Ball-Shooting Machine: The apparatus is a Prince tennis ball-shooting machine, capable of firing tennis balls at speeds of up to 110 km/h, and displays excellent consistency of shooting.

A screen affixed to the front of the machine concealed the machine and the direction of the barrel. An opening cut into the screen allowed fired balls to pass through, although it was covered with ribbons so that the direction of the shots could not be anticipated.

The Hockey Net and Targets: The face of a regular hockey net was covered with a tarpaulin, with the four corners left open. These open corners, measuring 35 cm by 35 cm, served as the targets.

The hockey net was positioned five metres (5 m) from the ball-shooting machine, ensuring that the relatively light tennis balls retained their velocity by the time they reached the targets.

An area measuring 1.0 m by 1.25 m was taped to the floor directly in front of the net and served as the Goal-tender's starting location.

Design of Study and Procedure *Design:* The study was a multiple-trial repeated-measures design (Schultz, 1989). Subjects were tested on their ball-stopping over six occasions (T1 to T6). The pre-test (T1) and the post-test (T6) consisted of three testing sessions on three separate days. Four tests (T2 to T5) occurred every eight days, after every five treatment sessions, over the six-week treatment period. During the treatment period, experimental subjects engaged in a program of Dynavision training (described below), whereas the control subjects did not. The analysis was made with a one factor (time) repeated option (MANOVA) in general linear models (SAS, 1986).

Ball-stopping test: The testing was performed in the Motor Learning Laboratory of the School of Physical and Health Education at the University of Toronto. Subjects wore only partial equipment, i.e., pads, blockers, gloves, a helmet, and a stick, but did not wear a girdle or jersey. Running shoes rather than skates were worn as the testing took place on a tile floor. Although these factors rendered the present procedure somewhat less sport-specific, the subjective feelings of the participants indicated that partial equipment was sufficient for use in the test procedure, and would not result in a misrepresentation of their save performance abilities.

The test entailed a warm-up of ten shots, followed by forty test shots fired randomly at the four target corners of the net (with ten shots per target). To allow goal-tenders to recompose after each shot, tennis balls were fired at four second intervals. A one minute rest period was granted after every 10 shots to allow recuperation.

Ball-firing Speed: To accommodate the differences in skill level, the firing speed of the tennis balls for each subject was determined in the following way: a series of ball-firing tests was used before actual testing began to determine the speed at which each goal-tender could save

approximately 50% of the shots. This speed was recorded and used on all subsequent testing occasions for that particular goal-tender. The ball-firing speeds ranged from 52 km/h to 67 km/h.

The dependent variable was the number of balls saved (save performance) per 40 shots.

Dynavision testing: All experimental subjects were tested on a basic Dynavision exercise that required the rapid visuomotor targeting of flashing light stimuli. The dependent variable was the number of targets struck ("hits") within a 60-second period; the greater the number of hits, the better the performance.

Dynavision Training: The training program occurred over a six-week period, consisting of 24 sessions, with four sessions of training per week. Each session consisted of about 20 minutes of actual training time per session. The training involved 20 to 25 different exercises on the Dynavision apparatus that imposed demands on visuomotor coordination and speed, peripheral visual awareness, and multi-task attention. All of the experimental subjects used the same exercises, although minor variations were introduced to accommodate subjects of different skill levels.

RESULTS

Table 1 provides a summary of mean results for experimental and control subjects: save performance and Dynavision hits for six tests. Using a repeated-measures MANOVA to assess the trial comparisons over time shows a significant difference for total saves ($F_{1,5} = 16.30$, $p <$

TABLE 1. Summary of means and standard deviations of experimental and control subjects across six tests.

Test Variable	Group	Tests					
		Pre-Test T1	T2	T3	T4	T5	Post-Test T6
Save Performance (No. of saves)	Expt'l	18.3 (4.43)	19.3 (3.86)	20.8 (4.86)	24.3 (4.86)	25.7 (2.89)	28.7 (2.08)
	Control	19.0 (4.97)	18.8 (6.60)	21.5 (2.89)	21.0 (6.22)	20.5 (7.59)	20.8 (7.93)
Dynavision Performance (No. of hits)	Expt'l	107.8 (21.27)	127.0 (17.36)	140.3 (19.03)	142.8 (16.88)	135.0 (10.14)	142.0 (12.29)

.01) and a significant time difference for total goals saved ($F_{1,5} = 4.40$, $p < .005$). A paired t-test indicated that the overall number of balls stopped by the experimental group improved significantly over the pre- and post-test ($t = 4.54$, $p<.05$), whereas the overall change in the control group showed no significant difference. The pre-test differences between the two groups in goals saved were not significantly different (see Figure 1), suggesting comparable performance levels at the outset of the study. An analysis of ball-stopping performance in specific target corners of the net revealed no significant overall F-values for both groups of subjects.

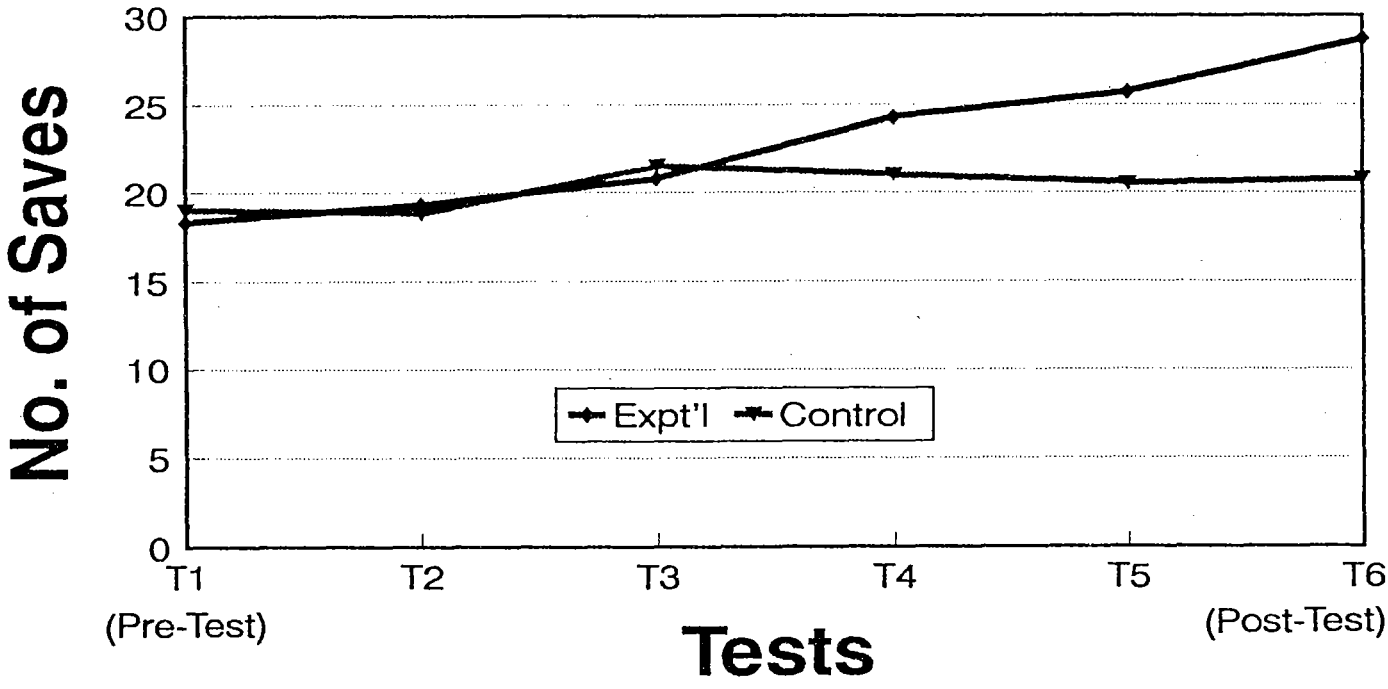

FIGURE 2. Mean Save Performance Across Six Tests for Experimental and Control Subjects.

Mean Dynavision performance for the experimental group only showed a trend towards improvement from 107.8 to 142.0 hits between the pre- and post-tests.

DISCUSSION

The save performance of the experimental group significantly improved following a six-week program of Dynavision training, in the absence of any such improvement in the control subjects.

The improvements in save performance of the experimental group was demonstrated after approximately 12-14 Dynavision training sessions, i.e., after the third test, T_3. These improvements continued throughout the experimental treatment period. In comparison, the save performance of the control group remained virtually unchanged across the last four tests, i.e., T_3-T_6. These findings confirm and improve upon Klavora et al.'s results (1995), and corroborates the conclusion that Dynavision training may improve the save performance of ice hockey goal-tenders. The significant results can be attributed to the fact that the present study was built upon the methodology of Klavora et al. (1995), taking into consideration the recommendations made as well as implementing other methodological strategies. Most significantly, the present study implemented a Dynavision training program that was longer, i.e., six weeks in duration, consisting of four sessions per week, for a total of 24 sessions; each session consisted of more intensive training consisting of approximately 20-25 minutes of actual training time. In the previous study by Klavora et al. (1995), training took place over a four-week period, involving four sessions per week, for a total of 16 sessions; each session consisted of 15 to 20 minutes of actual Dynavision training. The greater intensity of training and longer program in the present study could have been responsible for the training effects observed, because in the previous study (Klavora et al., 1995), training ended just after the point (16 sessions) where training effects became evident in the present study (12-14 training sessions).

Several methodological changes may have also contributed to the results of the present study. The following improvements in were made from the earlier study by Klavora et al. (1995) to the present study: (1) the ball-stopping tests took place in a laboratory setting rather than a hockey range, and therefore on a tile floor rather than on artificial ice; therefore the subjects wore athletic shoes rather than skates which improved the subjects' mobility as opposed to the use of skates on artificial ice; (2) the subjects wore only partial equipment, i.e., pads, a blocker, a glove, and a helmet, but they did not wear a girdle or jersey, which reduced the heat discomfort experienced at room temperature; this was a problem in the earlier study by Klavora et al. (1995); and (3) the speed of the balls was specific to each goal-tender, whereas it was fixed at 60 km/h in the previous study (Klavora et al., 1995), which may have placed some subjects at a disadvantage, depending on their particular skill level. Despite the modifications of the present methodology from the previous study by Klavora et al. (1995), all of the subjects indicated that the conditions and equipment used were satisfactory for ball-stopping tests and that this would not result in any significant misrepresentation of their actual save performance abilities.

The present and past studies differ only in the amount and intensity of Dynavision training given to subjects and in the degree of testing precision, suggesting that one or both of these factors was responsible for the present findings.

In summary, the present study found support for the original Klavora et al. (1995) hypothesis that Dynavision training may improve goal-tending performance. Future research should further explore the specific psychomotor skills improvements that mediate the goal-tending performance improvement, and should also investigate the potential for Dynavision training transfer effects to other sports and athletic activities.

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PECULIARITIES OF APPLYING THE HYPNOTIC SUGGESTION IN THE PREPARATION OF ATHLETES FOR COMPETITIONS

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Key Words : Hypnosis, Suggestion, Setting, Creation, Sense, Right cerebral hemisphere, Left cerebral hemisphere.

Introduction

Sport of top-class results is a unique social phenomenon, providing unforgettable emotional experience for humanity that cannot be done by any kind of our activity. However, at present there is a danger of turning big sport into the competition between the technologies of applying doping which ruin athletes' health. Our research is aimed at perfecting the unmedicamentous stimulators which are safe for athletes' health. In our opinion hypnosis and suggestion, self-hypnosis and self-suggestion may be such stimulators. We consider autogenic training and meditation as a kind of self-hypnosis.

In the course of studying this problem we took into account its moral and ethical aspects which had been repeatedly debated in scientific works, particularly, in the papers on psychoanalysis.

Why are we speaking about hypnosis ? After hypnosis or a course of hypnotic suggestions in particular, an examinee noticed infrequently enhancement of working capacity and creative productivity, upsurge of emotional abilities, greater interest in the surrounding world in all its manifestations. Even without special theraputic directness can hypnosis improve self-feeling and psychic state without any negative effects (Rothenberg V., 1985). Such properties of hypnosis can be used in psychotherapy and in the preparation of athletes as well. This is particularly effective for those athletes, who perform worse results at competitions in comparison with ones at trainings.

On the base of the published data in works we proposed

and proved experimentally that effectiveness of hypnotic suggestion and self-suggestion depended on the oral formulae of suggestion (Kulakova El., Bassiuni M., Chernikova O., 1980; Kulakova El., 1982; Kulakova El., 1983). We have proved experimentally positive action of the specific formulae of self-suggestion on the secretion of chatecholamines and sports results with young gymnasts (Kulakova El.,Bassiuni M., Chernikova O., 1980).

Experimental researches showed that during the hypnotic trance activity of the right cerebral hemisphere and the left cerebral one was levelling simultaneously with curbing activity of the left hemisphere (Rothenberg V.,1985). Modern data about the functional asymmetry of the brain's hemispheres enable us to comprehend the mechanisms of activation by means of verbal instruction, imagery thinking (right hemisphere) and inhibition of the logical thinking (left hemisphere), which cannot solve a goal in lack of time (Raikov V., 1983). But the educational abilities of most people make them explain everything firstly proceeding from logic or staged counting. Logic is subconsciously considered to be as a more reliable way of taking a correct decision and so the right hemisphere remains passive and does not develop.

Thus in order to settle athletes for a competition it is necessary to achieve harmony in the operation between the right hemisphere and the left one, and therefore the hypnotic suggestion must be aimed at forming creative attitude to the process of sports contest and not to gain a victory itself. And such a hypnotic suggestion means"the sensible setting".

What setting means? The setting is an integral state of a subject's readiness to act in a definite way for satisfying his needs. The level of the setting regulation is a result of subconscious psychophysiological activity, which cannot be almoust corrected in the process of activity (Raikov V., 1983).

Developing his theory from a standpoint of "the theory of activity" Asmolov A. (1975) proposed to distinquish such levels of the setting regulation of activity as (1) operational, (2) purposeful, (3) sensible. Besides he distingu-

ished the psychophysiological level of realizing settings.

Operational setting is a lower level of the regulation. It arouses when the only operation of action dominates in a subject's consciousness and not final result of activity at the given moment. Such a setting limits his activity within the past experience, connected only with the given concrete situation. And a subject is only percieving it at a given moment ignoring new elements (e.g. in chess, a player does not take into account the personality's peculiarities of his opponent).

Purposeful setting arouses in a subject's consciousness when a long-term purpose dominates, e.g. to win a game or a tournament for a chess player. He needs the only thing to be attentive, think over each combination carefully and comprehend the parameters as many as possible to take a correct decision at game. Such a setting makes a player be mistaken and exceed his time.

Operational and the purposeful settings are formed at the level of operating the left hemisphere and they are not a higher form of regulating a subject's activity.

Sensible setting is formed due to stiring up not so much perspective aim of activity as its sense -in the subconsciousness - "sense of life is in just life itself", sense of game is in just in game itself, sense of duel/contest is in just duel/contest itself. Athlete must be aimed at finding pleasure in the course of game or duel/contest.

The sensible setting of athlete is his inclination to creative attitude to the process of game or duel/contest. It does not bear a burden of personality's vanity in comparison with the purposeful or the operational ones directed to achieve intermediate or promising aim.

Creative potential is usually connected with functioning the right hemisphere (Rothenberg V., 1985). The distinguishing peculiarity of the right hemispherical, spacial-imagery thinking is the ability "to capture" swiftly all the operating channels ensuring perception of the surrounding reality. At the same time separate properties of images interact immediately with one another in many sensible aspects and as

a result of this a chess player or a fencer do not feel the necessity to count variations on scoring a goal - e.g. creative activity in lack of time. In this case a goal is scored by itself. This may be considered as intuition as it occurs at the level of subconsciousness (Kulakova El.,1983). Besides during the activation of the right hemisphere athlete is experiencing "the upsurge of emotional abilities" (Rothenberg V., 1985; Raikov V., 1983), that in its turn is of no small importance for effectiveness of the creative process.

With persons the absence of the sensible settings is a result of inborn and formed domination of the left hemispherical and logic token thinking. The left hemisphere operates originally for analysing the surrounding reality and distinquishing more essential ties for solving goals, ignoring sense of a situation and a subject's activity. There is the opinion that the domination of the left hemisphere diminishes tolerance for stress.

Objectives, methods and the order of research

Our research was aimed at substantiating rightfulness of the proposed hypotheses namely :

1.athletes with somehow formed sensible setting before the competitions perform better sports results in their sports carier than those with whom the operational and the purposeful settings are formed,

2.hypnosis and hypnotic suggestion, aimed at forming the sensible setting, make it possible to better sports results at the expense of triggering the right hemispherical spacial-imagery thinking,

Objectives

they are to :

1.determine the qualitative peculiarities of settings in dependence on athletes' qualification,

2.check up effectiveness of the sensible settings, formed with athletes on the base of hypnotic suggestion in their com-

petitive activity.

Research methods

We used the following methods in our done work : 1.special questionnaire, 2.observance over the game actions of chess players, 3.interview with chess players after after giving up their sports carier, 4.conversation with chess players after giving up their sports carier, 5.analysis of the scientific-methodical works on chess, 6.analysis of biographical and memorial sources, 7.analysis of results of the researched activity, 8.laboratory experiment, 9.experiment in applying the hypnotic suggestions.

Method of the laboratory experiment is a basic one in the given research. It was used at the Institute of Physical Culture in February 1988 and the Children sports school under the Chess Club named after Petrosyan T. in March 1988. The examinees were the students of the Chess chair (1st. grade and Candidates to Master of Sports) and the trainees of advanced course (the same sports qualification). The scheme of the given experiment was based on general principles of the "setting" experiments, sunstantiated by Uznadze D.N.

Procedure of suggesting the sensible setting by means of hypnosis

Seven competitive chess players of the Advanced Chess Coaching school were present in the study where the first post-hypnotic suggestion was conducted. This suggestion was aimed at adjusting highly qualified player Irina Umanskaya to the match virsus Crand Chess Master Vaganyan A. in the All-union joint men's and women's tournament in May 1991. At Irina's request hypnotic suggestion was made on the eve of this match. Everybody agreed to be brought into the hypnotic trance on the base of the autogenic training by suggesting warmth, heaviness and relaxation in the entire body. All the seven examinees, including Umanskaya I., were brought into the state of hypnotic trance, when man was known to hear and remember, but he

could not open his eyes himself, raise his arm etc. So all the seven examinees were witnesses of such a suggestion made at their presence. Besides they estimated a level of the game - Umanskaya vs Vaganyan as experts, applying the ten point system.

A desire to play chess tomorrow at 6 p.m., a desire to play, compete vurses Vaganyan, a feeling of joy and pleasure, derived from the game and the competition vs Vaganyan, upsurge of might and vigour were suggested to Umanskaya I.

Oral formulae of words, recommended usually in the manuals on psychoregulations, were suggested to her : "You will be absolutely serene in the course of a game", "You will be confident in yourself", "You shall defeat Vaganyan".

Similar suggestion was made to a fencer one week before the All-union competitions at request of his coach.

Results of the laboratory experiment

We have determined three groups of examinees, differing from one another on a level of the setting regulation of activity : 1 st.group characterized by the sensible setting for chess game. Here belonged highly qualified youths with eight year training length; 2 nd one included mainly the girls, who had used the purposefull setting ; 3 d group included the examinees of lower sports grade, who had used the operational setting.

Some dependence of manifesting the phenomenon of setting on examinees' individual peculiarities was determined as a result of researches.

Sensible level is a leading one and of more effective level of the setting regulation.

Results of suggestion

All the participants of our experiment, including the coach of Umanskaya I.and many chess experts ascertained Irina's best game vs Vaganyan despite her defeat, she played really much better. After that her sports rating became higher at

national and international levels. Due to such a game she was entitled to compete at international matches of Grand Chess Masters. Besides in a week Irina took the 2 nd place at the International tournament (Yerevan) and fulfiled the standard of Master of Sports of International class. Then she fulfiled this standard again in a week. Her 4 th place at the CIS championship may consider as good result.

It was necessary to note that some personality's changes had occured with Irina in her opinion. She felt herself uninhibited and emancipated in the chess matches and her life. A desire for more careful thinking over each move extinquished somewhere and she relied more on her intuition.

The fencer achieved greater success too. He won a semifinal bout defeating a stronger opponent and reached finals that had been planned by his coach. After the bout this fencer said that he had a feeling that his opponent was moving too slowly during the bout and he managed easily to anticipate the opponent's intended actions, and before the last touch he had seen a luminous spot on his opponent's shoulder and gave touch in this spot. Until nobody can explain this phenomenon, but the cases of manifesting the clairvoyance after hypnosis were described in works.

Both examinees feel well 1,5 year later and perform good sports results.

Discussion and conclusion

Proceeding from the results of our research we recommend to coaches to form the sensible setting for chess activity with players from the very beginning of their preparation, i.e. consolidate their interest in the process of game and not directly in victory at the level of subconsciousness. In our opinion it is difficult to realize this as in sports chess the competitive aspect prevails after all. Nevertheless it is necessary to teach young players first of all to overplay opponents than to defeat them, although this regulation cannot express the sensible setting completely. We should remember the following : promising athletes are considered to gain

victories due to the sensible setting, but they do not often realize it and of course their coaches likely to know this.

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MENTAL TRAINING FOR TABLE TENNIS PLAYERS AT A NATIONAL LEVEL

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Key Words : tennis table, stress management, mental training

INTRODUCTION

This study investigated the effectiveness of a cognitive-behavioral intervention in reducing competitive anxiety in a group of 25 young tennis table players at a national level, part of the Ile-de-France area. The coaches needed to deal with a lot of pre-competitive anxiety problems that dramatically affected the players performances during the tournament. Psychological techniques are not part of the coaches' training in France, they felt that they were deprived in this field and that is why they decided to contact a sport psychologist. The first year was experimentation and the mental training program was carried out between January and March 1994, until the French championship. The first conclusions, drawn at the end of the program, was planned to be the basis of a long term intervention.

PSYCHOLOGICAL ASSESSMENT

Tools used

During the first meeting, they were told that the assessment was not looking for psychopathology, but as a mean to figure the individual's program through identification of current or potential problem areas. Assessment was based primarly on interviews and psychological inventories. The scales have been carefully selected to give quick but reliable information on emotional, relational and behavioral levels. Emotional and behavioral sets were assessed by utilizing the State-Trait Anxiety Inventory (Spielberger, Gorsuch & Lushene, 1970) and the Behavioral Stress Adaptation Questionnaire (Bortner, 1969). The Personality Inventory (GPP-I) from Gordon (1982) also gives information about emotional stability together with relational and behavioral data. For the relational level, Assertive Behavior Scale (Rathus, 1973) was also used. To assess the cognitive style, Group Embedded Figure Test (EFT) (Witkin, 1971) which determines the Field-dependance/independance dimension was chosen. It distinguishes people according to their capabilities to adopt to an analytical point of view in problem solving.

Two weeks after the administration of this test battery, I met each athlete to discuss with them the results of his/her profile and at the same time, to conduct the interview in order to get more information about their strenghts and weakness and their needs for mental training. The questions were partly inspired by the Orlick's work (1989) that point 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 gave 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 told us what he/she had already done well. 3) What did he/she do during his/her worst performance ? It is a good indication of behaviour, thougths and focus he/she needed to be aware of and try to avoid.

Results of the evaluation

- A small number of the players found themselves with goals already well-defined, probably because they were young and not yet completely involved in a high level practise. Therefore they found it difficult to do a self-evaluation.
- Most of the players appeared field-dependant at the EFT test .That usually affects the tactical aspect of the game. A specific study of this relation should be done in the future.
- Pre-competitive anxiety was the problem that was most commonly shared by the players. A lot of the players did not know how to cope with this and often missed their matches.
- Some of them were also characterized by an emotional and behavioral instability which was expressed in anger or difficulties to concentrate.
- Others found it difficult to wake up before a match and needed to be more dynamic ; they were too slow in their movements and their reaction was too slow during a match.

