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Assessing Theory of Mind Abilities in Schizophrenia and Bipolar Disorder: A Psychometric Study of the Faux Pas Recognition Test in Serbian*

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Abstract

Theory of Mind (ToM) is a social-cognitive ability to understand the mental states of others. ToM functions are compromised in the case of mental disorders characterized by cognitive impairments. The Faux Pas Recognition test (FPRT) is considered a good measure

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of verbal aspects of ToM as it measures social adaptation through the adequate interpretation of potentially sensitive and awkward social situations. However, data on FPRT psychometric properties is somewhat limited. The aim of the present study is the psychometric evaluation of the FPRT in Serbian population. The adapted version in Serbian has been administered to 268 healthy participants, 30 patients with schizophrenia and 31 with bipolar affective disorder. The results show a high internal consistencies of Faux Pas stories (α = .954), Control stories (α = .929) and overall test (α = .936). Both Horn's parallel analysis and confirmatory factor analysis indicated that a single-factor solution is optimal, supporting the premise of a general ToM ability underlying performance across test. The Faux Pas test showed good discriminative power in differentiation between individuals from healthy and clinical populations making it a useful clinical instrument.

***Keywords**:* Faux Pas recognition test, Mood disorders, Psychotic disorders, Social cognition, Theory of mind

Highlights:

- The aim is the psychometric evaluation of the Faux Pas test in the Serbian population.
- FPRT discriminates between healthy and clinical groups well.
- Results support the premise of a single factor, general ToM ability.

Social cognition is the concept that usually refers to the mental processes underlying social interactions, including the perception and cognitive interpretation of the intentions, dispositions, and behaviors of others, and the generation of a response to these behaviors (Green et al., 2008). It is the ability to build a relationship between oneself and others and to use flexible mental constructs as a guide to social interactions, aiming to address adaptive problems within complex social behavior (Adolphs, 2003). Social cognition is a multidimensional construct that nowadays includes various areas/domains of research, such as social perception, social knowledge, mentalizing, Theory of the mind, emotional processing, and attribution styles (Green et al., 2008).

Theory of the Mind

Theory of Mind (ToM) or a mental state attribution, is a social-cognitive ability to understand feelings, intentions, beliefs, and mental states of oneself and others (Baron-Cohen et al., 2001; Zalla et al., 2009). This skill/ability helps an individual to represent the different mental states of others in order to determine their intentions, desires, and thoughts. This also includes understanding the wrong beliefs, intentions, scams, tips, ironies, and metaphors (Penn et al., 2008).

ToM functions are compromised in individuals with mental disorders characterized by cognitive impairments or disabilities, such as schizophrenia, major depressive disorder, or bipolar disorder (van Neerven, Bos, & van Haren, 2021; Martins-Junior et al., 2011). The opposite of ToM is a cognitive disorder called “the blindness of the mind” characterized by an inability to understand or predict the mental states of other people (or self), and this feature appears in people with autism, schizophrenia, and other disorders with a deficit of social insight (Pijnenborg et al., 2013; Zalla et al., 2009).

A Faux Pas (FP) can be defined as an action or behaviour in a social situation that is

socially inappropriate or impolite, and that causes embarrassment or offense (Watanabe et al., 2021). Faux Pas is defined as a situation "where a speaker says something without considering if it is something that the listener might not want to hear or know, and which typically has negative consequences that the speaker never intended" (Baron-Cohen et al., 1999: 408). Identification of FP requires an understanding of the wrong belief and an empathetic conclusion about the harmfulness of the statement and how it will affect others (Giannakou et al., 2019). Recognizing Faux Pas is considered an advanced ToM ability because it requires subtle social perception: a person must be able to understand that something should not be sad in a specific situation and that the statement may have an emotional impact on the listener (Stone et al., 1998; Baron-Cohen et al., 1999). These two mental representations correspond to the cognitive and empathic components of ToM (Şandor & İşcen, 2021). In this manner, recognizing FP made by others is related to recognizing shame since everyone involved in a particular situation who understands the Faux Pas event are more likely to feel embarrassed: the person who committed the FP, the person influenced by the FP, and all witnesses present (Thiébaut et al., 2016).

As mentioned, ToM functions are compromised in the case of cognitive impairments or disabilities. People with disorders from the autistic spectrum consistently show difficulties in identifying Faux Pas situations (Zalla et al., 2009). Similar deficits are shown in patients suffering from schizophrenia, dementia, etc. (Faisca et al., 2016; Martins-Junior et al., 2011). Evidence suggests that impaired theory of mind can be considered a trait marker for both affective and non-affective psychoses (cf. Mitchell & Young, 2016; Caletti et al., 2013), therefore, two subsamples were included in our study, patients with Bipolar affective disorder, and patients with Schizophrenia.

