

Rule-governed behavior as delusion maintenance factor in schizophrenia

JL Monestès, CNRS FRE 3291, Amiens, France
I Stewart, National Univ. of Ireland Galway, Ireland
M Villatte, Univ. of Reno, Nv
G Loas , CNRS FRE 3291, Amiens, France

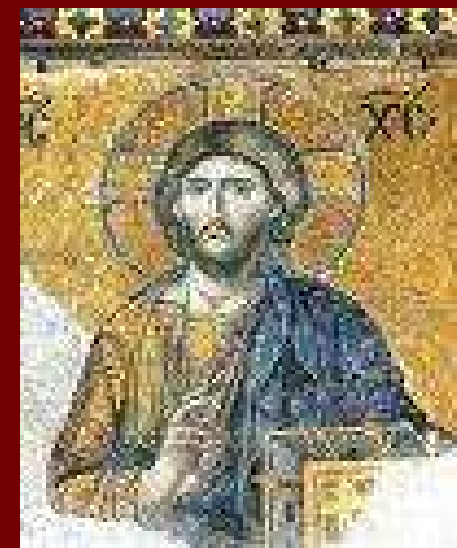
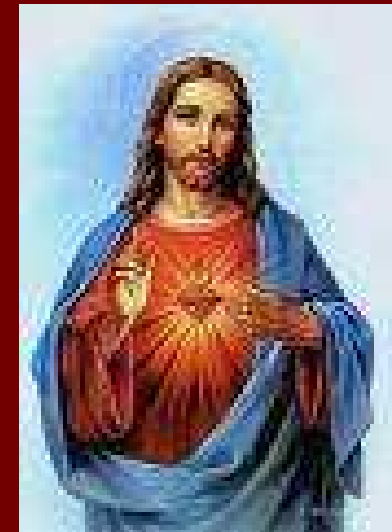
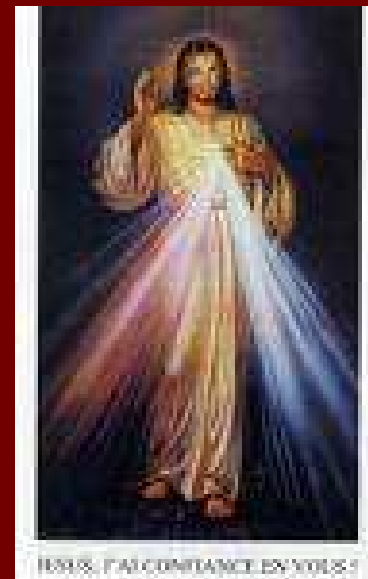


Delusion

- one of the core symptoms of schizophrenia
- frequent and various
- noteworthy for resistance to change
- insensitivity to contradictory evidence

The 3 Christs of Ypsilanti (Milton Rokeach)

- Crazy
- Duped
- Dead persons with machines inside



Big challenge of delusions

Why they persist despite evident proofs of their inaccuracy and negative consequences they engender?

Mechanisms of maintenance of delusions proposed so far

- **cognitive bias against disconfirmatory evidences** (BADE, Moritz & Woodward, 2006)
- **bias in favour of confirmatory evidences** (Freeman et al., 2002)
- **safety seeking behaviors** (Freeman et al., 2001, 2002)

