# GEOPTE Scale of social cognition for psychosis

## GEOPTE (Spanish Group for the Optimization and Treatment of Schizophrenia)

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***Escala GEOPTE de cognición social para la psicosis***

***GEOPTE (Grupo Español para la Optimización y Tratamiento de la Esquizofrenia)***

**Summary**

Introduction. *Despite the large number of scales to assess cognitive function, these are rarely used in clinical practice, both because of the time they require and because they do not give useful information to the clinician. The aim of this article is to present the characteristics and psychometric properties of a scale which aims, with its simplicity of use and design, to be of use in the clinical practice for measuring social cognition in psychosis.*

Methods. *The new GEOPTE Scale gathers information from two sources: the patient's subjective perception of his/her deficits and that of the informant or caregiver. It consists of 15 items (7 for basic cognitive functions and 8 for social cognition). The scale was applied to 87 patients with a diagnosis of psychosis (according to DSM-IV), and general clinical data, clinical global impression, mood and degree of insight were gathered.*

Results. *The GEOPTE Scale presented excellent internal consistency (Cronbach's alpha 0.84 for patient and 0.87 for informants). Factorial analysis identified two factors which explained a total variance of 39%. The first factor was related to the basic cognitive function items and the second to the social cognition items. Regarding the validity of the construct, the scores on the scale are closely related to clinical global impression, degree of insight and depressive symptoms.*

Conclusions. *The GEOPTE Scale for measuring social cognition in psychosis has an excellent psychometric behavior both in the degree of internal consistency and in correlation with clinical global variables, mood and degree of* insight.

***Key words:*** *Social cognition. Schizophrenia. GEOPTE Scale. Psychosis.*

**Resumen**

Introducción. *A pesar del gran número de escalas para evaluar la función cognitiva, la utilización de las mismas es muy escasa en la práctica clínica, tanto por el tiempo que precisan como por no dar información útil al clínico. El objetivo de este artículo es presentar las características y las propiedades psicométricas de una escala que aspira por su sencillez de uso y diseño a ser útil en la práctica clínica para medir la cognición social en la psicosis.*

Métodos. *La nueva Escala GEOPTE recoge información de dos fuentes: la percepción subjetiva del propio paciente acerca de sus déficit y la del informante o cuidador. Consta de 15 ítems (7 para funciones cognitivas básicas y 8 para cognición social). Se pasó la escala a 87 pacientes con diagnóstico de psicosis (según DSM-IV), recogiéndose datos clínicos generales, impresión clínica global, estado de ánimo y grado de* insight.

Resultados. *La Escala GEOPTE presentó una excelente consistencia interna (alfa de Cronbach, 0,84 para pacientes y 0,87 para informantes). El análisis factorial identificó dos factores que explicaron una varianza total del 39%. El primer factor relacionado con los ítems de funciones cognitivas básicas y el segundo con los ítems de cognición social. Respecto a la validez del constructo, las puntuaciones de la escala guardan una estrecha relación con la impresión clínica global, el grado de insight y los síntomas depresivos.*

Conclusiones. *La Escala GEOPTE para la medición de la cognición social en la psicosis tiene un excelente comportamiento psicométrico tanto en el grado de consistencia interna como en la correlación con variables clínicas globales, estado de ánimo y grado de* insight.

***Palabras clave:*** *Cognición social. Esquizofrenia. Escala GEOPTE. Psicosis.*

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## INTRODUCTION: WHY A NEW SCALE?

If there is anything Psychiatry cannot complain about, it is lack of measurement scales[1]. Only for schizophrenia, we have a large number of them to assess the most diverse features of the disease[2]. There are scales for clinical global assessment, scales for specific symptoms (for exam-

ple, for hallucinations alone, we have at least 12 different scales), social functionality scales, scales for subjective experience, for degree of insight, for social roles, for quality of life, for attitudes towards medication, etc. However, perhaps where the scales have proliferated most is in the attempts to assess so-called cognitive functions. It is known that the psychometric trend of neuropsychology began with the application of intelligence tests to patients with brain damage. Neuropsychology has been elaborating not only global intelligence tests but also a large number of tests to measure performance in each cognitive area: attention, speech, abstraction, calculation, etc. These tests have been extensively used to investigate cognitive function in schizophrenic patients[3,4]. In this extremely abundant amount of scales, it seems to be pretentious or a waste of time to dare to propose a new scale exactly where the offer is most abundant: the cognitive function. There are two types of arguments to justify this audacity, one theoretical and the other practical.

### Theoretical argument

Most of the neuropsychological investigations in schizophrenia are based on using batteries of tests similar to those that have been applied on patients with brain damage. The application of this model has significant limitations that should be remembered. Although we do not know the biological substrate of schizophrenia, what we do know, after thousands of investigations, is that it is not a focal brain disease or a degenerative disease; the damages are more subtle and the results that have been obtained with these tests are non-specific. Without placing the importance of cognitive deterioration in doubt, both due to its prevalence as well as its stability in time, this is interpreted as that the use of these tests has not provided a specific diagnostic profile of the disease up to the present date[5,6].

