Erice: *Body, Brain and Personal Identity*

August 2014

From the armchair to the wheelchair

How neuropsychology can inform the philosophy of mind

Marie-Christine Nizzi
Harvard university
mnizzi@fas.harvard.edu

Today's program

Study 1

Paralyzed body, working brain… the self in a locked-in Syndrome.

Study 2

Preserved body, brain in disarray… the self in Alzheimer's disease.

Current research

This special part of my bodily self: face recognition in dementia.

A definition of the self in philosophy

Synchronic self

- at any given moment
- I am a unique individual
- among other members of the same species

Diachronic self

- across time
- I remain the same individual
- despite natural and accidental changes

How personal identity became a problem

Plato's time: what was at stake?

- Epistemology (conceptual knowledge *vs* changes in matter)
- Ontology (sameness through soul)
- Morality (justice and asymptotic progress)

How did it shape our notion of personal identity?

- model is logical identity rather than personal identity
- identity is opposed to any change (Hume)
- dead end of the mind-body problem

Body, brain and personal identity

Memory, the psychological continuity criterion

- Locke: the self extends in time because of memory
- Narrative self as a linear process of accumulation

=> What about people with massive memory loss?

Body, a contingent container for the self

- Thought experiments like the prince and the cobbler
- The mind is the real ground for personal identity

Pb: is the body that secondary to personal identity?

To *be* or to *have*… a body?

This problematic piece of matter…in theory

- Natural changes like cells renewal (Plato, Hume)
- Accidental changes like amputation (Descartes)
- Fictional cases like brain transplant (Shoemaker, Williams, Nozick, Parfit)

Objections to the "armchair" approach… from practice

- Though physicalists, fictional cases rely on a dualist assumption
- They don't tell us much about real patients with massive bodily changes
- Phenomenology from the armchair might get it wrong

➢ Project: Investigate the role of the body **from the wheelchair**
An empirical approach to the experienced bodily self

A new method

- **Real** patients *vs* fictional cases
- **Experienced** identity (sense of self) *vs* objective identity
- Compare predictions from the armchair / patients' reports

➢ We want to determine, in real life, how far someone's body can objectively change and their *experienced identity* be preserved.

Study 1:

Self & Locked-In Syndrome

Jean-Dominique Bauby dictating his book “The diving bell and the butterfly” by blinking to select letters

Why the Locked-In Syndrome?

American Congress of Rehabilitation Medicine, 1995

- Full body paralysis with preserved cognitive functions
- Often results from a vascular accident touching the brain stem
- Communicate using vertical eye movements or blinking
- Preserved sensation so sense of agency rather than sense of embodiment

⇒**Massive bodily change, preserved cognitive functions**

We raise three questions:

(A) Do they feel like the *same* person as before the accident?

(B) Do they recognize these 'new' *bodies* as theirs?

(C) If they do, how do they evaluate their *quality of life* (experienced meaning)?

Psychological research tools

Questionnaire (Likert scale)

- 2 groups: patients/controls (previous studies, ethical issue)
- 3 dimensions:
  - (A) global sense of self: continuous?
  - (B) body representation : accepted?
  - (C) experienced meaning in life: positive QOL?
- 15 pre-selected items (positive/negative, Fiske)
- 4 levels of answer by blinking (totally agree to totally disagree)
- redundant question (reliability)

Based on :

- Quality of Life Test (Mc Gill)
- Coma Science Group questionnaire

Population

Patients' group

44 LIS patients

14 women

Mean age 53 (27 to 75)

Duration of LIS

<10 years: 8

10-15 years:21

>15 years: 15

Control group

20 Medical Doctors

7 women

Mean age 38 (21 to 64)

Communication and scores

Patients' answers

- 1 to 4 blinks for each item

Scores

- 3 partials scores
- 1 global score (sum of the partials)

Interpretation

- Separate positive/negative items
- Ex: "I'm still the same" = positive item (continuity)

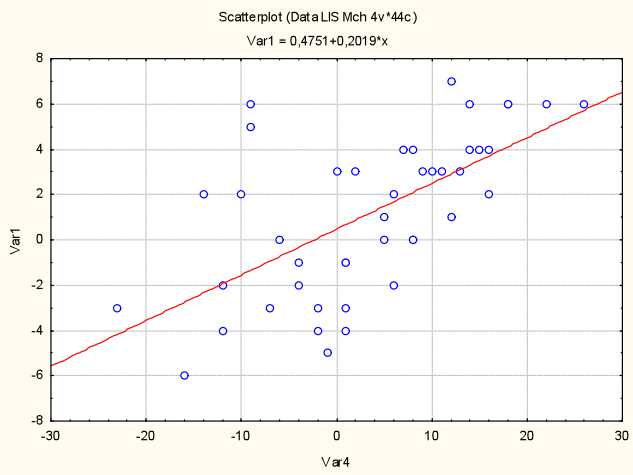
If "totally agree" = +2 / "totally disagree" = -2

