Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Social Cognition and Mother–Infant Interaction in Women with Severe Mental Illness: An Exploratory Pilot Study

Berta Vilaseca
Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic
Estel Gelabert
Universitat Autònoma de Barcelona
Anna Torres-Giménez
Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic
Ester Roda
Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic
Eva Solé
Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic
Susana Andrés-Perpiñá
Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic
Ana Barajas
Universitat Autònoma de Barcelona
Alba Roca-Lecumberri
aroca@clinic.cat

Unitat de Salut Mental Perinatal CLINIC-BCN, Hospital Clínic

Research Article

Keywords:

Posted Date: November 25th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11360870/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Introduction: Social cognition (SC) is frequently impaired in severe mental illness (SMI) and could be relevant in caregiving contexts, where understanding and responding to infant cues is essential for mother–infant interaction (MII). However, its relationship with MII in women with SMI remains underexplored.

Objectives: This study aimed to examine the association between domains of SC and MII in clinically stable women with SMI.

Methods: Ten postpartum women with SMI were recruited from a perinatal mental health unit. All were clinically stable at assessment. SC domains were measured using validated instruments (AIHQ, MSCEIT, PENN ER-40, RMET, HT), and MII was evaluated with the CARE-Index. Associations were analyzed using Spearman correlations focused on theoretically relevant variables. Multiple comparisons were controlled using the Benjamini–Hochberg false discovery rate (FDR).

Results: No associations between SC domains and dyadic synchrony remained significant after FDR correction. However, moderate-to large effect size correlations were observed. Higher intentionality bias and greater functional impairment were associated with lower synchrony, while better emotion recognition showed positive association with synchrony, although these findings did not reach statistical significance. Within SC domains, intentionality bias was strongly associated with angry bias ($r = .827$, $p = .003$), representing the only association that remained significant after FDR correction.

Conclusions: Although no robust associations were identified between SC domains and MII, consistent patterns of moderate-to-large effect sizes suggest that attributional bias and functional impairment may be relevant to dyadic interaction. These findings should be considered exploratory and highlight the need for replication in larger samples.

1. Introduction

Social cognition (SC) is a multidimensional construct encompassing the cognitive processes involved in recognizing, processing, and interpreting the intentions and behaviors of others. The National Institute of Mental Health (NIMH) has identified five core domains of SC: Theory of Mind (ToM), Emotional Processing or Emotional Intelligence (EI), Attributional Bias (AB), Social Perception (SP) and Social Knowledge (SK) (Green et al., 2008).

SC dimensions, particularly ToM, EI, and AB, have been consistently reported to be impaired in schizophrenia (SCZ) and schizoaffective disorder (SAD) disorders (Bora & Pantelis, 2016), with similar deficits observed in bipolar disorder (BD) (de Siqueira Rotenberg et al., 2020; Varo et al., 2017, 2022). SC represents a strong predictor of functional capacity and real-world functioning (Corbera et al., 2025). Beyond its impact on everyday functioning, SC may also be particularly relevant in caregiving contexts, where mothers must accurately interpret subtle, rapidly changing, and often ambiguous infant cues.

Indeed, the capacity to interpret and respond sensitively to an infant's cues depends on intact SC processes, including decoding emotional expressions, attributing mental states or intentions, and regulating interpersonal affect (Anke et al., 2019).

Studies evaluating mother–infant interaction (MII) in clinical populations have primarily focused on the impact of depression on child development (Soares et al., 2018). Evidence in women with BD or SCZ spectrum disorders remains more limited. In our previous review, we found that impairments in MII were associated with both disorders with greater impairment in psychotic disorders (Vilaseca et al., 2025). Furthermore, studies of mothers with psychotic disorders or BD, even when clinically stable, show alterations in MII compared to healthy controls (HC) (Biaggi et al., 2023; Healy et al., 2016), suggesting that disruptions in MII may involve additional factors beyond symptoms, including deficits in SC domains.

The main objective of this study was to examine the relationship between alterations in three specific domains of SC—ToM, EI and AB— and MII in a sample of ten women diagnosed with BD, SCZ or SAD.

