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Fédération Européenne de Psychologie des Sports et des Activités Corporelles
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IXth EUROPEAN CONGRESS
ON
SPORT PSYCHOLOGY

BRUSSELS - 4/9 JULY 1995

PROCEEDINGS

Part III

Edited by Renée VANFRAECHEM - RAWAY
Yves VANDEN AUWEELE

Integrating laboratory
and
fields studies

BELGIAN FEDERATION OF SPORT PSYCHOLOGY
SOCIETE FRANCOPHONE DE PSYCHOLOGIE DU SPORT
VLAAMSE VERENIGING VOOR SPORTPSYCHOLOGIE

Roland Seitz
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SYMPOSIUM SESSION 4

S.4.1. Motor performance and skill acquisition

S.4.2. Children under 6th

S.4.3. Mental training

S.4.1. MOTOR PERFORMANCE AND SKILL ACQUISITION IN EXERCISE PSYCHOLOGY

Chairperson : M. DURAND

LEARNING STRATEGIES AND ENERGY CORRELATES IN A COMPLEX CYCLICAL SELF-PACED SKILL ACQUISTION

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Key words: Discovery learning, Search strategies, Efficiency.

INTRODUCTION

It is well known that as motor skills are being acquired, their execution becomes increasingly efficient, i.e., the amount of energy expended decreases and/or the mechanical output increases (Durand et al, 1994; Sparrow et Irrizary-Lopez, 1987).

Furthermore, skill acquisiton is considered as a complex process in wich the transformations produced are generaly presented as a systematic search of the optimal solution in the "perceptual motor work space" (Newell et al, 1989). Seiler (1994), in learning discovery condition, observed that the learner was able to assess the efficacy of his strategy without feedback or instructions.

According to these authors, the search strategy orientation provides a basis for understanding the macrolevel behavioral changes in the movement form or coordination.

The aim of this study was to examine the behavioral and energetical aspects of the individual search strategies in learning a complex cyclical task.

METHODE

Subjects

Five physical education students from the University of Montpellier, France, volunteered to take part in the experiment. They were not experienced skiers, but all actively participated in some sport. Their mean age was 24.6 years (SD=1.14), their mean weight, 74,00 kg (SD=4.30), and their mean height 1.80 m (SD=0.03).

Subjects were trained for five sessions and then took a post-test. The training sessions were conducted on five consecutive days, and the post-test was given one week after the final training session. The sessions and post-test always took place at the same time of the day. The training sessions consisted of a 10-min warm-up followed by four 4-min learning periods with a 4-min break between them. The post-test was identical to the training sessions. The instructions given during the sessions were recorded on tape.

Tasks and apparatus

The subjects were instructed to learn to make slalom ski-like movements which were "as wide and frequent as possible". The movements, which were lateral and cyclical, were executed on a ski simulator (see Vereijken, 1991, for a detailed description). This apparatus (Skier's Edge) consists of a platform on wheels which moves back and forth on two bowed, parallel metal rails. The subject's feet are strapped to the platform, which in turn is fastened to the rails by means of two adjustable rubber belts.

Variables measured and calculated

Oxygen intake (VO2) was measured continuously using an open-chain, cycle-to-

cycle system (CPX, Medical Graphics). The subjects were filmed throughout the training sessions and the post-test (Panasonic HS1 video camera, 500 obturations/s, sampling rate 50 Hz, mid- frontal view). The videotape was analyzed image by image and movement amplitude was measured. After placement of a video timer (type VGT 33, FOR A), the frequency in Hertz was calculated from the time codes recorded at the rightmost and leftmost points of the movements (± 20 ms).

The subject's movements were analyzed for the last 15 seconds of each of the 4-minute learning periods and the 4 post-test periods, for a total duration of 24 minutes. For each of these 15-second segments, the recorded oxygen intake patterns were synchronized with the kinematic parameters of the corresponding periods (averaging over 15 s).

The following variables were calculated: mean movement amplitude in cm (A), mean cycle frequency in Hz (F), mean oxygen intake per unit of body weight in ml.kg.min-1 (VO2), and "movement cost" (VO2 / A * F, expressed in ml.kg. cm.s-1). Changes in each of these variables across training sessions were studied. An analysis of variance was conducted using the following design: 5 x 4 x 6 (subjects x periods x sessions).

RESULTS AND DISCUSSION

The mean amplitude and frequency increased significantly across sessions. The mean oxygen intake increase in a constant fashion whereas the movement cost decrease significantly in the same time with a fluctuation on the fourth session. The evolution of the individuals frequencies did not follow the average pattern, frequency was stable for subjects 2 and 5, decreased for subject 1, and increase for subject 3 and 4. On session 1, the movement frequency adopted by the various subjects differed, the correlation (r) between the subject's weight and the frequency was .51. On the post-test, this correlation dropped to

.09 (figure 1b.).

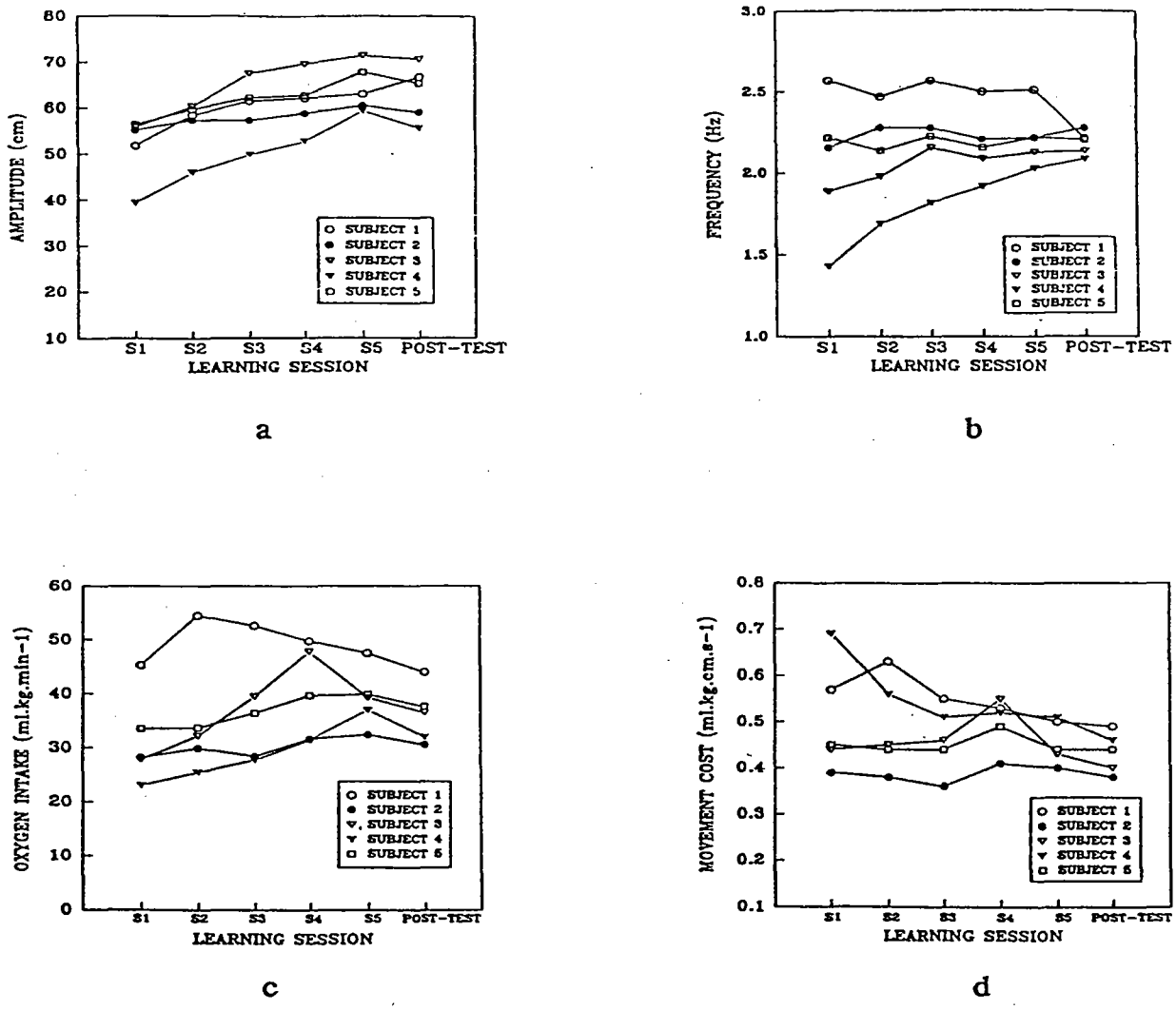
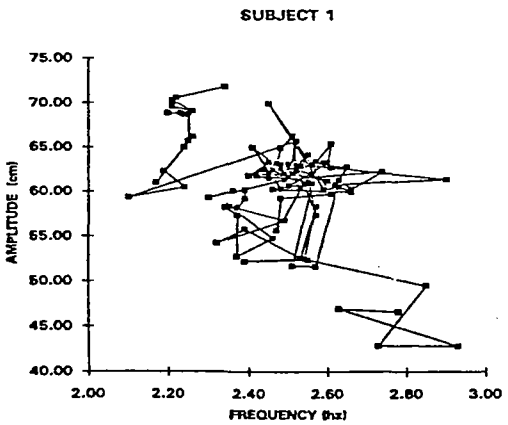


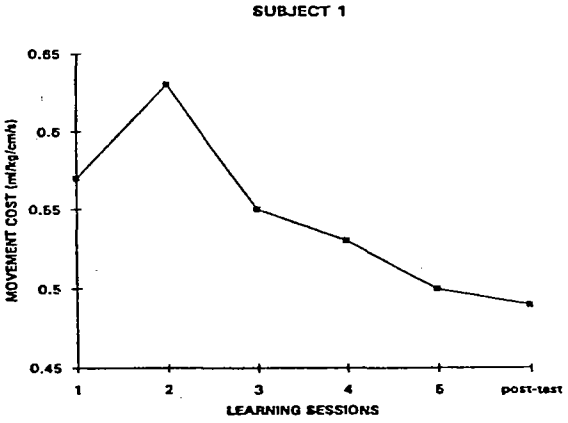
Fig. 1. Evolution of the Individual Patterns in Amplitude (a), Frequency (b), Oxygen Intake (c) and Movement Cost (d) across Learning Sessions.

Learning strategies was approached by analysing the topologic characteristics of the individual patterns of the amplitude/frequency ratio: The gradient of the increment (regular

or not), the directionnal or undirectionnal aspect and the number of explored dimensions (figures 2)



a



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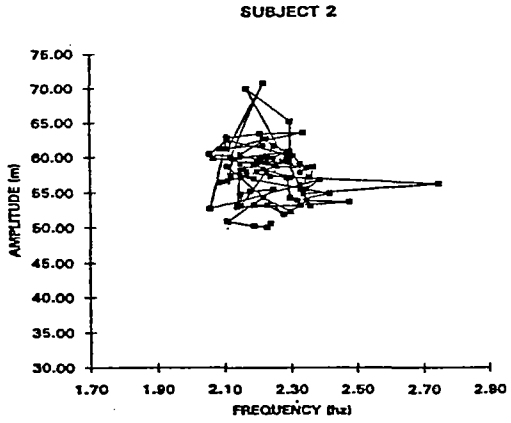

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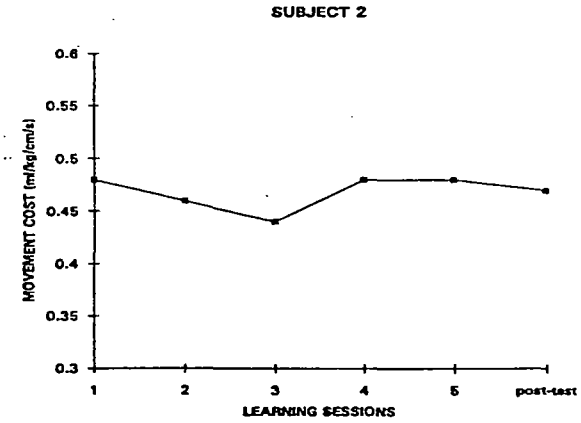

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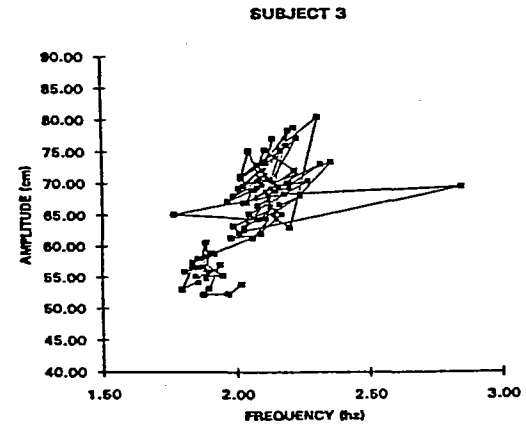

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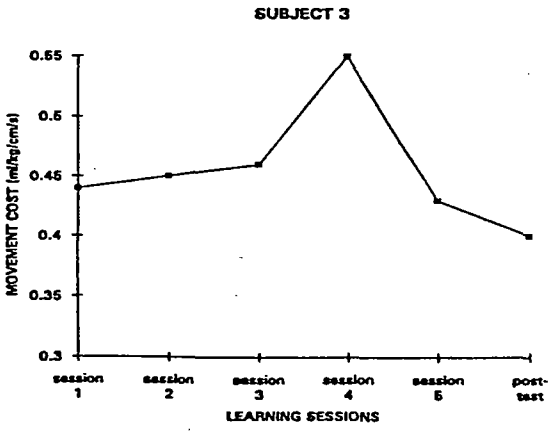

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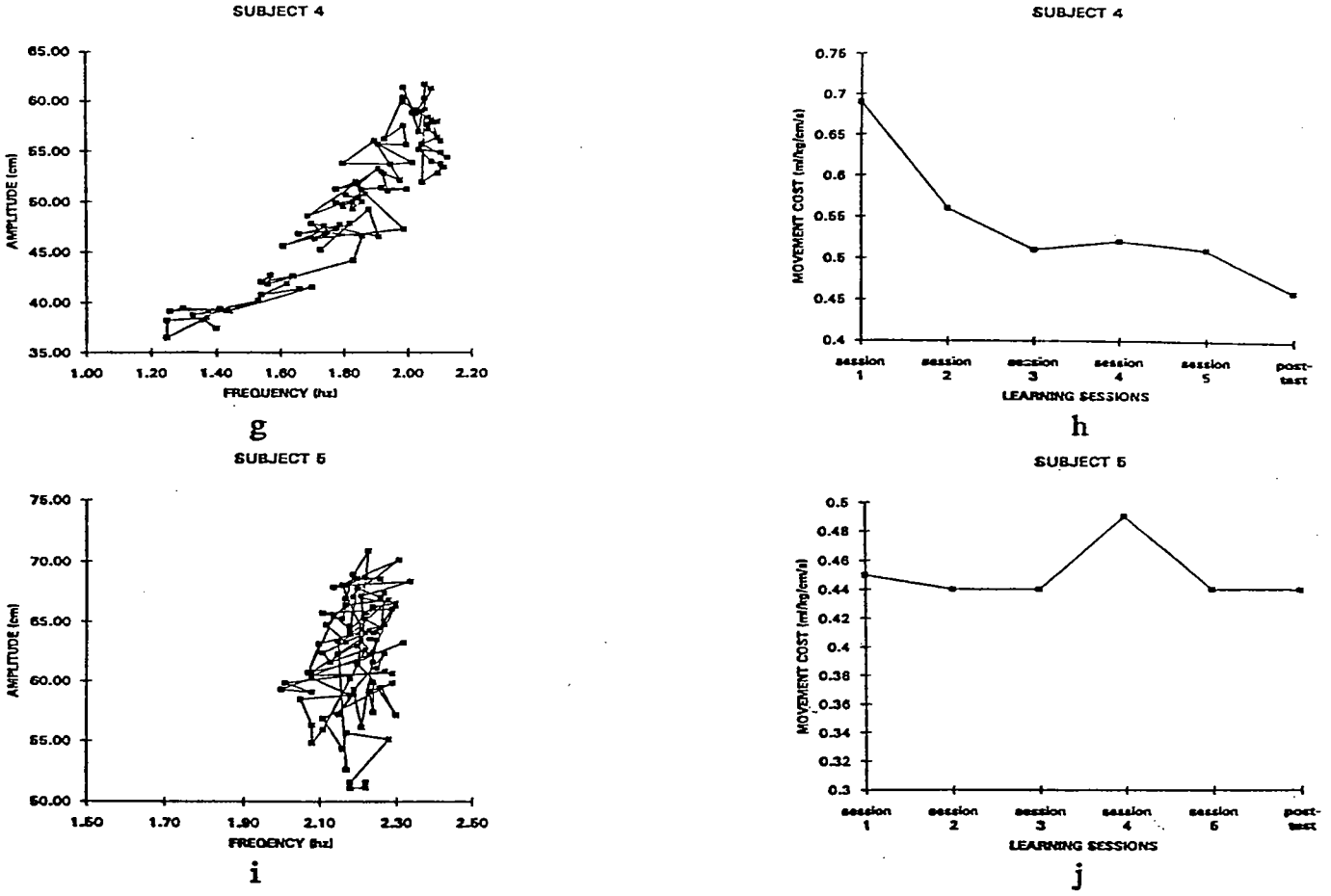

Fig. 2 Individual Learning Strategies and Movement Cost.

Subjects 4 and 5 displayed a progressive local strategy: the gradient of increment was small and regular. Subject 4 explored two dimensions (amplitude and frequency) whereas the subject 5 kept one dimension constant (the frequency). Subject 1and 3 diplayed an irregular strategy: the gradient of incremnent can be weak or very large depending on the moment in the learning process. Both subjects explored the two dimensions but not in the same direction.

In each cyclical task, there is an optimal pattern of response (Durand, 1992a, 1992b; Sparrow, 1983). There are many possible strategies to reach this optimal point that emphasize or not efficiency. It seems that regular strategies with weak gradients provide a

simultaneus gain in economy (figure 2g and 2h). The motor work space is explored in a proximal way, wich is consistent with the "local search strategy" described by Newell, (1989). In the irregular strategies (figure 2a and 2e) when a qualitative advance occure in the perceptual motor work space, it is characterised by some breaks in the gradient of increment. These breaks enhance in the first time a supplement of energy expended (see the pick on figure 2b and 2f) and in the second, a gain of economy. The subjects then explore this region where the coordination adopted is less energy demanding for a quite similar quantity of work done. This appears on figures 2a and 2e by a largest density of points.

What is not yet clear is how subjects assess their strategies and what factor could be determinant for deciding the maintenance or the shift in the strategy used. Another point to be explored is how to quantify the efficacy of the search strategies in terms of amount of distance performed in the perceptual motor work space, related to the quantity of work done and the level of performance reached. The aim of a seach investigation could be to define some strategies's profiles of "good or bad learners".

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THE EFFECTIVENESS OF A GLOBAL LEARNING STRATEGY ON A GROSS MOTOR TASK: A FIELD STUDY

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INTRODUCTION

A learning strategy has been defined as a way an individual organizes his/her thoughts during performance (Singer, 1988). More specifically, a learning strategy assists performers to control their "cognitive behaviors" prior to, during and after executing a motor task. By implementation of a learning strategy, general principles of problem-solving and "learning to learn" skills, for example, can provide learners with a unique approach to overcoming mental as well as physical barriers of both the task and environment (Good & Brophy, 1990). Consequently, a task-pertinent learning strategy can be described as the overall plan one formulates for accomplishing particular achievement goals with a learning task, and the knowledge about the usefulness of this plan.

Researchers in motor learning as well as in sport psychology have shown interest in the use of learning strategies in motor skill acquisition (e.g., Lidor, Tennant & Singer, in press; Singer, Lidor & Cauraugh, 1993, 1994; Singer & Suwanthada, 1986). The effectiveness of the Five-Step Approach (Singer & Suwanthada, 1986) and of awareness and nonawareness strategies (Singer, 1988) have been studied in well-controlled laboratory conditions. Findings which have emerged from this and other investigations suggest that motor task performances, i.e. dart-throwing, ball-throwing and key-pressing, can be enhanced by the utilization of a relevant learning strategy. Subjects who performed motor tasks combined with the implementation of a learning strategy executed them faster and more accurately than subjects who were involved in a similar motor activity, but who were not taught how to use the principles of the strategies.

Typically, strategy research has been conducted in laboratory settings in which the control over the independent variables, e.g., a learning strategy, and the procedure to be followed by subjects, was nearly perfect. Only one study (Lidor & Tenenbaum, 1993) was conducted in field-settings (e.g., a basketball court), however it was a case study design. In this field study, the effectiveness of the Five-Step Approach (Singer, 1988) was examined on shooting performances of a 16-year old basketball player. It was found that the Five-Step Approach improved the accuracy of free-throw shooting. Although the laboratory strategy investigations provide clear-cut findings with regard to the positive effect of learning strategies on motor task performances, it may be desirable and relevant to also examine this effect under field-settings. This practical approach in strategy research may increase the "environmental validity" of learning strategies, and thus the ability to be applied efficiently by practitioners.

One of the prominent learning strategies that has been examined in the last decade is the Five-Step Approach (Lidor, Tennant & Singer, in press; Singer, 1988). The Five-Step Approach is a global technique which requires learners to apply five sub-strategies: (a) readying, (b) imaging, (c) focusing-attention, (d) executing, and (e) evaluating, before, during and after self-paced motor performances. The first three steps are prepatory phases in which the performer is asked to: (1) be ready mentally and physically to execute (readying); create a mental presentation of the act to be performed (imaging); and (3) focus attention on one specific cue which is an integral part of the performance situation and is most relevant to the actual performance (focusing-attention). The fourth step is execution, which requires learners to perform without thinking about the act or its outcome. Finally, the learner is guided as to how to evaluate his/her quality of performance (evaluating) by using knowledge of results (KR) and/or knowledge of performance (KP) as informational guidance. Each of these sub-strategies has been subjected to a fair amount of scientific scrutiny.

In the current investigation, an attempt was made to examine the effectiveness of the Five-Step Approach on learning and performance of a gross motor skill acquired in

field-settings. A dancing skill was selected as a gross and real-life oriented activity. The strategy was taught as part of instructional program of physical education and dancing classes. [It was thought that it may be relevant to study the effectiveness of the Five-Step Approach on learners involved in physical education program as part of the school curriculum.]

METHODS

Subjects

Thirty-one subjects (20 females and 11 males; mean age = 14.7, S.D. = 2.2) were selected to participate in this study, and were randomly assigned to two groups: strategy and non-strategy (control). All subjects took part in a special program of dancing which was a sub-unit of the physical education program in school. The subjects were naive to the purposes, hypotheses and the expected results of the study.

Task and Learning Settings

The motor task was taken from the Classic Ballet: Chanet. This task required subjects to perform a series of turns on a specific pathway which was illustrated on the floor. Figure 1 shows a subject standing at the performing line and executing the turns.

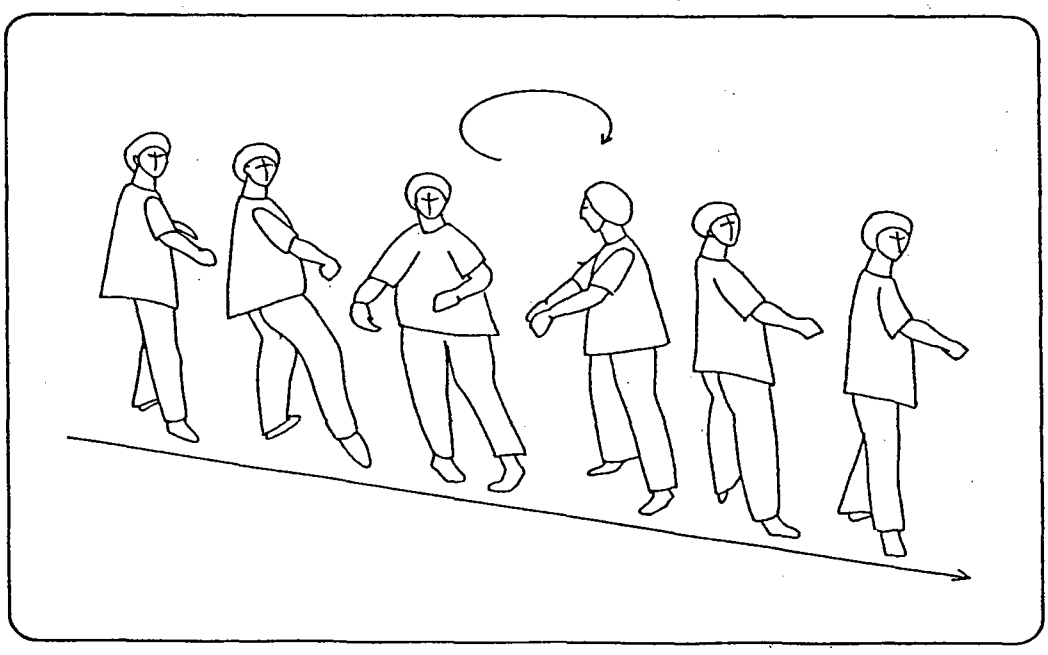

Figure 1. A subject stands at the performing line and executes the Chanet skill.

While performing the task, subjects moved on their toes, with an erect back and hands extended to both sides in order to maintain balance. They began to execute the task while standing on their toes, right hand extended forward and left hand extended to the left side, and the right leg stepping forward. Then, subjects were guided to move around using their right leg as a "pivot leg", and shifting their weight toward the right leg. Five turns were performed in each trial.

The performance line (length = 5 m, width = 5 cm, color = white) was marked on the floor of the gym at one of its corners. Five lines (length = 5 m; width = 2 cm; color = green) with a distance of 5 cm between each, were marked at both sides of the performance line. Figure 2 presents: (a) the location of the "learning corner" at the gym, (b) the performance line and 10 "accuracy lines", and (c) an illustration of distances between lines.

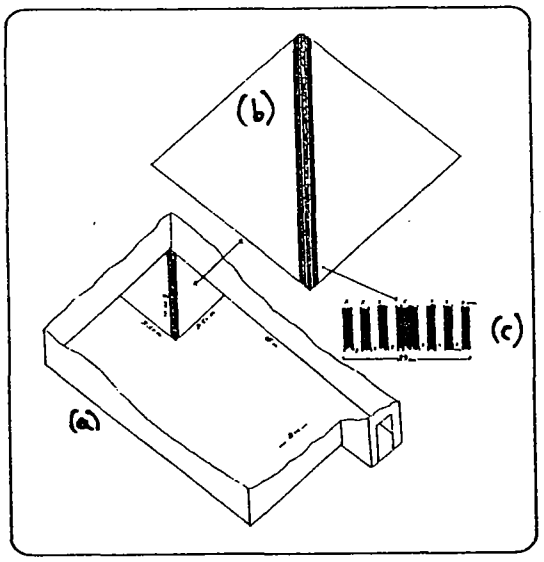

Figure 2. The location of the learning settings (a), the performance and "accuracy" lines (b), and, an illustration of all lines (c).

In front of the performance line, on the front wall a black spot was marked at a height of 1.70 m from the floor. The subjects were asked to focus their attention on the spot when executing the skill. A video camera was located about 5 m diagonal to the performance line to photograph all performances of the subjects. A skilled photographer videotaped the Chanet performances.

Procedure

Upon arrival at the gym, the subjects were given specific and general instructions. The strategy subjects listened to the Five-Step Approach 9-min tape-recorded directions. They were guided on how to implement the 5 steps before, during and at the end of execution: readying, imaging, focusing-attention, executing and evaluating. In each step, the subjects were taught to utilize the strategy based on the specific requirements of the task. For example, subjects were asked to be aware of their ready position and the way they approached the task (readying), and to focus their attention only on the black spot which was marked on the wall in front of them (focusing-attention). The control subjects listened to a 9-min tape-recording of general instructions, which included information about the dancing program, the gym and its functions. No strategy guidance was administered.

