Received: 17 October 2023 | Revised: 24 January 2024 | Accepted: 9 May 2024

DOI: 10.1111/eip.13559

ORIGINAL ARTICLE

WILEY

Psychometric properties of the Spanish version of the measure of insight into cognition-self-report in psychosis-risk and non-clinical Mexican young adults

Ana Fresán[1] | Tecelli Domínguez[2] | Yvonne Flores[3] | Lourdes Nieto[2] | Tamara Sheinbaum[4] | Rebeca Robles[2] | Alice Medalia[5]

[1]Laboratorio de Epidemiología Clínica, Subdirección de Investigaciones Clínicas, Instituto Nacional de Psiquiatría "Ramón de la Fuente Muñiz", Mexico City, Mexico

[2]Centro de Investigación en Salud Mental Global, Instituto Nacional de Psiquiatría "Ramón de la Fuente Muñiz"-UNAM, Mexico City, Mexico

[3]Laboratorio de Neuromodulación, Subdirección de Investigaciones Clínicas, Instituto Nacional de Psiquiatría Ramón de la Fuente Muniz, Mexico City, Mexico

[4]Dirección de Investigaciones Epidemiológicas y Psicosociales, Instituto Nacional de Psiquiatría "Ramón de la Fuente Muñiz", Mexico City, Mexico

[5]Cognitive Health Services, Columbia University Irving Medical Center, New York, New York, USA

Correspondence
Dr. Tecelli Domínguez. Centro de Investigación en Salud Mental Global. Dirección de Investigaciones Epidemiológicas y Psicosociales. Instituto Nacional de Psiquiatría "Ramón de la Fuente Muñiz." Calzada México Xochimilco # 101, Col. San Lorenzo Huipulco. Tlalpan. C.P. 14370, Mexico City, Mexico.
Email: tecelli.dominguez@gmail.com

Funding information
Consejo Nacional de Humanidades Ciencias y Tecnologías (CONHACYT), Grant/Award Number: 3205

Abstract

Aim: Cognitive disturbances typically precede the onset of overt psychotic symptoms and represent a neurobiological marker for psychosis risk that is also associated with poor functional outcomes. The Measure of Insight into Cognition-Self Report (MIC-SR) is a widely used 12-item questionnaire that assesses the perceived frequency of cognitive impairment in the domains of executing functioning, attention, and memory. However, the MIC-SR is not available in Spanish, one of the most widely spoken languages worldwide. The present study aimed to provide a Spanish version of the MIC-SR and examine its psychometric properties in psychosis-risk and non-clinical Mexican young adults.

Methods: The sample comprised 621 participants who completed a battery of self-report measures via an online survey. Of the participants, 478 were non-clinical, and 143 met the screening criteria for a clinical high-risk for psychosis (CHR-positive).

Results: Confirmatory Factor Analyses supported a one-factor model, consistent with the findings for the original MIC-SR. The results showed adequate fit indices for the general model and the independent models for both groups, with high Cronbach's alpha coefficients. Furthermore, the CHR-positive group showed more frequent subjective cognitive problems on each of the 12 items, higher total scores, and higher average frequency than the non-clinical group.

Conclusion: To our knowledge, this is the first translation of the MIC-SR into Spanish. Using the MIC-SR at the CHR stage may contribute to our understanding of cognitive processes associated with the onset of a psychotic disorder and provide valuable information in the context of detection and early intervention efforts.

KEYWORDS
awareness, cognitive symptoms, insight, neurocognition, psychosis risk

1 | INTRODUCTION

Along the psychosis continuum, schizophrenia is considered to be the most severe expression of the psychosis phenotype (Johns & van Os, 2001; van Os et al., 2009), while the clinical high-risk (CHR) state for psychosis is the phase prior to the first episode of psychosis, characterized by subclinical symptoms that indicate a risk for developing a psychotic disorder (Yung et al., 2005). Thus, individuals at CHR for psychosis have received extensive research for early detection and preventative intervention (McGorry et al., 2008).

Within the CHR for psychosis state, two phases can be distinguished: an early initial prodromal state characterized by non-specific signs and subtle experiences linked to slight changes in perception, emotion and cognition, not yet identified by the clinician but already experienced by the individual (Klosterkötter et al., 2010; Schultze-Lutter et al., 2010), and a late initial prodromal state including the presence of attenuated or transitory psychotic symptoms or a family history of psychotic disorders along with a significant decrease in functioning over the past year (Yung et al., 2005).

Several studies with CHR samples have highlighted the importance of cognitive impairment as a neurobiological marker for psychosis risk (Bora et al., 2014) that is also associated with poor functional outcomes and clinical prognosis (Barder et al., 2013; Lepage et al., 2014; Mohn-Haugen et al., 2022). Cognitive disturbances are core symptoms of schizophrenia and are present across the psychosis continuum (Gebreegziabhere et al., 2022; Lysaker et al., 2019; Mihaljević-Peleš et al., 2019; Solís-Vivanco et al., 2020). Some studies have indicated that CHR individuals have moderate cognitive impairments (Lawrie et al., 2001; Agnew-Blais & Seidman, 2013), which are less severe than those observed in first-episode of psychosis and schizophrenia patients, similar to those with high familial risk and poorer than healthy subjects (Bora et al., 2014; Mam-Lam-Fook et al., 2017; Mohn-Haugen et al., 2022; Solís-Vivanco et al., 2020). In CHR, cognitive changes typically precede the onset of psychotic symptoms, could affect social and academic functioning, and seem to predict the transition to psychosis (Lam et al., 2018). Therefore, it is important to assess and monitor cognitive performance in CHR populations to improve early detection and intervention that ameliorate cognitive dysfunction, improve clinical and functional recovery and potentially prevent psychosis conversion in some cases (Anda et al., 2019; Mam-lam-Fook et al., 2017).

Research and clinical observations indicate that poor insight into cognitive deficits in schizophrenia-spectrum disorders may impact compliance with interventions to reduce such cognitive impairments (Medalia et al., 2008; Saperstein et al., 2012). The concept of 'neurocognitive insight' describes the awareness of subjective neurocognitive complaints (e.g., impaired attention, memory and problem-solving; Medalia & Thysen, 2008; Stip et al., 2003). Previous studies have indicated that individuals with schizophrenia tend to have limited neurocognitive insight, as evidenced by a considerable discrepancy between the level of cognitive impairment and the degree of awareness of deficits (Keefe et al., 2006; Medalia & Thysen, 2008; Moritz et al., 2004; Medalia et al., 2008). However, less is known about neurocognitive insight at the CHR stage.