We hypothesized that alterations in selected SC domains might be associated with MII outcomes; given the limited sample size, analyses were considered exploratory.

2. Methods

2.1. Participants and procedure

Ten women with severe mental illness (SMI) were recruited from the Perinatal Mental Health Unit at the Hospital Clínic in Barcelona. The study was approved by the institutional review board (HCB/2024/0154) and forms part of a larger case-control study.

Participants met the following criteria: (i) aged over 18 years and up to 16 months postpartum (ii) diagnosed with SMI (BD or psychotic disorders, including: SCZ or SAD), (iii) euthymia defined by YMRS (Young Mania Rating Scale) score of ≤ 6, and HDRS (Hamilton Depression Rating Scale) score of ≤ 8, (iv) a score of ≤ 3 on items P1-P3 of the Positive and Negative Syndrome Scale (PANSS), (v) no language barrier, and (vi) written informed consent.

The exclusion criteria were: (i) intellectual disability [Intelligence Quotient (IQ) < 70], (ii) any physical or neurological condition that could affect cognitive performance, and (iii) an infant with severe malformations or a serious medical condition.

2.2. Measures

2.2.1. Clinical assessment

The YMRS (Colom et al., 2002; Young et al., 1978) and HDRS (Hamilton, 1960; Ramos-Brieva & Cordero Villafáfila, 1986) were administered in BD, and the PANSS (Kay et al., 1967) in SCZ and SAD. Functionality

was assessed using the Functioning Assessment Short Test (FAST) (Rosa et al., 2007). Clinical history, previous hospitalizations, illness duration, substance use, and current medication were also collected.

2.2.2. Premorbid IQ, executive functions and general cognition

IQ was estimated using the Vocabulary subtest of the Wechsler Adult Intelligence Scale, 4th Edition (WAIS-IV) (Wechsler, 2008). The Trail Making Test, parts A (TMT-A) and B (TMT-B) (Reitan, 1958), was used as an indicator of executive function (Llinàs-Reglà et al., 2017). General cognition was assessed using the Montreal Cognitive Assessment (MoCA) (Nasreddine et al., 2005).

2.2.3. Social cognition

SC dimensions were measured using validated instruments endorsed by the Social Cognition Psychometric Evaluation (SCOPE) project (Buck et al., 2017; Pinkham et al., 2016, 2018)

Emotional Intelligence (EI) was assessed using the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), which evaluates four core domains: emotional perception (EP), emotional facilitation (EF), emotional understanding (EU), and emotional regulation (ER) (Mayer et al., 2003). The Penn Emotion Recognition Test (ER-40) was used to assess the ability to identify facial emotions (Kohler et al., 2003), whereas the Baby Faces Stimuli Set (BFST) was used to assess recognition of infant facial expressions (Donadon et al., 2019).

The domain of Theory of Mind (ToM) was divided into affective and cognitive dimensions (Campanella et al., 2022). Affective ToM was assessed using the revised version of the Reading the Mind in the Eyes Test (RMET) (Baron-Cohen et al., 2001), which evaluates the ability to infer emotional states from the eye region of faces. Cognitive ToM was evaluated with the Hinting Task (HT), which measures the ability to infer intentions behind indirect speech (Corcoran et al., 1995).

Attributional Bias (AB) was assessed using the Ambiguous Intentions Hostility Questionnaire (AIHQ), which measures hostile attributional bias in response to ambiguous social scenarios (Combs et al., 2007). AIHQ scores are reported as mean item scores ranging from 1 to 5, with higher scores reflecting greater attributional bias. As no validated clinical cut-off has been established for the AIHQ, scores were interpreted dimensionally based on group means reported in previous studies (Buck et al., 2017; Combs et al., 2007).

2.2.4. Assessment of mother-infant interaction

MII was assessed using the Clinical Assessment of Relationship Engagement (CARE-Index) (Crittenden, n.d.), a validated observational tool based on a brief video-recorded free-play session. Maternal behavior is coded and classified into three sensitivity patterns: Sensitive, Controlling, or Unresponsive. The infant is classified as Cooperative, Compulsively, Difficult, or Passive. Dyadic synchrony is scored on a scale

from 0 to 14, with higher values reflecting greater mutual responsiveness and enjoyment. Certified raters coded all videos blind to clinical status.

