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Spanish adaptation and validation of the situational feature recognition test 2 (SFRT-2) in patients with schizophrenia and healthy controls

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ABSTRACT

The main purpose of the present study was to adapt and validate the social perception measure "Situational Feature Recognition Test 2" (SFRT-2) in Spanish psychiatric and non-psychiatric population. One hundred and one patients with schizophrenia and 100 healthy controls (HC) were assessed. Test's reliability was studied by Cronbach's alpha coefficients. Concurrent validity was assessed using Spearman's correlations. Discriminant validity was studied by comparing schizophrenia and HC groups by means of the ROC curve analysis. Internal consistency indexes of the test ranged from alpha = 0.66 to alpha = 0.90 in both groups. The SFRT-2 scores correlated with scores obtained in other social cognition measures such as Theory of Mind. The ROC curve analysis showed that the composite score including both actions and goals scores of the SFRT-2 discriminate well between patients and HC (AUC = 0.81). The Spanish adaptation and validation of the SFRT-2 showed good psychometric properties in both patients with schizophrenia and HC. To our knowledge, this is the first adaptation and validation of an existing social perception measure in native Spanish-speaking patients with schizophrenia. Results further support the use of the SFRT-2 as social perception measure in clinical practice and research.

1. Introduction

Social cognition refers to "those psychological processes that are involved in the perception, encoding, storage, retrieval and regulation of information about other people and ourselves" (Green et al., 2015). Social cognition has become a major focus of attention in the study of cognitive impairment in patients with schizophrenia As is well known, patients with schizophrenia suffer from cognitive alterations that affect many cognitive domains such as processing speed, memory, executive functions or attention (Fatouros-Bergman et al., 2014; Heinrichs and Zakzanis, 1998; Keefe and Harvey, 2012; Schaefer et al., 2013). However, it is only in the last two decades that social cognition in schizophrenia has attracted the interest of researchers (Pinkham, 2014). Both neuro and social cognition have been related to functional outcome in patients with schizophrenia and they have been demonstrated to be linked to community functioning, social behaviour, social problem solving or social skills (Fett et al., 2011; Keefe and Harvey, 2012). In fact, social cognition appears to be related to functional outcomes in a stronger way than neurocognition (Fett et al., 2011).

One of the greatest drawbacks when studying social cognition impairment in patients with schizophrenia is the lack of standardization and psychometric validation of social cognitive measures (Green et al., 2008; Pinkham et al., 2013; Savla et al., 2012). Moreover, some practices such as using social cognition measures without adapting and validating them on patients with schizophrenia might compromise the assessment and findings obtained when studying social cognition in psychopathology. Consequently, some initiatives such as the Social Cognition Psychometric Evaluation (SCOPE) study have been developed to address these obstacles, trying to achieve a consensus among experts in the field (Pinkham et al., 2013). In addition, due to the fact that social cognitive measures are generally designed for native speakers of English, Spanish adaptations and validations of these instruments are still lacking. Given the complexity of a psychological construct such as social cognition, this situation might lead to many difficulties and errors when using these measures with native speakers of Spanish. Thus, it is important to address cultural differences that may affect the comprehension of the task and consequently, the subject's performance in it, especially when adapting social cognition measures (Hambleton and Patsula, 1998).

Abbreviations: SFRT-2, Situational Feature Recognition Test 2; HC, healthy controls

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It has been proposed that social cognition can be understood and assessed as formed by four main domains: a) theory of mind; b) social perception; c) attributional style; and, d) emotion processing (Pinkham, 2014). Although these four subdomains are usually separately described in psychiatric research, the boundaries between them are not always clear, and some domains such as social perception, emotion processing and Theory of Mind are often interrelated, leading to a possible overlap between these components (Grant et al., 2017; Green et al., 2008). As shown in a recent meta-analysis, social perception and Theory of Mind present the greatest differences when comparing social cognition performance between patients with schizophrenia and HC (Savla et al., 2012). However, despite the well described alterations in social perception and Theory of Mind in schizophrenia, some domains such as social perception need further research, as it has been less studied than others. Especially, social perception has been highly related to social knowledge, since the two concepts make reference to a person's ability to identify and be aware of the roles, rules and goals that are present in a social context or situation (Green et al., 2008; Savla et al., 2012). Both domains usually overlap, and some authors have considered social knowledge to be a component of social perception (McCleery et al., 2014). In addition, and along with Theory of Mind, social perception has been proven to be especially related to functioning in patients with schizophrenia (Fett et al., 2011), emphasizing the importance of this social cognition domain in this pathology.