In recent years, interest has shifted from basic cognitive functions to the repercussions that these disorders may have on the social functioning of the patient. In this sense, more and more relevance is being given to the concept of *social cognition* in schizophrenia[7]. The concept of social cognition includes, in turn, different concepts such as that of *empathy*[8] or the *theory of mind*[9]. We could define social cognition as the part of cognition that involves perception, interpretation and processing of social signals as well as the capacity of adequately responding to such signals. Thus, we start from the hypothesis that the basic cognitive functions have a direct repercussion on social cognition and distortion of this social cognition would be that which has specific relevance in schizophrenia[10].

### Practical argument

The GEOPTE group was established in the year 2000, its first objective being to search for ways to optimize treatment of psychosis and especially of schizophrenia. One of the principal problems found in Psychiatry is the ever greater distance between investigation and clinical practice.

Few clinicians use any of the hundreds of scales mentioned in their daily practice, except for research purposes[11]. This is especially true in the use of neuropsychological tests as most of them require a longer time to be administered. The infra-utilization of scales by the physician is not, in our opinion, a problem of poor praxis. It is basically because their use does not involve any increase in understanding of the disease or does it suppose, for now, an improvement in the therapeutic approach. Due to its content and easiness of application, the scale that we have designed attempts to contribute to decreasing the distance between research and clinical practice within the field of diagnosis and treatment of psychosis.

## OBJECTIVES OF THE NEW SCALE

The new GEOPTE Scale aims to be able to relate basic cognitive deficits (or more specifically their subjective perception) with social cognition. This scale aims to be an instrument that is useful for the therapist in his/her clinical practice. Thus, it should fulfill at least two conditions: be easy and quick to apply and give information that is not redundant with that already commonly gathered. Ideally, this information should serve to improve understanding of the patient's problems and optimize the treatment.

## METHODS

### Bases and development in the elaboration of the GEOPTE scale

The previously mentioned objectives seem to be impossible to reconcile in principle. Any assessment of both basic cognitive functions as well as social cognition takes considerable time, so that it seems to be utopian to make it compatible with the creation of an instrument that is easy to use in the clinical practice. The solution to this crossroad came from experience in cognitive assessment in dementia and from remembering the importance of insight in psychotic patients. We know that the information in patients with dementia that correlates best with cognitive deficit is that supplied by the family. In this sense, the Spanish group of neurology for the study of dementias has created the *mild cognitive deterioration syndrome* in which only the complaint of the patient needs to be corroborated by a relative or caregiver[12]. Insight is, on the other hand, an essential characteristic of psychosis both because of its therapeutic implications (lack of compliance) as well as the hypothesis that the anosognosia of these patients is a direct reflection of its frontal cognitive dysfunction[13].

With these premises, the first draft of the scale was made by the GEOPTE group in March 2001. Since then,

eight drafts have been made and they have been consecutively changed and improved until reaching the final version that is presented herein. The successive changes were motivated by the problems arising from the experience of their direct application to reduced groups of patients (changes in the way of asking the questions, observation of limitations, etc.). In this process, in order to make it more applicable and to eliminate the problems of inter-rater reliability, it was decided that the scale would be self-administered and that it would gather information with the same questions from two different sources.

— *Subjective perception of the patient.* It is assumed here that there would be a distortion caused, above all, by the degree of insight of the disease and the patient's mood state.
— *Assessment of the informant (relatives or caregivers).* This information, although it can be distorted, is essential to have an idea of the daily functioning of the patient and makes it possible to compare it with the viewpoint that the patient has of him/herself. It can also be important to plan rehabilitation programs and family interventions.

Between the months of December 2001 and February 2002, the seventh draft of this scale was administered to 80 patients. The objective of this next to last version was twofold. On the one hand, sound out the manageability and usefulness of it in an already extensive group of patients and psychiatrists and one the other, to perform a first examination of its psychometric properties. To reach the first objective, the scale was accompanied by a small survey aimed at the clinician in which his/her opinion was asked on its usefulness and ease of use. Without entering into details, the results of the survey were encouraging. Eighty percent of those surveyed considered that it was easy to use and 100% considered that it could be useful to them in their clinical practice. In regards to the second objective, from the psychometric point of view, the behavior of the seventh version of the scale was excellent except in two of its 17 items. These two items, that reduced internal congruency, were eliminated, the final version being made up of 15 items.

