zusammenhängen. Dabei verringert sich die Angst vor "Blamage", "Konkurrenz" und "Mißerfolg", obwohl sie schon im Prätest ein relativ niedriges Niveau aufweist. Unter diesem Aspekt kann es ein Hinweis darauf sein, daß die Schüler die Bedeutung der Sportleistung und ihre sozialen Folgen anders wahrnehmen und bewerten. Möglicherweise hat die für sie neue Perspektive der Yogaübungen, nämlich ohne Leistungs- und Konkurrenzdenken lediglich auf die eigenen Erfahrungen konzentriert zu sein und unabhängig von sozialen Bewertungen die eigene Kompetenz zu erleben, Veränderungen in der Situationswahrnehmung bewirkt.

Die Verringerung der sportbezogenen Ängstlichkeit in der Kontrollgruppe legt aber

nahe, weitere Faktoren in Betracht zu ziehen. So ist zu klären, ob die Ergebnisse durch entwicklungsbedingte Veränderungen überformt sind. So weisen Untersuchungen von Schwarzer, Jerusalem und Lange (1982) auf eine geringe zeitliche Stabilität der Ängstlichkeit bei Kindern hin.

Des weiteren könnte die jeweilige Situation der Schüler zum Zeitpunkt von Prä- und Posttest modifizierend gewirkt haben. Der Prätest fand mitten im Schuljahr statt, als Leistungsanforderungen und Zensuren den Sportunterricht stark prägten. Als der Posttest durchgeführt wurde, standen die Zeugnisnoten bereits fest. Der Leistungsdruck im Sportunterricht war damit zeitweilig reduziert. Dadurch verringerte sich die potentielle Bedrohung des Selbstkonzepts. Es ist möglich, daß sich diese unterschiedliche Situation im Prä- und Posttest dahingehend ausgewirkt hat, daß die Schüler der Kontrollgruppe, die signifikant schlechtere Zensuren im Sportunterricht im Vergleich zu den Schülern der Versuchsgruppe erhielten, die Vorlagen des SAD anders wahrgenommen und bewertet haben.

Dieser Unterschied im Zensurenniveau von Versuchs- und Kontrollgruppe weist des weiteren darauf hin, daß die Sportnote bereits die Entscheidung von Schülern an einem Yoga-Kurs teilzunehmen bzw. nicht teilzunehmen beeinflußt. Schüler mit weniger guten Zensuren ("Drei") sind offenbar weniger motiviert, sich über den Sportunterricht hinaus freiwillig in der Sporthalle zu betätigen. Für die ablehnende Haltung kann auch die zum Prätest höhere sportbezogene Ängstlichkeit dieser Schüler von Bedeutung gewesen sein, denn Ängstlichkeit stellt einen Prädiktor für die Sportpartizipation von Kindern dar. Über die Erfahrung, daß in einem Yoga-Kurs verschiedene Faktoren, die im Sportunterricht angstauslösend wirken können, nicht vorhanden sind, verfügten die Schüler nicht.

Für die Durchführung weiterer Untersuchungen ist es deshalb erforderlich, gezielt Schüler zu werben, die ein hohes Niveau sportbezogener Ängstlichkeit aufweisen und zu den leistungsschwächeren gehören. Dabei sollten Versuchs- und Kontrollgruppen möglichst homogen sein. Darüber hinaus wäre es günstig, weitere Faktoren, wie das Körperkonzept und das Selbstwertgefühl zu erfassen. Es wäre auch interessant, die Entwicklung sportbezogener Ängstlichkeit über den Zeitraum eines Yoga- bzw. Entspannungskurses hinaus hinsichtlich langfristiger Wirkungen zu untersuchen.

Literatur

Eysenck, H.J. (1978). Expectation as causal elements in behavioural change. *Advances in Behaviour Research and Therapy, 1*, 171-175.

Fuchs, R. (1990). *Sportliche Aktivität bei Jugendlichen.* Köln: bps-Verlag.

Hackfort, D. & Nitsch, J.R. (1988). *Das Sportangst-Deutungsverfahren.* Schorndorf: Hofmann.

Kiphard, E.J. (1989). Die psychohygienische Bedeutung der Entspannungsfähigkeit im Erwachsenen- und Kindesalter. *Praxis der Psychomotorik, 11,* 182-189.

Kleine, D. & Schwarzer, R. (1991). Angst und sportliche Leistung - eine Meta-Analyse. *Sportwissenschaft, 1,* 9-27.

Schwarzer, R., Jerusalem, M. & Lange, B. (1982). A longitudinal study of worry and emotionality in German secondary school children. In R. Schwarzer, H.M. van der Ploeg & C.D. Spielberger (Eds.), *Advances in test anxiety research* (Vol. 1, pp. 67-819). Lisse/Hilsdale, NJ: Swets & Zeitlinger/Erlbaum.

Wandke, K. & Richter, K. (1990). Hatha-Yoga in der Schule. *Körpererziehung, 11,* 468-474.

SATISFACTION AMONG SOCCER OFFICIALS

SOME ANTECEDENTS AND CONSEQUENCES

ADRIAN TAYLOR, ENGLAND

A shortage of officials is seriously threatening the development of some sports such as football in both Europe and North America, and yet sports psychologists have had little interest in the cognitions, feelings and turnover of those in this vital role.

This paper, founded on organisational models of turnover (e.g. Price, 1977), contends that as aspects of the officiating role are perceived to be more stressful (i.e., the perceived role demands are inconsistent with an officials' abilities, goals, values or beliefs) then role satisfaction may diminish. An official who is less satisfied with the role may cognitively evaluate the cost/benefits of continuing (while also considering alternative leisure pursuits) and perhaps spend less time officiating and develop turnover intentions, preceding actual dropout.

Job satisfaction was defined by Williams and Hazer (1986, p. 222) as "an affective orientation of individuals to the work roles they occupy and characteristics of their jobs". Satisfaction would appear to be an important mediating factor in the link between perceived role characteristics and turnover (Locke, 1976). However, sport related research (e.g. Lewthwaite & Scanlan, 1984; Rail, 1987) has been limited to identifying levels of satisfaction and antecedent factors among athletes, coaches, and administrators, without considering the consequences of satisfaction, such as turnover. The variety of instruments used in these studies to measure satisfaction were not appropriate for the officiating role and it was necessary to develop items to assess officiating satisfaction.

Several authors have identified the pressures associated with officiating (e.g. Fry & Sefton, 1982; Isberg, 1982; Nelson, 1979; Weinberg & Richardson, 1990). Taylor and Daniel (1988) identified seven sources of stress among officials which may contribute to low satisfaction. In order of most to least stressful, these were labelled role-culture conflict, fear of failure, interpersonal conflicts, time pressures, fitness concerns, peer conflicts, and fear of physical harm.

It was therefore hypothesised, using a cross-sectional path analysis, that the effects of stress on turnover will largely be mediated through satisfaction and turnover intentions. Specific background variables and stressors were expected to be antecedent to satisfaction. Turnover intentions were expected to be consequences of satisfaction.

Methods

Subjects and Design

All 1269 officials registered with the Ontario Soccer Association (certified at Youth Competitive level and above) were mailed a copy of The Ontario Soccer Officials Survey, in June (T1 - three months after the start of the outdoor season in Canada). At the end of the season (T2 - four months later), all respondents at T1 were again mailed the survey. A total 529 subjects (i.e., 42%) responded (with usable data) at both T1 and T2. Only T2 data are reported here.

Variables and Measures

The Ontario Soccer Officials' Survey contained various multi-item sections to gain measures of perceived officiating stress, satisfaction and turnover intentions, (and other variables not reported here). Additional questions were concerned with demographics and role characteristics. The psychometric properties and format of the seven stressor scales (30 items) have been reported elsewhere (Taylor & Daniel, 1988; Taylor, Daniel, Leith & Burke, 1990).

The frequency of feelings of satisfaction was assessed using 9 items with a 4-point scale from never (0) to often (3). These reflected various facets of the construct including satisfaction with fitness, performance, achievements, support received, pay, social contacts, and the role of officiating in general. A composite score from five items reflecting both frequency and intensity of previous feelings and future intentions about quitting was derived as described by Taylor et al. (1990).

Results

Descriptive Analyses

The average official was 38.7 years old (SD=11.0), a married male, and employed in a white collar profession. He spent an average of 7.42 hours per week (SD=4.9) officiating, earned $16 (SD=8.1) per game and had been a soccer official for 7.27 years (SD=5.7). The majority of officials were certified to officiate any senior amateur game (level 3) with progressively fewer advancing through written and practical assessment to National level.

The satisfaction scores were negatively skewed with most officials generally satisfied with their role. Further analysis revealed that officials were satisfied with

all aspects of their role exception pay and support received. Principal components factor analysis of the 9 items revealed a uni-dimensional construct and a single composite score for satisfaction was used. Adequate internal consistency was demonstrated by Cronbach alpha coefficients of 0.75 and 0.84 for the satisfaction and turnover intentions scales, respectively.

The relative importance of the seven sources of stress confirmed the pilot study findings (Taylor & Daniel, 1988).

Correlational Analyses

Weak but significant ($p < .05$) correlations revealed that satisfaction increased with age ($r = .12$) and among those with more advanced levels of certification ($r = -.09$). All seven sources of stress were significantly and negatively related to satisfaction with the exception of peer conflicts: Correlations ranged from -.09 to -.16. Satisfaction was also correlated with number of games officiated ($r = .21$), hours involved in officiating ($r = .24$) and turnover intentions ($r = -.42$).

Cross-Sectional Path Analysis

In the first stage of the path analysis a backward stepwise regression procedure was used to identify non- significant relationships ($p > .05$) between (a) satisfaction, and (b) intent to quit, and the preceding variables in the fully justified recursive model (see Pedhazur, 1982). In the second step only significant predictors were entered in the regression equation. Standardized regression coefficients (betas) and residual terms ($e = 1 - R2$) are shown for the over-identified causal model in Figure 1.

Age and level of certification were the only significant background variables, related to satisfaction or turnover intentions. Those certified at higher levels tended to be more satisfied (Beta=-.11, $p < .01$), while older officials reported more frequent turnover intentions (Beta=.14, $p < .001$).

Clearly the strongest predictor of turnover intentions was satisfaction (Beta=.40, $p < .001$). When all exogenous variables were regressed on intentions to quit, 7% of the variance was explained ($R2 = .07$, $F = 10.83$, $p < .001$). With satisfaction also entered in the equation, 22% of the variance was explained ($R2 = .22$, $F = 30.09$, $p < .001$). Only 6% of the satisfaction variance was explained by the three significant predictors, officiating level, fitness concerns and role-culture conflicts. Role-culture conflict was the strongest predictor of satisfaction (Beta=.14, $p < .001$).

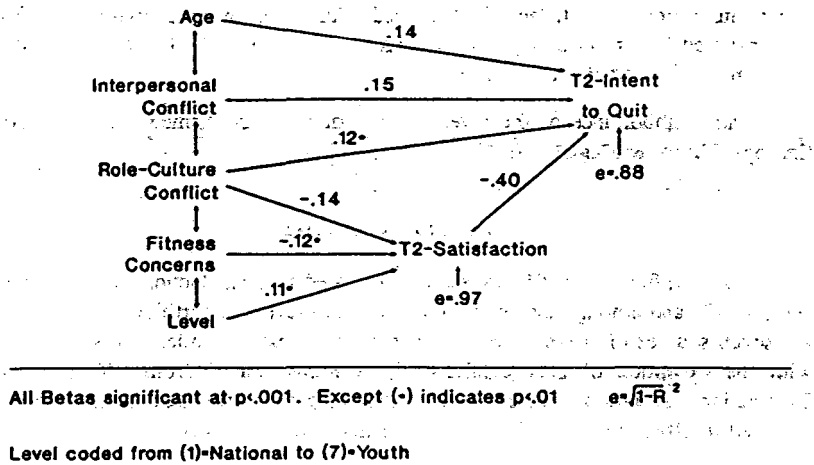


Figure 1. Cross-sectional path model with satisfaction mediating the effects of perceived stress on turnover intentions.

Discussion

The link between level of certification, age and satisfaction suggests that either the refereeing role becomes more satisfying or that a natural elimination process exists whereby only those who gain greater satisfaction from officiating tend to continue.

Various environmental antecedents have been related to satisfaction among those involved in primary and secondary sport roles. Findings from this study suggested that it was the lack of appreciation and recognition (role-culture conflict) and concerns about personal fitness that were related to officiating satisfaction. Referees are often given little credit for their efforts, irrespective of performance and there may be limited opportunity for social integration with players and coaches. Rail (1987) also found a lack of recognition to be an important predictor of role satisfaction, among volunteer sport executives.

The average age (38.7 years) of the subjects in this study reflects the socialization process into soccer officiating. Many officials have retired from playing, perhaps due to problems with fitness maintenance. It may become increasingly difficult to keep up with play; consequently the role is fulfilled less efficiently, resulting in less satisfaction.

The findings appeared to support a model in which the effects of perceived stress on turnover were mediated through satisfaction, but only for certain stressors (i.e., fitness concerns and to some extent role-culture conflict). The fact that turnover intentions related more strongly with satisfaction than perceived stress adds support to the need for process models in sport.

One explanation why the exogenous variables were only weak predictors of satisfaction may be due to the somewhat limited variability in the satisfaction measure despite the use of a composite 9-item score. Clearly, other important variables, such as perceived ability, could be added to the model to better explain variability in satisfaction.

In conclusion, this study has several practical implications. Faced with a growing shortage of officials in many sports, psychological skills such as stress and conflict management should be taught in referee training clinics. Younger officials may need assistance with assertiveness and interpersonal skills while the older official may need encouragement towards and advice on physical conditioning. Greater support and recognition for officials is also needed.

References

Fry, D.A.P. & Sefton, J.M. (1982). *Retention of game officials for ice hockey.* Unpublished manuscript, University of Saskatchewan, Saskatoon.

Isberg, L. (1982). Referee problems in football [soccer]. In J.T. Partington, T. Orlick & J.H. Salmela (Eds.), *Sport in perspective* (pp. 78/79). A Coaching Association of Canada Publication, August.

Lewthwaite, R. & Scanlan, T.K. (1984). *Children's satisfaction with sport: Intrapersonal and significant adult influences.* Paper presented at The American Alliance for Health, Physical Education, Recreation and Dance Convention, Anaheim, Ca.

Locke, E.A. (1976). The nature and causes of job satisfaction. In M.D. Dunnette (Ed.), *Handbook of industrial and organizational psychology.* Chicago: Rand-McNally.

Nelson, K.H. (1979). *Study of the relationship between support for political authority, support for sport officials, and disrespectful behavior towards sports officials.* Unpublished doctoral dissertation, University of North Colorado.

Pedhazur, E.J. (1982). *Multiple regression in behavioral research* (2nd ed.). New York: Holt, Rinehart & Winston.

Price, J.L. (1977). *The study of turnover.* Ames: Iowa State University Press.