Two practice sessions (45 min each) were administered to subjects before testing began. The Chanet skill was taught using the part learning technique (Schmidt, 1991; Singer, 1980) in order to assist subjects in efficiently acquiring the new skill. All subjects performed similar routines.

After listening to the instructions at the testing phase, subjects performed 3 blocks of 5 trials (15 trials of the Chanet skill). All performances were video-taped.

Dependent Variables and Data Analyses

Three dependent variables were measured in this study: (a) accuracy of performance (distance in cm between the performance line and the adjacent lines), (b) fluency of performance (number of turns performed by each subject), and (c) qualitative performance (assessment of critical elements of the skill which were selected before testing began). The variables of fluency and quality of performance are presented as categorical variable (see Table 1). All variables were measured by the experimenter while watching the video performances.

Table 1. Scales of performance measurements for fluency and quality of performance

Fluency	Quality
• Number of turns in each trial	• Location and position of hands, back and legs during the Chanet performances
25 pts = 5 turns	1 = excellent
20 pts = 4 turns	2 = good
15 pts = 3 turns	3 = fair
10 pts = 2 turns	4 = poor
5 pts = 1 turns	
1 pt = 0 turns	

Two-way analysis of variance with repeated measures on the trial block factor was conducted to reveal performance differences between groups for performance accuracy. Tukey's honestly significant difference (HSD) procedure was used for all follow-up comparisons when appropriate. A Chi-Square (χ^2) procedure was used to analyze fluency and quality of the Chanet performances. Alfa was set at .05 for all statistical tests.

RESULTS

Each dependent variable was analyzed separately. The accuracy of performance was measured in cm, and the fluency and qualitative variables were presented in categorical units. The data analyses are presented for each variable.

Accuracy of Performance. The 2 x 3 (Groups x Trial Blocks) ANOVA with repeated measures on the second factor revealed a reliable groups' main effect [F (1, 29) = 76.65, $p < .001$], and Trial Blocks x Groups interaction [F (2, 58) = 6.57, $p < .003$]. The Tukey's HSD procedure indicated that the strategy subjects were more accurate than the control subjects across the Chanet performances. For example, performance deviation of strategy subjects in trial block 1 (M = 32.18, SD = 18.21) was smaller than the control subjects (M = 93.46, SD = 15.16). Means of Chanet performances across trials for both groups are presented in Figure 3.

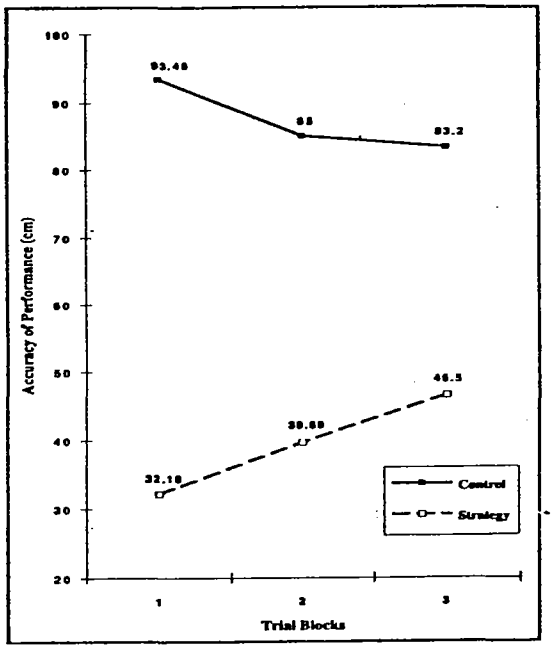

Figure 3. Means of strategy and control groups across trails.

Fluency of Performance. The χ^2 analyses revealed that subjects in the strategy group were more fluent in their performances compared with subjects in the control group (χ^2 = 31.00, df = 3, $p < .001$). Table 2 presents the χ^2 values for performance's fluency in trial block 1. The strategy subjects achieved higher values, e.g., 15 pts and 20 pts (see left-upper part of the table), for their performances in contrast to the subjects in the control group who achieved lower values (see right-lower part of the table). Similar values were observed for trial blocks 2 and 3.

Assessment (category)	Control Group	Strategy Group	Row Total
5.0	4 100.0 25.0 12.9		4 12.9
10.0	12 100.0 75.0 38.7		12 38.7
15.0		1 100.0 6.7 3.2	1 3.2
20		14 100.0 93.3 45.2	14 45.2
Column Total	16 51.6	15 48.4	31 100.0

Table 2 High and low assessments for strategy and control subjects (Chi-Square Analysis)

Quality of Performance. No reliable differences were revealed for the qualitative variable of performance.

DISCUSSION

An attempt was made in the current investigation to further examine the effectiveness of the Five-Step Approach (Singer, 1988) on skill acquisition processes. A gross motor skill, i.e., the Chanet dancing skill, was taught in school-settings. Learners who were directed on how to implement the five steps of the strategy were more accurate and fluent in their performances compared to subjects who were not guided in the strategy.

These findings are similar to findings from previous investigations in the learning strategy domain (e.g., Lidor, Tennant & Singer, in press; Singer, DeFrancesco & Randall, 1989). The prominent conclusion from these studies was that learners can benefit from using a learning strategy, e.g., the Five-Step Approach, when acquiring a novel motor task.

The impact of the Five-Step Approach as an instructional technique on the young learners was instant. The strategy subjects were more accurate (deviated less from the 5 cm central line) and fluent (consistently performed more Chanet turns) than subjects who received the same instructions but not the strategy. The control subjects did improve their accuracy between trial blocks 1 and 2; however, they did not achieve the high level of proficiency demonstrated by the strategy subjects. Only in the qualitative aspect of the Chanet performance, did the Five-Step Approach subjects not achieve better. However, it may be speculated that the scale of performance assessment (e.g., four levels of success) was not sensitive enough to reveal any influence of the strategy. Additionally, the number of trials executed by the subjects was not large enough to gain more progress throughout the acquisition course, and thus might inhibit any possibility of benefiting from the five steps of the strategy on the overall quality of performances.

The positive influence of the Five-Step Approach on a gross motor skill taught in school settings is an additional contribution to skill acquisition processes. Previously, the strategy was examined in laboratory settings (e.g., Singer, Lidor & Cauraugh, 1994) in which research procedures were almost optimally controlled and manipulated. However, the "real world validity" of the learning process and its recommendations rather minimal. In

the current study, learners could appropriately and efficiently implement the strategy in a dancing program conducted during physical education classes. Therefore, the effectiveness of the strategy was also realized in field settings.

Sport psychologists, physical educators and coaches who are involved in practical work with young learners should consider using strategy instructions, e.g., the Five-Step Approach, since it has been found that learners are able to perform better while implementing the strategy. Thus it is recommended that learners be exposed not only to technical directions in skill acquisition processes, but also to strategical instructions in which the emphasis is made on the mental side of motor performance. This combined approach to learning and performance of motor skills may result in better achievements and success.

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HOW TO BECOME AN EXPERT IN A COMPLEX GROSS MOTOR SKILL

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key words: skill acquisition, expertise, knowledge

INTRODUCTION

Skilled movements seem to be controlled fully automatically, and no conscious awareness is needed for example to walk, to ride a bicycle, or to perform many sport skills. There exist, however, considerable individual differences in the quality a skill is performed. Experts show a smooth behaviour with a high percentage of successful executions. The question is therefore how these differences in performance may be explained.

The focus of interest of researchers in the area of motor control and motor learning has turned, in the past few years, to the concept of expertise. Expertise is normally understood as domain-specific and acquired in a long period of intensive training. Having completed thousands and millions of trials, skilled performers in sport are experts in their specific domain (Abernethy, 1994, p. 241). In sport, normally a situation is ill-defined (Russell, 1990, p. 86), and athletes will have to classify it — different than in most other areas of expertise — under a high time pressure (Thomas & Thomas, 1994, p. 296). Sport specific expertise allows for a quick analysis of the problem a situation poses and the selection and execution of an adequate movement solution to attain the intended goal. This aspect of movement execution is a second difference between sport expertise and many other areas of expertise like chess where the motor component is negligible (Thomas & Thomas, 1994, p. 296). This includes that the correct decision in a situation does not necessarily mean that the motor solution may be performed, as is the case for many highly experienced coaches.

Expertise in sport seemingly means to have the relevant knowledge *and* to possess the necessary skill level to achieve at a high level (e.g. McPherson & Thomas, 1989). Most of the studies up to now have focused on the cognitive aspects of situation analyses and decision making mainly in game sports (e.g. Abernethy & Russell, 1987; Allard, Graham & Paarsalu, 1980; Allard & Starkes, 1980; Bard, Fleury & Goulet, 1994; French & Thomas, 1987; McPherson & Thomas, 1989; Starkes, Allard, Lindley & O'Reilly, 1994).

In this paper I want to show that cognitive processes to a high extent also underlie the development of tacit knowledge necessary to *perform* the skill, thus the motor component. This knowledge is usually not easy accessible, but it is assumed that it is still influental in later stages (e.g. Myers & Davids, 1993). The crucial point is therefore to gather information about the insight a person gains into the problem a complex movement poses. In a first step I will theoretically analyse the structure of expertise of skilled performers. In a second step I will show a methodological approach to empirically assess the development of a new knowledge structure when learning a gross motor task. I will then present some exemplary data and conclude with some implications both for future research in the area of skill acquisition and for application in the field of sport.

THEORETICAL ANALYSIS

If a person learns a new gross motor task, he or she gains increasing insight into the solution of a motor problem. In other words, movements are learned that allow for the best solution of the problem posed by the specific task. The task therefore has a strong impact on the course of the movement (Famose, 1990). The movement is furthermore limited by the constraints of the environmental conditions and of the human body (cf. Turvey, 1990). To acquire the respective movement means to know what to do under what conditions in order to get the expected effect, i.e. the mastering of the situation. Cognitive processes involved refer (1) to the subjective valuation of the task, the environment and the actor him- or herself, the so called processes of *orientation*, (2) the formation and selection of intentions and goals and the use of means, i.e. partial movements to attain the goals, the processes of *planning*, and (3) the *evaluation* of the resulting outcome, i.e. the control and attribution of differences between the expected and the real effects in terms of success or failure, but also in terms of e.g. kinaesthetic sensations.

In an action theoretical unterstanding (cf. Nitsch, 1992) the focus is on the intentions, with relevent research questions being 'what do you intend?', 'what do you want to avoid?', rather than asking 'how did you make it?'. The intentions influence the subjective relation between the means and the goals. The means refer to the conscious use of certain partial movements (cf. Glencross, 1992) which themselves do not necessarily need any attention.

Intentions, or goals, are hierarchically structured. Whereas a beginner has goals on a low level, e.g. put both hands on the ground, bend the neck, put the head on the ground etc., with increasing expertise the goals are situated on higher levels. The expert just wants to make a summersault and goals on lower levels are no longer represented.

Not every intention is important in every moment. Very often new intentions emerge in a specific situation. Certain aspects of the situation, i.e. environmental constraints or

affordances, task restrictions, or personal factors, may trigger a new intention. Sometimes the results of an action, or even the anticipated effects, have the consequence that new intentions are formed.

Another important information to learn are the conditions under which certain means may be used in order to attain a goal. The conditions are also represented by the three determinants of the situation, i.e. the person, the environment, and the task.

The results, the (expected) outcome is another component of importance. Of course means with an expected negative outcome are usually not used. The real outcome may be represented in form of e.g. kinaesthetic sensations, like increasing pressure in front of the tibia, or in form of success or failure. Failure may be atttributed to the previously mentionned aspects: The intention was unfavourably selected due to an inadequate classification of the situation, or the partial movements used did not fit with the situational conditions. Depending on the result of the attribution process, changes are introduced in a next trial, e.g. new intentions are selected, other partial movements are used, or the situational conditions are changed.

To summarize, the learner acquires expertise in the following five different concepts of knowledge:

- Intention: What somebody wants to attain
- Means, or partial movements, to attain the intended goals
- Trigger conditions that actualize intentions
- Conditions, under which the means are used
- Effects: expected or real results of the action.

For the regulation of actions and movements the following four relations between the five concepts of knowledge are of importance: Conditional relations between conditions and means are characterized by 'if-then'-relations. This includes knowledge about what to do under what conditions. The teleological aspect refers to the intention-means-relation. Knowledge in this domain includes what to do in order to reach a certain goal. Indicative relations are the relations between the trigger and the intention and includes knowledge about whan it is necessary to select a certain intention. Cause-effect relations link the means and the subjective effect and are charcterised by knowing what happens if something is made (Figure 1).

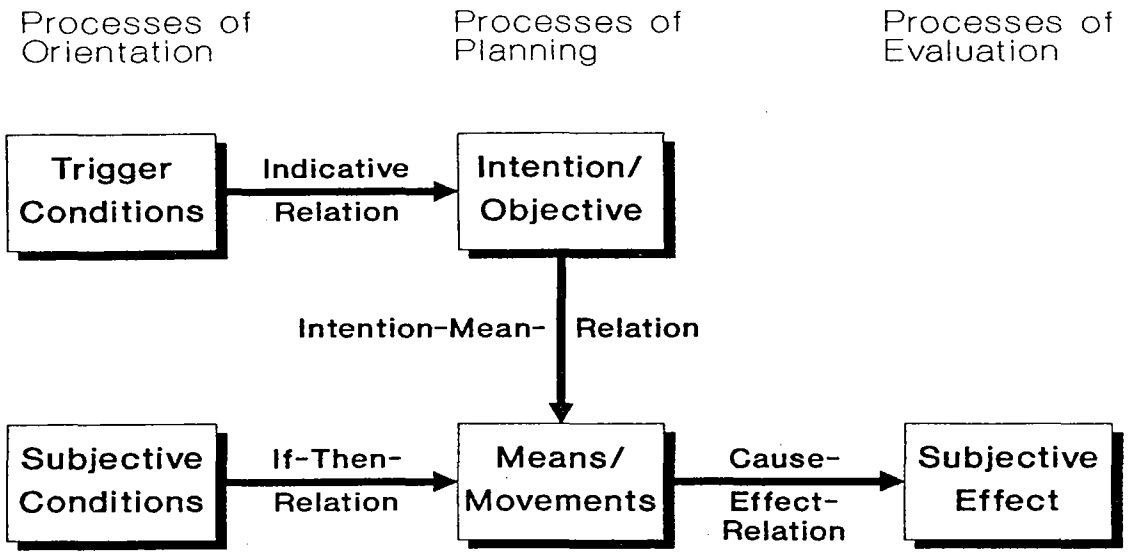

Figure 1. Knowledge Structure About Complex Motor Skills with Five Concepts and Four Relations.

METHODOLOGICAL APPROACH

The classical paradigm for the analysis of expertise is the comparison of of the performance of experts and novices (e.g. Abernethy & Russell, 1987; Russell, 1990; Bard, Fleury & Goulet, 1994). The approach presented here is slightly different and is based on analyses of the learning process, with the aim to demonstrate how expertise is acquired. In the "initial learning stage" (Whiting, Vogt & Vereijken, 1992, p. 100) the first confrontation with the problem may be observed. The cognitive processes of orientation, planning and evaluation may be registred from the very beginning. Since the learning process is irreversible, the early experiences have a strong impact on the developing knowledge structure.

Experimental Task

The task used in the learning experiments was the inverted bicycle: When turning left, the front wheel turns to the right, when treadling forward, the bike does not move on, whereas it moves foreward when treadling backwards. In other words, the outcome is contrary to what is uses to be on a normal bike.

The experiments were conducted under field conditions using sport students with no special expertise in bicycling as Subjects. No instruction was given, and no augmented feedback

was provided.

Data Registration and Reconstruction

Knowledge structures, as outlined above, may be reconstructed by *frames*, according to the concept of Minsky (1975). Every frame has a fixed number of *slots*. The slots are the invariant structure of a knowledge frame. In a specific situation, the slots are specified or filled out. According to the action theoretical assumption of the primarity of the intention knowledge components are grouped together in an intention frame. Each of the other components is forming a slot within the frame (Figure 2).

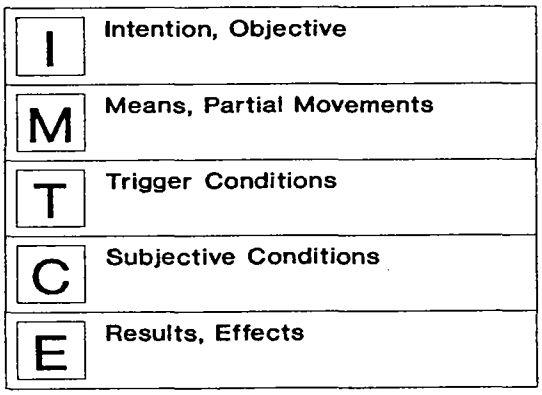

Figure 2. Frame-Form Representing the Five Concepts of Knowledge, as used for On-Line Registration.

Frames are hierarchically organized and dynamic. This means that parts of the knowledge structure are connected in different ways with frames on other hierarchical levels. Since actions are always polytelic, there are intentions on several levels of the execution of a movement. Higher goals are achieved by certain means, which represent goals of a lower hierarchical level. Within one frame, the relations outlined above may be found.

In the experiments conducted, data registration focused on the different knowledge representations the Subject developed in every stage of the learning process. The five categories, corresponding with the different knowledge concepts, were explained to the Subjects beforehand. During the whole learning session, an experimentor was at the side of the Subject. In an interactive research process, the Subject gave verbal reports about his or her intentions, means etc, which where registred in prepared frame-forms by the experimentor. The categorisation of the data was made in accordance with the Subject. Every time when starting with a new intention, using new means or changing the evaluation a new form was completed.

EXEMPLARY RESULTS

The exemplary results presented here are taken from a more comprehensive study (Seiler, in press). The hierarchical structure of intentions could be demonstrated. A two-folded process was normally found. An initial intention was for example to ride on the inverted bicycle just like on an normal one, by means of simply changing the direction of steering and treadling the other way round. The handle-bar was kept as steady as possible. Of course the result was not satisfactory because an incomplementary motor programme made it impossible to keep the balance while correction movements lead to a contrary effect of the front wheel. New intentions were formed which were easier to reach with other, simplier actions, for example to keep the feet on the ground and to explore the behaviour of the inverted steering-gear. If then the action was successul, tacit knowledge about the resulting effect and the situational conditions was acquired.

An example of one Subject is shown in Figure 3 using the frames from an intermediate learning stage. After the session, the Subject "knows" how to continue straight on after turning a right curve: It is necessary to control the balance and to keep the handle-bar steady. If the handle-bar movement is not controlled, the resulting curve is too narrow. It is necessary to pay attention to the balance, otherwise the correction movement is wrong.

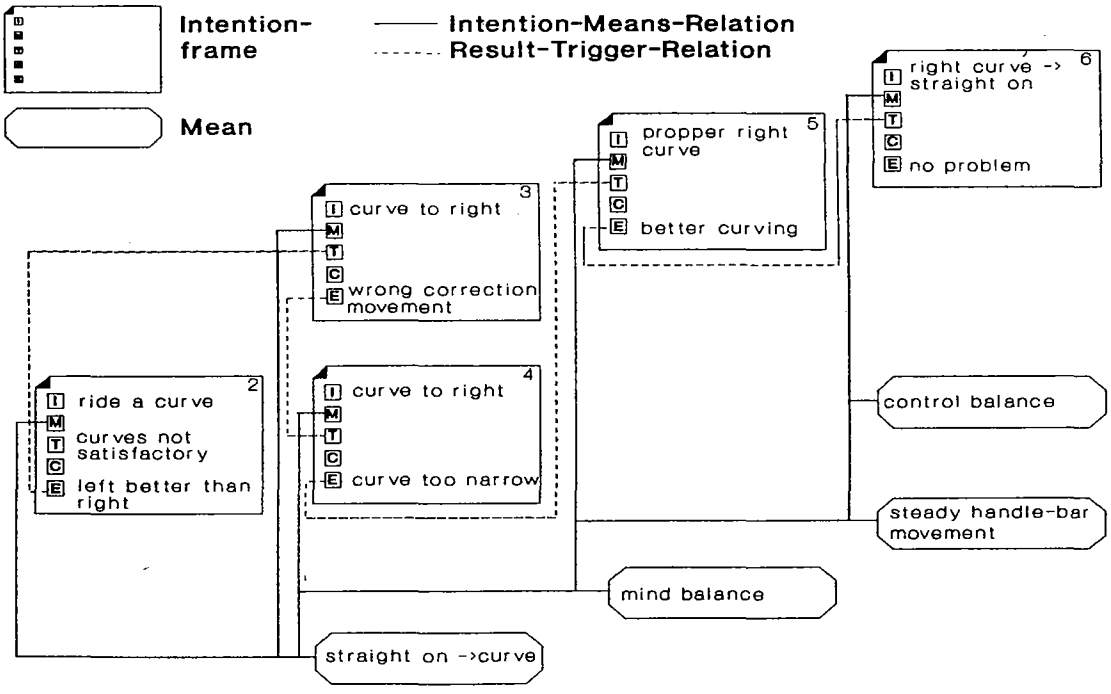

Figure 3. Example of the Developing Knowledge Structure, Reconstructed with Frames During the Learning Process.

With growing expertise, the direction of the process changed from a more analytical top-down to an integrating bottom-up. The lower-level intentions became superfluous, and sometimes the first, very general intentions, e.g. to ride straight on, became important again. No more thoughts were necessary about the partial movements and actions needed to keep the balance or to turn at a distinct point.

CONCLUSIONS

The underlying theoretical assumptions and the empirical evidence outlined briefly in this paper have some important implications for future direction of research in skill acquisition.

First, it strengthens the need for the study of learning processes for a better understanding of motor control (cf. Whiting et al., 1992). The way how degrees of freedom are reduced by the subject in the learning process (cf. Vereijken, van Emmerik, Whiting & Newell, 1992) is to a large extent a cognitive process depending on the intentions, the perceived situation and the available means. These cognitive processes have to be analysed further for different motor tasks.

Second, the results suggest to concentrate more on the subjective perception of the situational constraints and especially what Turvey (1990, p. 941) calls the "circumstances appended to laws", i.e. plans, intentions and goals, instead of, as is proposed in the so called ecological approach, to focus on the analysis of the evolving coordination mode as a result of the perceptual-motor workspace and (physical) laws. The subjective perception of the situational conditions defines the kind of experiences a person makes when exploring the perceptual-motor workspace, and the interpretation of the outcome of a motor solution is necessary to build up the relation between the knowledge concepts condition, mean and effect.

As one important consequence for the learning and training process it may be concluded that it is necessary to allow for errors. Only if a learner experiences unsuccessful attempts when trying to solve a problem situation he or she will build up the necessary knowledge about the circumstances under which a certain mean is more likely to be successful.

In the training process, cognitive processes have to be provoked and not suppressed, as is often the case by giving too much methodical help and/or augmented information (cf. Newell, 1991). When giving augmented information, the experimentor defines when and what information is given (e.g. Kernodle & Carlton, 1992). This, however, may lead to a completely different task in the perception of the Subject. Instead, he or she should control the resulting effect, attribute it to whatever seems adequate with the available body of knowledge, and draw the necessary conclusions. An excellent possibility to provoke a

cognitive analysis in the training of athletes is to use inversion tasks, e.g. to execute a movement with the weak hand.

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S.4.2. CHILDREN UNDER 6TH

Chairperson : N. BARDAXOGLOU

"DANCE" CONCEPT : VERBAL AND NON-VERBAL BEHAVIOURS OF CHILDREN AGED FOUR TO SIX.

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Introduction

Dance is one of the more primitive and natural expressive middle. The purpose of this study is to try to understand the meaning of "dancing" that young children may have.

Dance's definitions varie a lot because dance is a way "to express his identity" (3), which defers from one people to another. How do young children construct the concept "danse" and which are the variables which may influence that process are the main questions of this study.

If children communication's abilities are more and more appreciate by their non-verbal behaviours, it is interesting to compare them to their verbal productions.

Material and method

Twenty-seven children aged four to six have been tested. They all live in Brussels and go to a kindergarden. They did not practice dance at school or beside school.

The testing consisted in two parts : the first one is a questionnaire about the subject (age, gender, culture,. level at school...) which contents also only one question: "What is dance for you?" where every child's word has been noticed to analyse the verbal behaviour. The second one refers to the non-verbal behaviour where the child has been asked to show what "dance" is. Every child's productions has been recorded on a video tape.

The children have been tested in the same conditions : same room, same moment of the day and without any information about the testing.

Results

The analysis has been based on Mucchielli method of multiple responses to a thematic question (5).

Quantitative analysis

Corpus's quantitative analysis has been realized considering

1°) the numerotation's units : the corpus is extend from one to fourteen words

2°) the context's unit :

Verbal responses

Fiveteen children were completely unable to explain what dance mean for them. However, they affirmed they do know what it is but did not find the words to express it.
The twelve other children's answers have been traited by content analysis and may be classificed in five areas : eight answers refered to "to turn", three to "pleasure", two to "music", two to "to share" and one was a nonsense ("take a picture").
Only three children gave an answer belonging to two categories or more.

Laswell and Leites trends analysis (3) showed a prevalence of favourable units versus total units compare to unfavourable units versus total units:

favorable	unfavorable	neuter	total
4	0	73	77

Table 1 - units's distribution of the group

The individual distribution shows that only three children gave favorable contents:

	fav.	unfav.	neutral	total
Child 10	1	0	2	3
Child 15	2	0	10	12
Child 26	1	0	13	14

Table 2 - the three answers presenting a favourable content

It is interesting to notice that those three children (25% of the group giving an answer) are responsable of 37% among the total aswers's number (29/77) and that children 15 and 26 have produced the first and second longer corpus of the group.

This results have been improved by Janis Fadner coefficient (5 p 62) which pointed out an obvious positive ratio between favourable and unfavorable units (Child 10 1/0; Child 15 : 2/0; Child 26 1/0 ; total 4/0).

None unfavourable units has been recorded in the words used by the children who dare to express.

Non-verbal responses

The analysis described by Mucchielli refers to (5) :
- regards
- face movements
- respiratory movements
- hands movements
- attitudes
- body movements
- discordances between this codes and verbal emotions
- discordances between the codes
- discordances between the codes and the intellectual concept of the communication.

In our study, seven children did not move in front of the video camera and none discordances has been recorded.

Among the twenty left, fourteen have been turning, four have been moving from one foot to the other and two have been trying to stay balanced on one foot.

Gender analysis (6)

No difference has been found between the boys's and the girls's representations.

Cultural analysis

This sample did not allow to make such an analysis because of the small number of children belonging to another culture.

Discussion

The litterature insists on the importance of the young child's non-verbal communication in his general development (2). His school life is only a epiphenomena of this trends and some authors like Zimmerman have pointed out the importance of non-verbal behaviours during the school time (7). The comparison between verbal and non-verbal responses in our study trends to show that children used more easely corporeal communication than langage. Both communication's middles provide a meaning of "dance" almost refering to "to turn".

The testing's situation made at school is obsviouly an artificial situation which influences the child's behaviour. More, using the video camera as recording middle may be stressful. However, it has been the best way to let the child express his "dance" reprentation.

If the testing situation may be responsible of the hesitation of the child, regards to the small number of children who dare to speak or to move, we plan to use the same testing but with the teacher asking the question, for the verbal exploration, and with a musical background, for the non-verbal exploration.

Gender analysis did not present difference between the boys and the girls reactions. Perhaps is it the sign described by Perrault about the sociological modifications of dance. From an expression's middle mainly reserved to the women, the author seems to predict a men "coming back" in relation to the evolution of our society. (in 1, pp 72-73)

Content analysis is located at the border of linguistic and hermeneutic (5 pp 115) and its application field is very large. It represents "an interdisciplinary carrefour" which may be usefull in "dance" because this area refers to pedagogy, psychology, sociology, ethnology...