MENTAL TRAINING PROGRAM

Organization

It was decided to focus on the program of stress-management skills for dealing with pre-competitive anxiety. It was structured into 8 sessions where intervention strategy was administred every two weeks within small groups of players. Five players of the 25 decided not to be involved ; two were living too far away to come to the sessions on a regular basis, the others were not motivated.enough For the 20 players left, the sessions were conducted every two weeks over a period of 3 months (January to March) with the exception of an interruption of 3 weeks during the February holiday.
Six players dropped out from the programm before it ended for various reasons : one player did not want to interrupt his training (the mental training was conducted during the time of the tennis table training) ; another stopped the competition because he was not successful ; four missed the last

sessions because of various material difficulties.For these six players, the attitude of the coach towards mental training was not very positive. This is probably the most frequent reason, for the "drop out" of mental training. The athlete prefers to follow the recommendation or the feeling of his/her coach than to be in conflict with him.

Fourteen players participated in the whole program. One month after it ended, 12 players again took 3 psychological tests in order to evaluate the efficciancy of the program : STAI, Rathus and Bortner.

Because of the number of athletes involved, the sessions were organized in small groups of 2 or 3 players. However, some players were seen individually, when faced with personal difficulties (familial problems, drop of motivation, etc.). Following these problems, I sometimes met with the family.

Even, if it is important to work on an individual basis, the group sessions were found to be very positive. It is important to take into account group dynamics in the individual modifications. Sharing with peers, their sensations during relaxation or visualization was a means to re-inforce adherence to the program, as was shown elsewhere (Larsson, 1988).

Methods

The program included relaxation, imagery rehearsal and making positive self-statements :

- Progressive Relaxation modified from Jacobson was used. 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. During the group sessions, they learnt two methods and were asked to repeat the first one each day during the first week, and the second one each day during the second week. After 6 weeks, when they had got the "relaxation response" (Benson, 1975), they learnt to use it when they felt situationally tense, just prior to a competition. At this moment, the sensation of relaxation can be mentally recalled within just a few seconds. The relaxation response was also integrated into the four-stages between-point models (positive physical response, relaxation, preparation and ritual) according to James Loehr (1993) in order to avoid stress and precipitation. During the relaxation sessions, they also learnt how to control the breathing linked to calmness and how to quickly obtain it in a stress situation. Synchronizing this breathing out with relaxing the muscles was used as a key signal to get the sensation of relaxation prior to a stressful situation. To reinforce the effects of relaxation, they were taught to find one or two sentences meaning calmness for them and to repeat it at the important time.

- The second part of the sessions were dedicated to imagery training, very important in table tennis because the tactical part is primordial (Feltz & Landers, 1983). Some players were already pratising imagery spontaneously but without reaching its full potential, however, most of the time, the athletes had never really used this way of training. We spent the first sessions improving their visual and kinaesthetic imagery. The goal of the training was to use as many of the five senses as possible while producting an image. This is important, particularly in light of the findings of Orlick and

Partington (1988) who found that successful Canadian Olympic athletes had developed very well the imagery skills and that these skills involved an inside view, as if the athlete was actually doing the skill and feeling the action. When, this capacity was better, we began mental rehearsal, involving praticing as a visual image a technique procedure or a tactical shema in one'mind. They were asked to practise this technique every day, for 10 to 15 minutes in order to be helpul. This duration was increased when the athletes could not physically practice (injury, school examination.), or for the preparation of a specific event. As for the relaxation, they learnt to use this technique to improve their confidence just before a match. During the sessions, they choose one or several images from the past where they had been successful, and they were taught to use these images before the competition to improve their sensation of readiness. The rehearsal of technical or tactical procedure was introduced during the routine between the points in order to prepare the following action and be concentrated (Loehr, 1993). In the same purpose, they choose a sentence which meant confidence for one'self and learnt to repeat it at the appropriate time.

A part of each session was also used to discuss their goals and to evaluate themselves. The focus was put on short-term task specific goals dealing with specific training programs, for example, physical condition or technique skills. These goals were written down to help them to remember and to help in their assessement.

To help them to work on their own between the group sessions, they were given a specific relaxation and visualization tape and the different sessions written down to help them to remenber what they had to do and the schedule. They are asked to write in a journal everyday what exercises they had done, which progress and which difficulties they encountered. At each meeting with them, I could answer their questions without loosing time and eventually adapt the techniques.

Specific psychological skills were also taught according to the needs of each players :

- several concentration exercices were practiced based on breathing, meditation, attention shift from external cues to internal cues and back and self-talk. Some of these exercices were often introduced in the pre-competition routine or into the four-stages between point models.

- When the athletes suffered from cognitive anxiety, I used cognitive restructuring to help them to think more positively, and reduce the number of negative statements relating to performance (Beck, 1970). Point out the relationships between negative statements and performance deterioration helped these young athletes to be aware of this mental process that they often ignored. Each of them choosed after specific realistic or positive statements, to take the place of the negative ones. Usually, the athletes choose one or two positive affirmations, and one or two statements suggesting calmness and use them when needed. These sentences often become part of their pre-competition routine.

- When the players found it difficult to be correctly aroused, they were taught different methods : listen to a rythmical music before a match, visualization of a dynamic image of game, visualization of a symbolic image like an animal , active statements, etc.

The small group was also a means to enhance communication skills. Because table tennis is an individual sport, the players are not always very cooperative. This bad climate has conducted some

players, especially the girls, to stop the competition. When they continue, they do not train with a sufficient enthusiasm. The players need to understand that they have to cooperate in order to raise the level of the team and to have some fun practising. It is what Jerry May (1987) calls "Cooperative Competiveness". Being supportive of one another can actually enhance an athlete's success. During the group sessions, the players could share with the others their feelings of facing to a stressful situation and what was their progress in coping with such a situation. Doing this, they realized that they were not alone in these difficult situations and therefore supported the others.

After, four sessions, exercises to do before and during a competition were introduced. Everybody choose according to his/her own characteristics the best exercises among the different they had learnt (image, self-talk, relaxation, breathing, etc.) and the moment it was better to use it (just before the match, between the points, when they were close to winning or on the contrary to loosing).

The last three sessions were mainly focused on the preparation of the French championships. What they had learnt was adapted to this particular situation.

Evaluation of the program

It is vey difficult to assess the efficiency of a program outside an experimental framework. Moreover, psychological interventions are included in a general training are difficult to analyse. We can, however, take into account different criteria :

- Performance enhancement is often considerate. In table tennis, unfortunately, the performance is not only dependant of the player but also of his/her opponent. Technical and tactical criteria are moreover numerous and combine with each other. It is possible to try to enhance a precise skill, like the service and to evaluate as Noël (1980) in tennis, the proportion of successful first and second balls. But it looks reducing in front of the complexity of the game. This program was supposed to be more educative over a long term. We cannot change the preparation of an athlete in such a little time. Three years is the minimum according to Orlick (1989) to allow the athlete to feel confortable with the strategies he has learnt. Therefore, influence on performance cannot be so quick. It is why we did not build a precise protocol of evaluation.

- During the competitions following the program, no spectacular performance was recorded. Some players appeared less anxious but they were faced with some other difficulties : technical or tactical. Performance is linked to several factors (physical, technical, tactical, biomechanical), mental improvement cannot help everything. The players and the coaches need to understand that and not to use the stress to explain every problem.

- Beside the results, behaviour changes were recorded by the coaches during the competitions.. Important modifications was noticed for 4 players : they were more lucid at facing difficulties, more motivated and positive, and less tense. Less dramatic changes were found for the other players.

The evaluation made of 12 players one month after the end of the program, explained partly these results : the exercises they had integrated could explain the change in their behaviour. The number of players practising the following exercises are put into brackets : - Specific breathing during the match (9) - Successful or confident imagery to help to risk taking (7) - Tactical or technical imagery (7) - Concentration on the ball (6) - Positive self-talks (4) - Relaxation, image of calm (3).

The players who had changed the most in their way of preparation were the most anxious at the beginning of the program as shown in the results of the psychological tests. Three tests regarding anxiety and stress sensibility were taken again by 12 players one month after the end of the program. For all the players, no modification was noticed. If we only kept in the analysis the 6 more anxious players, the results are significant for pre-competitve anxiety ($p<.02$) ; the score decreases by 15 points in average for pre-competitive anxiety (from m=59, sd=9,3 to m=44,8, sd=8,9). The players who were more anxious at the beginning are the ones whose anxiety diminishes as shown by the results of the correlation anxiety state/decrease of anxiety ($r=0.6$) for the twelve players assessed. It appears quite logical since a stress management program is drawn first for the anxious subjects. These results are close to Crocker 's (1989) study who, assessing six months after the efficiency of a stress management program, for volley ball players, he found more long-term results on the women (decrease of anxiety, modification the inner dialogue) who were more anxious than the men at the beginning of the program. Comparing two different programs according to the type of anxiety (cognitive or somatic), Maynard and Cotton (1993) showed also that the programs were more effective for the more anxious subjects. This decrease of anxiety is not always linked to a performance enhancement. For some subjects, anxiety is motivational and allows for the contrary to increase the performance. Crocker (1989) precised that the anxiety level could be a signal to develop coping strategies : a very low level could mean that the athlete is not ready to compete. Only a very high level of anxiety could be dysfunctional. That could explain the lack of consistancy in the relationships performance/anxiety found in numerous researches.

CONCLUSION

The program was mainly focused on stress-management, and the best results were obtained on the more anxious players. However changes in anxiety do not necessarily result in performance improvements (Weinberg et al., 1981). Reliance on an oversimplified, unidimensional view of state anxiety may be partially responsible for these ambiguous findings. According to numerous researchers, state anxiety is a multidimensional construct containing both cognitive and somatic components (Prapavessis et al., 1992). From an intervention perspective, Gould et al. (1984) suggested that it is crucial to identify the predominant type of anxiety response so that the most appropriate intervention strategy can be selected. Our future program is therefore going to include a

multimethod approach to assess anxiety that incorporate cognitive (using CSAI-2 from Martens,1990) and physiological data (autonomeous nervous system parameters).

Beside anxiety, other specific problems have to be taken into account, as concentration, motivation, technical or tactical difficulties.

Some players had stopped practising mental training when the program stopped. It could be important to program regular meetings and a more individualized assistance by tape or card.

In this purpose, priority is probably the coaches' training. They can encourage the practice of the skills, monitor the use of theses skills in training and in competition. Their support of a program like this will insure that these skills become an integral part of the players' training and preparation. .Beside, coaches are also concerned by the stress. A commonly held belief that coaches are, in general, overworked and underpaid (Taylor, 1992). We then decided, at the end of the program to provide the tennis table coaches regular sessions of stress management training. Forty four coaches have already been concerned .In my point of view, the complete involvement of the coaches in the psychological program is the only way to allow mental training to be a real part of the general training and not to disapear with the psychologist.

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PSYCHOLOGICAL PREPARATION OF THE GREEK MEN'S NATIONAL VOLLEYBALL TEAM [1]

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KEYWORDS: psychological preparation, volleyball

INTRODUCTION

Although considerable research has been done into physical and technical training for the improvement of sport performance, relatively little research has been done to improve athletes' cognitive and emotional qualities leading to sport mastery. For example, physical skills are analyzed by slow-motion and computer-based techniques that help us to study the forces which affect performance and perhaps in the search for some hidden elements of sport performance. On the other hand, considerable research has reported on psychological strategies in the general psychology literature, but little research has examined psychological services in top level athletes. Thus, to date, most athletes are undereducated in psychological aspects of training and performance. They still learn psychological skills as they did two decades ago from trial and error procedures or by using personal mannerisms that help them deal with emotional problems (Tutco, & Tosi, 1976). Nonetheless, as Nideffer (1992) points out, most sport psychology books don't show athletes how to improve their performance. However, sport psychology as a growing scientific domain has increased the interest of athletes and sport teams in psychological support.

The purpose of this paper is to describe the sport psychology services provided to the Greek Men's National Volleyball Team in preparation for the 1994 World Volleyball Championships. The purpose of sport psychology services was to mentally prepare the players and how this preparation may modify athletes' performance so as to achieve specific goals. To accomplish this purpose, four sources of information were utilized. The first source lay in the theory of general psychology, especially group psychotherapy (e.g., Grotjahn, Kline, & Friedmann, 1983; Johnson, & Johnson, 1987; Yalom, 1975), and cognitive-behavioral theory (e.g., Mahoney, 1974; Meichenbaum, 1974). The second source of information was the sport psychology theory and the psychological programs that have been used by professionals around the world (e.g., Carron, 1980, 1982; Chelladurai, 1984; Cratty, 1984; Gipson, McKenzie, & Lowe, 1989; Glencross, 1986; Nideffer, 1992, 1981; Orlick, 1990, 1986; Suinn, 1986; Unestahl, 1983). The third source was our empirical experience of applying psychological interventions to top-level athletes. The

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fourth source of information was the athletes themselves. For example, structured interwiew forms provided us with useful information for designing the intervention strategies needed for each individual athlete and the team as a whole.

METHOD

Subjects.

Eighteen (18) male volleyball players served as subjects in this study. Their mean age was 24.9 (SD=3.6) years. All players had considerable competitive experience. All subjects participated for the first time in a structured psychological intervention program. One player was excluded from the measurements although he participated in the training. Thus, 17 subjects were included in all measures of data collection. The decision that a player should participate in such a program was made by the coach of the national volleyball team, who asked for scientific support from the Sport Psychology Laboratory of Athens University.

Types of Services

The program focussed on educational services. The educational role of a sport psychologist is to teach athletes cognitive and emotional skills to achieve high levels in training and performance. The program offers a coordinated number of techniques used to prepare the players both mentally and emotionally for a specific competitive goal.

The types of services provided to the Greek National Volleyball Team included three phases lasting in all seven months: (a) Basic Mental Training which consisted of concentration, progressive muscle relaxation, mental relaxation, imagery rehearsal, dissociation, and detachment training; (b) General Competitive Psychological Preparation which included motivation/goal settings, attitude in training and play, self-confidence, communication, and team harmony; and (c) Specific Competitive Psychological Preparation which dealt with model training for specific competitions and tasks; that is, task difficulty, mistakes, bad performance, tight situations, set/match-points, and competitive atmosphere.

The program was followed by daily practices at home/hotel and sport centres, individual and team meetings in small and large groups, including meetings with all the staff of the team (e.g., coaches, physicotherapist, and the sport psychologist).

Two psychological assessments were made, the first at the beginning of the program and the second two months before the World Volleyball Championships. Data gathered from the first

psychological assessment, interwiews and coaches' suggestions, was used to set individual and team goals. Data gathered from the second psychological assessment was used to evaluate possible changes arising during the preparation.

Instruments

For psychological assessment the players submitted to the following tests: The abbreviated version of the Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971) was used to measure six mood states (tension, depression, anger, vigor, fatigue, confusion), and total mood disturbance. General trait anxiety was measured by the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushere, 1970). The Sport Competition Anxiety Test (SCAT; Martens, 1977) was used to assess sport specific A-trait. Also, the Trait Sport Competitive Inventory (TSCI; Vealey, 1986) was used to assess self-confidence. The Generalized Appraisals of Outcome Control Scale (GAOCS; Kakkos, 1994) was used to evaluate the frequency and the intensity of outcome perceived control attributed by the athletes to internal-personal and external factors. The Ways of Coping in Sport Inventory (WCSI; Kakkos, 1994) which included four main subscales was used to assess: (a) cognitive appraisal coping, (b) active coping, (c) passive coping, and (d) the seeking social support. In addition, the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) and the Leadership Scale for Sports (LSS; Chelladurai, 1989) were used to evaluate group cohesion and leadership respectively. More-over, self-report inventories were utilized to identify specific characteristics and needs.

RESULTS

The program's effectiveness was evaluated through case and intrateam analyses. There were four criteria: (a) the indicators of psychological abilities referring to each athlete, based on the 1st and 2nd psychological assessments, (b) the indicators referring to communication, cohesion, and leadership, based on the 1st and 2nd psychological assessments, (c) the degree of self-perception displayed by the athletes in the course of open questioning during the procedure of individual and group meetings, and (d) the results achieved by the team in the games themselves as well as the fact that this same team continues to cooperate with the same sport psychologists in preparing for the 1995 European Championship.

The means, standard deviations, and t-values for mood states, state-trait anxiety, competitive anxiety, generalized appaisals of outcome control, and ways of coping are presented in Table 1. The means, standard deviations and t-values for social and task cohesion are shown in Table 2. Table 3 contains the means, standard deviations, and t-values for preferred and perceived types of leadership behavior.

TABLE 1. Descriptive Statistics for 1st and 2nd Psychological Assessment Scores.

VARIABLES	1st Psychological assessment		2nd Psychological assessment		t
	M	*SD*	*M*	*SD*	
Profile of Mood States					
Tension	10.57	5.92	6.36	5.18	3.27**
Depression	7.29	6.02	4.14	4.57	1.76
Vigor	22.86	4.74	24.21	6.35	.80
Anger	7.07	6.22	2.86	3.44	2.55*
Fatigue	5.86	3.74	5.93	5.06	.05
Confusion	6.07	3.65	2.00	2.66	4.15***
State-Trait Anxiety Inventory (STAI)	34.86	3.98	28.71	6.08	6.22***
Sport Competition Anxiety Test (SCAT)	16.71	4.12	13.29	4.16	6.00***
Trait Sport Competitive Inventory (TSCI)	74.21	8.94	83.43	5.14	5.78***
Generalized Appraisals of Outcome Control (GAOCS)					
Internal locus of control	35.50	6.12	40.50	6.07	3.12**
External locus of control	39.93	9.34	31.00	7.84	3.64**
Ways of Coping in Sport Inventory (WCSI)					
Cognitive appraisal coping	22.36	2.34	23.64	2.47	3.03**
Active coping	21.43	2.71	24.79	2.75	4.18***
Passive coping	17.50	4.49	15.79	2.91	2.04
Seeking social support	13.64	4.07	11.93	3.45	2.02

* p<.05 ** p<.01 *** p<.001

TABLE 2. Descriptive Statistics for 1st and 2nd Psychological Assessment GEQ Scores.

		1st Psychological assessment		2nd Psychological assessment		t
		M	*SD*	*M*	*SD*	
Social Cohesion	Individual attraction	30.57	6.73	29.71	7.18	.05
	Group integration	19.07	7.07	17.64	5.64	.77
Task Cohesion	Individual attraction	23.64	7.56	29.36	3.86	4.04***
	Group integration	26.50	6.20	33.14	6.83	3.99**

** p<.01 *** p<.001

TABLE 3. Descriptive Statistics for 1st and 2nd Psychological Assessment LSS Scores.

	1st Psychological assessment		2nd Psychological assessment		t
	M	*SD*	*M*	*SD*	
Preferred type of Leadership Behavior					
Training and Instruction	57.43	5.43	61.14	3.94	2.60*
Democratic Behavior	25.21	3.77	26.64	5.42	.90
Autocratic Behavior	14.64	2.65	13.29	3.12	1.29
Social Support	26.79	3.96	29.57	4.07	2.58*
Positive Feedback	19.07	4.48	19.79	3.49	.53
Perceived type of Leadership Behavior					
Training and Instruction	55.43	6.03	59.71	5.54	2.71*
Democratic Behavior	21.14	4.28	24.14	5.71	2.07
Autocratic Behavior	15.50	2.82	13.71	3.97	1.77
Social Support	26.00	3.57	28.71	4.07	2.80*
Positive Feedback	19.00	3.55	18.29	4.66	.46

* $p<.05$

DISCUSSION

The main purpose of this study was to describe the psychological services provided to the Greek Men's National Volleyball Team in preparation for the 1994 World Volleyball Championships. This psychological preparation program is similar to others dealing with the optimization of athletic performance through various psychological interventions. The philosophy of the program was not to force the players to follow some exact guidelines, but to permit each athlete to express his needs, including the right to be free to apply his own techniques. However, all players were engaged in the program except one who abstained from the individual meetings, taking responsibility for his own performance.

The results suggest that the psychological intervention program has a positive effect on players' individual performance, individual psychological profile, and group dynamics (task cohesion). The results indicated that psychological services led to mood-enhancement, and caused significant changes in psychological skills as well as individual and team goals. The program was particularly effective in relaxation, concentration, self-confidence, and positive thinking. However, the results were not uniform in respect of all players.

Players' attitudes towards the psychological services may be described as positive. Specifically, to the question «What do you think about the types of psychological services?» 12 players answered positively and 5 expressed themselves as neutral. Follow-up discussions with a number of players showed that some of them use psychological techniques in both their sport sessions and their daily life. This is consistent with other subjective reports (e.g., Zervas & Kakkos, 1991) indicating that some psychological techniques (e.g., relaxation and mental imagery) are useful to other areas of life.

The problems elicited during the seven months of this psychological program dealt with: (a) the sex of the sport psychologist, at least in the beginning of the program (it was unusual for some players to cooperate with a female sport psychologist), and (b) the failure to build up greater team cohesiveness (especially in social cohesiveness); this may be attributed to the fact that the players come from different sport clubs, different areas of the country, and even different cultural backgrounds. It should be noted, however, that the Greek National Volleyball Team won the sixth place in the Ixth World Championships which was considered as great success.

This study is not like an experimental investigation, which may lead to causal relationships. Designing and applying an intervention program under realistic conditions, it is hard to conclude that there is a cause-effect relationship between psychological intervention and a player's performance.

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THE LEARNING OF MENTAL AND TECHNICAL SKILLS FOR ARCHERY IN YOUNGSTERS

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Key Words: mental training, technical skills, mental skills, archery

In archery, accurately controlling the action, inhibiting unnecessary movements, focusing attention, regularly repeating the shoot, are skills of great importance. In each phase of the shooting sequence, from preparation (stance) to release and follow-through, the archer must control specific muscles. Stimulus gathered from sensory channels are elaborated and integrated in the central nervous system. During stance, for example, information on body positioning, muscular tension, and breathing pace come from the kinesthetic channel. During draw and aim, visual information allows string-bow and sight-target alignments. Tactile perceptions inform on correct position of the string with the face and with the hand holding the bow, while kinesthetic perceptions inform on back muscular contraction needed to pull the bow. Auditory stimuli, finally, derive from clicker action and string contact with the bow after release. The attention is now drawn again on kinesthetic perceptions to evaluate if shooting has been carried out correctly, and decide if next action must be modified. Taking into account the complexity of psychomotor requirements on archery, we understand the importance of starting an adequate mental preparation in youngsters. Mental training exercises proposed in the here outlined procedure, are carried out during practice along with shooting exercises (Robazza & Bortoli, 1993, 1994). These are aimed at increasing bodily awareness, arousal control, imagery, concentration, thought control, stress management, as well as many mental training programs do (see Williams, 1993). Exercises are based on the Five-Step Strategy proposed by Robert N. Singer (1988) to facilitate learning and performance of closed (self-paced) skills. The strategy helps cognitive processes, acquisition and retention of information and skills, error detection, comprehension of error causes, execution and transfer (Singer, DeFrancesco, & Randall, 1989). The Five-Step Strategy is composed of 5 substrategies to be carried out in sequence: (1) readying, (2) imaging, (3) focusing, (4) executing, (5) evaluating. The Five-Step Strategy has been modified to be combined with technical exercises, and be applied with

archers aged 14 to 16 (but also with adults). To be efficacious, the program should be applied on a regular base. It can be managed by the coach after adequate information, preparation, and experience. General and specific goals are outlined in the program. Exercises, problem solving instructions, and questions to the archer are given to achieve specific goals. The questions are put in order to (a) enhance archer's motivation and involvement, (b) stimulate subjective cognitive processes of analysis, action control, and correction, (c) obtain information concerning the levels of comprehension and evolution on the task. Questions and instructions are given to direct subject's attention on operations to be done instead of on things to avoid. Moreover, in each training session the archer practices a mental goal which is added to three technical goals inherent to: (1) stance, (2) draw and aim, (3) release and follow-through. Other goals of more advanced stages of learning and performance are introduced when the preceding goals are achieved. During stance (readying), goals of improvement of bodily awareness and arousal control are proposed. In the same phase, goals of shoot mental rehearsal (imaging) are pursued. During draw and aim, attention control (focusing) and automatic execution (executing) are emphasized. After release and follow-through, finally, the archer is required to evaluate the whole performance and strategy, and, if necessary, modify the next shoot. General goals, specific goals, exercises, and questions inherent to technical and mental practice are established for each shooting phase. Examples related to stance are proposed in Table 1.