2.3. Statistical analysis

Continuous variables were described as median, standard deviation (SD), and range; while categorical variables as frequencies and percentages. Associations between SC, functionality, and MII were analyzed using Spearman's rank correlation coefficient. Given the small sample size and multiple potential comparisons, analyses were restricted to theoretically relevant variables and corrected using the Benjamini–Hochberg false discovery rate (FDR). Significance was set at $p < .05$ (two-tailed), and analyses were conducted using IBM SPSS Statistics 22.

3. Results

Descriptive results are presented in Table 1.

3.1. Demographic, obstetric and clinical data

The study included 10 women aged 27–41 years; most were born in Spain (n=7), and all were living with a partner. Half of the sample had completed higher education (n=5), and most participants were employed (n=8); one received disability benefits, and one was a homemaker. Financial difficulties were reported by three participants. Clinical diagnoses included BD (n=7), SAD (n= 2), and SCZ (n=1). All infants were born at term. Most pregnancies were planned (n= 9). Pregnancy or postpartum complications occurred in four cases. Vaginal delivery was the most common mode of childbirth (n= 6), followed by urgent cesarean section (n= 3) and one elective cesarean section (n= 1). Participants were clinically stable at the time of assessment.

3.2. Estimated IQ, global cognitive functioning and executive functions

All participants showed an adequate estimated IQ ranging from average (90-110) to high-average (110-125). Executive function performance on the TMT-A and TMT-B was within the normative range for most participants, except for one below-normal TMT-B score. Results of the MoCA indicated that global cognitive functioning was within the normal range (median = 29, SD = 3.51; range = 24–30) except in one participant.

3.3. Social cognition domains

3.3.1. Emotional intelligence

Most participants showed overall Emotional Intelligence Quotient (EIQ) scores within the average range (median = 101.5, SD = 16; range = 77–122). Examination of the MSCEIT branches—EP, EF, EU and EM—revealed a heterogeneous profile, with lower scores varying across participants rather than clustering consistently in a specific domain. Regarding performance on the ER-40, scores ranged from 28 to 38,

indicating that most participants had preserved emotion recognition abilities. The results of the BFST ranged from 36 to 53, indicating generally preserved infant facial emotion recognition.

3.3.2. Theory of Mind

Performance on the RMET ranged from 20 to 30, suggesting some difficulty in affective ToM. Scores on the shortened five-story HT ranged from 3 to 10 out of 10, with a mean score of 8.60 (SD = 2.22). Performance was generally high, although some variability was observed, with two participants obtaining comparatively lower scores and one showing markedly low performance.

3.3.3. Attributional biases

Scores for Hostility Bias (HB), Aggressivity Bias (AB), Intentionality Score (IS), and Anger Score (AS) remained within expected ranges (HB= 1.6–2.4; AB= 1.0–2.2; IS= 2.5–4.6; AS= 2.1–3.6). Blame scores (BS) showed greater variability (BS= 1.86–4.3).

3.4. Mother-infant interaction

CARE-Index synchrony scores range from 5 to 9 (median = 7.5, SD = 1.5). Seven dyads scored within the adequate/sensitive range (≥ 7). Lower scores reflected interaction patterns with periods of desynchrony, while higher scores indicated more consistently sensitive interaction.

3.5. Correlations between Social Cognition domains and Mother Infant Interaction

Results are presented in Table 2. To reduce the number of comparisions and improve interpretability, analysis focused on a subset of theoretically relevant variables. The full correlation matrix is provided in Supplementary Table S1.

Within this reduced model, several associations reached statistical significance at the uncorrected level. However, after controlling for multiple comparisons using the Benjamini–Hochberg false discovery rate (FDR), only the association between intentionality bias and angry bias remained statistically significant ($r = .827$, $p = .003$).