The results presented here are only a small part of a largest study conducted with the same testing for primary school children, secondary school children, college school students and adults. This procedure would give a better understanding of the elaboration of "dance" concept regard to the age but also to the gender and the culture. This last parameter has not been tested in this study. However, another testing will be held in a different school where the children belong to North African culture to make the comparison. It would also be interesting to have an idea of the concept in various european contries as well in the USA, Asia or South America.

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PROBLEMS WITH FEAR OF FALLS AND OF DISEQUILIBRIUM IN DIPLEGIG CMD CHILDREN

(Henkinet Florence)

INTRODUCTION : (Missa A.M., 1993)

In CMD (cerebral motor disabled) children, the sensorimotor development is being disturbed by abnormal neurological behaviour patterns.
These disorders slow down the elaboration of the body as a whole.
However, the structuring of this body as a whole depends also and above all on the mediatisation of the motor and sensorial capabilities through the affection discovered within the mother/child relationship first, followed by the child/family and, finally, the child/society relationship.

In CMD children, some physiotherapists (Missa A.M.,1993) have recorded during their sessions that:
- emotion, fear of disequilibrium and of falls (gravity-related anguish) would further increase the muscular tone wich altere the quality of the motions;
- these children frequently desired to be picked up and held so as to experience strong sensations of motion (mainly sensations of speed or of handling in space);
- behavioural disorders were recorded (doubtlessly connected with the frustration felt because of their motor disability), essentially aggressive pulsions or depressive-type manifestations.

In my study, I concerned myself more particulary with the problems relating to fear of heights and of disequilibrium by attempting to demonstrate their existence objectively by way of equilibrium tests and one projective test.

METHOD - PROCEDURE :

1. Group :

We selected a Group of diplegic CMD children aged from 4 to 8 years, able to move and with a capability of understandable speech.

In addition, we selected a comparative group in teh same age range, without language problems (such as suttering,...) and without any problems of equilibrium.
We separated them into two subgroups:
- subgroup 1 : without any psychomotoricity;
- subgroup 2 : with psychomotoricity sessions.

2. Experimental techniques:

1. Equilibrium tests:

We selected equilibrium tests (Picq and Vayez, 1965)

*** Static co-ordination:**

This test comprises different situations that must be maintained.
Results will be recorded together with the age at wich the test was passed and, possibly, with the marks obtained; this allows for situating the child in relation to an age Group.

*** Dynamic co-ordination:**
This test comprises also various exercices, but of a dynamic nature.
The marking system is the same.

*** Adapting these two tests for CMD children:**
We are aware that in CMD children the body scheme structuring is slower.
This explains why we added static and dynamic situations to the initial test by using the development stages as a basis.
As regards marking, we ask the children to take all the positions and we write down only whether there was failure or success in each posture or movement.

*** Why these equilibrium tests ?:**
Through these various positions or movements, we know where the child is situated where equilibrium is concerned and whether this has any influence on the problems with fear of falls which we observe by way of the projective test (cfr. below in the text).

2. Projective test:
*** Introduction:**
No test has been in existence up to now where quantifying the problems with fear of falls in children is concerned.
We believed that a projective test would be the best method for revealing these problems, considering that the child can express its feelings spontaneously, in a conscious or unconscious manner, and we believed the playful aspect of comic strips to be more adequate in motivating the child.

Thus, whenever the child is brought into the presence of such situations relating to conflicts experienced by the child and generating repression, it will describe the stimuli situations as a function of its own problems by giving more or less free rein to its repressed tendencies; these are being related, however, to a different person with whom the child is secretly identifying, as we may rightfully assume (Corman L., 1968).

*** Description:**
Using projective tests such as « T.A.T. », « C.A.T. », « P.N. » and others as a basis, we developed our own projective test.
The pictures show all the situations of equilibrium and have the purpose of allowing for the quantification of the problems with fear of falls and of gravity (thanks to analysis of contents).
These situations represent a high vertical aspect, but without showing the most sharply plunging planes as we wish to record only the response to verticality without causing vertigo.
We wish to determine the difference between a normal child and a diplegic CMD child in situations of play or of day-to-day life as expressed by comic strips.

*** Course of the test:**
We see to in that the child is comfortably installed and that it can observe the various pictures properly.
We ask the child to tell us a story for each display, with a beginning, a middle and an end.
We record what the child says and carry out an analysis of content in order to bring out the problems of the child, specifically the problems with fear of falls and of gravity.

*** Corrective grid:**
We worked out a corrective grid for all the drawings, on the basis of the various projective tests for the children, but also of the various replies we were given during the presentation of the test to the children.

3. Statistical test:
We used independence tests, namely the Chi-Carré and Fisher Test wich allowed us to compare:
- the CMD children and those in the comparative Group and to point out the significant differences in the level of anxiety in the various drawings;
- the two subgroups of children (psychomotoricity and non-psychomotoricity) and to point out in this manner the beneficial effect of psychomotoricity in children of the comparative Group.

RESULTS - CONCLUSIONS:

1. Equilibrium tests:

1. Comparative Group:
To note that these children comply properly with the criteria of inclusion.
We do not observe any significant differences where equilibrium for the children is concerned.
Also, when we compare the two comparative subgroups (with or without psychomotoricity sessions), we fail to observe any significant difference.
Consequentiy, these children actually represent a reference comparative group.

2. CMD children:
To note that the number of positions maintained under static conditions is equal to an average 13 positions whereas this average is 8 positions where dynamic conditions are concerned.
This allows us to state that static situations are easier to perform than dynamic positions.
These average figures fluctuate in accordance with the seriousness of the diplegic conditions:
- medium and serious diplegia: static : average = ± 11
  dynamic: average = ± 7
- light diplegia : static : average = ± 16
  dynamic: average = ± 9.

2. Projective test:

1. Comparison between CMD children and normal children:

*** In General** (all drawings - all ages):
To note that, regarding the various parameters for the expression of anxiety, there is a significant difference between the CMD children and the children in the comparative Group.

These differences are expressed essentially :
- as regards CMD children, by:
* The situation for the child: the CMD children make essentially variable choices whereas the normal children are positioning themselves more readily at heights; consequently, CMD children display an anxiety as regards heights;
* The situation described by the child: the same applies here, wich confirms our conclusion above;

* Number of characters forgotten: this number greater with CMD children, wich could be the expression of a refusal regarding the position or of the fact that this position has not been integrated properly in the child;
* Indirect fear: very significant in CMD children; it shows up the fact that these children are unable to execute the position and that they are taking refuge behind someone else;
* Negation : they deny the situation so as to become more able to face it;
* Avoidance : very marked in CMD children who will go as far as to refuse describing the picture; they avoid the situation through various strategies in order to avoid having to experience this anxiety or fear.

- as regards the children in the comparative group, by:
* Direct fear: which is much greater than in CMD children as the comparative group children are aware that the situation proposed is dangerous and risky;
* No anxiety: the comparative group children display significantly less anxiety than the CMD children.

*** By groups of drawings:**
We also note differences between the comparative Group and the CMD children, but the various aspects of the anxiety grow more significant as the number of characters increases. Most characteristic and determined for each Group of drawings is this expression of anxiety via actual avoidance where CMD children are concerned.

*** Conclusions:**
The choice of drawings has thus been relevant, considering that:
- it allows for showing up the difference between CMD and normal children;
- normal children unaffected by any problems of equilibrium do not display much reaction regarding certain heights whereas CMD children do show such reactions, wich points out that there is a problem.
We may draw the conclusion therefore that CMD children who are also affected by a problem of equilibrium display anxiety when faced with day-to-day life situations, with playing situations.

2. Comparison between the two comparative subgroups of children (with / without psychomotoricity sessions)
*** In general:**
We note significant differences as to the following:
* Restrictive control : Which is greater in children without psychomotoricity sessions; these children keep at a distance from the situation so that they do not have to gave pu to it;
* Interpretative control : significant in children with psychomotoricity session; these children have learned to perceive situation and thus to analyse them and devise the various possibilities;
* Characters added : their number is larger where children without psychomotoricity sessions are concerned; this is, once again, a means for distancing oneself from the situation;
* Violence : more obvious in children without psychomotoricity sessions; this violence is frequently being expressed during psychomotoricity sessions and the children without such sessions express this violence much more willingly via the drawings presented to them.

*** Conclusion:**
We may conclude, from these few results, that for one and the same group of children, psychomotoricity sessions have a beneficial influence on problems of anguish.

DISCUSSION - PROPECTS:

1. As regards equilibrium:

Our observations go to show that CMD children are late developers as regards equilibrium, in relation to their age.
It is clear that the level of equilibrium in a diplegic CMD child is considerably lower as compared to a normal child and all the more so in relation to increasing seriouness of diplegia.
These observations are in concordance, consequently, with literature if we consider the various characteristic features of diplegia (Bobath B. and K., 1986):
- the entire body is affected, with the inferior members more seriously affected than the superior members;
- the distribution of the spacticity is usually more or less symetrical;
- these children possess, generally, good head control and their superior members are affected slightly or moderately;
- their language is usually unimpaired;
- some of them are affected by starbism.

It is therefore understandable that diplegic CMD children suffer more difficulties where equilibrium is concerned.

2. As regards anguish:

Our observations go to show that chidren are affected by problems of anguish and that these are greater, of course, where CMD children are concerned.
The latter protect themselves from this anxiety by various defence mechanisms and, above all, by an indirect fear and a reaction of avoidance.
They attach their anguish not to any object but rather to other characters (parents, for instance).
Zulliger H. (1972) has already demonstrated that the child suffers feelings of anguish and that it tries to protect itself from this anguish by various means, in particular by « attaching » its originally « diffuse » (groundless) anguish to an object.
The family circle also plays an essential role for CMD children as they cling to it for the purpose of not having to face up to the situation.
Zulliger H. (1972) had said already that the family circle (anxious parents, obsessional mother,...) influenced the persistence of such feelings of anguish.
Psychomotoricity sessions play a certain role in « normal » children, at least, as they diminish the expression of the anxiety.
Zulliger H. (1970) had already demonstrated the curative effect produced by spontaneous play on such feelings of anguish.

3. Prospects:

We could act upon the feelings of anguish in CMD children:
How ?
through: - influence by the family circle as numerous feelings of anguish experienced by children persist because of anxious parents,... (Zulliger H., 1972)
- influence by the child itself that finds itself in a situation of failure as regards its desire to communicate with its mother (Missa A.M., 1993).
Through which means ?
One could act upon the child by means of some playful psychomotorial activity that leaves the essentiel part to spontaneous action and aims at structuring the entire body into a unit of pleasure (Aucouturier B., 1984), considering that motor, sensorial and somatognosic disorders in CMD children are slowing down the elaboration of the body as a whole (Missa A.M., 1993).
With wich objective in mind ?
Building up the structurization of the body scheme and of the mental images.
The purpose consists in helping the child to give form to its desires or its difficulties so that it does become embedded in them (Donnet S., 1993).

This action would go hand with some neuro-evolutive treatment that provides the child with a sensorimotor experience that is as normal as possible and gives the child basic referential movements that it will need for all later activities (Beelen P., 1993).

At the level of the individual concerned, this psychomotorial activity could improve his/her proximal tone and thus provide a better organisation of the body centre line and, as a consequence, attenuate fears and feelings of frustration, allowing such individuals to regain the pleasure of movement.

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SPACE ADAPTATION OF BLIND CHILDREN THROUGH BABY-HOCKEY

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Introduction

Blindness is the only handicap that people in good health are able to imitate. Consequently they think they know what blindness is. This is an error because they have in memory a lot of images seen and recorded before.
Blind from birth have to invent the whole world without having seen the smaller part of it. He never saw colors, forms and is obliged to mobilize his other senses to take up garding-marks.(7)
"Every low vision influences more or less the motor behaviour ...(3)".
The sensori-motor development of blind children is mainly influenced by the blindness's suden appearance. New-born and very young child's elementary movements as catching objects, going on all-fours or on foot, running, jumping...are learned thanks the senses and particularly thanks to the view.
More than the sighted child, the blind one needs help to organize his perception system in relation with his mobility.

Material and method

Psychomotor activities, as well as physical activities have two big roles : firstly, to prevent development failures and secondly, to reduce a deficit by supporting the psychomotor development (5).
To play is a natural child's activity which serves his development and his integration in the world in relation with the objects and the other people (1).

Activity

Baby-Hockey is a quite new activity for children aged three to seven which is combining this two aspects-play and movement- in a psychomotor way.

The activity has been adapted for blind children. It is played with a sweden Unihoc stick, which is slide at the right high for each child, blind or sighted. For the blind children , the plastic ball is a sound one and has the same dimension as this used in baby-hockey for sighted children. The goal is not a classic one because it has no height and no depth. The player scores when the ball reach a definite wall.

This procedure is quite interesting for blind young children because it includes three related point of view necessary for a global work, in a holistic approach.(6)

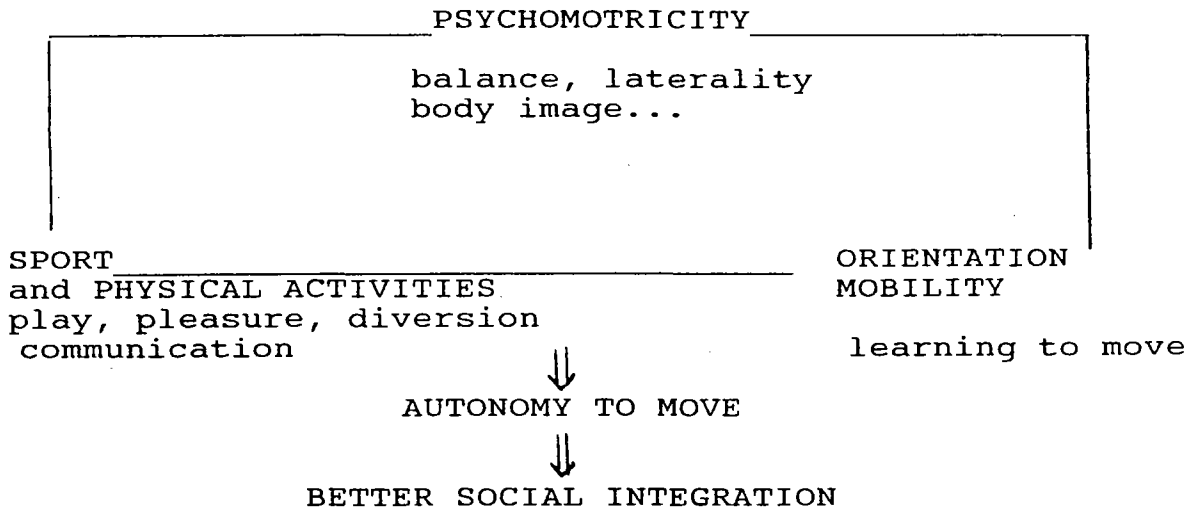

figure 1 psychomotricity, sport and mobility in relationship with the social integration

Aims

The Baby-Hockey for blind children has three principal aims:

- a sociological aim, to increase the contacts between children and to help to a better integration in the relationship of the group.

- a psychological aim, related to the construction of the ego

- a psychomotor aim, developed through the body image, the laterality and the time-space adaptation. Without that, no praxis can succeed.

Methodology

The exercices are proposed as little plays or stories and are based on the following principles :

- orientation education
- learning elementary movements for a better motricity
- learning skills with the stick and the ball.

The fundamental exercices refer to :

- moving with the stick
- shoot
- guide the ball with the stick
- locate the ball
- throw the ball.

Discussion

It seems a necessity to give to the visuel handicaped person, more than to everyone, the occasion to know himself, his possibilities and limits and to try to surpass himself. (2)

Baby-Hockey for blind children may be considered as a middle to begin to learn how to walk with a cane using the stick as a cane substitute, as protection middle and especially as warning signal.

On the physical field, using the stick let the child present less muscular stiffness and a less tense corporeal attitude.

On the psychological field, it let him feel less anxious to face up to obstacles and enhance more confident.
The more high head helding let the child appear as more competent which is an important point to be better integrated with sighted children (4).

On the psychomotor field, baby-hockey may help to introduce space and time concepts, or size and number concepts...

On the social field, it allows a better integration in the group.

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S.4.3. MENTAL TRAINING

Chairperson : P. GODIN

THEORICAL PRINCIPLES OF EMOTION FOR THE MENTAL PREPARATION: AN EXAMPLE IN TABLE TENNIS

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Within the sports environment, the notions of anxiety and stress are allowed but their management is rarely treated with the scientific seriousness it deserves. Even though these terms are linked together, they bear different meanings. The advantage to determine these differences and their link is primarily aimed at providing a better knowledge of these phenomenon and then be able to offer these athletes an efficient and rigorous management, which is one of their main preoccupation. If stress is an adaptation of the organism to a constraint as considered by Seyle (1956), then anxiety can be considered as part of the large area of emotions in which we would find other emotion such as joy, sadness, and so on which can all come out before, during and after the competition. In other words, to understand the stress and anxiety encountered by the athlete, and later on, efficiently help him to manage it, one must widen the question to the field of emotions because anxiety is not the only one the athlete encounters which has an influence on him. Consequently, it may be necessary to consider the theory on emotions. Whilst stress and anxiety are included in the large field of emotions, in sport psychology, one finds fairly few references to the general theories on emotions. Moreover, the research in this field remained for a long time limited the study of anxiety (Spielberger, 1989) which is not synonymous of emotion. Although, it is admitted that an emotion is never a unique phenomenon but has several aspects (Berstein, 1991), that is to say that several emotions are tangled up. So, one can think that anxiety is not an homogeneous set but is built according to the situations of different emotional components linked to other emotions like fear, anger, frustration... They mix together and form an original ,complex and/or moving set and which will, by definition, be eminently difficult to manage.

It is in the sixties that the first cognitive theories on emotions will succeed to the physiological theories on the inverted U curve and on Drive. The cognition theories will stress the importance of the evaluation mechanism of emotion (Arnold, 1960). Lazarus (1964) brought forward the hypothesis that it may not be the stimulus but the perception of it that caused stress. Lang (1978) in order to explain the stress response proposed a tridimensional model made of the physiological response, the cognitive response and the behavioral response which interact to a certain degree. Risking (1984) brought forward the question of the importance of posture on success or failure. Frijda (1986, 1989) developed the notion of tendency to action in the emotional process. This last concept

could be determinant in sport psychology because for this author, emotion is an evaluation of the environment followed by a preparation to action which leads to behavioral and physiological responses.

We think that the evolution of the theoretical conceptions progressively highlighted the importance of the emotional factor for the subject. To the point that we think that a systematic study of the emotional behavior during the sport competition would give us valuable information on the quality of the athlete sporting performance. The athletes clinical observation during performance has showed us the importance borne by the emotional aspect and its varied demonstration. During competition, certain sports (golf, tennis and table tennis) give the athlete time of non-activity (time between each point, game for the tennis and table tennis, between holes in golf, etc....).
It is during these periods of "non-activity" that the emotional factor can give its either positive or negative full impact . The hypothesis is that if these emotional demonstrations are too present or that the athlete cannot control them, then his physical efficiency will be reduced.
Loehr (1994) seems to share this idea when he highlights the importance of a specific time management between each point (the between point factor). He even states that it is the observation of the behavior during the between point factor rather than the observation of the actual playing that allows to discriminate the good competitor from the not so good. He even goes as far as proposing, for tennis, a Four stage sequence management method which, if systematically applied would allow an efficient management of the athlete's emotions.
Our research takes place before the Loehr hypothesis. It is applied to table tennis players (national and international level) filmed during competition from March 1994 to May 1994. It consists of a systematic decoding of the sequences of non-play (between points or sets) where the presence or absence of emotional behaviours and their quality (positive or negative) is spotted and related to the performance which follows.

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MULTIDIMENSIONAL MODEL OF MENTAL TRAINING APPLIED TO THE FRENCH SAILING TEAM

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Key Words : mental training, counseling, team work

INTRODUCTION

I began my work with the French Olympic Sailing team for the preparation of the 1996 Olympic games in November 1994. Two years is not really sufficient to allow the athletes integrating a complete mental training as a part of their general preparation, but the usual way is to work step by step and solidify a focused area before to refine another. I agree with Orlick (1989) with the following statement : "In the end we realize that refining and perfecting mental skills is a lifelong practice".
I first met the staff invited to a lecture on mental preparation for the annual French Sailing Federation Conference. Their major demands were stress management and communication problems mainly among the female teams. The new rules of the sailing competition (shorter but more wind-sails in a regatta) emphasise the problem of stress and shorten the time to be ready for a departure. When I began my intervention, two different well-known sport psychologists had already worked with them for 12 years. The staff was not quite the same, but some coaches who where athletes in the past had shared this experience. Therefore, there was a sensibility to the psychological concepts which allows us to go further in the proposal.However, my theoritical field and methods were different to what has been done in the past (Levêque, 1993) and this is the model that I would like to present in this article.

PHILOSOPHY

- I believe that sport psychologists have to be more an educator and teacher than a therapist. In France, we have a long tradition of psychoanalysis but I don't think that this fits very well within the sport field ; to give to the athletes a pathologic image of themselves and intervening only when trouble arises has contribuated to frightening the athletes and to prevent them to have recourse to psychology. Therefore my approach is inspired of cognitive and behavioral methods (Cottreaux, 1990) mostly developped in North America, even if sport psychology should include different interventions. Jerry May (1989) defined this action as "a broad spectrum theory approach". In this conception, the sport psychologist doest not need to keep "professional distance" but can be completly part of the team. The main purpose of his/her action is performance enhancement and that includes a large pannel of methods : educational, clinical, organizational and research.

- High level competition with an emphasis of winning, involves several mental skills as goal setting, relaxation training, mental rehearsal to be learnt, but when nonrelated circumstances interfere, such as a broken relationships, mourning, etc., other clinical or organizational interventions must be implemented. When the problem is linked to pathology or appeared too serious to be taken in charge by the sport psychologist, a referral to a professional in the individual's home area fore more intensive intervention is necessary.
- To be effective the program should be systemic and not deal only with the athletes but with the whole environment - coaches, administrators, busness partenairs, family members. If some stressors linked to the competitions are unavoidable, some are frequently related to misunderstanding between the different groups. In such an organization, the sport psychologist can help to develop open lines of communication between administration, coaching staff, athletes, etc.Prior to the competitive season, probable difficulties and future organization can be discussed at different level. It can help to avoid problems arising when decisions have not got the approbation from the different partenairs.
- In such an approach, a research program is conducted at several levels. Even, if sport organizations do not value basic research but tend to be applied in nature, the psychologist has to communicate the need for research to validate the services he provides to the athletes and organizations. My purpose with the sailing team is to validate the psychological assessment, and the stress management program both for athletes and coaches.
- Finally, as stressed by Orlick (1989), the program should be done according to the needs of the athletes : they know well what they need to work on to be mentally ready ; it is important to listen to them instead of arriving with a package of psychological theories or methods. Standardized methods can't focus on specific problems that occur under specific circumstances. The purpose of the first meeting of the athletes is then to identify their specific needs.

HOW TO BEGIN

Lectures

Lot of the time, the athletes never need to refer to a psychologist because they don't understand in which way psychology can help them. That is why, the early action of the psychologist has to be educational in nature. My initial program began as a lecture on topics relevant to the team ; the major goal is to provide to the athletes and the staff valid information of the psychological principles of sport including : stress and coping, goal setting, behavioral and cognitive techniques to improve performance, group dynamics, communication. I often dispense sport psychology articles or book dealing with facets of mental preparation and discuss them later when I meet with them individually or in a group during the training camps or the regattas. Group sessions can also sensibilize the athletes to their personal concern for some of the topics. For example, after a lecture on stress and its general manifestation, each member of the team can express oneself in front of the other about how stress is particularly experienced (thoughs, feelings, and performance) and at which moment of a competition

(departure, after a mistake, when ready to win...). We can, then, discuss the methods avalaible for some specific cases.

The purpose of this first step is to get the athletes interested in psychology but the realistic limitations of psychology are also presented. It is important that the athletes don't want everything from their mental program, as some psychologists or rather "guru" let them believe, but that psychology be understood in the context of the sport technique, physical training, biomechanics and exercise physiology.

Individual and Group Assessment

I believe the collection of information about an individual athlete is important in helping to design an individualized psychological mental training program. Mostly because the athletes are action-oriented, excessive use of paper-pencil evaluation can be viewed negatively, especially when they don't have an immediate feedback concerning the tests. During the first meeting, it is important that they understand that the assessment is not looking for psychopathology, but a means of enhancing the individual's program through identification of current or potential problems area. Assessment is based primarly on interviews, observations of the athletes during group meeting and training and psychological inventories. These scales have been carefully selected to give quick information on emotional, relational and behavioral levels and to be easy to take. Emotional and behavioral sets are assessed by utilizing the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) and the Behavioral Stress Adaptation Questionnaire (Bortner, 1969). Anxiety appears to be the most important variable to assess in order to recognize athletes who need stress management training. For the relational level, Assertive Behavior Scale (Rathus, 1973) is used. Problems in groups can frequently arise from athletes too shy or too agressive and this scale points out these characteristics. When the athletes are involved in the psychological program, I try to go a little bit further in the assessement. The purpose is always to better individualize the program but also to collect some data in a research perspective. Concentration skills, are then quantified by Nideffer's Test of Attentional and Interpersonal Style (Nideffer, 1977). To assess the cognitive style, Group Embedded Figure Test (Witkin, 1971) are used, and to get more precise information on emotional, behavioral and relational levels, the Personality Inventory (GPP-I) from Gordon (1982).

After every administration of this test battery, I met with each athlete to discuss the results of his/her profile in order to validate this data and to better understand their specific expression. The interview conducted at this moment allows us to get more information about their strenghts and weakness and their needs in mental training. The questions are mainly inspired of the Orlick's work (1986, 1989) and try to find out the following elements : 1) What are his/her goals ? What does he/she need to be mentally ready to meet his/her goals ? That gives a direction to focus for improvement. 2) What has he/she done during previous best performances with respect to mental preparation and focusing during the event ? That tells what he/she has already done well. 3) What did he/she do during his/her worst performance ? It is a good indication of behaviours, thougths and focus he/she needs to avoid.After

this interview, the athletes can choose an important psychological goal he/she wants to focus on this year and we can begin our "step by step" work in mental training.

SERVICES PROVIDED

Individual techniques

The most common service provided revolves around the psychology of excellence. Even if each athletes has specific characteristics, there are some important needs that appear to be common among high level athletes of the sailing team, for example, concentration training and development of stress-management skills for dealing with the effects of anxiety have on performance. It is important for every athlete to learn the sources of negative pressure and how to deal with them. After the introduction lecture, I begin teaching the athletes in small groups or individually relaxation and imagery training.

- I use the Progressive Relaxation modified from Jacobson because it is an easier technique to learn for action-oriented athletes. It begins with contraction-release of various muscle groups of the body in 6 steps. These exercises should be initially conducted on a daily basis for ten to fifteen minutes, for six weeks (one for each step). After this training, when the athlete has got the "relaxation response" (Benson, 1975), if he/she feels situationally tense, just prior to a competition, the sensation of relaxation can be recalled mentally within just a few seconds. On the boat, the athletes can easily transfer what he has learnt and contract only the muscles which are part of the action and relax the others (face, shoulders, etc.). Once the technique is learned, practicing three times a week is sufficient.

- Another focus of the early mental work is learning to control breathing. The athletes need to understand what happens when they are tense or angry : often they stop breathing or breath only with the upper part of their breast. They have to learn the breathing linked to calmness, centered in their stomach, and how to quickly obtain it in a stress situation. Synchronizing breathing out with relaxing the muscles enhance the effect of relaxation and can be used as a key signal to get the sensation of relaxation prior to a stressful situation.