## The GEOPTE scale of social cognition

As we have already indicated, the final instrument is made up of a total of 15 items. The items are formulated as short questions (for example, «you forget to do things asked of you, tasks, or errands») which are answered by means of a scale with 5 response options *(1: no; 2: a little; 3: normal; 4: enough; 5: a lot)*. The content of the GEOPTE Scale is detailed in table 1. The scale items should be answered by self-administration by the patient and by their corresponding informant (relative or caregiver) independently. These 15 items gather two groups of information (table 1): from 1 to 7, questions are given on basic cognitive functions and from 8 to 15, the questions refer to features of social cognition.

**TABLE 1. The GEOPTE Scale of social cognition for psychosis**

1. Is it difficult for you to pay attention?
2. Is it difficult for you to follow a conversation in which several people are participating?
3. Is it hard for you to learn new things?
4. Do you forget to do things asked of you, tasks, or errands?
5. When you have to speak to someone, do you have problems in expressing yourself?
6. Do you have problems understanding what a picture is about?
7. Is it difficult for you to understand the meaning of a conversation?
8. Is it hard for you to recognize the emotions of others (for example: sadness, happiness, rage)?
9. When you are in a group, do they usually tell you that you have misunderstood the attitudes, looks or expressions of the others?
10. Do you feel very sensitive to looks, words or expressions of others?
11. If you are alone at home and some problem arises (for example, an appliance breaks down), is it difficult for you to look for a solution?
12. Do you find it hard to maintain personal hygienen (to be clean and washed)?
13. Do you find it hard to make plans for the weekend?
14. Is it hard for you to make plans friends?
15. Are you generally unsatisfied with your sexual life?

Response options: 1: no; 2: a little; 3: normal; 4: enough; 5: a lot.

The answers provided by patients and informants are recorded in the case report form and used to calculate a summarized score for each one of them. Applying the fundamental concepts of the classical theory of tests[14], this summarized score simply consists in the sum of the numerical values associated to the response options assigned to each item of the scale. In this way, a score that has its minimum of 15 and maximum of 75 is obtained for both patients and informants. Given the meaning of the questions, 15 represent the best possible state of social cognition for this instrument while 75 mean the worse possible one.

The summarized scores of patients *(p)* and informants *(i)* are combined in a single central trend index by the calculation of the geometric mean (GM) of both values. The GM of a group of n values is the n-th root of the product of the values in the set. In this case $MG = \sqrt[2]{p \times i}$. Given that the GM between two positive and different numbers is less than its arithmetic mean, the use of the GM instead of the arithmetic mean is justified due to possible occurrence of significant deviations between the patients' and informants' scores. Faced with a large divergence of scores, the GM will provide a central measurement that is closer to the best of the two cognition states, that is, to the lowest score, whether obtained by the patient or by the informant. In general terms, it can be stated that the GM makes the «centering» of the values without being so affected by extreme numbers as the arithmetic mean.

The following example can help explain the sense of using a summarized score and the adequacy of the GM for it: we suppose that after administering the instrument to the patient and informant, we obtain summarized scores of 18 and 70. Eighteen is a low value on the GEOPTE Scale, indicative of a more positive cognitive state than the 70 value, which is truly extreme. According to these scores, there is a 52 point divergence in the assessment of the problems gathered by the questionnaire between patient and informant, this representing 87% of the maximum variation that can be observed with the instrument. Although it is not relevant for this example to know who, patient or informant, has provided the highest value, it is important to determine what is the «true» value, that which really reflects the state of the patient. Psychometrically, the solution is to assume that the two summarized scores observed are affected by the measurement error inherent to all process of evaluation; the larger the discrepancy, the greater the random error of measurement present in at least one of the two observations, and vice versa, the more that both scores are similar, the lower the error. Again, according to the classical Theory of tests[14], the reduction of the measurement error, whatever its magnitude, can be obtained by the calculation of the average of the different scores observed of the same attribute. This is the same theory underlying the practice of requiring average values of blood pressure equal to or greater than 140/90 measured on «at least 3 occasions» to verify the diagnosis of arterial hypertension. The arithmetic measure of 18 and 70 is 44, and it is equivalent to the middle range of the two values since the same distance, 26, exists to 44 from 18 and 70. The GM of 18 and 70 is 35.5, thus a score on the scale with less severity than the 44 points of the arithmetic mean. The value obtained is asymmetric in regards to the summarized scores (we could observe that the distance from 35.5 to 18 is less than to 70), and thus, in regards to the GEOPTE Scale, the GM provides a «conservative» index which, in a certain way, «gives more credit» to the scores that indicate a better state of social cognition in psychosis.

## Psychometric properties

Beyond the procedure used to obtain the scores on the GEOPTE Scale, the quality of the information that these scores provide will depend on whether the measurement scale fulfills some minimum requirements or not, which in psychometric terms are defined as reliability and validity[14].