Regarding MII, no associations between SC domains and dyadic synchrony remained statistically significant after FDR correction. However, several moderate-to-large effect size correlations were observed. Higher intentionality bias was strongly associated with lower synchrony ($r = −.745$, $p = .013$), and greater functional impairment was moderately associated with lower synchrony ($r = −.650$, $p = .042$). Synchrony was also positively associated with emotion recognition (PENN ER-40; $r = .592$, $p = .071$), although this result did not reach statistical significance.

Within SC domains, attributional bias measures were strongly interrelated. Intentionality bias was strongly associated with angry bias ($r = .827$, $p = .003$), and angry bias was also positively associated with aggressivity bias ($r = .768$, $p = .009$), suggesting a coherent pattern ofinterrelated attributional processes.

Overall, these findings should be interpreted as exploratory and hypothesis-generating, given the small sample size and limited statistical power.

4. Discussion

To our knowledge, this is one of the first studies to explore relationship between specific social cognition (SC) domains and mother–infant interaction (MII) in clinically stable women with severe mental illness (SMI). Contrary to our initial hypothesis, no statistically robust associations were found between SC domains and dyadic synchrony after correcting for multiple comparisons. However, several moderate-to-large effect size correlations were observed, suggesting potential relationships that warrant further investigation. These findings should therefore be interpreted as exploratory and hypothesis-generating.

An important implication of the present findings is the consideration of SC not as a homogeneous construct, but as a differentiated system comprising distinct components. Although no robust associations were identified with MII, the observed pattern suggest that specific domains, particularly attributional processes, may be more consistently interrelated than others. In this sense, the results support the view that SC may operate as a multidimensional system in which different components contribute differentially to complex interpersonal behaviours such as caregiving.

Within SC domains, attributional bias emerged as the most internally consistent construct with the association between intentionality and angry bias remaining significant after FDR correction. Rather than indicating an overall elevation in hostile attributional bias, this finding suggests that specific AIHQ components were closely interrelated in this sample. Mothers who were more likely to perceive ambiguous social situations as intentional also tended to report stronger anger responses, which were associated with more aggressive hypothetical reactions. This result should be interpreted cautiously, as the AIHQ assesses ambiguous adult social situations, so it cannot be assumed that the same attributional processes directly operate during MII. Moreover, the association between intentionality bias and dyadic synchrony did not survive correction for multiple comparisons. Despite these limitations, the large negative correlation between intentionality bias and synchrony may be clinically meaningful. Infant cues are often ambiguous and rapidly changing; therefore, a maternal tendency to over-attribute intentionality could reduce flexibility and emotional availability during MII. This interpretation is consistent with previous research linking hostile attributional styles to social and interpersonal difficulties in schizophrenia spectrum disorders and BD (Buck et al., 2023; Lahera et al., 2013).

Although no statistically significant associations were found between SC domains and dyadic synchrony after correction, several moderate-to-large effect size correlations were observed. In particular, higher intentionality bias and greater functional impairment were associated with lower synchrony. These findings are consistent with recent meta-analytic evidence indicating that the quality of MII partly depends on the mother’s ability to interpret infant cues and underlying mental states, supporting more sensitive and contingent interactions (Wendelboe et al., 2024). A tendency to attribute intention in

ambiguous situations may reduce contingent responses to infant signals, while reduced functional capacity may further limit adaptive caregiving behaviours.

In contrast to previous studies, emotional intelligence (EI) was not robustly associated with MII. Although difficulties in emotional processing have been linked to poorer affect regulation and less sensitive caregiving responses (Rutherford et al., 2015), this pattern was not clearly reflected in the present sample. Nevertheless, some moderate-to-large effect size associations were observed. In particular, the positive correlation between ER-40 performance and dyadic synchrony, although not statistically significant, is consistent with the idea that accurate decoding of facial emotion may support more contingent interaction. Previous research in mothers with depression and anxiety has linked impairments in facial emotion recognition to suboptimal maternal responsiveness and interactional adjustment (Arteche et al., 2011; Stein et al., 2014). Although difficulties in recognizing facial emotions have been reported in women with BD and SCZ (Pantoji et al., 2024; Shenoy et al., 2019) only limited evidence has linked these deficits to disturbances in MII. Evidence in SCZ (Healy et al., 2016) and perinatal risk groups (Biaggi et al., 2023) suggest a similar pattern, further supported by findings of reduced prefrontal reactivity to emotional faces in BD (Bjertrup et al., 2025). When considering infant facial emotion recognition, no associations with MII were observed. Research on infant emotion recognition in mothers with SMI is scarce, as most studies have focused either on adult emotion recognition (Healy et al., 2016; Shenoy et al., 2019) or on broader neural and attentional responses to infant cues (Bjertrup et al., 2022).

