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Letter to the Editor

Social cognition and its association with the duration and severity of psychosis in antipsychotic-naïve individuals at different stages of the schizophrenia spectrum disorders

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To the Editors:

Social cognition refers to a series of complex mental functions, which together allow the processing and elaboration of internal and external responses to different forms of social information (Green et al., 2012); it has become an important area of study in schizophrenia, due to the impact on the patient's functioning within its community and its mediating role between neurocognition and social behavior (Combs et al., 2011; Fett et al., 2011). Emotional management (EM), one of the most important subdomains of social cognition, refers to the ability to regulate emotions in oneself and in relation to others.

Research on cognition in schizophrenia has shown some degree of impairment in all stages of the disease (Mollon et al., 2018; Zanelli et al., 2019); however, the comparison of cognitive impairment across different stages of the disease has yielded controversial results: some studies have shown that alterations occur from the pre-symptomatic and prodromal stages (Seidman et al., 2010); progress during the first episode (Rund et al., 2004), and then tend to stabilize in the chronic stage of the disease (Rund et al., 2016). Social cognition has been even less studied, yielding mixed results (Brown et al., 2014; Kucharska-Pietura et al., 2005; Montag et al., 2020; Solis-Vivanco et al., 2020; Valaparla et al., 2017).

The aim of the present study was to explore the temporal nature of EM deficits on the schizophrenia spectrum and their association with the duration of untreated psychosis (DUP).

The study was approved by the Ethics and Scientific Committees of the Instituto Nacional de Neurología y Neurocirugía, which included 101 individuals at clinical high-risk for psychosis (CHR), 85 patients with first-episode psychosis (FEP), 60 individuals with chronic schizophrenia (CSz), and 97 controls. All individuals from the clinical samples were antipsychotic-naïve, which represented a major challenge, as evaluation times required to complete the tests were longer. To analyze EM, we used the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT, Mayer et al., 2003), Managing Emotions sections D and H, included in the MATRICS Consensus Cognitive Battery. After the analysis, explained in detail in the Supplementary Material, two factors were observed in each section: the first included items with effective responses to deal with emotions (e.g., sharing when feeling happy or relaxing under anxiety) under private (section D) or social (section H) contexts, while the second one included items with ineffective responses (e.g., revenge under anger or isolating under sadness) under private (section D) or social (section H) contexts. Comparisons of EM factors were done with a mixed ANOVA including effectiveness (2 levels: effective/ineffective) and context (2 levels: private/social) as within-subject factors, and group (4 levels: Controls/CHR/FEP/CSz) as the between-subject factor. In case that potential confounding factors (age, gender, mean parental education) differed across groups, these were entered as covariates in the ANOVA. Statistical significance was set at $P \leq .05$ for the ANOVA and post hoc comparisons were made using the Bonferroni correction for multiple comparisons. Finally, Pearson correlation analyses were performed between EM factors, DUP, and clinical variables (PANSS and SIPS subscales and general scores, and MATRICS total scores). For the analyses including the SIPS and PANSS, significance was established under a Bonferroni correction for multiple correlations (alpha = 0.05/N scores (4) = 0.0125). All statistical analyses were carried out with a significance level set at $P < .05$.

The full recruitment procedure, demographic and clinical characteristics of the sample, and the independent component analysis coefficients from the MSCEIT items as well, are described in detail in the Supplementary Material. Since age, gender and mean parental education were significantly different among the groups ($F_{3,339} = 33.35$, $P < .001$; $\chi 2 = 16.79$, $P = .001$; and $F_{3,331} = 18.44$, $P \leq .001$, respectively), they were included as covariables in the ANOVA. The mixed ANOVA comparing the EM factors revealed a significant effect of the group ($F_{3,327} = 16.15$, $P < .001$). Post hoc comparisons revealed no significant differences between the Control and CHR groups (mean difference (MD) = −0.003, $P = 1.0$) but both groups showed general lower EM scores compared with the FEP and the CSz groups (Controls: MD with FEP = -0.23, $P < .001$; MD with CSz = −0.36, $P < .001$; CHR group: MD with FEP = -0.23, $P = .001$; MD with CSz = −0.37, $P < .001$). No significant differences were found between the FEP and the CSz groups (MD = -0.14, $P = .17$). This result indicated a selective increase in certain EM scores in the Control and CHR groups, which was confirmed by a significant interaction of group by effectiveness ($F_{3,327} = 37.39$, $P < .001$). Post hoc comparisons showed higher effective EM scores in Controls,

