

Blindness of intentions and metacognitive deficits during moral judgements in schizophrenia

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Abstract

Background. Previous research has shown that moral judgments are affected by social cognitive abilities, such as theory of mind (ToM). This study examines how information about an actor's beliefs and the consequences of their actions affect the moral evaluation of the character's behavior in social events. Our research builds upon previous studies, which have shown that these factors contribute differently to moral judgments made by both adults and young children.

Objectives. This study aimed to explore how participants with schizophrenia and healthy controls read stories about social situations in the context of moral judgments.

Materials and methods. The study used the research procedure that included 4 variants of 16 scenarios describing social situations, and thus comprising 64 stories. After each story, participants evaluated their confidence level on a 4-point scale. To assess delusional beliefs, the Polish adaptation of the Peters Delusion Inventory (PDI) questionnaire and the Paranoia Checklist (PCh) were used. Respondents completed these questionnaires after completing the scenario test procedure.

Results. In social situations, patients with paranoid schizophrenia were found to evaluate actions of protagonists who attempted to harm another person more leniently than when it was an accident. Conversely, healthy individuals judged those actors who expressed intentions to hurt another person significantly more harshly than in an accident situation. Metacognition measures show that paranoid schizophrenia patients make moral judgments with high confidence, despite being based on an incorrect reading of the other person's intentions.

Conclusions. The study indicates that ToM has a significant impact on the moral judgment of others. Decreased moral cognition can result from both positive and negative symptoms. Deficits related to metacognition can also sustain such cognitive distortions.

Key words: paranoid schizophrenia, metacognition, theory of mind, moral judgments

Background

Paranoid symptoms are often observed among people diagnosed with schizophrenia.¹ Studies show that patients with schizophrenia, classified as paranoid and non-paranoid, process social information differently. For instance, patients with paranoid symptoms have difficulty recognizing negative emotions compared to healthy people.² Additionally, they tend to interpret ambiguous stimuli (e.g., neutral facial expressions) as threatening.³ Moreover, studies on patients with paranoid schizophrenia show their increased attribution of hostility, blame and aggression in socially ambiguous situations.⁴ Similar abnormalities of social cognition appear in the general population of those with a tendency to paranoid thinking.⁵

It seems that deficits in social cognition result from deficits in the theory of mind (ToM), which are commonly diagnosed among patients with schizophrenia^{6–9} and, according to some researchers, are related to paranoid beliefs.^{1,10} Moreover, people with schizophrenia exhibit many deficits in social cognition, including ToM,^{6,7,11,12} which are related to the processes of moral cognition and together form an integral aspect of social functioning.^{13–15}

Research indicates that moral judgment is a complex socio-cognitive process that requires ToM skills.¹⁶ For instance, neurocognitive studies among children show that the observer's knowledge about the mental state of another person (actor) is integrated with their knowledge about the outcome of the actor's behavior.¹⁶ When the scenarios of events describing the interaction between 2 people show a conflict related to information about the actor's behavior (the result of their behavior and intentions), the explanation of this behavior from a moral viewpoint will depend more on perceived intentions than the result of behavior.^{16–18}

Current data from studies among patients with schizophrenia are insufficient to identify some problems with the ability to make moral judgments. Some studies indicate that there are no deficits in moral judgments, i.e., patients with schizophrenia have no observable difficulties in understanding the intentions of others in social situations and in evaluating the moral acceptability of the resulting behavior.¹⁹ There are also studies conducted among adolescents indicating deficits in moral judgments.¹⁵ In contrast, research by McGuire et al.²⁰ indicates a link between negative symptoms in schizophrenia and severe judgments regarding behavior that is commonly accepted as a minor offense. The inconsistency and incompleteness of these findings calls for this research gap to be filled. Moral cognition in schizophrenia may play an important role in better understanding aggressive behavior in this illness, which is often wrongly attributed to deficits in moral cognition.²¹