Although SC domains did not show statistically robust associations with MII in the present study, the observed effect size patterns suggest that these processes may still be clinically relevant. Importantly, SC—particularly attributional style and emotional processing—has been identified as a potentially modifiable target with considerable plasticity. Interventions aimed at improving emotion recognition, mentalization, and attributional style have shown promise in psychiatric populations and may be particularly relevant for supporting caregiving behaviors in mothers with SMI.

Furthermore, emerging evidence suggests that SC deficits may be present in premorbid stages of psychotic disorders, highlighting their potential role as vulnerability markers. In this context, SC may represent an important target not only for intervention but also for early identification and prevention. Addressing these processes may have downstream benefits for interpersonal functioning, including parenting and caregiving capacities (Punsoda-Puche et al., 2024).

Overall, the present findings are partially consistent with previous research suggesting a role of SC in MII, but they also highlight the complexity of these relationships and the need for more focused investigation. A key contribution of this study is the examination of these domains in clinically stable mothers, suggesting that SC-related vulnerabilities in caregiving may persist beyond acute phases of illness. This addresses an important gap in previous research, in which the role of SC has often been confounded by active psychiatric symptoms (Vilaseca et al., 2025)

Several limitations should be considered. First, the cross-sectional design precludes causal inferences. Second, the small sample size limits statistical power. Third, the lack of a control group restricts interpretability. Further research with larger and adequately powered samples is needed to confirm and extend these preliminary results.

In conclusion, this exploratory study did not identify statistically robust associations between SC domains and MII after controlling for multiple comparisons. However, consistent patterns of moderate-to-large effect sizes suggest that attributional bias and functional impairment may be relevant to MII. These preliminary findings highlight the importance of further research with larger and adequately powered samples to clarify the role of social cognition in caregiving processes among women with severe mental illness.

References

1. Anke, T. M. S., Slinning, K., Moe, V., Brunborg, C., Siqveland, T. S., Skjelstad, D. V. (2019). Mothers with and without bipolar disorder and their infants: Group differences in mother-infant interaction patterns at three months postpartum. BMC Psychiatry, 19(1), 292. https://doi.org/10.1186/s12888-019-2275-4
2. Arteche, A., Joormann, J., Harvey, A., Craske, M., Gotlib, I. H., Lehtonen, A., Counsell, N., Stein, A. (2011). The effects of postnatal maternal depression and anxiety on the processing of infant faces. J. Affect. Disord., 133(1–2), 197–203. https://doi.org/10.1016/j.jad.2011.04.015
3. Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., Plumb, I. (2001). The “Reading the Mind in the Eyes” test revised version: A Study with Normal Adults, and Adults with Asperger Syndrome or High-functioning Autism. J. Child Psychol. Psychiatry, 42(2), 241–251. https://doi.org/10.1111/1469-7610.00715
4. Biaggi, A., Hazelgrove, K., Waites, F., Bind, R. H., Lawrence, A. J., Fuste, M., Conroy, S., Howard, L. M., Mehta, M. A., Miele, M., Seneviratne, G., Pawlby, S., Pariante, C. M., Dazzan, P. (2023). Mother-infant interaction and infant development in women at risk of postpartum psychosis with and without a postpartum relapse. Psychol. Med., 54(4), 823–834. https://doi.org/10.1017/S0033291723002568
5. Bjertrup, A. J., Andreu, H., Macoveanu, J., Sankar, A., Moszkowicz, M., Nielsen, R. E., Pagsberg, A. K., Vieta, E., Kessing, L. V., Miskowiak, K. W. (2025). Reduced prefrontal response to fearful faces in recent mothers with bipolar disorder and its association with mother-infant interaction and infant development. Psychiatry Res., 351, 116610. https://doi.org/10.1016/j.psychres.2025.116610
6. Bjertrup, A. J., Moszkowicz, M., Egmose, I., Kjærbye-Thygesen, A., Nielsen, R. E., Parsons, C. E., Kessing, L. V., Pagsberg, A. K., Væver, M. S., Miskowiak, K. W. (2022). Processing of infant emotion in mothers with mood disorders and implications for infant development. Psychol. Med., 52(16), 4018–4028. https://doi.org/10.1017/S0033291721000891
7. Bora, E., Pantelis, C. (2016). Social cognition in schizophrenia in comparison to bipolar disorder: A meta-analysis. Schizophr. Res., 175(1–3), 72–78. https://doi.org/10.1016/j.schres.2016.04.018

