

Mind &/v Logic

1. Mental disorder

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Schizophrenia

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Schizophrenia, Case 1

- <http://www.youtube.com/watch?v=bo7y4oe9Nqw&feature=related>
- Interviewer: What went on that you ended up coming into the hospital?
- Patient: Well, er, Jesus was giving me all these crack... window cracking er, er, screen crack sounds telling me that they, they was going to break into the house, so I put the camera stereo in the room where they juggled the window up to come through the window.
- I.: Uh-huh.
- P.: And the ca... cam... camera stereo of the security guards picked that up, the message.
- I.: Uh-huh.
- P.: By putting that camera in that room.
- I.: Uh-huh... Were you in danger?
- P.: Well, er, if anyone gets into the house they said I, I get shot.
- I.: Who said?
- P.: That's that's the eagle.
- I.: Can you say a little something about the eagle?
- P.: Well, the the ea... eagle works through General Motors. They have something to do, er, with my General Motors check I get every month.

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Schizophrenia, Case 2

- <http://www.youtube.com/watch?v=kvdw4b7tC-8>
- What do you drin...? What do you ea...? Do you realize I have a monopoly over the coffee industry? OK. So, that's the problem, isn't it? This is a complaint, right?... Well... I have kryptonite... You know what that means, don't you? Kryptonite? And... er... [*incomprehensible*] I drink coffee and soda and no one else knows what to eat. I mean, do you eat rice*? Do you eat rice*? When I was pregnant, I think boys and pregnants go dong*. Yes, that's true, but I like rice*. Do you eat rice*? What do you eat and drink? What's the biz...? Is that a big problem? Do you know what to keep you sane by? Is that, is that a complaint? No!? OK.

[* = dubious word]

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A canonical definition (ICD-10)

F20 Schizophrenia

The schizophrenic disorders are characterized in general by fundamental and characteristic distortions of thinking and perception, and affects that are inappropriate or blunted. Clear consciousness and intellectual capacity are usually maintained although certain cognitive deficits may evolve in the course of time. The most important psychopathological phenomena include thought echo; thought insertion or withdrawal; thought broadcasting; delusional perception and delusions of control; influence or passivity; hallucinatory voices commenting or discussing the patient in the third person; thought disorders and negative symptoms.

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Deductive
reasoning;
syllogisms

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Reasoning is a process of thought that yields a conclusion from percepts, thoughts, or assertions. The process may be one of which reasoners are painfully aware or of which they are almost unconscious. But it is a systematic process if it is reasoning, as opposed to, say, daydreaming.

(...) By definition, deduction yields *valid* conclusions, which must be true given that their premises are true, e.g.:

If the test is to continue, then the turbine must be rotating fast enough.
The turbine is not rotating fast enough.
Therefore the test is *not* to continue.

Some deductions are difficult, and the failure to draw this particular valid conclusion probably contributed to the Chernobyl disaster. Despite such mistakes, the business of life depends on the ability to make deductions. Individuals differ in this ability, and those who are better at it—at least as measured by intelligence tests—appear to be more successful. If so, it is not surprising. A person who is poor at reasoning is liable to blunder in daily life. Conversely, without deduction, there would be no logic, no mathematics, and no Annual Review articles.

Johnson-Laird, 1999 7

Categorical syllogisms

- E.g.:
 - Some four-legged creatures are gnus.
 - All gnus are herbivores.
 - Therefore, some four-legged creatures are herbivores.

This is a syllogism of the valid form:

Some As are Bs. All Bs are Cs. ∴ Some As are Cs.

Have fun!:

- <http://thefirstscience.org/syllogistic-machine/>

Schizophrenia
&
deductive logic

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Syllogism tasks (Mirian et al., 2011)

- No drunks are saints. Some Irishmen are saints. Therefore, some Irishmen are not drunks.
- All crunchy tubers are vegetables. Some carrots are crunchy tubers. Therefore, some carrots are not vegetables.
- Some ploms are dihedral. No modulees are ploms. Therefore, some modulees are dihedral.
- All flying birds have feathers. No people have feathers. Therefore, some people are flying birds.
- All handicapped are capable. All amputees are handicapped. Therefore, some amputees are not capable.