- The athletes also need to be aware of the effeciency of mental imagery training, as widely shown in the litterature (for a review see Feltz & Landers, 1983 ; Hall et al., 1990) and especially in sailing, an activity where the tactical part, the cognitive activity is very important and therefore where imagery is the most useful (Feltz & Landers, 1983). Some athletes practise imagery spontaneously but without reaching its full potential, however, most of the time, the athletes never really use this way of training. Like, for relaxation there are several steps to respect before using correctly mental imagery training. The first step is the memorization of the training or regatta area, and the sailing technique. Each athlete memorizes in his/her own way, and he/she has to find the best and quickest way. The second step is visual imagery enhancement training (Isaac et al., 1986). It is the ability to evoke a vivid image like a real picture in the mind. The goal of the training is to use as many of the five senses

as possible while producting an image. Finally the third step, mental rehearsal, involves praticing as a visual image a technique procedure or event in one'mind. Initially this can be done step by step until he/she can be in total synchronization with the flow of the action. This technique needs to be praticed every day, for 10 to 15 minutes in order to be useful.

-Goal setting is also an important part of the program. To stay focused, motivated and to cope with stress, it is important to know why one is involved in high level pratice and to set goals to achieve. Goals need to be understood over three period of time : short, intermediate and long term ; their wish or realistic (May, 1987). "Winning a medal" is an example of a long-term wish goal. These goals help to keep thoughts in perspective, but need not be focused on a daily basis, otherwise it could increase the pressure. It is better to be concentrate on short-term tasks, specific goals dealing with specific training programs, for example, physical condition or sailing technique skills. These goals can be written down to remember them better and to help in their periodic assessement. They need to be continually revised and made realistic to the given situation. If they are set too high, the athletes will continuously feel upset and negative. The result is a decrease in self-esteem and in emotional stability (Williams, 1993). Therefore, the goals need to be carrefully worked out with the help of the coach.

Each athlete usually tries one or two sessions and after chooses to be completly involved. During the lecture, and the first sessions, I clearly explain to them that to be effective, these techniques have to be pracised on a daily basis and as seriously than physical training. Most of them have decided to be involved, they are performance-oriented and do not want to loose one of the key instruments to win. One of the problems is in meeting each athlete frequently enough. I am in charge of 5 different teams which train and compete at different places in the world. I see them as often as I can (usually once every two or three weeks) in the early training to help them to really understand what is going on. When they become more autonomous, they can use a specific relaxation and visualization tape that I have done at their intention. At the same time, they also get the different sessions on cards to help them to remenber what they have to do and the schedule. They are asked to write in a journal everyday what exercises they have done, which progress and which difficulties they have encountered. At each meeting with them, I can answer their questions without loosing time, and I can control their individual progression. Some of them need different techniques and a quick adaptation of their problems is a way to avoid the dropout from mental training (Maynard & Cotton, 1993).

After these first psychological skills, other can be learnt depending on the needs of each athlete :

- several concentration exercices are often practiced based on breathing, meditation, attention shift from external cues to internal cues and back, self-talk. Each of them choose which exercice fits him best and often introduce it in a pre-competition routine.

- When the athletes suffer from cognitive anxiety, cognitive restructuring help them to think more positively, and reduce the number of worrisome statements relating to performance (Beck, 1970). The identification of the negative statements during a competition is often done in small groups together with the evaluation of their effect on performance. That helps the athlete to be aware of this mental process that they often ignore. Usually, the athletes choose one or two positive affirmations to

cope with the negative ones and use them when needed. These sentences often become part of their pre-competition routine.

Although most of the program's attention is focused on the olympic team, I try to develop educational workshops and group sessions of basic mental training with developmental athletes. It is important, according to several authors (Gordin &Henshen,1989 ; Salmela, 1989 ; Terry Orlick, 1989), to integrate the psychological program with physical conditionning and sport techniques. When these athletes reach the high level, they are much more ready to cope with the stressful situations, and the mental work can go further. It is more natural, because it is part of their education.

Teamwork and Communication Skills

Breakdown in communication is probably one of the most common problems encountered by a team. It was my main focus when I had helped another French team in the final preparation of the Olympic Games of 1992 (Le Scanff, 1995). Relational problems have often been associated with increasing of stress (Ivancevich, Matteson, Freedman & Phillips, 1990).

Olympic sailing is mostly an individual sport, or it concerns a team of two people. Only one boat from each of the different teams is going to be selected and all of them want to win. A protectionist mood often prevail between the team members : everybody keeps to theirself discoveries on materials, techniques, etc. But to have one team successul against the other countries, they need to cooperate in order to raise the level of the team. It is what Jerry May (1987) calls "Cooperative Competiveness". Being supportive of one another can actually enhance athlete's success. In this purpose, during the post-training or -regatta briefings, together with the coach, I try to obtain from each of the athletes that they need to explain what decisions they have taken and what was the results of their choice. The other athletes after can give their own opinion, and the common discussion takes the form of problem solving. It creates a supportive climate, and allows us not to waste energy in trying to hide from each other.

The ways that athletes communicate with their peers, coaches or administrators have also an important effect on tension levels of all involved. And as relationship tension develops, it has been commonly observed that the quality of coaching and performance diminishes (Taylor, 1992). Pointing out negative communication, judging, acting superior, or other ways increasing the tension, is one of my most important tasks during the meetings and daily life. A part of the mental training is kept to enhance positive communication. I help both the coaches and the athletes to focus on what they do right instead and not what it is usually like in sport, to focus on the mistake. This allows us to increase individual's self-esteem and cooperation. This emphasing on positive communication is also valid for the administrators. They should act as a social support and provide empathy and feedback to coaches when they are under stress. In the same way, cohesive, mutually-supportive staff will be more efficient and will be able to adress a greater variety of issues more effectively (Bair & Greespan, 1986). Working 8 years with my predecessor, had helped to build a cooperative climat in the French Sailing team, my goal is to continue in this direction, helping to schedule regular coaches'meetings

with the purpose of problem-solving, expressive support and developing preventive and coping strategy (Richman et al., 1989 ; Shanon & Saleeby, 1980).

I try to go further with the coaches and provide them with regular sessions of stress management training on the same model than for the athletes. It helps them to cope with the pressure linked to their work and well-analyzed in the litterature (Taylor, 1992). Moreover, they have a predominantely motivational role as they can encourage and participate in the practice of the skills. They can also monitor the use of these skills in training and in competition so that these skills become an integral part of the athlete's preparation. From my point of view, it is the only way to allow psychology to be a real part of the sport structure and not an "added part" which disapears with the psychologist.

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GOAL SETTING AND MOTIVATION IN MENTAL TRAINING

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Key Words: Motivation, Goal, Drive, Competence, Affect

INTRODUCTION

In order to achieve a specific goal in sport motivation has to be directed towards and connected with this goal. In applied sport psychology very often this link between the drive and the goal is not worked on carfully and realized clearly enough. Successful goal setting creates energy in focusing actions and attention over a period of time.

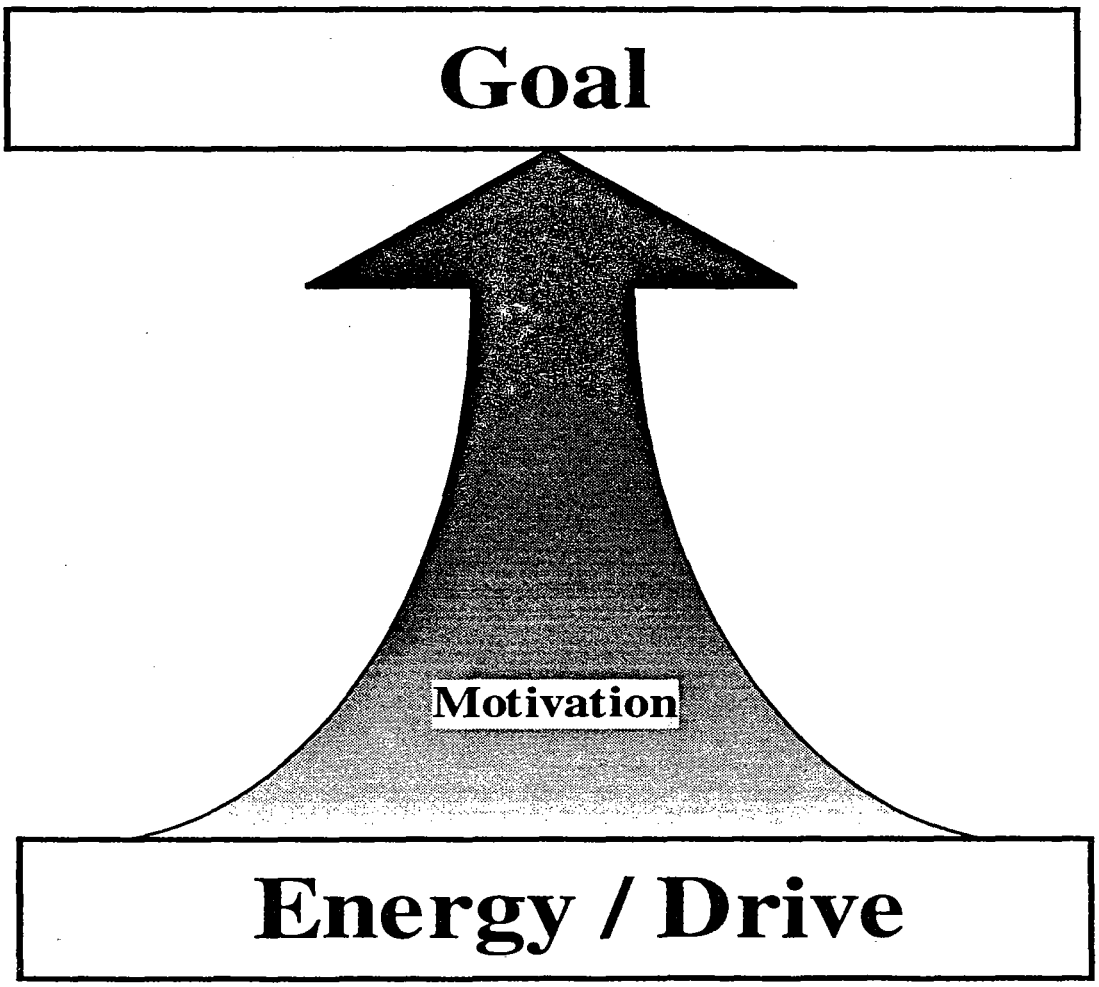

Figure 1. Motivation between Energy and Goal

The purpose of this paper is to outline different constructs related to motivation. Furthermore, an integrated model on sport motivation previously proposed by Weiss & Chaumeton (1992) will be analyzed. Discussion in the symposium will focus on how mental training (e.g. visualisation) and goal setting strategies can be combined in order to optimize the motivational orientation of an athlete.

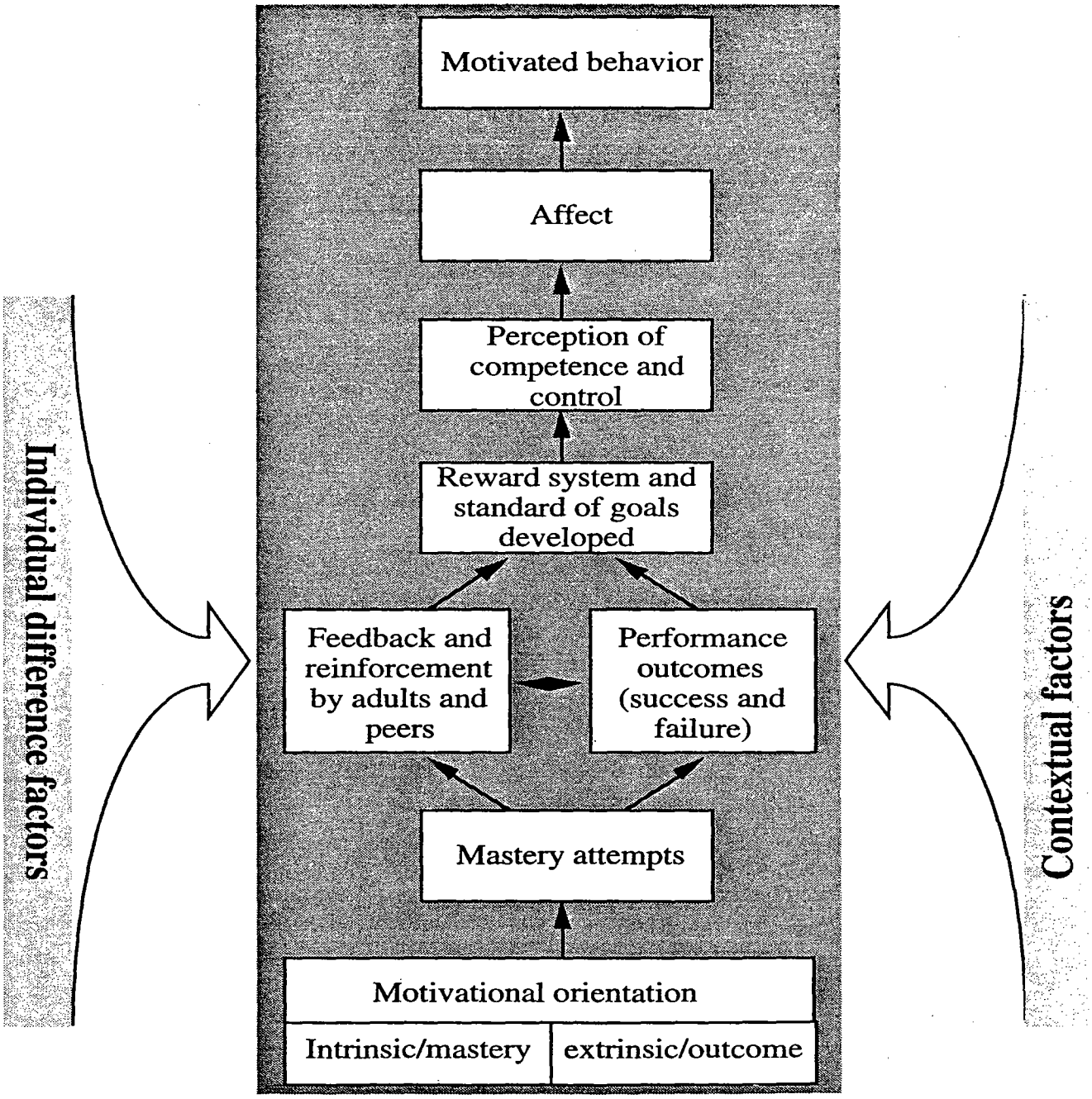

Figure 2. An integrated model of sport motivation proposed by Weiss & Chaumeton (1992, 90)

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① Motivated behavior in sport is related to a consistent set of motivational factors including intrinsic motivation (competence, fitness, affiliation, team aspects, competition, and fun) and/or extrinsic motivation (social approval, rewards, status, and winning)

② Motivational orientation is the starting block - the motivated outcome the finish line. (Weiss & Chaumeton, 1992, 89)

③ The motivation as a system is energized by a "battery". Emotions (affects) - positively or negatively - indicate the athletes' "state of motivation". (Weiss & Chaumeton, 1992, 92)

④ Mastery-oriented athletes are more able to use goal setting strategies to enhance their athletic performances.

⑤ Harter's theory of competence motivation is the most productive theory for studying youth sport participation motives. It is hypothesized that youngsters are motivated to demonstrate competence in an achievement area. „If successful, these mastery experiences result in feelings of efficacy and positive affect which, in turn, result in continued motivation to participate." (Weiss & Chaumeton, 1992, 65)

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LECTURE

Keynote speaker : L. ISBERG

Aggression in Sport

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Background

Aggressive actions have become more common in society and the sport context is no exception. Aggressive actions in sport can be illuminated by being specified as physical or mental, legitimate or illegitimate and taking place between actors or between fans.

The latter of these specifications means that you note whether the rules of the sport in question allow some elements, which in other contexts are looked upon as being aggressive. I believe this is specially important in team sports. One reason for my opinion is that the rules of some games allow aggressive acts, another reason is that these games are also given a lot of publicity in media. That doesn´t mean that you are can't find agressive actions or brutality in other sports. This February you could read in the Swedish newspapers about a gymnastics coach in Romania, who has beaten one of his young female athletes to death and that physical punishments were not uncommon elements in the coaching of female gymnastics athletes, especially when their performances were lower than expected.

In team sports, aggressive acts take place between players in the field, but also between supporters attending the arena.

When investigating aggressive behaviour it is not easy to decide what, in different contexts, should be called an aggressive act.

I would therefore like to start by reviewing how different researchers have defined the concepts of aggression and aggressive behaviour and the theories behind their definitions and after that exemplify how some researchers have applied their definitions and with what results. In the latter case I concentrate on studies made in two team sports, namely ice-hockey and soccer. I also carry out a short analysis of how researchers´ interest in the area has developed.

The origin of aggression

The theory of instincts

Freud and Adler represent the theory of instinct that attributes to the human beeing an active congenital instinct of hate and destruction, an instinct of death.

Besides that, the human being is also characterized by an instinct to preserve life; this instinct helps her not to destroy herself by directing the the instinct of death against the world outside by carrying out aggressive/violent acts against others (Ingelstam & Thunberg 1983). By doing so, the human being will achieve the Catharsis effect and feel a "kick" or satisfaction. According to Freud the aggression and the aggressive acts are more or less natural elements - the human being is aggressive by nature. Aggressive behaviour is aroused when the internal instincts reach a certain level.

The theory of etiology

Lorenz (1966) has, together with Tinbergen, studied animals´ aggressive behaviour and in doing so discovered that aggressive behaviour is congenital and is transferred phylogenetically with the function of saving the species. Lorenz divides aggression into an interspecific part, which means behaviours directed against other species and an intraspecific, behaviours to defend herself and her family. The release of the aggressive behaviour is triggered by stimulus from the context. Lorenz thinks that the human being has to learn to handle her aggressive acceptable modes of expression, e g through different competitions.

Frustration-aggression hypothesis

Dollard et al (1939) claim that all aggression has its origin in frustration, which means disappointment because of disturbance of a purposeful act. As a result of this, aggression is an effect of frustration producing instincts. The theory has further been illuminated by explaining

- that the level of frustration is an effect of the strength of willingness to reach the target, the kind of disturbances and the number of steps on the way to the target that are disturbed
- that the level of aggression is proportional to the level of frustration
- that the aggressive behaviour is directed to what is experienced to be the main impediment to reaching the target
- that the aggression is impeded if you are afraid of punishments
- that impediment of aggression raises the level of frustration, with an effect of raising the aggression against the one who impedes.
- that aggressive acts give vent to the aggression (catharsis effect)

Isberg (1985) points out that frustration causes aggression but that does not automatically mean aggressive behaviour; the aggression can be suppressed with a withdrawal as a result, dependent on the stimuli in the particular context and the effects following such aggressive behaviour.

Berkowitz (1964) believes that frustration only creates a readiness for aggressive behaviour, and that the contextual stimuli will be determined by the release procedure.

Social learning theory

Bandura (1973) is one of the most eager spokesmen of this theory. He believes that experience determines the variables making aggressive behaviour released.
This does not mean that Bandura takes no notice of internal instincts but he thinks that experiences arise from the relation between external stimuli and the internal condition of the human being. Bandura does not believe aggression to be congenital. Bandura´s theory explains aggressive behaviour as being a result of factors from the cognitive, the behavioural and the contextual area working together on a concurrent basis. At the same time he thinks that the human beings and the context determine each other concurrently.

Bandura & Huston (1961) coin the expression "symbolic modelling", which means that imitation of an aggressive behaviour in a specific situation is more than the imitation itself. The effect is also transferred to other situations. What is needed for that is a human being acting as a model. This discussion focuses the question of how youngsters experience the aggressive behaviour shown in televised and live games.

Perhaps there is a risk that the context will be looked upon as an authoritarian system with players feeling as actors responsible for doing what the coach demands, but not as an actor taking responsibility for the actions he is ordered to make. If human beings are trained to conformity with focus on specific elements in the game, the risk of them doing aggressive acts will probably increase. The result of this can be the starting of a desensibilisation process blunting the feelings of what aggressive behaviour really is and what effects it can have, with a risk of accepting more and more serious aggessive behaviour.
Important functions of the social learning theory are the expectations of the actors and the reinforcement of actions done. If aggressive behaviour results in a positive reinforcement it increases the risk of that behaviour being repeated.
The positive reinforcement can perhaps give the player an incitement to do acts forbidden by the rules, if the result of such acts is effective and leads to consequences positive for the team. There is also a risk that such acts will entail a rising degree of brutality. To use

the players' vocabulary, "using the system to find out how far the scale of brutality is accepted by the referee".

Bredemeier (1978) thinks that you should accept the fact that personal attributes influence the pattern of aggressive behaviour, but the real reason for the specific pattern is to be found in the interaction with "significant others" during different situations in the context. Wilke (1981) also thinks that aggressive behaviour is learnt and by conditioning it is possible both to reinforce it and to extinguish it. At the same time he aks himself the question why so many athletes feel more of a release than excitement after they have performed an aggressive act. A way to handle such a problem is, according to Wilke, to help the players to learn to look inside themselves and try to find out their feelings before the action was performed. When a player knows, what "he attacks inside himself", when he performs the aggressive behaviour, some kind of catharsis may be the effect.

Smith (1979) points out the importance of analysing the attitudes of those "significant others" in the the context, whose main task is to reinforce the players' behaviour. Smith has analysed the attitudes in different "reference others" such as parents, coaches and elder players and how players are influenced by their expectations.

Several researchers accept the social learning theory, here exemplified by Gill (1979, s 74)
"My view of aggression is close to Goldstein´s (1975), who stresses the social learning aspects of aggression".

Attribution theory
The attribution theory focuses the way human beings create explanations of their own and others' personal behaviour. The originator of the theory is Heider (1944), who describes it as a psychology of common sense not connected to theoretical abstractions such as instincts, but to models which human beings apply in day-to-day situations to understand, explain and predict behaviour.

Carron (1980) thinks that a fundamental factor in attribution theory is that each human being strives to predict and understand day-to-day situations in order to be able to take advantage of a stable and predictable relation with other people and the context. Attribution theory also takes notice of the relation between internal personal factors and external ones in the context. You can sometimes hear athletes explain their performances by saying "I exhausted myself too little" or "Some external factors were the reason for me not scoring".

Aggression and aggressive behaviour

The concept of aggression comes from the Latin root aggredi and from ad to or toward and gradior (walk). *"Literally, then, the word means to walk toward or approach, to "move against" or "to move with intent to hurt or harm"* (Husman & Silva 1984, s 247). The major problem when studying aggression in sport or any other environment is in finding an acceptable universal definition.

In some definitions of aggression you can see that researchers separate the two concepts aggression and aggressive behaviour while others do not.

Egidius (1981, s 9) is one example of those who do not separate the two concepts

"a conclusive designation of different kind of reactions and behaviours that is shown by an individual or a group, who during an emotional excitement attacks a living creature or an object"

Included in this definition there is another important concept, namely attack, which means that in order to be able to use the concept of aggression the human being in question has to attack someone or something.

Berkowitz (1964) differentiates more clearly between aggression and aggressive behaviour. He states that frustration creates a readiness for aggressive behaviour, and will get the effect of an inserted variable put in between, but whether decisiveness of aggression results in aggressive behaviour or not, is decided by stimuli from the context. The frustration hypothesis has become a social learning theory. Among the social learning theorists you find Heidenreich, Silva , Lindell, Fromm and Gill.

Heidenreich (1968) uses the following definitions of aggression

1. *"the bold and energetic pursuit of one´s goal"*
2. *"hostility which may involve actual attacks or the pushing around of other people"*

Heidenrich seems to believe that hostility should be there and an attack will take place but such an act can be of differing intensity.

Bredemeier (1978) is clearer: aggression is the beginning of a subsequent attack, the reason for which is to injure. In this sense the motive of the attack becomes important. She moves on and separates between reactive and instumental aggression.

The former means the initiation of an act, whose main purpose is to injure physically och mentally. Instumental aggression is the initiation of an act the main reason for which is not to injure but to win other advantages, e g an irregular attack to stop the opponent

player from scoring a goal. The injury then becomes an accidental consequence of the behaviour.

Silva (1978) agrees with Bredemeier. Gill (1979) emphasizes that most of the researchers use the concept *to injure* in their definition of aggressive behaviour. Gill himself uses instead the missing of provocation, a reason that more or less could have mitigated the action which causes the injure.

Gill´s definition (1979, s 74) also includes
"The degree of aggression is a function of the extent to which one takes initiative and of the extent of lack of provocation".
That implies that one further component is included in the reasoning, namely to take initiative to an act. This makes, according to Gill, the definition applicable in sport.

Ingelstam och Thunberg (1983, s 24) define aggression och aggressive behaviour as
"behaviours that actually injure or have a purpose to injure - physically or psychologically - another living creature"

Holm (1980, s 4) accepts the attribution theory and uses the following definition of aggressive behaviour
"a combination of observable and inferred factors based on the observation of an act, that the observer thinks constitute an aggressive act, given that the action implies a real or believed injury"
Holm introduces the alternatives injury or believed injury, that means that the observer has to believe himself seeing an injury or a believed injury to judge an act as being aggressive.

Silva (1978) defines aggressive behaviour in three sentences:
1. An aggressive act is clear and of physical or mental kind with an intention of injuring a player
2. A player who makes aggressive acts has an intention to injure
3. Aggressive behaviour is personal

The difference between Silva´s and Bredemeier´s definitions is that Silva is clearer when separating the two parts of aggressive behaviour, hostile and instrumental.
Silva states that hostile aggressive behaviour is outside the area of sport, but the instrumental one is determined by the rules of the game (sport) and on the interpretations of them.

Isberg (1985) believes that some aggressive acts are allowed by the rules, e g a fair tackle in ice hockey may cause the opponent player to fall and break his arm.
According to attribution theory an injury has happened, an attack has taken place and depending on the observer´s conclusions, such an act can be defined as being aggressive.

Smith (1993) is a little sceptical about the two notations hostile and instrumental, his argument is that all acts whose purpose is to reach a goal are instrumental. In order to know what the criterion is of an act that is simultaneously aggressive and violates the rules of the game, the researcher has to be well acquainted with the context. Smith mentions further that "significant others" in the context form a reference group, who decide what acts are judged as acceptable and non-acceptable and what kind of punishments follow the unaccepted acts. Mainly there are three groups, namely a normative one (making the norms), a comparative (a reference one) one and a public one. Two important comparison groups are the "legitimators" and the "role models", the same individual can be in both two groups.
If a young ice hockey player sees his idol making aggressive acts during a televised game, the young player can do the same and defends his action with the same behaviour being accepted when his idol does it.

So far I would like to emphasize
- that it is important to distinguish between aggression and aggressive behaviour
- that aggression is the starting phase of something that may turn out to be aggressive behaviour.
- that whether an act will end up in aggressive behaviour depends on the context and the specific situation
- that the reason for starting the process may be some specific stimuli in the context or some disturbances
- that decisive the player´s own experiences of similar situations and their consequences
- that decisive for whether an act is repeated is if it turns out to have positive consequences for a player or for the team
- that it is important to find out those "significant others", who decide the consequences
- that the concepts of purpose, reason, kind of injury, severity of the injury are important factors attributed to aggressive behaviour

From the above conclusion one can see that the social learning theory seems to be the one that is best able to illuminate the basic factors mentioned, e g factors such as the act needing to be judged in its context, the players own experiences of acts taking place in

the actual context, that the consequences of different acts are decisive of whether it will be repeated or not.