Faux Pas recognition test

There are different instruments for measuring different aspects of ToM, e.g., the "Reading the Mind in the Eyes" test for nonverbal aspects (Baron-Cohen et al., 2001), and the "Faux Pas recognition" test as a measure of verbal aspects (Baron-Cohen et al., 1999; Stone et al., 1998). The Faux Pas test was initially constructed for detecting ToM abilities in children (Baron-Cohen et al., 1999) and was later adapted for measuring individual differences in adults (Gregory et al., 2002, Zalla et al., 2009). Portuguese, Spanish, Swedish, and Chinese test adaptations confirmed that the test has good psychometric properties in healthy subjects (Faísca et al., 2016; Fernández-Modamio et al., 2018; Söderstrand & Almkvist, 2012; Zhu et al., 2007). Results obtained in the Spanish, Brazilian, and Chinese populations (Fernández-Modamio et al., 2018; Negrão et al., 2016; Zhu et al., 2007) confirmed the reliability of the test in the clinical population as well.

However, despite its' usefulness in clinical settings, there are different approaches to psychometric evaluation of the scale resulting in different factor analysis of FPRT and different scoring systems[1]. One of the approaches was to evaluate the factorial structure of the 8 questions, since they are the same across all the stories, and that way the aim is to verify whether a single summative score could be used to summarise all test results (Watanabe et al., 2021). The exploratory factorial analysis found a two-component structure, one component, consisting of questions 1 through 6 and another component, consisting of questions 7 and 8. However, majority of studies performed factor analysis with stories, and a few shortened versions have been developed reducing the number of stories in order to reduce the duration of test administration (Şandor & İşcen, 2021; Fernández-Modamio et al., 2018). The first study found one underlying dimension for FP, and one for Control stories (Şandor & İşcen, 2021). In the other, exploratory factor analysis showed one-factor solution for control subjects and

[1] Detailed elaboration on methodological, scoring problems, and different approaches to psychometric properties analyses of FRPT, can be found in Fernández-Modamio et al., 2018.

two-factor solution (FP factor and Control stories factor) for outpatients (Fernández-Modamio et al., 2018). The authors explained a one-factor solution in control subjects with their ability to perform well in both control and FP stories. Finally, in Portuguese study authors found a reliable one-dimensional solution with all ten FP stories remaining in the test (Faísca et al., 2016).

Regarding the scoring system, some studies show one global score, and others show a global score and a set of different subscores. All these inconsistencies make it difficult to compare results from different studies and give importance to further psychometric analyses of this test.

Bearing in mind that the existing empirical evidence does not provide sufficient data on FPRT structural validity and psychometric qualities for distinguishing healthy and clinical participants, in the present study we aimed to examine psychometric properties and factorial structure of the Serbian adaptation of FPRT as well as to test its diagnostic validity in differentiating between healthy participants and two clinical groups, one diagnosed with schizophrenia and the other with bipolar affective disorder.

Method

Procedure

The Clinical Centre Kragujevac Ethics Committee and "Dr Laza Lazarevic" Ethics Committee approved the study, which was conducted in accordance with the 1989 Helsinki Declaration. The research was conducted at the Clinic for Psychiatric Diseases "Dr Laza Lazarevic", Belgrade, and the Psychiatry Clinic, Clinical Center Kragujevac. Before being included in the research, all participants signed informed consent.

Translation and cross-cultural adaptation of the instrument followed the instructions of the Autism Research Centre (www.autismresearchcentre.com). Adaptation of the original adult version instrument (Baron-Cohen et al., 1999; Stone et al., 1998) was carried out using a

standard backward translation method in which professional translator and authors bilingual in English and Serbian took part. Names of persons and places in the story were adapted to fit the Serbian context. A preliminary Serbian version was tested on 40 subjects. With minimal corrections, the backward test translation was submitted to the ARC for approval. Upon approval (2016-0219), the test was administrated to participants in line with the instructions by Stone et al. (1998).

Sample

The study included a total of 329 participants – 268 participants recruited from the general population (73.1% females, age from 18 to 60 years old M_h = 27.47, SD = 9.94), 30 patients diagnosed with schizophrenia (13 females, age M_{sch} = 41.37, SD = 9.98) and 31 patients diagnosed with bipolar affective disorder (11 females, age M_{bd} = 40.00, SD = 12.78). Participants on average completed 13.30 years of formal education (M_{sch} = 12.60, SD = 2.57; M_{bd} = 13.26, SD = 3.09; M_h = 13.38, SD = 2.20).

All participants met the established inclusion and exclusion criteria. Participants from the clinical groups were all in remission of the primary disease (minimum three months) which was confirmed by defined scores: for schizophrenia score <50 on the PANSS scale (Kay et al., 1987), for mania score <10 on the Yang's Mania Scale (Young et al., 1978), and for depression score <7 on the Hamilton Depression Scale (Hamilton, 1960). It was also important that the pharmacotherapy protocol was not changed in the last three months. Additional exclusion criteria were: comorbid psychiatric disorders, intellectual impairment, CNS disorders (e.g., dementia, stroke, etc.), PAS use, and severe chronic somatic illnesses.