Findings available about insight into cognitive processes comparing CHR individuals with psychosis patients or healthy controls have been mixed, depending on the level of cognitive processes considered. For example, recent studies using the Beck Cognitive Insight Scale, which was developed to evaluate patients' self-reflectiveness and their overconfidence in their interpretations of their experiences, have indicated no significant differences between CHR, first-episode of psychosis and healthy subjects on overall cognitive insight (Dondé et al., 2021; Preti et al., 2022). By contrast, when insight into neurocognitive cognitive processes (i.e., attention, memory, etc.) is considered, CHR individuals differ from those with schizophrenia. Glenthøj et al. (2020) suggested that CHR individuals may over-estimate their cognitive deficits as compared with schizophrenia patients according to the Measure of Insight into Cognition-Self Report (MIC-SR; Medalia et al., 2008), a widely used instrument for the measurement of neurocognitive insight.

The MIC-SR assesses awareness and frequency of neurocognitive deficits and is available in English (Medalia & Thysen, 2008; Medialia et al., 2008; Saperstein et al., 2012), Chinese (Li et al., 2018), Persian (Mazhari et al., 2023), Norwegian and Danish (Glenthøj et al., 2020), with adequate validity and reliability properties. To our knowledge, this instrument has not been translated into Spanish, which is one of the most widely spoken languages worldwide.

Therefore, the present study aimed to translate the MIC-SR into Spanish and evaluate its psychometric properties in Mexican individuals with a positive screen for CHR (CHR-positive) and a non-clinical sample. As an initial one-factor solution was determined for the MIC-SR, we aimed to perform a confirmatory factor analysis (CFA) to test this one-dimensional structure. We also aimed to determine discriminant validity by comparing the MIC-SR scores between the CHR-positive and non-clinical groups and to examine internal consistency using Cronbach's alpha. We hypothesized that the MIC-SR in its Spanish version would show adequate validity and reliability for its use in individuals at CHR for psychosis.

2 | MATERIALS AND METHODS

The sample comprised individuals between 15 and 45 years old who voluntarily agreed to complete an online survey through Qualtrics® software, distributed through personal and institutional social media channels. Participants who were 18 years or older provided informed consent at the beginning of the survey. The survey was administered only to minors previously authorized by their parents/guardians to participate and who provided their informed assent. Participants did not receive compensation for completing the survey. Recruitment was performed from March to July 2022. Study procedures were approved by the Research Ethics Committee of the Ramón de la Fuente Muñiz National Institute of Psychiatry (CEI/C/019/2021).

Participants were excluded if they self-reported a psychotic disorder or a psychosis-related hospitalization. Furthermore, we excluded from the non-clinical group those participants who self-reported having a mental health diagnosis or currently being in psychiatric treatment/taking psychiatric medication.

2.1 | Measures

2.1.1 | Clinical high-risk for psychosis status

The positive screen for CHR for psychosis was based on the presence of positive attenuated symptoms and functional impairment assessed with two measures, the Prodromal Questionnaire-Brief (PQ-B; Fonseca-Pedrero et al., 2016) and the Social Functioning Questionnaire (SFQ; Tyrer et al., 2005). Both scales were used since low functioning has been considered an important criterion for identification. Participants were assigned to the CHR-positive group if they met the established cut-offs on both the PQ-B (>6 item rated as positive & distress score ≥29) and SFQ (score ≥10). The PQ-B is a self-reported scale consisting of 21 items answered with a yes/no response format. All items answered affirmatively are further rated on a 5-point Likert distress scale. The SFQ is an eight-item self-reported scale rated on a 4-point Likert frequency scale that evaluates functioning in various domains, including social contacts, work, home and leisure activities.

2.1.2 | Insight into cognition assessment

The MIC-SR (Medalia et al., 2008) was used to assess participant's awareness of difficulties with attention, memory and executive functioning (Medalia et al., 2008; Saperstein et al., 2012). The MIC-SR consists of 12 items, with 4 items assessing each cognitive domain on a frequency Likert scale ranging from 0 (Never) to 3 (Almost daily). The scale's total score ranges from 0 to 36, and an average is obtained by dividing the total score by 12. The MIC-SR has demonstrated satisfactory validity and reliability in samples with schizophrenia-spectrum disorders (Medalia et al., 2008; Saperstein et al., 2012; Mazhari et al. 2023).

The translation procedure followed the suggestions for the translation of instruments for cross-cultural research (Sperber, 2004). First, two bilingual psychologists made independent translations from English to Spanish. Then, a neuropsychologist researcher reviewed and integrated both translations into one. Third, a bilingual psychology researcher (different from the previous ones) performed a back-translation (Spanish to English). Finally, the translation and back-translation were reviewed by the author of the English scale to ensure the translation kept the sense of the original instrument.

2.1.3 | Data analyses

To characterize the sample, descriptive statistics were used. Demographic features were compared between the non-clinical and CHR-positive groups using Chi-squared tests for categorical variables and independent sample *t*-tests for continuous variables.

Construct validity of the MIC-SR was determined by (a) CFA including all the sample, (b) multi-group confirmatory factor analysis (multi-group CFA) and (c) invariance measurement to test the appropriateness of the one-dimensional model originally proposed for the MIC-SR in these two samples. For the CFA and multi-group CFA, the lower standardized loading factors (standardized regression weighted estimates) included in the model were at least 0.40, which indicates that the items of the scale are adequate and representative of the latent variable (total score of the MIC-SR) (Stevens 2009). Maximum likelihood estimation with standardized coefficients and values was the method used based on Hatcher recommendations (Marsh & Hau, 1996). Goodness of fit of the models was borne out by a chi-square ratio ($\chi 2/df$) with acceptable values near or lower than 3.0 (O'Rourke & Hatcher, 2013), a root mean square error of approximation (RMSEA) with values lower than 0.05 for good fit, between 0.05 and 0.08 as acceptable, and between 0.08 and 0.10 as marginal (Browne & Cudeck, 1992), Bentler's Comparative Fit Index (CFI) and the Tucker–Lewis index (TLI), both with values of 0.95 or higher and the Standardized Root Mean-Square Residual (SRMR) with values lower than 0.08 as adequate (Hu & Bentler, 1999). The process for performing the CFA was as follows: (1) a CFA using the whole sample was tested; (2) modification indices (MI) with the most important reductions in chi-square value were added to the model; (3) with this model, a multi-group CFA was performed; (4) the model obtained in the multi-group CFA was tested separately for the non-clinical and CHR-positive groups with maximum likelihood estimations to test configural invariance (Vandenberg & Lance, 2000). If the same model fits adequately in both groups, configural invariance is supported and finally, (5) we examined metric invariance by comparing the ΔCFI (the difference in CFI between the initial multi-group CFA and the models for each sample), with values less than 0.01 as indicative of invariance (Meade et al., 2008). We did not use the chi-square difference tests as it has been shown that it is highly sensitive to sample size and less sensitive than the ΔCFI. After construct validity was determined, we compared the percentage of each item scoring using the Mann–Whitney *U* test and independent sample *t*-test for the total and average scores of the MIC-SR between groups to evaluate discriminant validity. Finally, the internal consistency of the models in each group was tested with Cronbach's alpha, considering an item-total correlation greater than 0.3 as an indicator of the relation of the item with the overall scale and an alpha value equal to or greater than 0.80 as an adequate reliability indicator (Brown, 2015). These analyses were performed with the Stata/SE 13.0 software for Windows.