According to some researchers, metacognition may be another important factor influencing moral judgments, and it covers the processes of ToM that relate only to one's own thoughts and beliefs.²² The term metacognition refers

to thinking about one's thinking: thinking about thinking.²² It is assumed that metacognition enables an individual to observe their mental processes (monitoring) and use knowledge about their processes to regulate behavior (control).^{23,24} There is also a view that metacognition is used to evaluate one's own decisions. Therefore, if metacognitive processes are inappropriate, the individual ceases to adequately assess and perceive the functioning of their cognitive processes, including own decisions. In the case of mental disorders, there may be permanent metacognitive dysfunction manifested by a lack of adequate knowledge about the individual's cognitive processes. Therefore, abnormalities in metacognition may be a common cause of psychotic symptoms that also occur in schizophrenia.^{25,26}

Metacognitive impairment has been found to contribute to the development and persistence of schizophrenia symptoms.²⁷ There are data indicating an association between metacognition and overall symptom severity, and between impaired metacognitive functioning and the severity of schizophrenia symptoms, i.e., positive symptoms,²⁸ negative symptoms^{27,29,30} or disorganized symptoms.³¹

Judgments about social situations depend not only on inference about the intentions of the actor of an event, but also on understanding one's own knowledge of the subject. The most studied metacognition deficit is cognitive distortion in the form of overconfidence. This leads to a subjective level of confidence in one's own judgments, conclusions or predictions that is higher than objective criteria indicate. Recent studies have shown the presence of a strong overconfidence effect in schizophrenia, as well as in other mental disorders.^{32,33}

Objectives

Previous studies indicate that dysfunctional metacognition has a significant effect on moral inference about the behavior and intentions of actors in social situations. In the present study, we hypothesized that assessment of the morality of actors' behavior depends on the confidence of the assessors in their moral judgments and their perception of the actors' intentions in determining their behavior. We expect that the perceived effect of the actors' behavior influences the assessment, from a moral perspective, of actions in various scenarios presenting social interactions. In the study, it was expected that there would be significant differences in the assessments made by healthy people and by those with schizophrenia in social situations that arouse a dissonance between the actor's intentions and the result of their behavior. It was assumed that people experiencing paranoid delusions would attribute negative intentions whenever the outcome was negative, regardless of the intentions of protagonists, as a result of the very nature of delusions. Based

on the results of previous research,^{16,34,35} we explored the effect of dissonance between the perceived intention of actors and the outcome of their behavior. It is expected that such dissonance will result in “softer” judgments of the actors’ behavior. This should be especially noticeable in situations where the actor attempted (attempt) to hurt someone rather than in situations where the other person was ultimately hurt by accident (accident). Such assessments would result from ToM deficits typical for people with schizophrenia.

Materials and methods

Participants

The study included 10 patients diagnosed with paranoid schizophrenia (5 women, 5 men) and 10 healthy controls (6 women, 4 men). Patients in the clinical group were recruited from the Day Care Psychiatric Unit in Lubin, Poland. Participants in the control group were recruited among students of the Faculty of Psychology at the SWPS University in Wrocław, Poland. The study was approved by the Commission for Research Ethics at the Second Faculty of Psychology at the SWPS University. The participants in the research procedure gave their informed consent to participate in the study. A diagnosis of schizophrenia was confirmed using the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV Axis I Disorders (SCID-I)³⁶ and approved by a board-certified psychiatrist. To exclude individuals with mental or neurological disorders from the control group, we utilized the Mini-International Neuropsychiatric Interview (M.I.N.I.). Due to the small sample size and non-normal distribution of data, we used a non-parametric Mann–Whitney U test to compare variable distributions. The median age of the patients was 42 years (with the lower and upper quartiles being 36.25 and 47.75 years, respectively) and a range of 29–50 years. The median age of the healthy controls was 23.5 years with the lower and upper quartiles being 22 and 24 years, respectively and a range of 22–32 years.