In order to determine the reliability and validity of the GEOPTE Scale, this was administered between the months of April and July 2002, to a sample of 87 psychotic patients seen consecutively in out-patient visits of six to the members of the GEOPTE group (20 patients in Barcelona, 7 in Bilbao, 15 in Malaga, 11 in Salamanca, 21 in Valencia and 13 in Vigo). Although there are no guidelines that determine the minimum sample size necessary to carry out reliability and validity studies, some authors have suggested that the analysis of items of a questionnaire should be carried out with groups whose minimum size is 5 times the number of items included in the instrument[15]. Considering the 15 items of the GEOPTE Scale, 75 would be the minimum cases necessary to carry out this type of analysis.

Both the patients as well as their corresponding informants answered the GEOPTE Scale in a self-administered way. Furthermore, the responsible psychiatrist filled out an additional questionnaire that gathered clinical and sociodemographic information on each one of the patients included in the study. By means of a closed response format, the clinical part of this questionnaire for the physician included questions related with the diagnosis, evolution time since the first diagnosis, attitude during the interview, study level and scholastic performance, previous social adjustment, depression symptoms, mania symptoms, global impression on the degree of cognitive deterioration, impression on disease awareness, impression on awareness of the benefit of the medication and on the social consequences of the mental disease. The questionnaire also included the clinical global impression (CGI) scale.

The reliability of the GEOPTE Scale was estimated from the internal consistency of the questionnaire items by calculation of Cronbach's alpha statistics[14]. Given that the most important source of measurement error is found in the content itself of the scale, the alpha coefficient provides a good estimation of its reliability[14]. Besides Cronbach's alpha coefficient, the item-total correlation corrected for each one of the items of the scale was established as an additional measurement of internal consistency of the instrument. For Cronbach's alpha, values equal to or greater than 0.7 were required. Item-total correlations were considered good after 0.3[14].

The analysis of the items aimed at obtaining Cronbach's alpha and item-total correlations was carried out after combining the response of patient *(p)* and informant *(i)* to each one of the items by the previously discussed formula $\sqrt[2]{p \times i}$. In any event, as a measure of precaution, the same analyses of items were performed independently for the responses provided by patients and informants.

Estimation of the reliability of the GEOPTE Scale will make it possible to determine up to what point the results obtained with them are stable and reproducible. However, before fully trusting the instrument and using it in the clinical practice, we should, nevertheless, verify a final crucial characteristic of it, its validity[14]. The concept of validity of the scores of a questionnaire refers to the usefulness of the inferences that can be drawn from these scores[16]. Does the scale really measure what it aims to measure? It will be necessary to establish a validation process of the instrument in order to respond to this question. The concept «validation» refers to the process by which empiric evidence is gathered that gives support to the use of the scores observed for a specific proposal[14]. Traditionally, three different approaches have

been considered in the validation process: content, criterion and construct validation[14-17].

Establishment of the validity of the content of a questionnaire means determining if the questions or statements formulated by it really represent the observable preciseness of the construct that is being evaluated. Typically, it is carried out through the collaboration of experts in the area that is to be evaluated. These experts examine the content of the instrument and judge up to what point it is representative of that which it aims to measure. As has already been described in the introduction, the GEOPTE Scale was born precisely from a process of discussion between clinicians with experience in the treatment of schizophrenia, so that a certain degree of content validity could be attributed to the scale, which in any event, would have to be ratified tacitly by future users of the scale with its routine application.

Criterion validation, also known as determination of predictive validity, means a study of the relationship between the scores observed in the questionnaire and an external criterion that adequately and independently defines that which the instrument aims to measure. We understand that there is no completely adequate criterion to make direct comparisons with the GEOPTE Scale.

Given that all the validation forms (content, criterion and construct) involve the establishment of an *a priori* hypothesis on the relationships between the scores observed and third variables in one way or another, some authors have argued that there is only one form of validity, the construct validity[14,15]. The construct validity refers to the empiric verification that the variations in the construct to be studied are related with the scores in other related variables.

To determine the construct validity of the GEOPTE Scale, two different strategies have been carried out. In the first place, an exploratory factorial analysis (EFA) was performed of the items resulting from the combination $\sqrt[2]{p \times i}$ of the patient *(p)* and informant *(i)* responses. Factors based on the principal axes and Promax rotation were extracted, thus assuming the existence of correlation between the extracted factors. The decision on the number of factors to be extracted was multivariable, considering the sedimentation chart form, magnitude of the values themselves and percentage of variance of each one of the possible factors. Furthermore, independent EFA were performed for the responses to the items provided by patients and informants.

The second strategy to determine the construct validity of the GEOPTE Scale consisted in the determination of the mean scores on the scale for different extreme groups differentiated from the clinical variable values gathered by the psychiatrist. The analysis of the differences for the means observed was performed with the one-way variance (one-way ANOVA). If there were only two comparison groups, the one-way result is equivalent to the comparison of the means by the Student's t test.

The SPSS program, version 10.1.3. was used for all the statistical analyses.