My reasoning further implies

- that not until an act is performed are you able to decide if it is an aggressive one or not
- that the actual context decides if an aggressive act shall be punished
- that the concept of intent to injure has to be based on an irregular act
- that the player who performs the act has to be aware of the consequences the act may have for the opponent player
- that if a player performs an act which he is aware risks injuring an opponent player, the act shall be classified as aggressive, whether it resulted in an injury or not
- that dealing with provocation or not, in my opinion, does not justify aggressive behaviour, but it can be a reason for a milder form of punishment.

My reasoning so far helped me to the following operational definition of aggressive behaviour in the team sport of ice hockey:

"A player commits an aggressive act if he takes the initiative to and commits an irregular act which he is aware will injure or risk injuring" (Isberg 1985, s 98).

In my definition intent to injure is replaced by "awareness that an act injures or risks injuring". This means that I do not have to work with the concept of intention, which is difficult to study empirically; 'aware of' also includes the reasons for the act. If an act is done in spite of an opponent player risking being injured, the reasons must be very strong. Support for my reasoning can be found in Silva (1978, 1979), who mentions that a player who is unable to distinguish hostile from instrumental aggressive behaviour, is not "aware of the risk of injury". Later in this paper I will exemplify the use of my definition.

Research done in the area

How much research is to be found in the area? If I put together information in Hahn´s, Mercy´s & Remans´ (1985) report in their excellent bibliography, the result are those presented in Table 1.

Table 1. Studies of aggression in different sports (before 1960 - 1984).

Sport	Före 1960	1961 - 1970	1971 - 1980	1981- 1984
Soccer	3	9	47	7
Ice hockey	0	0	38	8
American football	1	2	9	0
Handball			15	2
Rugby			13	
Basketball		3	12	
Volleyball			5	
Baseball		2	3	
Tennis		1	6	
Judo			4	1
Wrestling	2	1	5	1
Boxing	1	3	13	2

The table gives some interesting information, e g that soccer and ice hockey are the sports that researchers pay the greatest interest and that the area seems to become very interesting during a specific period (1971 - 1980).

Whether interest in the area has reduced during the latter part of 1980´s up to now is difficult to say as I have not found any review of the area

Looking at the attention paid in media it would seem that even if aggressive acts of different kinds in different contexts in society are not increasing they seem to be becoming more brutal and result in more serious injuries.

Questions well worth asking are:

- Has aggressive behaviour in different sports been reduced from about 1985 and as a result of this made research in the area unnecessary ?
- Have the results of the researh presented resulted in any serious moves from "significant others" in actual contexts in order to diminish aggressive behaviour.

If the answer to the first one is yes, everything is okay, but if the naswer is no, the situation is problematical. If the answer to the second question is no the situation is even more precarious, because the diminishing could be a result of researchers' apprehension that it is not worth doing any research in the area.

To find answers to the two questions, I searched in the database Dialogue´s sportfile to find any studies made between 1985 - 1994 . The result is that relatively few studies of aggressive behaviour between athletes have been done after 1985.
However it looks like studies about violence between fans increased after the catastrophe at the Heysel Stadium in 1985. My restriction in this paper to aggressive behaviour between players during the game excludes the violent behaviour between the fans, a restriction made because of time and space and not because I find such behaviour less interesting and important.

At the 8th World Congress of Sport Psychology 1993 Escarti, Fernandez & Guzmán (1993) in their paper showed that during the period 1980 to 1991, 70 studies were carried in the area of "Moral development in sport and physical activity". They also show a peak of studies 1986 (27%) and a decrease during the period 1984 to 1989 (to about 10%/year). Most of the studies were made in USA and Canada with Berkely University as the major contributor (12 studies). Interesting is that only 26 of 60 articles is based on empirical studies. Bredemeier and Shields are the two researchers that have published 21% of the articles, most of them before 1985.
In the proceedings of 8th World Congress of Sport Psychology 1993 I find only two studies dealing with the area, one was the Excarti study mentioned above, and the other one will be mentioned later in this article.

It looks as if the aggressive behaviour is still there, but at the same time the researchers seem to have lost their interest in the area. One explanation may be - but I couldn´t verify this - that the researchers think that the "significant others" in different sports pay too little interest in using the results.That means that the answer to my second question is *no*.

Research studies

My choice of studies reviewed in this article is selective, the choice is based on
- studies done in those two sports (ice hockey and soccer) which have been paid most interest
- studies using data based on triangulation between different data collection techniques
- studies that use a strategy the aim of which is to improve the explanation of what really takes place and the understanding of why it takes place.

To be really egoistic I start with my own study in ice hockey. The study has been reported in four publications (Isberg 1985, 1986, 1987 and 1989).
The first one includes a theoretical part dealing with the definition of the concepts aggression, aggressive behaviour, violence and theories of their genesis.

My definiton, mentioned earlier, contains two important components, namely *"irregular act"* and *"to be aware that an act injures or risks injuring"*.
Gill (1985) classifies violence in violence accepted by the rules, the "grey zone" that contains such aggressive behaviour that is formally irregular but has been accepted, real sport violence that also includes criminal violence. Silva (1984) expresses the problem of what takes place inside the "grey zone" with this is group-sanctioned behaviour often directly conflicted with the constitutive rules, and this kind of normative rules are expected to be followed even if such behaviour violates the written or the constitutive rules. Silva (1984) mentions the following deficiencies in investigations of aggression and aggressive behaviour in sport made so far:
- the definitions of aggression and aggressive behaviour
- to illuminate the concept intent to injure
- to illuminate the importance of the context itself when deciding what behaviours should be classified as aggressive.

In my investigation I try to take Silva´s points of view into consideration.
My study investigates aggressive behaviour inside the grey zone and the real sport violence zone and whether the players are aware of the risks such acts may have. This means that I use the concept aware of the risks of injury instead of intent to injure, one main reason for that is that it is easy to investigate the concept aware of.

The analysis is done both on elite level and on youth level. The aim can be further specified by the following questions:
1. How does the interpretation of the rules take place?
2. How are interpretations of the rules distributed from coach to players?
3. How do the actors understand the interpretations?
4. How are these interpretations put into practice?
5. How do the players explain their application?
6. What personal traits do the players and coaches have?
7. What kind of interaction with the sport context have the players and coaches?
8. What experience do the players and coaches have of the concept "awareness of the risk to injure"?
9. What are the contextual conditions given to the players concerning their possibility to reflect upon the problem that some acts risk to injure the opponent player?

To restrict my investigation I have used fighting and elbowing as examples of hostile aggressive behaviour and hit with the stick on different parts of the body as examples of instrumental aggressive behaviour.

The analysis of the mentioned rules and their interpretations started on the highest international level and ends with how they are understood by the individual national player. One task in the analysis is to see if the rules content concepts undefined or unsatisfactorily defined. To do so I have analysed official texts and verbal information taped during two international congresses and inteviews with responsible "significant others".

To analyse on national level how elite referees, elite coaches, and elite players interpret and apply the rules in question, I use interviews and observation during three video-recorded matches. Immediately after the game the referee was shown some selected situations and was asked to motivate his decisions.

The coaches´ applications were taped during three games to see if they were giving any information to the players that encouraged them to commit irregular acts and vice versa. Afterwards the coaches were able to comment on their given information.

The players' application is measured by using four subjects and each of them was video-recorded during three games.

The results show that the rules analysed are relatively clearly specified, but there are concepts needed to be more specified, e g "fisticuffs", "intention" and "give back"

No trials of specifications are made on international and national level; instead contradictory information was given. The referees were hardly helped by this.

Hardly any information at all on the rules and their interpretation is given to the players on the national level.

As a consequence of the above-mentioned indistinctiveness, referees, players and coaches make specifications of their own. Specifications that facilitate their behaviours, but are not in line with the official rules and their interpretations. Most of those specifications become obvious during the application phase including follow-up interviews.

The results show a serious violation of the rules investigated each third minute - if I include less serious violations (still irregular acts) there are three per minute.

The discrepancies between spoken and applied behaviour are more common for the referees, because players and coaches rely on the referee´s specifications. The following quotation examplifies my conclusion:

"if the referee allows hard hits with the stick on the opponent players´ arms, we then hit even harder to find out how much he allows"

The third part of my study illuminates question 6 - 9 to find out the importance of the concept "awareness of the risk to injure" when the actors make their specifications.
To answer question 6, an interview and a test standardized by Bredemeier (1978) have been used. Question 7 is based on interviews and the actors judging interrupting situations in a test film (dealing with violations of the rules investigated). Question 8 is illuminated by actors judging a test film of violations of the mentioned rules: each kind of violation is presented in one serious and one less serious situation. The last question is illuminated in the discussion.
Results show

- that the ice hockey context gives impulses, when dealing with the problem of how to interpret the rules, that the most important thing is that the team gains as great advantages as possible,
- that none of the players have any great propensity toward hostile aggressive behaviour, but they have toward instrumental aggressive behaviour,
- that all actors have long experience of being in the ice hockey context, several of them in more than one function. Players have seldom taken part in any discussion of the rules, they looked upon themselves as self-made men,
- that the concept "risk to injure" does not play an important part when players decide what acts are going to be used and the same is valid for the referees
- that a distinct order to a player to get out on the ice and injure an opponent player is not accepted
- that the reasons players mentioned as explanations of why the violations have been performed, show that the context itself stimulates the performing aggressive acts
- that the actors are interested in discussing the consequences of performed acts.

To have the last sentence fulfilled and get actors to reflect on what has taken place and with what risks, the actors have to get rid of the context´s control in the form of the importance of "winning at any price"

In the last report dealing with the youth level (13, 16, 17 and 18-years old players in three separate teams), the same methodology has been used. The results show:

- that too little time is generally spent on interpretationt of the rules
- that the actors' interpretations of the rules analysed are often misinterpretations of the official rules
- that players strikingly often point out the importance of "attacking his opponent" before taking the puck rather than trying to get the puck the first of all
- that the coaches allow the players to violate the rules, if the violations are hitting with the stick at the opponent´s body
- that the team practises the mentioned violations in order to irritate the opponents

- that the players' specifications of the rules are dependent on the level of allowance of the referee and that they adjust their behaviour to that level
- that all players have little propensity towards hostile aggressive behaviour. All players except one show propensity towards instrumental aggressive behaviour, six of nine players show a relatively high propensity toward the use of violence in sport in general. It seems that players act differently within and outside the sport context
- that coaches have long experience of being in the ice hockey context, and their experience of coaching comes from the youth level
- that players have been in the ice hockey context between 4 and ll years, one of them is also a referee for youngsters
- that the risk of injuring does not seem to have a decisive role when players' decide what action to undertake in a certain situation
- that players seldom discuss the consequences of acts performed, and when doing so it's always in playing terms e g "winning at any price"
- that the context creates reasons that allows aggressive acts in spite of the fact that the rules do not accept such acts.
- that the answers presented show that it's allowed in the ice hockey context to "get revenge" and to "fight back" without any serious penalties
- that the actors only reflect on reasons like winning advantages for their own team when deciding what kind of act to perform in a certain situation.

2.

Nilsson (1993) has, in his dissertation, "Soccer and Morality" (written in Swedish), presented a content giving clear indications that the aggressive behaviour is socially learnt.

Nilsson also uses Bourdieu´s concept "habitus",

"a system of dispositions that allows human beings to act, think and orientate themselves in the social world", in his discussions. Nilsson further develops this into one of his five specified problems, namely to

"describe the system of collective readiness of action and interpretation, that three categories of soccer players, in different ages from four separate clubs, have acquired and to what extent they have an effect of determining the players´ way of thinking, acting and making value judgements in the context of soccer " (Nilsson 1993, s 52, my translation).

Within this specification Nilsson (1993) makes the following conclusions from his data based on interviews, questionnaires and observations made on four Swedish elite teams:

- players' comprehension of following the rules of the game is honest
- that does not mean that they follow the rules
- violations such as shoves, holdings and irregular ways of using the arms have become natural components in the game

- in some positions some irregular acts are done, which the players are aware of being irregular, but they do them to avoid the team from critical situations, e g to stop an opponent player from scoring a goal.
- the ideal manner is to play hard and correctly

Regarding how to effectuate that and why, different teams have different opinions, e g you find

- the ambition of "winning at any price"
- the referee may decide from game to game, the difference between "hard acts" and "irregular acts"
- a result of this is that players and coaches often lodge complaints about inconsistencies with referees
- players state that they both do and accept being attacked in such fouls
- players do not accept commtting violations in which they are sure of injuring an opponent player
- the risk of injuring does not have an influence on the player's style of play
- the style of play has been automatized for many years
- the pressure to win or not to lose makes the players play as near the limit of violation as possible, if the team gains advantages from it.
- players rely on the referee to decide the limits of when different acts are judged as irregular, during each separate match
- the referee is given the role as legitimator
- the youth players in the same four clubs seem to have the same opinions and they do not hesitate to carry out irregular acts to stop an opponent player starting or finishing a chance to score (such behaviour seems to increase dramatically when players become 14 - 15 years old)
- to play hard but on the ball is what every player likes to do
- the same preference is made about to play as hard and irregular as the referee decides
- losing control and starting a fight are regarded as the worst things you can do

A comparison between Isberg´s and Nilsson´s results show many of the same experiences coming from two different contexts.

3.

Mieko Ae (1993) has studied coaches´ violence as a punishment in girl´s sport. The first one of two studies investigates 268 female college students all with experiences of competitive sport training and all having high sport abilities. They were asked to report about sport coaches, who have taught them in each school age. A questionnaire was used as data collection instrument. The students who have been beaten were asked to write how often and how they felt about it. Most of the subjects also belonged to sport clubs.

The number of subjects beaten at least in one of the ages were more than half of the subjects, 22% of the girls in elementary have been beaten. In the case of team sports, coaches often hit and most of them were also teachers. Most of the coaches were males but even female coaches hit. 9% of those students beaten negativated violence.

Study 2 investigated why coaches beat and why so many athletes tolerated it. 50 students (62%) from study 1 who have experienced much violence were further investigated. 40 of these students were beaten in junior high and 37 in high school. The main reason for being beaten is that they couldn´t do what coaches asked for, they made too many mistakes. The students tolerated beating because the situation was caused by themselves and it was necessary to get high skills. 14% of those beaten explained that if they became coaches, they would also beat. Those students beaten had all high performance skills and they might believe that punishments were needed to perform better. This study also shows many components that fit the explanation that aggressive behaviour is socially learnt.

4.

Leith (1989) conducted a laboratory study the purpose of which was to examine the effect of direct participation in physical activity on subject aggressiveness. The independent variables are physical activity strategy (co-operative, competitive and competitive-aggressive), activity outcome (win or lose) and subject arousal (angered or non-angered). The various combinations of the three preceding variables produce twelve treatment conditions. Ten high school boys were randomly assigned to each of the twelve treatment conditions and exposed to their respective experimental manipulations. Subject aggression scores in both pretest and posttest conditions were by use of the Buss Aggression Machine. The data obtained indicate that the physical activity strategy and the activity outcome yielded statistically significant differences. Inter-participant competitive and competitive-aggressive physical activities resulted in significantly more aggressiveness that did the interparticipant co-operative physical activity. Results also indicate that losing outcomes result in significantly more elicited aggressiveness than did winning outcomes. Since frustration can be defined as coming from a goal-blocked response and the goal of competitive sports (as ice hockey and soccer) is to win, then losing obviously results in frustration in the losing participant (team), which in turn can result in increased aggressiveness.

Leith finds no significant difference of aggressiveness between angered and non-angered arousal conditions.

5.

Semyonov & Farbstein have, in their study of Ecology of Sports violence: **The Case of Israeli Soccer,** studied the extent to which aggregate violence among players of soccer teams is affected by the urban ecology and the sports ecolocy in which the teams are operating. The analyses focus 297 soccer teams in Israel represented six divisions, the two top divisions, each composed of 16 teams are professional, the third is semiprofessional.

The urban ecology is the distinction between seven types of communities, namely large metropolitan centers, large cities, midsized towns, small urban localities, rural localities, urban(inner city) neighborhoods, and Arab localities. The indicators of sport ecology are captured by two variables: a team´s position in the hierarcy of divisions and its relative position within the division. The hierarchy of divisions ranges from 1 (top) to six. The position of teams within the division distinguishes three levels, top third, middle third and bottom third. The indicators of violence were recorded directly from the file sof the legal authority of Soccer Commission. Players' levels of violence were computed by the number of convictions for unsportsmanlike conduct attributed to the clubs´players. The results show that once in five games a player was prosecuted and convicted for violent behaviour. However there was a considerable variation among teams in regard to the level of player violence. The authors found that

- player violence tends to be higher in urban communities
- the level of player violence tends to rise with the hierarchy of division
- violence level was considerably higher among teams placed at the bottom ot their division than on those in the intermediate position.

When using multivariate analysis the results show that player violence is most significantly affected by the sports ecology variables and to a lesser extent by the urban ecology variable. A conclusion of that is that processes and patterns of socialization into the role of soccer player are basically similar across communities. Sport ecology variables, eg players in teams in the upper divisions and in teams in the top third and bottom third positions in each division, are significant determinants of player violence. The authors summarize their results by saying that sports violence is neither a random nor a sporadic phenomenon. Rather it should be understood as a structural characteristic of the social system and mainly of the sport ecology system.

Conclusion

In my paper I have focused on the importance of defining the concepts of aggression and aggressive behaviour and the relation between them. In the definitions made so far you can find some important components, e.g. regular or irregular act according to the rules and their interpretation in the actual context, attack, provocation and intent to injure or awareness of that an act risks injuring.

This resulted in the importance of having an operational definition leading the empirical investigations. The social learning theory seems to be the most effective one to explain why aggressive acts take place.

The studies reviewed show that the contexts investigated give impulses to the players to commit aggressive acts as long as the team gains positive consequences from it and also that the contexts find reasons of their own to allow irregular, aggressive acts.

Another interesting finding is that the area in question seems (since 1986) to have lost the researchers´ interest. Perhaps, but I have no evidence, one explanation may be that the "significant others" in the sport contexts in question are not interested in using the results of research to change the situation.

I end this paper with three wishes

1. I wish that the "significant others" in different team sports would be more interested in using the results coming from research to diminishing the aggressive behaviour displayed today.
2. I wish that researchers would pay more interest in the area because it has a lot to with getting more fair play and at the same time giving the audience a possibility to enjoy the skill of the players.
3. I wish that coming investigations in the area would include an observation part to get data that makes it possible to judge what really takes place and to explain why it takes place and what are the reasons behind such acts.

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5TH POSTER SESSIONS

P.5.1. Mental training

P.5.2. Self perception, body concept

P.5.1. MENTAL TRAINING

NEUROLINGUISTIC PROGRAMMING IN THE SYSTEM OF ATHLETES MENTAL TRAINING

T.P.Koroliova, A.G.Barabanov, K.V.Mishienko

Key words: psychology, temporary line, beliefs, sense, code, non-verbal, verbal, submodals of thinking, training.

Introduction

During the training process rehabilitative means are usually applied in order to remain psychic capacity for work. But psychic rehability (as possibility of being efficient and stable) is mainly accomplished at the expense of accumulated psychic reserves. That s why these are preventive psychic means which raise reliability of system in general by increasing ist freedom degrees.

In well-trained sportsman organism adaptive modifications of all functional systems are submited ty following principles: minimization, independence and compensation of disturbed functions. Our experience showed that we proven the abovesaid adaptive scheme by analysing syndrome of psychic preparedness of sportsmen confirming their high qualification. Irrespective of sportsman specialization (sprinter, longjumper, yachtsman) modifications of diagnostic profile and intellectual functions have the same sinergetic form.

Psychic block, appearing with the transition from training to contest can be removed without asistance by means of mental training.

The technology of the psychoregulation and the psychomuscle traning which has been made up by doctor Alexeev (1) specially for children and sportsmen are revealed in various variants, such as: an autotraining, an joy-training, and a transdental meditation. But all these methods have a general "lack". Because it is necessary to repeat them systematically. But meditation has been unchangeable like as everyday profilactic and rehabilitation means of cleaning. That is why a sportsman should be mastered these variants

for an increasing of his self-regulation.

Current system of mental training for competitions lack of conorete and quick of influence on socialpsychological and motivational levels of the athlete s personality.

a) It means that personal problem has been "drive in" inside and it has been provoked a stress. In our opinion, the problem of transformation of beliefs, value orientations and personality norms may be successfully solved with the help of neurolinguistic programming (NLP), developed by G.Greender and D.Gordon (3).

b) Besides NLP is given an oportunity to code engrammes of the psychic mobiliration. The main distinguish of this technology from others is connected with a simuletaneous work with a sportsman and a sportsman work with his brain in one problem.

Methods

Step procedure of verbal and non-verbal effects lies in the basis of this technique. All representation systems and temporal lines of a person are used at the non-verbal level for subjective problems identification. The modelmethamodel of the person s behaviour, personality, thinking strategy is constructed at the verbal level, and then it is transformed to the non-verbal level, according to the ideal. From this point of view, it is revealed the diagnosis| to set up a strategy of mentality and structure of temporary line by means of an observation. The mentality strategy is determined in succession of representative systems; wich is used for obtained data. It is marked by the movement of the eye; which is conected with the sensor channel| upper-video; horizontal-audio; down - kinesthesis, emotions, an inner speech. It corresponds to the functional assymetry| to the side of the 10 gical hemisphere - is acquainted; picturesque, imaginary line is setting up in accordance with the character image| visual - colour, brightness, focus, sharpness, dimension, distance, form, state; audial - position, height, tone, timbre, rate (tempo), rhythm, loud-

ness, duaration; kinesthesis - quantity, state, direction, the mowement - inner-out of image, perspective, propotions, dimension, etc (5).

All further work with the sportsman is based on his individual strategy of mentality, the temporary line on the basis of the anchor technology and the finding of the place to the pose, respiration, and speech predicits. The 'Anchor' is a stimulus, which is flinged the mechanism of the conditional reflex. The positive emotional anchor is developed the reaction, but the negative one is reduced this reaction. The regulars of the anchor state are! the good choice of the position time, the anchor's type and also the exactness of its reproduce.

Results of investigation

The example of the analysis and correction of the temporary line in a sportsman N.- is a runner [400 m].

- Describe the images of your past, present and future time. N.! the past time is! yellow-black, diffuse, in front of me,

10 cm; the taste is! sour-sweet; smell of the tobacco; sound is! hystericalcry of the mother. The present time is! black-yellow. in front of me; shaking. Tone is nearest to the infrosound. The future time is! sunny ball, rays movement are spreading me; the ozone's smell; the goddess music sounds; in front of me, 2 m, 12 years old.

- Our problem is! all three parts of the temporal line are coinsided. Let's try to conduct it in accordance with you functional assymetry.[N.- is a right-handed person. The anchors ' repeat]. The vector of the past time is removed to the left shoulder; the future time is removed to the right one. What are you feeling now? [the anchors repeat].

N.! the future time i's apprached... The sound has become normal; the colour is orange. Suddenly, I have seen and heard myself. It has become calm...

- Now, show your new temporal line by two hands. So...(by echoanchors)...

LTD in training

Now, remember your best departure on the contest. Describe your awarenesses - video, audio, emotions... Good...(fixing the positive anchor). Then, go through the image of becoming start...Good...(the same succession). What do you feel now?

N.I the lightness in the muscles, joy, the wish to fly; the free respiration, I didnit notice, how I ran the distance...(during telling the story - the succession of the positive anchor.

- That's all. That it was be enough. The sportsman could built yourself the concrete images - slides of the strategy programme and tactics of her behaviour on the contest. She understood the work of her temporary line. Affer a month she told with a suprise, how the engrammes were excited during the training process and under the running.

Our study of the longjumpers shows that after the 1-st tackground attempt activating subjective engrammes of delight and optimal exitation cause improving results in 2 and 3 attempts combined with rising pulse and activity of nervous system. After following decrease the cycle of psychic state renews and in 5 and 6 attempts the result's show further improvement.

Excitement situations before the exam, fear of the publical speech, etc may be described by the following formulas. "The problem is that in the situation M, I feel the sense X. But instead of it, I'd like to feel the sense Y, which I had in the situation H". We can't solve this problem under this formulas (because the advantage of NLP is delicacyl). We work only with the process of the change... Here, it is applied the technic of the anchors coincidence. Follow to this formulas, we take the feeling Y from the context H and transfer it in the context M, and then we change the feeling of X to Y. It is the work scheme with the right-handed athlete. The context M, the feeling X - are put down the negative anchors, video - head turns to the right, audio - "so, so..." Kinesthasis is in the touching of right hand to the left knee of the athlete (it is repeated 2-3 times).

The context M, the feeling Y (it must be more stronger and brighter than X) - are put down the positive anchor; the head turns to the left,..."good, good...", the touching of the left hand to the right knee of the athlete. At the same time two anchors are excited: the head is in the normal position, the touching of the two knees, "so...good". Then we are waiting another oculogy ralstereotype, which is not coinides with the first (X) state... That's all.

We suggest to the athlete to remember and to image the first situation M, with the help of the positive anchor for the control of effectivness of our work. Then, when the anchors are coincided, the oculogyral stereotype is full answered to the second one, Y - is the experience, or it may be in the middle position, if the negative experience has become more weaker. Under the reinforcer to the future, a person feeling is negative, but the oculogyral stereo type has been shown the positive experience. It means, that the work is done very good.

After that, we show to the athlete, how he can himself to recode the negative contest experience (X) to the positive one (Y).

The negative image is situated on the temporary line in the past time part. It is removed in the black-white representation and squeezing in to the fist. The strong, bright, positive image (from another context) is situated on the temporary line in the future time part, maximal appoaching and also squeezing in to the fist. The pulms are opened and slowly appoaching to each other to the coinciding. The self-control is necessary: to place X in the pulm of the future (to apply the positive anchor-pulm) and to observe, to hear, to feel, how it is become weak.

As a rule, after such correction work, athletes have not any problems with their before-starting fever.

We use the following themes of the study at our academy. 1. The placing of the individual submodal and the thinking
strategy. 2. The structure analysis of the temporary lines and their

correction in case of the individual discomfort. 3. The conversation with the parts of EGO and the reconstruction of the connection with EGO. 4. Beliefs: an indentification and changes. The strategies of the reality and beliefs. 5. Re - imprinting. 6. Conflicts: an identification, an integrity, criterias. 7. The reducing of the psychological traumas. 8. Code-learning test for self-curing from phisical and psychological traumas. The students group, which learning the second profession 'as a "practice-psycholog" are practisedin methods of trans, and especially of anchor technic.

We direct by the full description of the procedure of each study with the help of stenogrammes which are applied in the psychtherapeutics books of the new wave (2, 4).

The studies are passed during 4 years under students learning. Many exercises are inclucling in the disciplines of the psychological cycle such as feeling, perception, person, communication, thinking, technic, tactic and psychological training of the athlete.

Our experience showed that acquisition of elementary fundamentals of neurolinguistic programming by coaches and athletes allowed to reform social-personality traits, dissociative states, thinking strategies comperatively quickly.

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MENTAL TRAINING OF THE ITALIAN TEAM PARTICIPATING AT THE YOUTH EUROPEAN CHAMPIONSHIP OF ROLLER-SKATING HOCKEY

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Key Words: mental training, youth sport, roller-skating hockey

A mental training program was applied to the junior Italian National roller-skating hockey team preparing for the European Championship held in Montreux (Switzerland), October 1994. The program was structured in collaboration with the coach, keeping in mind the hockey characteristics and the strenuous effort required to participate at the tournament. Hockey is an open (externally-paced) skill sport characterized by perceptual uncertainty and time-pressure. In externally-paced sports the athlete is forced by the opponent to identify and interpret a constantly variable situation, make decisions, carry out a response as quickly and accurately as possible (Ripoll, 1991). Field dimensions and movement speed make the game very fast and intense. Maintain concentration, keep attentional style externally oriented to detect significant cues, shift attention from a broad focus (e.g., be aware of the entire field) to a narrow focus (e.g., identify the team-mate position), are skills of great importance (Boutcher, 1992; Nougier, Stein, & Bonnel, 1991). Strong play intensity tends to keep arousal quite high for most of game time. Moreover, the short game times do not allow the athlete to slowly adapt to a playing pace, therefore optimal arousal is necessary at game start. Optimal arousal is important to carry out adequate performance and attend only important environmental cues. At low arousal, task-relevant and task-irrelevant cues are picked up, whereas relevant cues are gated out at excessive arousal level. Although arousal in hockey players is quite high, intermediate arousal helps focus the attention so relevant information is included (Landers, 1980).