Rail, G. (1987). Perceived role characteristics and executive satisfaction in voluntary sport associations. *Journal of Sport Psychology, 9,* 376-384.

Taylor, A.H. & Daniel, J.V. (1988). Sources of stress in soccer officiating: An empirical study. In T. Reilly, A. Lees, K. Davids & W.J. Murphy (Eds.), *Science and Football: Proceedings of the First World Congress of Science and Football* (pp. 538-544). London: E. & F.N. Spon.

Taylor, A.H., Daniel, J.V., Leith, L. & Burke, R.J. (1990). Perceived stress, psychological burnout and paths to turnover intentions among sport officials. *Journal of Applied Sport Psychology, 2,* 84-97.

Weinberg, R.S. & Richardson, P.A. (1990). *Psychology of officiating*. Champaign, Ill.: Human Kinetics

Williams, L.J. & Hazer, J.T. (1986). Antecedents and consequences of satisfaction and commitment in turnover models: A re-analysis using latent variable structural equation methods. *Journal of Applied Psychology, 71,* 219-231.

7

Stress und Erholung

Stress and Recovery

COMPETITION STRESS AMONG EXPERIENCED AND INEXPERIENCED TABLE TENNIS ATHLETES AND ITS EFFECT ON PERFORMANCE

ABDELWAHAB M. EL-NAGGAR, SAUDI ARABIA

Introduction

Evidence have indicated that performance errors of an athlete are a result of mental mistakes in the first place (Mahoney, 1978). Among the factors that produce mental mistakes is the inability of focusing on the task being performed, and such inability is affected by the degree of stress the athlete experiences (Landers, Min Qi & Courtet, 1985). It has been maintained that individuals who are prone to experiencing higher levels of competitive stress perform significantly poorer (Passer, 1983), and under this condition the more experienced athletes performed better than the less experienced athletes (Landers et al., 1985).

Most studies that examined effects of stress on the allocation of attention in performing motor task have been conducted in a laboratory context (e.g. Reis & Bird, 1982). The purpose of the present study was to investigate effect of competition stress on competition performance in experienced (EXP) and inexperienced (NEXP) table tennis male athletes.

Method

Subjects

Subjects were 43 male table tennis athletes. Based on their experience years in competitions they were devided into two groups. NEXP group (N=21, age M=21.43, SD=3.84) included subjects with less than 10 experience years (M=6.29, SD=2.41). EXP group (N=22, age M=26.45, SD=5.59) included subjects with 10 or more experience years (M=13.14, SD=4.81).

Procedure

Using the A-state scale from the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) stress level (SL) was measured for each subject at pre-

(PRE) and post- (POST) participation in a final match of an open national table tennis tournament at Riyadh. The result of the match (win or loss) and the final scores were the indicators of performance level of the athlete.

Results

Using MANOVA of repeated measures PRE and POST SL dependent variables were analyzed by experience (NEXP & EXP) and the match results (win & loss) as independent variables (Table 1). The results showed that the experience main effect and the interaction among experience, match results and SL, each with others and all together, were not significant at less than .05 level.

Table 1. Repeated measures MANOVA of stress level.

Source of variation	df	MS	F	p
		Between subjects effect		
Within cells	39	85.23		
Constant	1	123384.95	1447.63	.000
Experience (EX)	1	235.04	2.67	.105
Match results (RS)	1	846.53	9.93	.003
EX x RS	1	5.99	.07	.792
		Within subjects effect		
Within cells	39	84.42		
Stress level (SL)	1	173.94	2.06	.159
EX x SL	1	67.69	.80	.376
RS x SL	1	22.91	.27	.605
EX x RS x SL	1	5.84	.07	.794

The match results main effect was significant at less than .01 level. Such results indicated that the winners and loosers from each of the NEXP and EXP groups were not different in SL that they experienced at the PRE and POST. However, the SL by and large of all winners was different from that of all loosers athletes. This indication was confirmed by the t-test results presented in Table 2. They showed no SL significant differences between NEXP and EXP at PRE and POST, and between PRE and POST for each of NEXP and EXP at less than .05 level.

Table 2. t-test of stress level between inexperienced (NEXP) (N=21) and experienced (EXP) (N=22) athletes at PRE and POST competition and between PRE and POST for each group and for all subjects.

Variable	M	SD	M	SD	t	p
	NEXP		EXP			
PRE	39.10	9.53	40.86	8.73	-.64[a]	.529
POST	34.19	9.55	39.32	10.37	-1.68[a]	.100
	PRE		POST			
NEXP	39.10	9.53	34.19	9.55	1.55[b]	.137
EXP	40.86	8.73	39.32	10.37	.67[b]	.508
All	40.44	8.51	36.35	10.52	2.16[b]	.037

[a] Group t-test
[b] Paired t-test

The SL at PRE was higher than SL at POST for both NEXP and EXP together ($p<.05$). This indicated that SL reduced after performing the match. The Pearson correlation coefficients among variables were calculated and presented in Table 3.

Table 3. Correlation matrix of age, experience years (YRS), stress level (SL) at PRE and POST competition and match scores (SCO).

Variable	YRS	PRE SL	POST SL	SCO
Age	.56**	-.12	.15	-.01
YRS		-.10	.06	.13
PRE SL			.14	-.25
POST SL				-.40*

**: $p<.001$
*: $p<.01$

The results showed that the relationship between the POST SL and the score of the match was negative and significance at the .01 level. This indicated that winners who accomplished high scores in the match tended to have less SL than those who accomplished low score after they finished the match.

Discussion

The results showed that both NEXP and EXP athletes experienced some degree of

stress before participating in competitions. Such stress was expected as the competitive situation has the potential to elevate pre-competition stress levels (Scanlan & Passer, 1978). No significant difference in SL was detected between NEXP and EXP in contrary with previous research (Landers et al., 1985). The reason for that may refer to the criterion of identifying NEXP and EXP (less or equal 10 years and more) which did not fully differentiate between them and they seemed to be very close in experience. Observing no effect of SL on performance may be referred to the fact that SL was relatively low (M=40.44) because of the experience of the subjects.

References

Mahoney, M.J. (1978). Cognitive skills and athletic performance. In P.C. Kendall & S.D. Hollon (Eds.), *Cognitive-behavioral interventions*. New York: Academic Press.

Landers, D.M., Min Qi, W. & Courtet, P. (1985). Peropheral narrowing among experienced and inexperienced rifle shooters under low- and high-stress conditions. *Research Quarterly for Exercise and Sport, 56,* 122-188.

Passer, M.W. (1983). Fear of failure, fair of evaluation, perceived competence, and self-esteem in competitive-trait-anxious children. *Journal of Sport Psychology, 5,* 172-188.

Reis, J. & Bird, A.M. (1982). Cue processing as a function of breadth of attention. *Journal of Sport Psychology, 4,* 64-71.

Scanlan, T.K. & Passer, M.W. (1978). Factors related to competitive stress among youth sport participants: I. Predictors of competitive stress. *Journal of Sport Psychology, 1,* 151-159.

Spielberger, C.D., Gorsuch, R.L. & Lushene, R.E. (1970). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychological Press.

PSYCHOLOGICAL ASPECTS OF FATIGUE IN COMPETITIVE SPORTS

YVES VANDEN AUWEELE, BELGIUM

Introduction

The numerous studies (e.g. Borg, 1982; Mihevic, 1981; Pandolf, 1983) on the evaluation of the effort sensation/perceived exertion, 'during' physical exercise constitute the starting point of the present study.

Much of this research has taken place in a laboratory setting, using a static (handgrip) or a dynamic exercise task (cycle ergometer, tread-mill). While performing the task (e.g. cycling or running) the individual is asked to Rate the degree of overall Perceived Exertion (RPE) at different points in time, usually with the Borg scale (Borg, 1982).

From the findings of these studies one can conclude that various physiological factors, constituting both local (strain in the exercising muscles and joints) and central (feelings involving the cardio-pulmonary system) sensory cues, account for an important amount of the variance in RPE (Cafarelli, 1977; Robertson, 1982). There is also strong evidence to conclude that some of the remaining unexplained variance may be related to psychological factors (some traits, motivational factors, cognitive strategies) (Morgan, 1973; Simonson & Weiser, 1976; Hardy, Hall & Presthold, 1986).

Nevertheless some questions remain for the sport psychologist who is interested in investigating sports phenomena in their multi-dimensional complexity. It is questionable to what extent laboratory research on fatigue by means of a bicycle ergometer or a treadmill can be generalized to fatigue or exertion as it is experienced by athletes in various competitive sports. The registration of perceived exertion 'during' exercise is also questionable. Focussing attention on fatigue and fatigue signals may conceal the importance of attention itself and of attention fluctuations in the perception of fatigue.

To deal with these remarks in our research, the perception of fatigue has been studied using questionnaires that refer to competitive situations in a retrospective way. The objectives have been operationalized in two series of questions.

1. Is there, in the experience of an athlete, only a direct, overall and undifferentiated perception of fatigue or is there also some awareness of

different components (e.g. an awareness of a local and/or a central component)? Are there differences in the overall and/or differentiated perceptions of fatigue between relevant subgroups of athletes?

2. According to the athletes, which psychological factors influence their awareness/perception of fatigue?

Method

Two series of questions were embodied in three standardized closed questionnaires. Items were formulated on the basis of 15 in-depth interviews and 67 written answers to two open-ended questions on fatigue and the determinants of fatigue obtained from competitive sportsmen.

The first questionnaire contains 51 items concerning the perception of fatigue proper; the second and the third questionnaire, with respectively 40 and 44 items respectively, deal with factors which are found to either diminish or to increase the fatigue experience. All items are of the Likert-type and could be answered by grading the applicability from 0 (not applicable) to 4 (very high applicable).

In 1989, 600 sets of questionnaires were distributed by students of the Institute of Physical Education of Louvain among Flemish competitive sportsmen of different disciplines (i.e. among members of the clubs in which these students perform as competitors); 224 (37%) of the questionnaires were returned properly completed and could be analyzed. In order to deal with the questions raised in the introduction, the answers to the questions about perceived fatigue and factors influencing fatigue were processed in the following way. First, the numerous items were reduced to a few dominant dimensions by means of intercorrelation and factor analysis. Then the extent which the group of competitive sportsmen was heterogeneous with respect to these dimensions was examined. Differences between sportdisciplines were tested with analysis of variance and multiple regression techniques.

Results and Discussion

Perceived Fatigue (First Questionnaire)

Factor analysis of the 51 items concerning the preception of fatigue proper yielded three factors as a best solution (see Table 1). The first factor, mental fatigue, groups items that represent cognitive complaints before, during or after

competition. A second factor, physical fatigue, indicates the consciousness of physiological changes caused by fatigue (awareness of central as well as local sensory cues). A final factor refers to the sportsman's consciousness that his technical or tactical response patterns are less adequate.

Table 1. Dimensions of the perception of fatigue (factor analysis on the 51 items of the first questionnaire : How I perceive fatigue).

Fatigue dimensions	Number of items	Alfa coef.	Prototypical items	Factor loadings
Mental fatigue	20	.78	I am absent minded	.77
			I am mentally tired	.64
Behavioral fatigue	14	.77	My reactions are slower	.51
			I loose my sense of rhythm	.50
Physical fatigue	12	.60	I feel dizzy	.57
			My legs feel heavy	.65

The relatively high intercorrelation between these three factors refers to the existence of a generalized experience of fatigue. There is a correlation of .47 between mental and physical components, a correlation of .32 between mental and behavioral components and a correlation of .40 between the physical and behavioral components.

There is no awareness of a distinction between the local and central physiological components. Items referring to these hypothezised components grouped in the same physical fatigue factor.

These results are significant within the framework of current theoretical conceptions with respect to the perceptual structure of emotions (Orlemans, 1978). Each emotion includes an overall experience as well as three subsystems which influence each other: respondants (physiological reactions), operants (behavioral reactions) and cognitions.

There proved to be significant differences in the three dimensional perception of fatigue between some relevant subgroups of sportsmen (see Table 2).

Volleyball players are distinguished quite clearly from long-distance runners by a higher score on "mental fatigue". The explanation for this could be found in the differential requirements of the two disciplines. Volleyball is an "open skill sport" in which mental processes - like concentration play a more important part than in the relatively "closed skill sport" of long-distance running.

Table 2. Differences in the average scores on the perceived fatigue dimensions (score 0 to 4) by sports discipline (Analysis of variance with Scheffé's a posteriori test).

Dimensions of perceived fatigue	Subgroups of competitive sportsmen					F	p	Scheffé
	1 long dist. run. n=36	2 tennis n=31	3 soccer n=21	4 volley n=20	5 surfing n=21			
Mental	0,99	1,44	1,33	1,61	1,42	4,48	0,002**	4 vs 1
Behavioral	1,99	1,94	2,18	2,13	1,91	1,01	0,41	
Physical	0,99	0,99	1,29	1,30	1,29	2,27	0,06	

sign. level : $p < 0,05$ = * 4 vs 1 = subgroup 4 differs from subgroup 1
$p < 0,01$ = **

Psychological Factors Influencing the Perception of Fatigue (Questionnaires 2 and 3)

Factor analysis on the 40 items of questionnaire 2 and on the 44 items of questionnaire 3 yielded respectively, four and three factors which, according to competitive sportsmen, can diminish or increase the intensity of subjective perceived fatigue or determine the speed at which one is conscious of the fatigue symptoms (Table 3).

The athlete tires less or does so more slowly when he feels he is able to control the competition and everything is going smoothly. This feeling of control is accompanied by an expansive experience of joy or pleasure (D.1). Athletes tire less and at a slower rate when they have a good relationship with their parents and coach, when parents or girlfriend or boyfriend are present or when the athlete has received encouragement (D.2). A third factor influencing the perception of fatigue is the amount of concentration involved in the task. This concentration is co-determined by factors having to do with achievement motivation: the challenging character of the competition, the will to excel or to improve (D.3). The fourth factor reducing the fatigue sensation has to do with characteristics of the task allowing a better control of effort: when there are recovery movements; at the approaching end of the competition; when the opponent shows some weaknesses (D.4).

Table 3. Psychological factors influencing the perception of fatigue (factor analysis of 40/44 items from the second and third questionnaires).

Factors decreasing fatigue	Number of items	Alfa coef.	Prototypical items *The athlete tires less (not that quickly) when...*	Factor load.
Control (D.1)	9	.86	* everything is going smoothly * he is in control	.77 .65
Social support (D.2)	10	.81	* relevant others are congenial * when he can talk to somebody	.68 .60
Achievement motivation (D.3)	8	.75	* he is concentrated on the task * when he is determined to excel	.68 .51
Task characteristics (D.4)	4	.56	* there are recovery moments * at the approaching end	.61 .40
Factors increasing fatigue			*The athlete tires more/more quickly* when ...	
First appraisal (I.1)	9	.68	* he has not trained sufficiently * he has just been ill	.56 .63
Second appraisal (I.3)	17	.87	* he does not take pleasure in the competition * he is performing below his capacities	.72 .69
Anxiety (I.2)	11	.73	* others expect a good performance * he feels stressed	.63 .60

On the contrary, the athlete either tires more quickly or feels more tired when he has assessed his chances of success to be low at the beginning of the task or competition for one specific reason or another (first appraisal): having been ill; not having been able to train sufficiently; estimating the opponent as being too strong; the effort required is higher than his capabilities (I.3). When, during the competition, the athlete experiences that something is not working out as expected (second appraisal), that he is performing below his capacities, or that he is not able to control the competition, he will also feel tired more quickly (I.3). A third factor has to do with anxiety: the athlete tires more quickly when he is nervous, or has fear of failure because of social factors (loss of esteem of relevant others: parents, girl/boy friend) or because of a loss of self-esteem (failing in his own eyes) (I.2).