Procedure

The study used the research procedure employed in other studies.^{16,34,35} The Polish adaptation of the tool was carried out using the method of reverse translation. The research procedure included 4 variants of 16 scenarios that described social situations, resulting in a total of 64 stories. These stories were presented in 4 sequential parts: 1) background – information to set the scene (identical across all conditions); 2) foreshadow – information foreshadowing the outcome (negative or neutral); 3) belief – information stating the protagonist’s belief about the situation (negative or neutral); 4) outcome – information about

the protagonist’s action and the resulting outcome. In each scenario, a 2×2 pattern was used: 1) the outcome was either negative or neutral, 2) the expectations of the protagonists regarding the outcome (negative or neutral). The 4 combinations of these 2 factors can be categorized as follows: 1) neutral (both the expectation and the outcome were neutral), 2) attempt (the expectation was negative, but the outcome neutral), 3) accident (the expectation was neutral, but the outcome negative), 4) intentional (both the expectation and the outcome were negative)

For example, in the scenario presented in Fig. 1, identifying the white powder in coffee as poison, rather than sugar, foreshadows the death of a person as a result of ingesting the poison. In each story used in the experiment, when a threat is actual (e.g., poison instead of sugar), action by the protagonist results in someone’s death. Each possible belief was true for one outcome and incorrect for the other. The study participants independently switched individual slides in which a story was presented. The stories were then removed from the monitor screen and replaced with an instruction to assess the moral nature of the action on a scale of 1 (forbidden) to 7 (permissible) using the keyboard. This question, together with the scale, was then removed from the screen and replaced with an instruction to rate the participant’s own confidence regarding this moral assessment on a scale from 1 (guessed) to 4 (100 percent sure) (Fig. 2). The study participants saw 4 variants of each scenario for a total of 64 stories. The scenarios were presented in a random order, and each respondent observed the stories in a different order. The text of the story was presented in 42-point font using the Calibri facetype in black on a white background. The stories were displayed on the screen of a laptop with a 15-inch computer matrix.

In addition, the study assessed the severity of delusional beliefs. For this purpose, the Polish adaptation of the Peters Delusional Inventory (PDI) questionnaires^{37,38} and the Paranoia Checklist (PCh)^{39,40} were used, which the respondents completed after completion of the scenario test procedure.

Statistical analyses

The statistical calculations were carried out using the R package (R Foundation for Statistical Computing, Vienna, Austria). Cronbach’s alpha coefficient was used to assess the coherence of the moral assessments and recorded levels of confidence regarding the 16 scenarios for a fixed variant. A high value of the alpha coefficient indicates a high level of coherence in the answers. A coefficient of above 0.6 was regarded as acceptable, while a coefficient of above 0.7 was regarded as good. For both the moral assessments and the recorded levels of confidence, the alpha coefficient was at least 0.636 and was generally above 0.7 (it was always above 0.7 when the 2 study groups were combined). Hence, it was concluded that it is reasonable to summarize the reactions of a respondent to a given variant of the scenarios