As far as the authors are aware, there is only one assessment tool available to assess the social perception domain for Spanish speakers [The Social Perception Scale (SPS), (García et al., 2003)]. However, this instrument has been designed to assess social perception changes after a specific rehabilitation program of this domain, and therefore its use is limited. This lack of social perception measures available in Spanish points to the need for instruments that have been adapted and validated for the assessment of this domain in the native speakers of Spanish. The Situational Feature Recognition Test (SFRT) (Corrigan and Green, 1993; Corrigan et al., 1996) is a well-known social perception task designed for patients with schizophrenia. Although it has been used with English-speaking pathological and non-pathological populations (Gutiérrez Ruiz, 2013; Savla et al., 2012), this test has not yet been adapted and validated in Spanish. In addition, the SCOPE study has not assessed the psychometric properties of the SFRT-2, because this test was not selected as the final social perception measure included in the project. In fact, the social perception measure selected by the SCOPE showed less consistent psychometric properties than the other social cognition measures and was removed from further consideration, leaving the social perception domain unrepresented. This, added to the lack of studies assessing the psychometric properties of the SFRT-2 in other languages or cultures than English, reinforces the necessity of translating and validating this test into other languages. The SFRT-2 presents different familiar or non-familiar social situations along with a list of related and non-related actions and a list of related and non-related goals for each situation. Actions' list presents actions that might or might not be carried out in the given situation, whereas goals' list presents possible or not possible goals that people try to achieve in the given situation (see Fig. 1 for a sample item). The aim of this study was to adapt and validate the SFRT by using a sample of both native Spanish-speaking patients with schizophrenia and healthy controls (HC). The reliability of this Spanish adaptation for use with both pathological and non-pathological samples will be examined and the concurrent validity will be studied in the schizophrenia group. The discriminant validity of the adapted version when comparing patients with schizophrenia and HC was also assessed.