## RESULTS

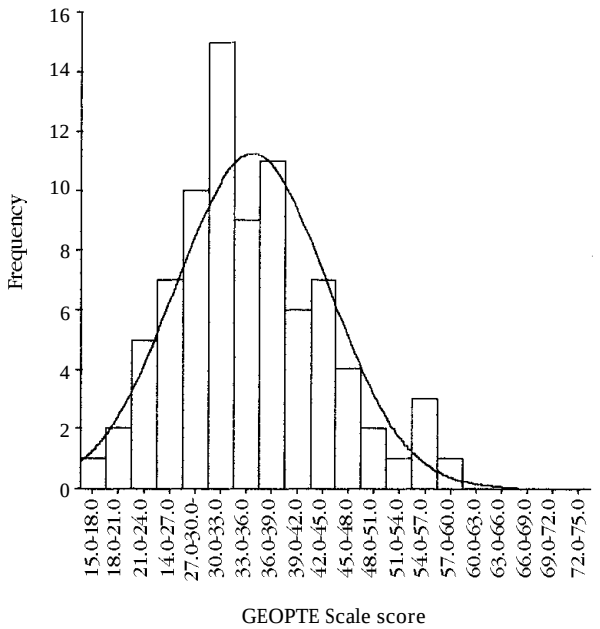
Table 2 describes some of the clinical and sociodemographic characteristics of the sample used to carry out this study. The mean age of the patients was 34 years, and 31% of the total were women. The patients with the diagnosis of schizophrenia were the most frequent. Of these, 72% presented a paranoid type of schizophrenia. The mean severity score on the scale of the clinical global impression scale was 4 points, and the mean evolution time from the first diagnosis of the disease was almost 11 years. Most of the patients had completed secondary or primary studies. A total of 58% of the informants were one of the parents. In 69% of the cases, it was declared that the patient and informant lived together.

Figure 1 shows a description of the distribution of the GEOPTE Scale scores. The histogram shows an approximately normal distribution of the scores, with greater frequency of cases in the central values of the scale. The score mean was 35, 11 points, very close to the median value (P50). Standard deviation was almost 9 points. The absence of any «floor or ceiling» effect of the scale scores stands out, since no case with a minimum score (15 points) or maximum one (75 points) was observed. The normal form of the distribution indicates that the statistical analyses of the scores can be carried out with parametric tests.

Table 3 shows an example of the GEOPTE Scale scores for a subgroup of 22 patients in the study. The first column indicates the case or patient number. The following column shows the score obtained by the patient

**TABLE 2. Clinical and sociodemographic characteristics of the sample of 87 patients used to evaluate the psychometric characteristics of the GEOPTE Scale of social cognition for psychosis**

| | |
|---|---|
| Age (mean [SD]) | 34 (11) |
| Women | 31% |
| DSM-IV diagnosis | |
| Schizophrenia | 76% |
| Schizoaffective disorder | 13% |
| Bipolar disorder | 9% |
| Delusional disorder | 2% |
| Clinical global impression (mean [SD]) | 4 (1) |
| Evolution time since 1st diagnosis (mean [SD]) | 10.5 (9) |
| Level of studies completed | |
| Whitout studies | 7% |
| Primary | 35% |
| Secondary-vocational training | 42% |
| University | 16% |
| Type of informant | |
| Father/mother | 58% |
| Husband/wife/partner | 6% |
| Children | 5% |
| Caregiver | 13% |
| Other (i.e. brother/sister, etc.) | 18% |
| Cohabitación patient-informant | 69% |




| | *Mean* | *SD* | $P_{25}$ | $P_{50}$ | $P_{75}$ | *% min.* | *% max.* |
|---|---|---|---|---|---|---|---|
| Total of sample | 35.11 | 8.92 | 29.32 | 34.18 | 40.80 | 0 | 0 |

% min y % max: percentage of patients with score equal to 15 and to 75, respectively.

**Figure 1.** *Descriptive analysis of the socres obtained by the patients on the GEOPTE Scale.*

*(p)* on the scale. The third column shows the score assigned by the informant *(i)*. The last two columns present the difference *(i-p)* between the informant and patient scores and their geometric mean (GM), respectively. The negative difference of (i-p) indicates a better assessment of the social cognition by the informant, while a positive difference indicates the contrary. As has already been indicated in the methods section, the GM summarizes the patient and informant score in a single index. Correlation between GM and the score of the patients was 0.78 and it was 0.81 with the score of the informants. The correlation between patients and informants was only 0.29.