Participants from the non-clinical population were selected through a non-probabilistic *snowball model* (personal contacts and social networks). They were interviewed in a single individual session lasting approximately 30 minutes. The inclusion criteria were age 18+ years, verbal understanding of the protocol and stories, while the exclusion criteria were psychiatric

disorders, use of medication, and other additional exclusion criteria mentioned for the clinical group.

Instrument

Faux Pas adult version test (Stone et al., 1998; Zalla et al., 2009) consists of a total of 20 short stories, 10 stories contain errors based on the Faux Pas principle (FP stories: 2, 4, 7, 11, 12, 13, 14, 15, 16, 18), and the other half does not (Control stories: 1, 3, 5, 6, 8, 9, 10, 17, 19, 20)[2]. After reading each story, participants have to answer eight questions in total. The two *control items* (items 7 and 8 in Table 2 and Appendix 1) serve to verify whether the participants understood the story. If participants had mistaken at least one of these control questions the points of these specific stories do not count in any subscale scores (Stone & Baron-Cohen, 1998).

The participants need to identify whether the story contains FP or not (item 1 in Table 2 and Appendix 1) – whether someone in the story said something inappropriate or something they should not have said. If the answer is affirmative, the participants respond to additional questions regarding the situation and requiring an assessment of the mental state of the actors in the story. From these six questions, according to authors (Stone & Baron-Cohen, 1998), the first two items reflect the Faux Pas Detection; the third item assesses the understanding of Inappropriateness; the fourth item measures Intentions, i.e., the actor's intentions or motivation; the fifth item captures the Belief of a character in the story; and the sixth item relates to Empathy – whether the participant knows how people felt in a given situation. The participant gets 1 point for each correct answer, and for each subscale, the score range lies between 0 (no correct answers) and 6 (all correct answers).

[2] Examples of the original FP and Control stories, as well as following questions for those stories are given in Appendix 1

Following the scoring system provided by the authors of the instrument (Stone & Baron-Cohen, 1998), five scores were calculated separately (Detection, Understanding Inappropriateness, Intention, Belief, and Empathy). FP total score ranging from 0 points to 60 points was also calculated (Faísca et al., 2016; Söderstrand & Almkvist, 2012). The authors of the original scale advise that results should not be reported just with one total score, and that subscores should be accounted. This way, practitioners can have clear insight where the clients have difficulties. As for Control stories, 2 points were given to each correct answer to the first question of each story (Stone & Baron-Cohen, 1998). This score, named the Control stories score, ranges from 0 to 20 points and reflects the correct rejection of stories without faux pas situations (Faísca et al., 2016).

Two authors scored/evaluated the responses of all participants. Inter-rater reliabilities were high. For the FP stories intra-class correlation coefficient (ICC) was .90 (boot-strapped 95% CI: .88–.93), and for Control stories it was .95 (boot-strapped 95% CI: .93–.97).

Results

Descriptive statistics

Descriptive statistics for each of the FP items and the total score, separately for clinical groups, healthy participants, and the whole sample, are shown in Table 1.

Insert Table 1

The average scores on individual subscales and the overall score in healthy subjects proved to be higher than those of the clinical groups, while the standard deviation of the scores showed to be lower. The standardized skewness and kurtosis values in clinical groups did not exceed the expected intervals for normal distribution, and the *K-S* test indicated normality of the distributions of scores for both clinical groups. On the other hand, the distributions of scores on the Faux Pas test for healthy participants deviated from normal distribution, as indicated by both asymmetry coefficients (*zSκ* and *zKu*) as well as by the *K-S* test. In sum, each of the

measures derived from the Faux Pas test proved to be skewed toward higher scores in healthy participants, but normally distributed in both clinical groups.

Table 2 shows the average performance of the whole sample on each of the items/questions and for each story. It can be seen that the percentages of the correct responses for control items (7 and 8) are close to 100%. So, participants generally did not have problems *understanding the story*. In test items (from 1 to 6), however, the differences occurred between Faux Pas and Control stories, with the Faux Pas stories being more difficult on average. The lowest score for control stories was 93% of correct answers, while the FP stories had scores ranging from 53 to 79%. The story 18 proved to be the most difficult of the Faux Pas stories (53% of correct answers), while Control stories had relatively similar indicators of difficulty with average values over 90%.

If we compare specific items, item 5 (question about understanding the belief of the story character) and 4 (question about interpreting intentions), proved to be the most difficult ones among Faux Pas stories (61 and 63% respectively).

