Asociaciones entre la teoría de la mente y la severidad de los trastornos internalizantes en una muestra mexicana

Associations between theory of mind and severity of internalizing disorders in a mexican sample

Moira Sofía Acuña-Ortega[1], Arantza Rodríguez-Olmedo[1], Andrea Daniela Rodríguez-Rangel[1], Vivian Fernanda Salcedo-Viquez[1], Ana Paula Del Villar-Hoyo[1], Aldebarán Toledo-Fernández[1]*

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[1] Universidad Anáhuac México, Facultad de Psicología

*Autor de correspondencia: Aldebarán Toledo-Fernández, aldebaran.toledofe@anahuac.mx, Av. Universidad Anáhuac 46, Lomas Anáhuac, C.P. 52786, Huixquilucan, Estado de México

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Resumen

Los trastornos internalizantes (TIs) son el grupo de enfermedades mentales más común y se caracterizan por miedo, ansiedad y tristeza. Existen pruebas de déficits cognitivos asociados a estos trastornos, incluida la teoría de la mente (ToM). Aún se necesita más evidencia transcultural. Los objetivos de este estudio fueron determinar si existen alteraciones en la Teoría de la Mente (ToM) en individuos con TIs en comparación con aquellos sin estos trastornos y comprobar la correlación entre la gravedad de los TIs y la ToM en una muestra mexicana. Se diseñó un estudio de casos y controles, en el que se incluyó a personas con criterios de trastorno depresivo mayor, trastorno de ansiedad generalizada o fobia social, según una entrevista estructurada. La ToM se midió mediante el Test de Lectura de la Mente en los Ojos (RMET). Se reclutaron 39 casos y 33 controles. No se encontraron diferencias significativas entre los grupos ni correlación entre la gravedad de la TDAH y las puntuaciones del RMET. Se observaron leves tendencias hacia puntuaciones más altas en la ToM de las personas con TIs. Los individuos con TIs podrían mostrar mayor atención a sus propias emociones debido a su intensidad y frecuencia, lo que podría hacerles más conscientes de las emociones de los demás, incluso con información limitada.

Palabras clave: trastornos internalizantes, teoría de la mente, cognición social, depresión, ansiedad.

Abstract

Internalizing disorders (IDs) are the most common group of mental illnesses, characterized by fear, anxiety, and sadness. There is evidence of cognitive deficits associated with these disorders, including Theory of Mind (ToM). Cross-cultural evidence is lacking. The objectives of the study were to determine whether individuals with IDs exhibit ToM alterations compared to those without IDs, and to test the correlation between severity of IDs and ToM in a Mexican sample. We designed a case-control study, conforming to the cases with individuals who met criteria for major depressive disorder,

general anxiety disorder or social anxiety disorder, according to a structured interview. ToM was measured with the Reading the Mind in the Eyes Test (RMET). Thirty-nine cases and 33 controls were recruited. We found no significant differences between the groups, and no correlation between severity of IDs and scores of the RMET. Mild non-significant tendencies were found towards higher scores in the ToM of individuals with IDs. It is assumed that individuals with IDs could be more alert and perceptive to their own emotions because of their intensity and frequency, this could in turn make them more aware of the emotions of others, even in the face of limited information.

Keywords: internalizing disorder, theory of mind, social cognition, depression, anxiety.

Introduction

Internalizing disorders (IDs) is one major category of psychopathology originally proposed by Krueger (Carver *et al.,* 2017) through factor analysis. These disorders are characterized by the presence of fear, anxiety, shyness, low self-esteem, sadness, and/or depression. These are the most common group among mental illnesses worldwide, affecting around 20 to 30% of individuals in their lifetime (Walsh *et al.,* 2019). For this study we will address *major depressive disorder* (MDD), *general anxiety disorder* (GAD) and *social anxiety disorder* (SAD).

GAD is a disabling chronic condition (Stein *et al.,* 2010) that involves persistent and excessive worries that interfere with daily activities. It is often accompanied by physical symptoms, such as restlessness, fatigue, difficulty concentrating, irritability, muscle tension in any part of the body, or sleep disorders (APA, 2014). Often, these worries focus on everyday things such as family, friends, interpersonal relationships, money, work, studies, home management, personal health, among others. GAD prevalence changes widely across countries, with a higher lifetime prevalence in high-income countries (5%) compared to low-income countries (1.5 - 3%) (Preti *et al.,* 2021). Its lifetime prevalence in the United States has been estimated to be 6%, 3% in Europe (García *et al.,* 2012), and 1.2% in Mexico (Gaitán *et al.,* 2021).