Conclusion

Perceived fatigue seems to be a process of consciousness in which specific mental, physical and behavioral experiences are interpreted as fatigue and to a certain extent are integrated into an overall impression of fatigue. There is evidence that "open skill sports" competitors perceive their fatigue more mentally than those in "closed skill sports". It is likely that attention processes play a particularly important mediating role. As an athlete only has a limited amount of attention, physiological, mental or behavioral fatigue-signals are not always perceived consciously. Before, during or after a sports performance, numerous other competition related emotions, cognitions and demands such as task stress, experiences of joy (flow), the competitive spirit, the need for self-esteem, and/or feeling in control of the situation might make claims on attention capacities so compellingly that even strong fatigue and pain signals are not noticed. The contrary also applies: there is an intensified awareness of fatigue symptoms when the task is assessed as detrimental to the satisfaction of fundamental needs, such as the need for self-esteem. In this case fatigue and task aversion become an escape mechanism for the athlete.

References

Borg, G. (1982). Pyschophysical basis of perceived exertion. *Medicine and Science in Sports and Exercise, 14,* 377-381.

Cafarelli, E. (1977). Peripheral and central inputs to the effort sense during cycling exercise. European *Journal of Applied Physiology, 37,* 181-189.

Hardy, C.J., Hall, E.G. & Presthold, P.H. (1986). The mediational role of social influence in the perception of exertion. *Journal of Sport Psychology, 8,* 88-104.

Mihevic, P.M. (1981). Sensory cues for perceived exertion: a review. *Medicine and Science in Sports and Exercice, 13,* 150-163.

Morgan, W.P. (1973). Psychological factors influencing perceived exertion. *Medicine and Science in Sports and Exercise, 5,* 97-103.

Orlemans, J.W.G. (1978). *Inleiding tot de Gedragstherapie.* Deventer: Van Loghum Slaterus.

Pandolf, K.B. (1983). Advances in the study and application of perceived exertion. *Exercise and Sport Sciences Reviews, 11,* 118-158.

Robertson, R.J. (1982). Central signals of perceived exertion during dynamic exercise. *Medicine and Science in Sports and Exercise, 14,* 390-396.

Simonson, E. & Weiser, P.C. (Eds.). (1976). *Psychological aspects and physiological correlates of work and fatigue.* Springfield: Charles C. Thomas.

STRESS TOLERANCE AS ADAPTATION TO EXTREME CONDITION DURING SPORTS ACTIVITY

ALBERT V. RODIONOV, RUSSIA

Sports activity in combats is marked of operative character:

- it proceeds in the time-limit conditions;
- it "complex comprises " motor and the informational operations, by which the athlete transforms the situation;
- it requires a high level of specific abilities, based on the complex of perspective, psychomotor and cognitive qualities and psychodynamic and personal traits;
- it proceeds at the background of intensive psychic states and it depends of them.

In combats operative tasks are solved in such a way that the active search for information is realised with a special importance of motor actions; the decision at the verbal level is inseparable from the decision at the psychomotor level.

The present study is an attempt to determine how stress-tolerance affect special abilities for operative task-solving and therefore how it affects the athletes performance.

In extreme conditions when the task is not very complicated and the situation is standard, the athlete executes the definite set of decisions, which are based on sensumotor reactivity. When the task is multivariant, mechanisms of operative thinking are involved and the athlete activities the images of the situation, combines them and makes the adequate decision. This synthesis of sensomotor and cognitive elements may be called operative or practical intellect.

The elements of the operative intellect are determined by the influence of invariomental stimuli adn the accompayning states.

The analysis of the fencers performance revealed a kind of a delayed improvement in operative intellect elements in the course of the tournament.

This delayed improvement is inversely proportinal to the complexity of psychomotor activity structure (simple reaction time improves better, choice reaction and the sense of time improve less). After several succeding wins, being on the rise (evstress state) the athlte displays a marked improvement in indices, with the exception of the sense of time, related to evaluation of selfaction; when the athlete is in distress we see the opposite picture.

The search for management of distress goes on through self-evaluation of actions in the time microintervals. Individual differences causes by the psychophysiological parameters "dynamics-inertness" by UZNADSE are revealed.

The differences are clearly manifested in set formation for the coming performance before the tournament in the most comlicated "competitive" situations before the finals.

"Dynamic" athletes react quicker and more precisely. This determines the specific character of their style activity. "Dynamic" athletes prefer risky tactics of creation of multialterantive situations from the first bouts; the "innerts", prefer temporizing tactics with the large amount of preliminary actions. The "innerts" are more tolerant to the stress situations at the beginning of the contest, the "dynamics" at the middel of the contest; and in finals mastership, fitness and motivation, but not psychodynamics qualities begin to play the desicive role.

Distinguishing of the individual differences in stress-tolerance may be illustrated by three examples of Galvanic Skin Response dynamics in pre and post competition and in practice. Besides that athletes self-evaluations of their states by Osgood Mathesius were used. Boxers served as subjects in this investigation.

The first variant is characterised by a gradual fall in Galvanic Skin Response before training and competitive bouth, which evidences of a strong precompetitive activation. After the first day the stage of exhaustion is observed, which is confirmed by objective data and self-reports.

If the first stage of the competition is successfully overcome, inaedequate reactions do not occur any more. This picture us usually observed in hypermotivated, anxious, emotionally reactive athletes. The combination of motivation intensity and uncertainty on the athletes environment is the main stress factor at the first stage of the competition for them.

The second variant stabilisation of state in the course of auquisiton of fitness and at the same time the self-appraisals are inadequately critical. During the competition stress reactions become less manifested.

The adaption overcomes the optimal level. These athletes are sufficiently motivated, innert, emotionally rigid. The imbalance of some personality traits and the demands of sports activity ist the main stress-factor for them.

The third variant - manifested dynamics of states in the process of preparation - to the tournament and in the tournament; the response to practice reflectss the concrete content of activity composition, while response to competition reflects the objective strength of the sequential opponent, this response ist adequate pre- and after the bout.

Self-appraisals reflect the anxiety and adaptation to the extreme competitive situation. As a rule these features are observed in moderately motivated, tolerant athletes with strong and dynamic nervous system. Combination of inner importance an outer uncertainty is the main stress factor for them.

The data obtained indicate that in the course of precompetitive training a number of changes in psychic and psychophysiological functions, takes place; these changes are of adaptational character and they objectively reflect changes in fitness. There is a divergence between these changes and self-evaluations, and ist becomes larger the sooner the competition and the greater ist importance to the athlete. The dynamics of psychic an psychophysiological functions at the different stages of practice and competition has heterogenic and heterochronic character, determined by individuell differences in stress-tolerance.

Under the influence of spors activity wich the operate task-solving in stress conditions psychodynamics porperties are acquized. They promote the development of special abilities and at the same time they form a basis for the athlete's individual style of activity formation. Some qualities, at the first glance have a negative effect on the operative task solving (such as neurotisigm, censitivity), but, most likely, they do determine the process of special abilities formation (for example, the quickness of emergence of readness state for urgent decisions; the ability to filter perceived signals). Exactly these qualities determine the athlete's individual style of activity in extreme competitive situations.

KOGNITIVE UND EMOTIONALE BELASTUNGSVERARBEITUNG IM HALLENHANDBALL

ZEITREIHENSTUDIEN BEI OBERLIGA- UND BUNDESLIGASPIELERN

JAN PETERS JANSSEN UND MANFRED WEGNER, DEUTSCHLAND

Einführung

Im zeitlichen Verlauf einer Wettkampfserie sind Spieler leistungsorientierter Handballmannschaften vielfältigen Belastungsbedingungen ausgesetzt. Dieser "psychische Druck" kann sich in Leistungsschwankungen bemerkbar machen, deren Ursachen nicht sofort feststellbar sind. Als sportbezogene Belastungen werden häufig der "Angstgegner", der Kampf um den Stammplatz oder das nächste Auswärtsspiel genannt. Außersportliche Beanspruchungen wie die immer wiederkehrenden, belastenden Alltagsprobleme ("daily hazzles") oder gar kritische Lebensereignisse werden dann zum Problem, wenn sie nicht effektiv bewältigt werden (vgl. Schönpflug, 1987). Im kognitiven Streßmodell von Lazarus und Launier (1981) wird die wahrgenommene Inkongruenz zwischen den Umweltanforderungen und den individuellen Kapazitäten des Individuums als Bedingung zur Auslösung eines Streßzustandes angenommen. Ähnlich beschreibt auch Scherer (1986) den Streß - im Gegensatz zu "normalen" Beanspruchungsreaktionen - als eine Reaktion auf eine Belastung, die entweder extrem intensiv ist oder länger andauert, ohne daß deren Ende und Konsequenz absehbar ist. Die vorhandenen Bewältigungsfähigkeiten sind m.a.W. unzureichend und die angewendeten Bewältigungsversuche mißglücken.

Im folgenden geht es um die Übertragung dieser Modellannahmen auf den Mannschaftssport. Welches sind geeignete Beanspruchungsindikatoren? Wie wird Beanspruchung im Verlauf einer Saison erlebt? Gibt es Hinweise auf die Effektivität der Bewältigung? Um diese Fragen beantworten zu können, müssen wir verschiedene Belastungsaspekte (Situationen, besondere Ereignisse), die erlebte Beanspruchung (Herausforderung oder Bedrohung), aber auch die Wirksamkeit des Spielverhaltens erkunden.

Wir möchten mit der vorliegenden Untersuchung drei Forschungsfragen beantworten: (1) Welche inneren und äußeren Belastungen werden von Handballspielern als potentielle Stressoren wahrgenommen? (2) Wie wirkt sich die Beanspruchung auf das Befinden im Saisonverlauf aus? (3) Welche Beziehungen zwischen dem wahrgenommenen Befinden (vor/nach Training und Wettkampf) und der tatsächlichen

Spielleistung liegen vor?

Methode

Als geeignete Methode für die Beschreibung von Belastungs-Beanspruchungs-Episoden im zeitlichen Verlauf erscheint die statistisch kontrollierte Einzelfallanalyse (vgl. Schlicht & Janssen, 1990).

Variablen und Untersuchungsablauf

Das Befinden im zeitlichen Verlauf dient als Indikator für das Beanspruchungserleben. An zwei Trainingstagen in der Woche und bei Wettspielen wird das aktuelle Befinden mit einem standardisierten Protokoll vorher und nachher erfaßt. Die Spieler müssen acht unterschiedliche kognitive, emotionale und motivationale Aspekte der Befindlichkeit bewerten wie beispielsweise: "Ich habe heute Lust zum Spiel" oder "Ich werde mich heute anstrengen". Sinngemäß heißt die Frage nach dem Spiel: "Ich habe mich heute angestrengt". In einer offenen Frage sollen bei Auftreten von besonderen Belastungsereignissen diese stichwortartig beschrieben und das Beanspruchungerleben bewertet werden. Die individuelle Spielleistung aus insgesamt 17 Wettkampfspielen (z.B. positive/negative Wurfaktionen, Assistenzen, Ballverluste) wurde mit einem standardisierten Beobachtungsbogen erfaßt, gewichtet und in einem Gesamtscore verrechnet.

Probanden

Drei Spieler des mittleren Leistungsniveaus (Oberliga) und drei Spitzenspieler (Bundesliga) auf identischen Spielpositionen (Rückraum-, Außen-, Kreisposition) haben in der Vorbereitungsphase und während der ersten Saisonhälfte 1988/89 an der Untersuchung teilgenommen. Aufgrund von Verletzungen oder unterschiedlicher Spielzeiten konnten nicht die gleichen Datenmengen erfaßt werden. Exemplarisch sollen die Ergebnisse eines Bundesligaspielers (A) und eines Oberligaspielers (B) vorgestellt werden: Spieler A ist Rückraumspieler und Haupttorschütze mit einer durchschnittlichen Spielzeit von 56 min. Er hat an 17 Spielen teilgenommen und an 67 Zeitpunkten das Protokoll geführt. Spieler B ist Rückraumspieler mit einer durchschnittlichen Einsatzzeit von 33 min. 16 Spiele und 47 Zeitpunkte sind in die Analyse aufgenommen worden.

Ergebnisse

Als Ursachen für die psychische Beanspruchung geben die Spieler sportartspezifi-

sche wie auch allgemeine Gründe an: Verletzung, Müdigkeit, Gewinnen müssen, schlechte Erfahrungen mit dem Gegner, Klausur, Prüfung nicht bestanden, Zahnarzt, Studium, Freundin. In der Bewertung der Beanspruchung durch die Ereignisse werden starke individuelle Unterschiede deutlich.

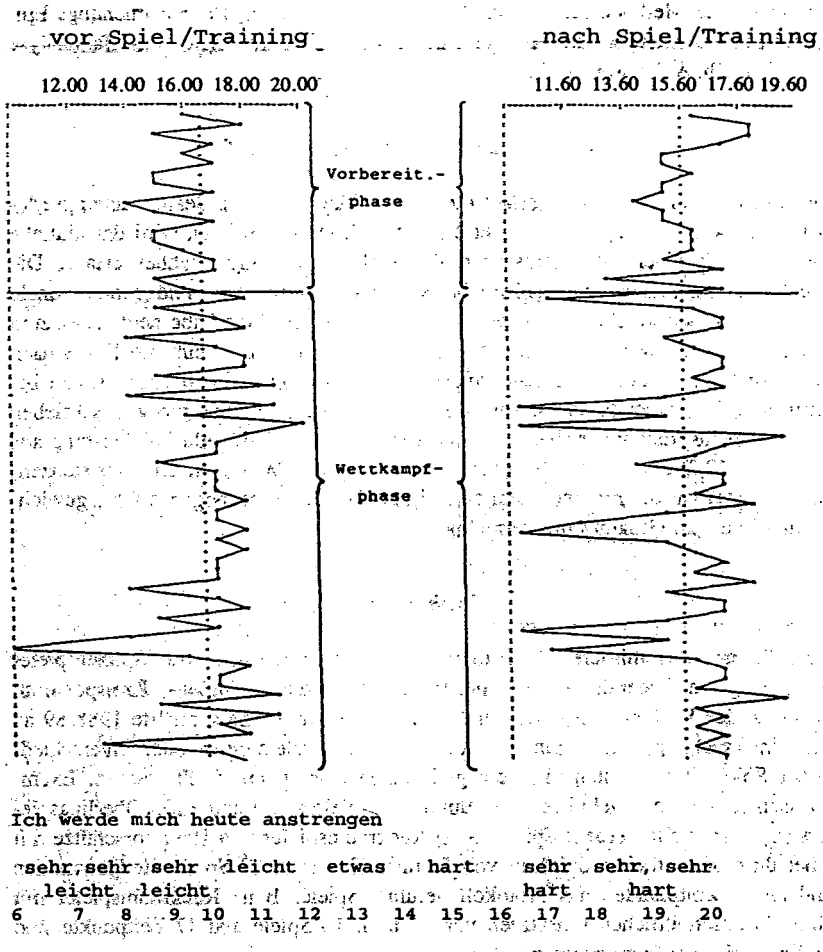


Abbildung 1. Zeitreihen der wahrgenommenen Anstrengung eines Bundesligaspielers über eine halbe Saisonphase.