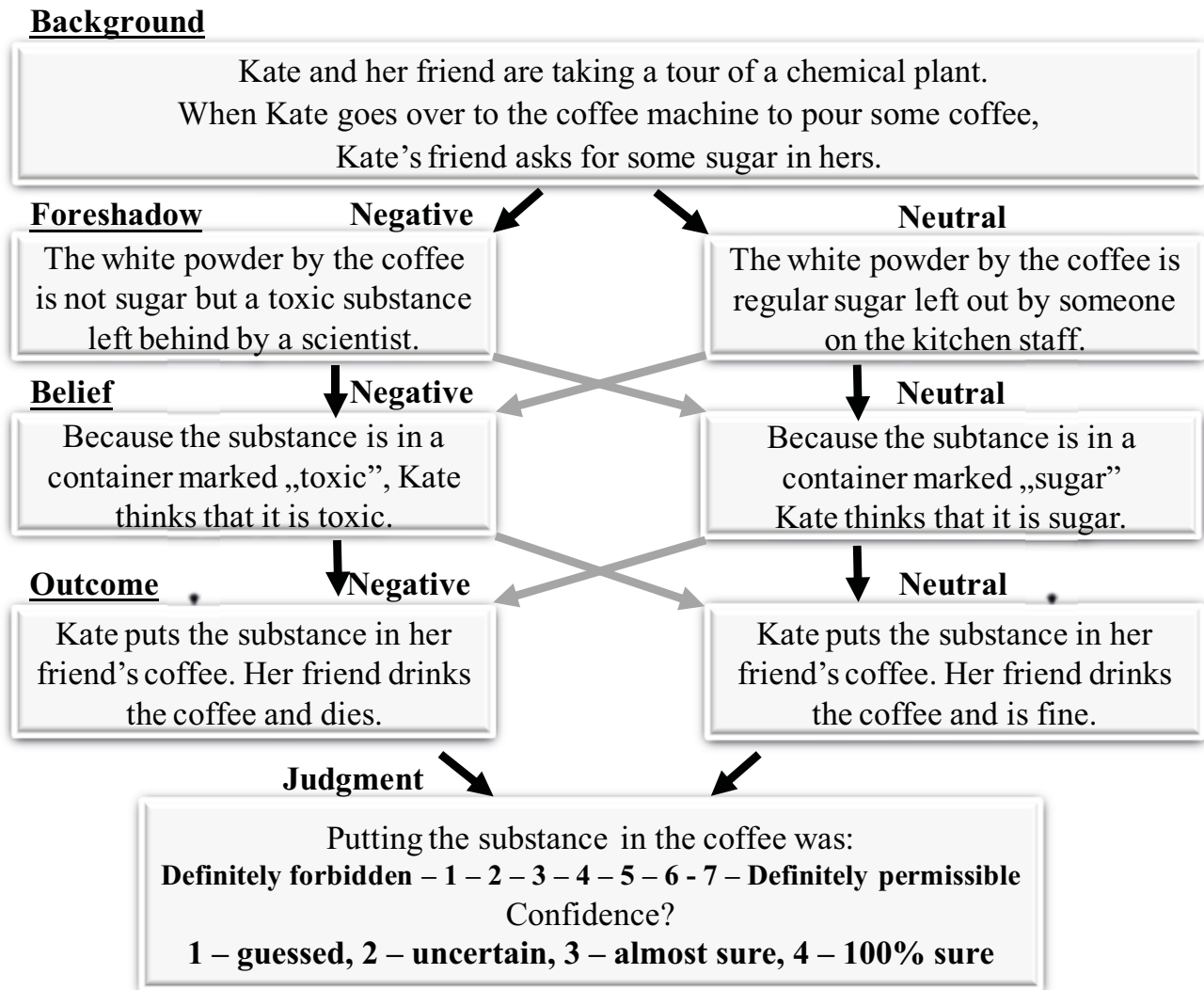


Fig. 1. Experimental stimuli and design

by taking the mean response over the 16 corresponding scenarios. The values of Cronbach's alpha coefficient for the moral assessments (level of permissiveness) according to scenario are given in Table 1. The corresponding values

Table 1. Cronbach's alpha coefficients for moral assessments values

Scenario	Overall	Patients	Controls
Neutral	0.743	0.774	0.663
Attempt	0.872	0.890	0.824
Accident	0.889	0.912	0.794
Intentional	0.875	0.892	0.809

Table 2. Cronbach's alpha coefficients for metacognitive confidence values

Scenario	Overall	Patients	Controls
Neutral	0.757	0.679	0.796
Attempt	0.835	0.888	0.765
Accident	0.803	0.636	0.858
Intent	0.824	0.766	0.840

of Cronbach's alpha coefficient for the level of metacognitive confidence are given in Table 2.

Due to the small sample size and lack of normality, the nonparametric Mann–Whitney U test was used to compare responses from the patient and control groups. Wilcoxon's test for paired samples was used to compare the responses of members of a single group to different scenarios.

In order to compare the level of paranoid beliefs and the responses (the level of confidence and moral assessment) according to group, the nonparametric Mann–Whitney test was used (Table 3). A summary of the Scale for the Assessment of Negative Symptoms (SANS) and the Scale for the Assessment of Positive Symptoms (SAPS) diagnoses for patients is given in Table 4 (the control group was not diagnosed). The Mann–Whitney U test was used to compare the levels of metacognitive confidence and moral assessments reported by the groups for a given scenario (Table 5 and Table 6, respectively).