Inensitivity to environment and verbal properties of delusions

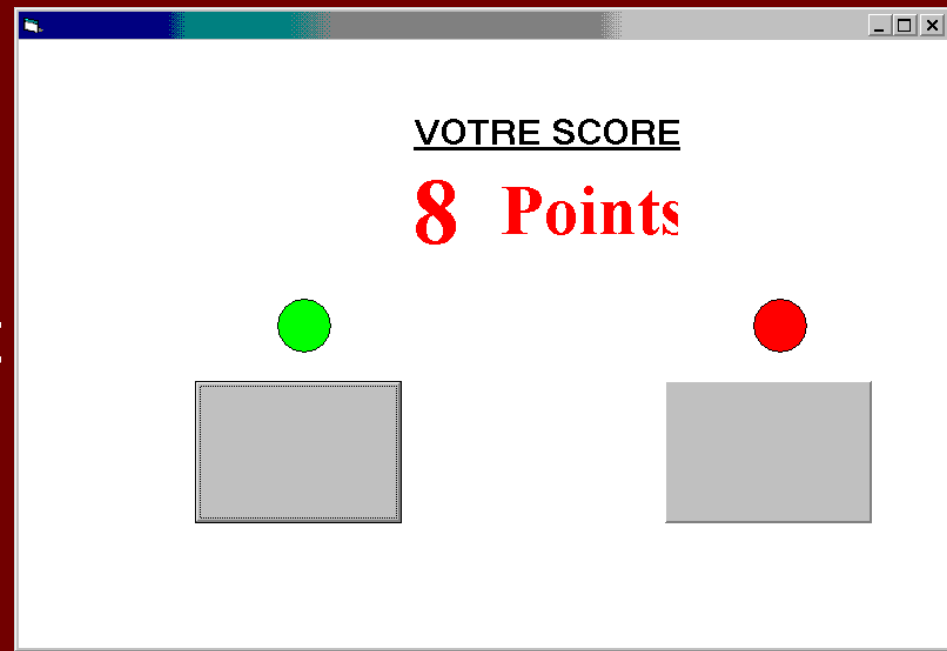
- hypothesis of maintenance of a relationship with the environment for the 3 accounts proposed
 - But resistance to change of delusions suggest insensitivity to the environment
- delusions represent verbal descriptions of the world as it is perceived and understood
 - Delusion = verbal behaviors with their own properties

Delusion and rule-governed behavior (RGB)

- Behavior, either verbal or nonverbal, under the control of verbal antecedents (Catania, 1991)
- RGB = insensitivity to changes in environment (Hayes et al., 1986, Catania et al., 1989, 1990)
- Our hypothesis: delusions are rules that create insensitivity to changes in the environment