2. Methods

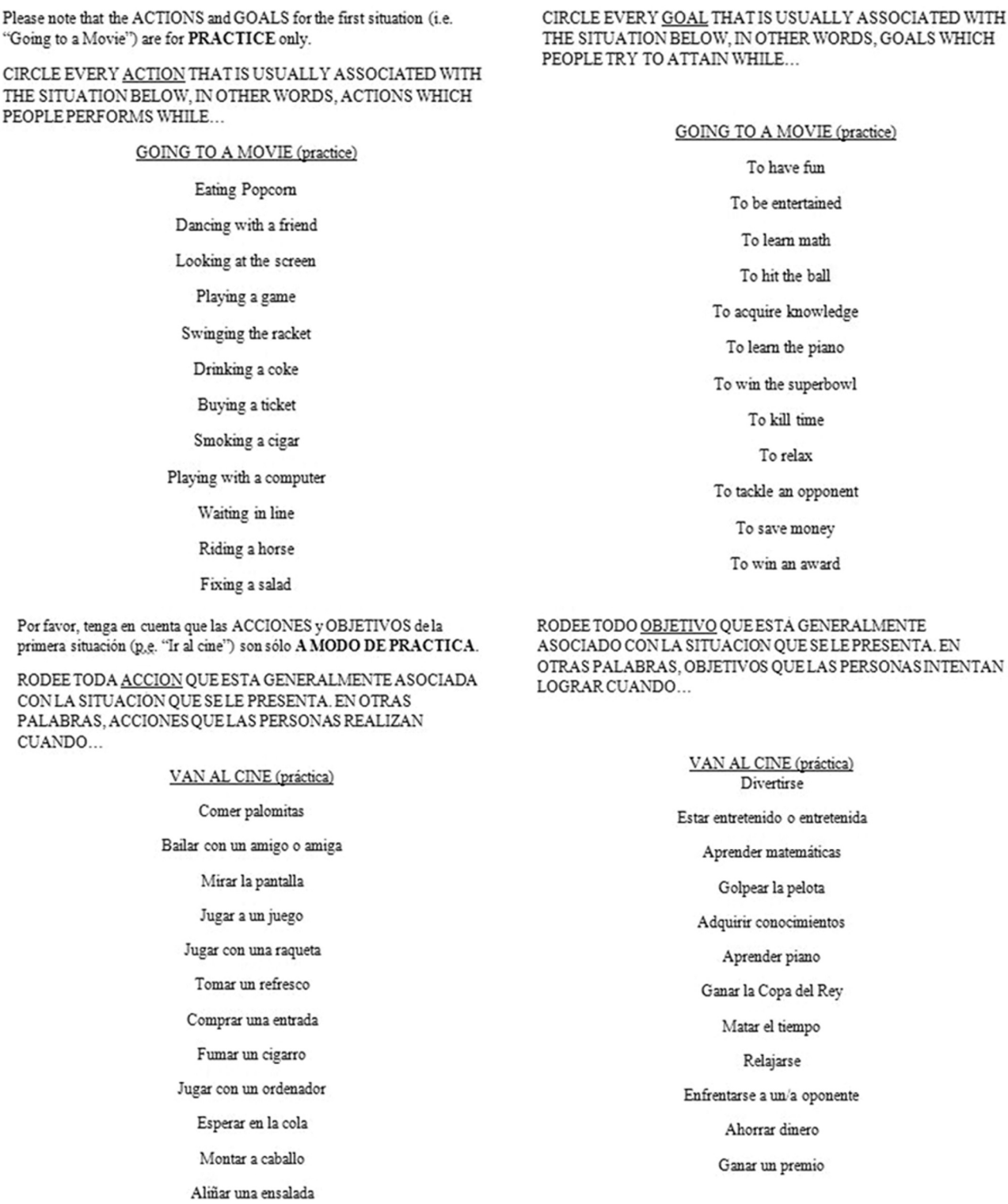
2.1. Participants

One hundred and one native Spanish-speaking patients with schizophrenia were recruited from the Osakidetza Public Mental Health Services in Bizkaia (Spain). Patients were involved in a project which assessed the efficacy of the REHACOP cognitive rehabilitation program for psychosis (Peña et al., 2016) and were assessed with an exhaustive neuropsychological battery, including measures of social cognition. For the purpose of this study, only those scores obtained before the intervention were used. Patients were diagnosed with schizophrenia based on the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000), using the Structured Clinical Interview for DSM-IV (SCID-I) (First et al., 1997) and excluded in case of: 1) having evidence of alcohol or drug abuse in the previous 30 days; 2) having a previous episode of loss of consciousness; 3) mental retardation; 4) substance dependence; or 5) having any relevant neurological or medical condition. Twenty eight were women and 73 were men, ranging in age from 19 to 65 years (M = 39.66; SD = 9.74) and with a mean of 10.02 years of education. In addition, 100 native Spanish-speaking HC were recruited by word of mouth, with ages ranging from 16 to 80 years old (M = 37.82; SD = 17.68) and a mean of 14.56 years of education. For the purposes previously mentioned, HC were assessed only by using the SFRT. However, one participant did not complete one of the situations and 10 HC declined having their personal data reported, and were therefore excluded from the statistical analyses. The investigation was carried out in accordance with the latest version of the Declaration of Helsinki. The study design was reviewed and approved by the Ethics Committee at the Health Department of the Basque Mental Health System in Spain and the Ethics Committee of the University of Deusto. Participants gave their informed consent before taking part in the study and after the nature of the procedures had been fully explained.

2.2. Procedure

The SFRT version 2 (SFRT-2) (Corrigan et al., 1996) was designed to assess the capability of patients with schizophrenia to identify a situation's features. In contrast to the first version of the SFRT (Corrigan and Green, 1993), the SFRT-2 manipulates familiarity of social situations and includes both familiar and unfamiliar situations. For each of the situations, one list of concrete (actions) and one list of abstract (goals) features are presented (see supplementary material in order to access the complete test). This assessment tool consists of nine situations (five familiar and four unfamiliar) with 14 options for related or non-related actions and goals (six correct responses and eight distractor items for each feature). The participant is given a description of a specific situation using as few words as possible (usually no more than four words) and a list of possible options for related actions and goals. Once the situation has been read and understood, the participant is asked to indicate and mark the actions or goals that are usually associated with the situation in their opinion. Each option list presents both situation related (hits in case of being selected by the participant) and nonrelated (false positives in case of being selected by the participant) options. False positives presence might indicate that participants are attributing features not generally considered as characteristic of a specific situation and so, they present difficulties identifying features of social situations. Before going ahead with the nine situations, participant is asked to perform a practice example (see Fig 1 and supplementary material). The psychometric properties of the original version (English) of the SFRT-2 have shown to have high internal consistency indexes for both patients with schizophrenia and HC. In addition, internal consistency was shown not to be affected by the educational level of the participants (Corrigan et al., 1996).