The Wilcoxon signed rank test for paired samples was used to compare differences between the levels

Kate and her friend are taking a tour of a chemical plant.
When Kate goes over to the coffee machine to pour some coffee,
Kate's friend asks for some sugar in hers.

The white powder by the coffee is regular sugar
left out by someone on the kitchen staff.

Because the substance is in a container
marked „toxic“, Kate thinks that it is toxic.

Kate puts the substance in her friend's coffee.
Her friend drinks the coffee and dies.

Putting the substance in the coffee was

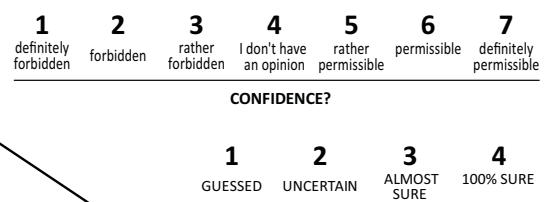


Fig. 2. Research procedure

Table 3. Summary of paranoid beliefs

Subscale	Patients			Controls			U	p-value
	Q1	Med	Q3	Q1	Med	Q3		
PDI (distress)	44.00	53.50	55.25	7.00	13.00	24.50	0.000	0.004
PDI (preoccupation)	35.50	44.00	56.50	8.25	13.50	22.50	6.500	0.003
PDI (convince)	41.25	48.00	53.50	11.00	20.50	26.75	9.000	0.004
PCh (frequency)	28.00	39.00	42.00	23.50	27.5	32.00	22.50	0.072
PCh (convince)	28.00	40.00	49.00	29.00	32.50	40.75	34.50	0.413
PCh (distress)	24.00	37.00	64.00	21.25	22.00	28.50	26.00	0.130

Q1 – 1st quartile; Q3 – 3rd quartile; PDI – Peters Delusional Inventory; PCh – Paranoia Checklist.

Table 4. Summary of SANS and SAPS among patients

Scale	Q1	Med	Q3
SANS			
Affective Flattening/Blunting	8.00	15.00	17.75
Alogia	0.00	5.00	7.50
Avolition/Apathy	2.25	4.00	5.50
Anhedonia/Asociality	3.50	8.00	11.00
Attention	2.25	3.50	4.00
General	19.75	34.00	45.75
SAPS			
Hallucinations	0.00	0.00	0.00
Delusions	0.00	1.00	4.75
Bizarre Behavior	0.00	0.00	3.75
Positive Formal Thought Disorder	0.00	3.00	12.00
General	48.50	76.00	96.00

Q1 – 1st quartile; Q3 – 3rd quartile; SANS – Assessment of Negative Symptoms; SAPS – Scale for the Assessment of Positive Symptoms.

of metacognitive confidence and moral assessments reported by a group for pairs of scenarios (for the patients: Table 7 and Table 8, respectively, for the controls: Table 9 and Table 10, respectively). The significance level used in all cases was 5% (i.e., a difference is inferred when the p-value is < 0.05).

Results

The Polish versions of the SANS, the SAPS,⁴¹ PDI,³⁷ and PCh³⁹ questionnaires were used to measure paranoid beliefs and schizophrenia symptoms (Table 3,4). The results of the PDI and PCh on the frequency of delusional beliefs show statistically significantly higher results for patients on some subscales.

Intragroup analyses indicated significant differences between the moral assessments according to scenario (Table 6–8, Fig. 3). In both groups, the behavior

Table 5. Comparison between levels of metacognitive confidence for patients and controls. Each observation is the average of 16 measurements on a 4-point scale (1–4) representing the level of metacognitive confidence. The analysis employed the Mann–Whitney U test

Scenario	Patients			Controls			U	p-value
	Q1	Med	Q3	Q1	Med	Q3		
Neutral	3.328	3.470	3.643	3.515	3.630	3.735	36	0.306
Attempt	3.225	3.560	3.658	3.395	3.595	3.810	43.5	0.649
Accident	3.000	3.345	3.735	3.208	3.530	3.630	43.5	0.649
Intentional	3.140	3.595	3.953	3.548	3.750	3.925	43.5	0.648

