

PSYCHOLOGICAL EVALUATION IN SPORT: METHODOLOGICAL AND PRACTICAL ASPECTS

M^a Dolores González Fernández

Instituto de Psicologia e de Ciências da Educação. Universidade Lusíada do Porto (Portugal)

Evaluation is one of the most important functions in psychological work. In this article, the most important assessment instruments in Sport Psychology (tests and questionnaires, interviews, observations and psychophysiological registers), as well as some administration references collected from the principal Spanish books and scientific journals are presented. Moreover, we analyze some important methodological and practical aspects in this process. Among them, the need to create specific and validated instruments for Spanish athletes or the need to complement the information with more than one instrument must be highlighted. These aspects will allow us to work more effectively in the assessment process, and also to guarantee a greater scientific rigor in psychological work in sport contexts.

Key words: *Evaluation; Instruments; Sport psychology; Practice; Methodology.*

La evaluación es una de las funciones más importantes en el trabajo psicológico. En este artículo presentamos los instrumentos de evaluación más importantes en la Psicología del Deporte (tests y cuestionarios, entrevista, observación, registros psicofisiológicos y sociograma) así como algunas de las referencias de aplicación recogidas en los principales manuales y revistas científicas españolas. Además, analizamos algunos de los aspectos metodológicos y prácticos más importantes en dicho proceso. Entre ellos, cabe destacar la necesidad de crear instrumentos específicos y validados para la población deportista española o la necesidad de complementar la recogida de información con más de un instrumento. Estos aspectos nos permitirán trabajar más eficazmente en el proceso de evaluación. Y garantizar un mayor rigor científico en el trabajo psicológico en contextos deportivos.

Palabras clave: *Evaluación, Instrumentos, Psicología del deporte, Práctica, Metodología*

Within the field of Sport Psychology and Physical Exercise, the following professional actions stand out (COP, 1998; Cantón, 2002; 2009): a) Evaluation and Diagnosis, b) Planning and Assessment, c) Intervention, d) Education and/or Training and e) Research. Without denying the importance of any of them, this article will be focused only on the first, being one of the areas of Psychology present in any activity undertaken by psychologists and probably one of the areas that has aroused most interest among professionals in this field from the beginning.

The aim of the evaluation process is to attempt to identify the behavior being studied in its different response variables as well as those that maintain or control them. Therefore, evaluation is not reduced to a simple analysis but must be centered on the relations that individuals establish with their physical, biological and social

environments. For this reason, Sport Psychology must evaluate the sports context that includes athletes, coaches, judges, relatives, spectators and means of communication. Both in the applied professional field and in the most rigorous research, the availability of reliable instruments for the gathering and analysis of information has become a condition for the advancement of this discipline (Renom, 2005). In order to carry out said evaluation, Sport Psychology professionals use valid and reliable assessment instruments and procedures, such as tests and questionnaires, interviews, observation registers, physiological registers, or sociograms, among others.

This article does not pretend to be an exhaustive review of the psychological evaluation process in sport but to briefly present some of the most utilized instruments in this context with detailed practical references by diverse authors of the principal manuals, acts of Congress and scientific journals concerning Sport Psychology and Physical Activity. The article is complemented with a discussion referring to some of the most relevant methodological and practical aspects in sport psychological assessment with a view to presenting some

Correspondence: M^a Dolores González Fernández. *Instituto de Psicologia e de Ciências da Educação. Universidade Lusíada do Porto (Portugal). Rúa Dr. Lopo de Carvalho. 4369-006 Porto, Portugal.*

E-mail: madogon@terra.es dolores@por.ulusiada.pt

future challenges. For a more detailed review, see Anguera (2002) and Cruz and Capdevila (1997).

PSYCHOLOGICAL ASSESSMENT INSTRUMENTS IN SPORT

The assessment instruments used in the sports field are no different than those employed in other areas of Psychology, although evidently, the specificity of said context requires adapting the instruments. Thus, we will refer to tests and questionnaires, interviews, observation, psychophysiological registers and sociograms as the most utilized procedures.

a) Tests and questionnaires

Doubtlessly, tests in their different modalities comprise one of the most utilized assessment procedures in Psychology in general and in sport psychology in particular. Questionnaires are extremely useful for gathering information about the athletes and other members of the field, their attitudes, beliefs, experiences and motivations, especially when a study is required. The information obtained with the tests and questionnaires must be enhanced with data obtained through personal interviews and direct observation of the athlete. In spite of their great advantages, they can be of little use in elite athletes if these perceive the situation as a threat, favoring positive responses (social desirability) or intermediate responses (central tendency), as stated by Orlick and Partington (1988).