In order to adapt and validate the SFRT-2 for use with the native speakers of Spanish, the English version of the test was forward and backward translated into Spanish. In addition, one of the situations, as well as the corresponding actions and goals, were modified to take into account the country's culture, habits and traditions. The situation


Please note that the ACTIONS and GOALS for the first situation (i.e. "Going to a Movie") are for **PRACTICE** only.

CIRCLE EVERY ACTION THAT IS USUALLY ASSOCIATED WITH THE SITUATION BELOW, IN OTHER WORDS, ACTIONS WHICH PEOPLE PERFORMS WHILE…

GOING TO A MOVIE (practice)

Eating Popcorn

Dancing with a friend

Looking at the screen

Playing a game

Swinging the racket

Drinking a coke

Buying a ticket

Smoking a cigar

Playing with a computer

Waiting in line

Riding a horse

Fixing a salad

CIRCLE EVERY GOAL THAT IS USUALLY ASSOCIATED WITH THE SITUATION BELOW, IN OTHER WORDS, GOALS WHICH PEOPLE TRY TO ATTAIN WHILE…

GOING TO A MOVIE (practice)

To have fun

To be entertained

To learn math

To hit the ball

To acquire knowledge

To learn the piano

To win the superbowl

To kill time

To relax

To tackle an opponent

To save money

To win an award

Por favor, tenga en cuenta que las ACCIONES y OBJETIVOS de la primera situación (p.e. "Ir al cine") son sólo **A MODO DE PRACTICA**.

RODEE TODA ACCION QUE ESTA GENERALMENTE ASOCIADA CON LA SITUACION QUE SE LE PRESENTA. EN OTRAS PALABRAS, ACCIONES QUE LAS PERSONAS REALIZAN CUANDO…

VAN AL CINE (práctica)

Comer palomitas

Bailar con un amigo o amiga

Mirar la pantalla

Jugar a un juego

Jugar con una raqueta

Tomar un refresco

Comprar una entrada

Fumar un cigarro

Jugar con un ordenador

Esperar en la cola

Montar a caballo

Aliñar una ensalada

RODEE TODO OBJETIVO QUE ESTA GENERALMENTE ASOCIADO CON LA SITUACION QUE SE LE PRESENTA. EN OTRAS PALABRAS, OBJETIVOS QUE LAS PERSONAS INTENTAN LOGRAR CUANDO…

VAN AL CINE (práctica)
Divertirse

Estar entretenido o entretenida

Aprender matemáticas

Golpear la pelota

Adquirir conocimientos

Aprender piano

Ganar la Copa del Rey

Matar el tiempo

Relajarse

Enfrentarse a un/a oponente

Ahorrar dinero

Ganar un premio

Fig. 1. SFRT-2 English and Spanish item sample. "Going to a movie". Left column: actions; right column: goals.

"Celebrating a Bar Mitzvah" was changed to "Celebrating first communion", a near equivalent Christian religious celebration, considering that Catholicism is the main religion in Spain. Moreover, for each of the nine situations, two possible actions and two possible goals were removed to reduce administration time. This process led to a final Spanish version of the test with nine situations and 12 possible options in both actions and goals lists (Supplementary material).

2.3. Reliability

Reliability of the Spanish adaptation of the SFRT-2 was examined by assessing the internal consistency of the total scores obtained in actions hits, goals hits, actions false positives and goals false positives in patients with schizophrenia and HC separately.

Table 1
Sociodemographic and SFRT-2 performance descriptive data and differences between groups (SZ = 101; HC = 99).