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SAD is characterized by persistent fear of one or more social situations or actions that occur in public and that generate a negative evaluation of others. That fear caused by humiliating social situations makes the individual choose to avoid them at any cost or, on the contrary, they face them with great discomfort and anxiety (APA, 2014). SAD is estimated to have a worldwide lifetime prevalence of 8.4 to 15% (Koyuncu *et al.,* 2019) and 4.7% in Mexico (Ontiveros, 2008).

MDD is a mental disorder that consists of profound sadness with loss of interest, accompanied by other emotional, cognitive, physical, and behavioral symptoms. Some of these may include irritability, lack of libido, fatigue, feelings of guilt and even feelings of worthlessness. To make a diagnosis of MDD, the symptoms must have been present for at least two weeks and must have affected the individuals' functioning (APA, 2014). It is estimated that, globally, 1 in every 10 adults suffer from MDD. In Mexico, 8.8% of individuals have experienced at least one depressive episode in their lifetime, and 4.8% in the past year (Pérez *et al.,* 2017).

There is evidence that IDs affect cognitive functions such as attention, memory, perception, and social cognition (Inoue *et al.,* 2006). This study is concerned with the latter. One of the main functions studied in relation to social cognition is *theory of mind* (ToM), defined as the ability to accurately infer others' thoughts and feelings (Hani & Newman, 2017) and using concepts of intentional mental states, such as beliefs, goals, and perceptual states, to predict and explain the behavior of others (Westra & Carruthers, 2018). This theory includes two components: decoding, which involves understanding others' nonverbal language, and reasoning, which is subdivided into affective (identifying emotional states) and cognitive (inferring intentions and beliefs) components (Hani & Newman, 2017). Currently, cognitive processes that arise from ToM are still being debated, and practitioners can be divided into those who favor a general explanation and those who vote for the necessity of a dedicated cognitive mechanism (Westra & Carruthers, 2018).

ToM has been studied mostly in schizophrenia, antisocial personality disorder and autistic disorder. Overall, scores in measures of ToM have been reported as low in samples of individuals with these

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conditions, and these measures have been linked with expressions of the disorders and clinical outcomes. For example, a study (Bechi *et al.,* 2019) addressing individuals with schizophrenia reported positive impact of ToM on work competence after an intervention to improve this cognitive ability. In autism disorder, for example, it has been reported (Hoogenhout & Malcolm-Smith, 2017) that ToM is a reliable predictor of severity of the disorder. In the case of antisocial personality disorder, research indicates that individuals often exhibit impairments in affective ToM, particularly in empathic understanding of others, while their cognitive ToM abilities remain relatively intact (Dolan & Fullam, 2004). Overall, deficits in ToM have been linked to poor social functioning in these disorders; as well, there is similar milder evidence for other psychopathologies.

Patients suffering from a neuropsychiatric illness such as SAD may sometimes have problems in their ToM, in terms of perceiving others' emotions as rude, lacking in subtlety and empathy, and as egocentric (Téllez, 2006). Concerning GAD, there is evidence that the state of worry may allow for better prediction of positive and negative reasoning in others (Zainal & Newman, 2017). Individuals who suffer from MDD may have problems decoding, perceiving, and reasoning information provided by the environment, and may have social and interpersonal difficulties, that is the reason why ToM may be affected as well (Washburn *et al.,* 2016). It is possible that IDs may alter the perception of individuals diagnosed with them towards negative emotions; for example, perceiving more threatening intentions in others' faces or gazes.

In a previous study (Washburn *et al.,* 2016), individuals with GAD and MDD exhibited biased attention toward negative facial stimuli and deficits in recognizing facial emotions. Furthermore, the GAD group performed significantly worse than the MDD group on the RMET and demonstrated a preferential bias toward angry and threatening facial stimuli, whereas individuals with MDD showed attention biases toward sad facial expressions.

Other studies found that depressed adults tended to have a lower ToM performance when presenting symptoms of acute depression as did patients who were in remission (Inoue *et al.,* 2006); depressive

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college students performed worse on the RMET compared to non-depressed students (Manstead *et al.,* 2013); and, ToM and self-reported depressive symptoms were significantly related in developing pre-adolescents (Caputi *et al.,* 2017). Finally, one meta-analysis linking GAD and SAD with ToM found a negative effect in mentalization, recognition of emotions and social knowledge/perception (Lavoie *et al.,* 2014).