❖ **Positive score means identity experienced as continuous**

Results: self in Locked-in Syndrome

- Patients' body representation was:
  - correlated with their sense of self ($\tau = 0.36$, $p < .05$)
  - highly correlated with their quality of life ($\tau = 0.51$, $p < .01$)

- Controls vastly underestimate the importance of body representation in patients' quality of life ($\tau = 0.15$ $p < .01$)

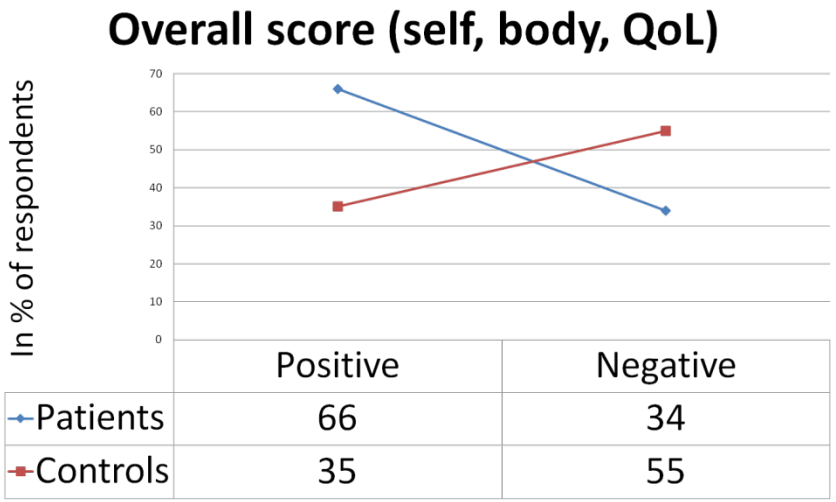


(p < .01)	Patients	Controls
cor self*body	0.36	0.47
cor QoL*body	0.51	0.15

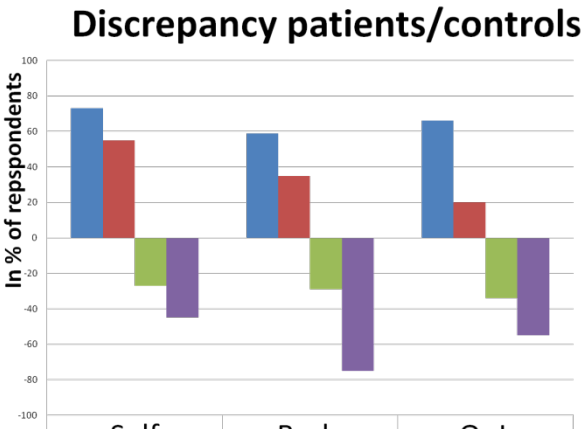
Results: self in Locked-in Syndrome

- Predictions from healthcare professionals' directly contradict patients' reports:

- about how much their body matters to their identity (χ^2= 11.9; p <0.001)
- about their experienced quality of life (χ^2= 10.9; p <0.001)



	Positive	Negative
Patients	66	34
Controls	35	55



	Self	Body	QoL
Patients Pos	73	59	66
Controls Pos	55	35	20
Patients Neg	-27	-29	-34
Controls Neg	-45	-75	-55

Some philosophical conclusions

- Philosophy “from the armchair” gets it wrong
- Identity is preserved in LIS when body representation is positive (i.e. not due to preserved cognitive functions only)
- Importance of the experienced meaning of the person’s condition (narrative self)
- Concept of plastic self: flexible relationship to oneself rather than objective sameness

Applying this research

- A positive body representation would improve the experienced identity and quality of life of fully-paralyzed patients
- Reinforcing physical care, not only for rehabilitation but also for improvement of body representation
- Adapting medical tools to evaluate first-person judgments in non-communicative patients

Study 2:

Self & Alzheimer's disease

Why Alzheimer's disease?

Symptoms:

- Amnesic syndrome affecting episodic memory at early stages (typical presentation)
- Presence of both retrograde and anterograde amnesia
- Temporal gradient affecting recent memories before remote memories

Loss of self?

- Locke (1690), memory necessary to maintain a diachronic self + anterograd.
- Hypothesized progressive and eventually total loss of self (Tappen, 1999; Caddell & Clare, 2010).

Could the body provide some basis for a sense of self when memory fails?