Insert Table 2

Psychometric properties

Intercorrelations of item scores are shown in Table 3. As can be seen, all correlations were very high (most of them exceeding .90).

Insert Table 3

Since one of the approaches to the evaluation of this scale (Watanabe et al., 2021) was to examine the factorial structure of the items/questions (to verify whether a single summative score could be used to summarise all test results) exploratory factor analysis was conducted on the five subscale measures using the Maximum Likelihood extraction method with Promax rotation (Table 4). Unlike the mentioned study, we did not include control questions (item 7 and 8) in the analysis because they are not included in the scores anyway. Moreover, since the

original instructions suggest adding the first two questions into one score (Detection), the five mentioned scores were included in the analysis. Bartlett's test ($\chi^2(10) = 3312.24$, $p < .001$) indicated the appropriateness of the correlation matrix for factorization and the Kaiser-Meyer-Olkin measure indicated satisfactory item sampling adequacy (*KMO* = .901). Both Guttman-Kaiser's rule and scree plot suggested the retention of a single factor with eigenvalue above 1 ($\lambda = 4.70$). Extracted factor accounted for 92.27% of the variance of five derived scores.

Insert Table 4

However, our main focus was to examine the factorial structure of the FP stories, as this is the most common approach in research so far. Due to the lack of variance in performance on Control stories, and the fact that only the scores on the first items from every control story are forming the Control stories score, a more detailed examination of the latent structure of the test was carried out for Faux Pas stories only. The *KMO* measure of sampling adequacy was .835, and Bartlett's test of sphericity ($\chi^2(45) = 501.99$, $p < .001$). We used parallel analysis (PA) to determine the number of factors to retain. The randomly generated eigenvalues (from the Brian O'Connor's syntax) were compared with the eigenvalues gained from Principal component analysis with Direct Oblimin rotation (O'Connor, 2000). Although the PCA showed two principal components solution with eigenvalues above 1, explaining 42.69% of the total variance (with stories N^0 2 and N^0 15 forming the second component), the PA revealed that only the first component can be retained (Table 5).

Insert Table 5

Finally, according to the theoretical model (Baron-Cohen et al., 1999; Stone et al., 1998), and results of PA, we tested a one-factor solution via Confirmatory factor analysis (Maximum likelihood method) in Amos 21. In order to evaluate model fit, the following indices were used: comparative fit index (CFI) >.95, goodness-of-fit (GFI) >.95, Tucker-Lewis coefficient (TLI) >.95, a root mean-square error of approximation (RMSEA) and standardized root mean-square

residual (SRMR). Cut-off levels for "good fit" were RMSEA <.06 and SRMR <.09 (Hu & Bentler, 1999). In the initial model no residuals were intercorrelated (Figure 1). After analyzing modification indices, covariances data, we concluded that certain stories (residuals) should be correlated (e1-e8, e3-e4, e3-e5). Origin of these correlations may lie in shared face meaning e.g., inappropriateness arises when someone's negative situation (illness - story 4) or feature (body image - items 3 and 5) is accentuated or mentioned. The final model shown in Table 6 and Figure 1 is the model where those stories were intercorrelated, which resulted in the reduction of chi-square values as well as the improvement of other model fit indices in comparison to the initial model.

Insert Table 6

Insert Figure 1a and Figure 1b

Although in the final model stories 2 and 15 still have relatively low loadings (less than .50), the model nevertheless shows satisfactory parameters, which suggests that they may be retained in the final version of the scale.

The internal consistency of the whole Faux Pas test was very high for each subgroup of participants (α_h = .937; α_{sch} = .937; α_{bd} = .932). Similarly, the values of Cronbach alpha proved to be very high for Faux Pas stories (α_h = .955; α_{sch} = 955; α_{bd} = .943) and Control stories (α_h = .925; α_{sch} = .926; α_{bd} = .933) separately.

Validity Evidence

Given the empirical evidence of the ToM deficiency in patients with mental disorders, we wanted to examine whether Faux Pas is successful, and to what extent in differentiation between clinical groups and healthy controls (Table 7). The healthy controls group (N = 31) was sampled from the whole subsample of healthy participants to match the relevant socio-demographic profile of clinical groups [age: $F(2,89) = 2.160$, $p = .121$; gender: χ^2 (2) = 3.010, $p = .222$; years of education: $F(2,89) = 0.854$, $p = .429$]. Univariate ANOVA showed significant

difference in FP total scores ($F(2,91) = 12.228$, $p < .001$, $\eta_p^2 = .216$), while post-hoc Tukey's B test revealed that Sch group performed significantly worse than other two groups (Table 7).