TABLE 1. Examples of General Goals, Specific Goals, Exercises, Questions, and Suggestions for Technical and Mental Training Related to Stance

TECHNICAL TRAINING	
General goals	Achieve correct and stable body alignment Discover body vertical axis during shoot
Specific goals	Resume feet position on shooting line Distribute body weight on feet
Exercises	Repeatedly enter and exit shooting zone and resume correct position Move back and forth during draw, and resume position before release
Questions	Is your body weight well balanced on feet? Do you feel still during shoot?
Suggestions	At each shoot check feet distance from line Equally distribute body weight on feet

TABLE 1 Continued

MENTAL TRAINING	
General goals	Improve bodily awareness Increase mental rehearsal of shoot
Specific goals	Perceive bodily cues Mentally "see" and "feel" movement
Exercises	Carry out a complete bodily "check up," from feet to head Shoot paying attention to muscular contraction. Mentally rehearse feelings
Questions	What cues do you perceive on your body? (Tension, relaxation, heat, etc.) Do you feel muscular contraction while imaging the shoot?
Suggestions	Concentrate only on a body sector trying to perceive tension, relaxation, heat Focus on back tension

THE MENTAL TRAINING PROGRAM

Mental training procedures related to the three shooting phases are now briefly discussed.

Stance

Shoot in archery is accurately carried out at relatively low arousal, so the subject can feel physically relaxed and mentally ready. Stressful situations, as during competition, tend to enhance arousal, produce negative thoughts, and hinder performance (Hardy, 1990); on the other hand, arousal control helps manage stress. During stance (readying), improvement of bodily awareness is achieved when the archer pays attention to somatic perceptions before shooting. In this way, optimal conditions for controlling arousal and shooting are attained. Exercises are aimed at (a) detecting bodily perceptions, (b) perceiving and controlling breathing (thoracic and diaphragmatic breathing and pace), and (c) perceiving heart-beat. Somatic perceptions during stance are detected turning attention to body areas (bodily check up). Different sensory channels can be involved, for example, requiring the subject to perceive muscular relaxation (kinesthesis), to imagine a ray of light moving on the body (sight), to mentally listen to own voice listing body sectors (hearing). For arousal control it is important to gain insight on breathing, through breathing exercises such as forced inhalations and exhalations paying attention to chest and abdomen movements. Perception of heart-beat is sometimes difficult and, at first, it can be helped through carotid compression. Some jumps, a run, and other arousing exercises help monitor body modifications.

Imagery is introduced in a following stage (imaging). The archer is required to form a mental picture of the whole shoot, becoming gradually stable, clear, controllable, and multisensorial. Videos, pictures, and drawings are useful to help subject mentally depict the action from an external perspective. Later, an internal perspective should be achieved to enable easier recovery of kinesthetic information. The whole action must be visualized from stance to follow-through, ending with a completely positive result (arrow landing on the center of the target).

Draw and Aim

At this stage, after readying e imaging, the archer is required to focus attention on some relevant aspects of the shoot, excluding external and internal disturbing stimuli (focusing). The subject can practice moving attention on (a) sight-target (visual reference), (b) string contact with the face (tactile reference), and (c) tension area between scapula (kinesthetic reference). Sub-vocal wording such as "sight, face, shoulder" or "forward, middle, behind" or "one, two, three" can aid visual, tactile, and kinesthetic information gathering. The focus should later be limited to important aspects of the performance (i.e., aiming points and muscular tension between scapulas). Automatic execution is helped by "passive" focused attention, allowing smooth execution and minimal corrections. The subject now must not think of the shoot or possible result: analytic thinking at this stage hampers the action to be smoothly carried out as programmed (Schmidt, 1991). The archer has to just let the shoot occur "spontaneously" (executing).

Release and Follow-Through

In this last stage the subject is required to evaluate own performance (evaluating). Details of action, application of strategy, and result, must be considered to get information to correct next shoot or reinforce execution. Personal evaluations should also be compared with actual performances. General questions such as "How did you execute?" or particular questions such as "What happens just before release?" help stimulate self-assessment. This way, the archer is forced to analyze the shoot, pay attention to what has been done, and link performance to result. Feedback from the coach is important, but it should not be given too frequently: many corrections and information facilitate immediate performance but not retention and transfer, because they tend to create dependence from an external guidance (Magill, 1993).

Complete Strategy

After enough practice on each strategy step, the whole procedure consists of applying the steps in sequence. The archer is asked to:

1. prepare himself during stance by placing attention on body key points such as feet, hips, and shoulders, taking a deep breath, and be confident of own capabilities;
2. mentally depict the shoot during stance in a multisensorial way imagining to execute with accuracy, from start to end, getting optimal result;
3. focus during draw and aim on the visual, tactile, and kinesthetic points of reference by mentally verbalizing key words (or positive statements);
4. eliminate distracting thoughts and execute automatically;
5. evaluate performance after release by analyzing the result and each step of the strategy.

Although the strategy applied to archery has not yet experimentally been tested, preliminary results on youngsters show improvements on mental skills and performance in subjects practicing the program systematically. Technical and mental performances of a young archer, assessed once a week for eight weeks, is represented in Fig. 1. The shoots score increased over time and there was a parallel improvement on the mental strategy subjectively evaluated on a Likert scale from 1 to 7.

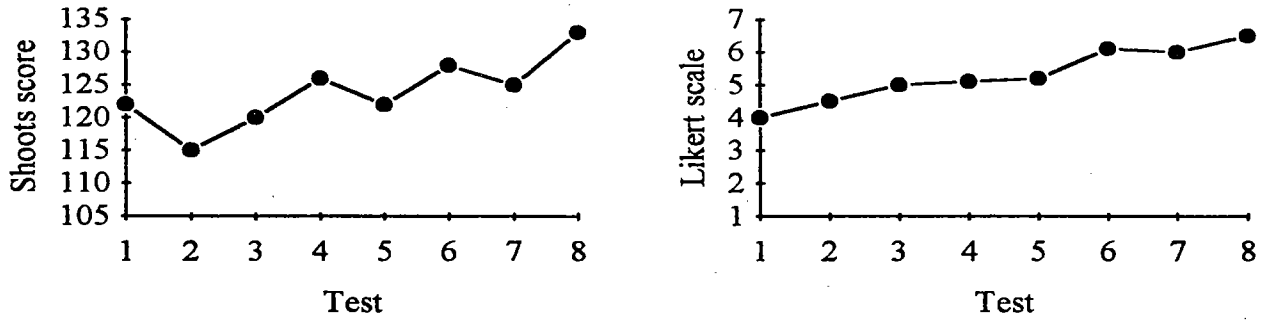
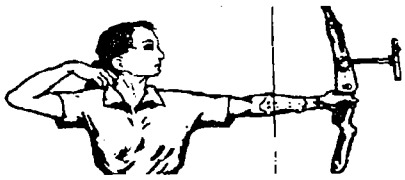


Fig. 1. Increase on Performance and Mental Strategy in a Young Archer

METHODOLOGICAL CONSIDERATIONS

Technical and mental goals should be pursued in a progressive and systematic way by programming interventions following important methodological principles. Some of these are: goal-setting, variability of practice, contextual interference (see Burton, 1993, and Chamberlin & Lee, 1993, for a discussion).

Goals evaluation can be carried out through assessment sheets where the archer reports, also with coach's help, his judgment about the performance. A self-assessment sheet with three technical goals (a goal for each phase of stance, draw and aim, release and follow-through) and one mental goal, is shown in Fig. 2. Self-assessment enables archer's deeper involvement in the task and in the evaluation process. This way it is also possible to individualize goals and modify tasks following acquisitions.

STANCE	DRAW AND AIM	RELEASE AND FOLLOW-THROUGH
Distribute body weight on feet	Perceive back muscular contraction	Maintain head positioning
		

Goals	Occasionally achieved	Often achieved	Always achieved
N° 1: Distribute body weight on feet	☐	☐	☐
N° 2: Perceive back muscular contraction	☐	☐	☐
N° 3: Maintain head positioning	☐	☐	☐
N° 4: Mentally rehearse the shoot	☐	☐	☐

Fig. 2. Archer's Self-Assessment Sheet

Variability and organization of practice are important further methodological principles. Variability is obtained through modification of parameters without changing the motor program. For example, shooting in time constraint, or in unstable balance, or at various distances, require the archer to adapt the program parameters. Modifying demands and conditions of execution such as force, direction, speed, and distance, tend to reinforce the motor schema (Schmidt, 1988). Moreover, different skills are presented in the same practice session alternating them. For example, the archer can work on stance, draw and aim, release and follow-through, and then again on stance, draw and aim, release and follow-through. This condition of contextual interference is advantageous for long-term retention and transfer (see Magill & Hall, 1990, for a review).

CONCLUSIONS

The mental training program, inspired by the Five-Step Strategy of Singer (1988) and here presented in essential lines, was proposed to young archers during practice to facilitate learning and performance, and to increase body awareness, arousal control, imagery, focusing, thought control, stress management. Mental procedures are integrated with technical exercises. Goals of bodily awareness, arousal control, and imagery, are inserted during stance. Goals of concentration and automatic execution are proposed during draw and aim. Goals of evaluation, finally, are pursued during and after release and follow-through. The mental and technical program is aimed at improving cognitive and behavioral skills the archer sometimes already applies on his own, but often not in a systematic or conscious way: performance preparation, mental anticipation of action sequence, attention focus on important aspect of the task, and performance assessment, are activities often applied (but not always) by expert athletes to achieve better results.

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A NEW APPROACH TO MENTAL TRAINING: THE DESCRIPTION OF 2 CASES.

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Key words: new approach to mental training, concentration, attention.

INTRODUCTION

Mental training and sportpsychology are more and more accepted in the Netherlands. In an attempt over the past years to make mental training accessible to many athletes, I have been using a new approach to mental training. I was not satisfied with the terminology used. Athletes thought they were 'crazy', or had an incureable fear of failure. This approach didn't invite athletes to go and see an sportpsychologist. It is important how to 'grab' the athlete. By means of a new approach to mental training this is accounted for. Explaining this approach to athletes makes them open to mental training.

METHODS AND PROCEDURES

The important construct in this approach is **concentration**. Concentration is a state of mind with the following charateristics:
Passiveness. The expression 'come on, concentrate now' implies that concentration is an active process. This is not true. You can direct your attention active, concentration is a state of mind that occurs. It is comparable with sleeping.
Direct consciousness. You are aware of things that are taking place right here and now. The opposite of direct consciousness is reflective consciousness. In reflective consciousness the person is a (re)viewer of his own acts. To control a movement during exhibition disturbes the act itself. Controlling movements often occur with athletes with low self-confidence.
Absoluteness. Concentration is absolute. This is comparable with a lightswitch. You are concentrated or not. You can't concentratie better or more.
Individual differences. Concentration has to do with the pace of executing acts. Executing acts too fast or too slow influences the perception of an athlete during the game and also his concentration.

The way to achieve this state of concentration is through **attention**. The thing that we are most aware of, is the thing towards what our attention is directed. In sport it is necessary to direct your attention to relevant information. What relevant information is, varies per sport. To reach the state

of concentration, different steps are needed concerning attention: free attention, collect attention, direct attention and hold attention.

Free attention. The athlete makes sure that all his attention serves the sport. At that moment nothing is more important than sport. Distractions from outside the sport, like privat problems and communicationproblems, are accounted for.

Collect attention. This has to do with distractions within the sport itself. The athlete should accept everything that is part of the game. Things that happened in the past and that will happen in the future are irrelevant. What matters is here and now. It is necessary that an athlete accepts the pressure, the circumstances, the shape of the day, etc. 'Wishful thinking' about the results is one of the main distractors for collecting ones attention.

Direct attention. During a game a lot of information is coming to the senses of a person. Not everything is noticed. Some things are relevant, other things are irrelevant. A lot of times athletes are checking if what they do matches an ideal state. They are controlling what they are doing. This influences concentration negatively. The attention is no longer directed to relevant perceptions but to other irrelevant perceptions. Another process that occurs often is judging. Athletes give judgments about what they are doing, for
example 'this was good' or 'this was worthless'.

Hold attention. When an athlete succeeds in directing his attention, the question is if he or she can hold this attention directed for the length of the game. Three things are important then: balance, economy and unity.

* balance. How well can an athlete hold his attention to relevant information even if the circumstances make it more diffecult, for example wether conditions, the importance of the game etc.

* economy. How well can an athlete focus his attention on a certain perception despite fatigue.

* unity. Is the athlete capable of holding his attention focused on a perception no matter what momenta or situations. For example, sometimes attention is bad in the beginning of a match or at the end of a match.

In the actual mental training several **skills** are used. They are: awareness, breathing, relaxation, imagery and thought control.

Awareness. Through observation and completing questionnaires the athlete becomes more aware of what he thinks and feels before, during and after games.

Breathing. By means of breathingexercises the athlete learns how to cope with tension better. The aim is that the athlete learn how to breath deep.

Relaxation. Through the progressive relaxation exercises the athlete learns how to be more relaxed in general, under pressure in games, and the imagery is working better when an athlete is relaxed.

Imagery. This is used for three purposes. First imagery is used to improve the skills of the

athletes. Second, it is used to learn how to perform at your best under pressure. And thirdly, by using imagery the thoughts that are helpful to the athlete are better practiced and used.
Thought control. By using the RET method, athletes know when they are using negative thoughts, and are guided in the proces towards real (sometimes positive) thoughts.

RESULTS

Using two cases the results of the effectiveness of this new approach is described.

Case 1. An individual female squash player, 4 times dutch champion and about number 20 in the world. She was shy in the beginning and had difficulties talking about herself. After mutual confidence was achieved she loosened up. Her main distraction was that in general she filled in thoughts for others. In sport this meant she considered herself nice if she won, and not nice if she didn't win. Through the different skills she learned how to free her attenttion and direct it to important aspects of the squash game.

Case 2. The national ice-hockey team of the Netherlands. In this case a good introduction of mental training was very important. After explaining them what mental training is and what it could do for them, the actual mental training started. Each player was seen for two hours, and the team was split up into goalies, defenders and attackers. Because of using this new approach to mental training the players were very receptive to it. Therefore it immediately showed in the games that were played.

DISCUSSION AND CONCLUSIONS

This approach to mental training appears to be very open to athletes. They don't consider themselves as having a problem but that their attention is wrong directed. They learn better how to cope with distractions. Almost everything that happens is a distraction in this approach. Famous examples of concentration are Koss in Lillehammer en Christie at the world championships.
Important in this appraoch that you learn the ins and outs of the sport. What is mentally required to perform at the highest level in this sport?
Constructs like stress, anxiety and self-confidence are considered for in the mental training. But how they link to attention and concentration is not known. Are these constructs that stand alone? Does a theoretical background imply that some constructs can be used and others can't? My experience so far is that the new approach is effective. Can it be more effective using other constructs? A thorough discussion about this issue would be very useful.

HEART RATE BIOFEEDBACK TRAINING TO IMPROVE CYCLING PERFORMANCE[1]

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KEYS WORDS: Biofeedback, heart rate, cyclists, maximal effort test.

1. INTRODUCTION

One of the objectives of psychological training in the field of sports can be helping athletes to improve their cardiorespiratory efficiency and, at the same time, their physiological performance (Ziegler, Klizing and Williamson, 1982; Capdevila, 1989; and Valiente, 1993). The investigations oriented toward improving the cardiorespiratory efficiency have been carried out primarily with clinical populations (patients with cardiovascular problems), using psychological training techniques such as heart rate biofeedback -HR BIO- (Lo and Johnston, 1984). The aforementioned technique has scarcely been studied in situations of physical exercise, having been used mainly in the general psychological setting during ergometric tests -with moderated levels of dynamic exercice- (Perski, Tzankoff and Engel, 1985; Alvarez, 1994), and during static performance tests (Clemens and Shattock, 1979). It has also been used in psychology applied to sports during dynamic exercise with bi-athletes (Burrill, 1990) and with cyclists (Valiente, 1993), and during static exercises with precision sports -ie., marksmanship- (Landers, 1985). Given the scarcity of empirical studies which evaluate the effectiveness of psychological training on cardiorespiratory efficiency and athletic performance, the aim of this research was to prove the effects of training on HR BIO during physical exertion tests on a cicloergometer.

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2. METHOD

2.1. SUBJECTS

Seventeen young male cyclists, 16.6 years old (SD= 0.96), trained on an average of 14 hours per week.

2.2. PROCEDURE

The study consists of three phases:

1) Pretest Phase (PRE)
2) Training Phase (TRA)
3) Post-test Phase (POS)

In the PRE and POS phases the cyclists carried out a test of maximum exertion on the cycloergometer with three different stages:

a) Resting period: the cyclist remained seated at the cycloergometer for three minutes.

b) Steps protocol: increases of 50 watts every three minutes until the exhaustion of the cyclist. This stage is carried out at 60 revolutions per minute (RPM).

c) Recovery: three minutes; during the first minute the cyclist continues pedaling, but without any load; the remaining two minutes he stayed on the cycloergometer without pedaling.

During the entire physical test the values were stored for HR every five seconds, in beats per minute, and the performance was measured by the total resistence time of the cyclist during the exertion test. Based on the results obtained for each subject in the physical tests in the PRE phase, the 17 cyclists were divided in groups. The Control group was formed by 9 subjects and the Experimental group was formed by 8 subjects.

The difference between the PRE and POS phases consisted in that in the POS phase all the individuals of the Experimental group had to apply the psychological technique of heart rate biofeedback learned during the training phase. In this phase, that had a duration of five sessions divided in fifteen days, the subjects of the Control group trained in moderate physical exercice on bicycle during 15 minutes; and those of the Experimental group trained in the heart rate control using biofeedback techniques. These last subjects received the instruction to reduce heart rate values both at rest as well as during moderate physical exercise on the bicycle during 15 minutes.

3. RESULTS

In order to evaluate the effect of psychological training in heart rate biofeedback (HR BIO) on cardiorespiratory efficiency -as measured by HR- and performance -as measured by the total time cyclist stands the exertion test- an analysis of the MANOVA standard deviation (2x2) was carried out, comparing the PRE and POS phases of the two groups in the study.

In regard to cardiorespiratory efficiency, a comparison was made between the difference in average heart rates of the control and the experimental groups in the PRE and POS phases. A greater difference in the HR of the experimental group -trained in HR BIO - was expected as compared to the control group. In regard to the performance of the cyclists, the total time during which the cyclist resists the exertion test in the POS phase was compared to the total time resisted in the PRE phase. A greater period of resistance in the POS phase was expected for the experimental group.

	PRE	PRE	POS	POS	
MEAN (S.E.MEAN)	CONTROL	EXPERIMENTAL	CONTROL	EXPERIMENTAL	p
TIME	1202.8 (20.65)	1315.00 (53.71)	1215.00 (22.76)	1383.12 (53.29)	0.0131
HR RESTING PERIOD	79.11 (3.2)	76.63 (5.35)	75.67 (3.05)	68.5 (4.78)	N.S.
HR STEPS PROTOCOL	146.04 (3.19)	141.35 (3.10)	147.56 (3.29)	139.83 (4.09)	N.S.
HR 150 WATS	136.78 (3.7)	133.00 (3.59)	141.67 (4.18)	130.25 4.28	0.077

Table 1: Summary of the HR averages at resting period, of HR in the steps protocol, an of HR for the 150 W, and for the time, of the PRE and POS phases in the 2 groups.

3.1. PHYSIOLOGICAL PERFORMANCE RESULTS

Figure 1 illustrates, for each group, the difference between the time employed in carrying out the exertion test in the POS phase minus the time employed in the PRE phase. In Figure 1 a greater duration is observed in the POS phase by the group that was trained in HR BIO. Specifically, this group carried out a POS test with an average total time of 68 seconds more than in the PRE test. These results are statistically significant ($p=0.0131$) and

indicate a greater performance by the subjects of the group trained in HR BIO as compared to the Control group.

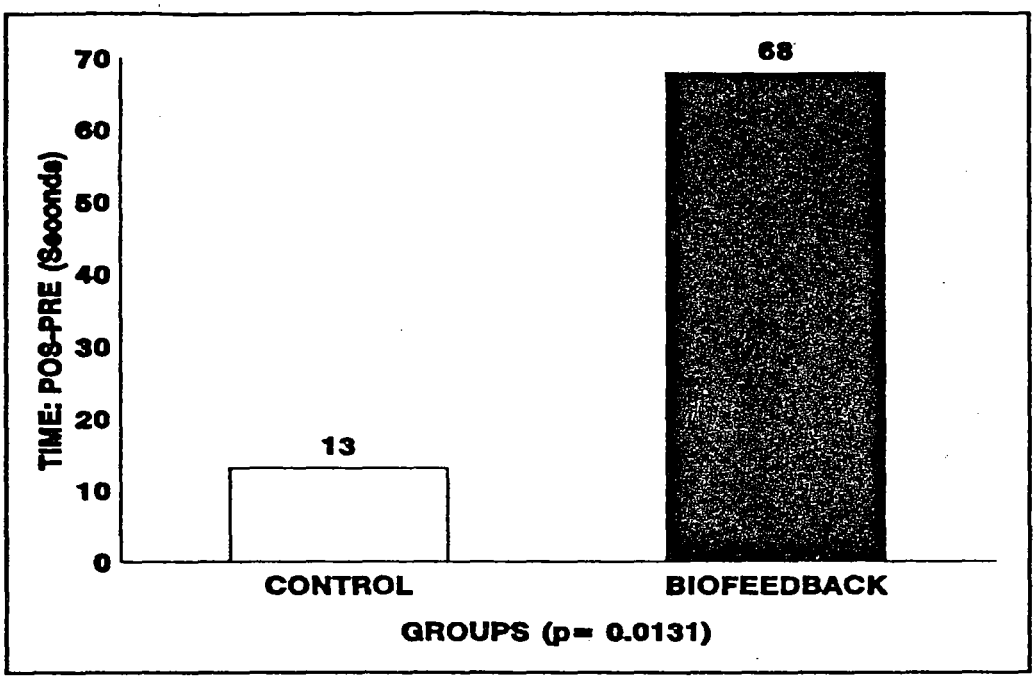

Figure 1: Differences (POS-PRE) in the total duration time of the exertion test (in seconds) of the two groups. The positive average values indicated an improvement in performance.

3.2. CARDIORESPIRATORY EFFICIENCY RESULTS

In order to evaluate the effect of psychological training on this physiological aspect, the differences in the HR averages in the PRE phase less those of the POS phase for the two groups of cyclists in different stages: rest, 50 watts, 100 watts, 150 watts, 200 watts, 250 watts and 300 watts, were compared (Table 1).

a) Analyzing the resting period, higher differences in the experimental group as compared to the Control group could be observed. These differences are not statistically significant.

b) At none of the various loads applied, following steps protocol, did we find statistically significant results in regard to the comparison between the two groups we studied. We only found differences tending toward significance in the 150 watts stage. Considering all the loads of the test, the subjects of the experimental group present a difference in PRE and POS HR greater than the ones in the control group (Figure 2).

In order to obtain more information on the behaviour of the HR during the exertion tests, we analyzed the continuous curves of this variable based on the analysis of Time Series, applying ARIMA models (Capdevila and Cruz, 1992). This technique will permit the identification of individual differences in regard to the complete pattern of HR presented.