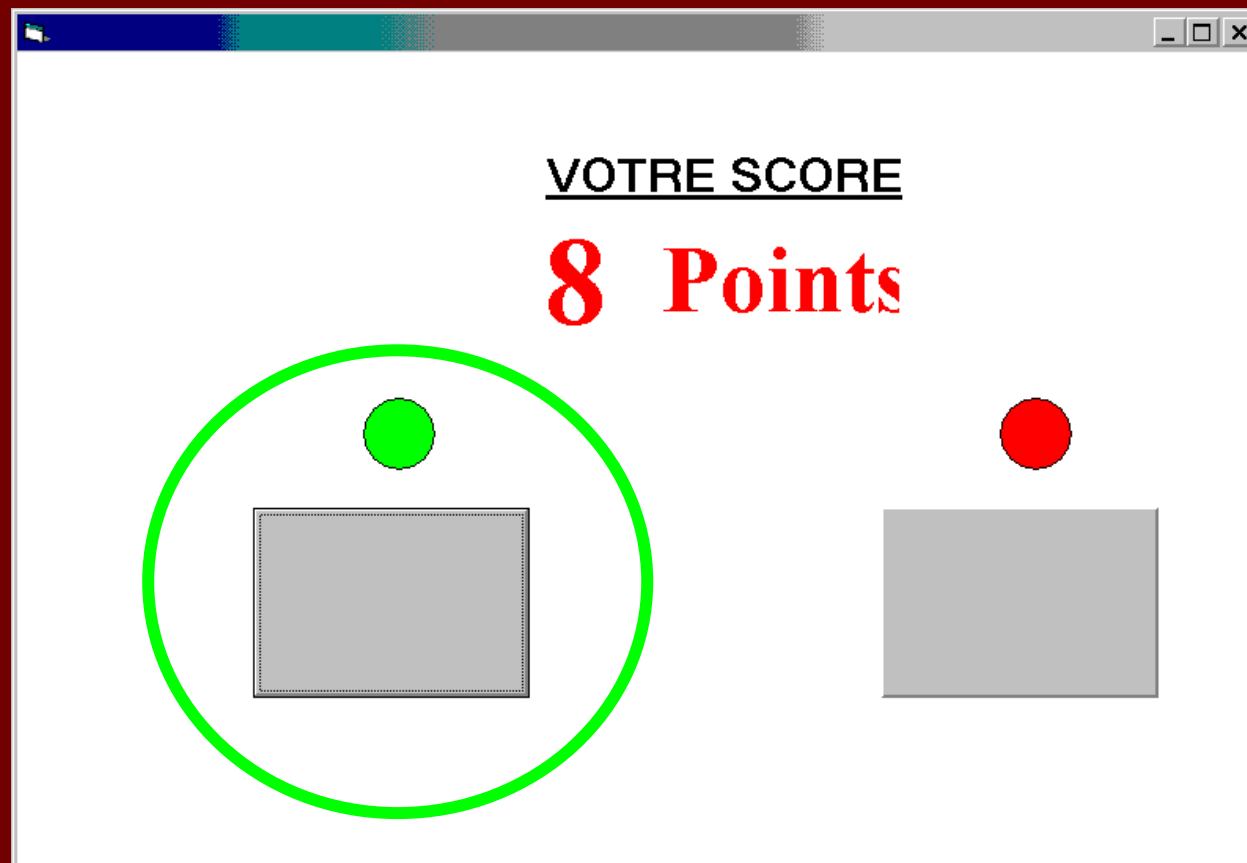
Our experiment

- Multiple schedule
- Presses on space bar
- alternance every 40 sec
- Instructions given or not to the subject



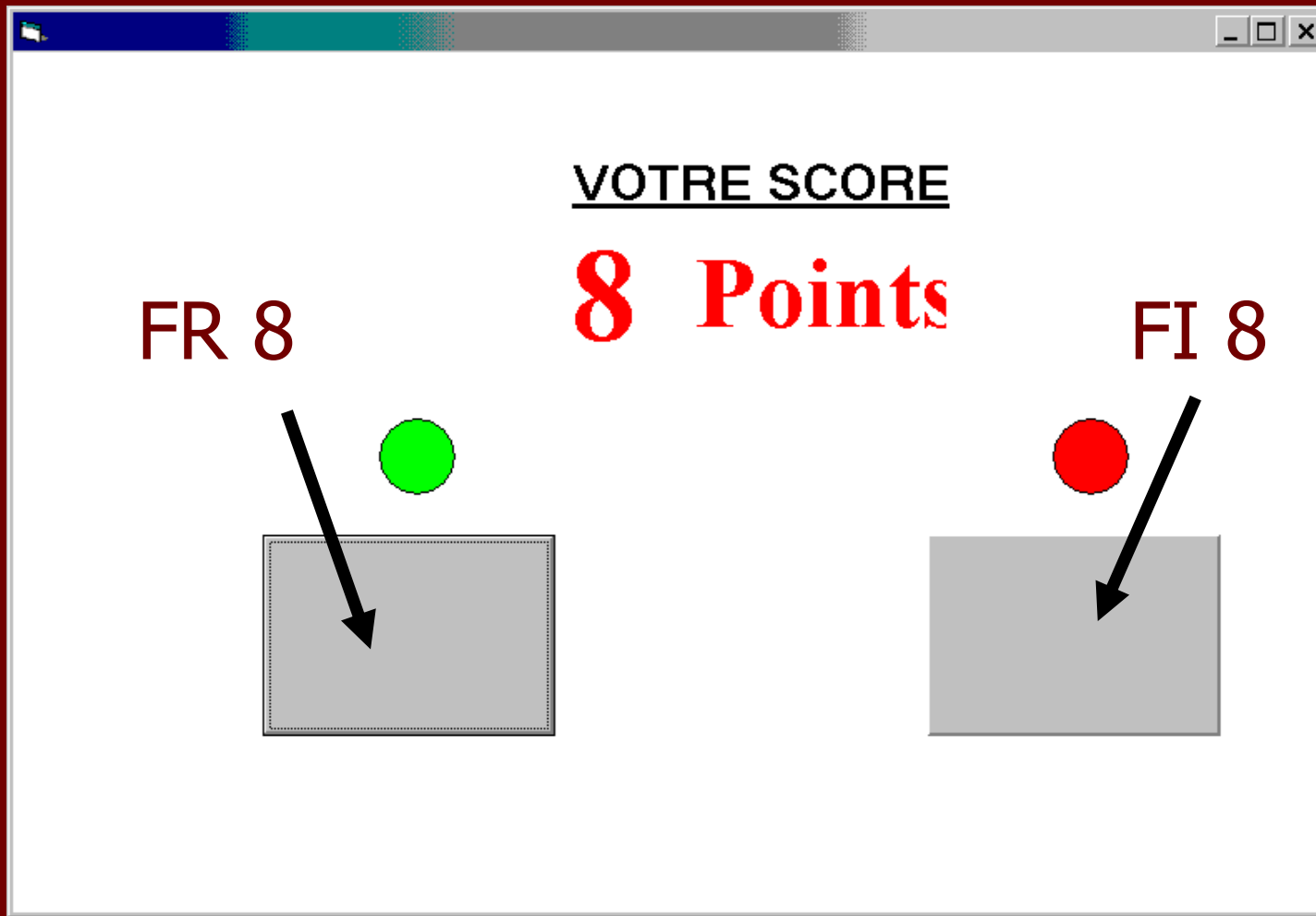
Our experiment

- A) Training phase: only one button
(FR8 – VR8 – FI8 – VI8)