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

Table 6. Comparison between moral assessments of patients and controls. Each observation is the average of 16 measurements on a 7-point scale (1–7) representing the assessment of the permissibility of an action. The analysis employed the Mann–Whitney U test

Scenario	Patients			Controls			U	p-value
	Q1	Med	Q3	Q1	Med	Q3		
Neutral	4.293	5.095	5.363	4.660	5.160	6.113	37	0.344
Attempt	2.380	2.750	3.750	2.343	2.690	3.015	57	0.623
Accident	2.033	2.815	3.420	2.440	3.815	4.390	26	0.076
Intentional	1.190	1.500	2.203	1.515	1.625	2.143	39.5	0.449

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

Table 7. Differences between level of metacognitive confidence according to the scenario type (patients). Each observation is the average of 16 measurements on a 4-point scale (1–4) representing the level of metacognitive confidence. The analysis employed Wilcoxon's test for paired samples

Scenario 1	Q1	Med	Q3	Scenario 2	Q1	Med	Q3	W	p-value
Neutral	3.328	3.470	3.643	Attempt	3.225	3.560	3.658	21.5	0.674
Neutral	3.328	3.470	3.643	Accident	3.000	3.345	3.735	26	0.293
Neutral	3.328	3.470	3.643	Intentional	3.140	3.595	3.953	21.5	0.674
Attempt	3.225	3.560	3.658	Accident	3.000	3.345	3.735	31.5	0.313
Attempt	3.225	3.560	3.658	Intentional	3.140	3.595	3.953	20	0.812
Accident	3.000	3.345	3.735	Intentional	3.140	3.595	3.953	8.5	0.207

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

Table 8. Differences between moral assessments according to the scenario type (patients). Each observation is the average of 16 measurements on a 7-point scale (1–7) representing the assessment of the permissibility of an action. The analysis employed Wilcoxon's test for paired samples

Scenario 1	Q1	Med	Q3	Scenario 2	Q1	Med	Q3	W	p-value
Neutral	4.293	5.095	5.363	Attempt	2.380	2.750	3.750	52.5	0.012
Neutral	4.293	5.095	5.363	Accident	2.033	2.815	3.420	55	0.002
Neutral	4.293	5.095	5.363	Intentional	1.190	1.500	2.203	55	0.002
Attempt	2.380	2.750	3.750	Accident	2.033	2.815	3.420	36	0.415
Attempt	2.380	2.750	3.750	Intentional	1.190	1.500	2.203	55	0.006
Accident	2.033	2.815	3.420	Intentional	1.190	1.500	2.203	40.5	0.038

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

of the protagonists in the stories was considered to be most acceptable in the neutral scenarios, in which negative intentions did not guide the protagonists, and their behavior was not a threat to the other person. Moreover, in both groups, the behavior in which the protagonist intentionally harms the other participant of a social event was judged to be the most unacceptable. While those diagnosed with schizophrenia gave statistically similar moral

assessments of the actor's behavior in the "attempt" and "accident" scenarios, members of the control group judged attempt to harm another person more harshly than in situations in which harm resulted from an unintended act, i.e., an accident.

However, no significant differences were observed between the groups according to the level of metacognitive confidence (Table 5).

Table 9. Differences between level of metacognitive confidence according to the scenario type (controls). Each observation is the average of 16 measurements on a 4-point scale (1–4) representing the level of metacognitive confidence. The analysis employed Wilcoxon’s test for paired samples

Scenario 1	Q1	Med	Q3	Scenario 2	Q1	Med	Q3	W	p
Neutral	3.515	3.630	3.735	Attempt	3.395	3.7595	3.810	13.5	1.000
Neutral	3.515	3.630	3.735	Accident	3.208	3.530	3.630	32.5	0.646
Neutral	3.515	3.630	3.735	Intentional	3.548	3.750	3.925	10	0.291
Attempt	3.395	3.595	3.810	Accident	3.208	3.530	3.630	25	0.813
Attempt	3.395	3.595	3.810	Intentional	3.548	3.750	3.925	11.5	0.114
Accident	3.208	3.530	3.630	Intentional	3.548	3.750	3.925	17	0.308