Insert Table 7

Additionally, to provide more detailed information on the discriminative validity of FPRT i.e., its successfulness in differentiating between healthy participants and two clinical groups, we conducted two discriminant analyses. Results showed that on the basis of FP total score Faux Pas can differentiate between healthy and Sch group with the accuracy of 73.8% ($r = .582$, Wilks' $\lambda = .662$, χ^2 (1) = 24.172, $p < .001$), while the discrimination between healthy and BD group proved to be overall somewhat less successful – 67.7% ($r = .431$, Wilks' $\lambda = .814$, χ^2 (1) = 12.218, $p < .001$). In both cases, most errors in classification emerged due to classifying clinical entities in the healthy group. Specifically, the false negative rate for the Sch group was 43.3% and for the BD group 48.4%. On the other hand, false positive rates, i.e., the percentage of errors in classifying healthy participants into the Sch group was 9.7, and for wrongly classified healthy participants into the BD group, 16.1%.

Finally, we investigated gender differences, for healthy control and individual clinical subsamples separately. Within the healthy subsample, significant differences in favor of women were found for the global Faux Pas measure ($U = 5641.0$, $p = .012$). In contrast, no gender differences in clinical subsamples were observed ($F_{sch}(1,28) = 0.459$, $p = .504$; $F_{bd}(1,29) = 0.017$, $p = .898$).

Discussion

The Faux Pas test is one of the most widely used tests for the assessment of individual differences in social cognition. It has been adapted into many languages; however, a review of the literature shows different approaches to psychometric evaluation of the scale that makes the results difficult to compare. Our findings suggest that the Serbian adaptation of FPRT has high internal consistencies of Faux Pas and Control stories in both clinical groups and healthy

participants. The values of Cronbach's alpha are in line with those reported for Portuguese (Negrão et al., 2016) and Swedish adaptation (Söderstrand & Almkvist, 2012) and higher than those reported for Spanish sample (Fernández-Modamio et al., 2018).

The results showed that Faux Pas stories were more difficult than Control stories, which could be expected due to their higher demands. If we compare the percentages for the correct responses to the first questions for each story (the one in which participants have to identify whether the story contains FP or not), we can see that percent of the correct responses to FP stories ranges from 55 to 88%, and for control stories from 93 to 99.7%. In similar study from Turkey (Sandor & Iscen, 2021), these percentages ranged from 72 to 94% for control stories, and from 58 to 93% for the FP stories.

Most of participants from the control group performed highly on stories containing Faux Pas and in particularly in Control stories, which led to restricted variability and skewed distributions toward higher scores in this subsample (a *ceiling effect*). In other words, the Faux Pas test has shown to be relatively easy for the healthy population. This was also the case in some of the previous studies which used general population in examining the psychometric properties of the instrument (Söderstrand & Almkvist, 2012) but not in others (Faísca et al., 2016). Considering that the healthy subsample in this research largely consisted of young and educated participants, high performances cannot be considered as unexpected.

A limited number of previous studies focused on an examination of the latent structure of the Faux Pas test. Factorization of the items of the Portuguese adaptation of the test resulted in the extraction of a single factor (Faísca et al., 2015). The results of this study are in line with previous findings leading to the conclusion on general ability underlying FP test performance. Although two FP stories show lower loadings in one-factor solution (below .50), in general this solution appear to have good model fit indices. Therefore, we believe that for now this scale should be left in its unchanged form, so that the results are comparable with other studies.

In line with previous studies (e.g., Faísca et al., 2016), the results showed that females are superior to males in ToM abilities. However, this was only true for healthy participants since no gender differences were observed within clinical groups. This may be explained by gender-related differences in emotion perception and different strategies that men and women apply when dealing with emotional information (Kohler et al., 2010). However, the effect of mental disorders may impose itself upon any gender-related difference (Navarra-Ventura et al., 2017).

A number of previous studies showed that clinical groups perform significantly lower on this test compared to healthy participants (Mitchell & Young, 2016; Pijnenborg et al., 2013). Results obtained in our study confirm this evidence. Namely, both patients diagnosed with Sch and those with BD had lower performance than healthy control indicating an underlying deficit in ToM abilities. This was especially true for the Sch group which performed significantly worse than other groups. Studies in patients with schizophrenia indicated that this population exhibit significant deficits in attributing mental states to others (Negrão et al., 2016). Previous studies pointed to the deficits in the identification of mental states implying a common neurobiological substrate affected by different diseases (e.g., Bora et al., 2009; Đorđević et al. 2017; Negrão et al., 2016). Here it should be noted that all our patients were in remission; thus, as results of previous meta-analyses suggested (Bora et al., 2009; Bora et al., 2016), ToM deficits seem not to be state but most likely trait-markers of impairments that persist after the acute phase of illness. Sprong et al. (2007) in a meta-analysis demonstrated a significant impairment in schizophrenic patients, even in patients in remission, suggesting that impairment of ToM could be a possible trait marker of schizophrenia, while ToM deficiencies within BD could be more related to current symptomatology.