In the *Directory of Psychological Tests in Sport and Exercise Sciences*, Ostrow (1996) presents 314 psychological assessment instruments gathered from English-language articles published in diverse international science journals during the period 1965 – 1995. Among these, it is worth mentioning 31 instruments found in the chapter dedicated to anxiety or 47 instruments included in motivation in sports and physical exercise. Nevertheless, as indicated by García-Mas, Estrany and Cruz (2004), only one of every three is based on a clearly defined conceptual framework, fewer than one-quarter of them present data about factor analysis and fewer than 10% show evidence of an extensive range of references prior to their construction. In Spain, Guillén and Márquez (2005) in their *Directory of the Psychology of Physical Activity and Sport* dedicate a chapter to tests and instruments used in this area, accumulating a total of 322. Of these, only 12 present data about their Spanish adaptation. In said manual, data regarding five tests developed from the outset by Spanish specialists are cited.

One of the variables that without doubt has attracted the most interest in relation to sports performance and psychological variables has been mood states (De la Vega, Ruiz, García-Mas, Balagué, Olmedilla & del Valle, 2008). To this end, one of the most adequate instruments used is the *Profile of Mood States* (POMS, McNair, Lorr & Dropleman, 1971) consisting of six subscales all of which are negative (tension, depression, confusion, fatigue and anger) with the exception of vigor, which is considered to be positive. The protocol of the Spanish version corresponds to the High Performance Center in Sant Cugat del Vallés, in Barcelona (Pérez-Recio & Marí, 1991), where two brief forms (with 15 items) are also used. Reviews of the research and meta-analysis confirm that the POMS is a useful instrument for making predictions about sports performance based on mood states (Andrade, Arce & Seoane, 2000).

In Spain, one of the instruments utilized most is the *Questionnaire of Psychological Traits related to Sports Performance* (CPRD) by Gimeno, Buceta and Pérez-Llantada (1999). It consists of 55 items divided into 5 subscales that evaluate stress control, the influence of performance assessment, motivation, mental skills and team cohesion. Nieto and Olmedilla (2001) used it to evaluate Gimeno, a race walker (2001) as part of the assessment process for sports talents in judo. The CPRD can be a useful instrument to assess the needs and resources of a single athlete or an entire team raising hypotheses within the framework of functional analysis or to implement psychological training programs to maintain and strengthen psychological skills in athletes (Gimeno, Buceta & Pérez-Llantada, 2007).

One type, scarcely used but also present in Sport Psychology, are projective tests (Renom, 2005), especially in some Latin American countries such as Argentina, which has a great tradition using this kind of focus (Roffe, 1999, 2004).

Finally, we can emphasize the reduced presence of sports instruments in general, commercialized catalogs. Among these, it is worth mentioning the *Battery of Psychological Tests for Athletes PY-BTPD-S* (Fernández, Fernández & Mielgo, 1999) or the *Cognitive Strategies Questionnaire for Athletes* (Mora, García, Toro & Zarco, 2001).

b) Interviews

The initial interview should collect the maximum information possible in areas relevant to sports practice. In Table 2, a summary of the basic, specific data to be collected is shown

in the interview proposed by Dosil (2004). It obviously requires previous training on the part of the sport psychologist in order to be performed correctly. Such aspects as adequate verbal and nonverbal communications, redirection of the topic when deemed necessary or shortening of responses when they are too long or irrelevant are important. Neither must we forget to establish a relationship of trust between the psychologist and athlete in order to facilitate the collection of information.

As examples of semi-structured interviews, we can highlight that used by Alonso-Arbiol, Arratibel and Gómez (2008) with the purpose of verifying motivation for initiation, maintenance and abandonment of football referees or that of Sánchez and Torregrosa (2005) to investigate the role that psychological traits play in climbing performance. Pozo and Sagredo (2005) propose an exhaustive exploratory interview in which information is collected in different areas such as economic resources, personal relationships, studies/work, time organization, sleep, alimentation and injuries, other sports, current sport, sport results, objectives/motivation, relation with the coach, teammates, training and competition.