Variable		SZ Mean (SD)/ *n* (%)	HC Mean (SD)/ *n* (%)	*U*/Chi	*p*	Hedges's *g*
Age (years)		39.66 (9.75)	37.82 (17.68)[a]	3926.50	0.082	0.25
Sex	Women	28 (27.72%)	72 (72.73%)[b]	40.50	< 0.001	
	Men	73 (72.28%)	27 (27.27%)[b]			
Education (years)		10.02 (3.16)	14.56 (3.00)[c]	1395.50	< 0.001	1.49
SFRT-2						
Total Actions hits		37.02 (6.80)	39.67 (4.06)	3939.00	0.009	0.38
Total Goals hits		36.64 (6.88)	39.56 (4.61)	3825.00	0.004	0.41
Total Actions FP		9.68 (8.44)	4.54 (3.22)	2618.00	< 0.001	0.90
Total Goals FP		10.08 (8.33)	4.29 (3.42)	2167.50	< 0.001	1.12

SZ = Schizophrenia; HC = Healthy controls; U = Mann Whitney-U; Hedges's *g* = Effect size; SFRT-2 = Situational Feature Recognition Test version 2; FP = False positives.
[a] Data available for 91 HC.
[b] Data available for 99 HC.
[c] Data available for 90 HC.

2.4. Validity

In order to assess concurrent validity of the SFRT-2 in the schizophrenia group, two composite scores were calculated for the test. One composite score included hits in both actions and goals (alpha = 0.92), whereas the other composite score was formed by false positives in both actions and goals (alpha = 0.96). Concurrent validity of the SFRT-2 was studied by means of assessing the relationship between the composite scores mentioned earlier and other measures of social cognition which were also included in the exhaustive neuropsychological battery, such as a) The Strange Stories Test (Happé, 1994) for Theory of Mind, which includes four different stories recreating situations of double bluffing, mistakes, persuasion, and white lies, about which the participant has to answer a question; b) the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) (Extremera et al., 2006; Mayer et al., 2000) for emotion processing, consisting in some tasks oriented to identify emotions conveyed through facial expressions and pictures and other tasks based on rating which emotional strategy would be most effective for emotional self-regulation, as well as other people's emotions; the self-serving bias index of the Attributional Style Questionnaire (ASQ) (Peterson et al., 1982; Sanjuán and Magallares, 2006) for attributional style, based on a seven-point Likert scale in which participants have to indicate the extent to which they attribute six hypothetical negative and positive life events to internal, stable, and global causes. Specifically, self-serving bias index consists on excessively attributing negative events to external causes and, displaying an exaggerated tendency to attribute positive events to internal causes, deflecting self-blame; and the GEOPTE (Sanjuan et al., 2003), which assesses general social cognition by means of 8 specific Likert items that participant has to answer. Based on previous studies, we expected that SFRT-2 measures would correlate specially with measures of Theory of Mind and emotion processing but in a lesser extent with the attributional style measure, as it has been suggested that this domain is separated from the other social cognition domains (Buck et al., 2016).

The discriminant validity of the test was assessed for an overall index which included hits and false positives in both actions and goals (alpha = 0.91) in order to determine its capability to discriminate between patients with schizophrenia and HC. To calculate this composite score, false positives were recoded so higher values indicated a better performance.

2.5. Statistical analysis

Distribution of the variables was studied using the Kolmogorov–Smirnov test. The following statistical analyses were therefore performed depending on the normal or non-normal distribution of the variables. Mann–Whitney *U* and chi-square analyses were used to assess sociodemographic and SFRT-2 performance differences between groups. Cohen's d effect sizes were obtained (Lenhard and Lenhard, 2016) and then converted into Hedges's *g* effect sizes based on the statistical formula presented in Lakens (2013) (0.2 = small; 0.5 = medium, and 0.8 = large). Cronbach's alpha was used to obtain the internal consistency indexes of the SFRT-2 in order to assess its reliability. Concurrent validity was assessed by means of Spearman's correlations in the schizophrenia group. Finally, Receiver Operating Characteristic (ROC) curve analysis was used to study the discriminant validity of the SFRT-2 when comparing patients with schizophrenia and HC, based on area under the curve (AUC) values (Fischer et al., 2003). The overall index including hits and false positives in both actions and goals previously described was used as test variable, and group (patients vs. HC) was added as state variable with a zero value. Sensitivity and specificity were obtained based on Youden index. Accuracy was calculated based on Zhu et al. (2010) formula. All the analyses were carried out using SPSS v.23 (SPSS Inc., Chicago, IL, USA).