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“(Non-)Commonsense syllogisms”

Owen et al., 2007

- All buildings speak loudly.
A hospital does not speak loudly.
Therefore, a hospital is not a building.
- If the sun rises, then the sun is in the east.
The sun is in the east.
Therefore, the sun rises.

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Table 1 Logical responses to syllogisms by patients with schizophrenia compared with a healthy control group

	<i>n</i>	No. of syllogisms	Correct responses	
			Mean (s.d.)	s.e.m.
All syllogisms				
Control group	19	15	6.21 (2.99)	0.69
Schizophrenia group	17	15	8.76 (3.25)	0.79
CS syllogisms¹				
Control group	19	7	1.16 (1.21)	0.28
Schizophrenia group	17	7	2.53 (2.01)	0.51
NCS syllogisms²				
Control group	19	8	5.05 (2.46)	0.56
Schizophrenia group	17	8	6.24 (1.82)	0.44

1. Commonsense syllogisms, invalid.

2. Non-commonsense syllogisms, valid.

Owen et al., 2007¹²

DISCUSSION

Our main results show that under conditions where common sense and logic conflict, people with schizophrenia reason more logically than healthy individuals. On a straightforward interpretation this is either because people with schizophrenia are better at logic or because they are worse at common sense. We present some exploratory evidence that it is because they are worse at common sense, but the question remains open.

(...)

The results are intriguing because they shed light on reasoning in schizophrenia but also have significance beyond schizophrenia research. They suggest that

in situations where commonsense knowledge is at stake, formal norms of rationality are violated by people with schizophrenia to a lesser extent than by healthy individuals. People with schizophrenia seem to have a bias towards theoretical rationality over and above practical rationality. It is an ongoing dispute within philosophy of science whether, as a matter of principle, theoretical reason has priority over practical reason or vice versa (Thagard, 2004). Given that schizophrenia is at its core a pathological state of thinking, our results suggest that concepts of rationality that prioritise theoretical reason over and above practical reason might apply more accurately in a pathological example of human thinking than in a healthy one. This is an example of how experimental psychopathology can shed light on fundamental philosophical debates that have not been settled by argument alone.

Owen et al., 2007¹³

Kemp et al., 1997

Abstract

- **BACKGROUND** Delusions are assumed to reflect disordered reasoning, but with little empirical support. We attempted to study this in 16 relatively intelligent deluded patients and 16 normal volunteers.
- **METHOD** Standard tests were used which required subjects to choose between logically fallacious and valid responses, both of which were plausible. The tests were: (a) conditional statements (if...then), (b) syllogisms (e.g. no A are C, some B are C, some C are not A), and (c) judgements of probability. All three tasks incorporated neutral and emotive content.
- **RESULTS** Both normal and deluded subjects frequently made logical errors. With conditionals, deluded subjects tended to endorse fallacies more often than normal controls and this was accentuated when the content was emotive. Similarly, with syllogisms, the effect of emotional content on the endorsement of unbelievable responses was increased slightly in the deluded group. Finally, the deluded patients showed a trend to be less prone to the conjunction fallacy than normals, suggesting less reliance on existing schema. conclusions: Differences in reasoning between deluded patients and controls are surprisingly small. Patients are somewhat more prone to endorse invalid or fallacious responses, especially when emotive themes are involved.

Ho, 1974

- **Abstract:** We investigated the extent to which faulty deductive reasoning is a specific intellectual deficit responsible for the thinking disorder in schizophrenia. The Deductive Inference Test (DIT), based on modern logic, was constructed and administered to 40 matched pairs of normals and schizophrenics. Results show that although the schizophrenics were significantly inferior to normals in their overall performance on the DIT (particularly with emotional material), they were similar to normals on symbolic material. It is concluded that the thinking pathology of schizophrenics results from functional disturbances rather than from concreteness or a basically faulty deductive process.

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