TABLE 1 TESTS AND INSTRUMENTS USED IN SPORTS PSYCHOLOGY CREATED BY SPANISH AUTHORS. TAKEN FROM THE DIRECTORY OF SPORT PSYCHOLOGY AND PHYSICAL EXERCISE (GUILLÉN AND MÁRQUEZ, 2005)	
✓	S. Márquez (1992). Antecedents, Manifestation and Consequences of Anxiety in Sports Competitions Questionnaires (CAMC)
✓	M. Boixados, M. Torregrosa, M. Mimbrero and J. Cruz (1994). Observation of Fairplay in Football Instrument (IOFF)
✓	G. Marrero, J. Martín-Albo and J. L. Nuñez (1996). Initiation, Maintenance, Change and Abandonment Questionnaire (MIMCA)
✓	J. Dosil and O. Díaz (2002). Alimentation and Sports Questionnaire (CAD)
✓	A. García-Más, F.J. Aguado, J. Cuartero, J. Calabria, R. Jiménez and P. Pérez (2003). Sleep in Sports Questionnaire (CSD)

c) Observation

Despite not being the most frequently used, observation is a method of great utility in Sport Psychology and Physical Exercise. In this respect, Anguera (2002) considers observation in sports contexts to be indispensable for various reasons:

- a) There is constant spontaneous behavior
- b) The framework in which the behavior is produced is natural
- c) A temporary follow-up can be carried out
- d) The perceptible character of the behavior
- 3) The possibility of studying the athletes as single entities or as group members

A truly interesting work is that presented by Ortín, Olmedilla and Lozano (2003) who proposed a recording model with 14 different situations in which they considered probable football rebounds, indicating the player who did it and the team he/she belonged to. Ortega, Giménez and Olmedilla (2008) also used video observation with a basketball team for each match played with the aim of improving the subjective perception of competitive efficiency and performance.

Without doubt, one of the assessment instruments most widely used in sports contexts is the *Coaching Behavior Assessment System (CBAS)* by Smith, Smoll and Hunt (1977) which permits direct and codified observation of the coach's behavior during matches and training sessions proving to be a useful instrument for registering most behaviors by coaches, with high reliability among observers and capable of detecting individual differences in the coaches' behavior patterns (Sousa, Cruz, Torregrosa, Vilches & Viladrich, 2006). The CBAS has been used in Spain to evaluate the behavior of coaches from different

TABLE 2 BASIC AND SPECIFIC DATA TO BE COLLECTED IN THE ATHLETE'S INTERVIEW (DOSIL, 2004)	
BASIC DATA	
1.- Identification data 2.- Sports data 3.- Technical equipment data 4.- Environmental data	
SPECIFIC DATA	
If an athlete comes with a problem	1.- Reason for the consultation 2.- Establish the behavior problem 3.- Ascertain the influence of the people close to the athlete in the behavior problem
If the athlete comes to improve his/her performance	1.- Study the athlete's physical, technical, tactical and psychological capacities using subjective assessment 2.- Detailed description of the athlete's habits 3.- Account of the most important psychological variables



sports such as basketball, handball and football (Boixadós & Cruz, 1999; Cruz, 1994; Marí, 1989) analyzing 12 categories divided into two large general factors: reactive behaviors (responses to desirable executions, responses to errors and responses to inadequate behaviors) and non-reactive or spontaneous behaviors (related to the game and irrelevant to the game).

Lastly, we must emphasize the fact that the incorporation of computerized resources and means has facilitated observation and behavioral assessment as well as providing a greater reliability of the registers and analyses performed. In this regard, it is worth mentioning the line of research carried out by Hernández-Mendo in the field of computerized observation. Due to the multiple variables that coincide in sports competitions, the interaction produced between them when executing and the difficulty in controlling the effects of the contextual variables never identical from one situation to another, it is advisable to use observation in Sport Psychology (Hernández-Mendo & Ramos, 1996). From their first work of codifying and analyzing data using a transcription program in different sports (Hernández-Mendo, González, Areces & Vales, 1996; Hernández-Mendo, Ramos, Peralbo & Risso, 1993) to the most recent studies (Anguera & Hernández-Mendo, 2003; Gorospe, Hernández-Mendo, Anguera & Martínez de Santos, 2005; Hernández-Mendo, 2001), there have been many contributions to the development of psychological assessment in the field of Sport Psychology and Physical Exercise by this work group.

d) Psychophysiological records

This type of record includes the attainment of psychological information using psychophysiological recording techniques such as electrocardiography (EKG) or electromyography (EMG) or through biochemical techniques such as the recording of hormone levels, enzymes or lactic acid in the blood (Cruz & Capdevila, 1997)

The control of activation levels has been one of the areas in which sport psychologists have used psychophysiological records. Thus, Dosil and González (2003) proposed a 4-channel biofeedback machine to collect information about electrodermic activity by means of the tone variation of an acoustic signal generated in a similar way as the variations in skin conductance.