3 | RESULTS

3.1 | Sample description

The sample was comprised of 621 participants. Most were women (76.2%, $n = 473$), with a mean age of 28.6 years (S.D. = 8.5), without

TABLE 1 Sociodemographic features between the non-clinical and the clinical high-risk (CHR)-positive groups.

	Total $n = 621$		Non-clinical group $n = 478$		CHR-positive group $n = 143$		Statistics
	Demographic features		*n*	%	*n*	%	
Sex-Women	473	76.2	365	76.4	108	75.5	$\chi^2 = 0.04$, $p = .83$
Age-years (mean; S.D.)	28.6	8.5	29.3	8.6	26.5	7.7	$t = 3.4$, $p = .001$
Marital status							$\chi^2 = 7.2$, $p = .06$
Single	343	55.2	259	54.2	84	58.7	
Married/partnered	145	23.3	123	25.7	22	15.4	
Has a sentimental partner	110	17.7	79	16.5	31	21.7	
Separated/divorced	23	3.7	17	3.6	6	4.2	
Level of education							$\chi^2 = 24.4$, $p = .001$
Elementary school	2	0.3	2	0.4	-		
Secondary school	20	3.2	11	2.3	9	6.3	
Technical career	9	1.4	6	1.3	3	2.1	
High school	202	32.5	139	29.1	63	44.1	
Bachelor studies	279	44.9	223	46.7	56	39.2	
Postgraduate	109	17.6	97	20.3	12	8.4	
Current occupation							$\chi^2 = 9.2$, $p = .02$
Unemployed	33	5.3	20	4.2	13	9.1	
Student	239	38.5	178	34.2	61	42.7	
Non-remunerated activity	41	6.6	30	6.3	11	7.7	
Economically remunerated activity	308	49.6	250	52.3	58	40.6	
Socioeconomic status							
Low	201	32.4	146	30.5	55	38.5	$\chi^2 = 5.9$, $p = .052$
Medium	375	60.4	292	61.1	83	58.0	
High	45	7.2	40	8.4	5	3.5	

TABLE 2 Results of the confirmatory factor analyses.

	Goodness-of-fit-indices					
	Chi-square ratio (χ2/df)	RMSEA	90%C.I.	CFI	TLI	SRMR
Model 1. All sample	9.08	0.11	0.10–0.12	0.90	0.88	0.05
Model 2: Model 1 + MI	2.46	0.04	0.03–0.06	0.98	0.97	0.02
Model 3: Multi-group CFA	2.19	0.06	0.05–0.07	0.96	0.95	0.05
Model 4: CFA for each group						
4.1 Non-clinical group	2.80	0.06	0.04–0.07	0.97	0.95	0.03
4.2 CHR-positive group	1.11	0.02	0.00–0.06	0.99	0.99	0.03

Abbreviations: 90%C.I, Confidence interval of the RMSEA; CFI, Bentler's Comparative Fit Index; CHR, clinical high-risk; MI, Modification indices; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean-Square Residual; TLI, Tucker–Lewis Index.

a partner (single 55.2%, $n = 343$; separated/divorced 3.7%, $n = 23$), with bachelor studies or higher (62.5%, $n = 488$), as well as having an economically-remunerated activity (49.6%, $n = 308$) or being students (38.5%, $n = 239$). A total of 23% ($n = 143$) met the combined PQ-B and SFQ criteria for a CHR-positive screen. When sociodemographic features were compared between groups, CHR-positive participants were younger, reported lower educational levels, fewer had an economically-remunerated activity, and a higher percentage were current students as compared with the non-clinical group (see Table 1).

3.2 | Construct validity and invariance measurement of the MIC-SR

As shown in Table 2 and Figure 1, the first CFA performed with the whole sample (model 1) displayed inadequate goodness-of-fit indices. MI suggested residual co-variances between items, all of them higher than 0.1, which improved the model up to having adequate goodness-of-fit indices (model 2). This suggests that the unidimensional model with the 12 items is stable and valid for assessing insight into cognitive