The overall diagnostic power of the Faux Pas test has shown to be moderate. Although the test successfully differentiated clinical groups from healthy control, it proved to be

insufficiently sensitive for the accurate classification of patients into their respective groups as indicated by the relatively high false negative rate. These false negative rates were higher for the subgroup of patients with BD than for patients diagnosed with Sch. The results of the present study showed that deficits in social cognition are more pronounced in people with Sch than in those affected by BD. A similar discrepancy in effect sizes was presented in several meta-analyses (Bora et al., 2009; Bora et al., 2016; Mitchell & Young, 2016). The systematic review of the secondary literature pertaining to ToM suggests that "ToM deficits increase in severity along the affective-psychotic spectrum, with mild deficits in patients with MDD, and severe deficits in patients with mania or psychosis" (van Neerven, Bos, & van Haren, 2021).

Conclusion

Cognitive dysfunction is common in schizophrenia and other psychotic disorders and these impairments are considered a major contributor to the disabilities in daily functioning in psychosis (Pinkham & Badcock, 2020). Therefore, routine assessment of cognitive abilities in patients with schizophrenia and related psychotic disorders is recommended in clinical settings.

The Serbian adaptation showed good psychometric characteristics of the Faux Pas test. A prominent common source of variance underlying performance on FPRT supports the premise of a single dimension of measurement, i.e., general ToM ability. In addition, the instrument has shown satisfactory level of diagnostic validity in distinguishing entities with ToM deficiency and healthy controls. The main study limitations are that we did not examine FPRT external validity, and that due to the small sample size, both PCA and CFA were performed on the same sample. Moreover, high inter-rater reliability may be due to the fact that two authors evaluated the responses of all participants. Therefore, future studies should further address and provide empirical evidence on the construct, predictive and external validity of the test using alternative test-markers of ToM abilities in various individuals sampled from the general and clinical population.

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Procena sposobnosti teorije uma kod shizofrenije i bipolarnog poremećaja: Psihometrijska studija Testa prepoznavanja društvenih grešaka (the Faux Pas Recognition Test) na srpskom jeziku

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Teorija uma (ToM) je društveno-kognitivna sposobnost razumevanja mentalnih stanja drugih. ToM funkcije su narušene kod mentalnih poremećaja koje karakterišu kognitivna oštećenja. Test prepoznavanja društvenih grešaka (the Faux Pas Recognition Test, FPRT) se smatra dobrom merom verbalnih aspekata ToM, jer meri socijalnu adaptaciju kroz adekvatnu interpretaciju potencijalno osetljivih i nezgodnih društvenih situacija. Međutim, podaci o psihometrijskim osobinama FPRT-a su donekle ograničeni. Cilj ove studije je psihometrijska evaluacija FPRT-a u srpskoj populaciji. Adaptirana verzija na srpskom jeziku primenjena je na 268 zdravih učesnika, 30 pacijenata sa shizofrenijom i 31 sa bipolarnim afektivnim poremećajem. Rezultati pokazuju visoku internu konzistenciju priča o društvenim greškama (α = .954), kontrolnih priča (α = .929) i testa u celini (α = .936). I Hornova paralelna analiza i konfirmativna faktorska analiza ukazali su da je jednofaktorsko rešenje optimalno. Ovo govori u prilog pretpostavci o opštoj ToM sposobnosti koja je u osnovi uspeha na testu. Test prepoznavanja društvenih grešaka je pokazao dobru diskriminativnu moć u razlikovanju osoba iz zdrave i kliničke populacije, što ga čini korisnim kliničkim instrumentom.

Ključne reči: Test prepoznavanja društvenih grešaka, poremećaji raspoloženja, psihotični poremećaji, socijalna kognicija, teorija uma

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Table 1

Descriptive statistical measures for Faux Pas for each subgroup

Healthy subsample (N = 268)							
*Scores	*Min*	*Max*	*M*	*SD*	*zSk*	*zKu*	*K-S*
Detection	.46	1.00	.85	.12	-5.39**	0.81	2.47**
Inappropriateness	.47	1.00	.84	.12	-4.35**	-0.16	2.01**
Intention	.47	1.00	.81	.12	-2.55*	-0.76	2.13**
Belief	.47	1.00	.78	.12	-2.13*	-1.79	1.99**
Empathy	.47	1.00	.85	.11	-5.23**	0.75	2.43**
Total score	.47	1.00	.83	.11	-4.13**	-0.40	1.45*
Schizophrenia patients (N = 30)							
Scores	*Min*	*Max*	*M*	*SD*	*zSk*	*zKu*	*K-S*
Detection	.46	1.00	.77	.15	-0.86	-1.25	0.77
Inappropriateness	.42	1.00	.77	.15	-1.11	-0.88	0.78
Intention	.42	.95	.69	.14	0.29	-1.13	0.77
Belief	.42	.95	.73	.15	-0.86	-1.20	0.87
Empathy	.47	1.00	.77	.15	-0.68	-1.36	0.94
Total score	.44	.97	.75	.14	-0.74	-1.16	0.85
Bipolar affective disorder patients (N = 31)							
Scores	*Min*	*Max*	*M*	*SD*	*zSk*	*zKu*	*K-S*
Detection	.50	1.00	.84	.12	-1.91	1.28	0.61
Inappropriateness	.50	1.00	.81	.13	-0.96	-0.56	0.72
Intention	.50	1.00	.75	.13	-0.40	-0.90	0.62
Belief	.50	1.00	.81	.14	-0.68	-0.95	0.70
Empathy	.50	1.00	.85	.12	-1.71	1.31	0.54
Total score	.51	.99	.81	.12	-0.92	-0.32	0.43

