

## Introduction

Schizophrenia is associated with disturbance in the sense of continuity of self across time (Danion et al., 2005)

### MENTAL TIME TRAVEL (MTT)

Remembering past events

Projection towards future events

- ❖ "The faculty that allows humans to mentally project themselves backwards in time to re-live, or forwards to pre-live, events (Suddendorf & Corballis 1997)."
- ❖ MTT contributes to develop and consolidate the identity and the sense of individuality.
- ❖ "The representation of self as an entity extended in time is closely related to the ability to remember one's personal past and the ability to project oneself into the future (Wheeler, Stuss, & Tulving, 1997)."

- Genetic and environmental factors are important to explain the causes of schizophrenia > Families studies can lead us to a better understanding of the genetic influence.
  - ↳ the cognitive deficits which have been found in the unaffected biological relatives of schizophrenia patients are similar to those found in these patients > **Those deficits might be putative endophenotypic markers of schizophrenia**.
- Previous studies reported that compared to healthy controls (HC), the relatives show cognitive impairments that are similar but at milder degree than those of schizophrenia patients (Sch). The deficits affect cognitive functions such as verbal memory, attention and executive function.

➤ the interest to take the endophenotypic markers into account

\*Characteristics that mark the presence of a genetic predisposition to a certain disease or disability

No study has assessed the abilities to MTT in the relatives yet despite some deficits in schizophrenia patients:

1. to retrieve specific memories;
2. to project into specific future events;
3. to define their identity in a stable way (which has also been described as fragmented instable or discontinuous in Schizophrenia patients).

➤ the ability to MTT might be a relevant endophenotypic marker

Healthy Subjects > Relatives > Schizophrenia Patients

- on:
- Remembering specific events
  - Projection into future events
  - Identity stability
  - Cognitive functions

## Hypotheses

## Method

Samples

Measures

Means (Standard Deviations)

	Schizophrenia Patients n = 31	Relatives n = 33	Healthy Subjects n = 31	p
Sex	♂: 21 ♀: 10	♂: 8 ♀: 25	♂: 13 ♀: 18	
Age	42.39 (11.37)	52.10 (14.6)	45.45 (11.01)	p=.008
Education Level	12.01 (2.4)	12.9 (2.83)	12.97 (2.24)	p=.31
IQ	94,35 (2,39)	106,45 (2,04)	109,68 (2,12)	p<.001

- Two oral versions of "TeMA" (French version of AMT, Neumann and Philippot, unpublished)

- Future version: participants are ask to generate specific personal events that may occur in the future in response to fifteen cue words;

- Past version: participants are ask to remember specific personal past memories in response to fifteen cue words;

↳ to evaluate MTT

- Cognitive functions measures

- Digit Span Forwards (Wechsler, 1997);
- Digit Span Backwards (Wechsler, 1997);
- Stroop-Color Word Test (Stroop, 1935);
- Trail Making Test – TMT (Spreen & Strauss, 1998).

- Mood Measures

- Beck Depression Inventory II (Beck, 1996) is a self-report inventory used to measure the severity of depression.
- Trait Anxiety Inventory (Spielberger, 1983) is a psychological inventory used to evaluate anxiety in general.

- "Version fonctionnelle unipolaire ultra courte" (unpublished)
- It is an original scale from L.A.B.E.L (Gendre et al., 2000) where the participants can describe themselves;
- 2 parallel versions of the questionnaire that contain 50 adjectives (personality traits) each of them being used;
- A comparison between the 2 versions allows to investigate the identity stability.

## Results

### Identity stability

Means (Standard deviations)

	Schizophrenia Patients	Relatives	Healthy Subjects
Identity Stability	0.67 (0.30)	0.84 (0.13)	0.84 (0.17)

Schizophrenia patients < Relatives = Healthy Subjects

↳ Schizophrenia patients have shown an identity significantly less stable than relatives ( $t(3,92) = 3.2, p = .002$ ) and healthy subjects ( $t(3,92) = 3.15, p = .002$ ).

### Cognitive Functions & Mood

Means (Standard Deviations)

	Schizophrenia Patients	Relatives	Healthy Subjects
Digit Span Forwards	5.61 (1.14)	6.09 (1.28)	6.19 (0.75)
Digit Span Backwards	4.39 (1.23)	4.67 (1.43)	5.55 (1.23)
Interference cue STROOP	0.27 (0.11)	0.28 (0.09)	0.23 (0.08)
STROOP	0.10 (0.31)	0.14 (0.35)	0 (0)
Trail Making Test A part	0.65 (0.87)	0.54 (0.86)	0.25 (0.55)
Trail Making Test B part			
BDI-II	12.87 (9.17)	8.15 (6.46)	6.23 (5.72)
STAI-Y (B)	46.5 (8.94)	41.7 (7.73)	40.48 (8.08)

1. Schizophrenia patients performed significantly less than healthy subjects throughout all cognitive measures;
2. In comparison with healthy subjects, relatives performed less on:
  - ❖ interference cue STROOP
  - ❖ B part from Trail Making Test

As predicted many relatives' scores are situated between schizophrenia patients' scores and healthy subjects' ones, even if the results are not significant.

## Discussion

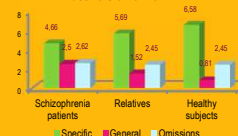
- ❖ Such as previous study, schizophrenia patients performed less on cognitive functions, identity stability and MTT tasks in comparison to healthy subjects.
- ❖ On the contrary to our hypotheses, there was any difference between relatives' performances and healthy subjects' performances as shown by results obtained in this study. There is however two exceptions: (1) interference cue STROOP and (2) B part from Trail Making Test.
  - ↳ Relatives < Healthy Subjects

Before to conclude that MTT is not an endophenotypic marker, some limits from this study have to be pointed:

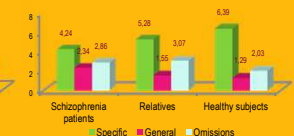
1. The limited sample doesn't enable us to have an adequate statistical power. Similar studies include at least 30 subjects within each group.
2. Our schizophrenia patients and their relatives didn't always come from the same family unit. This is a well known common limit throughout the relative studies.

### MTT

Past version of TeMA



Future version of TeMA



Specific memories Sch < HS

Sch = relatives

HS = relatives

Schizophrenia patients recalled significantly:

1. less specific ( $t(3,92) = 3.32, p < 0.01$ ) and more general ( $t(3,92) = 3.58, p < 0.01$ ) memories than healthy subjects;
2. more general memories ( $t(3,92) = 2.06, p = 0.04$ ) than relatives.

Specific memories Sch < HS

Sch = relatives

HC = relatives

Schizophrenia patients recalled significantly:

1. less specific memories ( $t(3,92) = 3.82, p < 0.01$ ) than healthy subjects;