

Table DS2 Theory of Mind.

Search Terms: "Theory of Mind" + "delusions" (ISI and Pubmed)/ "Theory of Mind" + "Schizophrenia" (ISI and Pubmed)

Review Articles: Garety and Freeman (1999)/Brune (2005)/Bora et al (2005)/Freeman (2007)/Harrington (2009)

Early View articles: Schizophrenia Bulletin; Schizophrenia Review; British Journal of Clinical Psychology; Behaviour Research and Therapy; Journal of Behavioural Therapy and Experimental Psychology; Psychological Medicine; Journal of Abnormal Psychology; Psychiatry Research

Table DS2a Clinical Theory of Mind studies

Study	Participant Groups	Task	ToM Deficit associated with:			Association of ToM performance with delusions / positive symptoms
			Schiz . diag nosis	Neg. symp toms	Para noid delus	
1. Langdon et al (2001)	32 Schiz. spectrum patients 24 Non-clinical controls	ToM Picture sequencing task ¹ (1 st order task)	✓			X
2. Mazza et al (2001)	35 Schiz. Patients	1 st Order False belief tasks (Sally Ann ² /Cigarettes ³) 2 nd order false belief tasks (Ice cream van ² /burglar ⁴)	✓	✓		X
3. Pickup and Frith (2001)	41 Schiz. Patients 16 behavioural signs	1 st order false belief tasks (Object	✓	✓	X	X

	16 paranoid 1 Passivity 8 Remitted 18 Psychiatric controls 35 Non-clinical controls	transfer ⁵ / smarties ⁶) 2 nd order false belief task (Ice cream van ²)				
4. Roncone et al (2002)	44 Schiz. Spectrum patients	1 st Order False belief tasks (Sally Ann ² /Cigarettes ³) 2 nd order false belief tasks (Ice cream van ² /burglar ⁴)		X		X
5. Corcoran and Frith (2003)	59 Schiz. patients 16 Paranoid del 10 Negative sym 10 Thought disorder 8 Passivity delusions 15 remitted 44 Non-clinical controls	Hinting task ⁷ (2 nd order task) 1 st and 2 nd order belief stories ⁸	✓			X
6. Randall et al (2003)	18 Schiz. spectrum & persecutory delusions 14 Schiz .spec & remitted persecutory delusions 18 non-clinical control	1 st and 2 nd order false belief tasks ⁸	✓			
7. Craig et al (2004)	16 Schiz. With persecutory delusions 17 Asperger syndrome 16 Non-clinical control	Hinting task ⁷ (2 nd order task) Reading the mind in the eyes task ⁹			✓	✓

8. Greig et al (2004)	128 Schiz. spectrum disorder patients	Hinting task ⁷ (2 nd order task)		✓	X	✓
9. McCabe, Leudar & Antaki (2004)	35 schiz. Patient-therapist interactions	Conversation analysis	X		X	
10. Harrington et al (2005)	25 Schiz. Spectrum Patients 13 Persecutory delusions 12 Non-persecutory delusions 38 Non-clinical controls	1 st and 2 nd order ToM tasks (Verbal and nonverbal) ¹⁰	✓		✓	✓
11. Kelemen et al (2005)	52 Schiz. Patients 30 Non-clinical controls	Reading the mind in the eyes test ⁹ (1 st order task)	✓	✓		X
12. Marjoram et al (2005)	15 Schizophrenia 15 Affective (7 Bipolar, 8 depression) 15 Non-clinical controls	Hinting task ^{7,11} (2 nd order task)	✓			✓
13. Marjoram, Tansley, Miller, MacIntyre, Owens, Johnstone, Lawrie (2005)	20 Schizophrenia patients (20 Non-clinical controls)	Visual Joke task ¹² (1 st /2 nd order)	✓	X		X
14. Irani, Platek, Panyavin, Calkins, Kohlerb, Siegel, Schachter, Gur and Gur (2006)	10 Schiz. Patients 10 first degree relatives 10 Healthy controls	Reading the mind in the Eyes test revised ⁹ (1 st order)	✓			
15. Langdon et al (2006)	34 Schiz. patients	False belief picture	✓		X	