Table 4 summarizes the properties of the GEOPTE Scale content by means of an analysis of its items. The corrected item-total correlation exceeded the 0.3 value for all the items. Cronbach's Alpha for all the items was 0.86, a value that can be considered as excellent. If any of the scale items are eliminated, the Alpha value does not improve, as is shown in column 3 of table 4. The last two columns of the table show the value of the average responses for each one of the items as well as their standard deviation. Considering that the response options of the scale move between values 1 (no) and 5 (much), most of the average of the responses to the items moved between somewhat more than 1.5 and somewhat less

**TABLE 3. Example of scores on the GEOPTE scale for a group of patients of the sample included in the study**

| *Case* | *Patient (p)* | *GEOPTE Scale scores* | | |
|---|---|---|---|---|
| | | *Informant (i)* | *Difference (i-p)* | *Geometric mean* $\sqrt[2]{p \times i}$ |
| 1 | 52 | 26 | –26 | 36.8 |
| 2 | 47 | 29 | –18 | 36.9 |
| 3 | 44 | 26 | –18 | 33.8 |
| 4 | 42 | 25 | –17 | 32.4 |
| 5 | 42 | 25 | –17 | 32.4 |
| 6 | 35 | 19 | –16 | 25.8 |
| 7 | 33 | 26 | –7 | 29.3 |
| 8 | 27 | 22 | –5 | 24.4 |
| 9 | 33 | 32 | –1 | 32.5 |
| 10 | 31 | 30 | –1 | 30.5 |
| 11 | 20 | 19 | –1 | 19.5 |
| 12 | 41 | 41 | 0 | 41.0 |
| 13 | 37 | 37 | 0 | 37.0 |
| 14 | 31 | 33 | 2 | 32.0 |
| 15 | 27 | 31 | 4 | 28.9 |
| 16 | 35 | 42 | 7 | 38.3 |
| 17 | 17 | 27 | 10 | 21.4 |
| 18 | 39 | 51 | 12 | 44.6 |
| 19 | 38 | 50 | 12 | 43.6 |
| 20 | 30 | 43 | 13 | 35.9 |
| 21 | 15 | 31 | 16 | 21.6 |
| 22 | 29 | 51 | 22 | 38.5 |

than 2.5 points, indicating a moderate severity for the content of each one of the items. The standard deviation of the scores was located around 1 SD. Very extreme values in the average or the SD would make it possible to

**TABLE 4. Analysis of the items of the GEOPTE Scale**

| *Item* | *Corrected item-total correlation* | *Cronbach's alpha if the item is eliminated* | *Response option (1-5) selected* | |
|---|---|---|---|---|
| | | | *Mean* | *SD* |
| 1 | 0.68 | 0.84 | 2.4 | 1.0 |
| 2 | 0.59 | 0.85 | 2.4 | 1.0 |
| 3 | 0.46 | 0.85 | 2.5 | 1.1 |
| 4 | 0.51 | 0.85 | 2.4 | 1.0 |
| 5 | 0.58 | 0.85 | 2.2 | 0.9 |
| 6 | 0.54 | 0.85 | 1.7 | 0.7 |
| 7 | 0.63 | 0.85 | 1.8 | 0.8 |
| 8 | 0.50 | 0.85 | 1.8 | 0.8 |
| 9 | 0.70 | 0.84 | 2.3 | 1.1 |
| 10 | 0.41 | 0.86 | 3.1 | 1.1 |
| 11 | 0.36 | 0.86 | 2.6 | 1.1 |
| 12 | 0.54 | 0.85 | 1.7 | 0.8 |
| 13 | 0.41 | 0.86 | 2.5 | 1.0 |
| 14 | 0.36 | 0.86 | 2.7 | 1.1 |
| 15 | 0.42 | 0.86 | 2.6 | 1.3 |
| Cronbach's alpha | | 0.86 | | |

identify aberrant items regarding the whole of the scale. None of the items show problems in this sense.

Analysis of independent items for the patient and informant responses showed very similar results. For the patients, the item-total correlation range was 0.35-0.60, and it was 0.42-0.68 for the informants. Cronbach's alpha for the patients' responses was 0.84 and 0.87 for the informants. In both cases, the results were, thus, also excellent.

The Kaiser-Meyer-Olkin measurement of sample adequacy (0.71) and the Bartlett Sphericity test ($\chi^2 = 368.4$; $p < 0.001$) verified the adequacy of the sample to carry out the exploratory factorial analysis (EFA) proposed. The EFA identified 2 factors that explained a total variance of 39%. For those interested, the details on the extraction of the two factors can be obtained directly from the authors. The EFA of the patient and informant responses provided results that were totally comparable to those presented in the following: those interested can also request the details from the authors. Table 5 details the factorial loads of each one of the items with the two factors identified. Loads lower than 0.3 have been obviated due to being insignificant and to simplify the reading of the table and its interpretation. The first factor is clearly linked to the first 7 items, specifically related with basic cognitive functions (attention, understanding, speech, learning, memory, speech fluency, concentration, abstraction). Items 11 and 12 involve tasks (capacity to resolve problems and self-care capacity) that require the application of the basic cognitive functions for their achievement. The remaining items are related with factor 2, that refers to the 4aspects of social cognition (recognition of emotions, interpretation of signals, sensitivity to signals, activity planning, capacity of relationship and sexual satisfaction).