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

Table 10. Differences in moral assessments according to the scenario type (controls). Each observation represents the average of 16 measurements on a 7-point scale (1–7) representing the assessment of the permissibility of an action. The analysis employs Wilcoxon’s test for paired samples

Scenario 1	Q1	Med	Q3	Scenario 2	Q1	Med	Q3	W	p
Neutral	4.660	5.160	6.113	Attempt	2.343	2.690	3.015	55	0.002
Neutral	4.660	5.160	6.113	Accident	2.440	3.815	4.390	55	0.002
Neutral	4.660	5.160	6.113	Intentional	1.515	1.625	2.143	55	0.002
Attempt	2.343	2.690	3.015	Accident	2.440	3.815	4.390	3	0.010
Attempt	2.343	2.690	3.015	Intentional	1.515	1.625	2.143	51	0.019
Accident	2.440	3.815	4.390	Intentional	1.515	1.625	2.143	55	0.038

Scale for the Assessment of Negative Symptoms (SANS). Q1 – 1st quartile; Q3 – 3rd quartile.

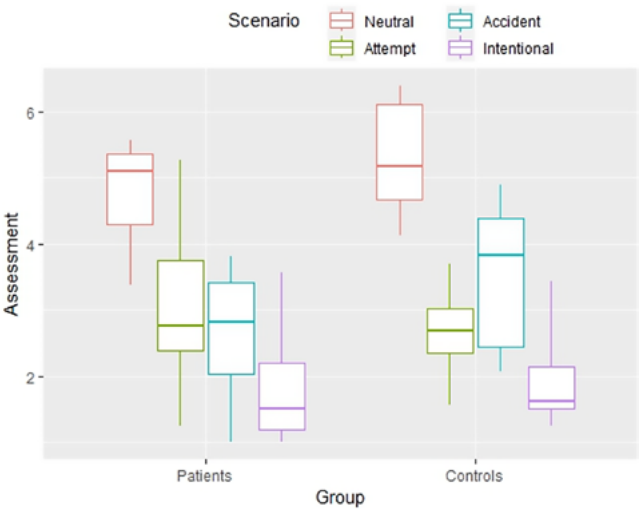


Fig. 3. Difference between groups in moral judgements according to scenario

Discussion

The results show a strong relationship between ToM and moral judgments. Empirical research has revealed the role of intention in moral judgments. For instance, the study by Cushman et al.⁴² showed that the assessment of the harmfulness or permissibility of someone’s behavior depended on the mental states of the observed study participants. Cushman proposed an explanation based on splitting moral judgments into 2 processes: the outcome of someone’s action and the mental state that led to that action.

The patients made incorrect moral judgments about the characters’ intentions, even though the actors in an incident showed a desire to hurt another person. The mild moral assessments by patients of the actors’ behavior in the “attempt” scenarios probably result mainly from the lack of harmful effects that originate from the protagonists’ actions. On the other hand, perceiving negative intentions can lead to the imputation of blame even in the absence of actual harm, similar to failed homicide attempts. Experiencing inappropriate desires is often enough to cause blame, even when causally detached from the harmful event.^{43,44} We also blame people who benefit from someone else’s misfortune, even if they are not the perpetrators themselves – we nevertheless consider such behavior to be morally inappropriate.⁴³ Moral judgments are inherently related to ToM and many studies also point to neural correlates of the described relationship.^{45,46}

The observer’s consideration of the actor’s lack of intention to harm the other person may lead the observer to assign less blame to the actor in an accident situation. In contrast, if the actor’s behavior is driven by intentions to harm the other person, the observer may morally condemn the actor’s behavior, even in a situation where there were no negative consequences for the other person. Research indicates that processes related to moral cognition mediate the relationship between the presence of specific psychotic symptoms and their significance for violence.⁴⁷