Das Beanspruchungserleben im zeitlichen Verlauf wird anhand der Schwankungen der Befindlichkeit geprüft. Mit der univariaten Zeitreihenanalyse wird die Verände-

rung des Befindens im Verlauf der Meßzeitpunkte vor/nach dem Training und vor/nach dem Wettkampf erfaßt. Es zeigen sich zwei durchgängige Befundtrends: Die Befindlichkeitsvariablen in der Vorbereitungsphase sind höher ausgeprägt als während der Saison. Von allen Pbn werden die Wettkämpfe belastender als die Trainingseinheiten bewertet. Exemplarisch werden die individuellen Muster der Zeitreihen für den Bundesligaspieler (A) für die Variable "Anstrengung" (vgl. Borg, 1970) dargestellt: "Ich werde mich heute anstrengen" und "Ich habe mich heute angestrengt" (vgl. Abbildung 1).

Mit der bivariaten Zeitreihe werden Zusammenhänge zwischen der Spielleistung und dem Befinden vor und nach dem Spiel geprüft. Die Einschätzung der Befindlichkeit vor dem Spiel soll Hinweise auf eine mögliche Beziehung von Beanspruchungserleben und Spielleistung geben; das Befinden nach dem Spiel gibt Aufschlüsse über den Attribuierungsstil des Athleten.

Bei Spieler A folgt auf eine hohe Anstrengungserwartung eine gute positive Spielleistung ($r=.55$; $p=.04$). Nach dem Spiel wird die zusammengefaßte Spielleistung mit einer hohen Konzentration ($r=-.58$; $p=.02$), mit einer Bestätigung der Erwartungen ($r=-.61$; $p=.02$) und mit einer hohen Anstrengung ($r=.63$; $p=.01$) erklärt.

Bei Spieler B zeigen sich Zusammenhänge der Besorgtheit ($r=-.51$; $p=.03$), der Anstrengung ($r=.49$; $p=.04$) und der Motivation ($r=-.63$; $p=.01$) mit den Wurfleistungen im Spiel. Nach dem Spiel korreliert die Variable "Zielerreichung" ($r=.68$; $p=.00$) mit der Wurfleistung und die Variable "Anstrengung" mit dem Gesamtleistungsscore ($r=.59$; $p=.01$).

Diskussion

Die Ergebnisse der Zeitreihen zeigen Zusammenhänge von Befinden und sportlicher Leistung bei Mannschaftsspielern auf. Dabei werden interindividuelle Muster und Verläufe deutlich. Sind aus den Verläufen der Befindlichkeits- und Leistungsvariablen auch Rückschlüsse auf die eingangs gestellten Ausgangsfragen zur Belastungs-Beanspruchungsproblematik möglich?

Als Belastungsereignisse oder -episoden können in der Studie die Leistungssituationen "Wettkampf" und "Vorbereitungsphase" identifiziert werden. Im Befinden der Athleten wird deutlich, daß diese Phasen intensiver und wahrscheinlich beanspruchender wahrgenommen werden. Aus sportbezogener Sicht ist dieses Ergebnis plausibel. Der Wettkampf stellt eine besondere Prüfungs- und Belastungssituation mit hoher Selbstwertrelevanz dar. Ähnliches gilt auch für die Vorbereitungphase auf die Wettkampfsaison, in der die Athleten bemüht sind, sich in die Mannschaft zu spielen oder ihre Position zu behaupten. Sportbezogene Beanspruchungssituationen dieser Art werden von Sportlern sicher nicht als heftige Streßsituationen erlebt,

sondern im Sinne von Lazarus und Launier (1981) eher und als Herausforderung wahrgenommen (vgl. Schlicht, 1989).

Hinweise auf mögliche "kritische Lebensereignisse" oder aber "daily hazzles" geben die protokollierten Belastungsfaktoren. In den Zeitreihen ist für beide Athleten eine Auslenkung im Beanspruchungserleben im Sinne eines Streßzustandes (vgl. Scherer, 1986) nicht nachzuweisen. Das betrifft sowohl den Verlauf der Befindensvariablen als auch den Verlauf der Leistungskriterien. Die Bewältigungskompetenz der Spieler scheint ausreichend, um die Beanspruchungsepisoden zu bewältigen.

Aus unserer Studie kann man einige Anregungen für die praktische Umsetzung im Sportspiel gewinnen. Einerseits bietet die Prozeßanalyse von Wettkampfvorbereitung, Wettkampfverhalten und Leistungsattribution Hinweise für eine individualisierte Vor- und Nachbereitung des Wettkampfgeschehens. Andererseits sind die Befindensprotokolle ein Hilfmittel, den Grad der Beanspruchung trainingsbegleitend anschaulich abzubilden. Hier zeigen sich sehr individuelle Muster, Stile und Trends (vgl. Wegner, Wilhelm & Janssen, 1991), deren Verlauf auch Rückschlüsse über kritische Saisonphasen (z.B. bei Verletzungen, Trainerinterventionen etc.) zulassen.

Sicherlich muß man auch nach der Ökonomie und nach der zeitlichen Verschiebung der Datenauswertung fragen. In diesem Zusammenhang dürfen wir auf die Studie von Janssen und Schlicht (1987) verweisen. Dort wurde mit Unterstützung des Bundesinstitut für Sportwissenschaft (Köln) ein trainingsbegleitendes Beratungskonzept bei 400 m Hürdenläufern durchgeführt. Auch ohne eine solche Förderung sind wissenschaftlich kontrollierte Begleitstudien möglich, wenn Interesse und Offenheit durch die Trainer und Spieler gewährleistet sind. Diese Art der Zusammenarbeit wäre dann auch für Mannschaftssportarten förderlich, um die Effektivität theoriegeleiteter Praxis zu verbessern.

Literatur

Borg, G. (1970). Perceived exertion as an indicator of somatic. *Scandinavian Journal of Rehabilitation Medicine, 2*, 92-98.

Janssen, J.P. & Schlicht, W. (1987). Beratung eines Hürdenläufers. *Sportpsychologie, 1*, 19-24.

Lazarus, R.S. & Launier, R. (1981). Streßbezogene Transaktion zwischen Person und Umwelt. In J.R. Nitsch (Hrsg.), *Streß. Theorien, Untersuchungen, Massnahmen.* (S.213-259). Bern: Huber.

Scherer, K.R. (1986). Voice, stress and emotion. In M.H. Appley & R. Trumbull (Eds.), *Dynamics of stress* (pp. 157-179). New York.

Schlicht, W. (1989). Belastung, Beanspruchung und Bewältigung. Zentrale Komponenten sportlichen Handelns. *Sportpsychologie, 3*, 10-17.

Schlicht W. & Janssen, J.P. (1990). Der Einzelfall in der empirischen Forschung der Sportwissenschaft: Begründung und Demonstration zeitreihen-analytischer Methoden. *Sportwissenschaft, 20,* 263-281.

Schönpflug, W. (1987). Beanspruchung und Belastung bei der Arbeit - Konzepte und Theorien. In U. Kleinbeck & J. Rutenfranz (Hrsg.), *Arbeitspsychologie* (S. 130-184). Göttingen: Hogrefe.

Wegner, M., Wilhelm, A. & Janssen, J.P. (1991). Befindlichkeit und Leistung im Hallenhandball: Zeitreihenstudien von Handballspielern im Saisonverlauf. In R. Singer (Hrsg.), *Sportpsychologische Forschungsmethodik - Grundlagen, Probleme, Ansätze* (S. 370-371). Köln: bps.

THE INFLUENCE OF SPECTATORS REACTIONS ON THE SPORT PERFORMANCE

PAVEL SLEPICKA, CZECH REPUBLIC

Sports practice ascribes considerable importance to spectator influence on sports performance. In psychology the mutual activity of people and the influence on their activities is comprised under the term social facilitation of activity. Spectator reactions either at home sportsground or at opponents' sportsground, expressing the momentary attitude to the sports team, act either as a supportive stimulus of the presented sports activity, or as discouraging stimulus. Sports practice has verified that the mere presence or absence of spectators at any sports match makes different sociopsychological conditions for sports performance. The influence of spectators' presence on sports performance is a factor appreciated in practice. Research verification carried out for the most part in laboratory conditions does not, however, bring indubitable results.

One of the first studies conceived in this way is the paper of Laird (1923) who claims that offensive remarks of spectators lower the level of motor skills. Karpovich (1965) says that performance increases with positive, supportive spectator reactions. Singer (1975) means that neither positive nor negative spectator reactions or commentaries influence the performance of well-prepared athletes. Thirer and Rampey (1979) in their study pointed out different influence of spectators' antisocial behaviour on the behaviour of the home team and the behaviour of their opponents.

The opinions of the quoted authors based on research studies are not, however, in absolute accordance with the findings of practice. Therefore we investigated the influence of spectator reactions on some aspects of activity of basketball, handball teams. We supposed that both positive cheering, positive response, and negative response of the spectators will have impact on selected aspects of the performed activity. We also presupposed a different influence of supporting which is generally considered positive, from the influence of negative (antisocial) behaviour of the spectators. Positive manifestations were, for the purposes of our study, wild clapping, shouts of admiration or agreement of a larger part of the spectators, or even chanting, which supported athletes or teams. Negative (antisocial) behaviour was characterized as behaviour with features of word aggression against the players, threatening players and referees, throwing objects on the sportsground, fights between spectators, wild negative response of spectators to game action, criticizing referees by means of whistling, yelling, shouting.

We selected basketball and handball as the investigated sports expecially because

the above mentioned spectator manifestations are not so frequent in these sports and therefore players are not so well adapted to them. Moreover the contact between the sportsmen and the terraces is closer, the distance in space is not so big, the closed space of the halls amplifies the sound effect of spectator reactions.

The investigations were carried out in the course of the league competition in these sports. During this period we investigated 20 league basketball matches and 20 handball league matches. There was applied the method of observation aimed at spectator reactions. The aim of the investigation was to find out when positive cheering, positive response to the performed game began, and when there were negative (antisocial) activities characterized above. Isolated displays of the feeling of individual spectators were not registered, as we concentrated on mass spectator manifestations. In the observation there was registered the time of the game when the spectator manifestations occurred and of what type. There was also registered the time they lasted. For the sake of better comparability we included in theses spectator manifestations in basketball only the time periods when the game was going. Besides the investigated displayes of spectators' feelings we also recorded the score of the match, the number of points or goals during the time, number of the players' errors (fauly pass, steps, dropping the ball, etc.) and the number of faults the players made in the investigated time intervals.

The results presented in Table 1 are the data found when investigating basketball matches, and in Table 2 there are data found out in handball matches.

Results

In basketball matches there were found out a significant difference in the number of points per one minute of play in the situation of positive behaviour (cheering) of spectators and negative spectator behaviour ($S^- = 84$, $S^+ = 7$). This is a difference significant on 1% significance level. Another found out significant difference (on 5% significance level) was the difference in the number of faults per one minute in the situation of positive spectator support and negative spectator behaviour ($S^- = 80$, $S^+ = 11$).

Further there was found out a significant difference (on 1% significance level) in the number of faults in the game situation without spectator reactions and game with negative spectator reactions ($S^- = 84$, $S^+ = 9$). The last significant difference of away basketball teams was the difference between the number of faults in the situation of game without spectator reactions and game with negative spectator reactions ($S^- = 80$, $S^+ = 11$), the significance being on 5% significance level.

Table 1: Influence of spectator reactions on same game activities in basketball.

	Playing time without significant spectator reactions								Playing time during spectator reactions cheering								Playing time during negative spectator reactions							
	minutes		points		mistakes		fouls		min.		points		mistakes		fouls		min.		points		mistakes		fouls	
match			aw	ho	aw	ho	aw	ho			aw	ho	aw	ho	aw	ho			aw	ho	aw	ho	aw	ho
1	36	64	72	22	18	15	17	3	7	10	4	6	2	1	1	0	4	2	6	1	1	6	1	6
2	34.5	53	55	28	20	31	24	2.5	3	2	2	3	3	2	3	3	7	4	1	3	3	3	3	3
3	40	71	71	17	23	21	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	38	51	47	19	16	26	24	0	0	0	0	0	0	0	2	3	6	3	0	1	1	3	2	2
5	35	67	80	20	12	22	14	4	8	10	3	3	4	2	1	1	3	1	6	2	2	6	2	6
6	40	80	102	23	17	19	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	32	57	65	18	10	26	20	3	6	9	4	2	2	2	5	8	10	2	6	2	2	6	2	6
8	36.5	66	60	23	20	24	24	26	2	4	6	2	3	1	1.5	3	3	1	2	2	1	2	1	1
9	32.5	42	38	17	19	20	23	1.5	6	6	3	1	2	4	4	5	11	3	1	1	1	1	4	4
10	37.5	61	84	19	13	30	22	2	3	6	2	0	1	2	.5	0	2	0	0	1	1	0	1	0
11	37	41	63	16	18	19	21	2	3	6	2	3	2	1	1	0	4	2	0	2	2	0	2	6
12	38	62	50	12	18	22	19	2.5	4	6	2	1	3	2	1.5	2	4	1	0	1	1	0	2	2
13	40	58	71	20	12	16	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	32	42	45	16	15	12	13	2	6	3	2	3	2	2	2	2	5	1	1	1	1	1	2	2
15	34	39	38	19	21	17	15	4.5	4	8	2	2	2	3	1.5	2	4	2	0	1	1	1	2	2
16	40	66	83	28	20	15	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	36	51	69	12	16	17	15	2	6	4	3	1	2	1	0	0	0	0	0	0	0	0	0	0
18	36.5	49	57	16	18	19	21	2	4	5	3	2	2	2	1.5	3	5	2	1	2	2	1	2	3
19	37.5	52	49	20	18	16	19	1.5	2	4	1	1	2	3	1	2	4	1	0	1	1	0	1	2
20	40	76	52	10	19	17	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mean	36.80	59.45	64.55	18.65	17.25	20.25	19.65	3.06	3.35	4.15	1.95	1.50	1.60	1.46	1.33	1.70	3.60	1.35	.30	1.20	1.35			