3. Results

3.1. Sociodemographic and SFRT performance differences

The sociodemographic characteristics of the sample and the differences in SFRT performance are shown in Table 1. Patients with schizophrenia significantly differed from HC in sex and years of education. HC showed more years of education than patients with schizophrenia.

Differences in SFRT-2 performance between patients with schizophrenia and HC were statistically significant (Table 1). Patients showed lower total hits and higher false positives in both actions and goals compared to HC. Effect sizes for these differences ranged from small-medium to large-very large. Results with a smaller sample (schizophrenia = 101; HC = 89) using years of education and sex as covariates (MANCOVA) were the same, except for actions hits, in which differences were no longer significant ($p = 0.089$).

3.2. Internal consistency

For the patients' group, internal consistency indexes were high for both actions and goals hits, and false positives, ranging from alpha = 0.83 to alpha = 0.90. Regarding actions, hits and false positives showed a Cronbach's alpha of alpha = 0.83 and an alpha = 0.90, respectively. When calculating Cronbach's alpha of the goals hits and false positives, indexes were alpha = 0.83 and alpha = 0.88, respectively. In the HC group, indexes of internal consistency ranged from alpha = 0.66 to alpha = 0.75. Specifically, Cronbach's alphas for actions hits and false positives were alpha = 0.70 and alpha = 0.66 respectively. Internal consistency indexes for goals hits and false positives were alpha = 0.77 and alpha = 0.74, respectively.

Table 2
Correlations between SFRT-2 composites scores and other social cognition measures (SZ = 101).

	SFRT-2 hits composite score	SFRT-2 FP composite score
GEOPTE (general SC)	0.07	0.30**
The Strange Stories Test (ToM)	0.46**	−0.25*
MSCEIT (EP)		
Faces	0.23*	−0.32**
Drawings	0.17	−0.34**
Emotional	0.21*	0.38**
Emotional management	0.11	−0.32**
Relationships	0.15	−0.19
Management	0.13	−0.29**
Bias	0.15	0.03
ASQ (AS)		
Self-Serving Bias	0.05	−0.34**

Spearman correlations. SZ = Schizophrenia; SFRT-2 = Situational Feature Recognition Test; FP = False positives; SC = Social Cognition; ToM = Theory of mind; MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test; EP = Emotional Processing; ASQ = Attributional Style Questionnaire; AS = Attributional style.

* $p < 0.05$.

** $p < 0.01$.

3.3. Concurrent validity

Significant correlations were found between hits and false positives composite scores of the SFRT-2 and other measures of social cognition (Table 2), such as The Strange Stories Test total score, the GEOPTE total score and some scales of the MSCEIT. ASQ self-serving bias only correlated with the false positives composite score. The highest correlation index was found between hits composite score and The Strange Stories Test total score.

3.4. Discriminant validity

Discriminant validity when comparing patients with schizophrenia and HC was moderate-good for the global index including hits and false positives of both actions and goals. AUC of this index was 0.81 ($p < 0.001$), with 89.9% of sensitivity and 63.4% of specificity and an overall accuracy of 76.77% (Fig. 2).

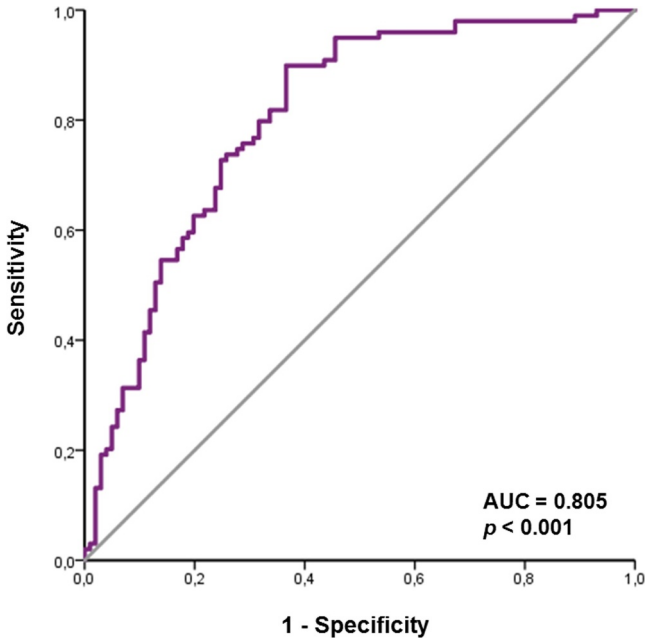


Fig. 2. Hits and FP for actions and goals composite score ROC curve. AUC, Area Under the Curve. (SZ = 101; HC = 99).