On the other hand, García-Mas (2004) proposed the highly reliable and valid actigraph as a system for observation, recording and analysis of physical activity.

By means of a small apparatus placed on an arm or a leg, the intensity and/or frequency of body movements can be recorded, through the sampling of electric signals.

Among the hormonal markers, Suay, Sanchis and Salvador (1997) emphasize the catecholamines and the coefficient of testosterone/cortisol as they reflect the state of the sympathetic-medulosuprarenal or hypothalamus-pituitary systems and their concentrations can be measured through urine and saliva analyses. The detection of said markers may constitute a good alternative in professional sports contexts because, as Suay (1997) points out, it cannot be ruled out that athletes may falsify the results of questionnaires or tests whereas biological markers provide adaptation measurements that are not easily manipulated by the subject.

On the other hand, constant technological advancement, telemetry and the portability of some polygraph machines are the ideal solution for registering physiological and psychophysiological fields as they permit analysis in real training and competitive situations without interfering in sports behavior (Capdevila, 1995).

e) Sociogram

As indicated by Weinberg and Gould (1996), the sociogram is one of the instruments most utilized in the study of group dynamics or cohesion facilitating the assessment of the degree of relationship, group structure and the relative position that each one of the members occupies. Despite the fact that questionnaires have been the most popular method for measuring group cohesion, they do not show the way in which people relate with each other, if they form subgroups, or if any of the members feel socially isolated (Carron & Grand, 1982).

Through this technique, data from all the group members is collected, with questions alluding to specific situations such as "in a trip taken in private cars, if you had to choose three players to travel with, who would you choose?"; "If the rooms where the team were going to stay for a week were for four people, which three teammates would you like to have with you? "Who would you not want to have? (Dosil, 2004).

A sociogram was used by Maltête and Garcarzyk (2006) with four EBA basketball teams in order to assess hierarchic, functional and social cohesion. Leo, García, Sánchez and Parejo (2008) also created a sociogram for the assessment of social relations (positive and negative) and tasks (positive and negative) of the players in various football teams.



Having described the main assessment instruments used in the field of Sport Psychology and Physical Exercise, we will now focus on the analysis of the most relevant methodological and practical aspects in this area.

METHODOLOGICAL ASPECTS

As indicated by Vealey (1992), the first assessment studies in Sport Psychology attempted to obtain profiles of personality traits in diverse groups of athletes and non-athletes and to study the relationship between personality traits and different sport behaviors, especially performance. Subsequently, and given the importance of situational factors in the sport context, sport psychologists began to develop specific tests for each sports situation as well as behavior observation instruments for coaches and athletes.

The assessment instruments most utilized in sport psychology are those corresponding to cognitive indicators, as can easily be verified. Nevertheless, this does not permit the continuous analysis of data during the course of training or competition (Cruz & Capdevila, 1997). The systematic observation of behavioral indicators enhances this aspect. The validity and reliability of behavioral indicator results in a sports environment depend on the recording instrument chosen and the training of the observers using it, on the procedure used to plan the observation sessions and on the sensitivity of the instrument to assess the most relevant behavior in the situation to be studied (Cruz & Capdevila, 1997). It is also true that most of the problems regarding the tests are derived from incorrect usage as well as from test construction.

With regard to some of the methodological aspects that may be the origin of research insufficiencies and limitations (Muñiz & Hambleton, 1996; Muñiz & Fernández-Hermida, 2000), we can make a note of the following: first of all and although on the decrease, translations of questionnaires or scales originating in other countries continue to be used without taking into account cultural differences and without the necessary psychometric adaptation. Thus, tests are not automatically utilizable and must be carefully adapted according to the intercultural differences between the original language/culture and those in which they are intended for use (Muñiz & Hambleton, 1996). For this reason, we must remember that the *International Test Commission* (ITC) established twenty-two specific directives for the attainment of accurate test adaptation or construction

referring to test context, construction and adaptation, application and score interpretation (Hambleton, 1996). As Renom (2005) indicated, the methodologically simplified pattern that describes the construction process of a questionnaire consists of (1) creating items based on a psychological model, (2) administering it to a certain sample, (3) performing an analysis of principal components, (4) examining the factors and explained variables and finally, (5) validating the test and subjacent model.

Additionally, given the difficulties in finding adequate sample sizes, many studies use samples of a reduced size or use students, which makes us wonder if we can apply these results to a population of athletes. With regard to the generalization of results, we must also ask if we can apply results from a group sport to an individual one or if, on the contrary, specific adaptations are necessary for each of them.