8. Buck, B., Browne, J., Gagen, E. C., Penn, D. L. (2023). Hostile attribution bias in schizophrenia-spectrum disorders: narrative review of the literature and persisting questions. J. Ment. Health, 32(1), 132–149. https://doi.org/10.1080/09638237.2020.1739240
9. Buck, B., Iwanski, C., Healey, K. M., Green, M. F., Horan, W. P., Kern, R. S., Lee, J., Marder, S. R., Reise, S. P., Penn, D. L. (2017). Improving measurement of attributional style in schizophrenia; A psychometric evaluation of the Ambiguous Intentions Hostility Questionnaire (AIHQ). J. Psychiatr. Res., 89, 48–54. https://doi.org/10.1016/j.jpsychires.2017.01.004
10. Campanella, F., West, T., Corradi-Dell'acqua, C., Skrap, M. (2022). Cognitive and affective theory of mind double dissociation after parietal and temporal lobe tumors. Brain, 145(5), 1818–1829. https://doi.org/10.1093/brain/awab441
11. Colom, F., Vieta, E., Martínez-Arán, A., Garcia-Garcia, M., Reinares, M., Torrent, C., Goikolea, J. M., Banús, S., Salamero, M. (2002). Versión española de una escala de evaluación de la manía: validez y fiabilidad de la Escala de Young. Med. Clin. (Barc.), 119(10), 366–371.
12. Combs, D. R., Penn, D. L., Wicher, M., Waldheter, E. (2007). The Ambiguous Intentions Hostility Questionnaire (AIHQ): A new measure for evaluating hostile social-cognitive biases in paranoia. Cogn. Neuropsychiatry, 12(2), 128–143. https://doi.org/10.1080/13546800600787854
13. Corbera, S., Kurtz, M. M., Achim, A. M., Agostoni, G., Amado, I., Assaf, M., Barlati, S., Bechi, M., Cavallaro, R., Ikezawa, S., Okano, H., Okubo, R., Penadés, R., Uchino, T., Vita, A., Yamada, Y., & Bell, M. D. (2025). International perspective on social cognition in schizophrenia: current stage and the next steps. European psychiatry, 68(1), e9. https://doi.org/10.1192/j.eurpsy.2024.1776
14. Corcoran, R., Mercer, G., Frith, C. D. (1995). Schizophrenia, symptomatology and social inference: Investigating "theory of mind" in people with schizophrenia. Schizophr. Res., 17 (1), 5–13.
15. Crittenden, P. M. (2007). *CARE-Index: Infants coding manual.* Unpublished manuscript.
16. de Siqueira Rotenberg, L., Beraldi, G. H., Okawa Belizario, G., Lafer, B. (2020). Impaired social cognition in bipolar disorder: A meta-analysis of Theory of Mind in euthymic patients. Aust. N. Z. J. Psychiatry, 54(8), 783–796. https://doi.org/10.1177/0004867420924109
17. Donadon, M. F., Martin-Santos, R., Osório, F. L. (2019). Baby Faces: Development and psychometric study of a stimuli set based on babies' emotions. J. Neurosci. Methods, 311, 178–185. https://doi.org/10.1016/j.jneumeth.2018.10.021
18. Green, M. F., Penn, D. L., Bentall, R., Carpenter, W. T., Gaebel, W., Gur, R. C., Kring, A. M., Park, S., Silverstein, S. M., Heinssen, R. (2008). Social cognition in schizophrenia: An NIMH workshop on definitions, assessment, and research opportunities. Schizophr. Bull., 34(6), 1211–1220. https://doi.org/10.1093/schbul/sbm145
19. Hamilton, M. (1960). A rating scale for depression. J. Neurol. Neurosurg. Psychiatry, 23(1), 56–62.
20. Healy, S. J., Lewin, J., Butler, S., Vaillancourt, K., Seth-Smith, F. (2016). Affect recognition and the quality of mother-infant interaction: understanding parenting difficulties in mothers with schizophrenia. Arch. Womens Ment. Health, 19(1), 113–124. https://doi.org/10.1007/s00737-015-0530-3