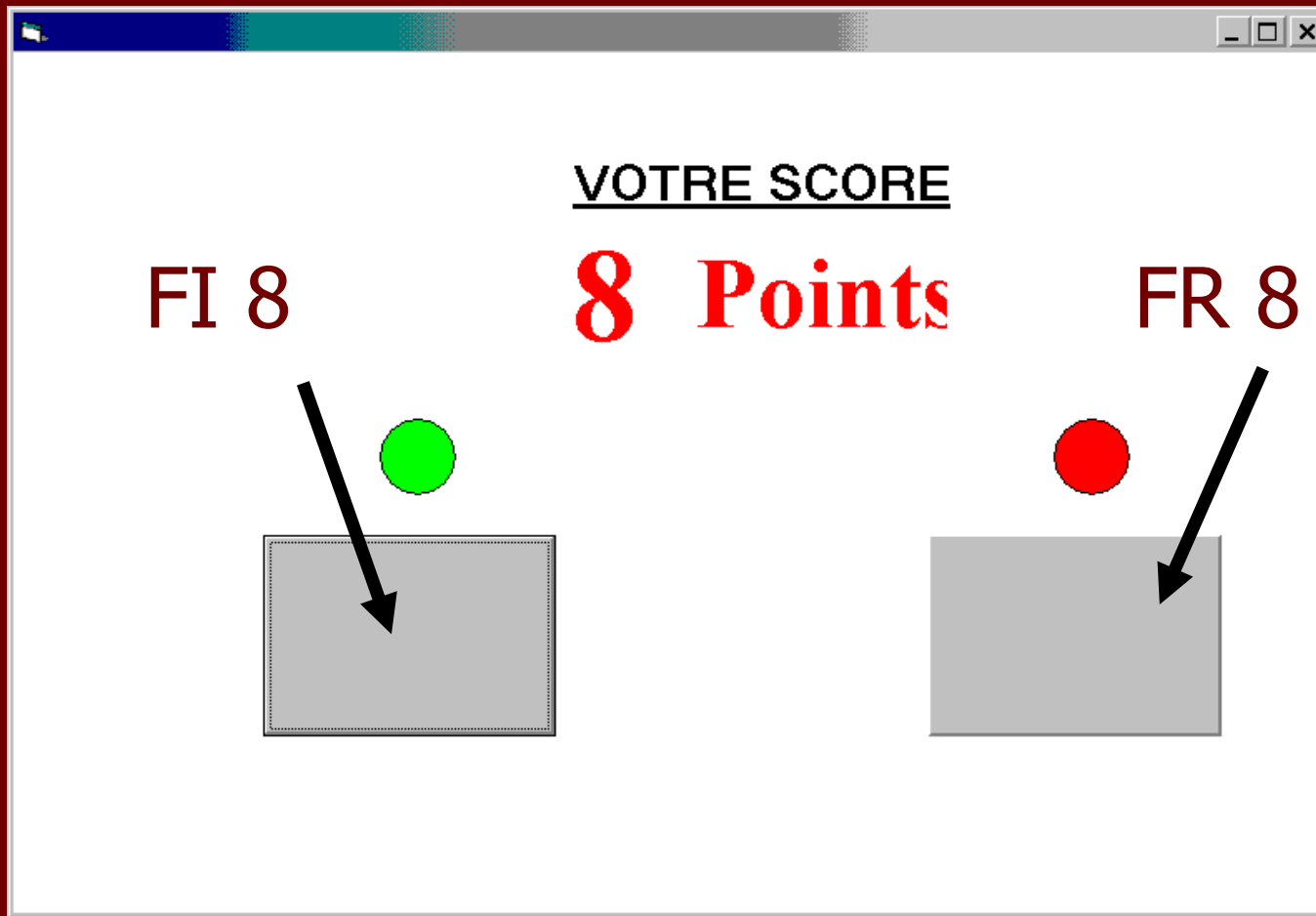
Our experiment

- B) Regular multiple schedule: both buttons, in alternance



Our experiment

- C) Reversed multiple schedule: inversion without any information to the subjects