**TABLE 5. Exploratory factorial analysis* of the GEOPTE Scale: loads of items in the two factors identified**

| | *Factor 1* | *Factor 2* |
|---|---|---|
| 3. Is it hard for you to learn new things? | 0.76 | |
| 4. Do you forget to do things asked of you, tasks, or errands? | 0.71 | |
| 11. If you are alone at home and some problem arises, is it difficult for you to look for a solution? | 0.70 | |
| 1. Is it difficult for you to pay attention? | 0.69 | |
| 6. Do you have problems understanding what a picture is about? | 0.56 | |
| 2. Is it difficult for you to follow a conversation in which several people are participating? | 0.49 | |
| 7. Is it difficult for you to understand the meaning of a conversation? | 0.46 | |
| 5. When you have to speak to someone, do you have problems in expressing yourself? | 0.43 | |
| 12. Do you find it hard to maintain personal hygiene (to be clean and washed)? | 0,41 | |
| 9. When you are in a group, do they usually tell you that you have misinderstood the attitudes, looks or expressions of the others? | | 0.71 |
| 14. Is it hard for you to make friends? | | 0.65 |
| 13. Do you find it hard to make plans for the weekend? | | 0.64 |
| 10. Do you feel very sensitive to the looks, words or expressions of others? | | 0.58 |
| 15. Are you generally unsatisfied with your sexual life? | | 0.54 |
| 8. Is it hard for you to recognize the emotions of others? | | 0.36 |

*Extraction method: factorization of the principal axis. Rotation method: Promax normalization with Kaiser (the rotation has converged in 3 iterations).

Extraction of a single factor in the EFA was also satisfactory: a single factor alone explains 33% of the total variance. The communality range of the Scale items (0.28-0.60) verifies that a common attribute underlying all the items of the instrument exists. A single score is thus fully justified. In any case, the structure of two factors helps to understand the nature of the Scale content.

Table 6 demonstrates the construct validity of the GEOPTE Scale by comparison of its mean scores in differentiated groups through the clinical variables gathered by the psychiatrist. As can be observed in the table, most of the variables made it possible to identify differences in the scores, which being statistically significant, point towards the validity of the instrument. We can see in the table that the patients who collaborated during the interview showed lower scores (better social cognition) than those who did not. These differences were also statistically significant and in the logically expected sense according to the level of studies, previous social adjustment, suspicion of previous cognitive deficit, presence of depression symptoms, impression on the degree of cognitive deterioration and awareness of the benefit of the medication. The GEOPTE Scale scores were also sensitive to the changes in the clinical global impression (CGI) scores. As is shown in the table, the patients classified from 1 to 3 (normal to mildly ill) showed values on the GEOPTE Scale that were 10 points inferior to those of the patients with classifications from 4 to 7 (from moderate to extremely ill). If we treat the CGI as a continuous measurement, correlation between the CGI and the GEOPTE Scale was 0.34 ($p < 0,001$). We find no differences in the scores of the scale based on the presence of mania symptoms, awareness of the disease or of its social consequences. In general, these results make it possible to indicate that the GEOPTE scale shows evidence of construct validity.

## DISCUSSION

The results of this study indicate that the GEOPTE scale is reliable and valid. It presents clear internal consistency and has a solid relationship with other clinical measurements, especially with CGI, degree of insight

**TABLE 6. Construct validity of the GEOPTE Scale: mean scores for different extreme groups differentiated according to clinical variables gathered by the psychiatrist**

| *Clinical variables gathered by the psychiatrist* | *Mean score (SD) in the GEOPTE Scale* | *n* | *p* |
|---|---|---|---|
| Attitude during interview | | | |
| Collaborator | 33.5 | 68 | |
| Indifferent, mistrustful or hostile | 45.2 | 9 | < 0.001 |
| Study level | | | |
| Without studies | 42.9 (14.7) | 5 | |
| With studies (primary, secondary, university) | 34.7 (8.4) | 78 | 0.047 |
| Previous social adjustment | | | |
| Very good or good | 33.2 (7.8) | 41 | |
| Normal, poor or very poor | 37.1 (9.7) | 42 | 0.045 |
| Previous cognitive deficit suspicion | | | |
| No | 33.5 (8.5) | 58 | |
| Doubtful | 36.9 (7.0) | 14 | |
| Yes | 40.8 (10.8) | 12 | 0.024 |
| CGI | | | |
| 1,3 (normal to mildly ill) | 29.3 (6.5) | 28 | |
| 4-7 (moderately to extremely ill) | 38.0 (8.6) | 56 | < 0.001 |
| Symptoms of depression | | | |
| No | 32.4 (9.5) | 39 | |
| Yes | 37.5 (7.8) | 45 | 0.008 |
| Mania symptoms | | | |
| No | 35.0 (8.7) | 69 | |
| Yes | 36.1 (10.6) | 14 | 0.665 |
| Clinical global impression on the degree of cognitive deterioration | | | |
| Without alteration or mild alteration | 31.7 (7.7) | 36 | |
| Moderate or severe alteration | 37.8 (9.1) | 47 | 0.002 |
| Awareness of disease | | | |
| Yes | 35.0 (9,0) | 57 | |
| No or unsure | 36.0 (9,2) | 23 | 0.686 |
| Awareness of benefit of the medication | | | |
| Yes | 34.1 (8.7) | 58 | |
| No or unsure | 38.9 (9.2) | 22 | 0.032 |
| Awareness of the social consequences of the mental illness | | | |
| Yes | 35.0 (9.2) | 35 | |
| No | 35.0 (8.5) | 40 | 0.934 |