4. Discussion

The Spanish adaptation and validation of the SFRT-2 meets a need for social perception measures in Spanish in general, and for patients with schizophrenia in particular. As previously mentioned, to our knowledge, only one scale has been developed to assess social perception in native speakers of Spanish with schizophrenia, namely the Social Perception Scale [SPS, (García et al., 2003)]. However, this scale was designed to specifically assess the three main goals of a particular social perception rehabilitation subprogram (García et al., 2003), making it less adaptable and generalizable to broader conceptions of the social perception construct. Thus, the current study describes the first adaptation to a native Spanish-speaking sample of patients with schizophrenia and HC of one of the most-used social perception measures (Gutiérrez-Ruiz, 2013), as well as its validation. Adaptation and validation of the SFRT-2 in both healthy and pathological samples overcomes the complications derived from the use of assessment tools designed and adapted to non-pathological population to assess patients with schizophrenia or other psychiatric pathologies (Green et al., 2008). In addition, providing adaptation and validation data for both patients and HC guarantees that the adaptation and validation processes have been the same for both samples, allowing their psychometric properties to be compared.

The reliability of the Spanish version of the SFRT-2 was studied by assessing the internal consistency of the test in both pathological and non-pathological samples. In patients and HC, internal consistency indexes ranged from moderate to high for both actions and goals hits and false positives. The Spanish adaptation showed similar internal consistency indexes to those found in the original version in English [ranging from 0.75 to 0.80 among patients with schizophrenia (Corrigan et al., 1996)]. Alpha coefficients in HC were lower than in the schizophrenia group. However, this result has been also observed in other social cognition measures that have been adapted to the Spanish language, such as the Hinting Task (Gil et al., 2012). This could be caused by a ceiling effect in the non-pathological group, suggesting that some of the situations of the SFRT-2 could be too easy for HC. Specifically, regarding the internal consistency values in the schizophrenia group, these were high and close to those obtained in the original version (Corrigan et al., 1996). In addition, reliability indexes obtained in this validation are in line with those presented by other Spanish validated social cognition tests such as the GEOPTE (Sanjuan et al., 2003), the MSCEIT (Extremera et al., 2006) or the ASQ (Sanjuán and Magallares, 2006). These indexes suggest that the Spanish version of the SFRT-2 could be a reliable measure of social perception, especially in schizophrenia patients.

Our results also showed a good concurrent validity of the Spanish version of the SFRT-2. Hits and false positives were related to other measures of social cognition, such as the GEOPTE and the MSCEIT. The magnitude of these relationships ranged from small to medium and was similar to those indexes reported by other studies showing from low to moderate associations between different social cognition measures and domains in similar sample sizes of psychiatric patients (Bell et al., 2010; Mancuso et al., 2011). Specifically, the hits composite score was highly related to the Strange Stories Test total score. This result points to a strong relationship between social perception and Theory of Mind, as has been suggested in previous studies (Grant et al., 2017). The opposite result was found regarding attributional style, measured by ASQ self-serving bias, since it showed a weaker relationship with social perception, which was restricted to the SFRT-2 false positive composite score. This weak relationship is a common finding in social cognition studies and it indicates that attributional style is usually the construct which correlates at a lesser extent with the rest of social cognition

measures (Bell et al., 2010; Mancuso et al., 2011). The lack of a relationship between social perception and attributional style might rely on their conceptualization as a state or trait that is characteristic of patients with schizophrenia. Thus, while attributional style is usually seen as state-related, social perception might be more trait-like in this pathology (Green et al., 2008). In addition, a recent study used a factor analysis (Buck et al., 2016) to find that attributional style is separated from the other domains of social cognition, supporting the present results. These findings emphasize that, despite the complexity of social perception, measures obtained with the Spanish version of the SFRT-2 are related to other validated measures of social cognition in patients with schizophrenia.