21. Kay, S. R., Flszbeln, A., Qpjer, L. A. (1967). (1987). The Positive and Negative Syndrome Scale (PANSS) for schizophrenia. Schizophr. Bull., 13(2), 261–276. https://doi.org/10.1093/schbul/13.2.261
22. Kohler, C. G., Turner, T. H., Warren Bilker, B. B., Brensinger, C. M., Steven Siegel, M. J., Kanes, S. J., Gur, R. E., Gur, R. C. (2003). Facial Emotion Recognition in Schizophrenia: Intensity Effects and Error Pattern. Am J Psychiatry, 160(10), 1768–1774. https://doi.org/10.1176/appi.ajp.160.10.1768
23. Lahera, G., Benito, A., Montes, J. M., Fernández-Liria, A., Olbert, C. M., Penn, D. L. (2013). Social cognition and interaction training (SCIT) for outpatients with bipolar disorder. J. Affect. Disord., 146(1), 132–136. https://doi.org/10.1016/j.jad.2012.06.032
24. Llinàs-Reglà, J., Vilalta-Franch, J., López-Pousa, S., Calvó-Perxas, L., Torrents Rodas, D., Garre-Olmo, J. (2017). The Trail Making Test: Association with other neuropsychological measures and normative values for adults aged 55 years and older from a Spanish-speaking population-based sample. Assessment, 24(2), 183–196. https://doi.org/10.1177/1073191115602552
25. Mayer, J. D., Salovey, P., Caruso, D. R., Sitarenios, G. (2003). Measuring emotional intelligence with the MSCEIT V2.0. Emotion, 3(1), 97–105. https://doi.org/10.1037/1528-3542.3.1.97
26. Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J. L., Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: A brief screening tool for mild cognitive impairment. J. Am. Geriatr. Soc., 53(4), 695–699. https://doi.org/10.1111/j.1532-5415.2005.53221.x
27. Pantoji, M. V., Ganjekar, S., Mehta, U. M., Chandra, P. S., Thippeswamy, H. (2024). Development of a tool for infant facial emotion recognition (InFER) for postpartum mothers with mental illnesses. Infant Ment. Health J., 45(3), 318–327. https://doi.org/10.1002/imhj.22111
28. Pinkham, A. E., Harvey, P. D., Penn, D. L. (2018). Social Cognition psychometric evaluation: results of the final validation study. Schizophr. Bull., 44(4), 737–748. https://doi.org/10.1093/schbul/sbx117
29. Pinkham, A. E., Penn, D. L., Green, M. F., Harvey, P. D. (2016). Social cognition psychometric evaluation: Results of the initial psychometric study. Schizophr. Bull., 42(2), 494–504. https://doi.org/10.1093/schbul/sbv056
30. Punsoda-Puche, P., Barajas, A., Mamano-Grande, M., Jiménez-Lafuente, A., & Ochoa, S. (2024). Relationship between social cognition and premorbid adjustment in psychosis: a systematic review. Schizophrenia (Heidelberg, Germany), 10(1), 36. https://doi.org/10.1038/s41537-023-00428-y
31. Ramos-Brieva, J. A., Cordero Villafáfila, A. (1986). Validation of the Castilian version of the Hamilton Rating Scale for Depression. Actas Luso Esp. Neurol. Psiquiatr. Cienc. Afines, 14(4), 324–334.
32. Reitan, R. M. (1958). Validity of the Trail Making Test as an Indicator of Organic Brain Damage. Percept. Mot. Skills, 8, 271–276.
33. Rosa, A. R., Sánchez-Moreno, J., Martínez-Aran, A., Salamero, M., Torrent, C., Reinares, M., Comes, M., Colom, F., Van Riel, W., L. Ayuso-Mateos, J., Kapczinski, F., Vieta, E. (2007). Validity and reliability of the Functioning Assessment Short Test (FAST) in bipolar disorder. Clin. Pract. Epidemiol. Ment. Health, 3, 5. https://doi.org/10.1186/1745-0179-3