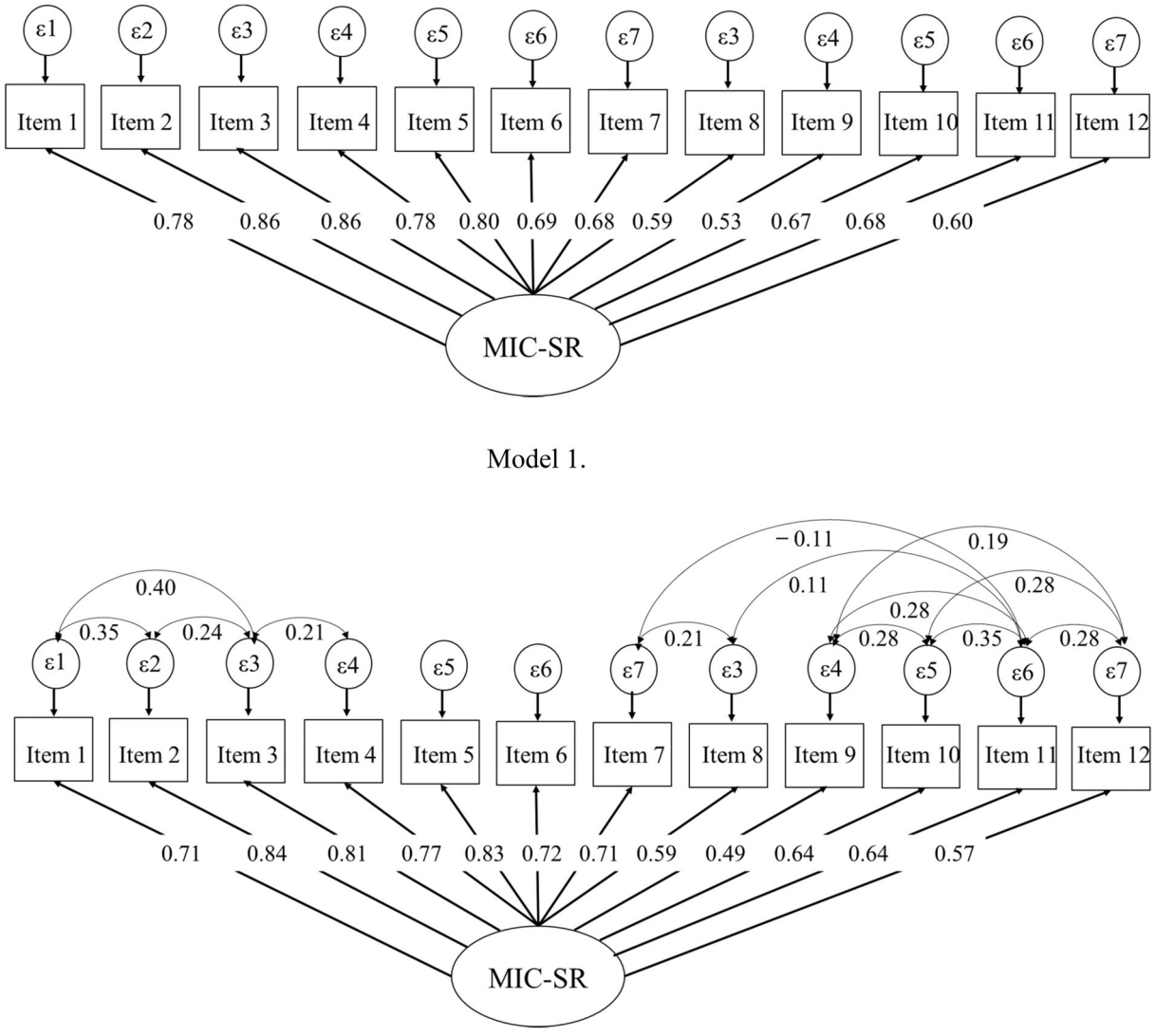

FIGURE 1 Confirmatory factor analysis of the total sample without modification indices (Model 1) and after modification indices were added (Model 2). MIC-SR, Measure of Insight into Cognition-Self Report.

deficits (Table 2 and Figure 1). With this second model, a multi-group CFA was tested (model 3), which showed a stable model with acceptable RMSEA values and adequate values in the remaining indices. As in the multi-group CFA, the independent model for the non-clinical group (model 4.1) showed acceptable RMSEA values with the remaining indices being adequate, while for the CHR-positive group (model 4.2) all goodness of fit indices were adequate (Table 2 and Figure 2). For all models, item loadings were equal to or higher than 0.40. Factor loadings and residual co-variances are presented as standardized values.

For invariance measurement, the results of the CFA models for both groups showed that the same measurement model fits adequately to the data, which supports configural invariance. When metric invariance was tested by comparing the ΔCFI, all values were equal or less than 0.01 (multigroup CFA vs. non-clinical group = −0.01; multigroup CFA vs. CHR-positive group = −0.03), results that support invariance.

3.3 | Discriminant validity and internal consistency of the MIC-SR

Participants from the CHR-positive group reported more problems on the 12 items of the MIC-SR more frequently (twice a week/almost daily) than the non-clinical group (p<.001 for all items; see Table 3). The MIC-SR total score can range from 0 to 36. For the non-clinical group, the mean was 10.7 (S.D. = 7.6), and for the CHR-positive group, 22.9 (S.D. = 8.3; $t = -15.6$, $p < .001$). The average frequency score was also higher in the CHR-positive group (1.9, SD. = 0.69; twice a week) than in the non-clinical group (0.8, S.D. = 0.6; $t = 15.6$, $p < .001$; once a week or less). These results support the discriminant validity of the MIC-SR.

In terms of reliability, item-total correlations were between 0.32 and 0.63 for the non-clinical group, with a Cronbach's alpha of 0.89.