Note: * Since the Detection has two questions, while others have only one, all scores were divided by the number of questions in order to make them comparable, hence the range from 0 to 1, *M* – mean, *SD* – standard deviation, *Min* – minimal score, *Max* – maximal score, *zSκ* – standardized skewness, *zKu* – standardized kurtosis, *K-S* – Kolmogorov-Smirnov test of normality of distributions of scores, * $p < .05$, ** $p < .01$

Table 2

Percentage of correct answers for all items and stories (whole sample)

Stories	Test items							Control items	
	item 1	item 2	item 3	item 4	item 5	item 6	*M* (1-6)	item 7	item 8
Faux Pas stories									
story 2	88.1	85.7	85.7	83.3	48.0	85.4	79.4	100	100
story 4	77.7	77.7	76.8	63.1	76.5	76.8	74.8	99.7	100
story 7	69.6	68.7	69.3	67.5	65.0	70.2	68.4	100	100
story 11	81.7	79.3	79.3	75.0	78.7	79.9	79.0	1.00	99.7
story 12	81.0	80.7	74.6	64.0	77.4	81.0	76.5	99.4	99.4
story 13	62.0	62.0	61.1	56.2	42.6	62.0	57.7	100	100
story 14	75.9	75.3	75.6	72.0	74.7	76.0	74.9	99.7	99.7
story 15	88.4	88.1	69.6	36.8	35.3	87.8	67.7	100	100
story 16	60.5	60.2	60.2	57.1	57.1	61.1	59.4	100	100
story 18	54.7	52.0	51.7	53.8	52.6	52.6	52.9	100	100
M – item	74.0	73.0	70.4	62.9	60.8	73.3	69.1	99.9	99.9
Control stories									
story 1	93.6	93.6	93.6	93.6	93.6	93.6	93.6	100	100
story 3	97.6	97.6	97.6	97.6	97.6	97.6	97.6	100	100
story 5	93.0	93.0	93.0	93.0	93.0	93.0	93.0	100	100
story 6	92.7	92.7	92.7	92.7	92.7	92.7	92.7	100	99.4
story 8	96.6	96.6	96.6	96.6	96.6	96.6	96.6	100	99.4
story 9	93.6	93.6	93.6	93.6	93.6	93.6	93.6	100	100
story 10	99.7	99.7	99.7	99.7	99.7	99.7	99.7	100	96.7
story 17	98.8	98.8	98.8	98.8	99.1	98.5	98.8	100	100
story 19	98.8	98.8	98.8	98.8	98.5	99.1	98.8	100	100
story 20	93.2	93.2	93.2	93.2	93.2	93.2	93.2	100	98.5
M – item	95.8	95.8	95.8	95.8	95.8	95.8	95.8	100	99.4

Table 3

Item scores intercorrelations

item no.	1	2	3	4	5	6
Item 1 (Detection)		.986**	.965**	.906**	.912**	.982**
Item 2 (Detection)	.986**		.968**	.908**	.906**	.976**
Item 3 (Inappropriateness)	.965**	.968**		.917**	.902**	.961**
Item 4 (Intention)	.906**	.908**	.917**		.875**	.909**
Item 5 (Belief)	.912**	906**	.902**	.875**		.910**
Item 6 (Empathy)	.982**	.976**	.961**	.909**	.910**	

Table 4

Factor matrix

Subscale (item no.)	factor loadings	h^2
Detection (1+2)	.995	.990
Inappropriateness (3)	.989	.952
Intention (4)	.976	.848
Belief (5)	.921	.845
Empathy (6)	.919	.978

Note. h^2 – communalities

Table 5

Percent of the variance accounted for and the number/loadings of factors extracted