	19 persecutory delusions 15 Non-persecutory delusions 21 Non-clinical controls	sequencing task ¹³ (1 st order)				
16. Moore, Blackwood, Corcoran, Rowse, Kinderman, Bentall & Howard (2006)	29 Late onset Schiz. Like Psychosis (>60) 30 Late onset depression (>60) 30 Non clinical	Deception ¹⁴ False Belief ¹⁴ Mentalising ¹⁴ (1 st and 2 nd order)	✓			
17. Murphy (2006)	13 Schizophrenic (11 delusional) 13 Aspergers Syndrome 13 Personality Disorder	1 st Order ToM task (Cigarettes ³) 2 nd Order ToM Task (Burglar ⁴) Reading the mind in the eyes task ⁹ (1 st order task)	✓			
18. Russell et al (2006)	61 Schiz. Patients 15 predominantly paranoid 22 Non-clinical controls	Triangle animations task ¹⁵ (1 st and 2 nd order)	✓	✓	✓	X
19. Zalla, Bouchilloux, Labruyere, Georgieff, Bougerol, Franck (2006)	40 schizophrenia patients 40 Non-clinical controls	Picture sequencing ¹³ (1 st order task)	✓			
20. Brune, Abdel-Hamid, Lehmkamper, Sonntag (2007)	38 Schiz. Patients 29 Non-clinical controls	Picture completion task ¹⁶ (1 st and 2 nd order)	✓	✓		X

21. Zhu, Lee, Jing, Wang & Wang (2007)	40 Schiz. patients 31 Non-clinical controls	Faux pas recognition ¹⁷ (2 nd order task)	✓			X
22. Bora, Gokcen, Kayahan & Veznedaroglu (2008)	91 Schiz. Outpatients 28 Residual psychotic symptoms 53 Residual negative symptoms 32 No residual symptoms 55 Non Clinical	Hinting Task ⁷ (2 nd order task) Reading the mind in the eyes task ⁹ (1 st order task)	✓	✓		✓
23. Brakoulias, Langdon, Sloss, Coltheart, Meares & Harris (2008)	16 Schiz. Delusional patients	Comic strip stories task ¹⁰ (1 st /2 nd order) Visual Jokes task ¹⁸ (1 st /2 nd order) Picture sequencing task ¹³ (1 st order)	✓			
24. Corcoran, Rowse, Moore, Blackwood, Kinderman, Howard, Cummins & Bentall (2008)	39 Schiz spectrum, current paranoid delusions 29 Schiz spectrum remitted paranoid delusions 20 Major depression and delusions 27 Major depression Control 33 Non-clinical controls	Theory of Mind stories ¹⁴ (1 st /2 nd order task) Non Verbal picture sequencing task ¹³ (1 st order task)			✓	(✓)
25. Kettle, O'Brien-Simpson	13 First Episode Schiz.	Reading the Mind in	✓			

& Allen (2008)	14 Major Depression 16 Non clinical Community 27 Non clinical university Undergrad	the Eyes Test ⁹ (1 st order task)				
26. Pousa, Duno, Brebion, David, Ruiz, Obiols (2008)	61 Schizophrenia patients (46 Delusional) 33 remitted 28 non-remitted 51 Non clinical controls	Verbal 2 nd Order (Ice cream van ² , Burglar ⁴) Picture Sequencing Task ¹³ (1 st order)	✓	X		✓
27. Shryane, Corcoran, Rowse, Moore, Cummins, Blackwood, Howard & Bentall (2008) ¹	88 Paranoid delusions 27 remitted paranoid delusions 56 Major Depression 64 Non-clinical controls	ToM stories task ¹⁹ (1 st /2 nd order task)				
28. Versmissen, Janssen, Myin-Germeys, Mengelersa, Campo, van Os, & Krabbendam (2008)	40 Psychosis Patients 3 delusional disorder 12 current delusions 21 lifetime history of delusions 49 Familial Risk Group 41 Non-Clinical High risk 54 Non-Clinical Controls	Hinting Task ⁷ (2 nd order task)	✓		X	✓

¹ Note modelling of data presented in two previous papers, reported in this table

29. Bental, Rowse, Shryane, Kinderman, Howard, Blackwood, Moore & Corcoran (2009)	39 Schiz spectrum paranoid delusions 29 Late onset psychosis >65yr with paranoid delusions 29 Schiz spectrum remitted 20 Comorbid depression and psychosis with paranoid delusions 27 Early onset <65yr depressed 29 Late onset >65yr depressed 33 <65 Healthy control 31 >65 Healthy control	TofM stories ¹³ (1 st /2 nd order task)				✓
30. Woodward, Mizrahi, Menon & Christensen (2009)	46 schiz. patients	Hinting task ⁷ (2 nd order task)		✓		X
31. Langdon, Ward & Coltheart (2010)	35 Schiz. Patients (30 currently deluded) 34 healthy controls	1 st order belief stories ¹⁸ Visual joke cartoon comprehension ¹⁸ (1 st /2 nd order task) Picture sequencing task ¹³ (1 st order task)	✓			✓
32. Lysaker, Salvatore, Grant, Procacci, Olesek, Buck, Nicolo & Dimaggio (2010)	102 Schiz. Spectrum, stable divided into: 14 High paranoia/Poor	Hinting test ⁷ (2 nd order task) Reading the mind in				