aw ... away team ho ... home team

Calculation to one minute of match

	Playing time without significant spectator reactions						Playing time during spectator reactions cheering						Playing time during negative spectator reactions					
	points		mistakes		fouls		points		mistakes		fouls		points		mistakes		fouls	
match	aw	ho	aw	ho	aw	ho	aw	ho	aw	ho	aw	ho	aw	ho	aw	ho	aw	ho
1	1.78	2	.61	.50	.42	.47	2.33	1.33	1.33	.2	.67	.33	0	4	2	0	1	6
2	1.54	1.59	.75	.58	.90	.70	1.20	.80	.80	1.20	1.20	.80	1	2.33	1.33	.33	1	1
3	1.85	1.78	.43	.58	.53	.62												
4	2.39	2.29	.50	.47	.68	.63							1.50	3	1.50	0	2	1
5	1.91	1.29	.57	.34	.83	.40	2	2.50	.75	.75	1	.50	1	2	1	0	2	0
6	2	2.55	.58	.43	.40	.38												
7	1.78	2.03	.56	.31	.81	.63	2	3	1.33	.67	.67	.67	1.60	2	.40	0	.40	1.20
8	1.81	1.44	.63	.35	.66	.66	.08	.15	.33	.08	.12	.04	.2	2	.07	1.33	1.33	.67
9	1.29	1.17	.52	.50	.62	.71	2.25	1.71	.86	.29	.57	1.14	1.25	2.75	.75	.25	.25	1
10	1.63	2.24	.51	.35	.80	.75	1.50	3	1	0	.50	1	0	4	0	0	3	0
11	1.11	1.70	.43	.49	.51	.57	1.50	3	1	1.50	1	.50	0	4	2	0	2	0
12	1.72	1.39	.33	.50	.64	.53	1.60	2.40	.80	.40	1.20	.80	1.33	2.67	.67	0	.67	1.33
13	1.45	1.78	.50	.30	.70	.43												
14	1.20	1.29	.46	.43	.34	.37	2	1	.67	1	.67	.67	1	2.50	1.50	.50	.50	.50
15	1.15	1.12	.56	.62	.50	.44	.89	1.78	.44	.44	.44	.67	1.33	2.67	1.33	0	.67	1.33
16	1.50	2.08	.70	.50	.30	.43												
17	1.24	1.02	.32	.42	.45	.39	3	2	1.50	.50	1	.50						
18	1.34	1.56	.44	.49	.52	.58	2	2.50	1.50	1	1	1	2	3.33	1.33	.67	1.33	2
19	1.39	1.31	.53	.40	.43	.51	2	2.67	.67	.67	1.33	2	2	4	1	0	1	2
20	1.90	1.30	.25	.40	.43	.55							2	3.33	1.33	.67	1.33	2
mean	1.61	1.75	.51	.47	.56	.54	1.74	2.13	.92	.75	.81	.76	1.20	3.04	1.12	.25	1.17	.97

Table 2. Influence of spectator reactions on same game activities in handball.

	Playing time without significant spectator reactions							Playing time during spectator reactions cheering							Playing time during negative spectator reactions						
	minutes	points		mistakes		faults		min.	points		mistakes		faults		min.	points		mistakes		faults	
match		av	ho	av	ho	av	ho		av	ho	av	ho	av	ho		av	ho	av	ho	av	ho
1	48	13	17	12	14	29	32	8	3	6	4	2	5	8	4	1	3	4	1	2	6
2	45	12	11	8	10	33	26	10	2	4	5	1	7	9	5	2	2	3	2	4	5
3	52	16	13	11	13	26	28	2	0	2	3	1	3	1	6	2	4	4	1	3	5
4	50	15	21	14	7	32	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	43.5	14	17	11	6	29	35	11	6	7	6	4	7	7	5.5	2	3	2	3	3	4
6	56	15	20	16	11	36	27	3	1	2	2	1	3	2	1	0	0	1	0	1	2
7	51	19	24	13	9	31	26	6	3	4	4	2	4	3	3	1	2	2	0	2	3
8	40	12	12	7	8	25	22	13	4	6	5	5	5	6	7	2	4	3	3	4	3
9	53	14	15	10	11	28	31	5	2	2	3	1	4	3	2	1	1	0	0	1	2
10	47	16	13	13	15	25	20	8	3	4	3	2	5	3	5	1	4	3	0	2	5
11	52	11	15	20	18	27	20	6	1	3	2	0	3	2	2	0	1	2	0	1	2
12	50	9	12	17	15	13	16	5	1	2	3	1	2	2	5	1	3	3	1	2	4
13	53	8	11	18	19	15	15	4	2	2	1	1	1	2	3	1	2	2	0	1	3
14	56	12	11	19	21	16	13	0	0	0	0	0	0	0	4	1	3	3	0	2	5
15	57	10	13	18	19	14	15	3	1	2	2	2	3	1	0	0	0	0	0	0	0
16	60	16	22	22	15	16	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	51	14	8	14	16	18	13	2	0	1	2	1	2	0	0	2	5	6	2	2	6
18	60	17	18	15	17	19	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	56	19	15	14	18	24	12	2	1	1	2	1	2	1	2	1	1	2	1	1	2
20	57	12	15	18	13	12	14	2	2	1	0	2	1	1	1	0	1	2	0	1	2
mean	53.20	13.70	15.15	14.50	13.85	22.40	21.20	4.50	1.60	2.45	2.35	1.35	2.85	2.55	3.10	.90	2	2.10	.70	1.60	2.95

av ... away team ho ... home team

Calculation to one minute of match

	Playing time without significant spectator reactions						Playing time during spectator reactions cheering						Playing time during negative spectitor reactions					
	points		mistakes		faults		points		mistakes		faults		points		mistakes		faults	
match	av	ho	av	ho	av	ho	av	ho	av	ho	av	ho	av	ho	av	ho	av	ho
1	.27	.35	.25	.29	.60	.67	.38	.75	.50	.25	.63	1	.25	.75	1	.25	.50	1.50
2	.27	.24	.18	.22	.73	.55	.20	.40	.50	.10	.70	.90	.40	.40	.60	.40	.80	1
3	.31	.25	.21	.25	.50	.54	0	1	1.50	.50	1.50	.50	.33	.67	.67	.17	.50	.83
4	.25	.25	.23	.12	.53	.48												
5	.32	.29	.25	.18	.67	.80	.55	.64	.55	.36	.64	.64	.36	.55	.36	.55	.55	.73
6	.27	.26	.29	.20	.64	.48	.33	.67	.67	.33	1	.67	0	0	1	0	1	2
7	.37	.47	.25	.18	.61	.51	.50	.67	.67	.33	.67	.50	.33	.67	.67	0	.67	1
8	.30	.30	.18	.20	.63	.55	.31	.46	.38	.38	.38	.46	.29	.57	.43	.43	.57	.43
9	.26	.28	.19	.21	.53	.58	.40	.40	.60	.20	.80	.60	.50	.50	0	0	.50	1
10	.34	.28	.28	.32	.53	.43	.38	.50	.38	.25	.63	.38	.20	.80	.60	0	.40	1
11	.21	.29	.38	.35	.33	.38	.17	.50	.33	0	.50	.33	0	.50	1	0	.50	1
12	.18	.24	.34	.30	.26	.32	.20	.40	.60	.20	.40	.40	.20	.80	.60	.20	.40	.80
13	.15	.21	.34	.36	.28	.28	.50	.50	.25	.25	.25	.50	.33	.67	.67	0	.33	1
14	.21	.20	.34	.38	.29	.23							.25	.75	.75	0	.50	1.25
15	.18	.23	.32	.33	.25	.25	.33	.67	.67	.67	1	.33						
16	.27	.37	.37	.25	.27	.23												
17	.27	.16	.27	.31	.35	.25	0	.50	1	.50	1	0	.25	.83	.75	.25	.25	.75
18	.28	.30	.25	.28	.32	.27												
19	.34	.27	.25	.32	.25	.21	.50	.50	1	.50	1	.50	.50	1	1	.50	.50	1
20	.21	.26	.32	.23	.21	.25	1	.50	0	1	.50	.50	0	1	2	0	1	2
mean	.25	.29	.27	.26	.44	.42	.36	.57	.60	.36	.72	.51	.26	.63	.76	.17	.56	1.08

When analyzing the results achieved in the observation of handball matches there appeared, in home teams, significant differences between the number of goals per one minute in the game intervals without spectator reactions and with positive spectator support ($S^- = 120$, $S^+ = 0$), significance on 1% level. Also with home teams there was found out a difference between the number of faults in the game periods without spectator reactions and the game with negative spectator reactions ($S^- = 117$, $S^+ = 3$, the significance level, 1%).

With away handball teams there was found out a significant difference only in the number of faults in the game periods without spectator reactions and the game with negative reactions ($S^- = 118$, $S^+ = 2$, significant on 1% significance level). On 5% significance level there was found out a significant difference between the number of faults in the situation of the game without spectator reactions and the game with positive support ($S^- = 103.5$, $S^+ = 16,5$).

From a general view of the achieved results we may say that mass spectator reactions were reflected in the investigated aspects of the game activity of both home and away teams in basketball and in handball. This fact is proved by the found out differences in the number of points or goals per minute of the game, as well as the differences in the number of faults and per minute in the game intervals with different spectator reactions.

It appeared that with the investigated basketball teams the supporting spectator reactions had a more positive influence on home teams, as in this case there was a considerable increase in the scored points per minute of the match in the game intervals with these reactions in comparison with game intervals without such reactions. With home teams there was even a decrease in the number of faults in these situations. With away there was, with mass spectator support (of the home team) an increase in the number of faults, there was also an increase in the number of faults with negative spectator reactions. With negative spectator reactions there was also an increase in the number of fouls per one minute of the game on both sides. The investigated handball teams showed similar tendencies.

References

Laird, D.A. (1923). Changes in motor control and individual variations under the influence of razzing. *Journal of Experimental Psychology, 6*, 236-243.

Karpovich, P.V. (1965). *Psychology of muscular activity*. Philadelphia: Sanders.

Singer, R. (1975). *Motor learning and human performance: an application to physical skills*. New York: Macmillan.

Thiren, J. & Rampey, M. (1979). Effects of abusive spectators' behavior on performance of home and visiting intercollegiate basketball teams. *Perceptual and Motor Skills, 48*, 1042-1053.

A Study of Ergopsychometry in a Junior Male Volleyball Team

Katalin Kudar and Mate Petrekanits, Hungary

Our lecture is in relation to the problem of loadability, examining the relationship between physical and psychic performance capacity. From the results of previous Hungarian ergometric investigations (Malomsoki & Szmodis, 1975; Nagykáldi, Apor, Fekete & Pilvein, 1978) we can deduct that the effect of physical activity on psychic functions depends on level of load, though the central and peripheric processes manifest selectively, and it is person-specific. The ergopsychometric investigations of Guttmann (1986) gave new perspectives to our work.

Subjects

22 selected junior male volleyball players were tested.

Table 1. Persons under survey.

Biological chracteristics	X	SD
Age	14.40	0.62
Sport history	4.60	2.30
Height	183.55	6.32
Body mass	68.02	5.40

Purpose

The aim was to give professional aid for the preparation of the team, focussing on the optimalization of load and the physical conditioning of the competitors, during the preparation period. At the same time we had the possibility to obtain information about each competitor's psychophysiological response to all-out treadmill exercise. We thought that the selectivity occurring as a result of the all-out treadmill exercise could be pin-pointed in the psychic functions studied by us and that the findings would have diagnostic importance.

Method

The following psychological variables were observed pre and immediately after 20 minutes of restitution post exercise: state and trait anxiety, by the Hungarian version of Spielberger's STAI- scales (Sipos & Sipos, 1988), the psychic tone, by the psycho-vegetative indices (V.I.8 colour and V.I.C.) taken from Lüscher test (Rókusfalvy, Povazsay, & Halmi, 1971), psychomotoric functions: response time (RT), disjunctive response time (DRT), decision time (DT) and rate information processing (IFC) without/with auditory stimulation, by a Hungarian Medicor PC-1 apparatus, endurance of attention, by a Pieron test adapted to Commodore 64 microcomputer, 4 minutes programme.

The physiological parameters were: peak exercise ventilation (Ve_{max}), maximum respiratory number (fR_{max}), maximum heart rate (HR), peak exercise oxygen pulse (O_2P), weight-related power (RVO_{2max}), fractional O_2 uptake (FO_2), fractional CO_2 production (FCO_2), ratio of CO_2 production and O_2 uptake (R), post exercise acid basic status (pH), base excess (BE), running time (RT).

On the basis of each of the physiological parameters, a series of ranks was set up and two subgroups a higher (HPC) and lower (LPC) performance capacity group were formed. The higher performance capacity group (HPC) differed from the lower group (LPC) in the higher peak exercise ventilation (VE_{max}) ($p<0.01$), and oxygen pulse (O_2P) ($p<0.05$), in the lower post-exercise acid-base status (pH) ($p<0.05$) and higher base excess (BE) ($p<0.02$).

Analysis

The one-sample t-test was used to compare pre- and post-exercise values. The results of HPC and LPC groups were compared by a two sample t-test.

Results

Comparing the subgroups, we expected that the HPC group would have better results in terms of their psychophysiological indices. But the reverse occurred. The observed differences manifested themselves mainly in the autonomous nervous system, in the difference between the electrodermal activity measured in pre- and post-exercise status, and in the psychic tone organized on the psychovegetative level.

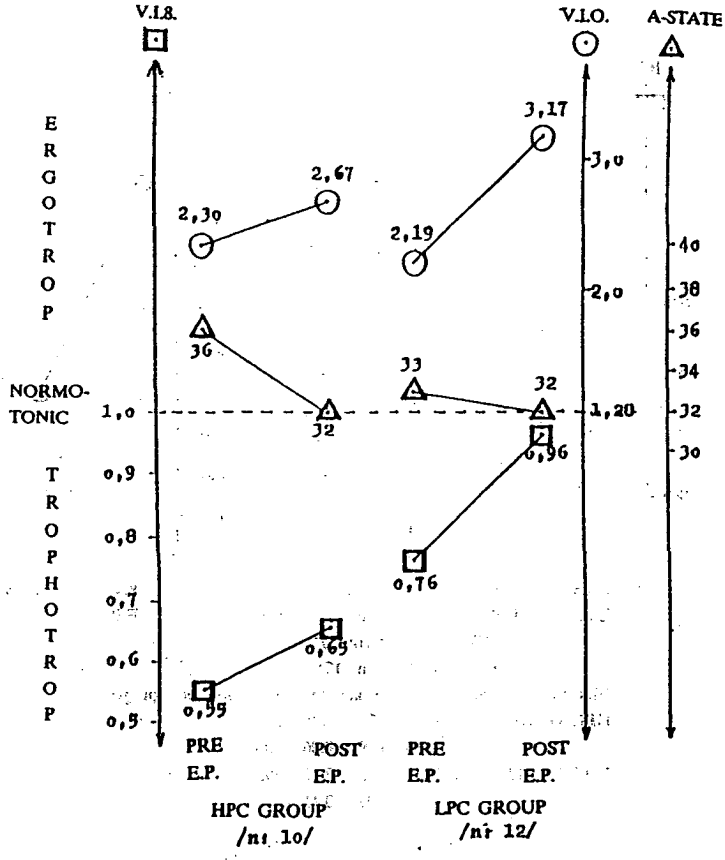


Figure 1. The psychic tone (V.I.8. and V.I.C. indices and A-state values in pre- and post-exercise period of higher (HPC) and lower (LPC) performance capacity groups.