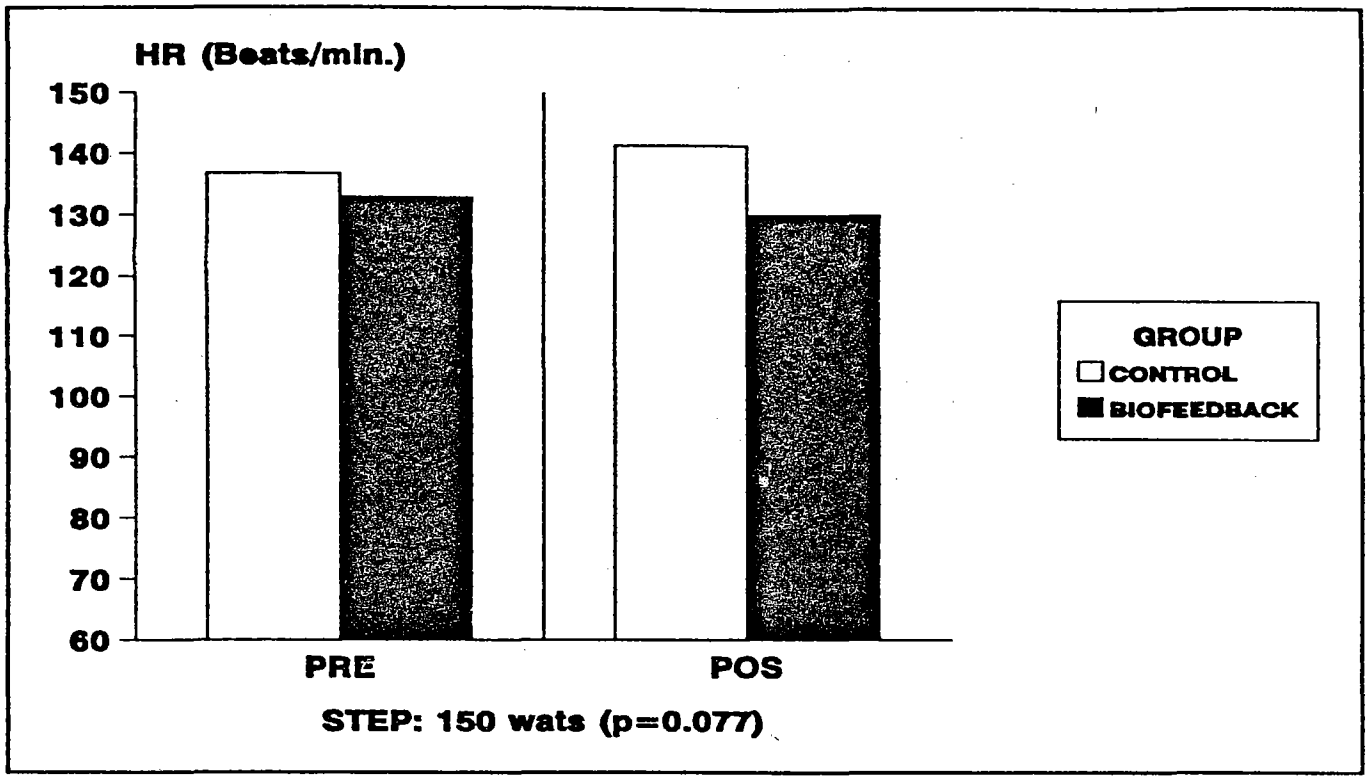

Figure 2: HR averages for 150 watts of the PRE and POS phases of the two groups.

That is, it will permit the identification of those subjects who don't fit the average model presented by the group. As an example, we show the results of such an analysis for one subject from the experimental group and one from the control group (Figures 3 and 4).

In Figure 3, corresponding to the subject from the experimental group, it could be observed that the HR curve in the POS phase, lies below the margin of error of the HR in the PRE phase. This indicates that, for this subject, the HR values shown in the POS phase are statistically inferior to those of the PRE phase.

On the other hand, in Figure 4, where the curves for the subject from the control group are shown, it could be not observed HR values statistically lower in the POS phase test as compared to the PRE phase test. On the contrary, at some points this subjects presents greater values in the POS phase.

Comparing, for the two groups, the percentage of cyclists that fall within the expected average pattern for the group to which they belong, the following results are observed: a) 50% of the subjects in the experimental group present the same pattern of HR in both phases; ie., differences between the HR curves in the PRE and POS phases do not exist. The other 50% of the subjects, obtained lower HR values in the POS phase than in the PRE

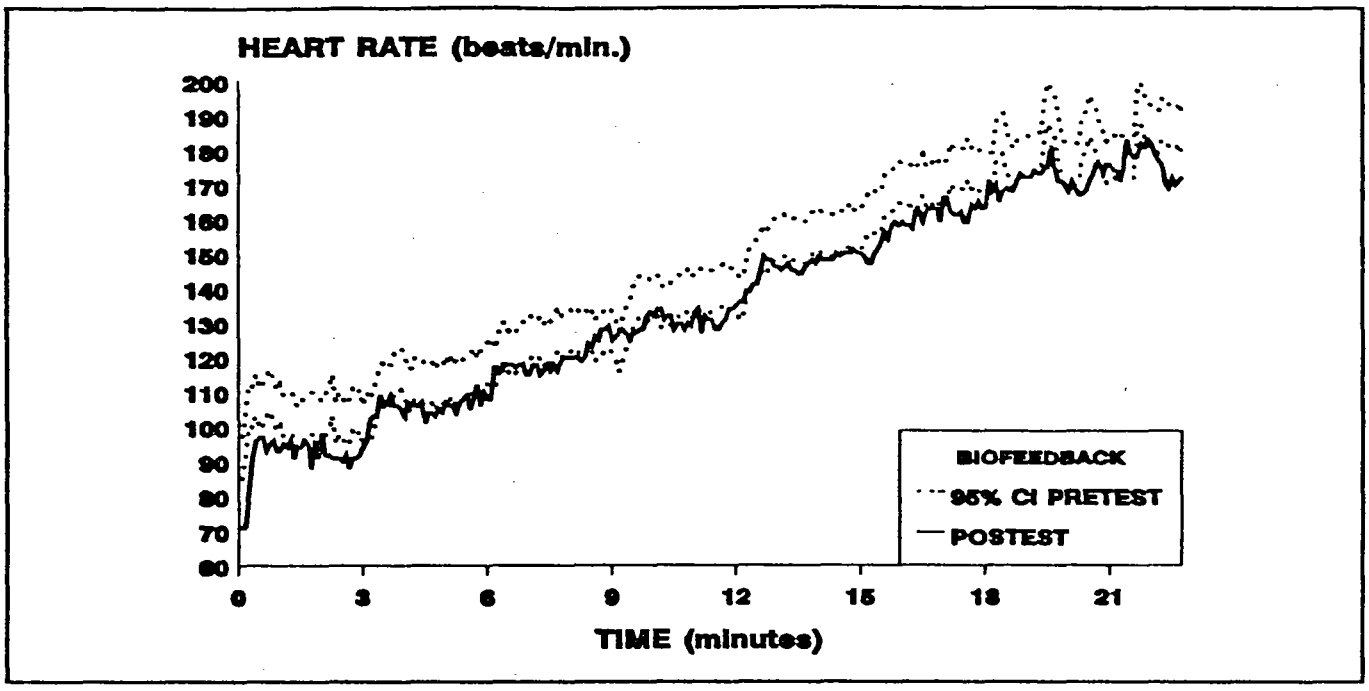

Figura 3: HR curve in the steps protocol stage (experimental subject).

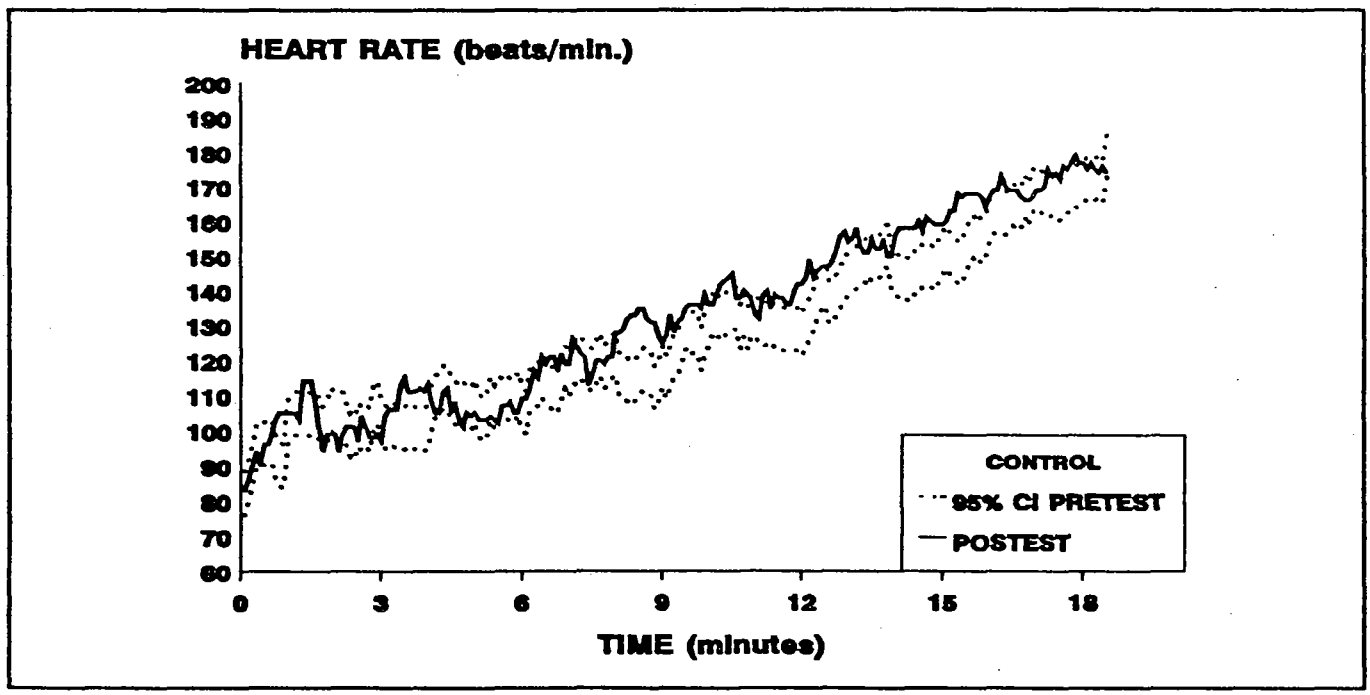

Figure 4: HR curve in the steps protocol stage (control subject).

phase; b) Regarding the control group, 50%, also, present the same HR pattern in both phases; ie., differences between the HR curves in the PRE and POS phases do not exist. And the other 50% of the subjects, on the contrary to the experimental group, obtained greater HR values in the POS phase than in the PRE phase.

4. DISCUSSION

An important conclusion applicable to the sports world, and to cycling in this case, is that the HR BIO technique permits the improvement of performance of the cyclists in the laboratory and during the execution of maximum exertion tests on the cycloergometer. This aspect hadn't been taken into account thus far, since previous studies had been carried out in basic and clinical contexts, and the improvement of athletic performance of the subjects in the exertion tests had not been considered as an objective. On the other hand, in marksmanship sports said objective had been considered (Landers, 1985). This observed improvement in performance in our investigation could be explained in the following ways:
a) As a result of a specific effect of the HR BIO technique which, based on the selfcontrol of the HR, produces a change in the subject's metabolism. This change could consist of facilitating a greater functional reserve that would permit a delay in the onset of fatigue.
b) As a result of a non-specific effect of the BIO technique, in that it requires the attention of the subject towards an external stimulus (numerical value of HR). This demand on the attention could result in a delay of the awareness of fatigue and, thus, a delay in abandoning the effort.
c) As a result of the subject's real HR information during the entire exertion test, which facilitates the biofeedback technique. That fact can help the cyclist to learn to be aware of his real state of fatigue and to regulate his efforts accordingly in order to achieve a better result.

The improvement in cardiorespiratory efficiency observed in the Experimental group -trained in HR biofeedback- as compared to the Control group, can be attributed to the apparent selfcontrol of the HR at rest as well as during the dynamic exercise. The discussion of the mediating processes of the biofeedback technique on the selfcontrol of the HR remains unsettled and deserves more studies.

In future investigation, it would be interesting to verify the general application of these results in two ways: a) in other endurance sports; and b) in real competitions or sports training situations.

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P.5.2. SELF PERCEPTION, BODY CONCEPT

THE DEVELOPMENT OF JUDGING TIME TO ARRIVAL ACCURACY IN CHILDREN : EFFECTS OF SPORT EXPERTISE

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Key Words : disappearence paradigm ; arrival time ; expertise ; development ; acceleration ; deceleration.

INTRODUCTION

Driving a vehicle, crossing a road, catching or hitting a ball require the prediction of arrival time of moving objects in the aim of producing a coordinated response. In this context, we may focus on the nature of the perceptual informations used to determine the temporal window available for the action. The "disappearence paradigm" defined by Caird & Hancock (1994) is a useful experimental method for answering these questions. In this kind of experiment, subjects are generally asked to estimate the arrival time of a moving object after the occlusion of the final part of its path (Caird & Hancock, 1994). It has often been concluded that the information about the time remaining before collision is a first-order temporal relationship commonly denoted as the "tau-margin" (Lee, 1976, 1980). The tau-margin is specified by the quotient of optical size and the rate of dilation of the optical size in the case of head-on or radial approaches (Bootsma & Oudejans, 1993) and by the quotient of the relative rate of constriction of the optical gap that separates the moving object and the target position in the case of tangential approaches (paths not leading to the observer). The generalized tau margin is defined by the combination of the relative rates of dilation of the moving object' optical contour and constriction of the optical gap (Bootsma & Oudejans, 1993). This optical information specifies the time remaining prior to contact of a moving object at any designated position in the field of view. According to its own definition, the tau margin gives no information about acceleration or deceleration of the moving object. Lee et al. (1983) demonstrated, in a task of judgement of arrival time, that subjects did not take into account the information about acceleration. These results were confirmed by Bootsma & Oudejans (1993) who observed that acceleration and deceleration of the moving object induced errors in the estimates of the subjects, thereby confirming the hypothesis of the exclusive use of the tau margin.

Caird & Hancock (1994) wonder if cognitive processes are involved after the occlusion to palliate the disapearence of the tau-margin information. Some authors (Runeson, 1974 ; Jagacinski et al., 1983) tried to modelize human behavior facing such cases on the basis of the recorded experimental results. These studies took into account the existence of an internal representation model of the motion. Caird & Hancock (1994), given the results of different authors (Cavallo & Laurent, 1988 ; Schiff & Detwiler, 1979 ; Schiff & Oldack, 1990), found a linear relationship between the "Actual Arrival Time" (the occlusion time) and the "Judged Arrival Time (the estimate of the subjects) such as $y = 0.54x + 0.56$ (with $R^2 = 0.96$) as a results of steady internal processes. These results show a general tendency to overestimate Arrival time for short occlusion (approximatively under 1 s.), and a tendency to underestimate arrival time for longer occlusion (Cavallo & Laurent, 1988 ; McLeod & Ross, 1983 ; Schiff & Detwiler, 1979 ; Schiff & Oldack, 1990). This last underestimation is directly linked to the duration of the occlusion. Concerning the information available in arrival time judgement, Caird & Hancock (1994) infered that the perception of the tau-margin is direct and instantaneous. In opposition with Rosenbaum (1975) who consider that the extrapolation consisted in a direct and automatic extension of the viewed part of the motion, some studies (Groeger & Brown, 1988 ; Groeger & Cavallo, 1991 ; Caird & Hancock, 1994) demonstrated that the estimation accuracy decreases with the diminution of the viewed time. This observation may indicate the implication of additional cognitive processes.

In this context, it can be remarked that the studies on the development of arrival time judgement and the effect of sport expertise on such abilities are not very numerous. Concerning the development of these operations, Ripoll (1994) showed that performances depend on the acquisition of complex mechanisms requiring automatic processes but also representations and computations which are linked with the cognitive development. This evolution was not found to be linear but can be located between 7 and 11. Children aged 9 respond quite differently from other groups with a very large overestimation. When studying the effect of driving experience, Cavallo & Laurent (1988) showed that novice drivers had less good performances than experienced drivers. The question following this review concerns the respective implication of cognitive operations and automatic processes in judgment of arrival time. Using short occlusion, in which automatic processes should be prevalent, this research focused on the effect of expertise in tennis practising, of development and of acceleration and deceleration of moving object on performance in a task of arrival time judgement. First, the equation related to an internal model defined by Caird & Hancock (1994) is going to be tested for a short occlusion. Then, the study of the combined effect of development and expertise should confirm the implication of some cognitive processes in arrival time judgement. Finally, the posssible effect of development and expertise on the inability to use the information about acceleration or deceleration in arrival time estimation is going to be studied.

METHOD AND PROCEDURE

The experimental population consisted in two groups of tennis players (regional and national level) and non-players, included respectively three groups of 8 subjects aged 7, 10, 13. The test consisted in predicting arrival time of a moving stimulus simulated by a runway of LED (4 m. long). The final part of the trajectory was occluded before reaching a target. The subjects, seated at two meters from the end of the runway, were instructed to press a response button exactly when they thought the occluded stimulus would reach the target (Fig. n°1).

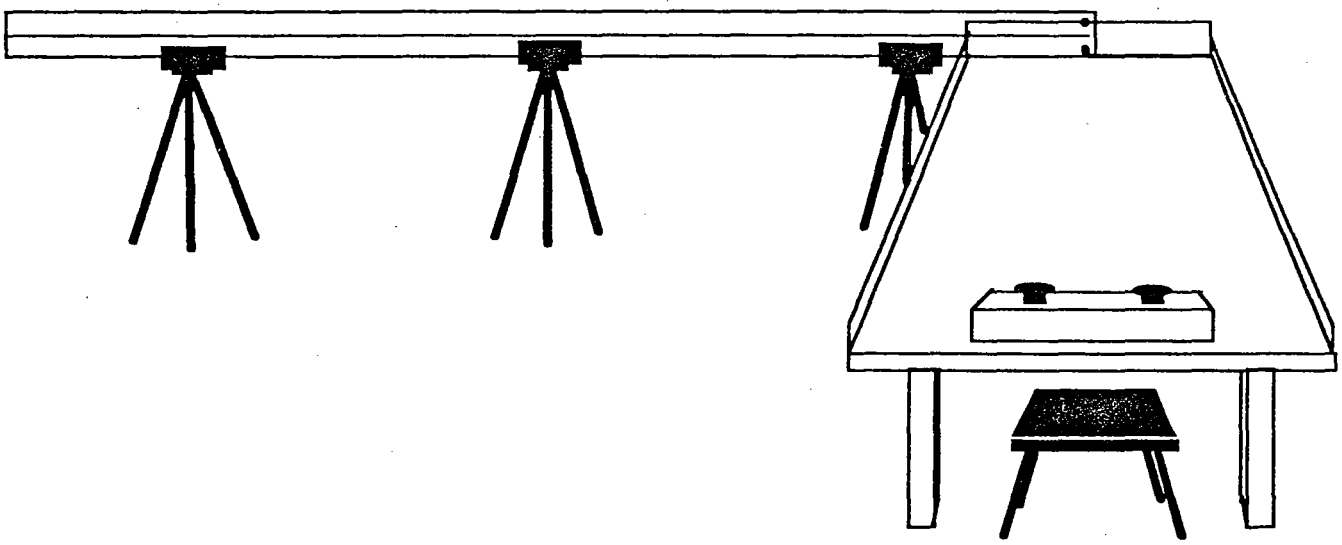

Fig. n°1. Experimental Display

The viewed and occluded times were respectevely 400 and 300 ms. Three different stimulus accelerations were used (Tab. n°1) : constant velocity ; increased velocity (+2,8 $m.s^{-2}$) ; decreased velocity (-2,8 $m.s^{-2}$). In the three conditions, the final velocity was the same (4,7 $m.s^{-1}$). Each subjects performed 20 trials in each condition. No information about performance was given to the subjects during the experimentation. The dependant variables were constant error, absolute error and variable error. A 3 x 2 x 3 (Age x Expertise x Acceleration) analysis of variance (ANOVA) was performed for each dependent variable.

TABLE 1. Spatiotemporal Caracteristics of the Paths

		Constant Velocity	Increased Velocity	Decreased Velocity
Acceleration	($m.s^{-2}$)	0.00	+2,8	-2,8
Viewed Distance	(m.)	1.89	1.34	2.55
Occluded Distance	(m.)	1.42	1.29	1.55
Total Distance	(m.)	3.31	2.63	4.00
Viewed Time	(s.)	0.40	0.40	0.40
Occluded Time	(s.)	0.30	0.30	0.30
Total Time	(s.)	0.70	0.70	0.70
Initial Velocity	($m.s^{-1}$)	4.73	2.77	6.69
Velocity at the Occlusion	($m.s^{-1}$)	4.73	3.89	5.57
Final Velocity	($m.s^{-1}$)	4.73	4.73	4.73

RESULTS

The analysis of variance on constant error showed :
- no significant effect of Expertise [$F(1,42)=0,59$; $p=.44$] ;
- no significant effect of Age [$F(2,42)=0,84$; $p=.44$] ;
- a significant effect of Acceleration [$F(2,84)=3,66$; $p<.05$], a Newman-Keuls post-hoc comparison showed that this effect was found between the Constant Velocity and the Increased Velocity ($p<.05$) and between the Constant Velocity and the Decreased Velocity ($p<.05$) (fig. n°2) ;
- no significant interaction between these factors.

The analysis of variance on absolute error showed :
- no significant effect of Expertise [$F(1,42)=3,73$; $p=.06$] ;
- no significant effect of Age [$F(2,42)=1,30$; $p=.28$] ;
- a significant effect of Acceleration [$F(2,84)=3,36$; $p<.05$], a Newman-Keuls post-hoc comparison showed that this effect was found between the Constant Velocity and the Increased Velocity ($p<.05$) and between the Constant Velocity and the Decreased Velocity ($p<.05$) (fig. n°3) ;
- no significant interaction between these factors.

The analysis of variance on variable error showed :
- a significant effect of Expertise [$F(1.42)=6..23$, $p<.05$] (Fig. n°4) ;
- a significant effect of Age [$F(2.42)=8.51$, $p<.001$] (Fig. n°5) ;
- no significant effect of Acceleration [$F(2,84)=0,22$; $p=.80$] ;
- no significant interaction between these factors.

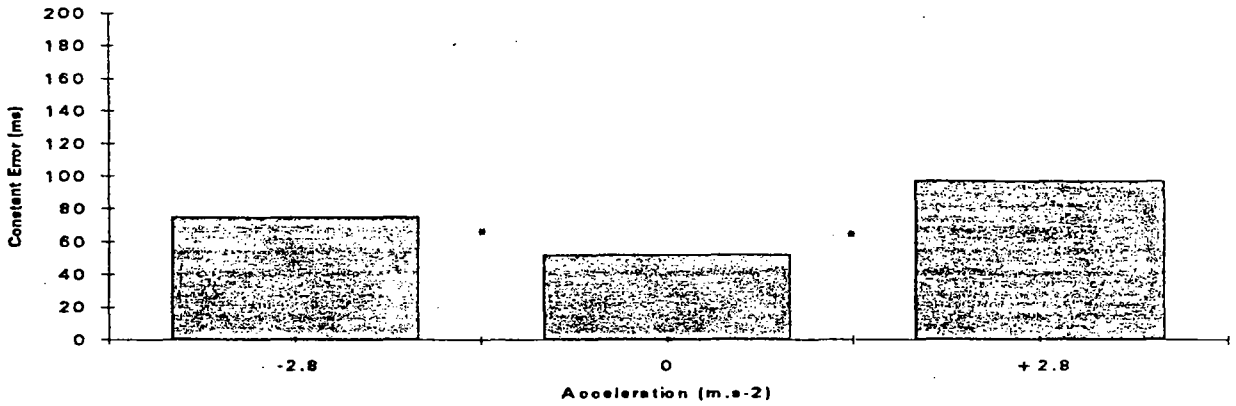

Fig. n°2. Effect of Acceleration on Constant Error (mean values for all subjects). * : Significant Difference (Newman-Keuls, $p<.05$).

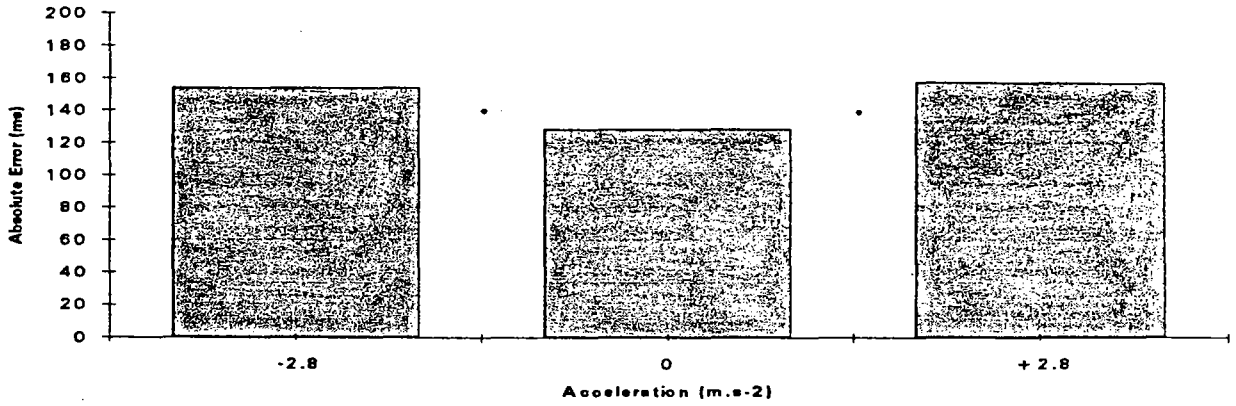

Fig. n°3. Effect of Acceleration on Absolute Error (mean values for all subjects). * : Significant Difference (Newman-Keuls, $p<.05$).