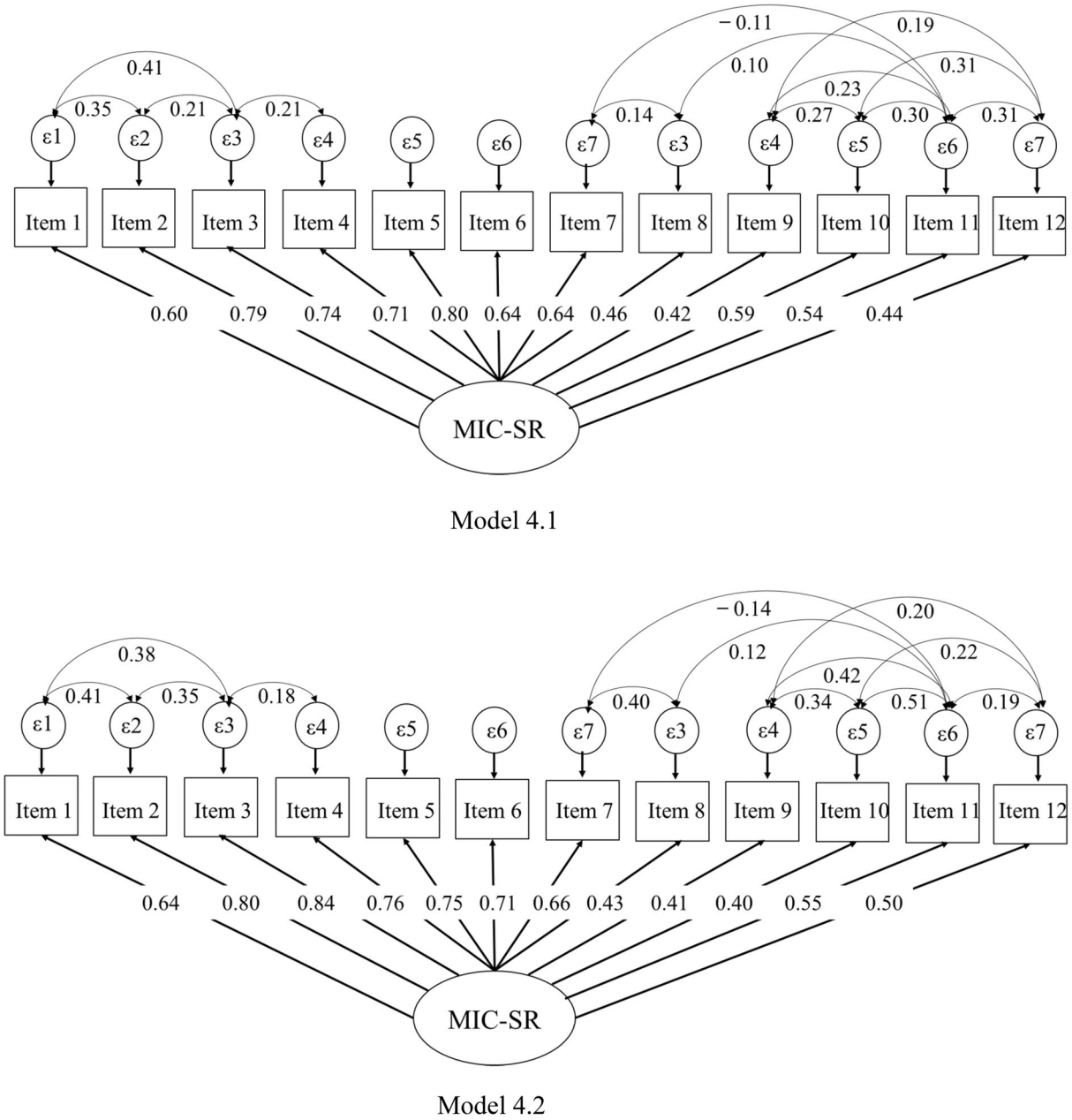

FIGURE 2 Multigroup confirmatory factor analysis: Non-clinical high-risk (CHR) group (Model 4.1) and CHR-positive group (Model 4.2). MIC-SR, Measure of Insight into Cognition-Self Report.

For the CHR-positive group, item-total correlations were between 0.31 and 0.78, and Cronbach's alpha was 0.89. The internal consistency of the MIC-SR with the total sample was 0.92.

4 | DISCUSSION

To our knowledge, this is the first translation of the MIC-SR into Spanish, which is one of the most widely spoken languages worldwide. Overall findings support the use of the MIC-SR as a stable measure of insight into cognition in non-clinical and CHR individuals. According to the original one-factor solution of the MIC-SR, our results include the 12 items of the MIC-SR, which show adequate fit indices for the general model and the independent models for non-clinical and CHR-positive individuals, with high Cronbach's alpha coefficients.

Participants from the CHR-positive group showed more frequent subjective cognitive problems (twice a week/almost daily) on each of the 12 items, higher total scores, and higher average frequency than the non-clinical group. This aligns with studies showing greater cognitive deficits in CHR individuals compared with healthy controls (Fusar-Poli et al., 2012; Mam-lam-Kook et al., 2017; Mohn-Haugen et al., 2022; Solís-Vivanco et al., 2020). Taken together, these findings highlight the importance of detecting and monitoring cognitive

TABLE 3 Percent of participants reporting cognitive problems according to the items from the Measure of Insight into Cognition-Self Report (MIC-SR).

MIC-SR items ratings	Never (0)	Once a week or less (1)	Twice a week (2)	Almost daily (3)
1. I have trouble listening and paying attention.				
Non-clinical group	38.9	41.8	11.7	7.5
CHR-positive group	7.0	23.8	30.8	38.5
2. I am not good at focusing on the task I am supposed to be doing.				
Non-clinical group	32.2	44.4	13.4	10.0
CHR-positive group	4.9	25.2	21.7	48.3
3. I have difficulty paying attention because my mind often drifts and I miss out on important information.				
Non-clinical group	40.8	33.7	13.6	11.9
CHR-positive group	7.0	19.6	25.9	47.6
4. I am easily distracted from tasks by background noises or activities.				
Non-clinical group	43.1	31.0	13.6	12.3
CHR-positive group	9.1	24.5	21.0	45.5
5. I have difficulty starting and completing tasks.				
Non-clinical group	37.2	35.4	14.6	12.8
CHR-positive group	5.6	21.7	18.2	54.5
6. I have trouble working on more than one task as a time				
Non-clinical group	52.5	29.1	10.7	7.7
CHR-positive group	18.9	21.0	25.9	34.3
7. I have difficulty being organized.				
Non-CHR group	36.0	39.7	13.0	11.3
CHR-positive screen	9.8	26.6	16.8	46.9
8. I have difficulty thinking through possible solutions to problems.				
Non-clinical group	50.8	36.2	9.0	4.0
CHR-positive group	12.6	32.9	24.5	30.1
9. I have trouble remembering information like names, directions and/or dates.				
Non-clinical group	41.4	36.8	11.7	10.0
CHR-positive group	20.3	28.0	21.0	30.8
10. I intend to do things but often forget (e.g., forget to return phone calls, get things from a store and keep appointments).				
Non-clinical group	34.3	41.2	15.7	8.8
CHR-positive group	7.7	27.3	30.1	35.0
11. I am very forgetful about what has been said, done, or read in the last 24 h.				
Non-clinical group	46.2	34.1	14.4	5.2
CHR-positive group	14.7	27.3	31.5	26.6
12. I have difficulty remembering where I placed objects of importance, that is, keys, bills.				
Non-clinical group	40.8	43.5	10.0	5.6
CHR-positive group	12.6	33.6	24.5	29.4

Abbreviation: CHR, clinical high-risk.

complaints before the onset of psychotic disorders to improve early intervention (Mam-lam-Fook et al., 2017) and prevent poor outcomes and functioning impairment associated with persistent cognitive deficits (Bolt et al., 2019; Davies et al., 2017; Davies & Greenwood, 2020; Fusar-Poli et al., 2012).

Mexican CHR individuals had a similar mean MIC-SR total score (21.2 vs. 22.9 in the Mexican sample) and the same average score reported by the Denmark sample (1.9) (Glenthøj et al., 2020), which suggests that CHR individuals across both cultures experienced cognitive difficulties more than once a week. This finding is relevant, considering that at this stage, the subjective perception of cognitive deficits could influence the subjects' disposition to receive interventions. It will be important for future studies to investigate how the MIC-SR relates to treatment adherence and clinical outcome measures in the CHR stage across different cultures.

Most of the studies evaluating cognition in CHR individuals have used clinician-rated instruments for both CHR determination and cognitive assessment (Anda et al., 2019; Glenthøj et al., 2020). Even though this assessment approach is the most recommended for objectively determining an at-risk state, this strategy may limit the scope of the cognitive assessment by not capturing the non-help-seeking population that may already have cognitive complaints and could be treated preventively to avoid further deterioration. The MIC-SR could also be valuable in clinical settings to monitor the subjective perception of cognitive dysfunction of CHR individuals receiving attention for cognitive impairments or other clinical symptoms (Falkenberg et al., 2015).