The above issues, along with the psychophysical demand athletes should have faced in the championship, were kept in mind in the mental training program here presented. Stress management procedures were then included in the program. Mental training was integrated

with technical preparation, seeking close collaboration with the coach. This operation took place during preparatory meetings and continued during the European Championship.

THE MENTAL TRAINING PROGRAM

The program performed during preparatory meetings and championship was broken down in four phases: (1) conceptualization and motivation, (2) mental skills development, (3) mental training during practice, and (4) mental training during championship (Table 1).

TABLE 1. Four Phases of Mental Training Program

PHASES	GOALS
1. Conceptualization and motivation	Establish cooperative relationships Make mental training goals understandable Increase motivation
2. Mental skills development	Enhance body awareness Improve imagery Control arousal Control attention Manage stress Recover from fatigue
3. Mental training during practice	Apply mental skills on the field Learn and refine techniques and tactics
4. Mental training during championship	
Distant the game	Rehearse techniques and tactics Recover from fatigue
Before the game	Enhance confidence Tune arousal Control attention Manage stress Rehearse techniques and tactics

Phase 1: Conceptualization and Motivation

The intervention started with a conceptual and motivational phase in a meeting with sport psychologist, team, and coach. The meeting was to (a) establish a cooperative relationship among sport psychologist, coach, and athletes for a commitment to the program, (b) inform

about goals and rationale of mental training, resolve doubts, and dissipate misconceptions, (c) explain the basic steps of the procedure, (d) motivate the athlete toward the program.

To assess psychological skills an inventory was applied. Many items of this questionnaire were selected from the tests proposed by Mahoney, Gabriel, and Perkins (1987), and Nelson and Hardy (1992) to assess mental skills in sport. Results were then presented to each athlete and discussed individually. Strengths and weaknesses were this way identified, along with psychological intervention procedures.

Phase 2: Mental Skills Development

Progressive relaxation (see Harris & Williams, 1993) was taught in this second phase. Deep relaxation in a quiet "protected environment," combined with imagery about performance and competition, is useful to increase imagery skills, experience way to regulate arousal, learn to focus attention, learn how to manage stress, recover from fatigue, and enhance body awareness (Murphy & Jowdy, 1992; Suinn, 1993).

Vivid, polysensorial, and controllable images were sought through visualization of simple, static, and known objects inherent to hockey (roller skates, cloths, equipment, etc.). Imagery related to performance and competition was later used to gain control over emotions.

Arousal adjustment was taught at first explaining athletes how to recognize bodily and mental signals associated with optimal arousal. Self-regulation procedure followed, requiring subject to monitor bodily and mental changes associated with breathing (slow and fast breathing, thoracic and diaphragmatic breathing), muscles tension and relaxation, game situations and positive sport experience visualization. These exercises were at first proposed in a quiet environment, but later in noisy situations similar to practice conditions.

Following Nideffer (1993) model, attention width and attention direction were explained to players while taking into account performance situations. During relaxation, for example, attention is focused internally toward the whole body (wide focus) or its parts (narrow focus). External attention (wide and narrow) is instead necessary to assess situations on the field.

Competitive scenes were proposed through imagery. Stressful situations (e.g., striving to recover from unfavorable scores, keeping the advantage few minutes before game ending, contrasting the opponent pressing) were visualized and the emotional involvement was gradually increased.

Phase 3: Mental Training During Practice

Mental training was integrated with technical preparation during practice and preparatory games. Difficult and stressful situations were simulated to help athlete face stress and competitive pressure, such as (a) last minute of game maintaining very little advantage, (b) last minute of game recovering from possible defeat, and (c) competition against a greater number of opponents (e.g., 4 vs. 5).

Mental practice was applied to help tactical schemes learning. After theoretical explanation of tactical play by the coach, the strategy was applied on the field. Athletes were required to mentally rehearse the whole movement and the strategy, immediately before the execution. Mental rehearsal was applied progressively involving different sensory channels: subject had to feel important aspects of movement, see own action, see team-mate placement and relocation, listen to team-mates calls. With this procedure learning times can be reduced, and actions speed and accuracy increased. Coach's interventions are periodically needed to direct athletes' attention toward important aspects of individual and team performance. Preparatory games were useful to apply mental training strategies during championship.

Phase 4: Mental Training During Championship

Mental training during championship was divided into two stages, the first distant the game, and the second just before the game.

The training sessions distant the game were aimed at mentally rehearsing techniques and tactics, and at recovering from fatigue. Relaxation was induced, as previously learned, in a quiet environment. Collaboration with the coach was again important to appropriately point out the techniques and tactics to be included in mental practice. Athletes, for example, were required to see ball capture and pass, feel ball contact and movement strength, hear ball impact

against stick, see result of action. Appropriate scenes were proposed to goalkeepers taking into account the different demands imposed by the role.

At game proximity, a specific and individualized procedure was applied. Appropriate time management before the game is important to reduce anticipatory anxiety. Athlete has to learn how to adequately organize time, save energy, keep optimal concentration, get ready for competition.

During the European Championship the team usually reached the competition site one hour and a half before the beginning. The first fifteen minutes were devoted to "acclimatize" with the environment also watching ongoing competitions. The following procedure was then carried out. In the dressing room, an abbreviated form of progressive relaxation served as a basic condition to imagine successful scenes aimed to review tactics, enhance confidence, achieve optimal concentration. Athletes then moved to gymnasium to warm up, keeping concentration and setting arousal to an optimal level. When returned to the dressing room, players maintained concentration focusing on dressing routines and coach's speech. They also continued to tune arousal through breathing and movements appropriate to own needs. Arousal reduction, for example, can be achieved through physical relaxation, deep breathing, slow movements, cue words such as "relax." Energizing techniques to increase arousal, instead, comprise stretching and exercises, quick breathing rhythm, cue words such as "explode," and energizing imagery (Zaichkowsky & Takenaka, 1993). The procedure ended with technical warm up immediately before the game. Arousal was further tuned and concentration directed to technical and tactical contents of hockey play.

The whole procedure was widely adapted to suit individual needs. A preliminary thorough dialogue with each subject and the application of various psychoregulatory techniques during practice, served this purpose.

Athletes and coach reacted positively to the mental training program. The players applied the procedure enthusiastically, demonstrated interest and commitment, and obtained good performance results during practice and competition.

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MENTAL TRAINING ADHERENCE IN ELITE JUNIOR TENNIS PLAYERS

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Key words: adherence, consultant, mental training, tennis.

INTRODUCTION

The many developments in applied sport psychology service delivery over the past decade have not been accompanied by systematic research to investigate levels of athlete adherence to prescribed programmes of mental skills training. A line of research which systematically examines the factors which influence adherence behaviour would create a body of knowledge which would complement research investigating the efficacy of mental training techniques. Indeed, the two areas could be described as interdependent - i.e., mental training efficacy is unlikely to occur without adherent behaviour and vice versa.

Low levels of adherence to mental training were demonstrated by Bull (1991). Factors which emerged as influencing adherence were self-motivation, sport motivation, progress in sport career, time constraints, degree of programme individualisation and home environment. However, this study involved a group of athletes across a range of different sports who were gathered together for the purposes of the study. Studies examining more homogeneous groups of athletes in a real life setting would yield findings with greater relevance to specific athletic contexts.

The purpose of this study was to retrospectively investigate the mental training habits of a group of elite junior tennis players. The retrospective nature of the study is an acknowledged weakness in design but was a necessary requirement in order to gather data from a real life setting. Four areas of interest were identified: (a) the influence of self-motivation on adherence behaviour, (b) the influence of athlete belief in the efficacy of mental training on adherence behaviour, (c) the effect of differential exposure to sport psychology training on adherence behaviour, and (d) the perceptions of a sport psychology consultant on the adherence behaviour of his own athletes.

METHOD AND PROCEDURE

Subjects (N = 31) were nationally ranked British junior tennis players comprising of 12 females and 19 males. Subjects were chosen for inclusion in the study if they had received extended contact with a sport psychology consultant in the two years preceding the Grass Court National Championships at which the data was collected. The 31 subjects were independently analysed in two separate samples. Sample 1 (n = 20, 12 females and 8 males) consisted of players who had met a consultant during regional training camps which occurred approximately 4 times per year. Sample 2 (n = 11, all male) consisted of the resident pupils at the English Lawn Tennis Association's Tennis School at Bisham Abbey National Sports Centre. These players met a consultant regularly on average once every two weeks. Although ranked high in the national standings, these players did not exclusively represent the top junior players in the country as not all top players are offered, nor accept, places at the school.

Subjects completed two questionnaires. First, a children's version of the Self-Motivation Inventory (Dishman & Ickes, 1981) which has been developed by Biddle and Brooke (1992). As a measure of perceived efficacy (i.e., the athlete's belief in the efficacy of mental skills training), a short questionnaire was administered which was entitled the Mental Training Questionnaire. The conceptual basis for this questionnaire was Shapiro's (1981) credibility scale which has been used in expectancy theory research.

Having completed the two questionnaires, each subject was briefly interviewed. During this brief interview subjects were asked how "much" mental training they did, on average, over the course of several months. Responses were converted into a weekly average (in minutes) to represent an adherence duration score. Subjects were also asked how "often" they engaged in a mental training session, on average, over the course of several months. Responses were converted into a weekly average (in number of sessions) to represent an adherence frequency score.

An additional measure of adherence was obtained for Sample 2. The sport psychology consultant who worked with each player in this sample was present at the championships and agreed to be interviewed for this study. He was asked how much mental training each of his players ought to be doing (in his view) and how much he felt they actually did. This latter

estimate yielded a measure of perceived adherence and could be compared with the actual levels of adherence reported by the players themselves.

RESULTS

Table 1 illustrates the descriptive statistics relating to Sample 1. The perceived efficacy mean score of 50.7 demonstrates a favourable attitude towards mental training by the group as a whole (possible range is 0 to 63). Nevertheless, mean adherence scores of 24.7 minutes per week (duration) and 2.1 occasions per week (frequency) are not as high as many practising sport psychology consultants would recommend (Bull, 1990).

TABLE 1. Mean, standard deviation and range of scores in Sample 1 (n=20) and Sample 2 (n=11)

	Sample 1			*Sample 2*		
Measure	*M*	*SD*	*Range*	*M*	*SD*	*Range*
Self-motivation (SMI)	77.1	10.0	55-92	73.4	13.1	47-81
Perceived efficacy	50.7	7.5	35-62	51.6	7.8	36-62
Adherence duration	24.7	29.6	0-105	83.7	71.2	0-210
Adherence frequency	2.1	2.2	0-7	3.7	2.1	0-7
Ad-DES	-	-	-	162.3	65.1	105-280
Ad-PER	-	-	-	74.1	48.3	0-150

Note. *Ad-DES*: consultant's perception of how much mental training each player should desirably do in minutes per week. *Ad-PER*: consultant's perception of how much mental training each player actually does in minutes per week.

Pearson correlation calculations revealed significant relationships between perceived efficacy and adherence duration ($r = .53$; $p < .01$), and perceived efficacy and adherence frequency ($r = .48$; $p < .05$). However, no significant correlations emerged between either measure of adherence and self-motivation.

The descriptive statistics relating to Sample 2 are also presented in Table 1. Perceived efficacy is again high with a mean score of 51.6. There is little difference between the two samples when comparing the two

psychological measures but there does appear to be a contrast in mental training adherence. The mean adherence duration of Sample 2 is 83.7 minutes per week as compared with 24.7 minutes for Sample 1. This difference is significant, $t(29) = 3.26$; $p < .01$, as is the difference between the adherence frequencies of the two samples - $t(29) = 2.09$; $p < .05$.

Pearson correlations were calculated on the Sample 2 data and revealed a number of significant relationships. Positive correlations were demonstrated between self-motivation and both adherence duration ($r = .53$; $p < .05$) and adherence frequency ($r = .67$; $p < .01$). Positive correlations also emerged between perceived efficacy and both adherence duration ($r = .71$; $p < .01$) and adherence frequency ($r = .87$; $p < .0001$). Consultant perceived adherence correlated significantly with perceived efficacy ($r = .54$; $p < .05$) and its correlation with self-motivation was approaching significance ($r = .45$; $p < .08$).

TABLE 2.Comparison between consultant desired, consultant perceived and athlete reported measures of mental training adherence in Sample 2 (n = 11)

Athlete	*Consultant desired (DES)*	*Consultant perceived (PER)*	*Athlete reported (AR)*	*Discrepancy between DES & PER*	*Discrepancy between PER & AR*
1	280	60	0	- 220	- 60
2	280	0	80	- 200	+ 80
3	140	60	30	- 80	- 30
4	105	105	120	0	+ 15
5	140	30	15	- 110	- 15
6	140	140	210	0	+ 70
7	105	60	180	- 45	+ 120
8	140	150	60	+ 10	- 90
9	140	120	52.5	- 20	- 67.5
10	210	30	150	- 180	+ 120
11	105	60	22.5	- 45	- 37.5

Note. All figures represent minutes per week.

Table 2 compares the different measures of adherence for each player in Sample 2. As the table indicates, there are some substantial discrepancies between the different measures - particularly subjects 2, 7 and 10. Evidently, the consultant sometimes underestimated, as well as overestimated, the amount of mental training reported by his players. An inspection of the two consultant columns reveals that generally the players are perceived not to strongly adhere to the programmes devised for them -

with the exception of subjects 4, 6 and 8. The correlation between consultant perceived adherence and athlete reported adherence duration was positive but not significant ($r = .23$; $p > .05$). An interesting negative correlation emerged between consultant desired adherence and athlete reported adherence duration. The correlation approached significance ($r = -.49$; $p < .06$) and suggests that the more mental training the players needed (as identified by the sport psychology consultant), the less they actually carried out.

DISCUSSION AND CONCLUSIONS

The results of this study provide further evidence of the need to systematically investigate mental training adherence. Although levels of adherence were higher than those reported by (Bull, 1991), these levels are still lower than the amount specified as desirable by a group of experienced sport psychology consultants (Bull, 1990). The mean desired amount of mental training for subjects in Sample 2, as identified by the players' consultant, was 162.3 minutes per week. This represents almost double that reported by the players (83.7 minutes) and more than double that perceived by the consultant when estimating individual adherence levels (74.1 minutes). In reality, the appropriate amount of mental training will clearly depend on the nature of the sport and the characteristics of the athlete. Desirable amounts will obviously therefore vary significantly between different individuals. Nevertheless, lack of adherence can still be a problem regardless of the amount of specified training required. Hence the need to identify influential factors before formulating efficacious techniques of fostering higher levels of adherent behaviour.

Those athletes receiving regular contact with their consultant (players in Sample 2), demonstrated significantly higher levels of adherence whilst not demonstrating any difference in perceived efficacy or psychological characteristics. This finding, however, has not been shown within the confines of a tightly controlled experiment. Therefore, it is possible that the quality of sport psychology service provision varied between the two samples and hence led to the contrast in mental training behaviour. Alternatively, presence at the tennis school perhaps allowed for more time to be spent on tennis training generally. Controlling for this variable was not possible, however, due to the natural setting of the data collection. Interpretations must therefore be made with caution. Notwithstanding this reservation, it is

worthwhile to note the views of DiNicola and DiMatteo (1984) who suggest that interpersonal influence may be the "essential catalyst" in creating behaviour change, regardless of the mode of psychological intervention. This implies that the personal influence of the sport psychology consultant is an important precondition in facilitating athlete mental training adherence. DiNicola and DiMatteo (1984) also point to a number of health care studies which suggest that the quality of the health care provider-patient relationship is a key factor in compliance/adherence and Halliwell (1990) explained his view that the sport psychology consultant's relationship with the athlete is as important as the mental training techniques used.

The strongest result to emerge from the correlational analyses was clearly the relationship between perceived efficacy and mental training adherence. This finding links intuitively with Shapiro's (1981) work in expectancy theory which postulates that the key to therapeutic change lies in the arousal of positive expectancies. It is important to note, however, that the current findings do not indicate directional causality. The results of this study demonstrate correlational, rather than causal relationships. It could be suggested that doing more mental training will itself enhance feelings of perceived efficacy. If this were so, it would be mental training adherence which would influence efficacy rather than vice versa. It is, however, more likely that the relationship is a circular one whereby perceived efficacy influences mental training adherence, the results of which enhance perceived efficacy via observable performance increases.

The results of this study lend partial support to the findings of Bull (1991) regarding the relationship between self-motivation and adherence. Nevertheless, due to the equivocal nature of the present results, more detailed research is needed to investigate this dimension of personality in a range of adherence settings. Recent research by Garcia and King (1991) demonstrated no relationship between self-motivation and long-term adherence to aerobic exercise, clearly contradicting previous work in a variety of adherence contexts (Bull, 1991; Dishman, Ickes & Morgan, 1980; Duda, Smart & Tappe, 1989; Knapp et al., 1984; Stone, 1983).

DiMatteo and DiNicola (1982) claimed that more than 80% of physicians overestimate patients' medication consumption. The analysis of consultant perceptions in this study provides some evidence of the possible inaccuracy of a sport psychology consultant's estimation of his/her athletes'

mental training habits. Comparison of the "discrepancy between PER & AR" column reveals the general inaccuracy with which this particular consultant estimated adherence levels of each of his players at an individual level. Six of the players reported doing less mental training than the consultant perceived with the largest discrepancy being 90 minutes (athlete #8). The remaining five players, however, reported doing more mental training than the consultant perceived - most notably athlete #7 who reported doing 120 minutes per week more than the consultant estimated. Despite these individual discrepancies, however, the consultant's overall mean perceived adherence of 74.1 minutes per week is fairly close to the athlete reported mean of 83.7 minutes. This indicates that this consultant is somewhat cognizant of the adherence problem and, on balance, does not overestimate the mental training adherence of his group of athletes as a whole.

In summary, the results of this study confirm the need to further investigate athlete adherence patterns to programmes of mental skills training. There are clearly a range of different personal and situational factors which influence adherence behaviour (as summarised by Bull, in press) - athlete perceived efficacy being perhaps one of the most important. Of great importance also, is the nature of the contact and relationship between sport psychology consultant and athlete. This study has demonstrated the need to explore this area in much more detail if constructive suggestions can be made about the association between elements of the consultant-athlete relationship and level of mental training adherence.

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IMAGERY PRACTICE AND EMG CHANGES

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KEY WORDS

Electromyography (EMG), Imagery, Psychoneuromuscular Hypothesis, Visualization, weight-lifting.

INTRODUCTION

Imagery is a psychological training technique very used in athletic situations (Feltz & Landers,1983). Its main aim is the performance facilitation and the automatization of motor skills with a high technical component. It is basically accepted what is it and that it works. But we have several questions to answer. How it works? What are the mechanisms implied during imagery? And how do they facilitate performance improvement? There are several trials to answer this questions, between them psychoneuromuscular hypothesis has been the most accepted theoretical model to explain imagery's mechanisms (Palmi, 1991).

The aim of this research consists in comparing and relating Electromiographic activity patterns between real performance of a motor skill and its visualization. A weight-lifting task has been chosen because it is simple and easy to quantify.

METHOD

Subjects

The subjects of the study were 10 University female students (8 right-handed and 2 left-handed) with M=19.6 years and a SD=1.4 years.

Material

The material used in the investigation was:

- EMG analyzer (Mega, Muscle Tester ME-3000P)
- Bipolar surface electrodes (Ag-AgCl, 9mm diameter)
- 2 weights of 1Kg each one.
- Video equipment (video recorder, monitor, etc.) SONY
- 1 walkman and 1 audio tape with relaxing music (Leivax, 1993)
- Sport Imagery Questionnaire (SIQ; Roberts, 1987), it is a questionnaire used to measure facility to imagine in sportive situations.

Procedure

The performed task consisted in an arm press-up lifting 1 kg with one hand.

Previously to the experimental session, a videotape was edited showing:

a) The task that subjects should execute.

b) Three right arm series of 5 arm press-up to facilitate imagery.

c) Three left arm series of 5 arm press-up to facilitate imagery.

In one experimental session all the subjects completed the following steps for each arm:

1) Real Performance: After watching the part "a" of the videotape, 5 arm press-up were executed by subjects.
2) Relaxation: Muscular relaxation hearing relaxing music with head-phones.
3) Imagery: Subjects visualized 5 press-up without observable motor activity. Before they have watch the arm press-up recorded on a video tape (part "b": before right arm visualization; and part "c": before left arm visualization).
4) Relaxation: Once again muscular relaxation hearing relaxing music with head-phones.
5) Real Performance: Finally 5 arm press-up were performed.

In each step EMG biceps and triceps activity of right and left arms was recorded by bipolar surface electrodes with an intrapair distance of 15mm. Ability for Imagery was also assessed with a specific questionnaire (SIQ, Roberts,1987).

RESULTS

Individual analysis:

For each arm's subject a comparison between EMG activity during real performance (Figure 1) and imagery (Figure 2) was made.

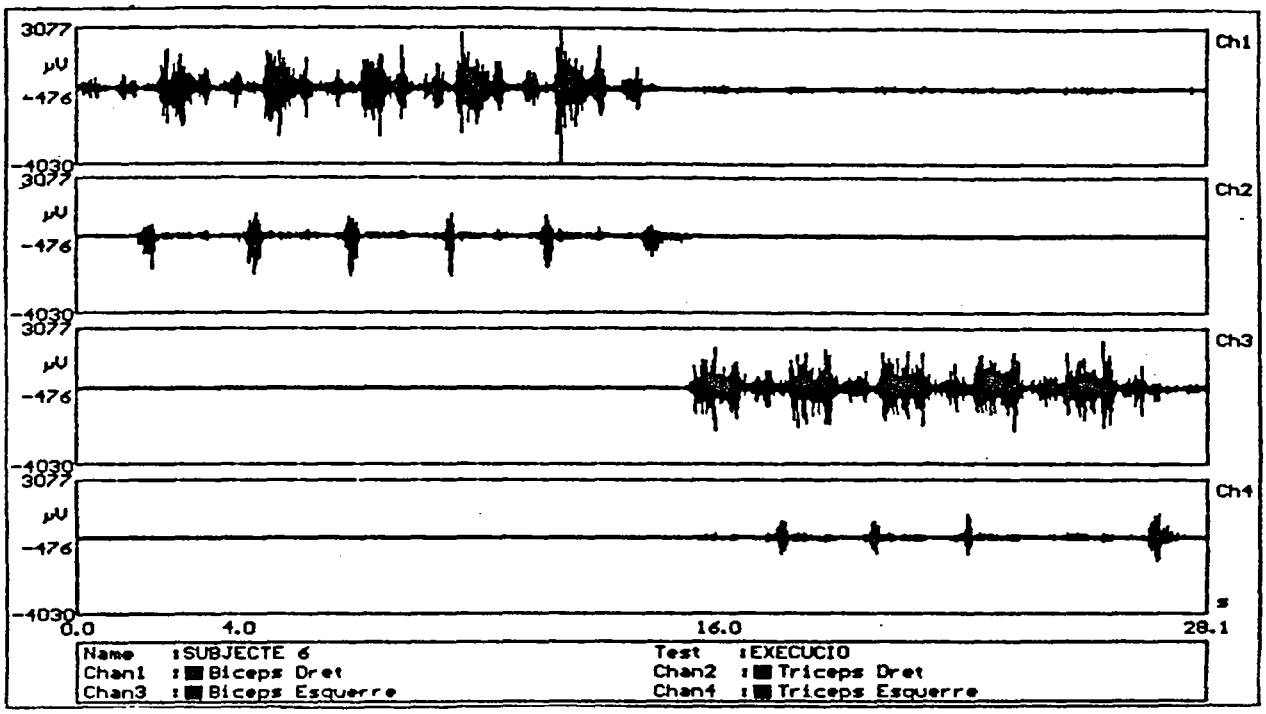

Figure 1. Real performance of the task by one subject (5 press-up with each arm).

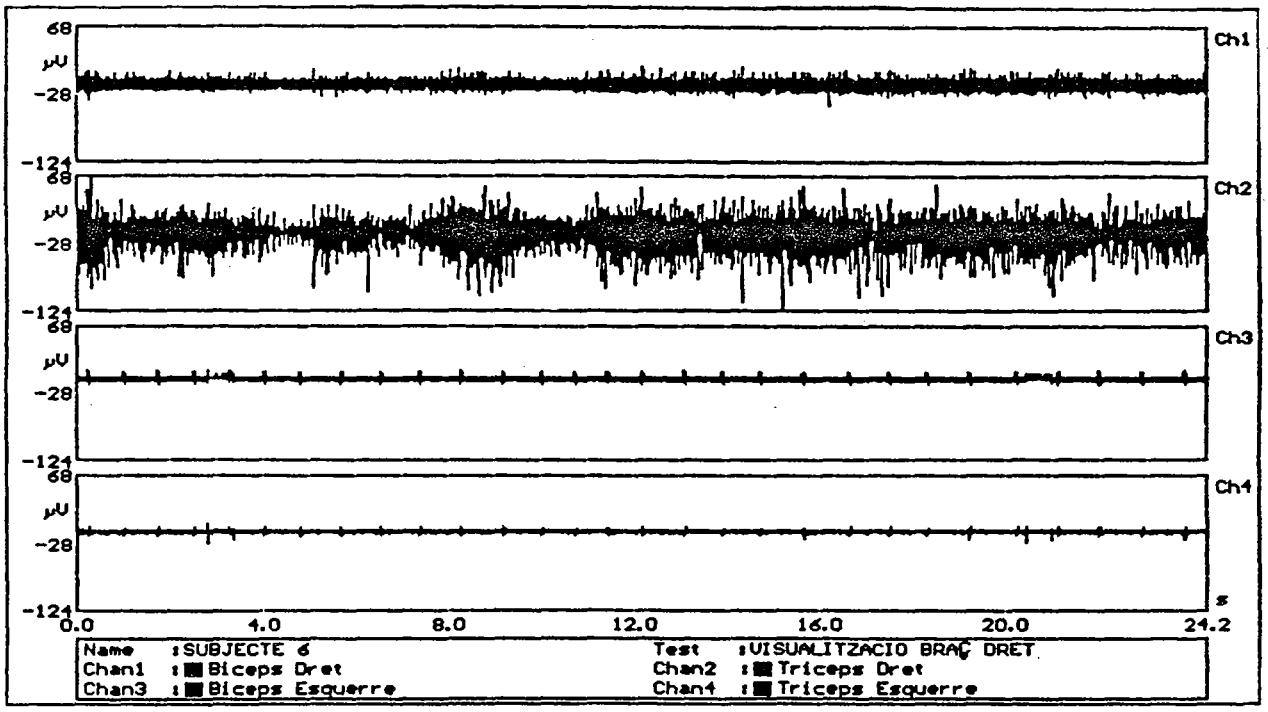

Figure 2. Visualization of 5 press-up with right arm by the same subject of figure 1.

Subjects with higher ability to visualize showed higher relationship between EMG recordings during real performance and during the visualized task. In general, during imagery subjects showed unspecific EMG activity in muscles of the visualized arm. No activity was observed in the same muscles of the other arm (Figure 3).