The above data indicate a link between schizophrenia and a reduced ability to make appropriate moral judgments, resulting from a reduction in the ability to read the intentions of others, which is consistent with the findings

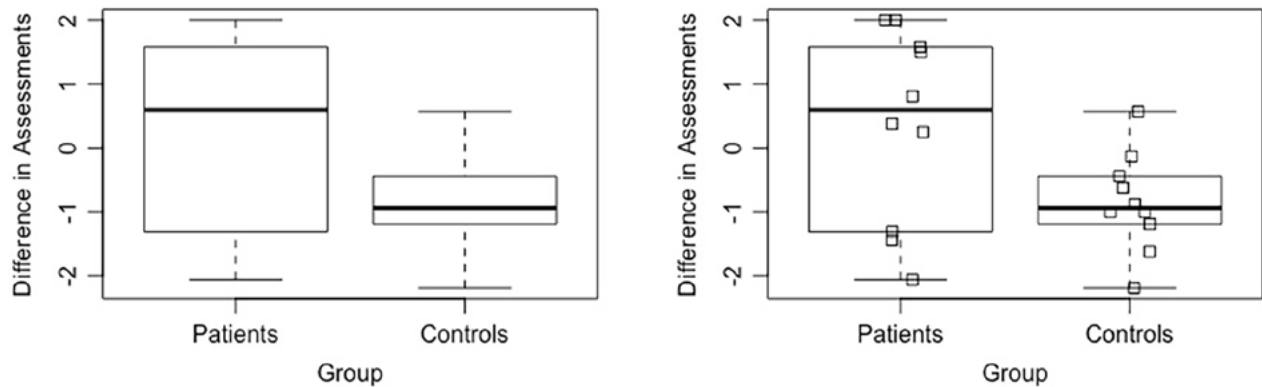


Fig. 4. Difference between groups in moral assessment of accidents and attempts

of the studies presented earlier.^{19,20} The present results indicate a reduction in the level of moral cognition and its impact on the evaluation of the intentions and moral conduct of others.

Another mediator of the postulated relationships is social cognition, including mentalization skills, the dysfunctions of which will be reflected in moral judgments and thus in attitudes and behaviors, including aggressive ones.⁴⁸

The present study also shows interesting results regarding the confidence expressed in moral judgments. The analysis showed no differences in metacognition for intergroup measurements (Fig. 3,4). The mean confidence level for both groups in each scenario is above 3 on a 4-point scale. This means that the respondents expressed almost complete confidence in their moral judgments. It also means that patients did not show any doubts about their assessment in those situations that mainly required understanding the intentions of others (in which they showed “blindness” to these intentions as opposed to healthy people). Although they assessed the behavior of the protagonist, who intentionally tried to hurt another person more leniently than those who harmed another by accident, they did not express any doubts about their judgment on a subjective scale of certainty. This means that there was a deficit at the level of reading intentions, which significantly influenced the moral judgments of patients and the metacognition component. This translated into the confidence with which the assessments were made and, thus, into their durability and consistency. In a situation where, despite a mild moral evaluation, someone expresses doubts about his assessment, it may mean that the assessor is reflecting whether the assessment should be harsher.

This type of research allows us to deepen the understanding of moral inference in people with schizophrenia, which may also allow for a better understanding of the mechanisms behind some behaviors, including violent ones. It is worth noting that people suffering from mental illness, particularly schizophrenia, are socially stigmatized due to common stereotypes about increased levels of aggressive behavior in this population.⁴⁹

Limitations

The present work has limitations. Firstly, the patients found it difficult to read stories and make judgments. The task included 64 stories describing social situations. Additionally, the number of study participants was limited to 10 in both the patient and control groups due to the demanding nature of the task. To reduce cognitive load, it would be valuable to replicate the present study with fewer stimuli. This would allow for an increase in sample size.

Conclusions

Patients diagnosed with schizophrenia and experiencing severe symptoms during hospitalization tend to overlook the intentions of the actor towards the affected person when making moral evaluations of observed behavior in social situations. Limited moral reasoning can result from both positive and negative symptoms, and deficits related to metacognition can further sustain such cognitive distortions.

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