The pychic tone of HPC group showed a marked trophotrop divergence on the 8th volume of the psychovegetative 8 colour scale. It suggested an attitude of rest, or inactivity. There was only a slight increase in the post-exercise period, too. But in this period at the same time, the A-State anxiety significantly declined ($p<0.01$).

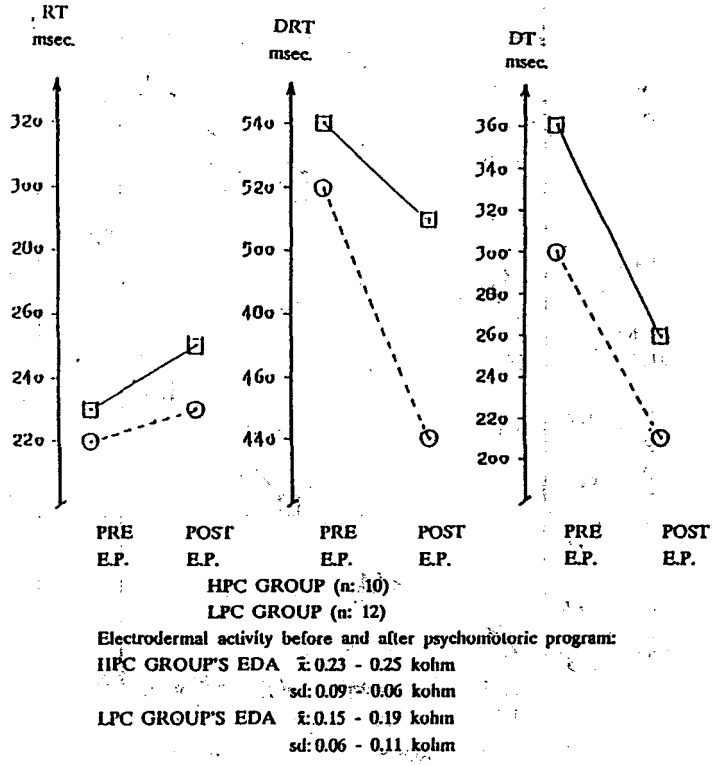


Figure 2. Simple response time (RT) *without* additional auditory stimulation and time pressure, disjunctive response time (DRT) and decision time (DT) values with groups of higher (HPC) and lower (LPC) performance capacity.

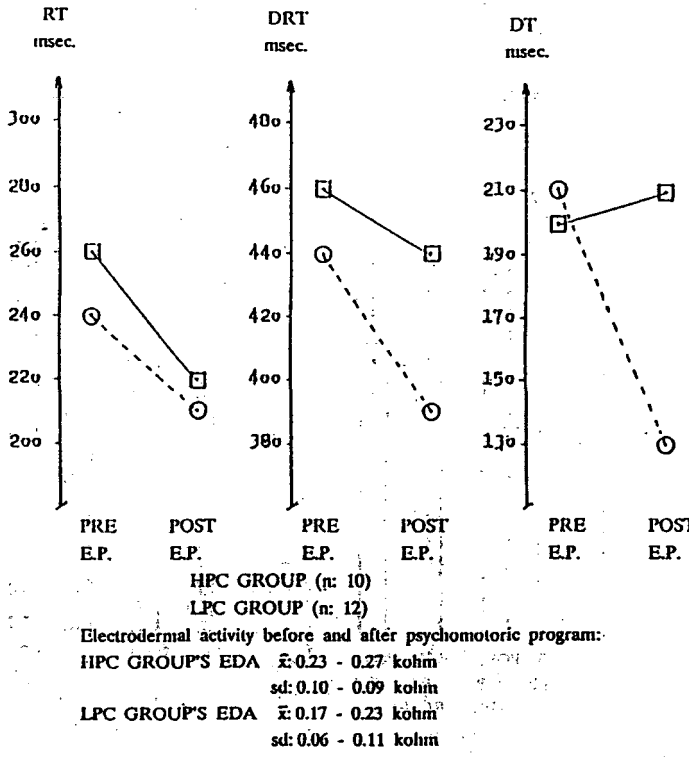


Figure 3. Simple response time (RT) *with* additional auditory stimulation and time pressure, disjunctive response time (DRT) and decision time (DT) values with groups of higher (HPC) and lower (LPC) performance capacity.

In both the simple and the complex psychometric programme we found that the members of the HPC group had a slower response and decision time in the pre- and post-exercise period.

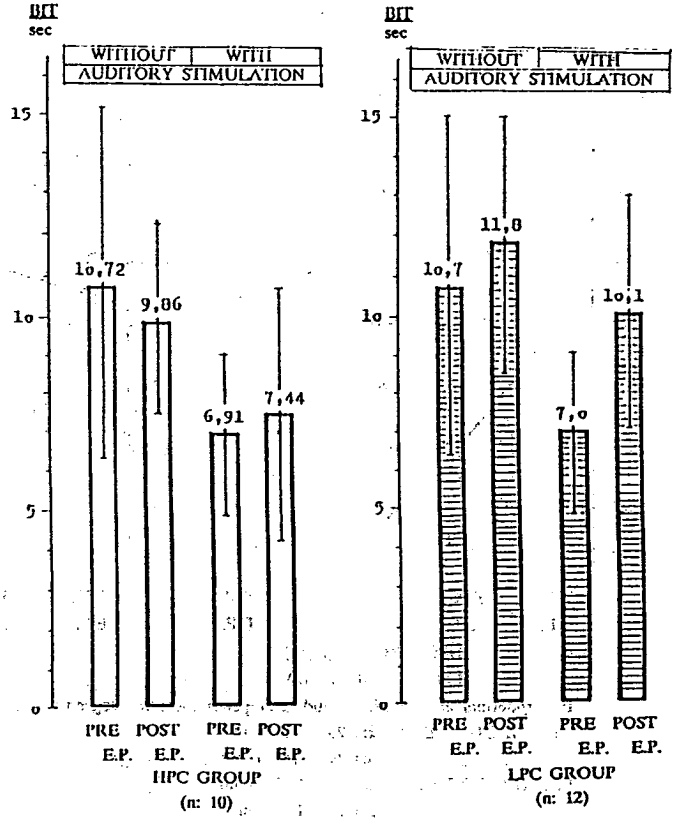


Figure 4. Pre- and post-exercise values of information processing capacity (LPC) in the without/with additional auditory stimulation and time pressure program with groups of higher (HPC) and lower (LPC) performance capacity.

The results show that there is no difference in the starting position between the IFC values in all of programmes, while in the post-exercise period the LPC had better results ($p < 0.05$).

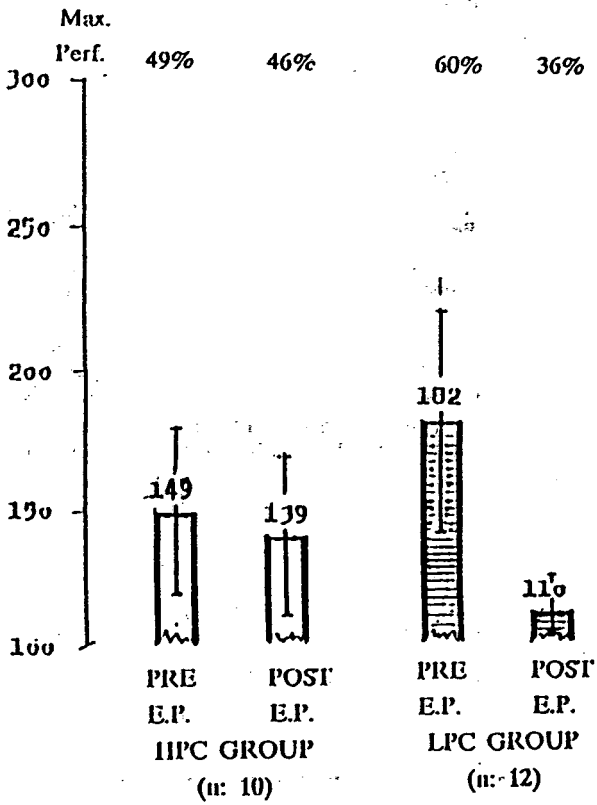


Figure 5. Signal-detection test for measuring the pre- and post- exercise endurance of attention with groups of higher (HPC) and lower (LPC) performance capacity.

The competitors showed the most unfavourable results in this test. It is very poor performance level. While the attention endurance of HPC group does not differ from that of the pre-exercise state, the higher achievement of the LPC group in the post-exercise period, where it significantly declines ($p < 0.05$).

Summary

We can deduct that the loadability, the rate of performance capacity has an effect on the mobility of the examined psychic functions, but at the same time it guarantees a higher function-stability.

References

Guttmann, G. (1986). Ergopsychometric testing: predicting and actualizing optimum performance under load. *Pszichológia, 6,* 235-247.

Malomsoki, J. & Szmodis, I. (1975). Changes of the optical reaction time during effort. *Hungarian Journal of Psychology, 3,* 499-511.

Nagykáldi, C., Apor, P., Fekete, G. & Pilvein, M. (1978). Psychophysiological functions and the changing of the blood-ammonia-level on physical load. Hungarian *Journal of Psychology, 3,* 246-251.

Rókusfalvy, P., Povazsay, E., Sipos, K. & Halmi, G. (1971). Possibilities of application of Lüscher's Test and its standardization. *The examination of psychovegetative tone with ergotrop-trophotrop indices* (pp. 100-122). Budapest: Akadémiai Kiadó.

Sipos, K. & Sipos, M. (1988). A-State-Trait Inventory. Hungarian version. *Psychodiagnostic Vademecum* (pp. 123-136). Budapest: Tankönyvkiadó.

PSYCHISCHE ERHOLUNG UND REGENERATION ZWISCHEN BEANSPRUCHUNGEN

HANS EBERSPÄCHER, HANS-DIETER HERMANN UND K.W. KALLUS, DEUTSCHLAND

Athletinnen und Athleten sowie Trainerinnen und Trainer wissen, wie wichtig die Zeit zwischen zwei Beanspruchungen ist. Ob es sich nun um eine Halbzeitpause, um die Pause zwischen zwei Runden, zwei Spielen oder zwei Disziplinen handelt - im Hinblick auf eine effektive Erholung und Regeneration kann die unzweckmäßige und psychologisch wenig einfühlsame Gestaltung der Pause Ursache für einen suboptimalen psychophysischen Zustand vor und während der nächsten Anforderung mit entsprechenden Leistungsbeeinträchtigungen sein.

Nach Renzland und Eberspächer (1988) ist psychophysische Regeneration "ein intentionaler, geplanter und kontrollierter Prozeß, um nach Beanspruchungen für eine Person die bestmöglichen subjektiven Handlungsvoraussetzungen zur Bewältigung nachfolgender Anforderungen zu schaffen (S. 15). "In diesem Verständnis der Regeneration muß eine Pause die Funktion einer Schleuse annehmen, um die Zeit zwischen Beanspruchung 1 (B1) und Beanspruchung 2 (B2) möglichst optimal zu gestalten (vgl. Abbildung 1).

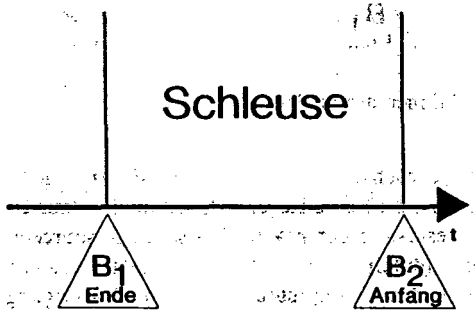


Abbildung 1: Das Modell der Schleuse, dargestellt für die Zeit (t) zwischen zwei Beanspruchungen (B1 und B2).

Zunächst dienen Pausen der Erholung. Veränderungen des Beanspruchungszustands in Pausen sind auf unterschiedlichen psychischen und physischen Beschreibungsebenen erfaßbar und über unterschiedliche Zugänge beeinflußbar. Bei längeren Pausen findet Regeneration eher automatisch statt. Bei kürzeren Pausen aber, ins-

besondere innerhalb mehrgliedriger Wettkämpfe, stellt die psychische Steuerung hin zur Startphase für die folgende Beanspruchung ein zentrales Moment dar. Im Gegensatz zu langfristigen Pausen ist der Erholungsprozeß unmittelbar um eine Reaktivierung zu ergänzen, damit der Regenerationsprozeß erfolgreich durchlaufen werden kann.

Sportlerinnen und Sportler müssen also ihren Zustand in der Pause zwischen zwei Beanspruchungen durch eine Art Schleuse so steuern, daß die Regenerationsmöglichkeiten voll ausgenutzt werden und für die nächste Beanspruchung ein optimaler Vorstartzustand erzielt wird.

Das Modell der Schleuse bietet sich aufgrund einer Reihe von Funktionsanalogien (Abbildung 2) zur Beschreibung des verwobenen, mehrschichtigen Prozesses in Pausen an.

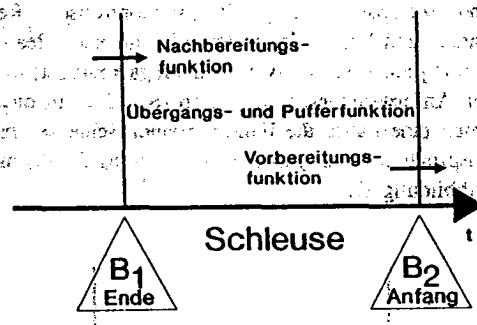


Abbildung 2. Funktionen der Schleuse.

So kann die Schleuse zunächst eine nachbereitende Funktion haben. Dieser nachbereitenden Funktion kann z.B. eine Regenerationsfunktion (zur Förderung der autonomen Rückstellprozesse und der psychophysischen Resourcenregeneration), eine Regulationsfunktion (durch den aktiven Einsatz kognitiver Fertigkeiten, Eberspächer, 1990) und eine Copingfunktion (zur Bewältigung psychischer und physischer Beanspruchungen) zugeordnet werden. Desweiteren kann die Schleuse Übergangs- oder auch Pufferfunktionen haben. So kann es z.B. im Mehrkampf vonnöten sein, die Pause derart zu gestalten, daß die "Unterbrechung" minimiert wird und Athletinnen sowie Athleten leichter von einer in die nächste Beanspruchung (Disziplin) übergehen können. Andererseits kann es auch notwendig sein, die Zeit zwischen zwei Beanspruchungen (z.B. die Halbzeitpause in Spielsportarten) zumindest teilweise als Puffer einzusetzen, so daß ein aus B1 resultierendes, leistungsinadäquates psychophysisches Niveau keine Auswirkungen auf B2 hat. Unter Umständen müssen Athletinnen und Athleten auch die Möglichkeit haben,

einen bestimmten Zeitbetrag in der Pause als "geistige Nische" (Nischenfunktion der Schleuse) zu verwenden, um die Vorbereitung auf B2 nicht durch Gedanken an B1 zu stören. Zur Vorbereitung auf B2 steht neben der Steuerungs- und Dosierungsfunktion wiederum die Regulationsfunktion im Vordergrund, damit für B2 letztendlich optimale Handlungsvoraussetzungen gegeben sind.