This study has some limitations. First, despite the advantages of reaching more individuals with the use of online surveys, we cannot generalize our results as self-reported measures may represent some bias where individuals may underestimate or overestimate their cognitive symptoms. Second, individuals who did not have access to the internet were unable to answer the survey. For example, people with a low-income level and lower educational level, both described as risk factors for CHR, are not well-represented in this sample. Third, the CHR-positive status was determined from a self-report measure rather than through a validated semi-structured interview. Some recent studies support the possibility of detecting CHR individuals through online screening using the PQ-B (McDonal et al., 2019) and that both self-report and interview measures of psychotic experiences were associated with similar risk indicators (Monshouwer et al., 2023). We attempted to mitigate this limitation by using strict criteria including social functioning impairment, but it is recommended for future studies, especially those involving treatments, to confirm the CHR-positive screen status with the wild-used clinical interviews, such as the CAARMS (Yung et al., 2005) and the SIPS (Miller et al., 2003). Finally, the current study did not describe the comorbidity of CHR status with other mental health symptoms, which would be important to consider for further studies using MIC-SR, as affective symptoms and other mental health conditions in the high-risk phase may influence the underestimation or overestimation of neurocognitive symptoms (Moritz et al., 2023).

Regarding the psychometric evaluation of the Spanish MIC-SR, future research should also examine its psychometric properties in patients with psychosis as well as its temporal stability and congruence with objective measures of insight into cognition, such as the MIC clinician-rated version (Medalia & Thysen, 2008) or other clinically rated cognitive measures.

The current study supports the importance of assessing cognition across the psychosis continuum, with a particular interest in CHR individuals, to better understand cognitive processes associated with the onset of psychotic disorders (Mam-lam-Fook et al., 2017). The Spanish version of the MIC-SR is a brief and valid self-report measure of neurocognitive insight for its use in Spanish-speaking samples, which also allows for comparing findings with other studies worldwide. Evaluating insight into cognition in CHR Spanish-speaking individuals could improve the early recognition of the initial prodromal phase, characterized by subjective cognitive changes difficult to detect by clinicians (Schultze-Lutter et al., 2010), as well as provide valuable information for treatment planning in populations from Mexico and Latin America, where preventive efforts are still scarce (Aceituno et al., 2021; Kohn et al., 2018). Moreover, it can help healthcare professionals tailor interventions and support strategies that address specific cognitive challenges and promote compensatory strategies for this population.

ACKNOWLEDGEMENTS

This study was supported by Programas Nacionales Estratégicos del Consejo Nacional de Humanidades, Ciencias y Tecnologías (CONHACYT-PRONACES). Grant 3205.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Ana Fresán https://orcid.org/0000-0001-9160-6988
Tecelli Domínguez https://orcid.org/0000-0003-4369-8288
Lourdes Nieto https://orcid.org/0000-0002-3078-7583
Tamara Sheinbaum https://orcid.org/0000-0002-2268-7697
Rebeca Robles https://orcid.org/0000-0001-5958-7393

REFERENCES

Aceituno, D., Mena, C., Vera, N., Gonzalez-Valderrama, A., Gadelha, A., Diniz, E., Crossley, N., Pennington, M., & Prina, M. (2021). Implementation of early psychosis services in Latin America: A scoping review. *Early Intervention in Psychiatry*, *15*(5), 1104–1114. https://doi.org/10.1111/eip.13060

Anda, L., Brønnick, K. K., Johannessen, J. O., Joa, I., Kroken, R. A., Johnsen, E., Rettenbacher, M., Fathian, F., & Løberg, E. M. (2019). Cognitive profile in ultra high risk for psychosis and schizophrenia: A comparison using coordinated norms. *Frontiers in Psychiatry*, *10*, 695. https://doi.org/10.3389/fpsyt.2019.00695

Agnew-Blais, J., & Seidman, L. J. (2013). Neurocognition in youth and young adults under age 30 at familial risk for schizophrenia: A quantitative and qualitative review. *Cognitive Neuropsychiatry*, *18*(1–2), 44–82. https://doi.org/10.1080/13546805.2012.676309

Barder, H. E., Sundet, K., Rund, B. R., Evensen, J., Haahr, U., Ten Velden Hegelstad, W., Joa, I., Johannessen, J. O., Langeveld, H., Larsen, T. K., Melle, I., Opjordsmoen, S., Røssberg, J. I., Simonsen, E., Vaglum, P., McGlashan, T., & Friis, S. (2013). Neurocognitive development in first episode psychosis 5 years follow-up: Associations between illness severity and cognitive course. *Schizophrenia Research*, *149*(1–3), 63–69. https://doi.org/10.1016/j.schres.2013.06.016

Bolt, L. K., Amminger, G. P., Farhall, J., McGorry, P. D., Nelson, B., Markulev, C., Yuen, H. P., Schäfer, M. R., Mossaheb, N., Schlögelhofer, M., Smesny, S., Hickie, I. B., Berger, G. E., Chen, E. Y. H., De Haan, L., Nieman, D. H., Nordentoft, M., Riecher-Rössler, A., Verma, S., … Allott, K. A. (2019). Neurocognition as a predictor of transition to psychotic disorder and functional outcomes in ultra-high risk participants: Findings from the NEURAPRO randomized clinical trial. *Schizophrenia Research*, *206*, 67–74. https://doi.org/10.1016/j.schres.2018.12.013

Bora, E., Lin, A., Wood, S. J., Yung, A. R., McGorry, P. D., & Pantelis, C. (2014). Cognitive deficits in youth with familial and clinical high risk to

psychosis: A systematic review and meta-analysis. *Acta Psychiatrica Scandinavica*, *130*(1), 1–15. https://doi.org/10.1111/acps.12261

Brown, T. A. (2015). *Confirmatory factor analysis for applied sciences* (2nd ed.). The Guilford Press.

Browne, M. W., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological Methods & Research*, *21*(2), 230–258.