Overall, the evidence from these studies seems to consistently point to an association between IDs and ToM; however, most of the studied samples have been from Anglo-Saxon countries, providing insufficient cross-cultural evidence. Thus, the main goal of this study is to replicate these findings in a Mexican sample. Specifically, the objectives are to determine whether there are ToM alterations in individuals with IDs compared to individuals without them, and to test the correlation between severity of IDs and ToM. For this study, it is hypothesized that individuals with IDs will exhibit deficits in ToM compared to controls, and that higher levels of severity will be positively correlated with greater ToM impairment. These findings may contribute to advancing knowledge regarding cognitive impairments in individuals with IDs, helping to better characterize them in clinical settings.

Method

Participants

For this non-experimental, case-control study, data was collected from October 25th, 2021, to March 29th, 2022. Inclusion criteria for the participants to start the interview process were as follows: accepting and understanding the informed consent; meeting at least one primary diagnostic criteria for either GAD, SAD or MDD; and being between 18-50 years of age. Potential participants would be excluded if they report diagnosis of schizophrenia, bipolar disorder, mania, or any personality disorders diagnosed in the last twelve months.

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Instrument

Mini International Neuropsychiatric Interview, 6th edition (MINI-6)

MINI-6 is a short-term structured diagnostic interview that investigates the Axis I of psychiatric disorders described in DSM-IV and the ICD-10. A Spanish-adapted version was used. Studies demonstrate that the MINI-6 has a validity and reliability score, which is acceptably high and can be administered in a much shorter period than other instruments. Additionally, it can be used by clinicians after a short training session. For this study, the modules for assessing MDD, GAD, and SP were used, considering both the presence or absence of the disorders and their severity based on the number of criteria met (Ferrando *et al.,* 2000).

Reading the Mind in the Eyes Test (RMET)

The RMET evaluates one´s abilities to read the intentions, feelings, and thoughts through other´s facial expressions (Sanvicente-Vieira *et al.,* 2014). This test consists of the presentation of 36 images with different types of gazes with 4 different word choices that can describe what the person is conveying; the participant must choose only one of those options to describe the gaze. The test also includes a glossary with a list of all the words included as responses, their synonyms and one example. The glossary has the goal of eliminating any language biases (Sanvicente-Vieira *et al.,* 2014).

The answers were coded with only one of the options being correct and being equivalent to one point, giving a maximum total correct score of 36 points (Baron-Cohem *et al.,* 2015). The RMET is often interpreted in terms of this total score, with higher values indicating a better ToM. Also, studies have added different subscales to its interpretation. The most common subdivision consists of splitting the items into positive, negative, and neutral emotions, although the psychometric properties of these subdivisions have not been sufficiently studied (Sanvicente-Vieira *et al.,* 2014). The original English version

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has been translated into several languages, a Spanish-adapted version was used for this study.

Procedure

A promotional poster was prepared and distributed through social networks. Also, Facebook advertising was paid for diffusion throughout the Mexican Republic. A contact was provided to book an appointment to perform the evaluation via Zoom. The assessment protocol began after the informed consent was presented by the participant and once accepted by him/her, sociodemographic, RMET and MINI-6 data was collected.

Subsequently, feedback and recommendations were given in case of having met diagnosis of one or more of IDs. Recommendations consisted of encouragement to seek the professional mental health care, and contact information. Finally, at the end of the interview, participants were asked to disseminate the poster across their social networks.

For the recruitment of the participants for the control group, a promotional poster was designed and distributed across social networks, and the same protocol was applied.

Data was collected by the authors of this study after a training process in all the procedures and instruments, provided by the main researcher, and that included the following phases: verbal description of the procedures, behavioral modeling, role-playing, feedback and correction, behavioral trial with a voluntary participant, feedback and correction.

Statistical Analysis

For the description of numerical variables, arithmetic mean and standard deviation, as well as minimum and maximum range were used for the following variables: age, RMET scores and severity of internalizing disorders. In addition, categorical variables (i.e., education, diagnoses, degree of schooling) were described with frequency and percentage.

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To determine whether there are differences between cases and controls with respect to RMET scores, the Mann-Whitney test was used. Also, to determine the degree of association between RMET scores and levels of severity of internalizing disorders, the Spearman ordered rank correlation was used. The use of non-parametric statistics was decided in this case because of the non-probabilistic recruitment of the sample and because of its small size.