	ToM 22 Low paranoia/Good ToM 29 Low paranoia/Low middle ToM 23 High paranoia/High middle ToM	the eyes ⁹ (1 st order task)				
33. Mehl, Rief, Lullmann, Ziegler, Kesting & Lincoln (2010)	33 Schiz. spectrum acute persecutory delusions 25 Schiz. spectrum remitted persecutory delusions 58 Non clinical controls	Movie task (Infer intentions and emotions) ^{20, 7} (2 nd order task) False belief task ²¹ (2 nd order task)	✓		X	✓
34. Kim, Shin, Jang, Kim, Shim, Park, Hong, Kwon (2011)	49 Ultra High Risk (UHR) of psychosis 13 Converters 36 Non converters 45 Non clinical controls	1 st and 2 nd order False belief stories ⁵ Strange stories ¹⁸ Cartoon Task ²⁶	✓			X
35. Menon, Addington & Remington (2011)	18 Schiz. Patients (delusions of reference) 17 Non-clinical controls	Hinting Task ⁷	✓			
36. Montag, Dziobek, Richter, Neuhaus, Lehmann, Sylla, Heekeren, Heinz &	80 Paranoid Schiz. 80 Matched controls	Movie for the assessment of social cognition (MASC) ²² (1 st /2 nd order task)	✓	✓	X * -	X * -

Gallinat (2011)						
37. Stanford, Messinger, Malaspina & Corcoran (2011)	63 Clinical High risk patients 24 Non clinical youths 13 Schizophrenia patients 14 Non clinical adults	1 st and 2 nd order False belief cartoons (Apple ² ; Refridgerator ²) Strange Stories ³ Reading the Mind in the Eyes ⁹	✓			X
38. Ventura, Wood & Hellemann (2011)	Meta analysis (Studies=154; combined N=7175)	Meta analysis		✓		X

✓ = A deficit in ToM performance in groups/association between symptoms and ToM performance was examined and found
X = A deficit in ToM performance in groups/association between symptoms and ToM performance was examined and NOT found
_ = An association with 'overmentalising'

Tasks

- ¹ Langdon et al (2001)
- ² Baron-Cohen et al (1985)
- ³ Happe et al (1994)
- ⁴ Happe and Frith (1994)
- ⁵ Wimmer and Perner (1983)
- ⁶ Perner et al (1987)
- ⁷ Corcoran et al (1995)
- ⁸ Frith and Corcoran (1996)
- ⁹ Baron-Cohen et al (2001)

- ¹⁰ Harrington et al (2005)
- ¹¹ Gardner et al (2005)
- ¹² Gallagher et al (2000)
- ¹³ Langdon and Coltheart (1999)
- ¹⁴ Snowden et al (Unpub.)
- ¹⁵ Abell et al (2000)
- ¹⁶ Brune (2003)
- ¹⁷ Baron-Cohen et al (1999)
- ¹⁸ Happe et al (1999)

- ¹⁹ Langdon et al (1997)
- ²⁰ Mehl et al (2010)
- ²¹ Pickup and Frith (2001)
- ²² Dziobek et al (2006)
- ²³ Corcoran et al (1997)
- ²⁴ Fletcher et al (1995)
- ²⁵ Kinderman (Unpub)
- ²⁶ Sarfati et al (1997)

27- Note modelling of data presented in two previous papers, reported in this table

Table DS2b Non-Clinical Theory of Mind studies

Study	Participant Groups	Task	ToM Deficit			Correlation of ToM performance with delusions or positive symptoms within whole patient group
			Schiz	Neg.	Para.	
1. Fernyhough, Jones, Whittle, Waterhouse & Bentall (2008)	828 Non-Clinical young adults 40 High Schizotypy 40 Low Schizotypy	Hinting Task ⁷ (2 nd order task) Visual Joke comprehension Task ²³ (1 st order)			X	X
2. Fyfe, Williams, Mason & Pickup (2008)	61 Non-clinical participants 31 High PDI score 30 Low PDI score	ToM Stories Task ²⁴ (1 st /2 nd order) Triangles Task ¹⁵ (1 st /2 nd order)			X	X
3. Barragan, Laurens, Navarro & Obiols (2011)	72 Non-clinical adolescents	Strange stories task ³ (1 st /2 nd order task)			X	✓

Table DS2c Other Patient Groups Theory of Mind studies

Study	Participant Groups	Task	ToM Deficit			Correlation of ToM performance with delusions / positive symptoms
			Schiz	Neg.	Para.	
1. Blackshaw et al (2001)	25 Asperger Syndrome 18 non-Clinical controls	Projective imagination test ²⁵				X
2. Abell and Hare (2005)	46 Aspergers/high functioning autism	Strange stories test ³ (1 st /2 nd order task)				X

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