SUBJECTIVE AND OBJECTIVE EVALUATION OF COGNITIVE PROCESSES IN THE ELDERLY

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INTRODUCTION

The relative increase of elderly people has aroused growing scientific interest in the medical and social problems related to the third age. This interest has increasingly taken the form not only of action addressed to pathological forms typical of this age but also that of the capacity to maintain and recover biological functions that are altered during the normal aging process.

Recent research has stressed with increasing clarity the importance of psychological factors, particularly cognitive ones, in the aging process. However, the clarification of the role played by these factors has not been accompanied by a corresponding methodological clarity in the treatment of the related problems.

Current research on the psychological factors has to take into account 3 main objectives: 1) an increasingly accurate description of the psychological patterns involved in normal aging; 2) the construction of psychological tests that allow early diagnosis to be made; 3) the development of suitable rehabilitation plans. The present paper addresses the first 2 objectives.

The capacity to make early diagnoses of any abnormality in a psychological process depends on the amount of information available concerning normal patterns related to that process and on the availability of adequate measuring instruments. Neither of these conditions has so far been satisfied in the field of cognitive processes and the obvious result is incorrect diagnosis and failure to act until the deficit has become manifestly pathological and probably irreversible. The construction and use of suitable evaluation tools therefore represents a particularly important stage in research and clinical practice.

Attempts to satisfy the need for early diagnosis have recently been made using self-evaluation questionnaires, which are believed to allow the clinical situation of numerous subjects to be ascertained rapidly. The aim of the present research is to examine the quality of the information conveyed by these tools by studying the correlations obtained from objective tests. A brief study is also made of the effects of some variables, such as age and education, on the results obtained using these tools.

METHOD

Materials

The present research aims to compare 2 self-evaluation questionnaires - the Cognitive Failures Questionnaire (CFQ) of Broadbent et al. (1982) and the Everyday Memory Questionnaire (EMQ) of Sunderland et al. (1983) - with two objective tests, respectively, the Cognitive Capacity Screening and Examination (CCSE) of Jacobs et al. (1977) and a verbal and non-verbal learning test (LT) (Salmaso et al. 1987).

The CFQ is used to ascertain the daily frequency with which the subject makes cognitive errors, which may take the form of errors of memory, perception or attention. The questionnaire comprises 25 items measured using a 5 point scale: each response is scored from 4 (very often) to 0 (never). The total score (max = 100) indicates the subject's degree of cognitive deficit; i.e. the higher the score the greater the deficit. The questionnaire is quick to administer (10-15 min) and can be given both to individuals and to groups.

The EMQ is concerned solely with amnesia in everday life and the subjects are asked to evaluate their own memory disorders on a scale from 0 (no disorder) to 4 (maximum deficit). The total score is divided by the number of responses, so that the maximum score is 4.

The CCSE is used for the objective evaluation of cognitive capacity and consists of 30 items designed to test space-time orientation, memory, arithmetical ability and logico-verbal skills. Also this questionnaire can be administered quickly, one point being given for each correct answer (maximum score = 30). A score of less than 20 indicates diminished cognitive capacity. The results are liable to contamination by culture- or education-linked variables.

Lastly, the LT test, which is divided into a verbal and a non-verbal part, calls for the repetition of items in a series. The verbal test consists of a list of 7 high-frequency words, while the non-verbal test (7/25 fixation

test of Rey, 1968) consists of a sequence of 7 positions on a 25-square matrix. The tests are terminated either after 2 consecutive correct performances or after a maximum of 12 repetitions. In both cases the number of repetitions required for learning are counted. The validity of this type of test is based on claim (Benton et al., 1983) that learning is a more sensitive indicator of deficit in the elderly than span alone.

Subjects

The CCSE and the CFQ were administered to 78 (15 M and 63 F) normal elderly subjects attending the University of the Third Age in Rome. The average age was 63.5 and educational level ranged from secondary school certificate to university degree.

The EMQ and verbal and non-verbal LT test were administered to 2 groups each made up of 16 normal elderly subjects, Group A (10 M and 6 F) formed by persons from the Centres for the Elderly in the Rome area and Group B (7 M and 9 F) taken from persons attending courses at the University of the Third Age. The age of the two groups was no statistical different (66 yr. vs. 71 yr.) while their IQ was differential (119.4 vs. 98.4; t-test=7.10, df=30, $p<.001$) as measured using PM38 (Raven, 1954). These two groups of elderly subjects were compared with another group (C) composed of 16 young subjects (7 M and 9 F) from a nurses' professional training school. Their mean age was 19.94 and their IQ (104.8) did not differ significantly from that of Group A.