For all inferential analyses, a *p*-value <.05 was considered to determine statistical significance. JASP version 0.16.1 (JASP Team, 2022) was used for all analyses.

Ethical considerations

Regarding ethical considerations, we adhered to guidelines from the Declaration of Helsinki. All the participants opt-in after careful reading of the informed consent, which included detailing of objectives of the study, voluntariness of participation, general themes of the questionnaires, minimal-risk nature of the study, confidentiality (declaring that they would only be identified with a number), return of results, and contact of the main researcher (AT-F).

Being an observational study with minimal risk for participants from the general population (not a vulnerable group), approval by an ethics committee was not obtained, following guidelines from the ethical code of APA (2017).

Results

As shown in Table 1, of the 180 participants who were contacted, 88 interviews were scheduled and 72 were conducted (cases = 39; controls = 33), 63.88% of participants were female; the average age of the total sample was 28.26 (*SD*= 7.44). It was also found that most of the participants (86.10%) reported having a level of education between bachelor's and PhD. Most of the participants (80.55%) didn't have any neuropsychiatric history.

Table 1
Characteristics of the participants

	Cases (n= 39)	*Controls (n= 33)*	*p-value of statistical differences*
	***M* (*SD*) or *f* (%)**	***M* (*SD*) or *f* (%)**	
Demographics			
Sex			
Men	14 (35.89)	12 (36.36)	--
Women	25 (64.10)	21 (63.63)	--
Age	28.64 (7.42)	27. 81 (7.55)	--
Education			
None-Middle School	1 (2.56)	0 (0)	--
High School	12 (30.76)	4 (12.12)	--
Bachelor´s degree-PhD	24 (66.66)	29 (87.87)	--
Neuropsychiatric problems in the past year			
Yes	12 (30.76)	2 (6.06)	--
No	27 (69.23)	31 (93.93)	--
Internalizing disorders			
SAD Diagnosis	18 (46.15)	--	--
SAD Severity[A]	2.33 (1.70)	--	--
MDD Diagnosis	29 (74.35)	--	--
MDD Severity[A]	6.02 (3.26)	--	--
GAD Diagnosis	33 (84.61)	--	--
GAD Severity[A]	8.89 (2.16)	--	--
RMET scores			
Total scores	24.07 (3.12)	23.57 (3.36)	.470
Correct items in men's photos	12.35 (1.96)	12.21 (1.76)	.744

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	Cases (n= 39)	*Controls (n= 33)*	*p-value of statistical differences*
	***M* (*SD*) or *f* (%)**	***M* (*SD*) or *f* (%)**	
Correct items in women´s photos	11.71 (2.06)	11.36 (2.59)	.414
Correct items in positive photos	12.69 (2.12)	13.13 (2.44)	.385
Correct items in neutral photos	11.38 (2.02)	10.45 (1.71)	.052

Notes: [A]= Severity is estimated by the addition of met criteria in each diagnosis.
Abbreviations: SD= standard deviation, RMET= Reading the Mind in the Eyes Test, *SAD*= social anxiety disorder, MDD= major depressive disorder, GAD= generalized anxiety disorder.

Source: prepared by authors.

As can be seen in table 1, no statistical difference was found between case and control groups relative to RMET scores. Also, Table 2 shows how significant correlations between the severity of the disorders and the RMET scores were absent.

Table 2
Correlation analysis between severity of the disorders and RMET scores

RMET scores	***Severity of SAD***	***Severity of MDD***	***Severity of GAD***
Total score	.088	.074	.056
Correct items in men's photos	.206	.092	.170
Correct items in women´s photos	-.121	.033	-.138
Correct items in positive photos	.096	.201	.123
Correct items in neutral photos	.023	.090	-.046

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$
Abbreviations: RMET= Reading the Mind in the Eyes Test, SAD= social anxiety disorder, MDD= major depressive disorder, GAD= generalized anxiety disorder.

Source: prepared by authors.

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Discussion y conclusiones

The main goal of this study was to determine whether there are ToM alterations in individuals with IDs compared to those without them. Evidence of this study suggests that there is no significant difference between cases and controls. However, mild tendencies towards higher scores in the ToM of individuals with IDs were found, which suggests that these individuals have a better capacity to correctly interpret emotional stimulus with ambiguous or partial information. We hypothesize that individuals with IDs could be more alert and perceptive to their own emotions because of their intensity and frequency, and this could in turn make them more aware of the emotions of others, even in the face of limited information. This may have been determined by the severity of the IDs in our sample, which may not have been high since they were sufficiently motivated to participate in the study, meant they could be retaining sufficient functionality to remain aware of their own and others' emotions, and to express them during the interview.