and depressive mood state. We want to emphasize that the information included in the GEOPTE scale is not gathered in any of the scales that presently exist to assess psychosis, the scales that study insight on memory problems in dementia perhaps being those that could come closest to the construct analyzed here[18]. However, these studies on insight in dementias do not gather the view of the informant as does the GEOPTE Scale and they are more oriented towards the search of the neuropsychological substrate of anosognosia than improvement of treatment. We want to re-emphasize that the first objective of this scale is to be «useful» and for the clinician, useful meaning that it helps him/her to better understand and treat his/her patients. It should be stated that if we feel encouraged by this new instrument, it is not only due to its good psychometric behavior but also because during the months that we have been applying it, we have verified that it gives beneficial and non-redundant information about the specific patient that we are trying to help.

Although the first evidence suggests that the GEOPTE scale may be a useful as well as psychometrically solid instrument, there are some limitations inherent to the scale's own nature that can make its incorporation into the clinical practice difficult.

The first limitation is the need to have an informant or caregiver. Social isolation is, unfortunately, one of the principal consequences of schizophrenia and it is frequent, above all in the most serious cases, that these patients live alone and do not count on a relative or caregiver to fill out the corresponding part of the scale. This limitation can precisely leave those patients who may potentially score more without the possibility of being evaluated. Although the patients who we have analyzed in this study have all been assessed by a close caregiver, one way of overcoming this problem would be to gather the information from the nursing personnel who regularly take care of the patient. It is likely that their way of scoring is different, but this also occurs when the person who scores it lives or does not live with the patient. In fact, we consider that one of the possible lines of future research with the scale would be to evaluate the difference in the perception of the patient according to the degree of closeness, cohabitation or therapeutic involvement.

The second limitation, which is common to all self-applied scales, is that the patient may have total or functional illiteracy. Some patients having low cultural level are reluctant to fill it out due to this problem. In these cases, we consider that the scale can be administered by reading the patient the questions, the therapists filling out the scale. In this latter case, standardization in the administration process must be guaranteed so that his/her influence on the results of the questionnaire is minimized.

This study indicates the good psychometric behavior of the GEOPTE scale, but it must be considered that the validation process is something continuous and dynamic and not punctual. Some of the possibilities to complete the estimation of the reliability and validity would be the following.

In the first place, it would be interesting to perform a test-retest. Although the scale is designed, among other things, to measure clinical changes, the test-retest analysis in a short period in which it is not foreseen that these changes would make it possible to know the degree of stability in time of the data gathered.

In the second place, although that gathered by the GEOPTE scale is a new measurement, it should be, in some way, related with the following constructs: degree of insight, mood state (which we have verified in this same study), cognitive deficit and social cognition. One aspect that we believe would be extremely interesting, and which we have already begun to investi-

gate, is its relationship with the performance in cognitive function tests. The other aspect would be the degree of relationship with some social cognition measurement. Even though observing the relationship with social cognition would probably be the best way to validate this scale, the test or tests used up to now to measure this construct are multiple[7], there being clear differences in the type of degree of deficit according to the test used and the clinical subtype[19]. In any event, this is probably the most promising research line in neuropsychology of schizophrenia and the GEOPTE Scale could service as a first element of screening in this direction.

Another question that has arisen during the elaboration of the scale is if we should look for data in the general population or if it is preferable to be inclined to try to investigate cut-offs between clinical groups. The essential aspect is to answer the question: Why do we want to use the scale? For what purpose? As we have stated before, the origin of the GEOPTE scale was essentially to search for the design of an instrument that is «useful for the clinician». In our opinion, the psychometric school of neuropsychology has wrongly centered all their interest on the external validity, often sacrificing internal validity.

It is becoming clearer that in order to assess if psychopharmacological treatment such as the so-called cognitive rehabilitation programs of schizophrenia have a repercussion in daily life and improve these patients' prognosis, and we should measure the changes in social functioning and not simply the variations in the cognitive tests[20,21].

Verifying the usefulness of the scale in longitudinal studies and seeing its possible relationship with prognosis and with choice of treatment, both psychopharmacological as well as psychosocial rehabilitation programs, in a wide group of patients would probably be the best way of completing the validation.

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