Component	Random generated Eigenvalues	PCA Eigenvalues	% of Variance	FP story	PCA Factor 1 loadings	PCA Factor 2 loadings
1	**1.2761**	**3.148**	31.477	FPS2	.427	.626
2	**1.1982**	**1.121**	11.212	FPS4	.562	
3	1.1341	.971		FPS7	.604	
4	1.0675	.821		FPS11	.604	
5	1.0193	.777		FPS12	.640	
6	0.9708	.724		FPS13	.506	
7	0.9233	.693		FPS14	.658	
8	0.8665	.646		FPS15	.440	.508
9	0.8050	.599		FPS16	.599	
10	0.7393	.500		FPS18	.611	

Table 6

Model fit indices for FP one-factor solution

	χ^2/df	*df*	*p*	GFI	CFI	TLI	RMSEA	LO 90	HI 90	SRMR
initial model	1.834	35	.002	.961	.937	.919	.050	.030	.070	.047
final model	1.250	32	.057	.975	.983	.976	.028	.000	.052	.038

Note: comparative fit index (CFI), goodness-of-fit (GFI), Tucker-Lewis coefficient (TLI), *a* root mean-square error of approximation (RMSEA) and standardised root mean-square residual (SRMR).

Table 7

Post-hoc Tukey's B differences in Faux Pas total score between subsamples

Groups	N	Subset for alpha .05	
		1	2
Sch	30	34.13	
BD	31		43.68
Healthy control	31		49.39

Figure 1a

Initial FP stories one-factor model

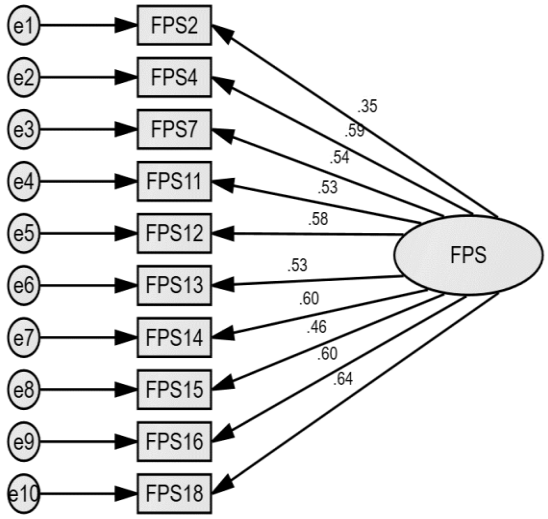
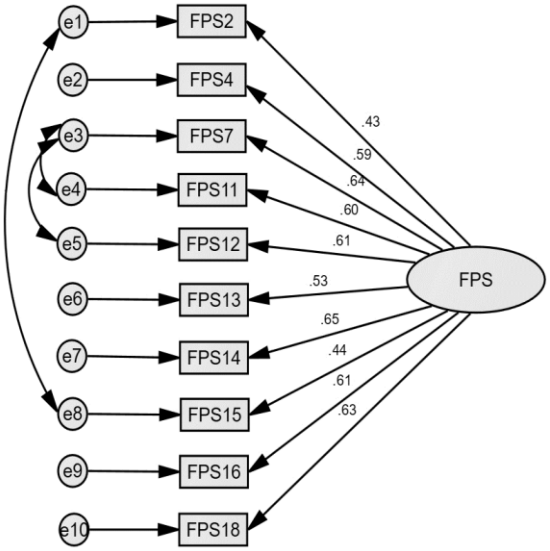


Figure 1b

Final FP stories one-factor model



Appendix 1

Examples of FP and Control stories

Story 1 (Control)
Vicky was at a party at her friend Oliver's house. She was talking to Oliver when another woman came up to them. She was one of Oliver's neighbours. The woman said, "Hello," then turned to Vicky and said, " I don't think we've met. I'm Maria, what's your name?" "I'm Vicky." "Would anyone like something to drink?" Oliver asked.

Control questions: 7. In the story, where was Vicky? 8. Who was hosting the party?

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:
2. Who said something they shouldn't have said or something awkward?
3. Why shouldn't he/she have said it or why was it awkward?
4. Why do you think he/she said it?
5. Did Vicky and Maria know each other?
6. How do you think Vicky felt?

Story 2. (Faux Pas story)
Helen's husband was throwing a surprise party for her birthday. He invited Sarah, a friend of Helen's, and said, "Don't tell anyone, especially Helen." The day before the party, Helen was over at Sarah's and Sarah spilled some coffee on a new dress that was hanging over her chair. "Oh!" said Sarah, "I was going to wear this to your party!" "What party?" said Helen. "Come on," said Sarah, "Let's go see if we can get the stain out."

Control questions: 7. In the story, who was the surprise party for? 8. What got spilled on the dress?

1. Did anyone say something they shouldn't have said or something awkward?

If yes, ask:
2. Who said something they shouldn't have said or something awkward?
3. Why shouldn't he/she have said it or why was it awkward?
4. Why do you think he/she said it?
5. Did Sarah remember that the party was a surprise party?
6. How do you think Helen felt?