The scores from our controls group were lower than those reported for the control group in the study by Baron-Cohen *et al.* (2015), and even like the scores of the cases with autism also reported in that study. It is important to consider that these authors recruited a larger sample (*n* controls=326, *n* cases=395), so it is possible that our results were strongly related to our sample size.

An additional objective of our study was to test the correlation between severity of IDs and the scores of the RMET. We found no significant correlation. Aside from the explanations that were already mentioned, we believe that the MINI-6 is not designed to measure the severities of the IDs, only to identify the possible presence of the disorders. Future studies should consider psychometric scales better designed to determine severity.

Our findings are in contrast with those reporting differences in ToM in individuals with current MDD and MDD with one year of remission (Inoue *et al.,* 2006), with GAD and MDD (Washburn *et al.,* 2016), and GAD and SAD (Lavoie *et al.,* 2014). One key difference is the sample size. All three of these studies employed slightly larger or more targeted samples, which may have increased statistical power and sensitivity to detect ToM impairments. Also, the clinical charac-

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teristics of the populations studied may have influenced the results. Inoue *et al*. (2006) examined 50 individuals with MDD in remission for one year, which may have allowed them to detect ToM differences that persist over time. Washburn *et al*. (2016) compared a sample of 119 individuals with GAD and MDD, while Lavoie *et al*. (2014) studied individuals with GAD and SAD, both of which are associated with cognitive and emotional difficulties. In contrast, our study may have included participants with more varied symptom profiles or different levels of illness severity, which could have affected the findings.

Thus, differences in sample size and clinical characteristics likely contributed to the divergence in findings between the current study and prior research. Future studies should aim to refine these methodological factors to enhance the detection of ToM differences in clinical populations.

This study has important limitations. First, those related to the selection and size of the sample, which could have compromised the generalizability of the results. Due to the COVID-19 pandemic, it was not possible to access participants who were in a clinical setting where higher levels of severity of IDs are more likely to be found. The fact that we opted for online recruitment could imply that participants may have been sufficiently motivated to agree to participate, suggesting that the level of severity of IDs was not high. Likewise, when applying online recruitment, the sample was restricted to a medium-high socioeconomic sector, with easier access to the Internet, an also biased to women, who tend to answer this type of survey. Also, the small sample size of the groups could have limited the observation of meaningful effect sizes; however, the size was not dissimilar to other studies on ToM in different pathologies (Dolan & Fullman, 2004 = 89; Hoogenhout & Malcolm-Smith, 2017 = 69; Bechi *et al.,* 2017 = 37). To minimize this first set of limitations, a Facebook publishing service was purchased to expand the distribution of the study to all the Mexican Republic, and participants were also asked to share the poster across their social networks.

Another limitation found in this study was that the RMET has no evidence of validity in the Mexican population, which does not allow us to interpret the results of the test with sufficient precision; for example, by lacking cut-off scores to determine ToM functioning as normal

https://doi.org/10.36105/psic_anah.2026v1n1.04

or deficient. However, it has evidence of validity in other samples from countries with similar characteristics to Mexico, such as Brazil (Sanvicente-Vieira *et al.,* 2013). Additionally, the RMET evaluates a basic perceptual process that could be less influenced by acculturation.

There are several strengths in this study. To the best of our knowledge, this is the first study conducted on a Mexican sample using the RMET and the first to examine the relationship between individual differences (IDs) and Theory of Mind (ToM) in this population. Additionally, this study employs a relatively uncommon data collection method—video calls—providing further evidence of its usefulness in situations where access to individuals with specific conditions (e.g., psychopathology) may be limited, such as during the COVID-19 pandemic.

Some practical considerations may be derived from these findings. For instance, the results suggest that individuals with IDs may be more accurate at evaluating others' emotions rather than simply being "exaggerated," which could lead to a more empathetic understanding of their feelings and possible "distorted thoughts," particularly in psychotherapy settings. Moreover, when assessing a person with IDs, it may be beneficial to include a ToM assessment to complement their diagnosis with insights into their social cognition and to better understand the potential impact of IDs on ToM.

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