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regardless of the context (private or social), compared with all the clinical groups (MD with CHR = 0.37, $P < .001$; MD with FEP = 0.28, $P = .003$; MD with CSz = 0.31, $P = .003$; Fig. 1A). No significant differences were found between the clinical groups (all $P \geq 1.0$). On the other hand, Controls showed lower ineffective EM scores, regardless of the context, compared with all clinical groups (MD with CHR = -0.36, $P < .001$; MD with FEP = -0.73, $P < .001$; MD with CSz = −1.04, $P < .001$). There were significant differences across clinical groups, with higher ineffective EM scores in the CSz group compared with the FEP (MD = 0.30, $P = .01$) and CHR (MD = 0.67, $P < .001$), and in the FEP group compared with the CHR (MD = 0.37, $P < .001$; Fig. 1B).

An additional mixed ANOVA including only the groups with psychosis confirmed increased ineffective EM in the CSz group compared with the FEP, as revealed by a significant interaction of group by effectiveness ($F_{1,122} = 5.53$, $P = .02$; MD = 0.36, $P = .004$), even after controlling by PANSS total score.

Also, significant correlations were found between the DUP and both ineffective EM scores, especially under social context (private: $r = 0.19$, $P = .02$; social: $r = 0.32$, $P < .001$; Fig. 1C). For the FEP and CSz groups, there were significant positive correlations between ineffective social EM and the Positive, Negative, and Total PANSS scores ($r = 0.24$, $P = .005$, $r = 0.31$, $P < .001$, and $r = 0.23$, $P = .006$, respectively; Fig. 1D). No significant correlations were found between any factor and the SIPS subscale scores within the CHR group.

Our main finding is a reduced ability to identify effective strategies for EM even from at-risk stages of the schizophrenia spectrum, with no changes over time, and a parallel, progressive increase in choosing ineffective strategies for EM along the disease progression. Although the present study is not longitudinal, it provides an understanding of the cognitive trajectory of chronic psychotic illness unaltered by medications and, specifically, on how EM as a social cognition domain evolves throughout the course of the disease.

Credit authorship contribution statement

Drs León-Ortiz, Solís-Vivanco and de la Fuente-Sandoval had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Concept and design: León-Ortiz, Solís-Vivanco, de la Fuente-Sandoval. Acquisition, analysis, or interpretation of data: León-Ortiz, Reyes-Madrigal, Solís-Vivanco, de la Fuente-Sandoval. Drafting of the manuscript: León-Ortiz, de la Fuente-Sandoval. Critical revision of the manuscript for important intellectual content: All authors. Statistical analysis: León-Ortiz, Solís-Vivanco. Administrative, technical, or material support: León-Ortiz,