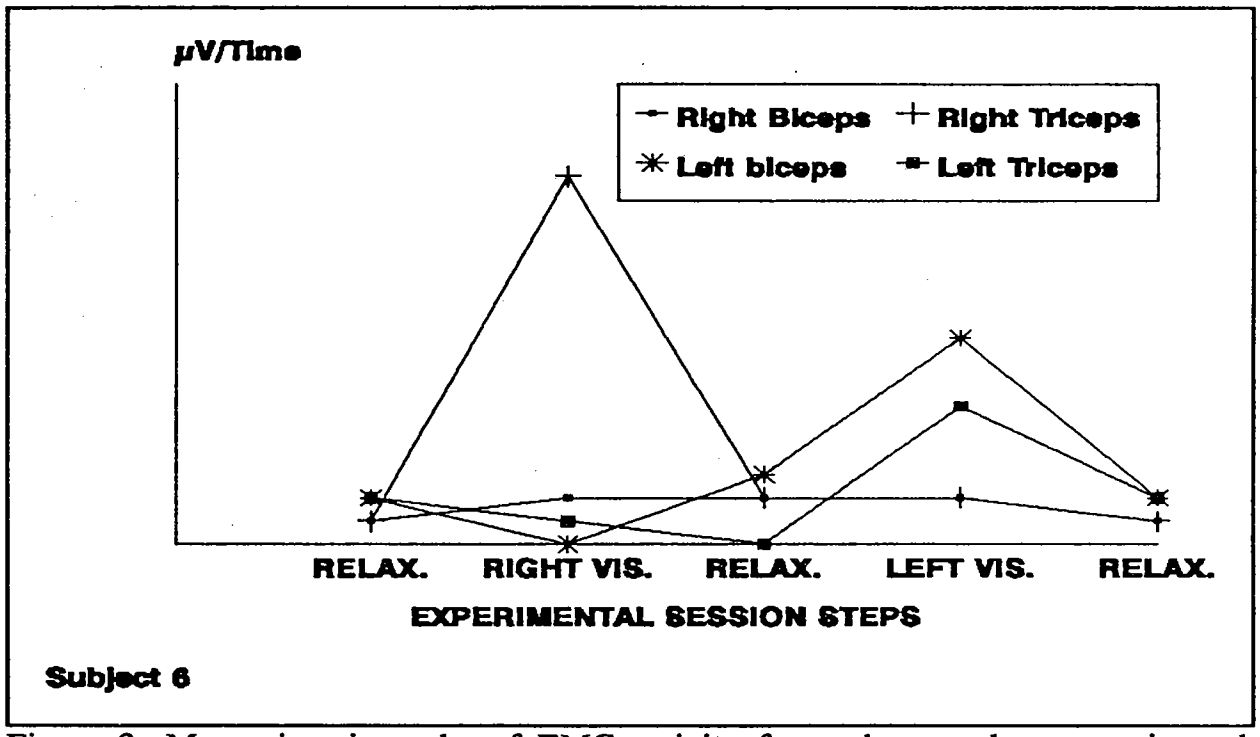

Figure 3. Means in microvolts of EMG activity for each muscular group in each visualization and relaxation.

Group analysis:

EMG activity means have been analyzed for each step of the study. During imagery period higher muscular activity than in the relaxation period is observed. However, it seems that this is only true when press-up are visualized with the dominant arm (Figure 4).

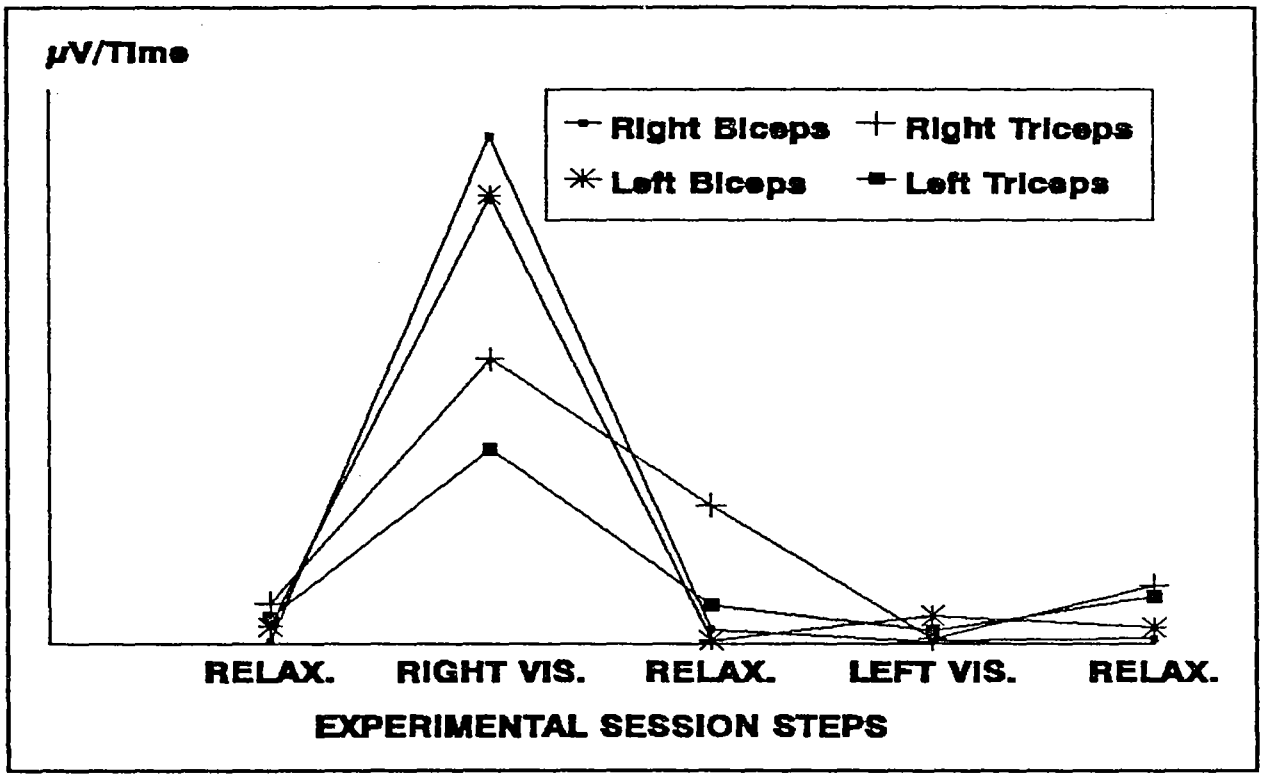

Figure 4. Means in microvolts of 8 right-handed subjects in each visualization and relaxation.

DISCUSSION AND CONCLUSIONS

In general, results support psychoneuromuscular hypothesis since almost in all subjects EMG activity is observed only in the visualized arm. However, this unspecific activity does not permit to identify exactly the moments when press-ups are visualized. Besides, during imagery EMG activity has lower magnitude than in real performance. These two aspects -specificity and magnitude of EMG activity- could be potentiated with an appropriate imagery training. We must note that in our study, subjects received general guidelines -but not a specific training- in imagery. Moreover, the more capable subjects in imagery were the ones who showed more relationship between EMG activity in real performance and in visualization.

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PRECOMPETITIVE PREPARATIONS IN PROFESSIONAL HOCKEY

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The purpose of this study was to examine the process professional hockey players follow before each competitive game after arriving at the rink. A purposeful non-probability sample consisting of fifteen Canadian professional hockey players between the ages of 21 to 32 was interviewed.

A grounded theory approach was used. The systematic analysis of interview transcriptions yielded common categories which were linked together. The emerging categories were substantiated through additional data collection, and were validated by both players and by the researcher's observations.

The findings of this study indicate that precompetitive preparation is experienced as a process resulting in optimal readiness. The process is comprised of five phases directed by time: the arrival, dressing, on-ice warm-up, off-ice adjustments, and the team ritual. As individuals progress through each phase, they are getting the body ready, getting a feel, and getting the mind ready.

The player's descriptions of the process revealed that they implemented rituals and routines as strategies to order their preparation. These rituals and routines included a variety of physiological and psychological techniques. The findings indicated that the degree of adherence to and complexity of routines differed significantly among the players. Veteran players used more structured and complex routines than the rookies. Furthermore, it was found that the routines were particularly beneficial at away games where surroundings were less familiar.

The role of the coach was minimal during the five phases of preparation. However, it is recommended that coaches be more aware of the player's individual needs, routines, and more specifically optimal levels of arousal prior to each game.

Key Words

Precompetitive preparation, ice hockey, ritual, routine.

INTRODUCTION AND LITERATURE REVIEW

Sport at the professional level may be stressful, intense, emotional, and physically demanding on the players. Coaches and players are constantly searching for new ideas and strategies that are effective in generating optimal readiness in every sense. The hours immediately prior to the competition are critical to determine a player's physical and psychological readiness. How a player engages his cognitions, emotions, and behavior at this time could be the difference between success and failure. Precompetitive preparations are both physical and psychological in nature. Psychological preparation is becoming increasingly important particularly at the elite level, where athletes possess similar physical skills and the difference between winning and losing is perhaps embedded in the behavioral efficiency of the athlete. Psychological preparation requires an athlete to utilize skills such as concentration, focusing and refocusing, arousal control, relaxation, goal setting, positive thinking, and calming the mind before competition occurs.

An athlete may carry out pregame rituals inclusive of psychological skills while preparing for competition. Despite media attention and the widespread belief in the prevalence of ritualistic behavior in sport, little empirical attention has been focused on this area. Most research has concentrated on superstitions in general, and even classified ritual as superstitious behavior (Becker, 1975; Buhrmann, Brown & Zaugg, 1982; Gregory & Petrie, 1975; Neil, 1982; Neil, Anderson & Sheppard, 1981).

Much of the research to date investigates "sport as ritual" rather than "ritual within sport" (Blanchard, 1988; Cheska, 1981; Harris, 1983 Smith, 1976). Yet athletes do use a variety of pregame rituals that are an important part of their physical and psychological preparation. It would be beneficial for athletes to become more sensitive to the diverse forms pregame rituals can assume and the functions they serve. Athletes can then implement psychological skills as part of their rituals thereby eliminating distractions and allowing for a more focused preparation. The incidence of pregame rituals increases with higher levels of competitive involvement and professional hockey is an example of a sport in which athletes frequently perform pregame rituals (Neil et al., 1981).

Some research studies have focused on superstitious behaviors exhibited and reported by athletes (Buhrmann et al., 1982; Gmetch, 1972; Gregory & Petrie, 1975; Neil et al., 1981). These studies describe in detail, the superstitious beliefs and idiosyncratic behaviors of athletes, and in particular the kinds of rituals, fetishes, and taboos adopted by athletes. However, only a few studies have considered what these behaviors really mean to an athlete (Dunleavy & Miracle, 1981; Womack, 1979). One reason for this has been the methodological

problem facing researchers who wish to study a topic of a personal nature. An athlete's preparations are often private and self-disclosure of these behaviors can be difficult.

On the day of competition coaches aim to have their athletes attain an ideal performance state (I.P.S), a state typically associated with the athletes' peak performance. The I.P.S is the unique psychological state that allows athletes to perform at or near their performance potential. Each athlete needs to discover the conditions under which he or she performs to his or her optimum potential (Cox, 1990). Performance is likely to be enhanced if preparation is repetitious and systematic (Williams, 1986). Pregame rituals are utilized by athletes for many reasons including (a) to focus attention, (b) to organize internal and external stimulus, (c) to isolate oneself from others, (d) to create team cohesion, and (e) to bring good luck. However, Sherman (1988), warns that athletes are vunerable and the use of rituals can be "non-functional". If the athlete becomes obsessed with the ritual and it is not performed correctly, preparation and hence performance may be negatively affected.

The purpose of this study was to explore and describe the experiences of professional hockey players as they prepare for a competitive game and to identify commonalities or patterns of behavior within the experiences.

METHOD AND PROCEDURE

This exploratory and descriptive study was conducted using grounded theory which is a theory-generating approach (Glaser, 1978). Grounded theory was used to examine the experience of precompetitive preparation from an emic perspective, that is the perspective of the player. Grounded theory is also called the method of constant comparative analysis because it is based on the concurrent processes of collection, coding, and analysing the data which directs subsequent data collection. Thus data and the emerging theory are in relationship to each other in a recursive and ongoing process of inquiry and analysis.

Sample

Theoretical sampling methods were utilized to select participants. A sample consisting of 15 professional hockey players between the ages of 21 and 32 years of age was interviewed. The players interviewed included 7 forwards, 2 goaltenders, and 6 defencemen. The number of years playing professional hockey and the number of years with the current team ranged from 1 to 13 years. Players were interviewed and observed during the 1991-1992 preseason and regular National Hockey League (NHL) playing season.

Data Collection

Since rich descriptions of the player's precompetitive experiences was sought, unstructured open-ended interviews and participant observations were utilized to collect data.

The interviews, 25 to 60 minutes long, were conducted over a six month period with the first at the player's preseason training camp. The first interview with each player did not have a formal set of questions to ask, except for an opening question, "Could you describe in as much detail as possible everything from the time you arrive at the rink to the time of the first face-off?"

Second interviews were conducted after the initial analysis was completed midway through the regular season. The second interview was more structured, as emerging concepts were taken back to each informant for clarification, elaboration, and verification. In the later stages of data collection, two secondary informants were interviewed. These players were not involved in the initial sample and were asked to verify the theory. These informants were asked such questions as, "Some players indicate that the team ritual is an individual thing, is this true for you?" Participant observation allowed the researcher to validate what had been said in interviews. The on-ice pregame preparations for two preseason exhibition games and six regular season games were carefully observed by the researcher.

Data Analysis

Analysis of the data was conducted as a continuous, ongoing process which was integrated with the data collection and coding. Interviews were audiotaped, transcribed verbatim and then coded line by line. Coded data were clustered into related categories and were compared with one another and with new data to discover the relationships among the data in order to continually refine or discard emerging hypotheses. Throughout the data collection and analysis, great emphasis was placed on memoing and diagramming which involved writing up ideas about developing categories and their relationships to one another. These memos and diagrams then provided the outline for documenting the study's findings. Interviewing and data analysis continued until no new information was being gained.

FINDINGS AND DISCUSSION

The findings follow the temporal flow of the preparation as identified by the players during the interviews. Five separate phases, with distinct time constraints, clearly formalized the players preparations. The five phases of preparation were: (a) the arrival, (b) dressing, (c) on-ice warm-up, (d) off-ice adjustments, and (e) the team ritual. Three components to the preparation which progress through the five phases also emerged from the data. The three components include: (a) getting the Body Ready (physiological), (b) getting a Feel (psychophysiological), and (c) getting the Mind Ready (psychological).

The Five Phases of Preparation

The Arrival. The arrival phase extended from the time the player arrived at the rink until he began dressing for the game. Although there were individual differences in the

preparation players undertook for away games, they placed considerable importance on the time of arrival at the arena. Based on previous experience in the lower levels of hockey, the players arrived at home games individually at a time they found suitable. During the arrival phase players spent time preparing sticks, stretching, treating injuries, relaxing, joking around, or meeting with the media. The arrival phase for the hockey players interviewed ranged from one to two hours in length and was the longest phase in the player's preparations.

Dressing. Hockey is a contact sport which requires players to wear protective clothing and padding. Players repeatedly emphasized that dressing for a game was different from dressing for a regular practice. These differences included the amount of time spent putting the equipment on and the precision with which this activity was performed. The average amount of time players took to dress was twenty minutes.

On-Ice Warm-up. In professional hockey each team is given a 20 minute on-ice warm-up which begins forty-five minutes before the start of a game. At this time both teams are assigned one half of the rink on which to warm up. According to the players interviewed, the purpose of the warm-up is to go out on the ice and skate around, to increase the heart rate, to stretch, to handle the puck, and to check the equipment. The coaches were not involved in the on-ice warm-up and although individuals were constantly preparing themselves, the captain and assistant captains directed both the players and the order of the preselected drills. Players then returned to the dressing room after the 20 minute on-ice warm-up.

Off-ice Adjustments. During the final 20 minutes before the start of the game, the players make any necessary alterations to their equipment in readiness to return to the ice. This is the last opportunity the players have to prepare both physically and psychologically before returning to the crowded stadium and the start of the game. During this phase the coach gives final strategical instructions and the leaders on the team try to "psych up" the players.

Team Ritual. Although the structure of the team ritual varies from team to team it would be difficult for a spectator of the game to be unaware of it's occurrence in professional hockey. The entire hockey team returns to the ice two minutes before the start of play. This is the last time every player is on the ice during the first period. Two minutes before the game begins the referee blows his whistle to remind the players the game is about to begin. Upon hearing this signal the players move like bees around the hive, or in this case the goaltender's net, and in particular the goaltender. Within two minutes, players have performed their role in the ritual and quickly dispersed from the ice or to the blue line ready to commence play. A veteran player described this ritual as:

> ...an on going tradition. If you didn't have a ritual you'd have players running into each other. Players like to say good luck to the goaltender.

At the conclusion of the ritual, players are ready to begin the game. The five phases the players experienced are ordered and controlled by time. Although preparation occurred on an

individual basis, the players in this study were very conscious of the clock in the two or three hours leading up to the game. Timing was crucial to the smooth transition from a relaxed mode to an optimal level of arousal needed to play the game at this level.

Components of Preparation

As each player progressed through the five phases in his preparation it became apparent from the players' descriptions of their behaviors that there were three components to be considered. 'Getting the Body Ready', 'Getting a Feel,' and 'Getting the Mind Ready.' When these three components were combined the player tried to achieve a state of optimal readiness.

Getting the Body Ready. The competition between professional hockey players is severe. In comparison to other occupations, a player's career is relatively short. Each player faces the ever present and very real danger of injury. An injury can result in a premature end to what may have been a promising career in the sport. For these reasons, the players spend ample time getting their bodies ready for competition.

'Getting the body ready' was a category that emerged early in the data analysis and related to any aspect of the player's preparation that was physiological in nature. It became evident that the older players in this study arrived at the rink earlier because they often needed treatment for some or other injury. One of the more experienced players explained:

> ...5.00p.m to 6.00p.m is normally, ah, therapy time 'cos generally I have an injury of some type, probably 60% to 70% of the games I'll have an icepack on me for some reason. I'll spend 20 minutes icing and maybe 5 or 10 minutes ultrasounding.

Because professional hockey is a fast moving contact sport where players are being forechecked, driven into the boards or sometimes involved in fights for example, the physical preparation cannot be taken lightly. In fact, thorough preparation of the body is essential to the longevity of the player's career as a professional. It was evident that the older veteran players found the eighty game regular season physically gruelling and that they needed to take more time and greater care during their physical preparation for the games. Veteran players also pointed out that if they felt confident about their physical readiness then they went into the games psychologically confident. In contrast, the rookies did not connect their physical preparation with their psychological preparation. The rookies found it easier to focus on the physical preparation and lacked confidence in their ability to prepare psychologically.

Getting a Feel. The second component 'Getting a Feel,' which emerged late in the data collection and analysis, refers to psychophysiological aspects of a player's preparation. Behaviors that combined both mental and physical processes, such as relaxation, were categorized as "getting a feel." Other behaviors in this component included; taping sticks, ensuring equipment felt comfortable and getting into a rhythm or tempo on the ice.

An integral part of every players' preparation involved the careful selection and preparation of sticks. In professional hockey the stick serves numerous functions. These include moving the puck across the ice, stopping the puck, defending oneself or even "interferring" another player. The stick becomes an extension of the player's body and for some players it is not just an object but it has life! As one player pointed out, "I talk to it, it has goals in it." Players were responsible for the preparation of their own sticks for all practices and games. While physically cutting the sticks down to the correct height, shaving the blade, and taping the nob and blade, players began to think about the game. At this time, verbal interaction between players, usually about the upcoming game, occurred and more importantly, like the highly skilled craftsman, players were feeling the stick between their hands so that it felt comfortable and ready for use in the game. One player stated:

> ...sticks are very important if you don't have a stick that's quite close to what you're used to using it can be quite devastating.

Getting the Mind Ready. The third component 'Getting the mind ready' refers to the psychological strategies that players utilized while preparing for the game. These included visualization, focusing attention, positive thinking, and self-talk. Hockey is an open skilled sport that is fast, physical and demands total concentration as well as split second reactions. The success of a player at the professional level requires him to acquire certain psychological skills that, when applied, enable him to deal with the pressure of competition.

Developing emotional and attentional control is an important part of the player's preparation. One veteran player learned to monitor and control his emotions using relaxation techniques early in the arrival phase. He stressed that this came with experience and practice over the years. Four of the players referred to "keeping an even keel" before each game. When asked what was meant by this, the players explained that they tried to control their emotions and attention before the game. Regarding an optimal time to arrive at the arena, several factors seemingly influenced this decision. These included: ensuring therapy time was sufficient to treat injuries, consideration of media commitments for pre-recorded interviews, special duties or responsibilities that had to be performed, setting up the music in the dressing room and allowing enough time to prepare equipment.

The dressing phase began at 6.30p.m when the upbeat music in the dressing room was turned off, players moved to their stalls and equipment was put on. Players referred to the dressing phase as a 'quiet time', when the joking around ceased and concentration was required. The veteran players and captains discussed the game strategy for that evening. At this time few overt emotions were displayed, players were quietly concentrating on the game to be played that night. The players then left the dressing room for the on-ice warm-up which was not a time of pressure and errors could be made that would not effect the outcome of the game. While on the ice for the warm-up the players displayed more emotions, as reflected in

an overt display of excitement as they communicated with each other, talking as they skated past and occasionally tapping each other on the pads. Although the emphasise in the warm-up was on the physiological preparation, psychologically players were trying to build their confidence while on the ice.

If the warm-up did not go as planned for the player, he still tried to stay positive and feel confident. One technique frequently used was affirmations or positive self-talk. Players needed to feel good and think positively before the start of each game. A few of the players said that if they had negative thoughts or were discouraged they would probably perform below their true potential. One of the veteran players in the study felt that confidence was extremely important to his performance and compared his performance highs and lows during the hockey season to peaks and valleys. He explained how self-talk can be used to get out, and stay out of the valleys:

> When you're on a roll everything comes easy, you put very little thought into the game. It's when you're struggling that it gets a lot tougher and you know you might have to talk to yourself a bit more to try and get yourself out of it.

Self-talk was only one form of reinforcement that occurred during the off-ice adjustment phase. The recognized leaders of the team, motivated themselves and the other players. The category "supportive activity" emerged early in the data collection and analysis and included behaviors or interactions between players where concern, tolerance and respect was displayed toward other players. Although hockey is a team sport, the majority of the preparation is done on an individual basis and players tolerate each other's behaviors.

Implications and recommendations for players and coaches

There are several implications for the players that emerge from this study. The most important of these is the recognition and understanding that a player's preparation can always be improved upon through careful planning and practice. The author believes that incorporating specific mental training skills and strategies in training sessions is the one of the most practical, effective and efficient ways of facilitating learning. Athletes come to training sessions expecting to learn what they need to perform well in competition. Practising mental skills under these conditions increases the chances of learning these skills.

Including such techniques in training means practising physical and psychological skills in conjunction with each other rather than in isolation. Professional teams need to utilize specialists trained in teaching these mental skills because in the past athletes have haphazardly gone about implementing these techniques. For example, telling a player it is beneficial for him to go and visualize is not always sufficient. He must first learn how to visualize. Part of the overall helping process may involve educating or re-educating some coaches, managers and players to the fact that psychological coping skills need to be learned and perfected in order to have full benefits.

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CONTEMPORARY ISSUES OF PSYCHOLOGICAL SKILL TRAINING: TECHNIQUES TO OPTIMIZE SELF-EFFICACY IN SPORTS

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Key words: self-efficacy; efficacy expectations; performance

INTRODUCTION

Psychological Skill Training (PST) is broadly discussed in the current literature of sport psychology as a strategy to optimize performance in sports (e.g., Sailer, 1992; Vealey, 1988). If PST is considered as 'psychological intervention', the theoretical foundation is unalterable for the evaluation of the treatment. The theoretical foundation of the skills used in PST is often missing. This often appears as a lack of clear empirical results. However, the concepts of arousal-regulation and self-efficacy (Bandura, 1977) include this prerequisite and, therefore, are well supported by empirical research.

In this paper, we aim to emphasize the central concept of self-efficacy and its influence on performance in sports (e.g., training champion). The concept of self-efficacy is closely related to Bandura (1977). He was able to show that people's action is influenced by their efficacy expectations. Positive and/or negative expectations of the efficacy of one's own action determine, for example, whether an action will take place in a stressful situation, how much effort will be put into this action, and how long this action will last. The degree of the influence of efficacy expectations on a person depends on the expectations of the person and on his/her trust into his/her efficacy. Moreover, correlations exist between the concrete (demanding) situation in which the athlete perceives his/her own action and the expectancies mentioned above.

In his concept, Bandura (1977) differentiates between outcome expectations and efficacy expectations. "An outcome expectancy is defined as a person's estimate that a given behavior will lead to certain outcomes. An efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes. Outcome and efficacy

expectations are differentiated, because individuals can believe that a particular course of action will produce certain outcomes, but if they entertain serious doubts about whether they can perform the necessary activities such information does not influence their behavior" (p. 193). Therefore, efficacy expectations are introduced before outcome expectancies when action takes place, i.e., outcome expectations without efficacy expectations are not relevant to action.

Bandura (1977) cited four primary sources of information through which psychological procedures operate. Performance accomplishment is especially influential because it is based on personal mastery experience. However, success raises mastery expectations; repeated failure lowers them. Vicarious experience, especially in performance situations, enhances efficacy expectations because performances are often judged by social comparison (e.g., model learning). However, it is a less dependable source of information regarding one's capabilities than is the direct evidence of personal accomplishment. In addition, verbal persuasion either in form of external and/or self-instruction (e.g., self-talk) supports efficacy expectations. As the fourth but weakest source of information, Bandura describes the effects of emotional arousal that, depending on the circumstances, might have informative value concerning personal competency. Because high arousal usually deliberates performance, individuals are more likely to expect success when they are not beset by aversive arousal than if they are tense and viscerally agitated (e.g., pre-start condition).

The effects of efficacy expectation training can be shown by the optimization of psycho-physic stress regulation. Improvements can be observed in perception-regulation (e.g., desensibilization, concentration), emotion-regulation (e.g., anxiety, stress-regulation), and motivation-regulation (e.g., action oriented, success oriented). These effects enhance the likelihood that athletes will realize their actual performance potential in competition.

The general goal of efficacy expectation training is to teach athletes to systematically set goals for themselves in order to strengthen the assurance of accomplishing the self-established goals based on their own abilities and efforts. This is a necessary requirement for athletes to be self-confident and to perform on a constant level in competition.

TECHNIQUES TO OPTIMIZE SELF-EFFICACY IN SPORTS

Practical experience shows that many athletes who perform very well in practice are not able to perform so well in competition. These athletes do not lose their physical and tactical abilities to perform well, but they are no more convinced of their efficacy. Within this context, the phenomenon of 'training champion' can be explained: A young swimmer, for example, regularly achieved top results in practice. The training conditions seemed to be optimal because the coach reckoned that the athlete's performance improved step by step. The swimmer had no problems with concentration, motivation, etc., and everything was fine in practice. But every time a competition approached, i.e., when the athlete felt the atmosphere of competition, when he saw his competitors and the spectators, he lost his balance. He started to doubt his own abilities and thought that he was not able to perform on the same level as he did in practice. This subsequently led to a performance decrement in competition (Eberspächer, 1990).

This example shows how important it is to practice the assurance of the efficacy of one's own action (self-efficacy) even in difficult situations. Motivation and stability are given only if the athlete, facing internal or external demands, is convinced of fulfilling all demands. Prerequisites for athletes who have stability in competition and show no lack of confidence regarding the effectiveness of their own action is the deep assurance of their own abilities and skills as well as the ability for an adequate assessment of internal and external demands. Also, they have to be convinced that the optimal performance can take place when necessary and can be performed on the optimal level (i.e., at the exact time of demands). In addition, they need the ability to focus on optimal movement and internal organization with readiness for full effort even in difficult and/or demanding situations.