Davies, G., Fowler, D., & Greenwood, K. (2017). Metacognition as a mediating variable between neurocognition and functional outcome in first episode psychosis. *Schizophrenia Bulletin*, *43*(4), 824–832. https://doi.org/10.1093/schbul/sbw128

Davies, G., & Greenwood, K. (2020). A meta-analytic review of the relationship between neurocognition, metacognition and functional outcome in schizophrenia. *Journal of Mental Health (Abingdon, England)*, *29*(5), 496–505. https://doi.org/10.1080/09638237.2018.1521930

Dondé, C., Lapr'evote, V., Lavall'e, L., Haesebaert, F., Fakra, E., & Brunelin, J. (2021). Cognitive insight in individuals with an at-risk mental state for psychosis: A meta-analysis. *Early Intervention in Psychiatry*, *15*(3), 449–456. https://doi.org/10.1111/eip.12993

Falkenberg, I., Valmaggia, L., Byrnes, M., Frascarelli, M., Jones, C., Rocchetti, M., Straube, B., Badger, S., McGuire, P., & Fusar-Poli, P. (2015). Why are help-seeking subjects at ultra-high risk for psychosis help-seeking? *Psychiatry Research*, *228*(3), 808–815. https://doi.org/10.1016/j.psychres.2015.05.018

Fonseca-Pedrero, E., Gooding, D. C., Ortuño-Sierra, J., & Paino, M. (2016). Assessing self-reported clinical high risk symptoms in community-derived adolescents: A psychometric evaluation of the prodromal questionnaire-brief. *Comprehensive Psychiatry*, *66*, 201–208. https://doi.org/10.1016/j.comppsych.2016.01.013

Fusar-Poli, P., Bonoldi, I., Yung, A. R., Borgwardt, S., Kempton, M. J., Valmaggia, L., Barale, F., Caverzasi, E., & McGuire, P. (2012). Predicting psychosis: Meta-analysis of transition outcomes in individuals at high clinical risk. *Archives of General Psychiatry*, *69*(3), 220–229. https://doi.org/10.1001/archgenpsychiatry.2011.1472

Fusar-Poli, P., Deste, G., Smieskova, R., Barlati, S., Yung, A. R., Howes, O., Stieglitz, R. D., Vita, A., McGuire, P., & Borgwardt, S. (2012). Cognitive functioning in prodromal psychosis: A meta-analysis. *Archives of General Psychiatry*, *69*(6), 562–571. https://doi.org/10.1001/archgenpsychiatry.2011.1592

Gebreegziabhere, Y., Habatmu, K., Mihretu, A., Cella, M., & Alem, A. (2022). Cognitive impairment in people with schizophrenia: An umbrella review. *European Archives of Psychiatry and Clinical Neuroscience*, *272*(7), 1139–1155. https://doi.org/10.1007/s00406-022-01416-6

Glenthøj, L. B., Mariegaard, L., Kristensen, T. D., Wenneberg, C., Medalia, A., & Nordentoft, M. (2020). Self-perceived cognitive impairments in psychosis ultra-high risk individuals: Associations with objective cognitive deficits and functioning. *NPJ Schizophrenia*, *6*(1), 31. https://doi.org/10.1038/s41537-020-00124-1

Glenthøj, L. B., Kristensen, T. D., Wenneberg, C., Hjorthøj, C., & Nordentoft, M. (2020). Investigating cognitive and clinical predictors of real-life functioning, functional capacity, and quality of life in individuals at ultra-high risk for psychosis. *Schizophrenia Bulletin Open*, *1*(1), 1–10. https://doi.org/10.1093/schizbullopen/sgaa027

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Johns, L. C., & Van Os, J. (2001). The continuity of psychotic experiences in the general population. *Clinical Psychology Review*, *21*(8), 1125–1141. https://doi.org/10.1016/s0272-7358(01)00103-9

Keefe, R. S., Poe, M., Walker, T. M., Kang, J. W., & Harvey, P. D. (2006). The schizophrenia cognition rating scale: An interview-based assessment and its relationship to cognition, real-world functioning, and functional capacity. *The American Journal of Psychiatry*, *163*(3), 426–432. https://doi.org/10.1176/appi.ajp.163.3.426

Klosterkötter, J., Hellmich, M., Steinmeyer, E. M., & Schultze-Lutter, F. (2010). Diagnosing schizophrenia in the initial prodromal phase. *Archives of General Psychiatry*, *58*(2), 158–164. https://doi.org/10.1001/archpsyc.58.2.158

Kohn, R., Ali, A. A., Puac-Polanco, V., Figueroa, C., López-Soto, V., Morgan, K., Saldivia, S., & Vicente, B. (2018). Mental health in the Americas: An overview of the treatment gap. *Pan American Journal of Public Health*, *42*, e165. https://doi.org/10.26633/RPSP.2018.165

Lam, M., Lee, J., Rapisarda, A., See, Y. M., Yang, Z., Lee, S. A., Abdul-Rashid, N. A., Kraus, M., Subramaniam, M., Chong, S. A., & Keefe, R. S. E. (2018). Longitudinal cognitive changes in young individuals at ultrahigh risk for psychosis. *JAMA Psychiatry*, *75*(9), 929–939. https://doi.org/10.1001/jamapsychiatry.2018.1668

Lawrie, S. M., Byrne, M., Miller, P., Hodges, A., Clafferty, R. A., Cunningham Owens, D. G., & Johnstone, E. C. (2001). Neurodevelopmental indices and the development of psychotic symptoms in subjects at high risk of schizophrenia. *The British Journal of Psychiatry: The Journal of Mental Science*, *178*, 524–530. https://doi.org/10.1192/bjp.178.6.524

Lepage, M., Bodnar, M., & Bowie, C. R. (2014). Neurocognition: Clinical and functional outcomes in schizophrenia. *Canadian Journal of Psychiatry. Revue Canadienne de Psychiatrie*, *59*(1), 5–12. https://doi.org/10.1177/070674371405900103

Lysaker, P. H., Minor, K. S., Lysaker, J. T., Hasson-Ohayon, I., Bonfils, K., Hochheiser, J., & Vohs, J. L. (2019). Metacognitive function and fragmentation in schizophrenia: Relationship to cognition, self-experience and developing treatments. *Schizophrenia Research Cognition*, *19*, 100142. https://doi.org/10.1016/j.scog.2019.100142

Li, T., Lam, C. B., & Chan, K. K.-S. (2018). Grandparental involvement and young adults' cognitive and social adjustment: The moderating role of filial piety in Hong Kong. *Journal of Social and Personal Relationships*, *35*(7), 999–1018. https://doi.org/10.1177/0265407517702011

Mam-Lam-Fook, C., Danset-Alexandre, C., Pedron, L., Amado, I., Gaillard, R., & Krebs, M. O. (2017). Neuropsychology of subjects with ultra-high risk (UHR) of psychosis: A critical analysis of the literature. *L'Encephale*, *43*(3), 241–253. https://doi.org/10.1016/j.encep.2017.02.001

Mazhari, S., Jahanbakhsh, F., Soliemanizadeh, S., & Raaii, F. (2023). Validation of the Persian version of measure of insight into cognition self-report (MIC-SR) in patients with schizophrenia. *Zahedan Journal of Research in Medical Sciences*, *25*(3), e126567. https://doi.org/10.5812/zjrms-126567

McDonald, M., Christoforidou, E., Van Rijsbergen, N., Gajwani, R., Gross, J., Gumley, A. I., Lawrie, S. M., Schwannauer, M., Schultze-Lutter, F., & Uhlhaas, P. J. (2019). Using online screening in the general population to detect participants at clinical high-risk for psychosis. *Schizophrenia Bulletin*, *45*(3), 600–609.