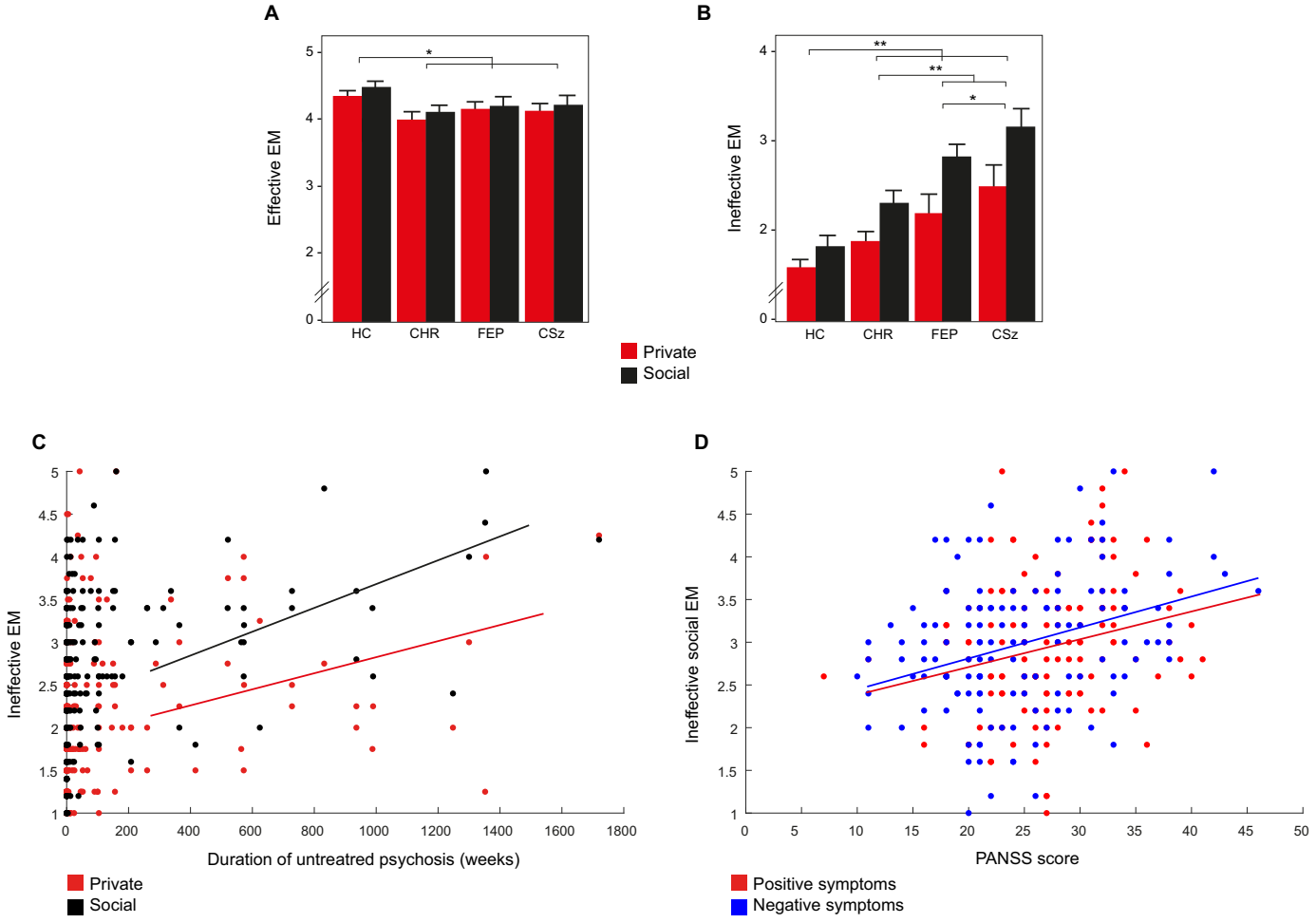

Fig. 1. Ineffective emotional management and clinical variables.
(A) Effective and (B) ineffective Emotional Management in all groups. (C) Relationships within both groups with psychosis (first-episode psychosis and chronic schizophrenia) between private and social ineffective Emotional Management, and the duration of untreated psychosis ($P = .02$ and $P < .001$, respectively). (D) Relationships within first-episode psychosis and chronic schizophrenia groups between ineffective social Emotional Management and PANSS positive and negative symptoms ($P = .005$ and $P < .001$, respectively).
Abbreviations: EM, Emotional management; HC, Healthy controls; CHR, Clinical high-risk for psychosis; FEP, First-episode psychosis; CSz, Chronic schizophrenia
*$P \leq .01$; **$P < .001$. Error bars represent 2*SEM.

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Declaration of competing interest

Francisco Reyes-Madrigal, Pablo León-Ortiz and Ricardo Mora-Durán have received speaking fees from Janssen (Johnson & Johnson). No other disclosures are reported.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.schres.2022.08.019.

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