- Recent models have insisted on the role of the body in maintaining a sense of self (Damasio, 1999).

Hypotheses

2 perspectives on the bodily self:

- first person perspective
- third person perspective, in a mirror.

Previous literature:

Impaired self-recognition in the mirror in AD patients (Biringer, 1994).

Studies in developmental psychology have suggested that babies recognize themselves earlier from the first person perspective than in a mirror.

Our hypothesis:

AD patients would show a reverse pattern, with preserved first person perspective after the loss of narrative self and third person perspective.

Method

Questionnaire (Likert scale)

- 4 groups:
  patients mild > moderate > severe and controls

- 3 dimensions:
  (A) autobiographic memory
  (B) mirror self-recognition
  (C) body from first PP

Population

- 60 patients (mean age 82, range 55-96 years; 42 females)
- 20 healthy controls matched in gender and age

Results

Results to part A confirm an expected early drop in autobiographic memory performances, with a significant difference appearing between mild and moderate groups ($U=75.5$, $Z=-3.43$, $p<0.001$).

Performances in part B are preserved longer, with a difference appearing only between moderate and severe groups ($U=132$, $Z=-2.3$, $p=0.018$)

- Mild group no failure,
- Moderate group = 10% failure
- Severe group = 45% failure.
- MMS < 6 (n=8) = 87.5%
- MMS ≤ 5 (n=4) = 100%.

Scores in part C show a gradual decrease, significant between all groups, with lower scores than in part B for all groups.

Lessons to move forward

- The sense of self is supported by a number of different cognitive processes.
- The body can serve as an anchor for the sense of self when memory fails.
- Mirror self recognition shows remarkable robustness, consistent with literature in brain-damaged patients.

- Self face is a particular stimulus: very important and need for update process:
- Study self face recognition over several decades
- Compare with more or less familiar others

Current research:

Self & face recognition in AD and FTD

Protocol Softdad

Population

- 90 patients (30 AD, 30 FTD, 30 controls):
- 2 informants per patient (family member, friend)

Hypotheses

- double dissociation AD/FTD
- episodic memory is responsible for updating the sense of self so that AD patients can make good judgments about their past self but are unable to build a recent narrative self.
- semantic memory is responsible for awareness of personality traits so that FTD patients have an updated narrative self but are unable to correctly assess self-properties.

Protocol Softdad

Part 1: Self-focused neuropsychological evaluation

- Global cognitive efficiency
- Self assessment of personality traits
- Autobiographical memory

Part 2: faces' recognition task

- individualized stimuli for each patient
- 4 categories:
  - (A) 8 pics of patient at 4 time-points
  - (B) 8 pics of spouse and family members at same time-points
  - (C) 8 pics of celebrities
  - (D) 24 foils = unknown
- Have you seen this face before?
- Who is it?

Merci !

I would like to thank:

My current advisors, Ken Nakayama and Christine Moroni
My clinical mentors, Catherine Belin and Steven Laureys
My lab-mates from the Vision Sciences Lab at Harvard University
The Coma Science Group
The ALIS association
The Avicenne Hospital
The Montreuil Hospital
The Montfermeil Hospital

… and all of you for your attention!

Questionnaire

Global sense of self (Part A) => continuous?

- My life has ended the day of the accident
- I'm still the same person
- I changed (values, friends…)
- Despite the handicap, my choices still express who I am
- My personality has changed, sometimes I don't recognize myself

Questionnaire

Body representation (Part B) => accepted?

- This body isn't mine any more, it's not me
- Body is less important as long as the mind still works
- I don't recognize this face as mine
- It's still my body though in a different way
- The real Me is inside, this body has become a jail

Experienced meaning in life (Part C)=> positive?

- I have the feeling that I do not control my life
- I have a richer inner life, I know myself better
- I kept my place in the family life
- Though not directly through my body I still feel active in my life
- I can see the meaning of my actions

Results: self in Locked-in Syndrome

LIS: mean global score is **positive** (3±7 SD)

Controls: mean global score is **negative** (-1±6 SD).

⇒ Significantly more patients reported a continuous experienced identity when compared to controls ($\chi 2=3.8$, $p=0.048$).

By item differences

Four items express a greater difference between patients and controls:

B1, “This body is not mine anymore, it is not me”
(χ^2= 4,6; p = 0,03)

B2,“Body is of secondary importance as long as the mind works”
(χ^2= 11,9; p < 0,001)

C2 “I have a richer inner life, I know myself better”
(χ^2= 4; p = 0,045)

C3, “At home, I keep a role fulfilling my needs and my family”
(χ^2= 10,9; p < 0,001)

By item differences