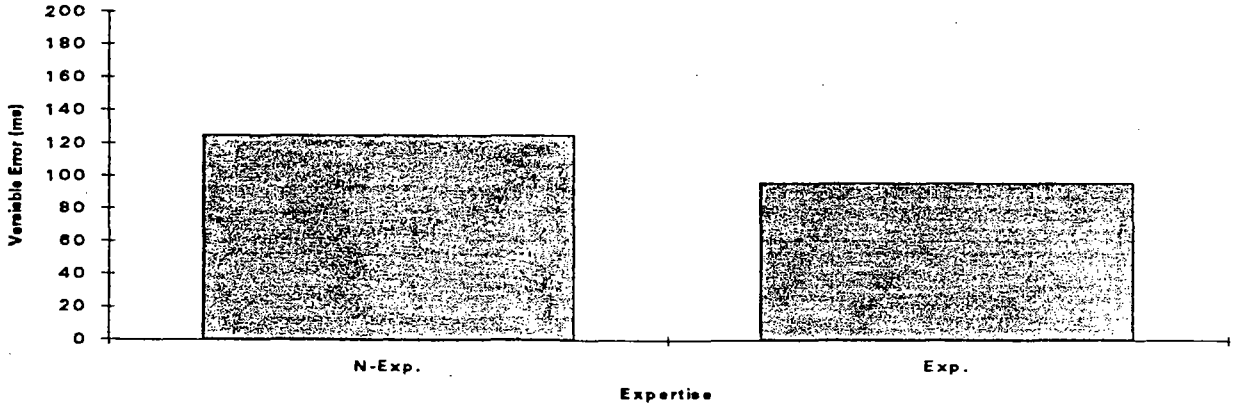

Fig. n°4. Effect of Expertise on Variable Error (mean values for all conditions). Expert Players are less Variable than Non-Expert Players [$F(1.42)=6..23$, $p<.05$].

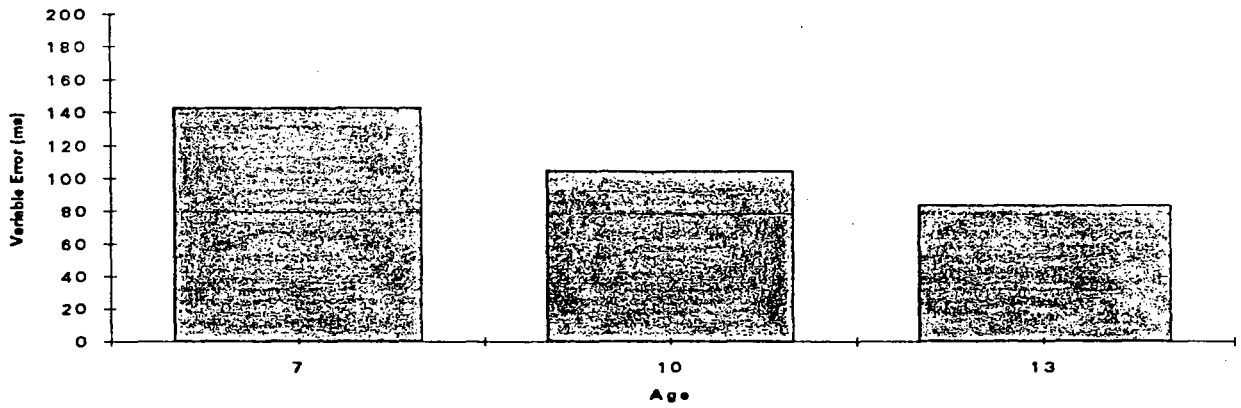

Fig. n°5 : Effect of Age on Variable Error (mean values for all conditions). Variable errors Decrease with Age [F(2.42)=8.51, p<.001].

DISCUSSION AND CONCLUSIONS

The first question addressed in the present contribution was a confirmation of the model proposed by Caird & Hancock (1994) for short occlusion. It can be noted first that, in agreement with the prediction of these authors, the subjects overestimate arrival time of the stimulus after its disappearence. However, the mean overestimation for our population is 74 ms. This result doesn't fit with the proposed equation ($y = 0.54x + 0.56$) which yelds for an occlusion of 300 ms a theorical overestimation of 422 ms. This first observation shows that the model defined by Caird & Hancock (1994) and which was elaborated on the basis of the results for long occlusions does not hold any more for short occlusions. This failure might be a consequence of the implication of different processes in arrival time estimation for short and long occlusion. On the basis of this first finding, it can be supposed that automatic processes are predominant for short occlusions while representations and computations are predominant for long occlusions.

In opposition with the results of Ripoll (1994), no significant difference was observed between the three age groups for constant error and absolute error. This lack of difference may be attributed to the high variability of the subjects. The analysis of variable error showed that children aged 7 are more variable than older children respectively aged 10 and 13. Even though the decrease of response variability represents a privileged indicator of the subjects' skill level (Gagnon et al., 1988), these results may indicate that the processes which interfere with arrival time judgement are functional very early (before 7) and that it is only the ability to use these processes which develops with age. This assumption is confirmed through the analysis of the effect of Expertise. As a matter of fact, the difference between expert players and novices is only located on variable error. The lack of interaction between Age and Expertise factors

means that this difference exists for all the age groups. The next question concerns the origin of this difference. On the one hand, it can be supposed that the practice of tennis which requires on each shot the estimation of time to collision of the oncomming ball induces an earliest stabilization of the processes of arrival time judgement. Following this assumption, it can be expected that non-expert players will develop the same ability with age. On the other hand, it can be thought that expert players possess special ability which induce a spontaneous superiority in the prediction of the arrival of a moving object. The response to this fundamental question would entail an extension of this study to younger children and to adults.

The final part of this study dealt with the effect of acceleration and the decelaration on the precision of the subjects' estimation. Sticking with the results of Lee et al. (1983) and Bootsma & Oudejans (1993) acceleration and deceleration of the stimulus are not used in the estimation and induce a decrease in response precision. Nevertheless, the overestimation for the decelerated velocity related to constant velocity doesn't fit with the exclusive use of the information contained in the tau margin. As a matter of fact, the expected result in this condition compared to the result in the constant velocity condition should have been an underestimation. This finding may lead us to think that variation in velocity (acceleration or deceleration) induces a general disorganization of the system in the direction of an overestimation. It can be finally remarked that this disorganization does not seem to be influenced by development or expertise in sport practising.

Following these observations, it can be concluded that, for short occlusion, the automatic processes in arrival time judgement are predominant. Nevertheless, the involvement of cognitive processes should not definitly be dismissed and more extensive research on the effect of development and practice remains interesting in the enhanced understanding of motion perception.

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THE APPROACH OF LITTERATURE NOVELS REGARDING THE SOCIAL REPRESENTATIONS OF HUMAN BODIES CONCERNING AIDS

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key WORDS (Aids, Social representations of human bodies, Litterature novels)

Introduction

Nous rendions compte lors du dernier colloque de la Société Francophone de Psychologie du Sport (POITIERS 1994) d'un recours à la littérature romanesque pour accéder aux représentations sociales du corps des sujets atteints du sida et aux facteurs sous l'effet desquels elles se structurent. Cette utilisation de la littérature comme moyen de connaissance des représentations corporelles était rendue nécessaire par la difficulté que rencontrent ces sujets à parler de leur corps autrement que comme les médias le font. Ils répondent à ces entretiens "tels que des sujets atteints du sida" le feraient sans que l'on puisse évaluer le degré d'appropriation par chacun de ces discours. Nous nous proposons d'étudier les conditions d'utilisation de la littérature romanesque à des fins didactiques et d'analyser les données relatives aux représentations corporelles qu'elle permet de recueillir.

Nous privilégions les représentations sociales du corps des sujets homosexuels pour deux raisons; 2/3 sujets auxquels nous proposions la pratique d'une Activité Physique et Sportive étaient homosexuels. D'autre part, les sujets homosexuels constituent 47,1% de la population globale contaminée par le VIH.

Method and Procedure

Nous ne nous sommes intéressés qu'à la littérature romanesque en première personne définie comme "l'étude de la subjectivité du malade qui interprète lui-même les processus qui font qu'il "se sent mal" ou "en pleine forme". (LAPLANTINE, 1986, 19) Elle compte, à la fin de l'année 1994, 21 ouvrages répartis de la manière suivante. 18 ont un homme pour auteur, 3 une femme. 14/18 des récits masculins sont l'oeuvre de sujets homosexuels, 2 de sujets bisexuels, 1 est l'oeuvre d'une sujet hétérosexuel, le dernier d'un homme prostitué. 2 des femmes sont hétérosexuelles, la dernière est toxicomane. Après ce premier repérage énonciatif, nous avons constitué un glossaire corporel. Y sont consignés tous les énoncés ayant pour thème central un élément corporel (bras, tête, etc.) ou un élément participant à la structuration de sa représentation (discours, médias, pratiques de soins, traitements thérapeutiques, etc.). Cela représente 2225 signifiants corporels. Ce glossaire a fait l'objet de deux

analyses; quantitative d'une part dans laquelle on ne s'est intéressé qu'aux signifiants corporels eux-mêmes, et qualitative dans laquelle on s'est intéressé aux énoncés. La première analyse nous a permis, avant toute catégorisation, de mesurer l'étendue du champ lexical du corps selon que le sujet est homosexuel, bisexuel, hétérosexuel, etc., et d'évaluer la nature des signifiants partagés par les sujets appartenant à un même groupe de transmission. Les données ont ensuite été catégorisées (20 catégories) selon les aspects du corps qu'elles mettaient en jeu (état corporel, image du corps, sensation, sexualité, etc.). Cette catégorisation devait nous permettre de répondre à la question suivante : "La représentation corporelle des hommes homosexuels atteints du sida se distingue-t-elle de celle des sujets appartenant à d'autres groupes de transmission?" L'analyse qualitative utilise la notion de classe-objet telle que la présente J.-B. Grize (GRIZE, 1990). Nous avons relevé dans le glossaire corporel et pour chaque sujet tous les énoncés utilisant le signifiant "corps" ou l'un de ses synonymes; "anatomie", "mécanique", "organisme", "terrain". Cette deuxième série de données a été répartie dans 3 catégories selon qu'elles désignent une propriété du corps , une relation du corps ou un schème d'action du corps.

Results

L'analyse quantitative : - l'étendue du champ lexical. Elle est en moyenne de 141,2 termes/ouvrage pour les hommes (2542/18) et de 135 pour les femmes (405/3). La différence entre hommes et femmes n'est pas significative, ni celle existant entre les différents groupes de transmission (sujets homosexuels = 158,9, autres groupes de transmision = 103,1). Cette analyse apporte 2 informations; la littérature romanesque du sida est d'emblée une littérature corporelle. Cela corrobore l'idée que la maladie "est un processus de prise de conscience et de connaissance du corps" et que sa narration accorde une très large place au corps. La seconde information est que la contamination par le VIH uniformise l'étendue du champ lexical corporel des hommes et des femmes alors que la différence était significative en 1976 chez des sujets "sains" (JODELET, 1976).

- la nature des notions partagées. Le corps "atteint" par le VIH, que le sujet soit homosexuel ou non, est un corps "mort". Le signifiant "mort" vient en première position des signifiants utilisés par les sujets homosexuels et en troisième par l'ensemble des autres. La déclaration de la maladie est vécue comme "une mort avant l'heure". Cette représentation corporelle interdit à la fois aux sujets d'éprouver quelque plaisir lors de la pratique des activités physiques et de se penser

capable de les mener à bien. "Etre contaminé par le VIH, c'est être porteur de mort". C'est aussi un corps où le "sang" occupe une très large place (7ème position pour les sujets homosexuels, 3ème pour l'ensemble des autres). La représentation corporelle donne réalité à la dimension intérieure du corps.

- après catégorisation, ce n'est pas à ce niveau que se manifestent les spécificités de chaque groupe de transmission. Les catégories qui viennent en première position désignent, pour chaque groupe, des éléments désignant "le corps propre", "l'état corporel" et "la maladie".

L'analyse qualitative : - Les propriétés du corps : les adjectifs les plus souvent cités par le sujet homosexuel contaminé par le VIH pour parler de son corps sont : "décharné" (5 citations), "affaibli", "atteint", "malade", "osseux" (2 citations). Les substantifs sont : "un champ de batailles", "une patrie dans laquelle on a grandi", "notre seul allié", "un territoire occupé". L'analyse des adjectifs et des substantifs dessinent les contours d'un corps vécu comme en état de guerre sur lequel s'inscrivent les stigmates de la maladie.

- Les relations : l'analyse des relations nous fait prendre conscience que le corps de l'autre (du proche, de l'ami) qu'il soit sain ou contaminé

par la VIH sert d'étalon. Lorsque le sujet est séropositif, le corps de l'autre ayant déclaré la maladie, agit comme une image de soi à venir. Lorsque c'est l'inverse, le sujet ayant déclaré la maladie y voit l'occasion d'évaluer ce qu'il a perdu comme l'écrit Bourdin "le lieu du corps des autres était toujours l'occasion pour toi d'une comparaison" (BOURDIN, 1994, 75).

- Les schèmes d'action : 3 types de discours reviennent majoritairement. Le premier montre le sentiment de dépossession de son propre corps au profit du médecin "Il me raconta à quel point le corps... lancé dans les circuits médicaux, perd toute identité, ne reste plus qu'un paquet de chair involontaire, brinque-balé par-ci par-là, à peine un matricule, un nom passé dans la moulinette administrative, exsangue de son histoire et de sa dignité." (GUIBERT, 1990, 32). Le second révèle une métamorphose perpétuelle du corps "Mon corps vit une mutation perpétuelle pour laquelle je me passionne" (DE DUVE, 1994, 137). Le dernier est spécifique de la période de la maladie déclarée "Un corps de vieillard avait pris possession de mon corps d'homme de trente-cinq ans" (GUIBERT, 1991, 10). Le sujet homosexuel vit un corps soumis à un processus de dégradation accéléré d'abord vécu comme un état de guerre lorsque la "lutte" est interne et ne se voit pas puis vécu comme un vieillissement anticipé. C'est avec ce corps tel qu'il est imaginé, vécu et représenté par le sujet contaminé par le VIH que

l'intervenant en Activités Physiques et Sportives a à composer.

Discussion and Conclusions

Cette approche de la littérature romanesque comme moyen de recueil de données relatives aux représentations sociales du corps s'inscrit dans la perspective ethnologique ouverte par Marcel Mauss selon laquelle il n'y a pas d'objet noble et indigne de la science. Elle permet les constats suivants. Le sexe n'apparaît plus dans le cas de la contamination par le VIH comme un facteur déterminant dans la constitution de la représentation sociale du corps. Il est relayée par l'appartenance ou non à un groupe social particulier défini par la nature de ses pratiques sexuelles. On comprend aussi que les représentations sociales du corps varient selon que le sujet est inscrit dans un lieu ou un autre. En d'autres termes que le contexte infère sur ces représentations par les discours qui y sont tenus, le regard sur le corps qui y est porté, et les pratiques qui y ont cours.

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PERCEIVED COMPETENCE AND ATTRIBUTIONS FOR SPORT OUTCOMES.

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KEYWORDS

competence, perceived, attributions, sport

INTRODUCTION

Over the past fifteen years, the development of the attributional model of achievement motivation and emotion (Weiner, 1979; 1986) has motivated several research work in sport contexts (for more details, see Biddle, 1993). However, in spite the fact that ability, or competence, are one of the variables that most interfere with performance, when we look the attributional sport literature we found few researches about this concern (Fonseca, 1993a).

Although some findings suggested that ability or competence are related with athlete attributions (e.g., Fonseca, 1993b; Kimiecik & Duda, 1985; Mark et al., 1984; Tenebaum & Furst, 1985), research sparseness and methodology inconsistency don't allow us to conclude indubitably in this way. In consequence, some authors (e.g., LeUnes & Nation, 1990) recommended further research in this area.

Therefore, the main purposes of this study were: 1) the assessment of the perceived causality of the most important sport outcomes of one group of athletes of several different sports; 2) the exploration of athlete perceived competence differences on perceived causality.

METHOD AND PROCEDURE

Subjects

The subjects were 305 athletes from several sports (swimming, artistic gymnastics, rythmic gymnastics, track and field and volleyball). Age of the subjects ranged between 10 and 24 years.

Instruments

The subjects completed a questionnaire which included: a) background questions such as sex, age, years of practice; b) questions about the contexts where occurred the worst and best sport outcomes of the athlete careers; c) sport specific scales of competence; and d) a Portuguese translated and validated version (Fonseca, 1992; 1993) of the Causal Dimension Scale II (CDSII; McAuley et al., 1992). The CDSII contains 12 semantic differential scales each scored on a 9-point Likert-type response scale and assesses four causal dimension properties of causal attributions (locus of causality, stability, personal control and external control). Each causal dimension is assessed by three items.

Procedures

The questionnaires were administered to the athletes during periods before or after their regular practice sessions. The investigators explained the purpose of the research and assured the confidentiality of responses.

In a first step, we asked athletes to recall their best and worst sport outcomes of their career (the criterion of the recalled outcomes selection was exclusive by the responsibility of the athletes) and to describe, in their own words, why they succeed and why they failed. After the athletes had stated an attribution for their performances, they rated that causes on the CDSII items. Scores for the four causal dimensions (locus of causality, stability, personal and external control) were created by summing athlete's ratings of the attributions on each of the four semantic differential scales representing that dimension. No time limit was established, and athletes were encouraged to ask the

investigators to clarify any items on the questionnaires. No one asked, so we were confident that the CDSII was easily understood.

RESULTS

TABLE 1. Context Assessment According to Athlete Perceived Competence and Outcome. Mean and Standard Deviations.

DIMENSIONS	OUTCOME	PERCEIVED COMPETENCE LOW n=85	MIDDLE n=130	HIGH n=90
SPENT TIME[1]				
	success	13.22 ± 13.51	12.54 ± 15.55	9.26 ± 12.37
	failure	13.57 ± 13.60	12.71 ± 13.37	13.38 ± 21.77
	success + failure	13.39 ± 13.51	12.63 ± 14.47	11.30 ± 17.73
RECALL CLEARNESS [1]				
	success	6.55 ± 2.10	7.05 ± 1.76	8.08 ± 1.39
	failure	6.16 ± 2.72	6.17 ± 2.35	7.09 ± 2.10
	success + failure	6.36 ± 2.43	6.61 ± 2.12	7.59 ± 1.84
IMPORTANCE [1]				
	success	7.01 ± 2.22	7.63 ± 1.61	7.97 ± 1.54
	failure	5.70 ± 2.75	6.51 ± 1.97	7.04 ± 1.99
	success + failure	6.36 ± 2.58	7.07 ± 1.88	7.51 ± 1.83
DIFICULTY[1]				
	success	6.34 ± 1.84	6.58 ± 1.78	6.21 ± 2.19
	failure	5.53 ± 2.12	5.73 ± 2.06	5.49 ± 2.32
	success + failure	5.94 ± 2.07	6.16 ± 1.96	5.85 ± 2.28

1=values indicated in months; 2=values ranged between 1 and 9 (higher values correspondend to high recall clearness, importance and dificulty).

Table 1 shows the opinions of athletes about the contexts where ocurred their more important sport outcomes. There weren't evident differences between the time spent before the recalled outcomes.
The athletes with high perceived competence (Hig-PC) recalled the contexts where ocurred their more important (positive and negative) outcomes with more clearness ($F_{2,583}$=14.113) than their colleagues

with medium perceived competence (Med-PC) and low perceived competence (Low-PC).

All athletes reported the competitions where happened their best outcomes as more difficult and important than the competitions where happened their worst outcomes. But, while Hig-PC athletes recalled their best results with more clearness than their worst results, Low-PC athletes did not reported any differences. Furthermore, Hig-PC athletes stated that their competitions were more important ($F_{2,583}$=11.451) than Low-PC athletes did.

TABLE 2. Outcome Assessment According to Athlete Perceived Competence and Outcome. Mean and Standard Deviations.

DIMENSIONS	OUTCOME	PERCEIVED COMPETENCE LOW n=85	MIDDLE n=130	HIGH n=90
PROBABILITY [1]				
	success	5.22 ± 2.03	5.73 ± 1.89	6.36 ± 1.73
	failure	4.56 ± 2.47	4.71 ± 2.12	4.09 ± 2.13
	success + failure	4.89 ± 2.28	5.22 ± 2.07	5.23 ± 2.24
EVALUATION [1]				
	success	7.50 ± 1.27	7.35 ± 1.52	7.73 ± 1.28
	failure	1.95 ± 1.55	2.34 ± 1.44	2.45 ± 1.59
	success + failure	4.74 ± 3.13	4.86 ± 2.95	5.07 ± 3.01
GENERATED SATISFACTION [1]				
	success	8.07 ± 1.64	8.02 ± 1.50	8.52 ± 1.02
	failure	1.85 ± 1.62	2.08 ± 1.78	2.04 ± 1.73
	success + failure	4.98 ± 3.52	5.07 ± 3.40	7.51 ± 1.83

1=values ranged between 1 and 9 (higher values correspondend to high probability, evaluation and generated satisfaction).

Hig-PC athletes indicated that their best results were more probable ($F_{2,302}$=6.886) than Med-PC and Low-Pc athletes did. Also, Hig-PC ($t_{1,148}$=7,164) and Med-PC ($t_{,1,214}$=3.711) athletes reported that their best outcomes were more probable than their worst outcomes, rather than Low-PC athletes did not showed any differences in their answers.

As expected, all athletes indicated that their best outcomes generated more satisfaction than their worst outcomes, and classified better the best outcomes than the worst outcomes.

TABLE 3. Dimensional Assessment of the Causes According to Athlete Perceived Competence and Outcome. Mean and Standard Deviations.

DIMENSIONS	OUTCOME	PERCEIVED COMPETENCE LOW n=85	MIDDLE n=130	HIGH n=90
LOCUS OF CAUSALITY [1]				
	success	18.21 ± 4.55	19.17 ± 3.88	20.80 ± 4.45
	failure	17.08 ± 5.87	17.75 ± 5.20	18.86 ± 5.52
	success + failure	17.65 ± 5.27	18.46 ± 4.63	19.83 ± 5.09
STABILITY [1]				
	success	13.25 ± 5.11	13.62 ± 4.96	15.14 ± 4.53
	failure	10.05 ± 4.80	10.86 ± 4.48	9.99 ± 5.10
	success + failure	11.65 ± 5.19	12.24 ± 4.91	12.56 ± 5.46
PERSONAL CONTROL [1]				
	success	18.24 ± 4.49	19.22 ± 3.94	20.89 ± 3.95
	failure	16.72 ± 5.59	18.10 ± 5.11	18.36 ± 6.18
	success + failure	17.48 ± 5.11	18.66 ± 4.59	19.63 ± 5.32
EXTERNAL CONTROL [1]				
	success	13.49 ± 5.30	13.30 ± 5.13	11.03 ± 5.03
	failure	12.01 ± 5.88	12.84 ± 5.68	12.11 ± 5.77
	success + failure	12.75 ± 5.63	13.07 ± 5.41	11.57 ± 5.42

1= values ranged between 3 and 27, with high values corresponding to high perceptions of internality, stability, personal control e external control.

In general, Hig-PC athletes assessed the causes of their outcomes as more internal ($F_{2,583}=7.806$) and personal controlable ($F_{2,583}=7.257$) and less external controlable ($F_{2,583}=3.692$) than Low-PC. Interestingly, these differences were consequence of differences on success attributions because there weren't evident significant differences when we compare failure attributions of the different athlete groups.