McGorry, P. D., Killackey, E., & Yung, A. (2008). Early intervention in psychosis: Concepts, evidence and future directions. *World Psychiatry*, *7*(3), 148–156.

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *The Journal of Applied Psychology*, *93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Medalia, A., & Thysen, J. (2008). Insight into neurocognitive dysfunction in schizophrenia. *Schizophrenia Bulletin*, *34*(6), 1221–1230. https://doi.org/10.1093/schbul/sbm144

Medalia, A., Thysen, J., & Freilich, B. (2008). Do people with schizophrenia who have objective cognitive impairment identify cognitive deficits on a self report measure? *Schizophrenia Research*, *105*(1–3), 156–164. https://doi.org/10.1016/j.schres.2008.07.007

Marsh, H. W., & Hau, K. T. (1996). Assessing goodness of fit: Is parsimony always desirable? *The Journal of Experimental Education*, *64*(4), 364–390.

Mihaljević-Peleš, A., Bajs Janović, M., Šagud, M., Živković, M., Janović, Š., & Jevtović, S. (2019). Cognitive deficit in schizophrenia: An overview. *Psychiatria Danubina*, *31*(Suppl 2), 139–142.

Miller, T. J., McGlashan, T. H., Rosen, J. L., Cadenhead, K., Ventura, J., McFarlane, W., Perkins, D. O., Pearlson, G. D., & Woods, S. W. (2003). Prodromal assessment with the structured interview for prodromal syndromes and the scale of prodromal symptoms: Predictive validity, interrater reliability, and training to reliability. *Schizophrenia Bulletin*, *29*(4), 703–715.

Mohn-Haugen, C. R., Mohn, C., Larøi, F., Teigset, C. M., Øie, M. G., & Rund, B. R. (2022). Cognitive functioning in a group of adolescents at risk for psychosis. *Frontiers in Psychiatry*, *13*, 1075222.

Monshouwer, K., Ten Have, M., Tuithof, M., Van Dorsselaer, S., Bak, M., Gunter, N., Delespaul, P., van Os, J., & De Graaf, R. (2023). Prevalence, incidence, and persistence of psychotic experiences in the general population: Results of a 9-year follow-up study. *Psychological Medicine*, *53*(8), 3750–3761.

Moritz, S., Ferahli, S., & Naber, D. (2004). Memory and attention performance in psychiatric patients: Lack of correspondence between clinician-rated and patient-rated functioning with neuropsychological test results. *Journal of the International Neuropsychological Society: JINS*, *10*(4), 623–633. doi:10.1017/S1355617704104153

Moritz, S., Xie, J., Penney, D., Bihl, L., Hlubek, N., Elmers, J., Beblo, T., & Hottenrott, B. (2023). The magnitude of neurocognitive impairment is overestimated in depression: The role of motivation, debilitating momentary influences, and the overreliance on mean differences. *Psychological Medicine*, *53*(7), 2820–2830.

O'Rourke, N., & Hatcher, L. A. (2013). *Step-by-step approach to using the SAS system for factor analysis and structural equation modeling* (2nd ed.). SAS Institute Inc.

Preti, A., Barbera, S., Malvini, L., Confalonieri, L., Parabiaghi, A., Magnani, N., Lora, A., Butteri, E., Prato, K., Vaggi, M., & Percudani, M. (2022). Cognitive insight in individuals at ultra-high risk for psychosis compared to patients with first-episode psychosis and non-psychotic help-seeking youths. *Asian Journal of Psychiatry*, *73*, 103107.

Saperstein, A. M., Thysen, J., & Medalia, A. (2012). The measure of insight into cognition: Reliability and validity of clinician-rated and self-report scales of neurocognitive insight for schizophrenia. *Schizophrenia Research*, *134*(1), 54–58. https://doi.org/10.1016/j.schres.2011.10.002

Schultze-Lutter, F., Ruhrmann, S., Berning, J., Maier, W., & Klosterkötter, J. (2010). Basic symptoms and ultrahigh risk criteria: Symptom development in the initial prodromal state. *Schizophrenia Bulletin*, *36*(1), 182–191.

Solís-Vivanco, R., Rangel-Hassey, F., León-Ortiz, P., Mondragón-Maya, A., Reyes-Madrigal, F., & De la Fuente-Sandoval, C. (2020). Cognitive impairment in never-medicated individuals on the schizophrenia spectrum. *JAMA Psychiatry*, *77*(5), 543–545. https://doi.org/10.1001/jamapsychiatry.2020.0001

Sperber, A. D. (2004). Translation and validation of study instruments for cross-cultural research. *Gastroenterology*, *126*(1 Suppl 1), S124–S128. https://doi.org/10.1053/j.gastro.2003.10.016

Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences* (5th ed.). Taylor & Francis.

Stip, E., Caron, J., Renaud, S., Pampoulova, T., & Lecomte, Y. (2003). Exploring cognitive complaints in schizophrenia: The subjective scale to investigate cognition in schizophrenia. *Comprehensive Psychiatry*, *44*(4), 331–340. https://doi.org/10.1016/S0010-440X(03)00086-5

Tyrer, P., Nur, U., Crawford, M., Karlsen, S., McLean, C., Rao, B., & Johnson, T. (2005). The social functioning questionnaire: A rapid and robust measure of perceived functioning. *The International Journal of Social Psychiatry*, *51*(3), 265–275.

Van Os, J., Linscott, R. J., Myin-Germeys, I., Delespaul, P., & Krabbendam, L. (2009). A systematic review and meta-analysis of the psychosis continuum: Evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. *Psychological Medicine*, *39*(2), 179–195. https://doi.org/10.1017/S0033291708003814

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*(1), 4–69.

Yung, A. R., Yung, A. R., Pan Yuen, H., Mcgorry, P. D., Phillips, L. J., Kelly, D., Dell'Olio, M., Francey, S. M., Cosgrave, E. M., Killackey, E., Stanford, C., Godfrey, K., & Buckby, J. (2005). Mapping the onset of psychosis: The comprehensive assessment of at-risk mental states. *Australian & New Zealand Journal of Psychiatry*, *39*(11–12), 964–971.

How to cite this article: Fresán, A., Domínguez, T., Flores, Y., Nieto, L., Sheinbaum, T., Robles, R., & Medalia, A. (2024). Psychometric properties of the Spanish version of the measure of insight into cognition-self-report in psychosis-risk and non-clinical Mexican young adults. *Early Intervention in Psychiatry*, 1–10. https://doi.org/10.1111/eip.13559