Likewise, we find ethical difficulties in interviewing or utilizing questionnaires immediately before or after a competition for which on most occasions we must depend on the prospective collection of information that, although relevant, may not be entirely complete.

APPLIED ASPECTS

As we have been able to observe, assessment instruments in Sport Psychology and Physical Exercise are of the same nature as those utilized in any other area of Psychology. However, and as the first aspect to be considered on a more practical level, the selection of assessment instruments must be limited to the essential, choosing among these those that offer the greatest guarantees as recommended by Ezquerro (1996). In Sport Psychology, assessment should not be limited only to the athletes' psychological needs with an end to intervening in areas where it is necessary. As Buceta (1998) states, it should also be applied to assess the characteristics and effects of the training itself. In this manner, we can evaluate the content of the training, the volume and intensity of the same or the performance of the athlete, which, without doubt, will provide a greater understanding of the context in which the sport is carried out.

Another highly practical aspect consists of collecting information using different sources. Thus, Jaenes and Caracuel (2006), for the assessment and subsequent intervention of young individual athletes, propose an open interview for parents and a semi-directed interview for coaches and athletes. According to these same

authors, the information collected in said interviews with the different individuals should be enhanced, whenever possible, with in situ observation.

It is equally of great importance to explain to the coaches and athletes what the assessment process consists of and their relation to the subsequent assessment process and intervention. With regard to the role of the psychologist, it is fundamental to know the physical and psychological requirements of each sport, its argot, training and competition timetables etc., as assessment varies from one sport to another. Along these same lines of work, it is important to communicate the assessment process results as quickly as possible in order to guarantee a greater credibility in the process

On a practical level, we can also mention the role of new technologies given that they affect data analysis and the instruments used in the collection of information (Renom, 2005). As indicated by the author, this phenomenon is especially worrisome in emerging areas characterized by less regulation with regard to intellectual property and the existence of a heterogeneous target public such as coaches, athletes, parents, among others.

Finally, with respect to the most practical level of psychological assessment in sports contexts, in line with that indicated by Prieto and Muñiz (2000), we propose the following ways to improve the use of tests in general (and by extension other assessment processes): a) restrict user access, allowing only professionals duly capacitated and accredited to employ them; b) increase user training; and c) promote research for the development of efficient tests (construction of new tests, adequate adaptation of those developed in other countries and periodic revision of the technical quality of those already available).

CONCLUSIONS

As we have been able to observe, general tests and questionnaires specific to sport are the assessment procedures most utilized in Sport Psychology and Physical Exercise. Behavioral and psychophysiological assessment require more time and money, which results in their being less utilized in the applied field. Nevertheless, we propose, as is already done in general psychology, the complementarity of the diverse instruments for an accurate assessment of psychological aspects in the field of Sport and Physical Exercise.

At the same time, we must emphasize that psychological assessment in sports contexts must be subject to the principles of the Deontological Code of the Association of

Psychologists. Among these, we can make reference to article 6 (“...sincerity with clients, caution in the application of instruments and techniques...”) or article 18 (“...the psychologist will not use means or procedures that are not sufficiently contrasted within the limits of current scientific knowledge...”).

We can conclude in line with that indicated by García-Mas, Estrany and Cruz (2004) that the topic of assessment in the field of Sport Psychology and Physical Exercise is truly open. These authors point to the necessity of greater conceptual and methodological refinement in different aspects: subjacent theories, design methodology, reliability studies, different possible validation studies, the establishment of external objective criteria, adaptation of the instruments to the characteristics of the different sports situations, and finally, the reintroduction of the data collected as knowledge of results for the athlete. There remains, therefore, a long road to be travelled that will undoubtedly provide psychological assessment with greater scientific rigor in sports and physical exercise contexts.

As a future line of work responding to the aforementioned practical and methodological needs, we propose the creation of a Directory of psychological assessment instruments for sports and physical exercise specific to Spain in which data is supplied about the technical characteristics of each one and which would allow for the selection of the most appropriate instrument for the particular objectives of each situation. And along the lines indicated by the COP Tests Commission, revise the most utilized tests in said contexts with a view to guaranteeing greater quality and scientific rigor in the psychological assessment process. At the same time, we must continue to emphasize the need for improved specific training of the professionals who obtain the information whatever the instrument or procedure used, as well as a greater effort in the construction of tests developed entirely in Spain and adapted to the different populations object of the studies.

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