We found another interesting aspect: when perceived competence increased there were evident a more pronounced difference between the evaluation of success and failure attributions. In the Low-PC athletes

the success-failure attribution differences only were significant in the stability dimension. However, in the Mid-PC athletes the success-failure attribution differences were significant in the dimensions of stability and locus of causality, and in Hig-PC athletes the success-failure attribution differences were significant in the dimensions of stability, locus of causality and personal control.

DISCUSSION AND CONCLUSIONS

In the present study, athletes who perceived themselves as more competent assessed contexts and causes of the more important outcomes of their career in a different way than their colleagues who perceived themselves as less competent.

In general, our data provide some support for the suggestions of other authors (e.g., Kimiecik & Duda, 1985; Rudisill, 1989; Tenebaum & Furst, 1985) that perceived competence are related to the evaluation that people made about their outcomes. For example, Tenenbaum and Furst (1985) have stated that high perceived competence athletes evaluated the causes of their outcomes as more internal, stable and controlable than low perceived competence athletes.

In a previous study (Fonseca, 1993a) we also found significant differences between the way that athletes with different levels of expertise perceived the causality of their outcomes. When we studied professional and university soccer player attributions we found that professional players perceived the causes of their success as more internal, stable and personal controlable than university players. Moreover, professional players assessed their success causes as more internal, stable and personal controlable than failure causes rather than answers of university players did not show any differences between perceptions of success and failure causes.

In relation to the high importance dedicated to the sport practice in their lives it is not surprising if high perceived competence athletes evidentiated a more pronounced self-serving bias than low perceived competence athletes. In fact, our results are consistent with this hypothesis. For example, high perceived competence athletes seem profite better of the positive effects of success than their low perceived competence colleagues - when they considered success: a)

more probable; and b) originated by more internal, stable and personal controlable causes.

Mark et al., (1984) suggested the existence of a inverted relationship between competence and differences between success and failure attributions. We also found a relationship between: a) perceived competence; and b) discrepancy between the assessment of positive and negative causes.

However, the circumstance that we used a different instrument (CDS *versus* CDSII, respectively) and a different methodology to assess athlete competence (objective *versus* subjective, respectively) have to be reflected and only allow us to suggest further research to clarify this subject.

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SELF-ESTIMATES OF ABILITY AND FITNESS LEVEL, AND REASONS FOR SPORT (NON) PARTICIPATION BY UNIVERSITY ENTRANTS

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Key Words: Sport Participation; Participation Motives; Self-ratings of Ability and Fitness; College Freshmen

INTRODUCTION

It is important for the effective promotion and management of mass participation to examine the extent of and reasons for participation in sport and other physical activities. Frequencies of sport participation have been studied in North America (e.g., Athletic Footwear Association, 1990; Lindner et al., 1994a) and in Europe (e.g., Telama et al., 1994) and they appear to be substantially higher than in Asian children (Speak & Lindner, 1994). Patterns of motives for participation have also emerged from European (e.g., Harahousou & Kabitsis, 1994; Biddle, 1992; Biddle & Fox, 1988, Telama & Silvenoinen, 1979) and North American (e.g., Lindner et al., 1994b, 1991a; Gould & Petlichkoff, 1988; Wankel & Kriesel, 1985) research and were generally supported by recent results in a Hong Kong sample, where leisure and relaxation reasons were rated highest followed by health, sport competence and social reasons. Unlike the North American sample (Lindner et al., 1991a), the strongest non participation reason was *studying*, while *other interests* and *not being skilful enough* were also important.

From the analytical research by Lindner and his co-workers (Lindner & Speak, 1995; Lindner et al., 1994b, 1991b, Speak & Lindner, 1994) it has become evident that participation, non-participation and withdrawal reasons should be established for different groupings of subjects. While prevalence of motives has usually been established for children and youth in general, the utility of such measures should be questioned. For a fuller understanding and effective planning of youth sport it is necessary to examine the specific motives and problems in relevant groupings of the population. Some of the factors are evident: males have different reason than females; age groups differ significantly with respect to a number of motives as well. For sport withdrawal, factors of interest include: sport type, parental social status and economic indicators; level of sport participation at time of withdrawal (particularly elite dropouts versus lower-level dropouts), and the number of other sports the dropout was involved in at the time of withdrawal (Lindner et al., 1994b). In a recent paper Lindner & Speak (1995) demonstrated that there are significant differences in participation motives among groupings based on their frequency of sport and exercise participation.

In view of the importance motivation theories attach to feelings of competence, confidence and ability for the engagement in and adherence to physical activity and sport, it seems desir-

able to determine the role of perceived fitness and physical ability in the reasons respondents give for their participation and non participation. In this paper the data from the 1994 University of Hong Kong survey are analysed to examine differences in participation motives between respondents who indicated different self-ratings of their skill and fitness levels. In addition to providing evidence to support or question the theories, this study will be of practical value in that the needs and expectations of potential participants with very different achievement orientations will be gauged.

METHODS

Newly admitted students at the University of Hong Kong were issued a self-administered questionnaire as part of the documentation package from the university's registry in June 1994. At a rate of over 90%, 2533 returns were received (1164 from males and 1367 from females) via the students' faculty offices and analysed by the Physical Education and Sports Science Unit. The instrument included questions about the frequency of participation in sport or physical activities during the school years but outside of the school setting, and the frequency of intended participation during the university years. Reasons for past and future participation were queried through Likert-scale statements, for which the respondents indicated the strength of their agreement with stated reasons. The respondents were also asked to rate their own abilities in sport and physical activity and their own level of physical fitness as compared to people of their own age and sex.

For the current analysis, the respondents were grouped according to how they replied to the questions about their perceived ability, i.e., Far Above Average (FAA), Above Average (AA), Average (A), Below Average (BA) and Far Below Average (FBA). The physical fitness groupings were Very Good (VG), Good (G), Fair (F), Somewhat Poor (SP), Poor (P) and Very Poor (VP). Where the number of subjects dropped below 10, adjacent groups were combined. The strength of the average participation motives was compared among these groupings through one-way ANOVAs. Although there were substantial differences between the sexes with regard to participation motives as described by Lindner & Speak (1995), no separate analyses were performed for the current paper since significant sex by ability/fitness interactions were found for only a few of the motives.

The following research questions were studied in this paper:

- To what extent is frequency of sport participation associated with self-perceptions of physical ability and fitness?
- Are there significant differences in participation motivation reasons among groupings of self-perceived ability and fitness levels?
- Do respondents of different self-perceived ability and fitness levels rate reasons for not participating in sport and exercise differently?

RESULTS

Frequency of Sport Participation

Active participation in sports activities outside the school setting was comparatively low in this Hong Kong sample. More than 70% of the respondents indicated that they had never or rarely taken part, and less than 10% had been active twice or more a week. At the time of the survey, just over 10% was actively involved in sports, 16% of the males and less than 6% of the females. The attitude toward future participation was much more positive with more than half of the respondents indicating that they would be physically active at least twice a week while attending university. Only 7% said they would not or rarely participate.

There were moderate correlations between participation frequencies and perceived ability or fitness, all significant at .01. Ability and past participation correlated at r= .33; Fitness and past participation at r=.24. Future participation frequencies correlated to higher extents: with Ability r=.42 with Fitness r=.31.

The mean responses of the Ability and Fitness groupings for both past and future participation frequency are shown in Figure 1. The main effects of groups were significant ($p<0.0001$) for both Ability ($F_{4, 2545} = 112.2$ for future participation; $F_{4, 2512} = 73.0$ for past participation), and for Fitness ($F_{5, 2544} = 51.2$ for future participation; $F_{5, 2519} = 734.9$ for past participation). There was only a significant difference between the sexes for future participation by Ability groupings ($F_{1, 2545} = 9.3$; $p= 0.002$ for future participation).

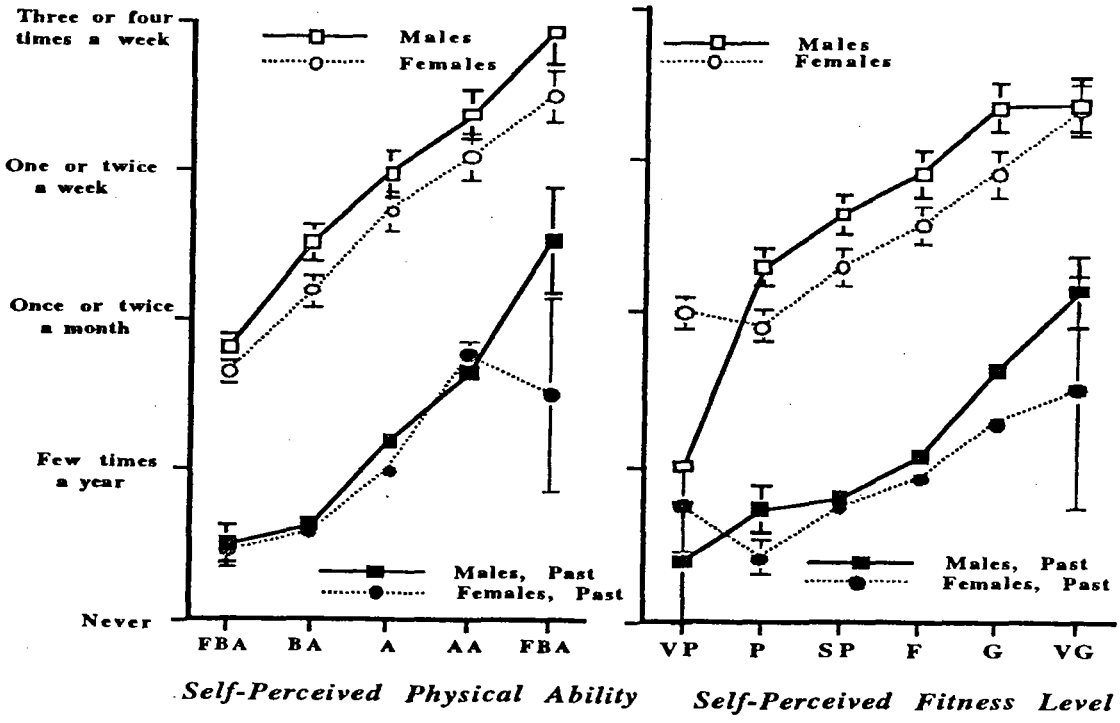

Fig. 1. Past and Intended Future Sport Participation by Ability and Fitness Groups

Future Sport Participation Motives

Most motives for future participation in University were rated significantly different by the self-perceived ability and fitness groups as shown in Figure 2. First, there is a general trend for higher groups to be more positive about the importance of the participation reasons, a reflection of improving attitude toward sport and physical activity with increasing ability and fitness levels. This trend was more pronounced across the ability than the fitness groupings. Exception was *Health*, which declined in importance with increasing ability and fitness groupings, but remained one of the most important motives. *Health* was the only variable for which the ability and fitness groupings did not differ significantly. In all other variables the F-test was significant for both ability and fitness groupings. Two variables clearly exceeded the general upward trend in the ability groups, i.e., *Skill* and *Sports Excellence* which increased dramatically with higher ability self-ratings. In the fitness groups this trend was only evident for the groups that rated themselves fair or better.

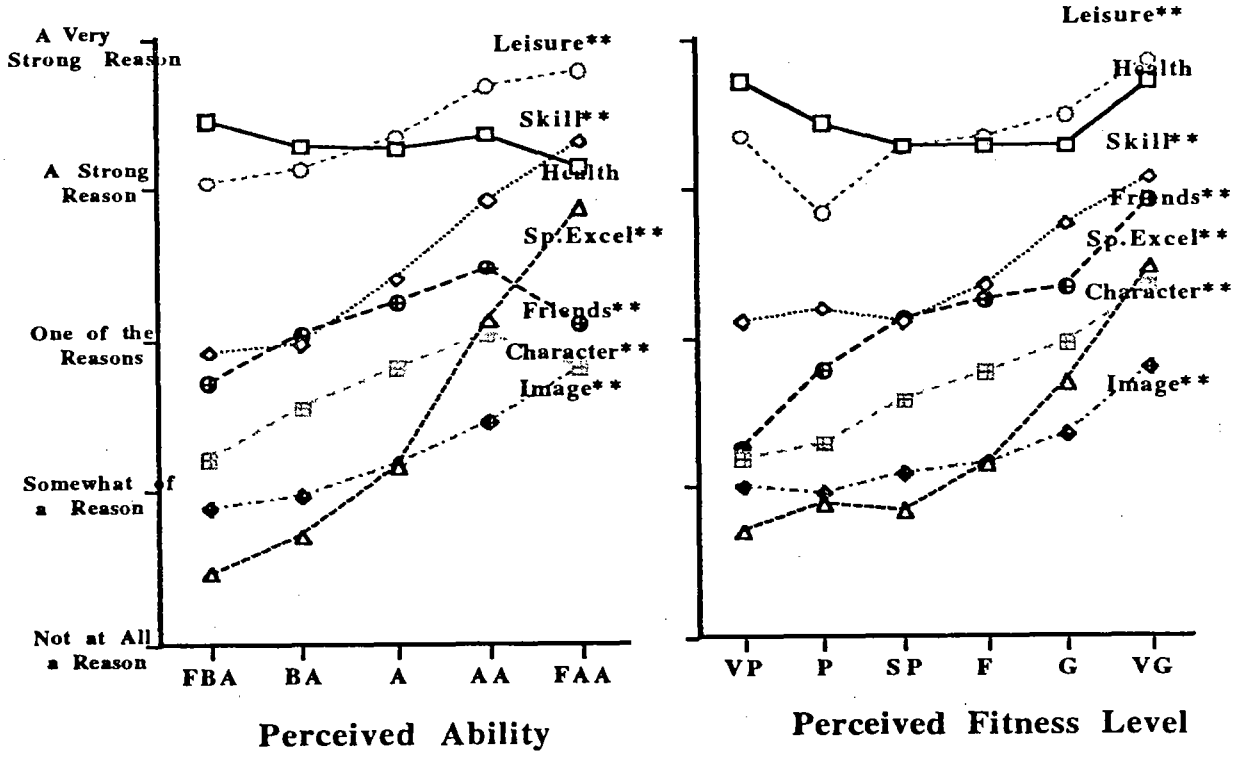

Fig. 2 *Reasons for Future Participation by Perceived Ability and Fitness Groupings.*
•• = sign.differences, p<0.0001

Future Non Participation Motives

Since there were only 180 respondents who indicated they would not regularly participate in sports or physical activity during their university years, the number of physical ability and fit-

ness levels had to be limited to three. *Lack of skill* and *interest* were the most important reasons for intended non participation by the low ability and fitness respondents (Figure 3), with *studying* a major third motive. The latter reason was the most important obstacle for participation by the Average or better groups, second most for the fair or better fitness respondents. *No interest* in the Average or better ability group was significantly lower in importance than in the other groups ($F_{2, 169} = 18.99$; $p<0.000$). *Poor health* as reason was modestly associated with self-perceived ability and fitness, the latter showing a significant difference for the fitness groupings ($F_{2, 161} = 3.16$; $p= 0.045$).

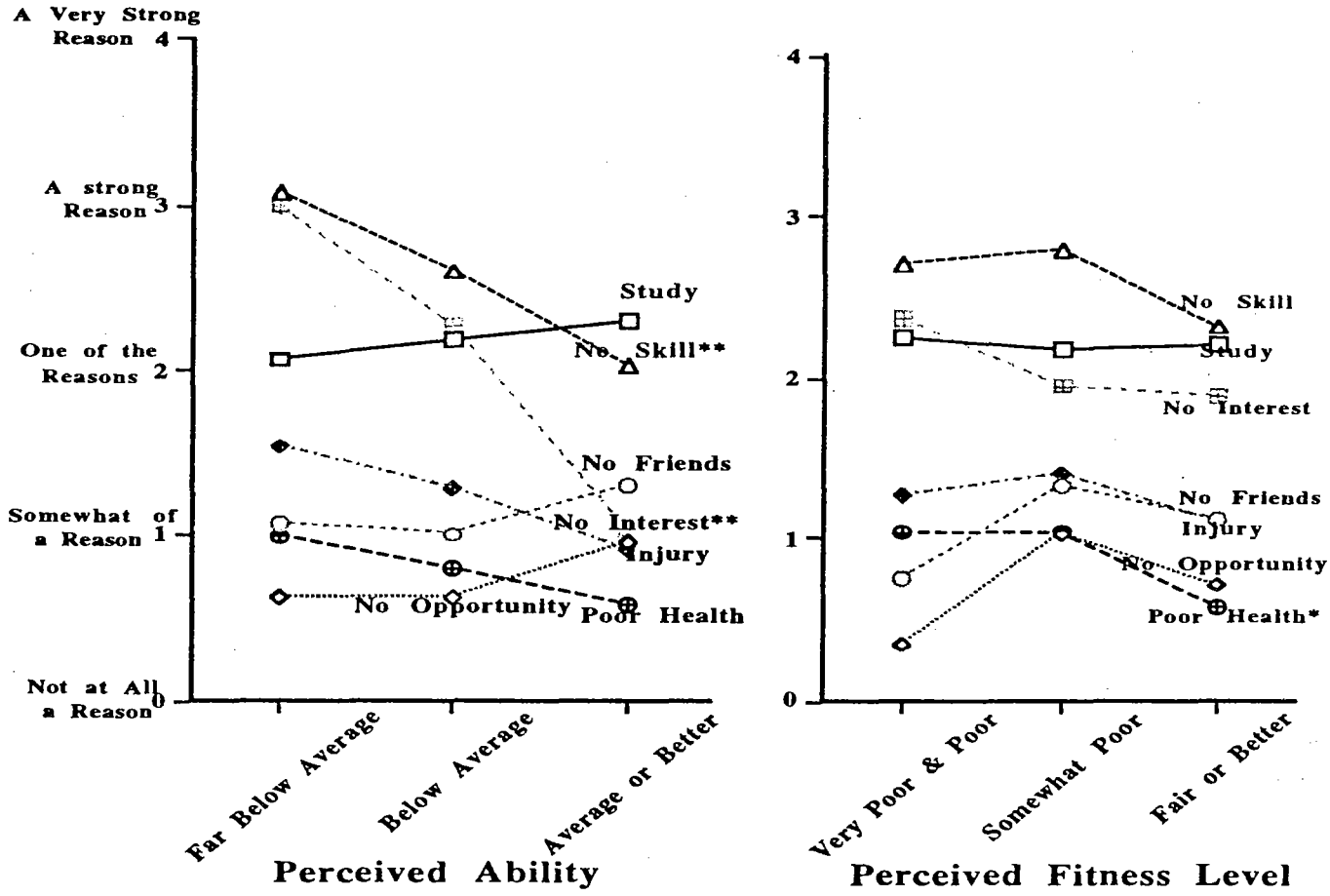

Fig. 3. Reasons for Intended Non participation by Ability and Fitness Groupings

DISCUSSION AND CONCLUSIONS

This paper has considered three separate, but related questions: the extent of sport participation associated with self-perceptions of physical fitness and ability; whether there are significant differences in intended future participation reasons among groups who perceive their own ability and fitness levels differently; and whether such groups rate reasons for intended non participation differently. The authors believe strongly that reasons for participation, non

participation and withdrawal should be considered for different groups of subjects. This would allow agencies to target specific groups whose needs may be substantially different. It is recognised, however, that this may not be easy to achieve in certain societies or environments. The authors also acknowledge the limitations of this paper in that the respondents form a selected segment of the age cohort, and the self-perceptions of fitness and ability may not indicate real ability or fitness accurately. From the available evidence it appears that Hong Kong students tend to overestimate their own fitness levels compared to established norms.

Among the findings of this survey the following warrant consideration:
1. With regard to extent of participation associated with self-perceptions of ability and fitness, it was found that there were significant differences for both past and intended future participation frequency among groups who ranked themselves differently. There was also a significant difference between the sexes in attitude to future participation based on self-perception of ability. Both sexes were positive in their prognosis, however, perhaps reflecting the opportunity and hope of a new start in a new, well-provided and sympathetic milieu. These findings also may reflect the feelings of students who have underachieved in sport and physical activity at the primary and secondary levels of education and who have become disenchanted with their own fitness and ability levels, compared with those who have enjoyed positive and successful experiences during their school years. As suggested by Competence Motivation theory (Harter, 1978), these respondents may have lost much of their desire to become competent in physical activity and are reluctant to return for another try, while high ability and fitness groups have acquired participation habits, feel confident (Vealey, 1986) and thus enjoy regular involvement.

2. With regard to participation reasons of those who perceive their own fitness and ability differently, there is evidence that those with higher ability and fitness are more positive about provided reasons for participation. This may reflect a general feeling of appreciation; a feeling that they have joined the party. There is also evidence that those in the FAA and AA groups rated *sports excellence* and *skills* very highly as reasons for participation, while the lower ability groups rated *leisure* and *health* as the most important ones. The view on the value of skill and fitness achievement and maintenance of those involved in higher levels of sport is probably reflected here.

3. As for non participation reasons rated by those who self-perceive fitness and ability differently, it was apparent that lack of skill and interest were the most important reasons offered by low ability and fitness respondents confirming the disaffiliation of this group already referred to. Studying was an important obstacle for all ability and fitness groups reflecting the work ethic typical of Hong Kong students, for whom 60 hours per week of studying at secondary and tertiary levels is not uncommon, and the community in general.

The implications for agencies would appear to be a desirability to identify groups clearly and cater to their needs. Those who, through reasons of self-perceived ability and/or fitness clearly wish to be involved in sport need provisions which allow them to compete at intramural, inter-hall and interfaculty or inter university levels, so that skills and fitness can be extended. On the other side, there needs to be considerable effort put into encouraging those who have low self-ratings of ability and fitness to share the pleasures of participation. This may come about through voluntary or required programmes which stress enjoyment and build fitness and skill levels gently.

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FATIGUE PERCEPTION IN TREADMILL MAXIMAL EFFORT TESTS*.

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KEY WORDS: fatigue perception, athletes, heart rate, treadmill run

INTRODUCTION

The perception of effort refers to the psychological identification of the actual level of fatigue during the development of an effort test or a competition. Thus, the accuracy of perceived effort during long-distance running can help athletes in controlling and delaying fatigue symptoms. When an athlete believes that he is making an effort that equals his real effort, he has more information to perform according to his possibilities (Rossi, 1994; Sime, 1985). Therefore, the accurate knowledge of his own effort could improve performance, since it allows to control the moment at which the extenuation arrives as well as to have information about the remaining time for arriving to the limit (Monod and Flandrois, 1986). Thus, the aim of this work is to compare perceived effort rates obtained by the Rating of Perceived Exertion Scale - RPE- (Borg, 1962), with heart rate (HR) values, while developing maximal effort tests in a treadmill run.

METHOD AND PROCEDURE

SUBJECTS

18 subjects belonging to two groups: a) 10 long-distance runners (7 men and 3 women), and, b) 8 sedentary subjects (4 men and 4 women). Mean age was 25.6 years (SD= 3.9 years), (See Table 1).

VARIABLES: MEAN STD.DEV.	GROUPS		TOTAL
	ATHLETES	SEDENTARY	
AGE	25.6 4.6	25.7 2.8	25.6 3.9
WEIGHT (kg.)	64.2 11.1	60.7 13.5	62.6 12.2
HEIGHT (cm.)	168.2 10.5	162.4 12.3	165.6 11.3
TRAINING HOURS	11.0* 3.5	3.5* 1.1	6.4 2.7

Table 1. Characteristics of the subjects (: P< 0.05).*

INSTRUMENTS

- Treadmill run, Jaegger, Laufergotest LE/3 model, with regulation of velocity and slope.
- Heart rate recording, Sport Tester, Polar model.
- Scale "Rating of Perceived Exertion (RPE), Borg (1962) for evaluation of perceived exertion. (See Table 2).

RPE:	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		very very light		very light		fairly light		somewhat hard		hard		very hard		very very hard	

Table 2. RPE scale is used to assess perceived exertion during exercise. Its values can be transformed (RPE value x 10) in order to make comparisons with heart rate values.

PROCEDURE

Subjects performed a maximal effort test on a treadmill run. This test was developed at a constant speed of 12 km/h., whereas slope was progressively increased by 2% every 2 minutes period (See Figure 1). At each minute, RPE and HR values were recorded.