The learning of behavior and action patterns (e.g., special techniques in sports) does not necessarily imply that these patterns are best realized at a definite time. Therefore, it is necessary to build up the subjective assurance of the athlete that the skills and abilities are sufficient to handle stressful situations. It is necessary to improve the assurance of athletes in practice so that all the motorical, technical, and tactical prerequisites learned can be realized under all circumstances. This assurance results from the experienced certainty that

all actions and action possibilities can be efficient in the sense of given goal setting (Eberspächer, 1993). Before constructing techniques which include the goal of building efficacy expectations as direction mentioned above, it is necessary to realize four psychological differences between practice and competition:

1) Situations in competition are not repeatable; they are unique.
2) Situations in competition are always accompanied by a prognosis (consciously or unconsciously), i.e., a forecast about the expected results. This can be clearly seen when the athlete is happy, satisfied, disappointed, or frustrated after competition.
3) Situations in competition always have consequences.
4) The time of performance is set by external events, i.e., the athlete has to fit into the external circumstances and cannot decide for himself/herself when to perform.

The efficacy expectation training can be applied in regular practice (Eberspächer, 1990) as well as in rehabilitation training after injuries (in cooperation with the medical doctors and athletic trainers; Hermann & Eberspächer, 1994). When employing these trainings it is useful to have other people around, because on one hand the presence of others increases the athletes commitment, and on other hand they can support the analysis of action. For the rehabilitation training after injuries, the presence of others increases the security of the injured athlete in case problems should occur.

Using this efficacy expectation training, the exercises, prognosis, and results should be written down so that the athlete is confronted with the achievement or non-achievement of the given prognosis (success/failure). In particular, these trainings are relevant if thoughts disturb the action rather than support it, or when stressful situations in competition cannot be practiced (Eberspächer, 1990).

Prognosis Training

The safest way to avoid psychic stress is to do something first and to set goals afterwards. Thereby, the goal is adapted to the results of action. Using this approach, a person can be sure never to experience any failure, because the goal was always accomplished.

This way of 'practice' seems to be widespread. It can be the only explanation why so many athletes fail in competition. Obviously, they did not take the chance to experience success and failure in practice and, therefore, never had the chance to deal with the consequences. To experience success or failure requires to set a goal first, to act, and to subsequently analyze whether the goal was achieved. If this is not done adequately, a person can avoid the risk, and therefore, the fear of failure (avoidance of the comparison with the goal). On the other hand, the person will never learn how to use counter-measures. The experienced success is simply to fool oneself because the person will never experience himself/herself as the cause of success.

The 'Prognosis Training' (Prognosetraining) deals with the reality that athletes have to deal with differences of situations in practice and in competition. It is based on the understanding that a person can learn to cope with psychic stress, success, and failure in practice only if the goal settings take place before the action. This means, for example, that during test-situations in practice the coach does not simply announce: "We are doing a test. Everybody is to give his/her best." It also implies that the demands and the goals have to be set first (e.g., 10 risky serves in tennis or volleyball, 5 attacks of the offence against the defence in a soccer team). After that, each participant of this test has to give his personal prognosis (e.g., 9 out of 10 serves will fall in the court, or we will complete 3 out of 5 attacks with a goal kick), and that subsequently every participant tries to accomplish the - recorded - prognosis.

As we already mentioned, it is important that the time of performance is set from the outside (e.g., coach) and not from the athlete himself/herself because this reflects situations in competition. Using this form of training, the athletes and coach will learn to cope with psychic stress imposed by themselves, as well as with success and failure, because after each test they can determine whether their prognosis was fulfilled or not. After that, they have to check whether the prognosis was realistic or unrealistic and why the prognosis was reached, not reached, or exceeded. If necessary, the expectancies of the participants can be adapted to a realistic and optimistic level regarding the performance abilities in the next 'Prognosis Training'.

Open Prognosis Training

The 'Prognosis Training' can be intensified by using 'open Prognosis Training' (offenes Prognosetraining). Employing this form, the prognosis will not only be given between coach and athlete, but also will be published in the training group.

For example, in martial arts, the opponent will be told what kind of prognosis was given. A Judoka will tell his opponent before the Randori (contest in practice) that he will throw him down with the right Uchimata within the next 3 minutes. Or, that the defence of a handball team will tell the offence how many out of 10 attacks will be stopped after the offence posted their prognosis.

This form of training is closely related to competition because very often the athletes/teams know with what kind of techniques the opponents are successful or have been successful in competition. With this knowledge, appropriate defence strategies can be provided.

Training of Singularity

Another reason why situations in practice differ from competition is the fact that in practice, the performance can be repeated if it was unsuccessful. In competition, performance usually cannot be repeated. This knowledge of the non-repeatable action in competition may cause very intensive psychic stress ("Do or die"; "If I mess up now I'll have to go home"). Based on this, the 'Training of Singularity' (Training der Nichtwiederholbarkeit) was developed by Eberspächer (1990). This training works as follows: The athlete who wants to check his/her ability to perform on call can act only once, without the option of repetition if failure occurs.

Using this form of training, the coach has to set the time of performance. This is an important aspect of the 'Training of Singularity'. The time of performance determined is defined by outside authorities and not by the athlete himself/herself. This approach is similar to competition where the time schedule is set by external circumstances (e.g., organization, weather, etc.). After being told the time, the athlete has a certain amount of time to prepare himself/herself adequately. Subsequently, he/she has only one attempt to perform. The

athlete will give a prognosis in advance as to the outcome of this attempt. If the attempt fails, practice either continues or is finished immediately if the performance was set at the end of practice. Employing this contest at the end of practice, the athlete experiences positive or negative consequences of the own performance: independently of success or failure, practice will be finished. Athletes who were successful will have a good experience (their next prognosis may be based upon performance enhancement); athletes who failed will have to cope with the consequences of not succeeding. However, according to experience, in particular athletes who failed are very motivated to perform better next time.

Prognosis Training and Training of Singularity with Time Delay

An additional stress factor to the training forms already described is a time delay of performance. For example, the athletes will give a prognosis first, and after that they will have 10, 20, or 30 minutes to prepare themselves for performance.

According to experience, the difficulties to accomplish the prognosis correlate with the span of lag time period. The reason is that during preparation and waiting time disturbing cognitions occur (e.g., negative self-talk) which can irritate concentration on performance and, may therefore, disturb the athletes when preparing for competition.

DISCUSSION

The purpose of 'Prognosis Training and Training of Singularity with and without time delay' is to construct situations in practice which are similar to competition. Referring to Bandura (1977) who pointed out that performance accomplishment is the most important source of building up efficacy expectations, these strategies help athletes to have positive experience in practice. It therefore, will enhance their efficacy expectations which is positively related to performance in sports (e.g., Feltz, Landers, & Raeder, 1979; McAuley, 1985; Taylor, 1989; Weinberg, Gould, & Jackson, 1979). In a sport specific context, Feltz and Riessinger (1990) pointed out that efficacy expectations depend on the own experience. This result supports Bandura's (1977) contention that one's own experience is the most relied upon source of efficacy information.

After applying 'Prognosis Training' and 'Training of Singularity', a discrepancy between the actual value and criterion value will be calculated, i.e., one checks whether the prognosis given was accomplished, not accomplished, or even exceeded. Then it is important to analyze the reasons for the particular performance outcome. If necessary, the prognosis/goal setting has to be adapted for situations to follow. This process enables the athletes to develop a finely tuned feeling for their performance abilities at a specific time which is necessary to avoid mistakes in goal setting which impair efficacy expectations. Obviously, daily practice cannot only consist of 'Prognosis Training'. Without question, the time in practice is also needed to train other goals/skills; it is advisable and efficient to employ the 'Prognosis Training' regularly. However, the efficacy of these training forms is impaired if they are used too often and without plenty of time in between; it is useful to have an interval of a couple of days.

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ANALYSIS OF CASE STUDIES ON PSYCHOLOGICAL TRAINING POSITIVE EFFECTS OF PSYCHOLOGICAL TRAINING IN HIGH LEVEL SPORTS

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Key words: Psychological training, high level sports, positive effects, coaches, athletes

1. INTRODUCTION

The aim of the study consists of showing coaches, athletes and all officials, some practical examples for practical use which make clear which positive effects can be achieved by psychological training.[1] This is because psychological training still means for many people a time-consuming superfluous part of training which is often associated with many prejudices (see GABLER, H.; JANSSEN, J. P. & NITSCH, J.R., 1990).

By using interview data the motives which make psychological training seem to be necessary are analysed. Furthermore the attitudes of coaches and athletes are presented who have already successfully applied psychological forms of training in their general training.

As the whole spectrum of ranges of ability of Olympic champions and world champions to young competitors was considered, differentiated attitudes about the above-mentioned problems can be expected.

In this study the results of the following questions will be analysed:

1. Questions about motives: Which motives were there which caused the coaches and athletes to include psychological training in the general training?

2. Questions concerning effectiveness: How successful is psychological training for the coaches and athletes? Could the problems which caused psychological training be overcome by psychological training being used?

2. METHOD

To answer the questions which are raised in the above-mentioned central themes, 33 guided narrative interviews were carried out with 13 coaches and 20 athletes between March and October 1994.

The results have been obtained by means of statistically calculated data as well as basic descriptive and content analysis.

13 male and female coaches and 20 male and female athletes participated in this investigation (female coach: n=1, 29 years old). The average age of the athletes was 23 years. The male athletes were on average about 3 years older than female athletes.

On average the coaches inverviewed had been active as coaches for 11 years. 77% had been concerned since they started as coaches with problems related to psychological training. The coaches' had trained on average for 7 years together with their athletes at the present level of performance.

1) The study presented here contains parts of the results of a research project which was carried out on behalf of the Federal Institute for Sport Science in Cologne.

The athletes had practised their present form of sport for 10 years on average. The athletes had trained for 3 ½ years on average with their present coach at the corresponding performance level. The average number of hours they worked together with their coaches was 22 hours for the athletes. 8 athletes belonged to the high level, 7 to the medium level and 5 to the lower level of performance. The athletes had applied psychological training on average for about 4 years.

The following 10 forms of sports were incorporated for the interviews:

1. archery	3. badminton	5. hockey	7. swimming	9. synchronised swimming
2. athletics	4. gymnastics	6. rowing	8. ski-jumping	10. tennis

3. RESULTS

3.1. Motives for using Psychological Forms of Training

The first question of the interview was related to the motives for psychological training. Referring to the classification of problem fields in psycho-regulation according to BAUMANN (1993), the main motives which caused coaches and athletes to include psychological training in general training will be presented.

3.1.1. Motives from the point of view of the coaches

Mental Regulation

Mental blockage/Uncontrolled thought process

"The motive was that the female athlete had a one-sided, narrow attitude in some situations. Anger and aggression developed in her and suppressed her objectivity and her overcoming of certain situations."

Limited imaginative ability/Completely inadaquate capability to think of specific forms of sport

"The athletes had difficulties with their rhythm so that we tried with psychological training to achieve a change in ideal steps between the hurdles."

"We wanted to change the technique and tactics in the coordination. The female athlete was intended to adjust herself psychologically, according to the general conditions. She was intended to change her swimming rhythm, was intended solely to imagine a faster time than she can swim."

Emotional regulation

Psychological stress

"With us the motive was mainly coping with stress. The athletes were often too tense. An important point was relaxation training. The following questions were raised: 'How can I relax, how can I get down from a level after a competition, but also before a competition so that I can get rid of pre-competition tensions?"

Lacking self-confidence

"T*he performances of the female athlete increased so rapidly that she had problems coming to terms with it. We had the problem that she had to repeat her performances twice or three times to see that she had actually achieved them and that she could*

achieve them, and that she could even improve on them. She had to convince herself repeatedly that her performances were not merely chance results. The problem was that she had self-doubts and showed early signs of resignation." .

"The motives are to be found in the personality structure of the athletes." ... *"They are not mature enough. We want to make the athletes more professional, so that they can develop personally in many areas. Therefore positive thinking is always integrated into daily training. Thinking positively is a big problem for athletes. Self assurance and self consciousness is not developed sufficiently. We are working hard on that.*

Anxieties
"Our athletes were very nervous. They were afraid of losing, as incorrect thoughts concerning performance were present. This put them under extreme pressure and had a negative effect on their whole performance."

Regulation of the ability to influence psychological processes positively
Limited stamina in concentration
"Our athletes had a very unprofessional attitude with regards to preparation for the match. They had very limited phases of concentration and had not prepared themselves mentally at all."

"The motive was that some athletes were very tense mentally. But if the head is not clear then the whole coordination is completely blocked. They could not concentrate and were distracted too easily."

The exhausting of reserves of performance was named by the coaches, as a further motive without a special problem being present:

Applying mental reserves
"The psychological training intended to assist the general increase in performance levels is used as an automatic part in training. This counts for me not only as a psychological means but also as a training unit."

3.1.2. Motives from the point of view of the athletes

Mental Regulation
Mental blockage/Uncontrolled thought process
"My problem was that I was often angry on the court and became furious. This distracted me completely and I did not concentrate any longer on the important aspects of the game."

Limited imaginative ability/Completely inadaquate capability to think of specific forms of sport
"The rhythm of my movement was not perfect so I just wanted to improve my technique and tactics. The problem was that I could not imagine better coordination, but this had to take place mentally before it can be put into practice. That is why I began with psychological training."

Emotional regulation
Nervousness
"I was always rather nervous, put myself under pressure. As a consequence, I have perhaps lost one game or another."

Lacking self-confidence
"Self confidence was always lacking in me so that the coach decided to talk to the psychologist."

"I had always doubts in myself, listened too much to myself, and believed that my performances were a matter of chance. I could not assess my performance correctly and did not believe that I could manage things, and then I gave up."

Auxieties
"The motive for beginning with psychological training was for me a traumatic experience concerning feared opponents. It was in this situation that I thought I could not beat them."

Regulation of the ability to influence psychological processes positively
Limited stamina in concentration
"I do psychological training firstly because I do not often concentrate and in a competition situation chat with other athletes. When shooting I concentrated too much on other people and not on the event. Then I looked what the others were doing or I calculated the points in the meantime and that confused me constantly."

The exhausting of reserves was named as a motive by the athletes, without particular problems being present:

Applying mental reserves
"If one wants to train professionally to any degree, then one uses all the possibilities which exist. I am a relatively young hurdler, much is underdeveloped, there are weaknessess everywhere. Apart from that there are no concrete problems. I have only started with psychological training to make use of the possibility of increasing performance."

3.2.Effectiveness of Psychological Training Methods

The effectiveness of psychological training, the success of applied psychological forms of training are basic criteria by which the use of psychological training is measured. All the coaches and athletes were satisfied with the application of psychological training carried out so far, although those people questioned expected more from psychological training in the future. How far the problems named in the paragraph 'Motives for using psychological forms of training' could be overcome, which positive effects psychological training had for coaches and athletes, are shown in the following quotations.

3.2.1.Assessments of effectiveness by the coaches

Mental Regulation
Mental blockage / Uncontrolled thought process
"The female athlete learnt to control her emotions by the conscious use of psychological methods. She can focus her perception more objectively on the given situation and has learnt to control and regulate herself. She has become calmer and more self aware."

Limited imaginative ability/Completely inadaquate capability to think of specific forms of sport
"The athletes have acquired the new movement by psychological training very quickly and can imagine for the first time that they can run a faster time. It is important that they

can imagine it at least mentally. Now they believe in it and there are perfomances which they can achieve and they are not unrealistic times. Up to now psychological training was very effective for us. The rhythm is right and the performances have definitely improved."

Emotional regulation

Psychological stress

"An important point was relaxation-training. The athletes can now overcome stress situations or regulate themselves more quickly after a competition and this has proved to be very positive before the game, as well as during a difficult game, or after a game."

Lacking self-confidence

"The female athlete has learnt that her performances had been not only of a chance nature, but that she was really capable of constantly good performance. Psychological training has contributed very much to this goal. The female athlete does not listen so much to herself. Formerly she often doubted her own ability. In cooperation with our sport psychologist she has become much more self-assured and can assess herself much better and more realistically."

"Psychological training has had a positive effect on me personally, and on the group. The athletes have become much more self-confident and we can now communicate quite differently. We learnt to communicate more calmly and to think more positively."

Anxieties

"We relate to thoughts concerning sporting performance quite differently, because we do not put ourselves under pressure any longer. This has a positive effect on the athletes, because it tranfers calmness and avoids negative stress. Our honorary officials do not understand us very well when we say to the athletes: 'We know that we can lose today and we only want 100% performance from you, then it's O.K.'. But the athletes feel much better. Before beginning with psychological training we had very nervous athletes who were afraid of losing. And now one may lose, now one must only play well. We can come to terms with this very well, because the athletes can come to terms with it very well."

Regulation of the ability to influence psychological processes positively

Limited stamina in concentration

"The athletes have learnt to concentrate on the important things in the game. By using psychological training they are much clearer mentally and do not occupy themselves with restricting and negative thoughts, which always led to games being lost unnecessarily, as these thoughts hindered the coordination and the tactical game. Apart from that they have become calmer and less nervous."

"Our athletes prepared themselves very unprofessionally for the match. By using psychological training they can now concentrate much better on the game and the opponent. Their intentions are directed on the important aspects of the game, and they are no longer distracted so easily."

Further positive effects could be named by the coaches, which do not refer specifically to the named motives:

Applying mental reserves
"By virtue of the fact that the athletes learnt from the sport psychologist, quite generally, which possibilities there were, to apply mental performance reserves, there has been an increase in performance in many athletes who have used psychological training."

A step into successful high level sports/In the direction of world class-levels

"If psychological training is used, then it is for the athletes a step into successful high level sport. I cannot say now if it is twenty, forty or fifty percent of it, but it makes high level sport more successful."

"Psychological training has a very important position in the development towards the direction of world class levels. In order to find out the limits of performance ability, one must be able to use many means and methods. This happens on the one hand on the training methodological level, on the other hand on the psychological level. Afterwards one achieves parallels between the methods used. One cannot only follow one of the named methods, but one must simply try to combine the two in a practice-oriented way. Therefore psychology has far for me a high-ranking position. By means of psychological training methods I get into close contact with the athletes in a way which I cannot achieve solely through general training. To set something in motion mentally with the athletes I need a psychologist, who is in charge of the psychological training as an expert. If the specific problems of an athlete are recognised, and if psychological training is carried out, then risks are made more calculable. In that I see a very positive effect of psychological training."

Victories decided mentally
"It is known that victories are decided mentally. Nothing else is possible, as performances in high level sport concerning fitness and technical ability are almost on the same level in our athletes. We know indeed what sort of potential an athlete has. Whether he can make use of it in the game, depends very strongly on how clear his head is mentally. We have achieved the correct mental attitude largely through psychological training. Therein lies the effectiveness of psychological training."

3.2.2. Assessments of effectiveness by the athletes

Mental Regulation
Mental blockage / Uncontrolled thought process
"Through psychological training I have learnt to concentrate on important things in the game. When I notice that I begin to get annoyed again and that there is a danger of becoming distracted, I now know techniques with which I can control psychological problems. This has helped me greatly."

Limited imaginative ability/Completely inadaquate capability to think of specific forms of sport
"As I can very quickly adjust myself to an improved rhythm mentally, I have become much better in performance. My coordination has become more harmonious, my times faster. I would not have achieved this without psychological training."

Emotional regulation

Nervousness

"I can now regulate myself much better and I am no longer so nervous. By using the various psychological methods I have not to put myself under so much pressure, so that I no longer find the game itself so stressful."

"I can definitely say that psychological training has done a great deal for me and I can recommend it to anybody who has weak nerves."

Lacking self-confidence

"I have become more self-assured through psychological training. Because of this I was successful in events which contributed to my self-confidence. In this way psychological training has had a successful effect on my whole personality."

"I now know that my performances do not rely on chance. Because of psychological training I have become more self-assured and do not give up so easily. This has been very successful and if one no longer looks at oneself in the wrong way self-critically, then the training and the event is much more fun."

Anxieties

"I am not afraid of any opponent any longer. By exact psychological training, by bringing out my own abilities and performance I am no longer afraid of the so-called opponent. That is great."

Regulation of the ability to influence psychological processes positively

Limited stamina in concentration

"By using psychological training I concentrate quite differently on the event. I am not distracted so easily, have my rhythm in my head and prepare myself mentally before a competition for the necessary important phases during the competition. I do not allow myself to be distracted so easily any longer. In this respect psychological training has meant for me a lot of positive effects."

Applying mental reserves

"Psychological training can be part of success in improving performance, if one is in the area of extremes." ... "And even if it only makes available half a percent of performance, it is then meaningful. One would be stupid if one did not use it."

4. DISCUSSION AND CONCLUSIONS

In this study, by using questions from the coaches and athletes interviewed, positive effects for psychological training and the appraisals of effectiveness of psychological training are described. These motives were the reasons why coaches and athletes were more intensively concerned with the psychological questions raised.

The quotations make clear that there are various motives for the use of psychological training. These are important reasons to make use of psychological forms of training in general training. From the point of view of coaches and athletes, the motives were partly the imbalance in the regulation of self-control. In addition to this, other reasons were disturbances in attention and concentration. These difficulies result from a lack of coping with psychological problems in stress situations. On the other hand the reasons are to be found in an adequate self-assessment on the part of the athletes. Coping with fear of

opponents was no less a reason for some athletes to begin with psychological training. Furthermore psychological forms of training are used to achieve a technical, tactical improvement of performance, without psychological problems being in the foreground. But not only actual problems can be extracted from the named motives, but also the use of reserves of performance, the integration of psychological training as an integral training unit into general training to improve performance and personality development. These motives were pointed out by the coaches and athletes.

By means of psychological forms of training many of the above-mentioned problems could be overcome or reduced. The study shows that positive effects concerning the action-related and action-regulating emotional and cognitive processes can be achieved by psychological training. Anxiety and negative stress symptoms could be coped with. By the improvement of imagining movement or plans of action, improvements were found in movement coordination with which an improvement of performances was associated with success in the specific sport discipline.

Psychological training is for the coaches and athletes interviewed, a contributory factor in successful high level sport and is seen as a supporting measure for the development of athletes on their way to the world class level. It becomes clear that over and above success in sport, the whole personality structure is influenced positively and the psycholgical intervention has a positive effect on the relationship between coach and athlete. Finally, psychological training has been attributed to a high degree of effectiveness in high level sport, as here the physical as well as technical and tactical performance ability are very closely related and often the optimal mental attitude is decisive for success.

The findings of this study show very clearly that coaches and athletes place very great importance on psychological training in the areas of top senior athletes and junior athletes. If one analyses the motives in the form of quotations which caused coaches and athletes to make use of psychological training and the corresponding assessments of effectiveness, then it becomes very clear that definitely positive effects could be achieved by psychological training amongst coaches and athletes.

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THE EFFECTS OF DYNAVISION TRAINING ON HOCKEY GOAL-TENDERS' PERFORMANCE

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KEY WORDS

hockey, goal tender, save performance, Dynavision training, perceptual-motor training

INTRODUCTION

Research has demonstrated the importance of visual skills and abilities to athletic performance (Morris, 1977; Ripoll, Kerlirzin, Stein & Reine, 1993; Helsen & Pauwels, 1993; Leibowitz, 1968), and has also shown that such capacities can be improved using various types of visual skills training programs (Revien, 1987; McLeod, 1991). The present study continued the research of a previous study by Klavora, Martin, Weston & Gaskovski (1995), which examined the effectiveness of Dynavision training for improving the puck-stopping performance of ice hockey goaltenders. The results of this previous study were promising, although not statistically significant, and it was suggested that several changes in methodology could induce greater training effects in the experimental subjects. To address these recommendations, the present study: (1) used a longer Dynavision training program and a more intensive and varied Dynavision testing protocol; and (2) used improved and more controlled testing procedures. With these modifications, it was hypothesized that Dynavision training would generate significant improvements in the save performance of amateur hockey goal-tenders.

METHOD

Subjects Eight university-aged students (mean age=22.12 yrs.) participated in the study. Equal numbers were assigned to experimental (n=4) and control (n=4) conditions, with two males and two females per condition. Three subjects played hockey for varsity teams and five subjects played intramural-level hockey.

Apparatus *The Dynavision*: This Dynavision apparatus was designed to measure and train visuomotor reactions and coordination, peripheral visual awareness, and general attentional skills in athletes. The training area of the Dynavision measures approximately 120 cm by 120 cm, in length and width, respectively (see Fig. 1). It weighs 130 kg and must be wall-mounted. The training surface houses 64 small square buttons, each button being illuminated by a small light bulb, arranged in a pattern of five rings. The objective of the task is to locate an illuminated button and strike it with the hand as quickly as possible. After each hit, another button will

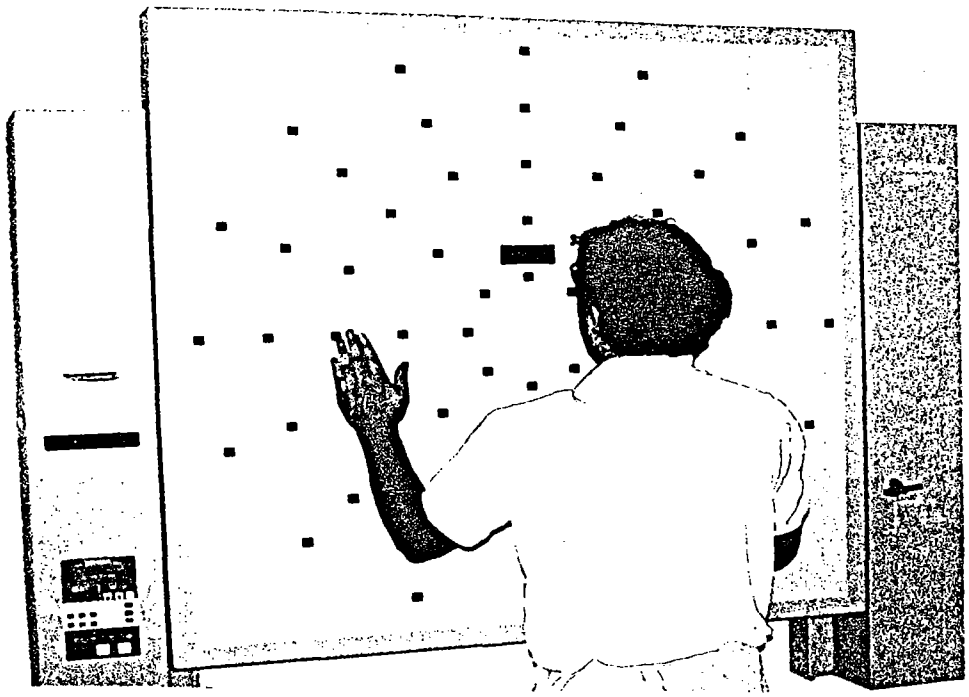

FIGURE 1. A Dynavision User.

randomly illuminate; this continues for the duration of the exercise. A successful hit is acknowledged by a beep signal. The total number of successful hits within a given exercise is the main performance variable and is recorded by the apparatus.

Exercises can be of various durations: 30, 60, and 240 seconds. A computerized display panel and a printer are built into the side of the apparatus and provide immediate performance feedback to the subject. A light-emitting diode (LED) display is positioned just above the centre of the training surface. It can display up to seven computer-selected random numbers every five seconds for preselected exposure periods, i.e., from 0.01 to 1.0 sec. The user can be instructed to call out the digits displayed, as well as perform various computations, e.g., addition and subtraction during a button-striking task, thereby increasing the complexity of the task. The board is vertically adjustable to accommodate users of different heights. For most efficient use of the board, a darkened environment is preferred.

A study conducted on the Dynavision apparatus (Klavora, Gaskovski & Forsyth, 1995) has found the board to have a high test-retest reliability, with intraclass R correlation coefficients ranging from .88 to .97, and paired correlation coefficients ranging from .74 to .92.