Nicht zuletzt die wenig trennscharfe Unterscheidung zwischen der Regulations- und der Steuerungsfunktion verdeutlicht, daß die einzelnen Funktionen nicht als disjunkt angesehen werden können, da sie sich teilweise ergänzen und ineinandergreifen. Zur effektiven Gestaltung der Zeit zwischen zwei Beanspruchungen hat Eberspächer (1990) sechs kognitive Fertigkeiten (Abbildung 3) herausgearbeitet, die ebenso wie motorische Abläufe (vgl. Eberspächer & Hermann, 1991) zunächst trainiert werden müssen, um in Wettkampfpausen abrufbar zu sein. In Abbildung 3 sind diese kognitiven Fertigkeiten und ihre Wirkungsansätze dargestellt. Je kürzer die Pause, desto größer ist der notwendige Automatisierungsgrad der einzelnen Fertigkeiten.

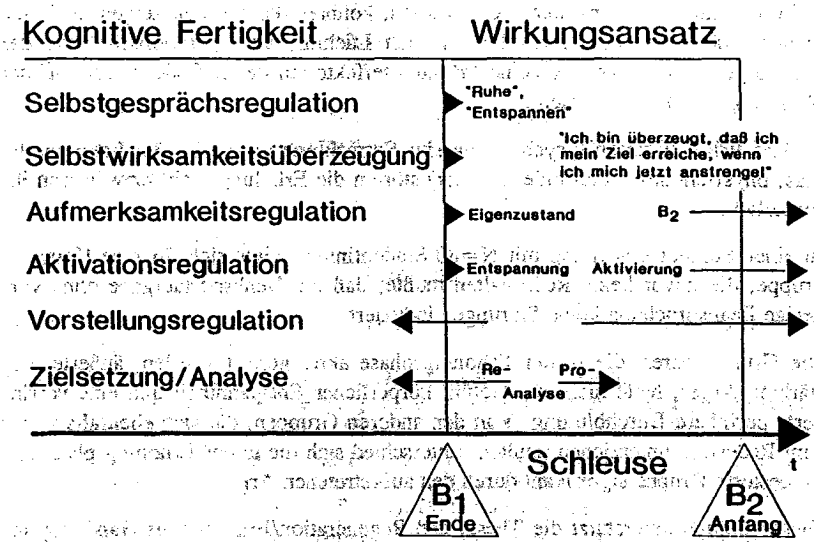


Abbildung 3. Kognitive Fertigkeiten und ihre Wirkungsansätze in der Zeit zwischen zwei Beanspruchungen (Eberspächer, 1990).

Erholung kann also als aktiver Prozeß aufgefaßt werden, d.h. das Geschehen in der Schleuse soll als Regenerationshandlung verstanden werden, wobei die einzelnen Fertigkeiten Teilhandlungen darstellen.

Da Handlungen über kognitive Prozesse reguliert werden, ist psychophysische Regeneration im Sinne von Renzland und Eberspächer (1988) ein Problem der Handlungsregulation. Regenerationsstrategien setzen daher neben der Schaffung der psychovegetativen Voraussetzung für die Einleitung wirksamer Erholungsprozesse gezielt an bestimmten handlungsregulierenden, kognitiven Skills an.

Die Funktionsmerkmale der Schleuse implizieren bereits, daß der Kontrolle innerer und äußerer Randbedingungen eine wesentliche Rolle für den Regenerationsprozeß zukommt. Die Verfügbarkeit und Durchführbarkeit der Teilhandlungen der Regeneration kann durch Störungen und emotionale Schwankungen erschwert werden.

Wie Kallus (1990) durch Arbeiten zur psychophysischen Erholung im Bereich der Grundlagenforschung zeigen konnte, liegt gerade in der Erholungsphase nach Beanspruchungen eine hohe Störbarkeit und eine geringe Schwelle für emotionale Reaktionen vor.

Neuere Arbeiten (Kallus, Martin & Meurers, 1991) bestätigen dies: Mit N=32 Studentinnen, die in der Post-Stress-Phase (nach einer videokontrollierten Rede mit Leistungsanforderungen) untersucht wurden, konnten die Autoren zeigen, daß eine Denksportaufgabe (Umschüttaufgaben nach Luchins) als Operationalisierung der aktiv-psychischen Erholung keine Erholungseffekte auf der Befindens- und auf der physiologischen Ebene brachte.

Andere Erholungsarten (psychisch-passiv: Betrachtung entspannender Landschaftsdias; physisch-aktiv: Fahrradergometer) störten die Erholung nicht bzw. waren ihr förderlich.

In einer Folgeuntersuchung mit N=80 Studentinnen zeigte sich für eine Kontrollgruppe, die zuvor keine Rede halten mußte, daß die Denksportaufgabe ohne vorherige Beanspruchung keine Störungen induziert.

Die Gruppe derer, die in der Erholungsphase aktiv gestört wurden, äußerte verstärkten Ärger, hatte nicht das Gefühl körperlicher Entspanntheit und eine verringerte periphere Durchblutung. Von den anderen Gruppen, die sich ebenfalls zuvor dem Redestreß unterziehen mußten, unterschied sich die in der Erholungsphase aktiv gestörte Gruppe signifikant durch den aufgetretenen Ärger.

Dieser Befund unterstützt die These, daß Regeneration/Erholung als Handlung angesehen werden muß, da Ärger v.a. in Situationen entsteht, in denen eine (zielgerichtete) Handlung blockiert oder behindert wird (vgl. z.B. Steffgen, 1991).

Die mittelfristige Konsequenz von aufgetretenem Ärger in der Erholungszeit konnten Wilhelm und Janssen (1989) für Triathleten belegen. Sie resümieren: "Das körperliche Befinden verschlechtert sich am folgenden Morgen, wenn der Athlet sich nach dem Training geärgert hat. Unabhängig von der Trainingsbelastung wirkt sich damit der Ärger negativ auf die Erholung des Athleten aus".

Es darf also davon ausgegangen werden, daß gestörte Erholung einer effizienten Regeneration entgegensteht. Aus unserer Sicht stehen daher für die Pausengestaltung in der Trainings- und Wettkampfpraxis zwei Dinge im Vordergrund:

1. die autonomen Rückstellprozesse müssen gefördert werden bzw. es muß vermieden werden, etwas gegen sie zu tun.

2. (Aktive) Regenerationshandlungen (entsprechend dem Schleusenmodell und den enthaltenen kognitiven Fertigkeiten; Eberspächer, 1990) müssen angeboten, vermittelt, gelernt und induziert werden.

Sportpsychologen, Trainer und Athleten haben dazu ihren Teil beizutragen, wobei vermieden werden muß, daß es zu Interferenzen zwischen den autonomen Rückstellprozessen und Regenerationshandlungen kommt (z.B.: O_2-Schuld und Aktivationskontrolle).

Für die weitere Arbeit unserer Forschungsgruppe stellen sich vor allem Fragen nach den zeitlichen Bedingungen und der Abstimmung der psycho-physischen Wechselbeziehungen. Erschwert werden die Forschungsbemühungen insbesondere durch die Notwendigkeit einer sportartspezifischen und differentiellen Betrachtungsweise.

Zur Beantwortung der aufgeworfenen Fragen haben psychologische Grundlagenforschung und angewandte sportpsychologische Forschung komplementär ihren Beitrag zu leisten.

Literatur

Eberspächer, H. (1990). *Mentale Trainingsformen in der Praxis*. Oberhaching: Sportinform.

Eberspächer, H. & Hermann, H.D. (1991). Kognitives Fertigkeitstraining im Techniktraining. In R. Daugs, H. Mechling, K. Blischke & N. Olivier (Hrsg.), *Sportmotorisches Lernen und Techniktraining* (Bd. 1, S. 203-209). Schorndorf: Hofmann.

Kallus, K.W. (1990). Erholung und Belastung als Determinanten des Ausgangszustands. In D. Frey (Hrsg.), *Bericht über den 37. Kongreß der Deutschen Gesellschaft für Psychologie in Kiel 1990* (Bd. 1, S. 237). Göttingen: Hogrefe.

Kallus, K.W., Martin, E. & Meurers, B. (1991). *Experimentelle Untersuchung zur Störung von Erholungsvorgängen*. Unveröffentlichter Forschungsbericht, Psychologisches Institut I, Universität Würzburg.

Renzland, J. & Eberspächer, H. (1988). *Regeneration im Sport*. Köln: bps.

Steffgen, G. (1991). "Ärger laß nach" - Ärger auf der Trainerbank. *Sportpsychologie, 5* (3), 14-17.

Wilhelm, A. & Janssen, J.P. (1989). Beanspruchung und Belastung im Triathlon. *Sportpsychologie, 3* (2), 18-22.

THE RECOVERY-STRESS-QUESTIONNAIRE

A POTENTIAL TOOL TO PREDICT PERFORMANCE IN SPORTS

MICHAEL KELLMANN AND K.W. KALLUS, GERMANY

The Recovery-Stress-Questionnaire (RESTQ), developed by Kallus (1988, 1991), was designed to measure in a quantitative way the level of current stress of a subject taking recovery processes into consideration.

The RESTQ includes 72 items. It assesses potential stressful events and their consequences for the subject, as well as potential recovery situations and their effects on the subject, within "the past 3-4 days (nights)".

Table 1. Subtests of the Recovery-Stress-Questionnaire with example items.

Subtest	Subtests\Item
1	"General Stress" ... everything was too much for me.
2	"Emotional Stress" ... I was enraged.
3	"Social Stress" ... I was angry with someone.
4	"Conflicts\Pressure" ... I felt under pressure.
5	"Fatigue" ... I felt tired in the morning.
6	"Lack of energy" ... I had difficulties in focusing my attention.
7	"Somatic Complaints" ... I did not sleep well.
8	"Success" ... I had some good ideas.
9	"Social Relaxation" ... I laughed.
10	"Somatic Relaxation" ... I felt bodily relaxed.
11	"General Well-being" ... I was in a good mood.

The eleven subtests of this questionnaire allow a quantitative differentiation of the stress/recovery level. A short description of the subtests is given in Table 1.

The RESTQ reflects different aspects which in general influence performance in sports. The level of physical fitness of the athlete, as the basic component for optimal performance, can be measured by using the subtests "fatigue", "lack of energy", "somatic complaints" and "somatic relaxation". Nevertheless, one of the main problems is the transformation of optimal physical fitness into high performance at an upcoming competition. This is "pressure" for the athletes. In this context the subtests "general stress", "emotional stress", "social stress", "success", "social relaxation" and "general relaxation" reflect an update of the psychic condition and the current stress/recovery level of the athlete.

The main purpose of this study was to evaluate the validity of the RESTQ to measure stress and recovery in sports. In addition, it was assumed that the stress/recovery level would predict performance for an upcoming competition.

Method

For the present study paraterciles (upper, medium and lower 33%) of the RESTQ scores (high, medium, low) were selected for analyses (Table 5, Table 6).

Subjects

Track and field team (Ss=33) of Appalachian State University, (North Carolina), USA (Table 2).

Table 2. Subjects of the present study.

	Ss	Age	Mean	SD
WOMEN	20	18-23	19.95	1.24
MEN	13	19-22	20.54	1.08

Design[1]

The RESTQ and the STAI were completed two days before the Championship of the indoor track and field season (Southern Conference Championship).

---

1 Ten days after the Southern Conference the athletes filled out the RESTQ for a second time to measure the stress/recovery level after competition. The complete design for this study covered five measurements within a period of two months.

Table 3. Design of the present study.

Date	02/14/90	02/16/90	02/26/90
WOMEN	X1 RESTQ STAI	CHAMPIONSHIP	X2 RESTQ STAI
MEN	X1 RESTQ STAI		X2 RESTQ STAI

RESTQ: Recovery-Stress-Questionnaire
STAI: State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1983).

These championships are very important for the athletes, because they represent the final qualification for further national championships (NCAA). Additionally, the team is gaining prestige by winning against other universities.

Performance Measurements

The results of the Southern Conference Championship were recorded. To compare different disciplines in track and field, the final rank was chosen as the best performance measure. Some athletes participated in more than one discipline. In this case, their best rank was chosen to classify their performance. The coding of ranks is presented in Table 4.

Table 4. Coding of ranks into three performance groups.

rank	code	Ss
1	1	10
2	2	
3	2	12
4	2	
5	3	
6	3	
7	3	11
8	3	
9	3	

Coding can be verbally transformed as follows:

- Rank one: Winner of the discipline
- Ranks two to four: Extended circle of favorites
- Ranks five and lower: Obvious distance to the winner

Results

An overview of results for H-tests and Mann-Whitney U-tests (performance by RESTQ group) is given in table 5.

Table 5. Listing of H-tests and U-test analysis.
Independent variable: RESTQ score.
Dependent variable: performance code.

			U-test [1]		
		H-test	1 , 2	1 , 3	2 , 3
	1. General Stress			(*)	
	2. Emotional Stress	(-)		(*)	*
S	3. Social Stress			(*)	(*)
U	4. Conflicts\Pressure	*		*	**
B	5. Fatigue				
T	6. Lack of Energy	(*)			*
E	7. Somatic Complaints				
S	8. Success				
T	9. Social Relaxation				
	10. Somatic Relaxation	(*)	*		
	11. General Well-Being		(*)		

Two-Tailed-significance [1] One-Tailed-Significance

*: $p < 0.05$ **: $p < 0.01$
(*): $p < 0.10$ *: $p < 0.05$
(-): $p < 0.20$ (*): $p < 0.10$

The H-Test for "RESTQ-conflicts\pressure" groups discriminates performance groups on a p=0.033 level.

The U-tests showed differences between the winning athletes (code 1) and athletes with an obvious distance to the winner (code 3). This occurred especially for subtests "general stress", "emotional stress", "social stress" and "conflicts\pressure".

Substantial differences were found comparing extended favorites (code 2) and athletes with an obvious distance to the winner (code 3). In this case, subtests "emotional stress", "social stress", "conflicts\pressure" and "lack of energy" were able to predict performance.