34. Rutherford, H. J. V., Booth, C. R., Luyten, P., Bridgett, D. J., Mayes, L. C. (2015). Investigating the association between parental reflective functioning and distress tolerance in motherhood. Infant Behav. Dev., 40, 54–63. https://doi.org/10.1016/j.infbeh.2015.04.005
35. Shenoy, S., Desai, G., Venkatasubramanian, G., Chandra, P. S. (2019). Parenting in mothers with schizophrenia and its relation to facial emotion recognition deficits- a case control study. Asian J. Psychiatr., 40, 55–59. https://doi.org/10.1016/j.ajp.2019.01.022
36. Soares, H., Barbieri-Figueiredo, M., Pereira, S., Silva, M., Fuertes, M. (2018). Parents attending to nurse visits and birth age contribute to infant development: A study about the determinants of infant development. Early Hum. Dev., 122, 15–21. https://doi.org/10.1016/j.earlhumdev.2018.05.006
37. Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., Howard, L. M., Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child. Lancet, 384(9956), 1800–1819. https://doi.org/10.1016/S0140-6736(14)61277-0
38. Varo, C., Jimenez, E., Solé, B., Bonnín, C. M., Torrent, C., Valls, E., Morilla, I., Lahera, G., Martínez-Arán, A., Vieta, E., Reinares, M. (2017). Social cognition in bipolar disorder: Focus on emotional intelligence. J. Affect. Disord., 217, 210–217. https://doi.org/10.1016/j.jad.2017.04.012
39. Varo, C., Solé, B., Jiménez, E., Bonnín, C. M., Torrent, C., Valls, E., Lahera, G., Martínez-Arán, A., Carvalho, A. F., Miskowiak, K. W., Vieta, E., Reinares, M. (2022). Identifying social cognition subgroups in euthymic patients with bipolar disorder: A cluster analytical approach. Psychol. Med., 52(1), 159–168. https://doi.org/10.1017/S0033291720001865
40. Vilaseca, B., Roca-Lecumberri, A., García-Gibert, C., Forte, F., Torres-Giménez, A., Solé, E., Andrés-Perpiñá, S., Barajas, A., Gelabert, E. (2025). The impact of severe mental disorders on mother-infant interaction: a systematic review. Arch. Womens Ment. Health, 28(5), 969–982. https://doi.org/10.1007/s00737-025-01561-6
41. Wechsler, D. (2008). *WAIS-IV: Wechsler Adult Intelligence Scale-Fourth Edition*. Pearson.
42. Wendelboe, K. I., Reijman, S., Madsen, E. B., Støve, L. L., Stuart, A. C., Smith-Nielsen, J., Væver, M. S. (2024). Maternal mentalizing and quality of interactive behavior with their infant in the first year postpartum: A meta-analysis. Dev. Rev., 73, 101136. https://doi.org/10.1016/j.dr.2024.101136
43. Young, R. C., Biggs, J. T., Ziegler, V. E., Meyer, D. A. (1978). A rating scale for mania: Reliability, validity and sensitivity. Br. J. Psychiatry, 133(11), 429–435. https://doi.org/10.1192/bjp.133.5.429

Tables

Tables 1 and 2 are available in the supplementary files section

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table1.GeneraldataSocialCognitionandMotherInfantInteractionVariablesAcrosstheTenCases.docx

- Table2.Spearmancorrelationsbetweensocialcognitiondomainsanddyadicsynchrony.docx
- SupplementaryTableS1.docx