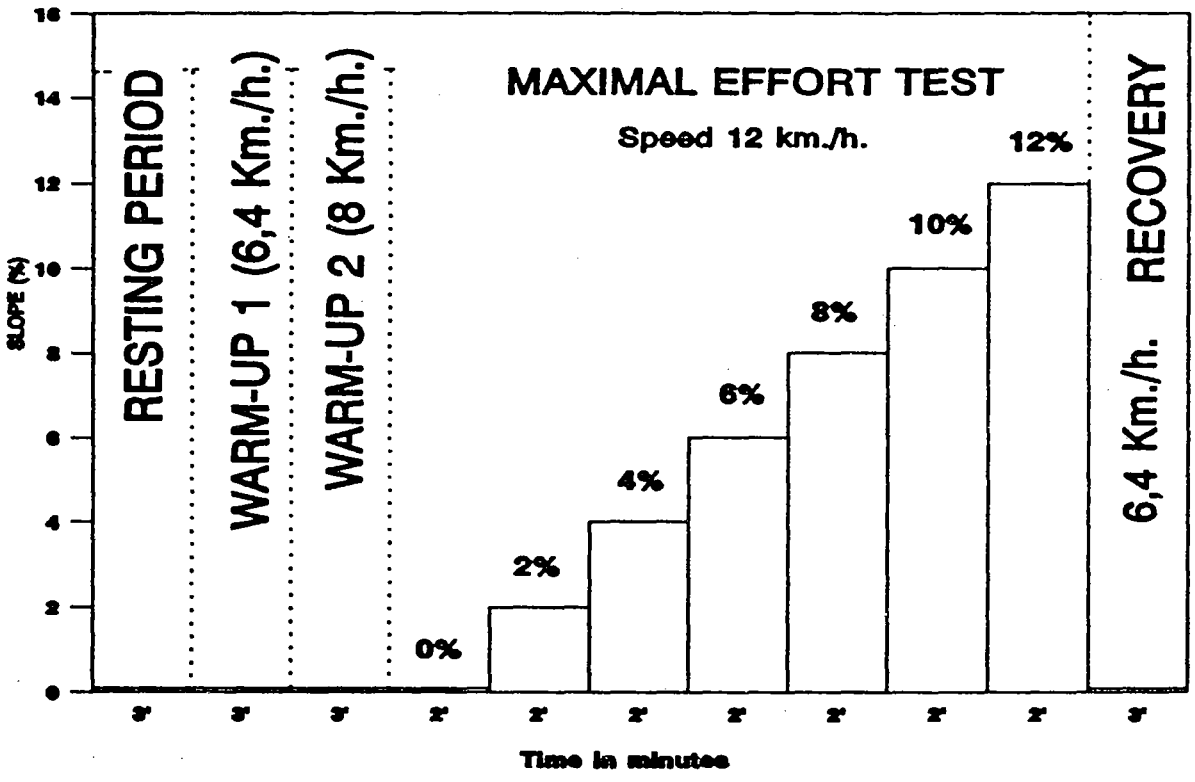


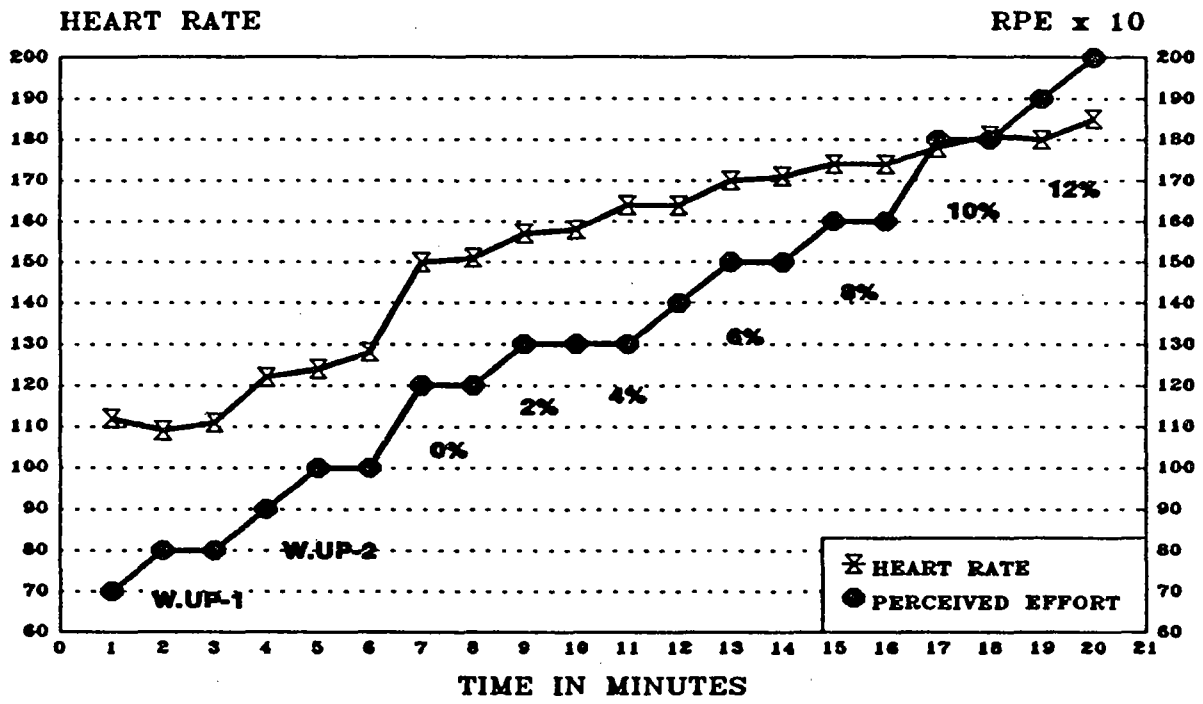
Figure 1. PROCEDURE USED FOR THE MAXIMAL EFFORT TEST IN THE TREADMILL RUN.

RESULTS

HR and RPE curves were obtained for each group of subjects. Between-groups differences were as follows:

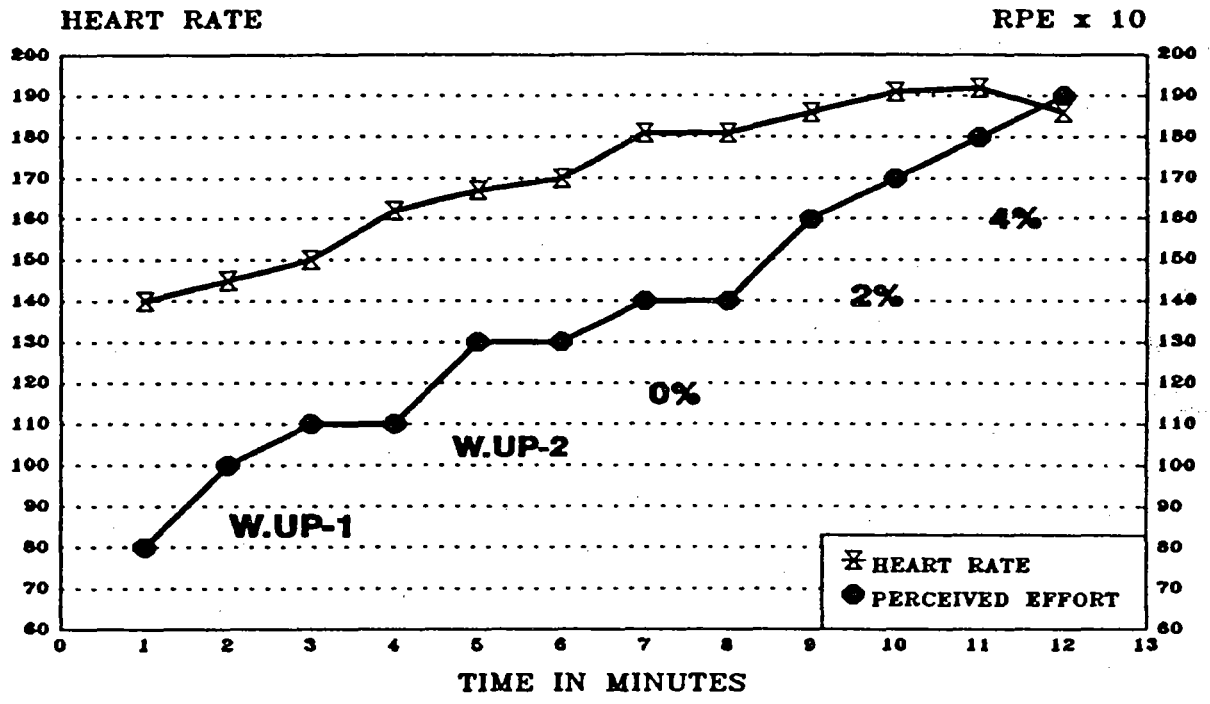
a) HR and RPE values are prone to a parallelism for the athletes group. It seems that the increases of RPE have a relation with the changes of each lap of the maximal effort test. For these subjects, the greatest effort period (with a slope of 12% on the treadmill run) shows a RPE value of 20 and a HR value of 185 bpm (See Figure 2).

FIGURE 2. Comparison between heart rate and perception of effort in the maximal effort test for athletes.



b) In general, HR and RPE values for sedentary subjects diverge from parallelism, particulary at the first minutes of the maximal effort test. At this moment, the differences between HR values and transformed RPE values (that is, RPE value x 10) reach statistical significance. However, at the greatest effort period (with a slope of 4%) subjects show a RPE value of 19 and a HR value of 192 bpm (See Figure 3).

FIGURE 3. Comparison between heart rate and perception of effort in the maximal effort test for sedentary subjects.



To better illustrate these results, Figure 4 shows the differences between HR and RPE for both groups. A positive value indicates that the HR is greater than RPE, whereas a negative value means that HR is lower than RPE. In the athletes group, the difference between HR and RPE remains constant, except for the final moments of the effort test. At this moment, the difference becomes negative and RPE arrives to its maximum value. On the other hand, sedentary subjects decrease their differences between HR and RPE as this effort test goes on. This indicates that the curves of HR and RPE are not going so parallell like in the athletes group. Besides, the sedentary ones show bigger differences between both curves. Both groups present significant differences in the differences between HR and RPE in the minutes one ($p < .005$), two ($p < .05$) and minute four ($p < .05$) (See Figure 4).

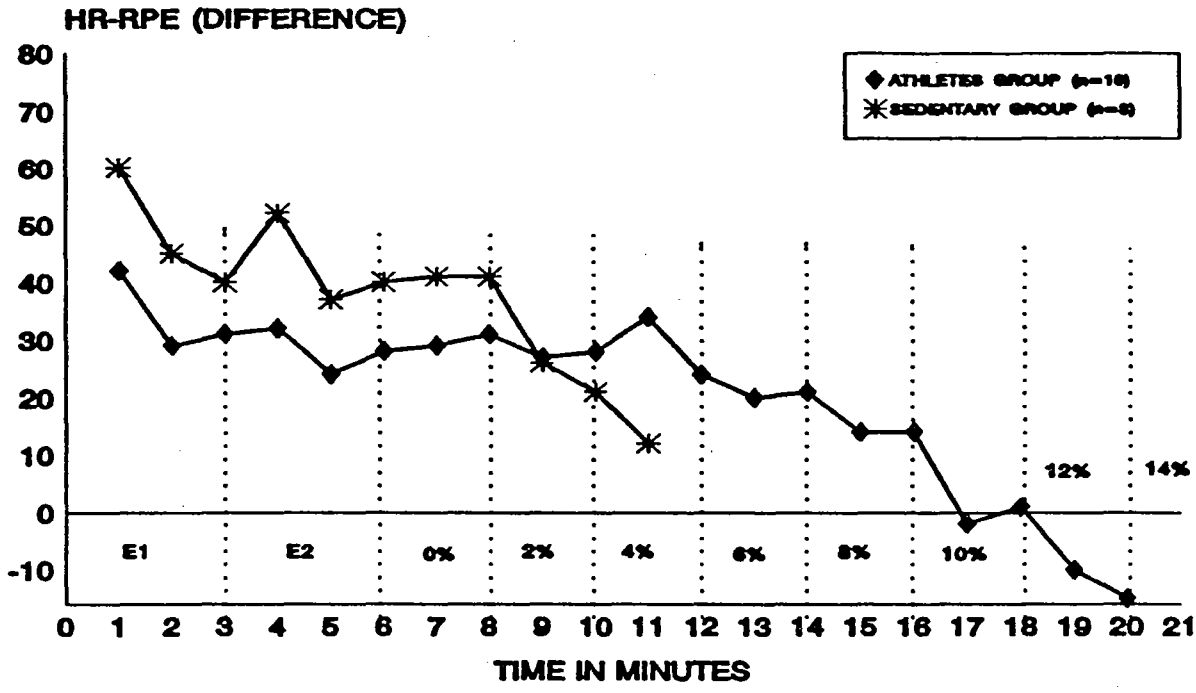


Figure 4. Difference value to compare between heart rate and perception of effort. Difference between athletes and sedentaries.

DISCUSSION AND CONCLUSIONS

Results show that, compared with sedentary subjects, athletes have a better perception of their effort, since their RPE values correlate with their real effort, wich is assessed by HR values. This ability could be related with the athlete's level of experience, since, in general, experienced athletes achieve a more accurate perception of their effort (Pandolf, 1982). Thus, strategies addressed to achieve a better effort perception (be these based on the knowledge of real heart rate or on the knowledge of respiratory frequency) could be very useful for individuals in order to recognize fatigue symptoms early (Mihevic, 1981; Sime, 1985). From this point on, sedentary subjects,

as well as beginner athletes, can develop a control of their physical effort and, consequently, a better performance during maximal effort test and/or competitions.

Another important aspect is that athletes seem to recognize better than sedentaries the limit of their effort, since they score the maximum value of the scale (20) just when they leave the effort test. On the other hand, sedentary subjects not playing sports do not recognize the appearance of maximum fatigue symptoms.

In future researchs we will apply psychological training programs -like those suggested by Capdevila (1989)- in order to develop a control of the effort perception wich can allow to an improvement of the athletes performance.

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Analyse des représentations et des motivations à l'égard d'activités sportives dans une population de jeunes femmes: duplication d'une enquête à dix ans de distance

Analysis of the representations and motivations toward sport activities in a population of young women : a revisited experiment

Prof. P. Salengros & C. van de Leemput[1]

En 1985, D. Massart a analysé, auprès d'une large population de femmes de 20 à 50 ans, les représentations et les motivations du recours à trois disciplines à caractère sportif, à savoir le jogging, l'aérobic et le body-building.

A cette époque, l'étude a été réalisée au moment où s'ouvraient, pour les femmes en général, et plus seulement pour celles qui avaient choisi une pratique sportive par vocation professionnelle ou par choix personnel, un ensemble d'activités au profil encore mal dessiné, sauf pour quelques points saillants, soulignés par les médias et la publicité, et qui touchaient essentiellement à la relation « sport - santé ». La banalisation de ces activités, pratiquées de manière solitaire ou groupale, a conduit à un intérêt sociétal évident, qui va déboucher sur une accélération des pressions culturelles ou sociales visant à les promouvoir, à les présenter d'abord comme un possible, puis comme une nécessité. Suivant le mécanisme qui est celui des mass médias en général, et que la mode illustre si bien, on passe du « pouvoir » au « devoir ». Une diversification des motivations en fonction du statut, de l'activité principale et de l'âge apparaît, car il n'est guère possible de mobiliser les femmes sur un seul objectif, pour des raisons évidentes.

Massart va dans un premier temps inventorier les messages plus ou moins séducteurs : maîtrise du soi psychique et de son corps par la gymnastique, plaisir pur, confiance en soi, joie de vivre, nouveaux sentiments d'appartenance, épanouissement, liberté... L'investigation des images - des représentations - de ces activités au travers d'un questionnaire fermé a conduit à

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des résultats qui se sont surtout intéressés aux différences formelles d'analyse des femmes par rapport aux trois activités, aux différences relatives à l'âge, à la pratique régulière d'un sport, à l'activité professionnelle.

En 1994, nous avons discuté ces résultats sous un angle méthodologique (C. van de Leemput & P. Salengros, 1994). L'objectif de cette discussion n'était pas de reprendre le catalogue des incitations formelles ou informelles qui ont conduit voici dix ans à une explosion de ces activités qui sont objet de l'étude mais d'insister sur les choix méthodologiques des traitements de tels questionnaires.

En fait, l'analyse de représentations au travers de questionnaires psychologiques amène naturellement la question de l'évaluation des concepts, concepts constituant le support des représentations, par le recours à des échelles de jugement, telle une échelle de Likert ou une échelle bipolaire. On retrouve aussi naturellement la question de la relativité du jugement exprimé sur de mêmes items d'un concept à l'autre (l'étude d'un concept à la fois ne poserait que le problème du rapport entre échelle construite et concept en analyse).

On connaît bien les réponses habituelles à la question de la comparaison entre concepts lorsque l'instrument d'investigation est constitué d'échelles métriques classiques ; la statistique descriptive apporte le soutien des tests t, des chi-carrés ou des analyses de variance sur les scores obtenus. Si le plus souvent, ces techniques apportent une interprétation des différences au niveau de l'item lui-même par rapport aux concepts en comparaison, elles portent en elles leur propre contradiction puisqu'elles apportent une information nécessairement limitée à leur niveau, alors même que les réponses fournies sont aussi dépendantes de l'environnement des autres items de l'échelle d'évaluation.

Pour notre part, les statistiques descriptives sont surtout l'occasion d'un affinement des échelles présentées, et permettant d'exclure des items pour lesquels les réponses démontrent une trop grande dépendance faciale aux concepts, ou qui au contraire, témoignent d'une insensibilité à ceux-ci, reflet tantôt d'un « rapport de force » disproportionné entre concept et item de l'échelle, tantôt d'une incompréhension vis-à-vis de l'item de jugement. L'analyse de premier niveau permet d'orienter les choix ultérieurs en matière d'investigation multivariée, offrant les tendances générales des réponses, permettant le test de la désirabilité apparente des liaisons « concepts - items », enfin initiant une réflexion sur l'intérêt de recourir à tel type d'échelle plutôt que tel autre, d'utiliser un nombre pair ou impair de pas d'échelle, etc... On l'aura compris, ce moment de l'analyse ne peut être perçu, et surtout lorsqu'il s'agit de représentations psycho-sociales, que comme une première investigation dotant les résultats (et singulièrement les moyennes de réponse) d'une valeur « absolue », sans référence encore à une nécessaire relativisation en fonction précisément de l'emprise des déterminations psychosociales que l'on étudie.

Une fois l'échelle épurée, il est possible de s'intéresser à des problématiques plus internes à la démarche qui a été menée ; l'une d'entre elles concernera les sujets, soit ici les répondantes à l'échelle proposée ; une autre prendra en compte les items de l'échelle elle-même.

La démarche la plus naturelle serait de s'attacher d'abord aux items et à leurs relations vis-à-vis du concept associé ; la sélection des items, la mise à l'écart de ceux d'entre eux qui n'apportent qu'une information très faciale ou biaisée, la mise en place de nouvelles passations

doivent faire l'objet d'une réflexion aussi précoce que possible. Elle est rarement menée et, dans certains cas, elle n'apparaît même pas comme précaution analytique lors de l'exposition des résultats. Par contre, les remarques relatives aux sujets sont fréquentes ; entre l'analyse « clinique » des réponses sujet par sujet, n'offrant qu'une information très locale (surtout si l'on travaille sur des populations étendues) et l'analyse qui prend en compte la totalité de la population au travers de moyennes générales, il doit exister pour l'analyste une voie moyenne qui tienne compte des variations de réponse certes, mais en les atténuant selon un procédé formalisé.

Bien des procédés ont été développés au cours des trente dernières années, en vue de permettre une comparaison des réponses de sujets à l'occasion de l'évaluation d'un ensemble de concepts par l'intermédiaire d'échelles sur le plan multifactoriel ; un procédé interactif consiste à utiliser la méthodologie que Faverge a appelé analyse binaire classique (Faverge, 1973, 1975 ; Karnas, 1977, 1982 ; Karnas et Salengros, 1983). En première approximation, nous dirons que cette méthode relève du caractère dual de l'analyse factorielle en composantes principales : une analyse factorielle en axes orthogonaux est réalisée sur les colonnes de la matrice des réponses, soit sur les items ou échelles, les corrélations entre les lignes (ici, pour cet article, les concepts) de la matrice formant base de la métrique. Cette analyse est complétée d'une seconde, réalisée sur les concepts cette fois, les corrélations entre items ou échelles formant, à son tour, base de la métrique. Les axes factoriels résultent de la structuration des items et permettent de situer les concepts par rapport à ceux-ci ; la correspondance entre les points figuratifs des items et ceux figuratifs des concepts permet une interprétation « relative » de ces derniers par rapport aux premiers.

La méthode de l'A.B.C., très riche lorsqu'on travaille sur de larges ensembles, pose cependant quelques difficultés lorsqu'il s'agit d'analyser quelques concepts seulement. Dans le cas qui nous occupe, trois concepts sont traités ensemble (il faut en effet au moins une matrice à trois « lignes » pour générer une représentation factorielle à deux dimensions), chacun d'entre eux figurant l'une des activités investiguées. Dans un tel mécanisme factoriel, les représentations privilégient les distances entre concepts et items, et donc le problème de la véritable discrimination de ces derniers les uns par rapport aux autres doit être posé par référence aux évaluations portées par les répondants.

On voit bien le débat méthodologique : distinguer dans l'analyse les positionnements qui signent des axes factoriels pertinents de ceux qui ne sont pas porteurs de sens au regard des réponses des sujets.

L'analyse typologique des réponses des sujets constitue une première réponse à l'étude de la cohérence des évaluations des répondantes, et elle va constituer la base des analyses binaires classiques discutées, les groupes typologiques construits se substituant aux sujets singuliers.

Ce traitement statistique consiste à diviser de manière naturelle - c'est-à-dire au sens des réponses portées aux items des échelles de jugement - une population de sujets ; on fragmente l'ensemble des sujets de façon à maximiser l'homogénéité des réponses au sein des groupes et l'hétérogénéité entre les groupes ; à chaque étape de l'analyse, il est possible de décider de la pertinence d'un groupement plus grossier ou non, voulant dire que l'on regroupe peu à peu des sous-groupes de sujets dont la ressemblance est de plus en plus artificielle (par exemple, Faverge, 1973, 1975).

L'analyse typologique répond ici à sa vocation d'expression de la variabilité des réponses individuelles ; l'analyse binaire classique réalisée, non plus sur les réponses globales aux différents concepts, mais réalisée sur la matrice des réponses des groupes typologiques et des échelles, permet de décider des significations accordées par tel ou tel groupe aux échelles ou aux items par le truchement des axes factoriels.

La technique des polygones convexes, développée dans notre laboratoire, suggère de construire un polygone en reliant symboliquement entre eux les points figurant les positions des groupes typologiques d'un même concept, délimitant de la sorte un « champ », et simulant « la zone d'influence » du concept sur les items de l'échelle, et donc aussi par référence aux axes factoriels que ceux-ci permettent de mettre en évidence. Par rapport à ces axes factoriels, on étudie alors les limites et les recouvrements des concepts les uns par rapport aux autres par le biais des recouvrements de ces champs convexes.

La démarche s'interprète ensuite plus aisément dans la recherche d'une différenciation entre critères ; on estimera que plus les polygones seront séparés les uns des autres, plus l'on pourra supposer que l'effet de différenciation est fort et concerne une majorité de sujets (ici les sous-groupes typologiques); plus les polygones seront confondus, plus l'on adoptera l'idée que si l'effet de moyenne générale joue bien un rôle de mise à distance des concepts les uns par rapport aux autres, il ne permet guère de prédiction sur les attitudes des répondants sur un plan plus individuel ; l'effet « sociologique » du questionnaire demeure, mais l'effet « psychologique » s'estompe (C. van de Leemput, G. Karnas, P. Salengros, 1994). La figure 1 présente la différenciation des concepts et la place des polygones y afférant.