Table 6. 3x3 contingency tables for the RESTQ subtest "pressure/conflicts" and performance groups of the athletes.

code	low	medium	high	Σ
1	4	6	0	10
2	3	3	6	12
3	3	2	6	11
Σ	10	11	12	33

Two-tailed-significance
Chi^2-value: 8.85 df: 4 p-value: 0.065

None of the athletes with high "conflicts\pressure" scores won at the Championships. Only two athletes in the medium "conflicts\pressure" group failed. For the low "conflicts\pressure" subjects no performance prediction was possible.

Results for "RESTQ-lack of energy" are closely parallel to those obtained for the subtest "conflicts\pressure".

Discussion

The results of this study strongly suggest, that the RESTQ is a valid tool to predict performance before competitions. The analyses give evidence that the subtest "conflicts\pressure" has an extraordinary impact on performance prediction for an upcoming competition (Table 5 and Table 6). In particular, this study showed that perceived conflicts which occurred "in the past 3-4 days (nights)" have a substantial impact on athletes' performance.

Analysis of the STAI showed no significant results for paraterciles (same analysis as shown in Table 6). The STAI did not allow to predict performance two days in advance of the competition. This of course is no surprise in view of the purpose of

the state form of the STAI.

In contrast, the RESTQ results were obtained two days before the competition which leaves enough time to intervene for an optimal initial state.

These results encourage further research with the RESTQ in sports. As a consequence a sport-specific version of the RESTQ will be soon available to specify events of stress and recovery in sports.

References

Kallus, K.W. (1988). Ausgangszustand und Streßreaktionen: Beiträge des Erholungs-/Belastungsfragebogens (EBF). In W. Schönpflug (Hrsg.), *Bericht über den 36. Kongreß der Deutschen Gesellschaft für Psychologie in Berlin 1988* (Bd. 1: Kurzfassungen, S. 87). Göttingen: Hogrefe.

Kallus, K.W. (1991). *Erholung-/Belastungs-Fragebogen (EBF): Kurzbeschreibung und Handanweisung* (In Vorbereitung). Würzburg: Universität Würzburg.

Spielberger, C.D., Gorsuch, R.L. & Lushene, P.R. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo Alto, CA: Consulting Psychologists Press.

A Validation of the Effectiveness of Ikulayo Stress Management Approach (ISMA) in Competitive Sports

Philomena B. Ikulayo and Festus M. Adeyeye, Nigeria

Introduction

The awareness being generated in sport competition worldwide has placed continuous stress on athletes, especially the elite athletes. Stress can be a positive factor as seen by the need to reach and maintain optimal arousal level prior to and during a particular competition event, or a negative one as evident in externally-derived pressures which may cause failure (Anshel 1990). Madden, Summers and Brown (1990) believe that competitive sport comprises a potentially stressful situation in which athletes strive to perform at peak level under circumstances in which an opposing side aims to restrict such performance which could lead to failure. As a result of poor and fluctuating performances noticed amongst Nigerian athletes due to poor management of stressful situation in sports competitions, the Ikulayo Stress Management Approach (ISMA) was developed. The purpose was to assist athletes in coping with and managing stress in order to enhance their athletic performance. It was first administered on Nigerian athletes preparing for the 1986 Edinburgh Commonwealth Games.

ISMA is an instrument which the originator has used extensively with Nigerian athletes and claimed to have yielded fruitful results. Hence, there is a need to validate this claim because it is believed that the authenticity of the instrument can only be proved by the scope of its usage and acceptability. It is against this background therefore that the researchers carried out a study to investigate and validate the effectiveness of ISMA and present its findings at an international congress in order to encourage its usage internationally and for possible criticism for future improvement.

Review of Literature

Concept of Stress

The word stress is not new to many behavioural scientists, especially the

psychologists. Bates (1979) defined stress as the body's physical, mental and chemical reactions to certain circumstances that frighten, excite, confuse, endanger, or irritate. Efunkoya (1987) wrote that "stress means any stimulus of such magnitude to tend to disrupt the homeostasis of the organism". Rushall (1975) referred to stress as a state in which the natural homeostasis of the body is disrupted, this is usually caused by any threat to the organism, for example: fatigue, heat, or cold. Selye (1978) described stress as the rate of wear and tear in human body that accompany any vital activity, while Neeves (1982) described it as the human beings' respond to a condition that scare, threaten, anger, bewilder, or excite them. Gross (1958) in other hand described stress as a state manifested by a specific syndrome which consists non-specifically induced changes within a biological system. Singer (1968) also wrote that stress symptoms are non-specifically caused but result in a specific physiological state involving specific physio-psychological processes. Ikulayo (1987; 1990) contended that stress is seen as a form of arousal which is specifically linked with specification of task expectation-demands which a situation places on the individual and thus forces a readjustment. Cratty (1975) affirmed that stress is an internalised kind of preparation to meet an immediate threat. Lawther (1968) believed that the term stress is used to describe bodily conditions in the adjustment to physical effort, fatigue, tissle injury, or resistance to disease or harmful poison and thus stirred up the state of the organism. From the above different considerations of stress, it is obvious that what is termed stress could be varied and diversed but it affects the body and has both physiological and psychological consequences.

Sources of Stress in Competitive Sports

Various sports psychologists have identified a great number of sources of stress amongst athletes. Kroll (1982) identified some psychological and physiological sources contributing to stress as anxiety, guilt, anger, and despondency (psycho), and poor diet, fatigue, infection, and inadequate rest (physio). Cratty (1975) contended that the major sources of stress in athletes are (a) fear of success (success phobia) (b) fear of failure, (c) fear of crowd, (d) fear of expressing aggression and (e) fear of physical harm to their body. Ukpo (1987) agreed that stress in sports is created by pressure from within the environment as well as outside. Explaining further, he identified the factors responsible for this pressure as principally caused by inadequate training, the absence of qualified coaches, administrators as well as poor facilities, equipment and kit amongst Nigerian athletes.

Effects of Stress on Performance

The prediction of performance under various stressful conditions is a challenging

problem. Associated with this problem is the consideration of a general persistent factor of stress. A basic generalisation about stress is that it is present in all human activity. A low level of it is characterised with poor performance as it is evident in a case of low task requirement, lack of adequate motivation and stimulation, lack of cheering from the crowd, or having to train under a disgruntled coach. On the other hand, an excessive level of stress reduces efficiency, effectiveness, and general task productivity (Ikulayo, 1990). Fitts and Posner (1973) postulated that people perform best at an optimal level, that is under a moderate condition of stress.

Methodology

Population sample

Twenty male subjects were randomly selected from Comet Basketball Club in Lagos (Nigeria). All have played at the national basketball league and at international competitions.

The subjects aged between 19 and 33 years. Their playing experience ranged from two to fourteen years.

Instrumentation and research design

The instruments used in this study were:

1. Printed questionnaire adapted from Kroll's (1982) anxiety inventories (Psychological scaling) to assess the basketballers' stress level.
2. Application of ISMA-MAIRTAR as treatment for the experimental group. MAIRTAR is the abbreviated seven steps involved in the application of Ikulayo Stress Management Approach (ISMA). Full details are found in Appendix 3.
3. A twenty inventory questionnaire to validate findings of the research.

Treatment procedure

The subjects were randomly grouped into equal- number control and experimental groups. Both groups were subjected to a pretest using questionnaire which contained Kroll's (1982) psychological scaling. This was done to elicit the stress and anxiety level of the two research groups. The questionnaire was classified into five sub-groups. All five sub-groups had equal number of items (Appendix 1).

The respondents had five options to chose from. The experimental group was subjected to ISMA-MAIRTAR technique while the control group was left out of the treatment. Both groups continued with their regular training, practices and competitions. Eight weeks were assigned for the treatment period. Both groups were subjected to posttest to determine the outcome of the treatment. It was also to discover the real adjustment on their stress level after ISMA treatment in order to assess its effectiveness. The second questionnaire contained twenty inventory items in which the subjects were expected to answer yes or no on each question. This served as additional posttest to establish the improvement made and to further validate the findings (Appendix 2).

Data analysis

The statistical method used was t-test, tested at 0.5% level of significancy to compare the scores of the control and the experimental groups and the pretest and posttest of the experimental group. Percentage was used to allow for a descriptive analysis of the Subjects' response to the second questionnaire which further validated the effectiveness of ISMA technique of stress management.

Table 1. A t-test calculation of pre-test and post-test scores on basketballers stress level.

Parameter		x	sd	t-cal	t-table
Somatic Compliants (a)	Pre-test	2.81	.53	3.67*	2.101
	Post-test	2.018	.43		
Fear of Failure (b)	Pre-test	3.07	1.72	1.71	2.101
	Post-test	2.056	.74	ns	
Feeling of inadequacy (c)	Pre-test	2.72	0.41	3.80*	2.101
	Post-test	1.96	0.48		
Loss of Control (d)	Pre-test	2.87	0.74	3.81*	2.101
	Post-test	1.69	0.62		
Guilt (e)	Pre-test	2.65	0.72	3.23*	2.101
	Post-test	1.72	0.56		

* Significant at level of 0.05
ns - not sifnificant

Results

The result of the t-test calculation between the pretest - posttest scores showed a significant stress reduction in four out of the five categories of stress causative factors with the use of ISMA; the calculation was not significant with (b), fear of failure (Table 1). There was a strong indication that the treatment of ISMA assisted

the basketballers in coping and managing their stress level during major competitions. The result obtained for the control group was constant.

The result obtained for the twenty inventory questions revealed that ISMA was very effective in the management of stress in the game of basketball as all respondents agreed positively to nineteen items of the questionnaire. However, item 13 which was based on bad luck scored 20%. This indicated that subjects did not believe that any technique could eliminate bad luck.

Conclusion

The study confirmed the effectiveness of ISMA and further validated the claim that its application had worked successfully with Nigerian athletes. The use of ISMA principles and procedures assisted the experimental group to excel, and they performed increasingly better in all the three national competitions they played after the treatment. The coach also agreed that the players' performances were impressive and attributed their successes to the new psychological approach (ISMA) which they were exposed to. It was revealed that the use of ISMA built the required confidence to execute their skills. And also increased commitment and motivation towards group goal, increased poise and improved abilities to adopt, cope, and set goals in perspective. It enhanced concentration on specific objectives and provided an insight into typical psychological problems confronting both coaches and athletes, and also helped to solve them. Therefore ISMA-MAIRTAR is recommended for those interested in sport performance enhancement through stress management techniques.

References

Anshel, M.N. (1990). Towards validation of a model for coping with acute stress in sports. *International Journal of Sport Psychology, 21*, 58-83.

Bates, C. (1979). Stress and health: A management approach. *Health, 3* (3).

Cratty, B.J. (1975). *Psychology in contemporary sports*. New Jersey: Prentice-Hall.

Efunkoya, A.A. (1987). Stress management in competitive sport - A sport medical viewpoint. In SPAN (Eds.), *Proceedings of the 4th National Conference* (pp. 76-89).

Fitts, P.M. & Posner, M.I. (1973). *Human performance*. London: Prentice Hall.

Gross, N.E. (1958). *Living with stress*. New York: McGraw-Hill.

Ikulayo, P.B. (1987). Stress reduction techniques. In SPAN (Eds.), *Proceedings of the 4th National Conference* (pp. 63-75).

Ikulayo, P.B. (1990). *Understanding sports psychology*. Lagos: EA/TCN Press.

Kroll, W. (1982). "Psychological scaling of Alan", code of ethics for coaches. *Research Quarterly, 48*, 223.

Lawther, J.D. (1968). *The learning and performance of physical education.* New Jersey: Prentice-Hall.

Madden, C.C., Summers, J.J., & Brown, D.F. (1990). The influence of reviewed stress on coping with competitive basketball. *International Journal of Sport Psychology, 21,* 21-35.

Neeves, R.E. (1982). Coaches reaction to M.D. Mergolies stress management for professional and world class competition. In I.D. Zaichkowsky & W.E. Sime (Eds.), *Stress management in sport* (pp. 77-79), Virginia: AAHPERD Publications.

Rushall, B.S. (1975). *How to be an effective coach.* Toronto: Manulife.

Selye, H. (1978). *The stress of life.* USA: A Paperback Edition.

Singer, R.N. (1968). *Motor learning and human performance.* London: MacMillan.

Ukpo, A.S.I. (1987). A speech delivered by the Military Governor of Rivers State on the Formal Opening of the Seminar on Stress Management in Competitive Sports. In SPAN (Eds.), *Proceedings of the 4th National Conference* (pp. 18-21).

Appendix 1 A

Subject biography :

Name.....

Age.....

Years of playing experience.....

Post in the team .....

Position played.....

Level of participation: Please tick the appropriate level.

(i) University level (Hall Representation

(ii) NUGA (Nigerian Universities Games Association)

(iii) National league championships

(iv) International championships

Appendix 1 B

Instruction: On each of the following statements, rate yourself according to (a) always true

(b) offen true

(c) sometimes true

(d) seldom true

(e) never true

	a	b	c	d	e
How often do you feel any of the following before, during and after competition.					
Somatic complaints					
1. Tightness in neck					
2. Awareness of heartbeat					
3. Urge to urinate					
4. Ringing in the ears					
5. Trembling					
6. General body sweating					
Fear of Failure causes					
7. Making a foolish mistakes					
8. Mind going blank					
9. Criticism by coach					
10. Pressure to win					
11. Living up to the coachs expectation					
12. Improving upon last performance					
Feeling of Inadequacy causes					
13. Getting tired					
14. Inability to psych-up					
15. Runing out of Gas					
16. Being afraid					
17. General restlessness					
18. Unable to concentrate					

(cont.)

Appendix 1 B (cont.)

	a	b	c	d	e
Loss of Control is caused by					
19. Behaviour of spectators					
20. Equipment failure					
21. Conduct of opponents					
22. Unfair officials					
23. Bad luck					
24. Weather					
Guilt makes me					
25. Lose temper					
26. Swear too much					
27. Hurting an opponent					
28. Making an opponent foolish					
29. Not being mean enough					
30. Play dirty					

Appendix 2

20 Inventory question-naire to validate the effectiveness of ISMA.

Name:.....

Number of matches played:.....

Instruction: Check Yes or No in the space provided

Questions	Yes	No
1. Do you find most of the techniques in ISMA useful?		
2. Is there any significant change in your pattern of play in terms of confidence?		
The intervention of ISMA helps me to prevent:		
3. Nervousness		
4. Awereness of fast/irregular heartbeats		
5. Urge to urinate		
6. Ringing in the ears		
7. Yawning too much		
8. Being afraid before competition		
9. Getting unnecessarily tired		
ISMA has helped me to overcome loss of control caused by		
10. Behaviour of spectators		
11. Conduct of opponents		
12. Unfair decision of officials		
13. Bad luck		
14. It has helped my mind from going blank in the game		
15. There is little criticism from the coach because of fewer critical mistakes		
16. I am now more able to psyche-up myself		
17. I now believe that I have built-in self confidence that I believe I can beat any opponent		
18. I am now able to cope with unexpected situations on the playig field.		
19. Mentally, I am now very tough		
20. I now play better in tougher competitions than the easier ones.		