RESULTS

The group of 78 subjects obtained an average score of 27 on the CCSE and 35 on the CFQ. The 2 measures showed no statistical correlation. (see Table 1).

TABLE 1: Mean values and correlations between cognitive self- evaluation (CFQ) and an objective test (CCSE).

AGE	N	CFQ Test (max def. = 100)	CCSE Test (max def. = 0)	r	p
63.5	78	35	27	.18	n.s.
50-59	28	34.6	27.9	.11	n.s.
60-69	35	40.2	26.3	.11	n.s.
>70	15	29.2	25.6	.51	.05
		$p < .05$	$p < .05$		

Also the analyses carried out by breaking down the group total into 3 age groups revealed no significant correlations in the expected direction. Table 1 shows how only in the 3rd age group (>70) was a moderately significant correlation found which, as it is positive, is to be interpreted as an inverse correlation since the scores show opposite tendencies.

Lastly, analysis of variance was performed on the results obtained for each test, taking into account factors such as age and educational level (primary school, secondary school, degree). In this analysis only the age factor proved to be significant for both CCSE ($F=3.5$; $df=2,69$; $p<.05$) and for CFQ ($F=4.1$; $df=2,69$; $p<.05$).

However, while in the CCSE the score (and therefore the performance) decreases with increasing age, in CFQ it is actually the older subjects who self-evaluate themselves as having less deficit.

As far as the memory tests are concerned, the following table sum up the results obtained in the individual tests.

TABLE 2: Mean values and correlation between self-evaluation (EMQ) and objective memory test (LT).

GROUPS	N	EMQ Test (max def. = 4)	Verbal LT Test (max def. = 12)	r	p
A	12	1.08	5.00	-.15	n.s.
B	16	0.75	4.40	-.20	n.s.
C	16	1.07	2.81	.32	n.s.

GROUPS	N	EMQ Test (max def. = 4)	Nonverbal LT Test (max def. = 12)	r	p
A	12	1.08	5.00	.30	n.s.
B	14	0.75	3.86	.29	n.s.
C	16	1.07	2.13	.32	n.s.

The EMQ results were compared separately with the verbal and non-verbal LT test. The analyses carried out reveal the absence of any significant correlations.

As for the cognitive tests, also in this case analysis of variance was carried out on the individual tests. No significant differences were found for EMQ. However, the second analysis of variance carried out on the results of the objective tests shows that the

performance of the three groups is significantly different ($F=7.76$; $df=2,36$; $p<.005$), i.e. unlike what was found for self-evaluation. (There is a significant difference also between groups A and B).

DISCUSSION

The results obtained in both the cognitive tests and in the memory tests reveal no significant correlation between self-evaluation questionnaires and objective measures of the same functions. This confirms the findings of other authors (Broadbent et al., 1982; Herrmann, 1982; Sunderland et al., 1983). It may thus be concluded that the perception of one's own capacity does not correspond to the actual level of performance (at least as far as the measurement tools used are concerned).

This discrepancy is also found to be basically independent of the age factor. It is also interesting to note that the only, small, correlation between self-evaluation and the objective tests is of the opposite sign and refers to the older subjects. The latter individuals, whose performance is poorer, nevertheless evaluate their capacity as superior to that of other subjects.

The negative correlation between self-evaluation and the objective tests does not change when the general or specific aspects of the cognitive functions are taken into account and must therefore be considered to be a constant feature.

It is still not possible to ascertain the causes of this lack of correlation. Nevertheless, the existence of significant correlations between self-evaluation and personality aspects, such as depression (Larrabee & Lewin, 1986), anxiety (West et al., 1984) or finding the task to be carried out a pleasant one (Panek et al., 1985), indicate that an important factor in the subjective tests is related to the sphere of the personality, which would thus have a disturbing effect on the cognitive ability questionnaires.

It may therefore be concluded that the self-evaluation tests of cognitive ability do not measure the subjects' actual capacity but rather their judgment and perception of such capacity, which may be further removed from reality the worse the state of the subject.

In passing, this is confirmed by the fact that only objective tests actually succeed in providing a true distinction between the groups examined and to bring out the relative importance of a number of variables such as the subjects' IQ (cf. Salmaso et al., 1987).

In conclusion, the information obtained from self-evaluation tests cannot be considered as replacing that from objective testing since the 2 different sets of data obtained cannot be superimposed. Further research is necessary to extend our knowledge of the relationship between the two types of test and to find ways and means of increasing the accuracy of diagnoses.

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