A dix ans de distance, il faut reconnaître que le jogging, l'aérobic ou le body-building, s'ils font toujours partie du paysage des activités offertes aux pratiquantes, ont déserté les pages des magazines de mode ou les séances gymniques télévisuelles. Doit-on parler de banalisation, ou plutôt d'intériorisation (l'activité devenant plus « naturelle », il n'est plus nécessaire de la promouvoir constamment), ou encore dans certains cas de démystification, alors que les résultats peuvent ne pas sembler avoir été à la hauteur des expectations placées sur leur pratique ? La réponse à la question importe moins que le fait que les représentations, telles qu'elles sont amenées par un questionnaire fermé, doivent avoir changé, dès lors que nous savons combien elles sont fragiles (ou sensibles) au dit social en général.

Le questionnaire soumis est constitué de quatre parties essentielles. La première partie reproduit le volet utilisé en 1985 sur la représentation de trois activités sportives (le jogging, l'aérobic et le body-building) ; il s'agit de l'évaluation pour chacune des activités de 15 items sur une échelle bipolaire à 6 pas d'échelle, et ceci à partir de l'énoncé de l'activité et d'une photographie l'illustrant (Echelle n°1). Un second volet, préalable au volet d'identification, se rapporte au concept de santé en général ; il est figuré par une autre échelle bipolaire de 25 items, toujours à 6 pas d'échelle (échelle n°2). Un questionnaire ouvert, consacré aux valeurs personnelles et sportives clôture l'instrument d'investigation.

Le parallélisme avec l'instrument proposé en 1985 permet à présent des comparaisons très riches à partir d'une première hypothèse issue de la méthodologie des polygones convexes. Si la population traitée est naturellement différente d'une passation à l'autre, elle va l'être « graphiquement » de deux manières différentes :

- soit il s'agit de différences qui ne concernent que quelques sujets, dont les réponses sont par trop dissemblables par rapport aux tendances centrales, et qui constitueront de ce fait des groupes typologiques très spécifiques; dans cette éventualité, les groupes typologiques excentrés par référence au champ défini précédemment modifieront la surface du champ du polygone convexe sans que l'on puisse parler de réel changement de perception ; l'accroissement (ou la diminution) de ce champ ne témoignera pas d'une réelle différence de représentation ;

- soit il s'agira de différences qui intéresseront la position de l'ensemble des groupes typologiques par rapport aux axes factoriels définis, et l'on pourra -toujours par référence à ces axes factoriels - parler d'un glissement de sens, d'une modification des représentations, ce que nous pourrions encore appeler des changements de « style » perceptif, puisqu'il est possible de doter l'analyse des réponses moyennes aux items internes à un groupe typologique d'une signification plus globale, ce que nous appelons la mise en évidence d'un style de perception, pour ne pas dire d'un style comportemental.

Dans l'étude réalisée par Massart, l'analyse binaire classique réalisée sur les trois concepts à partir des groupes typologiques (dans ce cas, nous avons conservé un nombre important de groupes (8))avait permis de bien montrer l'étendue différenciée des champs, soit l'extension des concepts telle qu'exprimée par le polygone reliant les positions factorielles des groupes typologiques dans une analyse conjointe à l'ensemble des groupes typologiques.

Il s'agira ensuite d'éclairer ces éventuelles différences de représentations à la lumière des volets relatifs au concept de santé et aux valeurs personnelles et sportives.

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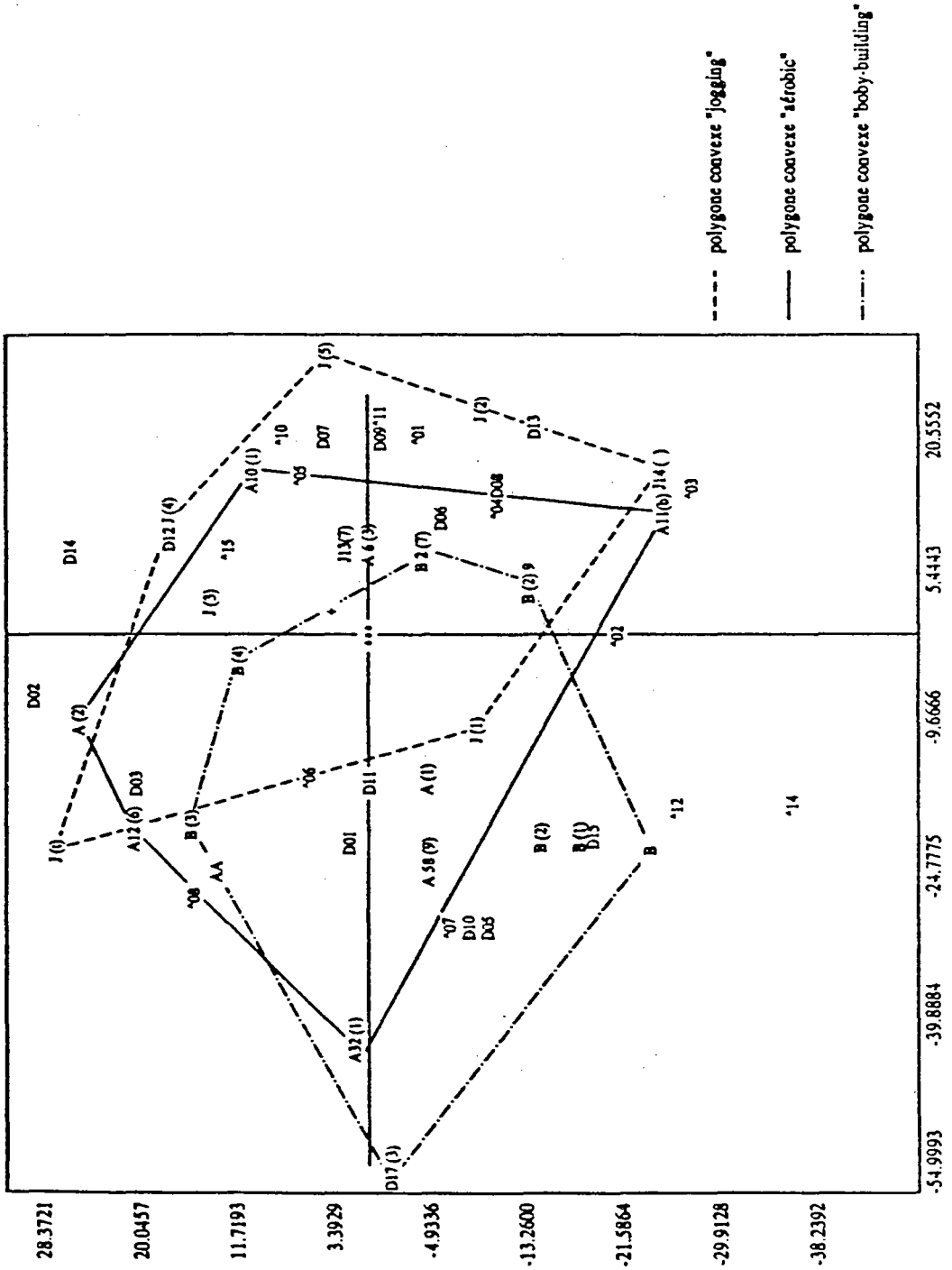
Figure 1 : A.B.C. sur les groupements typologiques des concepts



Volet n°I: évaluation de chacune des trois activités, « jogging », « aérobic » et « body building » au travers de l'échelle suivante:

Pour libérer son corps	☐☐☐☐☐	Pour se valoriser physiquement
Pour devenir plus forte	☐☐☐☐☐	Pour s'identifier à un groupe
Pour mieux se connaître	☐☐☐☐☐	Pour suivre la mode
Pour le plaisir de déployer l'énergie de son corps	☐☐☐☐☐	Pour s'affirmer
Pour se défouler	☐☐☐☐☐	Pour se réaliser
Pour se montrer	☐☐☐☐☐	Pour se faire des ami(e)s
Pour se sentir libérée	☐☐☐☐☐	Pour se détendre
Pour suivre ses ami(e)s	☐☐☐☐☐	Pour le plaisir de se sentir souple
Pour se mesurer à d'autres	☐☐☐☐☐	Pour compenser ses conditions de travail
Par goût du mouvement	☐☐☐☐☐	Pour se sentir battante
Pour se rapprocher de la nature	☐☐☐☐☐	Par amour pour son corps
Pour avoir le sentiment d'exister	☐☐☐☐☐	Pour rester jeune
Par snobisme	☐☐☐☐☐	Pour sortir de son foyer
Pour aller au-delà de ses limites	☐☐☐☐☐	Pour mincir
Pour garder la forme	☐☐☐☐☐	Pour s'exprimer corporellement

volet n° 2 :

Voici maintenant un questionnaire qui se rapporte au concept de santé en général. A chaque fois, deux mots s'opposent. Dans la mesure du possible, il vous est demandé d'exprimer votre évaluation du concept « santé » par rapport aux mots proposés. Pour ce faire vous devez mettre une croix dans la case de l'échelle qui correspond à votre degré d'accord avec l'une ou l'autre des propositions.

Pour soi	☐☐☐☐☐☐	Pour les autres
Difficile	☐☐☐☐☐☐	Simple
Par goût	☐☐☐☐☐☐	Par nécessité
Psychologique	☐☐☐☐☐☐	Physique
Angoissant	☐☐☐☐☐☐	Rassurant
Plaisir	☐☐☐☐☐☐	Contrainte
Pour l'avenir	☐☐☐☐☐☐	Pour maintenant
Hygiène de vie	☐☐☐☐☐☐	Régime
Réfléchi	☐☐☐☐☐☐	Spontané
S'autoriser	☐☐☐☐☐☐	Se priver
Par le sport	☐☐☐☐☐☐	Par le repos
Privé	☐☐☐☐☐☐	Public
Pour les vieux	☐☐☐☐☐☐	Pour les jeunes
Spontané	☐☐☐☐☐☐	Imposé
Pour le confort	☐☐☐☐☐☐	Pour la vie
Préventif	☐☐☐☐☐☐	Combatif
Vie active	☐☐☐☐☐☐	Cocooning
Pour tout le monde	☐☐☐☐☐☐	Pour certains
Visible	☐☐☐☐☐☐	Invisible
Médicaments	☐☐☐☐☐☐	Plantes
Etre mince	☐☐☐☐☐☐	Etre en forme
Onéreux	☐☐☐☐☐☐	Gratuit
Epanouissant	☐☐☐☐☐☐	Frustrant
Personnalisé	☐☐☐☐☐☐	Stéréotypé
Beurre	☐☐☐☐☐☐	Margarine

COGNITIVE AND EMOTIONAL BODILY SELF-PERCEPTION IN YOUNGSTERS

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Key Words: body perception, body measures estimate, body image

Body perception has been for some time object of interest and study in psychology. Body image, a mental representation of the body, has been considered as having two main components, a "perceptual component" and an "attitudinal component" (Slade, 1994). It is viewed as a loose representation, influenced by many factors: history of sensory inputs to body experience; history of weight change or fluctuation; cultural and social values; cognitive and affective variables; individual attitudes to weight and shape; biological variables.

Body image, therefore, is a perception developing and changing in time not only according to physical growth, but cognitive, social and emotional factors as well. It is an important element in the development of identity and sex roles, influenced by cultural aspects, sometimes based on stereotypes and prejudices. For instance, women are often particularly susceptible to body dissatisfaction because of great importance given to their appearance, in particular to slimness (Garner, Garfinkel, Schwartz, & Thompson, 1980; Jasper & Klassen, 1990).

With this research cognitive and emotional aspects of bodily perception have been taken into consideration, to verify in youngsters if differences linked to age and gender exist. This research was particularly aimed to verify if:

- estimate of body measures was more accurate with aging because of a better cognitive evaluation of spatial (metric) measures;

- differences by gender, as often reported in studies on body image, were shown also in body measures evaluation.

THE RESEARCH

Method and Procedure

In this study 180 subjects aged 12, 15, and 18 took part (30 males and 30 females for each age). Each subject was asked to evaluate some of their body dimensions: after giving them their own objective height in cm. and standard measure of 20 cm. as reference, they were asked to estimate their own biacromial, bicristale, and bithrocanter diameters and the acromial, cristale, and throcanter heights. For each subjective measurement, the corresponding objective measurement was pointed out. From this data, the subjective and objective areas of the body (head, torso, pelvis) and the entire body area were calculated.

A modified version of the body-cathexis (Jourard & Secord, 1955) was used to obtain an emotional body evaluation. Each subject was asked to rate on a 5-point scale how satisfied he/she was with each of 24 body parts. Finally, a physical self-efficacy scale (Bortoli & Robazza, 1991) was given to evaluate, on a 5-point scale, the perception of some aspects related to movement (for example, two items of the scale are "My muscles are strong", "I run quickly"). This scale revealed in other studies good reliability ($\alpha = .804$; split-half = .810).

Results

ANCOVA 2 (gender) × 3 (age), with objective areas as covariables, was performed on the differences between subjective and objective areas. ANOVA 2 (gender) × 3 (age) was conducted on the scores obtained from body-cathexis and physical self-efficacy. Scheffé test was used for all follow-up mean comparisons where appropriate (alpha was set at .01). To assess difference between subjective and objective area, diameters, and heights, *t* pair test was applied to each group.

Mean scores and standard deviations on the difference between body subjective and objective area, body-cathexis, and physical self-efficacy are reported in Table 1.

TABLE 1. Means and Standard Deviations on the Difference Between Body Subjective and Objective Area, Body-Cathexis, and Physical Self-Efficacy in Males and Females Aged 12, 15, and 18 (n = 30 Each Group)

Gender	Age	Subjective Area - Objective Area		Body-Cathexis		Physical Self-Efficacy	
		M	*SD*	*M*	*SD*	*M*	*SD*
Females	12	-349.03	876.65	92.43	7.58	25.60	4.75
	15	252.30	792.10	97.83	10.87	28.20	4.89
	18	-629.55	667.33	93.73	16.09	24.17	3.82
Males	12	-387.80	630.33	103.83	6.77	28.87	3.70
	15	123.46	791.62	97.73	8.55	28.97	3.71
	18	429.98	537.92	102.70	9.19	29.83	3.43

The difference between total subjective area and total objective area was significant in the main effects gender ($F_{2,173}$ = 6,34, $p < .05$) and age ($F_{2,173}$ = 8,95, $p < .001$), and in their interaction gender by age ($F_{2,173}$ = 11,38, $p < .001$). Males 18 years old perceived greater bodily area than the real one thus differentiating from females aged 18 and from boys and girls aged 12, who perceived smaller bodily dimensions than actual. No differences emerged by gender at 12 and 15. In males, subjective area was smaller than objective area at 12 ($p < .01$), became wider than the objective at 15 (even if n.s.), and even wider at 18 ($p < .001$). Females showed the same trend of males at 12 ($p < .05$) and 15 (n.s.), but subjective area became smaller than objective area at 18 ($p < .001$) (see Fig. 1, and 2).

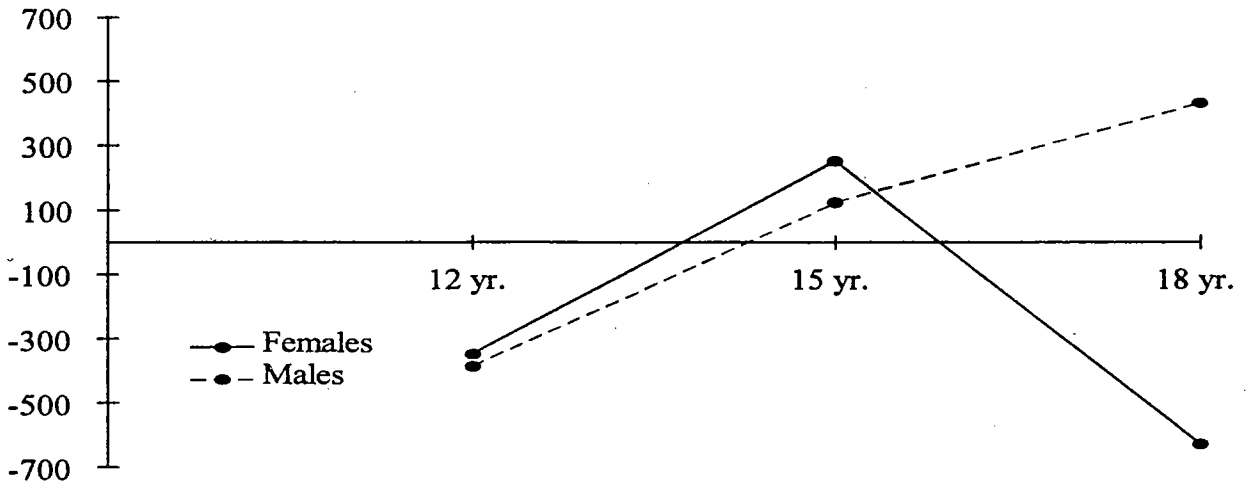

Fig. 1. Body Subjective and Objective Area by Gender and Age

In groups where significant differences emerged between subjective and objective areas (both males and females aged 12 and 18), *t* paired test on subjective and objective diameters and heights revealed the following results: boys and girls aged 12 as well as females aged 18, perceived themselves taller in the three heights considered ($p < .01$), while diameters did not reach a significant difference with alpha set at . 01 (except biacromial diameter on females 18 years old). Males aged 18, instead, perceived themselves wider in the three diameters considered, and in acromial height (see Fig. 2).

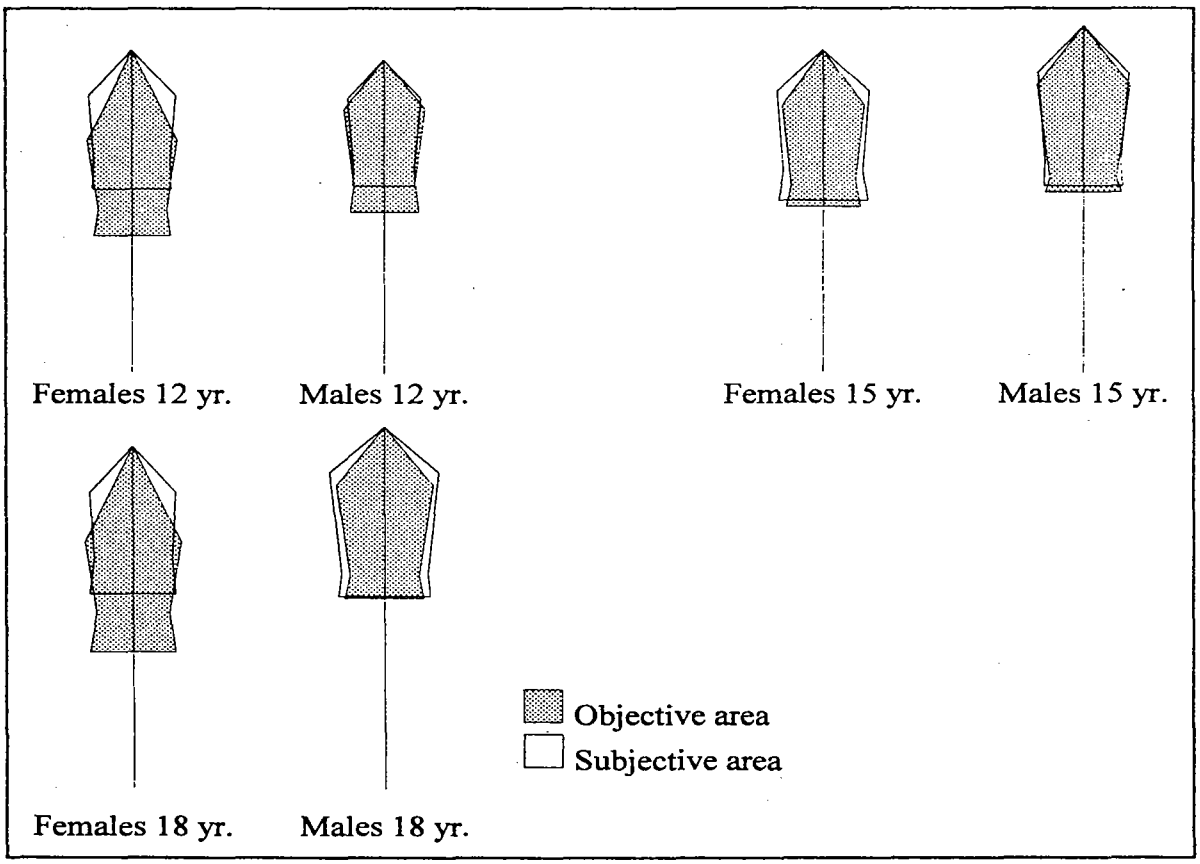

Fig. 2. Subjective and Objective Areas by Gender and Age

In body-cathexis, differences were found by gender ($F_{1,174} = 19.31$, $p < .001$), and in the interaction gender by age ($F_{2,174} = 5.18$, $p < .01$): females appeared to be less satisfied with their body than males and the largest difference between the two genders appeared at 12. Similar results were found in the physical self-efficacy (gender: $F_{1,174} = 28.12$, $p < .001$; gender × age: $F_{2,174} = 5.38$, $p < .01$): females showed less physical self-efficacy, particularly at 18 (see Fig. 3).

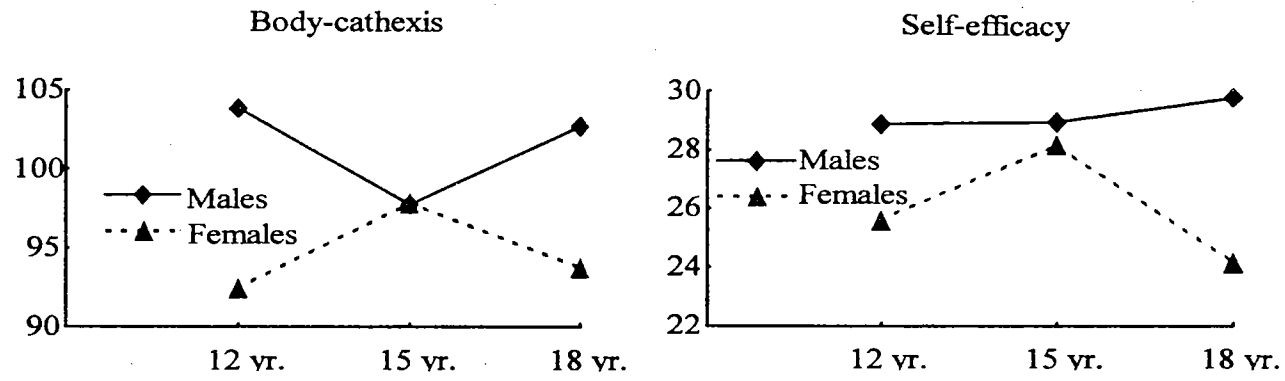

Fig. 3. Body-Cathexis and Physical Self-Efficacy Scores by Gender and Age

Discussion

The results taken together showed how the two genders perceived their body in a different way, both at cognitive and emotional level. Differences existed also by age. On body size estimate, boys and girls 12 years old perceived acromial, cristale, and throcanter heights higher than the actual measures. This could be related to desire to grow and imprecise awareness of bodily modifications. At 15, instead, perceived measures did not differentiate from the actual, maybe because of slower growth and certain body structure stabilization. At 18, difference by gender came out: males perceived width measures wider than real, while females perceived higher height measures. Body shape at 18 is quite stable and fixed; both genders probably have an ideal body image, socially and culturally influenced, differing from the actual. For instance, while broad shoulders are appreciated on males, the opposite is true for females.

In body-cathexis the findings confirmed what previously noted in other studies: females expressed higher dissatisfaction with their body than males (Fisher, 1986; Mintz & Betz, 1986; McCauley, Mintz, & Glenn, 1988). Social pressure to a cultural ideal of female slenderness is probably partly to blame for body image dissatisfaction among females. According to previous studies (Bortoli, Robazza, Viviani, & Pesavento, 1992; Viviani, Bortoli, Robazza, & Casagrande, 1991), males exhibited also better physical self-efficacy than females. Although more girls participate in motor activities and sports today than ever before, sex-role socialization and sex-stereotyped attitudes still act negatively on female athletic participation. Girls, therefore, have fewer opportunities to develop motor skills and to

improve, in this way, their self-efficacy expectations and personal confidence in facing motor tasks.

In conclusion, males tend to give a better image of themselves. Social and cultural factors linked to gender roles, and the different value given to physical appearance can, at least in part, explain the results.

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