Finally, discriminant validity showed to be moderate-good for the composite score that includes hits and false positives of both actions and goals. Indexes obtained pointed out that this score can discriminate between patients with schizophrenia and HC with a 76.77% of accuracy. Sensitivity (89.9%) and specificity (63.4%) indicated that this test shows a better capability to identify patients with schizophrenia as having the pathology than to identify those without the disease as not having it. Specifically, sensitivity index showed that this test tents to identify all possible patients with schizophrenia missing only a 10%. Results suggest that SFRT-2 scores can be combined in one unique index which could act as a good classifier when trying to discriminate between patients with schizophrenia and HC based on their social perception performance. Although these indexes are not perfect and not all the patients were correctly classified, the obtained values point to SFRT-2 as a useful social cognitive measure which, along with other cognitive and clinical measures, could help in the diagnosis of this pathology. The use of SFRT-2 scores in one overall index to discriminate patients with schizophrenia and HC and its good capability to identify specifically patients with schizophrenia is in line with the results shown by Browne et al. (2016) presenting a single factor model of social cognition impairment including measures of emotion processing and Theory of Mind which fits specially well in patients with schizophrenia. Even though discriminant validity of existing social perception measures in schizophrenia has not been widely assessed, many studies have found differences in social perception performance between patients with schizophrenia and HC (Savla et al., 2012). In the present study, the magnitude of the differences between patients with schizophrenia and HC in social perception performance was moderate-high, and especially high for false positives. The sizes of these effects are in line with those presented for social perception in Savla et al. (2012)) meta-analysis, and higher than the magnitude of the differences between patients with schizophrenia and HC in other social cognition domains such as emotion processing and attributional bias (Savla et al., 2012). These findings suggest that, given the social perception impairment in schizophrenia, scores obtained by means of the SFRT-2 would be useful to classify patients with schizophrenia compared to HC based on social perception performance. Thus, SFRT-2 use would allow clinicians to obtain a social perception impairment profile of patients with schizophrenia based on a reliable and valid measure.

As it has been previously mentioned, social cognition and, specifically, social perception is highly related to functioning in patients with schizophrenia (Fett et al., 2011). Moreover, social perception has proved to be a key factor in functional improvements after social cognitive rehabilitation in patients with schizophrenia, above other social cognition domains such as Theory of Mind and emotion processing (Grant et al., 2017). Taking this evidence into account, the selection and use of validated and reliable measures of social perception are very important when assessing it in this pathology. The SCOPE study (2013) investigated the psychometric characteristics of eight social cognition tasks in order to select the most reliable instruments for measuring each of the four domains identified within the social cognition construct (Pinkham et al., 2015). Regarding social perception, the selected measure showed less consistent properties than the measures used in the other domains, and was omitted from further study in the SCOPE project. Given the good psychometric characteristics that both the original version and the present Spanish adaptation of the SFRT-2 has shown, this test could be a good measure to be further analysed in order to be selected as a representative social perception assessment tool.

One limitation of the present study is that we did not matched patients and HC in terms of sex and education. Thus, although differences between groups in SFRT-2 indexes were almost the same when we controlled for sex and years of education, matching samples would be a key factor that should be taking into account specifically when calculating discriminant validity in future studies. Another limitation is that this study did not test the test-retest validity of the SFRT-2 Spanish adaptation. Due to the fact that patients with schizophrenia were involved in a cognitive rehabilitation trial, scores obtained after the intervention were biased, which made them unusable. This psychometric property should be investigated in future studies in order to complete the psychometric information of the Spanish adaptation of the SFRT-2. In addition, further studies should try to adapt and validate the present test for use in other Spanish-speaking countries. Although the main content of the test could be easily understood by any Spanish-speaking people, some words or expressions could be misunderstood by Latin American Spanish-speakers. Moreover, and due to different cultural features, some situations of the SFRT-2 may not be as familiar to people in Latin America or may even be totally unknown to them. Further studies are also needed in order to validate the present instrument in other pathological samples such as autism, bipolar disorder or schizoaffective disorder, in which social cognition could also be compromised. This process would contribute to increasing the knowledge about the domain of social perception in those pathologies.

In conclusion, the Spanish version of the SFRT-2 showed good psychometric properties when assessing social perception in both patients with schizophrenia and HC. These findings support the use of this test as a representative measure of social perception when assessing social cognition, especially in schizophrenia. The Spanish version of the SFRT-2 would offer an objective measure of a complex psychological construct such as social perception, contributing to the understanding of this social cognition domain in schizophrenia.

Conflicts of interest

None.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2018.09.051.

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