3 groups

- No Instruction given (NI)
- Instruction on how to earn as much point as possible on each button (WI) (*« Press at a fast rate on left, slow and steady state on right »*), given before regular multiple schedule
- Self-Instruction after regular multiple schedule (SI) (*« To earn as many points as possible on the left button, I must ... »*)
- For control and patients with schizophrenia

Hypotheses

- Patients would become insensitive to changes when given an instruction and when asked to formulate their own instruction, but controls would adapt
- Patients would become more insensitive to changes when asked to formulate their own instruction than when an instruction is given

Results (17 patients, 30 controls)

Training phase

- Patients and control adjust to different schedules (ratios vs intervals)

Schedule	Controls		Patients	
	<i>Mean</i>	<i>Sd</i>	<i>Mean</i>	<i>Sd</i>
FI	508	355	522	286
VI	530	366	531	239
FR	905	371	703	292
VR	797	372	700	319

$$X^2 = 38,65, df=3; p<.05 *$$

$$X^2 = 9.37, df=3; p<.05 *$$

Results

Training phase

- Patients able to discriminate between schedules
($X^2 = 9.1411$, $df=3$; $p<.05$),
in favor of ratio schedules

Results

Multiple schedules:

A difference between FR and FI in regular multiple schedule but not in reversed multiple schedule means insensitivity to changes

Results

- First hypo: Patients insensitive to changes when given an instruction, but controls adapt

Condition	Group	p regular multiple schedule	p reversed multiple schedule
Controls	WI	0.005 *	0.036 *
	NI	0.016 *	0.006 *
	SI	0.005 *	0.005 *
Patients	WI	0.027 *	0.463
	NI	0.224	0.043 *
	SI	0.043 *	0.138

- Controls With Instruction adjusted to changes, whereas Patients With Instruction did not.

Results

- Second hypo: Patients insensitive to changes when build their own instruction, but controls adapt

Condition	Group	p regular multiple schedule	p reversed multiple schedule
Controls	WI	0.005 *	0.036 *
	NI	0.016 *	0.006 *
	SI	0.005 *	0.005 *
Patients	WI	0.027 *	0.463
	NI	0.224	0.043 *
	SI	0.043 *	0.138

- Controls Self Instruction adjusted to changes, whereas Patients Self Instruction did not.

Results

- Third hypo: Patients more insensitive to changes when given an instruction than when formulate their own

Condition	Group	p regular multiple schedule	p reversed multiple schedule
Controls	WI	0.005 *	0.036 *
	NI	0.016 *	0.006 *
	SI	0.005 *	0.005 *
Patients	WI	0.027 *	0.463
	NI	0.224	0.043 *
	SI	0.043 *	0.138

Results

Differences between FR and FI during regular and reverse multiple schedules compared.

- No difference between patients With Instruction and patients Self Instruction (MW = 13; $p > .05$)

Conclusions

- 1st hypo validated: Patients insensitive to changes when given an instruction, whereas controls adapt to changes
- 2nd hypo validated: Patients insensitive to changes when build their own instruction, whereas controls adapt
- 3rd hypo not validated: Patients as insensitive in case of instruction or self instruction

- May provide a mean of understanding the data-gathering bias highlighted by Garety & Freeman (1999).
- Insensitivity observed here could imply that further adaptation to the environment and further rule modification is shut off as soon as a rule is formulated

- can shed light on the influence of bias in favor of confirmatory evidences on maintenance of delusions.
- confirmatory evidences could contribute to strengthen patients' confidence in self-generated rules by reinforcing the process itself.

- results could help to understand why clients present a bias against disconfirmatory evidences even for beliefs that do not touch on delusional themes (Woodward et al.,2008)
- The insensitivity to environment coming from self-instructions could represent a trait for patients with schizophrenia

Discussion

- Delusions are verbal in essence: verbal properties must be taken into account
- Maintenance of delusions may depend on insensitivity of RGB.
- Patients with schizophrenia may present increased rigidity in case of RGB
- CBT focus on what delusion contains. Therapeutical process could be improved by less relying on verbal, i.e. present moment and defusion

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Thanks for your attention

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